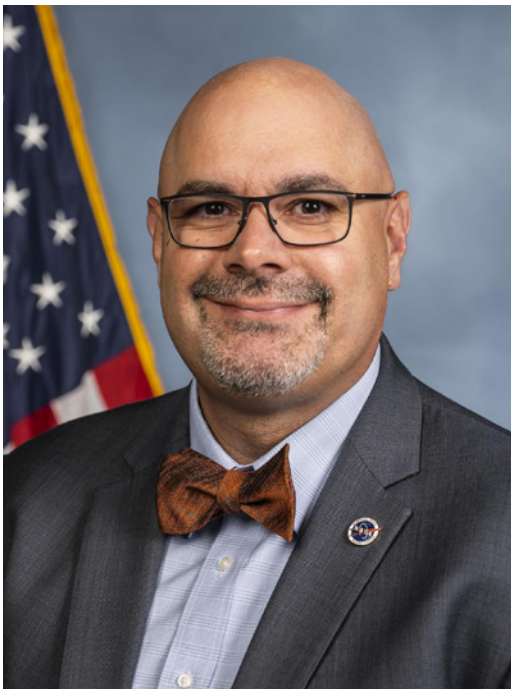
National Aeronautics and Space Administration

MARSHALL SPACE FLIGHT CENTER

MICHOUD ASSEMBLY FACILITY

YEAR IN REVIEW 2024

FROM THE DIRECTORS



MICHOUD EXPERTISE, COMMITMENT ON DISPLAY IN 2024

This has been another tremendous year for NASA's Michoud Assembly Facility in New Orleans. The dedication and resilience of Michoud's workforce have been on full display as we continue assembling the hardware that will propel Artemis missions to the Moon and beyond.

In 2024, we celebrated the successful rollout of the Artemis II SLS (Space Launch System) core stage – a monumental milestone in NASA's journey to return humans to the Moon and go on to Mars. The precision and teamwork required to deliver this critical piece of hardware showcase the expertise and commitment of the Michoud team. You are directly supporting the safe return of the first astronauts to venture beyond Earth's orbit in over 50 years.

We also saw incredible advancements in manufacturing for the SLS rocket's advanced exploration upper stage. To build components for this critical upper stage, new tooling and manufacturing equipment have been installed in Michoud's state-of-the-art production area. The exploration upper stage will power future Artemis missions with enhanced payload capabilities, supporting crew and cargo configurations for SLS Block 1B and Block 2 flights.

As we look to the year ahead, your contributions to building and delivering Artemis hardware remain essential to NASA's Moon to Mars vision. I am proud to work alongside a team defined by excellence, integrity, and an unwavering commitment to safety and inclusion. Together, we are making history and shaping the future of space exploration, for the benefit of all humanity.

Thank you for your remarkable efforts – here's to a successful 2025!

Joseph Pelfrey

CELEBRATING MICHOUD'S 2024 MILESTONES

As we embark on a new year, I'd like to take a moment to congratulate everyone on the milestones reached in 2024 at NASA's Michoud Assembly Facility.

The completion of the Artemis II core stage is no small accomplishment. It is the culmination of years of hard work, dedication, and perseverance. During his visit to Michoud with Artemis II astronaut Victor Glover, NASA's director of the Moon to Mars Program Office, Amit Kshatriya, called Michoud a "cathedral of victory," noting the tremendous amount of success throughout our robust history. It is a true privilege to continue to build on that success with you.

Standing in the company of Artemis II crew members, Reid Wiseman and Jeremy Hansen, and seeing the core stage roll out of our vertical assembly building on July 16 filled me with an indescribable sense of pride; not only in the massive stage before me, but in the people who made it happen. I hope you felt it, too. Without each and every one of you – without the countless hours you put in – we would not be on the cusp of sending humans back into lunar orbit for the first time in over 50 years.

It did not come without its challenges. There were many ups and downs along the way, including yet another storm. Through diligent preparation and response, we emerged from Hurricane Francine with minimal damage and downtime.

In 2024, this team not only rolled out the core stage for Artemis II, but also components for the Artemis II Orion spacecraft. Production of the fifth Orion capsule pressure vessel is well underway as well as flight hardware for the core stages of Artemis III – V. Work continues on installation of tooling and the production of the weld confidence articles, which will soon allow us to begin manufacturing SLS's more powerful exploration upper stage.

I also had the honor of joining NASA's Marshall Space Flight Director Joseph Pelfrey, Josh Cassada, who served as a NASA astronaut at the time (before he retired in October 2024), and other industry leaders for Louisiana Space Day at the Capitol, which gave us the opportunity to demonstrate the vital part we play in the local economy, our workforce development initiatives, and partnerships in STEM education. It was apparent that our legislators and key partners within the state support Michoud and our industry partners and they're proud of the NASA presence as an economic driver in our region.

I am truly honored and humbled to work with this amazing workforce. Thank you for all that you do to make NASA Michoud a great place to work, and I look forward to seeing what we can achieve together in 2025.

With gratitude,
Hansel Gill

On the cover: Michoud rolls out the SLS rocket's core stage for Artemis II.

JAN • FEB • MAR

Michoud Cultivates Future Workforce

Aligned with national efforts to enhance STEM education and workforce readiness, NASA's Michoud Assembly Facility continued to cultivate future innovation and qualified aerospace manufacturing professionals while remaining a key source of employment to the local economy in 2024.

Drawing from a legacy of revolutionizing the practices of manufacturing space hardware in the Apollo and shuttle eras, Michoud has also been home to the National Center of Advanced Manufacturing since 1999. Such collaboration between federal agencies, state legislators and economies, and educational institutions is not unfamiliar today, particularly in the industries required for spaceflight, with efforts at each level working to align with the White House and National Space Council's Space priorities framework.

In 2024, in addition to the enduring programs onsite to actively train and equip workers with the skills necessary to sustain and grow a technically proficient workforce, the factory provided STEM college students—from LSU, Tulane, Loyola, Delgado Community College, and Nunez Community College—tangible insight into advanced manufacturing technologies, space launch capabilities, and the near future of space exploration.

Key legislators and decision-makers, such as the Aerospace States Association and Louisiana Gov. Jeff Landry's policy team, were also afforded the experience of immersion in the facility. Lieutenant governors, delegates, legislators, and tribal government representatives traveled to Michoud for stakeholder tours, on-site events, tours adjacent to nearby events, and NASA-facilitated joint workforce development initiatives.

Continued partnership with Greater New Orleans Inc. and the Louisiana Economic Development enhanced Michoud's ability to take on an impactful role in local initiatives to foster interest, education, and future employment in STEM fields for underrepresented demographics—particularly the economically disadvantaged populations, people of color, and women—often either through active educational engagement or as a backdrop in which conferences and groups can convene to discuss the topics adjacent to Michoud and the general aerospace manufacture-related industries.

Michoud's operations support approximately 2,500 jobs in the Greater New Orleans area, contributing about $507.3 million to the state's economic output. Specifically, within aerospace manufacturing, training and skill development on state-of-the-art equipment allows Michoud to produce space flight hardware for the Artemis campaign using a specialized workforce that draws skilled technicians from the localized pipeline. Educating and training today's students gives them more job proficiency and opportunities for the next generation of the region to meet the evolving demands of the aerospace industry.

Michoud has built all NASA's human space vehicles since 1961, contributing to the success of the Apollo, space shuttle, and now Artemis programs. Through dedicated partnerships in industry and academia to create next-generation technical workers, Michoud can continue to fulfill its mission for another 60 years and beyond.

Michoud Site Recovery Team Receives NASA's Silver Group Achievement Award

The High Voltage Hurricane Ida Site Recovery Team at Michoud was awarded the agency's Silver Group Achievement Award on March 18. The team of seven was recognized for "exemplary employee dedication and perseverance ensuring the safety of site, SLS (Space Launch System) hardware, and personnel" onsite post landfall of the category 4 storm. Immediately after Ida's landfall, the team methodically and safely energized the 6 Mega Watt emergency generator while procedurally transferring power to the facility's east and west master substations. The transfer provided critical power to the rocket factory's final assembly area while and provided essential power for SLS purges for Engine Section and Clean Work Areas to ensure the safety of flight hardware components.

STEM Outreach Provides Career Exposure, Inspiration to New Orleans Youth

Building on NASA's long-standing commitment to STEM education and outreach, Michoud engaged with more than 1,000 local youths throughout 2024. Through tour opportunities, career fairs, special events, and engagements, students from elementary to graduate school were exposed to potential career paths at Michoud and the greater aerospace industry.

While the facility is closed to the public, Michoud's STEM initiatives allow students and teachers from the surrounding region to attend tours of the rocket factory on a case-by-case basis. In 2024, students and teachers funneled through "America's Rocket Factory," with an opportunity to view SLS (Space Launch System) rocket core stage production spanning Artemis missions II through V. Additionally, students had the opportunity to glimpse the Orion V crew module in production along the route.

Team members from Michoud's Strategic Communications team conduct the STEM tours, carefully planning and tailoring each experience to the group's age and interest. While younger students were given a brief history and a production overview during their visits, older students with specific interests such as robotics, manufacturing, or engineering received a more detailed discussion with occasional input from subject matter experts.

In addition to onsite tours, Michoud leadership and employees supported multiple career fairs at local schools throughout the year, engaging with more than 800 students. Using videos, presentations, models, and educational material, team members demonstrated the facility's critical role in the Artemis campaign, and the various jobs that support the herculean effort. The career fairs also afford students, who may not be inclined toward a STEM career, the opportunity to explore some of the many other professions at Michoud and other NASA centers.

Special events such as Louisiana Space Day at the Louisiana State Capitol in May and Lockheed Martin's Space Day in October provided unique opportunities for students who were able to interface with Marshall and Michoud Leadership, key stakeholders, and prime contractors, as well as a NASA astronaut supporting the events. Other engagement opportunities for Michoud staff in 2024 included NASA Day in the Park in Huntsville in June, Space Day in the Bay in November hosted by Partners for Stennis & Michoud, and Greater New Orleans Inc's Women in STEM program.

Youth within the Greater New Orleans area also benefit from NASA's regional STEM Office at the nearby Stennis Space Center.

APR • MAY • JUN

Michoud All-Hands Provides Updates, Introductions to New Leadership and Initiatives

Michoud Director Hansel Gill held an All-Hands meeting for team members April 24. The meeting was the first formal all-hands for Gill since officially taking on his new role earlier in the month. Michoud civil servants and direct support employees attended the event, which included updates on hardware production and infrastructure improvements and repairs, as well as discussions on Michoud's culture. During the all-hands, Gill introduced the "Michoud Ambassadors" from Marshall's Center Action Team to speak on NASA 2040 and other future initiatives before opening the floor to questions.

Marshall, Michoud Leadership Join Industry at State Capitol for Louisiana Space Day 2024

Michoud, leading aerospace companies, and Greater New Orleans Inc. (GNO) hosted Louisiana Space Day 2024 at the Louisiana State Capitol in Baton Rouge on May 8. NASA, along with commercial and educational partners emphasized Louisiana's contribution to space exploration, the critical impact the industry has on the state's economy, as well as the importance of STEM education to maintain a skilled workforce. NASA Marshall Space Flight Center Director Joseph Pelfrey, Michoud Director Hansel Gill, and NASA astronaut Josh Cassada met with Louisiana Gov. Jeff Landry, and Lt. Gov. Billy Nungesser, presenting them with certificates of appreciation to the state and joined Louisiana Legislators for the reading of the Louisiana Space Day 2024 proclamation and resolutions. Other activities included a chat with Cassada at the state library for area middle-school, high-school, and college students, followed by a workforce development panel, which featured speakers from Boeing, GNO, and directors Pelfrey and Gill.

Hansel Gill, Keith Savoy Take Reigns at Michoud

Hansel Gill was named as director of NASA'S Michoud Assembly Facility in April. Gill, having served as deputy director from 2021-2023, took over as acting director in January following the retirement of former director, Lionel "Lonnie" Dutreix, at the end of 2023. Keith Savoy, Michoud's former chief executive officer (2022-2024), was selected as deputy director in June. He previously served as manager of the Office of Center Operations of Michoud from 2016-2022. Gill and Savoy now manage the day-to-day operations of the 829-acre site.

Michoud Workforce 'Goes Green' in Celebration of Earth Day

Team members at Michoud marked Earth Day 2024 on April 22 by planting satsuma trees and small plants near administrative and office buildings. Nearly 50 employees from NASA, Boeing, Lockheed Martin, Syncom Space Services (S3), Textron, and various other contractors worked together to weed flower beds and pick up litter and debris around the 829-acre site on Earth Day.

JUL • AUG • SEPT

Michoud Marks Artemis II Milestone with Employee Event Featuring NASA Astronaut Victor Glover

On July 15, Moon to Mars Program Deputy Associate Administrator Amit Kshatriya and NASA astronaut Victor Glover spoke to the Michoud workforce as part of a Space Flight Awareness event marking the completion of the core stage for Artemis II. The core stage rolled out of Michoud's rocket factory July 16 and was shipped to Kennedy, where integration with the Orion spacecraft and the remaining components of the SLS (Space Launch System) rocket is underway.

From One Crew to Another: Artemis II Astronauts Meet NASA Barge Crew

Members of the Artemis II crew met with the crew of NASA's Pegasus barge prior to their departure to deliver the core stage of the SLS rocket to the Space Coast. Glover, NASA astronaut and pilot of the Artemis II mission, met the crew July 15. NASA astronaut Reid Wiseman, commander, and CSA (Canadian Space Agency) astronaut Jeremy Hansen, mission specialist, visited the barge July 16 shortly before the flight hardware was loaded onto it. Pegasus, which was previously used to ferry space shuttle external tanks, was modified and refurbished to ferry the SLS rocket's massive core stage and is now used to transport critical hardware between the agency's Michoud, Stennis, Marshall, and Kennedy centers.

Michoud Ships, Delivers Artemis II Moon Rocket Core Stage for First Crewed Flight

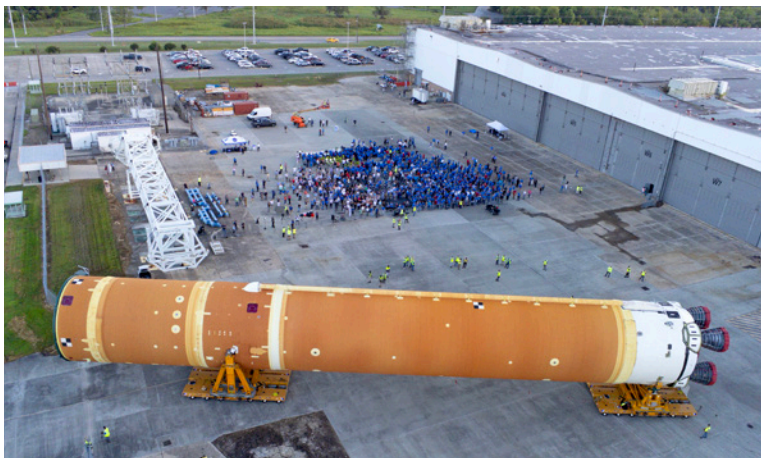
Michoud rolled out the SLS (Space Launch System) rocket's core stage for its Artemis II crewed test flight July 16. Flanked by move teams from NASA and Boeing, the SLS core stage lead contractor, the 212-foot-tall rocket stage was sent off on its 1.3-mile journey to the agency's Pegasus barge with customary New Orleans fanfare.

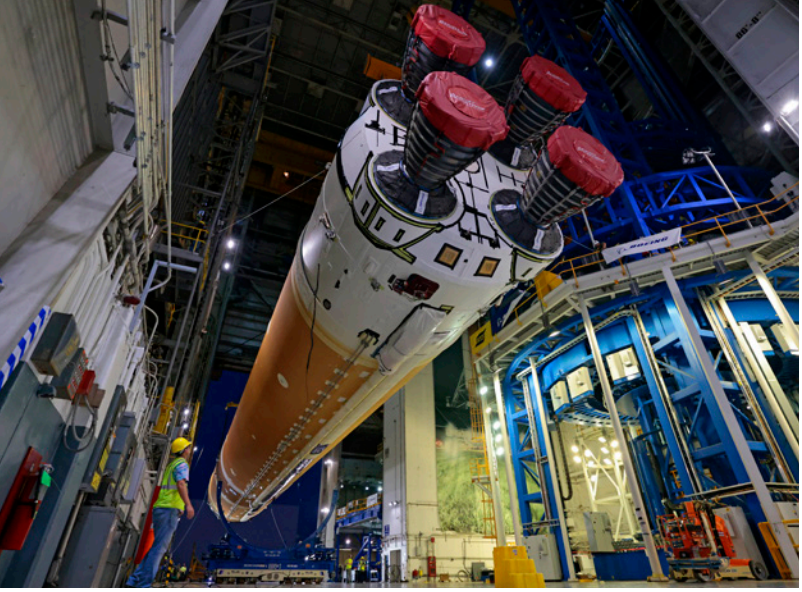
On the 55th anniversary of the launch of Apollo 11, an estimated 750 attendees were on hand to celebrate the first fully assembled Moon rocket stage for a crewed mission since the Apollo Program. It was a key milestone for NASA's Artemis campaign, which will return humans to Moon to establish a long-term presence. Gathered among the workforce were suppliers, stakeholders, legislators, members of the media from around the world, and "The Roots of Music" marching band, who played local jazz favorites to mark the occasion.

The event included remarks from SLS Program Manager, John Honeycutt; leadership from Boeing and lead RS-25 engines contractor Aerojet Rocketdyne, an L3Harris Technologies company; and Artemis II astronauts Reid Wiseman and Jeremy Hansen, as well as a military flyover provided by the Louisiana Air National Guard's 159th Fighter Wing – "Bayou Militia."

Following the scheduled program and a "family photo" with the core stage, legislators, key stakeholders, and media were offered the opportunity to tour the rocket factory where flight hardware for Artemis III – V, Orion V, and test articles for the exploration upper stage are all in production. At the same time, media were invited to interview Marshall and Michoud leadership, SLS program managers and subject matter experts, as well as Wiseman and Hansen.

The core stage continued its way to Michoud's deep water port where teams secured the stage for its next day departure to NASA's Kennedy Space Center. After eight days and more than 900 miles, the Artemis II core stage arrived at Kennedy where SLS, the Orion spacecraft, and the launch abort system are being integrated, stacked, and readied for launch.





Production at Michoud Continues with Hardware for NASA's Artemis III, IV, and V Missions

Having celebrated the completion and sendoff of the core stage for NASA's Artemis II SLS (Space Launch System) rocket July 16, teams at Michoud continue work on hardware for future missions.

Artemis II

- Lockheed Martin completed and shipped the spacecraft adapter jettison panels to Kennedy in late 2024.

Artemis III

- SLS's prime contractor, Boeing, has completed structural production on all major components for the core stage for Artemis III.
- Teams have loaded the forward ring for the core stage's forward skirt into the vertical assembly center where it will be friction-stir welded before also joining the forward skirt's aft ring.
- The liquid oxygen tank has successfully passed proof testing and has been cleaned in preparation for primer and thermal protection system application.
- Internal work on Artemis III's intertank continues, while externally, priming and thermal protection system applications are complete.
- The liquid hydrogen tank has successfully passed proof testing and has been cleaned and primed. Application of the thermal protection system is underway.
- The Artemis III boat-tail structure was shipped to Kennedy on Aug. 28. There it will be integrated with the Artemis III engine section, which was completed at Michoud and shipped to Kennedy in 2022.

Artemis IV

- Production of AVCOAT blocks for the Artemis IV heat shield continues at Michoud by Orion prime contractor, Lockheed Martin.
- In late August, the structurally completed engine section was shipped to Kennedy for continued production.
- Teams are continuing internal work for the Artemis IV intertank, while the barrels and domes, which make up the core stage's propellant tanks are complete and awaiting assembly.

Artemis V

- The engine section for Artemis V is in production in Michoud's vertical weld center.
- Lockheed Martin has completed five of the seven welds needed to construct the crew module pressure vessel.

OCT • NOV • DEC

Michoud Continues Regional Manufacturing Partnership

Michoud and Greater New Orleans Inc. (GNO Inc.) hosted the second Regional Aerospace & Advanced Manufacturing Partnership (RAAMP) conference on Dec. 10. The initiative was established in 2023 to bring together federal government agencies, private industry, higher education, and training groups to align with the National Space Council's priorities, an extension of the White House's space policy.

Covering Southeast Louisiana, RAAMP promotes aerospace STEM efforts to inspire and create opportunities to train and employ future aerospace workers, particularly in underserved communities, by uniting industry and educational partners. Its overall goal is to keep business and people in the region, which will create a pathway of employment to the gates of Michoud.

To further collaboration and open dialogue, this year's RAAMP schedule included three panel discussions: an aerospace and advanced manufacturing industry panel, a workforce development panel focused on training and education opportunities, and a two-student spotlight to discuss the experiences utilizing these initiatives. Following opening remarks from Michoud Director Hansel Gill and GNO Inc. President Michael Hecht, a program overview of the previous year led into the panels. Leaders from Boeing, Vivace, and Laitram comprised the industry panel, followed by discussions with representatives of the city of New Orleans' Career Center, Louisiana Economic Development, and Chalmette High School's Career and Technical Education Office.

In 2025, GNO Inc. intends to increase the active pace of RAAMP events and engagement. Plans for an industry-driven roundtable, partnership meetings, career fairs, and marketing campaigns promoting advanced manufacturing in and around New Orleans are all initiatives that have been established for the coming year. Such initiatives will prove critical as the demands of the ongoing efforts to manufacture the Artemis III, IV, and V's components expand at Michoud, ushering in a new chapter of deep space exploration for NASA and humanity's spaceflight capabilities.

Michoud Continues Work on Evolved Stage of SLS Rocket for Future Artemis Missions

Manufacturing equipment that will be used to build components for NASA's SLS (Space Launch System) rocket for future Artemis missions is being installed at Michoud. The novel tooling will be used to produce the SLS rocket's advanced exploration upper stage, or EUS, in the factory's new manufacturing area. The EUS will serve as the upper, or in-space, stage for all Block 1B and Block 2 SLS flights in both crew and cargo configurations. In tandem, NASA and Boeing, the SLS lead contractor for the core stage and exploration upper stage, are producing structural test articles and flight hardware structures for the upper stage at Michoud and Marshall. Early manufacturing is already underway at Michoud while preparations for an engine-firing test series for the upper stage are in progress at nearby Stennis Space Center.

Michoud Gets Rare Visitor

The Oort Cloud comet, called C/2023 A3 Tsuchinshan-ATLAS, passed over Southeast Louisiana near Michoud on Oct. 13. The comet made its first appearance in documented human history; it was last seen in the night sky 80,000 years ago. The Tsuchinshan-ATLAS comet made its first close pass by Earth in mid-October and remained visible to viewers in the Northern Hemisphere just between the star Arcturus and planet Venus through early November. Eric Bordelon, a NASA photographer at Michoud, captured the image, which was featured as NASA's image of the day. "On Sunday evening I decided to head out to find the comet I've read so much about," Bordelon said. "Struggling at first to see it, once my eyes adjusted to the darkness, I could faintly see it. I pulled my camera out and set up a tripod, with a longer exposure around six seconds I was able to capture this shot with a single frame. The far-off setting Sun made a beautiful color gradient in the dark sky with the other stars just beginning to appear."

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