National Aeronautics and Space Administration

NASAfacts

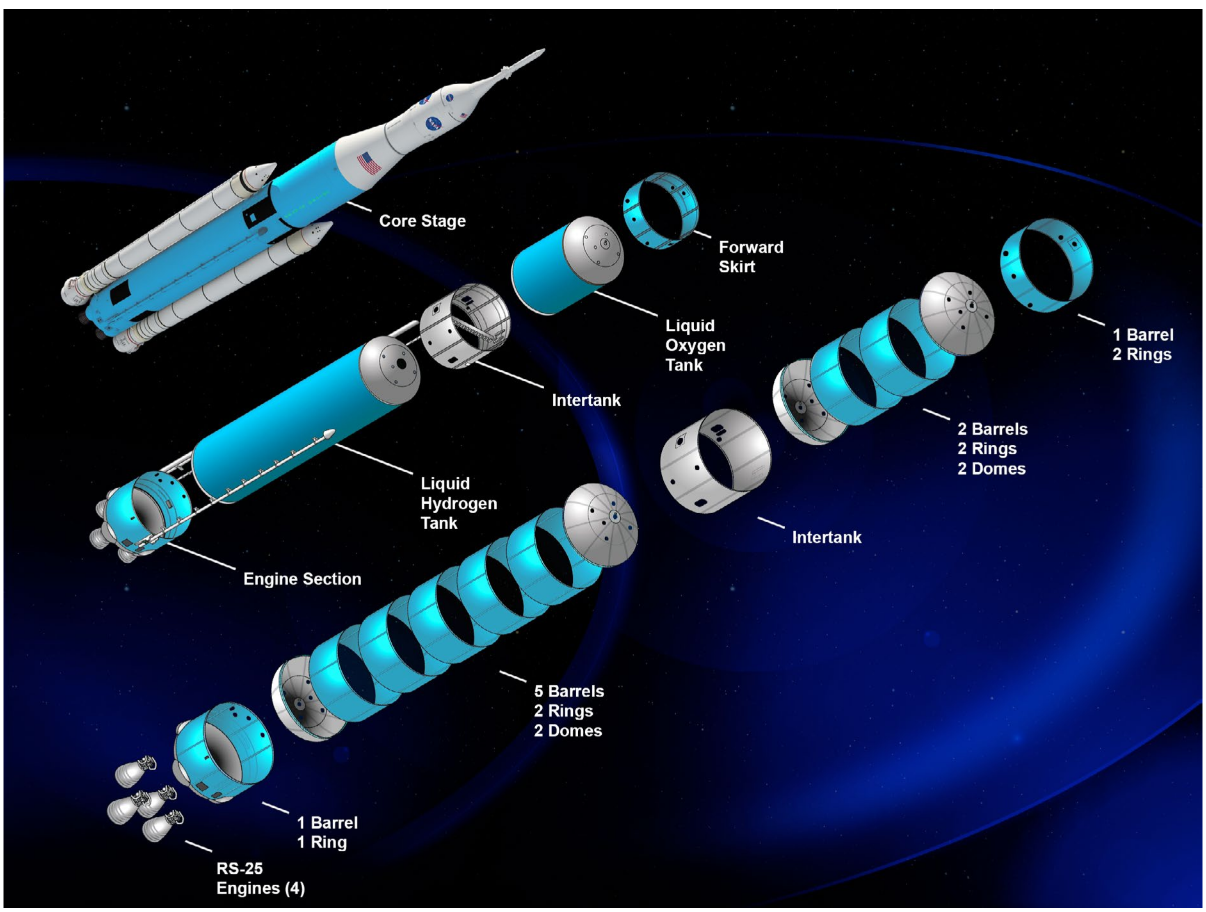
Space Launch System Core Stage

NASA's Space Launch System (SLS) core stage, towering more than 200 feet tall with a diameter of 27.5 feet, will store cryogenic liquid hydrogen and liquid oxygen that will feed the vehicle's RS-25 engines. SLS is an advanced, heavy-lift launch vehicle that will provide an entirely new capability for science and human exploration beyond Earth's orbit.

The core stage is being built at NASA's Michoud Assembly Facility in New Orleans using state-of-the-art manufacturing equipment. Michoud is a unique advanced manufacturing facility where NASA has built spacecraft components for decades—most recently, the space shuttle's external tanks.

The Boeing Company of St. Louis is the prime contractor for the SLS core stage, including its avionics.

Propulsion for the SLS core stage will be provided by four RS-25 engines. The RS-25 engine design was previously designated the space shuttle main engine and is built by Aerojet Rocketdyne of Sacramento, California. As part of the Space Shuttle Program, these engines operated with 100 percent mission success during 135 missions. The SLS Program is adapting an inventory of 16 RS-25 flight engines, including the development of a new electronic engine controller based heavily on the development experience with the J-2X engine.



The B-2 test stand at NASA's Stennis Space Center near Bay St. Louis, Mississippi—originally built to test Saturn rocket stages that propelled humans to the moon—is being completely renovated to test the massive SLS core stage in late 2016 and early 2017. The core stage will be installed on the stand for propellant fill and drain testing and two hot fire tests.

The core stage also will house the vehicle's avionics and flight computer. Flight computer software development is underway at NASA's Marshall Space Flight Center in Huntsville on engineering development units for the core stage. Developmental hardware and software early integration is also ongoing to mature rapidly and ensure implementation of safe, highly reliable avionics and software on SLS. All avionics components have completed their preliminary design review (PDR), and many have completed critical design review.

SLS's first flight test, will feature a configuration for a 77-ton (70-metric-ton) lift capacity and carry an uncrewed Orion crew capsule beyond the moon. The SLS will evolve to a two-stage launch vehicle using the core stage and will provide a lift capability of 143-ton (130-metric-ton) to enable more complex missions beyond low-Earth orbit and support deep-space exploration to an asteroid and to Mars.

Core Stage Facts

Length	Approximately 212 feet (64.6 meters)
Diameter	27.6 feet (8.4 meters)
Empty Weight	Approximately 188,000 lbs (85,275 kg)
Material	Aluminum 2219
Number of Engines	Four RS-25

In July 2014, the core stage passed its Critical Design Review—a major milestone for the program which proves the first new design for SLS is mature enough for production.

Marshall manages the SLS Program for the agency. SLS will be the most powerful rocket in history and is designed to be flexible and evolvable to meet a variety of crew and cargo mission needs.

Vertical Assembly Center (VAC)

Enhanced Robotic Weld Tool (ERWT)

Segmented Ring Tool (SRT)

Vertical Weld Center (VWC)

For more information on SLS, visit:

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