



NASA's Michoud Assembly Facility

'America's Rocket Factory' Builds Future in Space

A Brief History

Michoud's history dates back to the 1700s when it was part of a French Royal land grant and later became the site of a sugar cane plantation and refinery operated by Antoine Michoud. The U.S. government purchased the land in 1940 and built a production facility to manufacture cargo aircraft, tank engines and more. NASA acquired the facility in 1961.

For more than 60 years, NASA's Michoud Assembly Facility in New Orleans, Louisiana, has been "America's rocket

factory," the nation's premiere site for manufacturing and assembly of large-scale space structures and systems. The government-owned manufacturing facility is one of the largest in the world, with 43 acres of manufacturing space under one roof—a space large enough to contain more than 31 professional football fields. Michoud is managed by NASA's Marshall Space Flight Center in Huntsville, Alabama, with several areas of the facility used by commercial firms or NASA contractors.



An aerial view of the main building at Michoud Assembly Facility, which features more than 43 acres of advanced manufacturing under one roof and convenient interstate, railway and port access. (NASA/MSFC/MAF)

NASAfacts

Michoud Today

Michoud is manufacturing and assembling the largest rocket stage NASA has ever constructed: the Space Launch System (SLS) core stage—the world’s most powerful rocket that will send the Orion spacecraft, astronauts and supplies on bold exploration missions to the Moon and beyond.



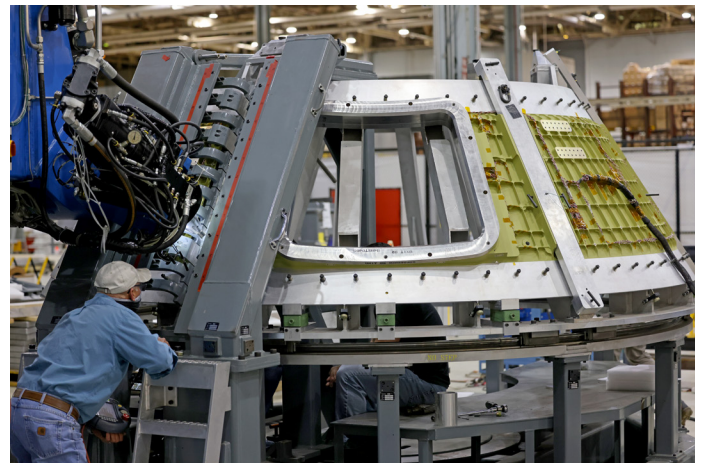
Crews moved the flight hardware for the first Artemis mission to NASA’s Pegasus barge on Jan. 8 in preparation for the core stage Green Run test series at NASA’s Stennis Space Center near Bay St. Louis, Mississippi. (NASA/MSFC/MAF)

Michoud workers, led by prime contractor The Boeing Co., headquartered in Chicago, Illinois, are building the SLS core stage, the largest part of the 322-foot-tall rocket, for all of the SLS rockets. Towering at 212 feet tall with a diameter of 27.6 feet, the SLS core stage will be the largest rocket stage ever flown. It will store 733,000 gallons of super-cooled liquid hydrogen and liquid oxygen to fuel the four RS-25 engines which power the rocket. Aerojet Rocketdyne of Sacramento, California, is the prime contractor for the RS-25 engines.

Michoud’s state-of-the-art manufacturing and welding equipment—including a friction-stir-welding tool that is the largest of its kind in the world—make it possible to build several core stages simultaneously. Each core stage’s major structures are built with the large welding machines, then outfitted with avionics, thermal protection systems, propulsion systems and other internal hardware. Finally, the structures are assembled, and the four RS-25 engines are added to form the entire core stage. During launch, the RS-25s produce more than 2 million lbs. of thrust.

The core stage for Artemis I has been delivered to NASA’s Kennedy Space Center in Florida where it is being prepared for the first integrated flight of SLS and the Orion spacecraft. SLS will provide the power to send the un-crewed Orion spacecraft 280,000 miles beyond the Earth, farther than any spacecraft built for humans has ever flown. At Michoud, teams are constructing the core stages for three more SLS rockets, including Artemis II, the first mission that will send astronauts to lunar orbit. Michoud’s large manufacturing space, along with advanced tooling and equipment, has enabled construction of the first hardware for the Exploration Upper Stage (EUS), a more powerful upper stage that will be used with the evolved Block I B configuration of the SLS rocket. The EUS will provide the power to send larger and heavier payloads to the Moon and Mars.

Orion’s large structures and composites are being manufactured at Michoud by prime contractor Lockheed Martin of Bethesda, Maryland. These structures include the Orion crew module pressure vessel and its underlying framework, designed to ensure a sealed life support environment. Fabrication and development of the launch abort



Technicians from Orion prime contractor Lockheed Martin have welded together three cone-shaped panels on Orion’s crew module for the Artemis III mission. (NASA/MSFC/MAF)

system is also underway at Michoud by Lockheed Martin. This system is positioned on a tower atop the crew module and can activate within milliseconds to propel the vehicle to safety and position the crew module for a safe landing.

To help realize these next-generation spacecrafts, Michoud is building on its long legacy of successful

fabrication and manufacturing of large, complex hardware for NASA flight programs. During the Apollo Program in the 1960s, workers at Michoud built the first stages of the Saturn IB and Saturn V rockets, which took America's astronauts first to low-Earth orbit and then on to the Moon. In the decades after Apollo, Michoud was home to manufacturing of the 15-story-tall external tanks, the largest space shuttle elements, which carried the fuel for 135 shuttle flights from 1981-2011. Experience and expertise gained while building the Saturn stages and the space shuttle external tanks benefit SLS core stage development and manufacturing.

Facilities and Capabilities

Situated on 829 acres of land, the Michoud Assembly Facility features more than 2 million square feet of manufacturing space, and more than 300 acres of green space for expansion. The site includes numerous open, high-bay areas, an extensive overhead crane network and the

45,000-square-foot Vertical Assembly Center, the world's largest robotic tool for building rockets, for the integration and stacking of large-scale structures. Its list of state-of-the-art manufacturing capabilities includes friction stir welding, non-destructive evaluation, high-gantry machining centers, 40,000-square-foot machine shop, build to print part/component fabrication, component processing facility and much more.

The facility also has interstate highway access, and a port on the Intracoastal Waterway connecting Michoud to the Mississippi River and Gulf of Mexico for transportation of manufactured space hardware. NASA's barge Pegasus, maintained at Michoud, has been modified to transport large SLS elements such as the core stage—the largest piece of hardware NASA has ever moved by barge.

Michoud's location allows the agency and its tenants to take advantage of leading-edge manufacturing, welding, fabrication and material evaluation



The Pegasus barge, originally used during the Space Shuttle Program, has been redesigned and extended to accommodate the SLS rocket's massive 212-foot-long core stage - the backbone of the rocket. (NASA/MSFC/MAF)



Experience and expertise gained while building the Saturn stages (above) and the space shuttle external tanks (below) benefit SLS core stage development and manufacturing.



techniques developed by NASA and its academic and industry partners. Michoud is a multi-tenant community, an example of successfully operating large, government-owned facilities by sharing space with other government and commercial tenants. Since the space shuttle era, the facility has seen a 60-percent reduction in operating costs.

Approximately 3,500 people are employed on-site, including government civil-service workers, contractor employees and tenants. Michoud's tenants include aerospace contractors, other government agencies and commercial firms. The National Center for Advanced Manufacturing—a partnership among NASA, the state of Louisiana, Louisiana State University in Baton Rouge and the University of New Orleans—also calls Michoud home.

For more information about Michoud and its role in the nation's space program, visit:

<http://www.nasa.gov/centers/marshall/michoud>

For more information about NASA's Space Launch System, visit:

<https://www.nasa.gov/sls>

For more information about NASA's Orion Spacecraft, visit:

<https://www.nasa.gov/exploration/systems/orion/index.html>

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