NASAfacts

SLS (Space Launch System) Solid Rocket Booster

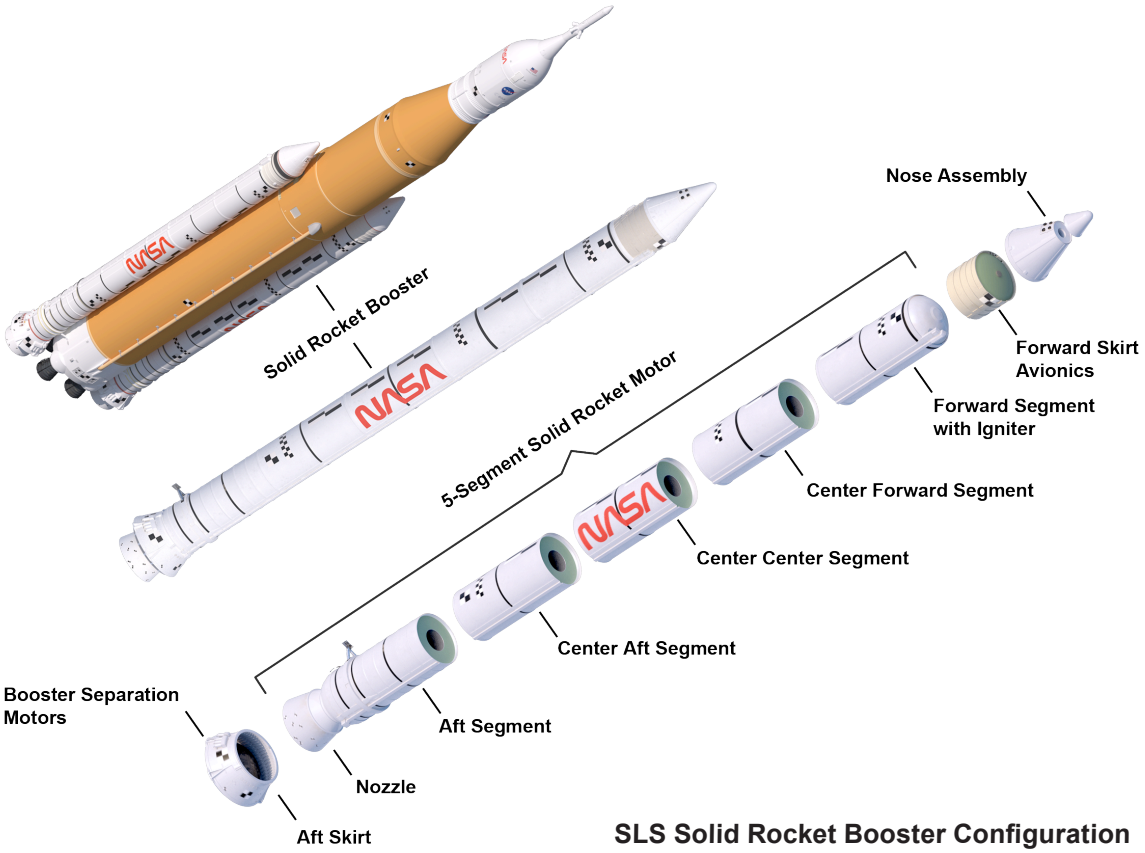
NASA's SLS (Space Launch System) solid rocket booster is based on three decades of knowledge and experience gained with the space shuttle booster and improved with the latest technology.

SLS is the only rocket that can send the Orion spacecraft, astronauts, and a large cargo to the Moon in a single launch.

The boosters contribute to the power that SLS needs to launch payloads with more mass and volume to deep space making it possible to send astronauts to distant destinations including the Moon and, later, Mars.

Solid Rocket Booster Details

Length	177 ft.
Diameter	12 ft.
Weight	1.6 million lbs. each
Propellant	polybutadiene acrylonitrile (PBAN)
Thrust	3.6 million lbs. each
Operation time	126 seconds



SLS Solid Rocket Booster Configuration

Five-Segment Solid Rocket Booster

The SLS booster is the largest, most powerful solid propellant booster to ever fly. Standing 17 stories tall and burning approximately six tons of propellant every second, each booster generates more thrust than 14 four-engine jumbo commercial airliners. Together, the twin SLS boosters provide more than 75 percent of the total SLS thrust at launch.

The major physical difference between the shuttle and SLS boosters is the addition of a fifth propellant segment to the four-segment shuttle booster, allowing NASA's new launcher to lift more weight than the shuttle. Additionally, the SLS boosters are optimized for single use, while the shuttle boosters were designed to be reused. Though based on the shuttle booster, the SLS booster benefits from several design, process, and testing improvements for greater performance, safety, and affordability.

All booster components use steel cases repurposed from cases used on previous space shuttle flights. The five booster segments are manufactured by Northrop Grumman in Utah and transported by train to NASA's Kennedy Space Center in Florida where they are stacked and prepared for launch. The segments that include the propellant are the largest single component of each booster. They undergo a rigorous nondestructive inspection process to confirm each segment's readiness for flight.

A completed booster segment for the Artemis IV flight.

Boosters undergo hot fire tests to evaluate materials and processes for future missions.

Artemis I boosters and core stage structurally mated in the Vehicle Assembly Building at Kennedy Space Center in Florida. (side view)

Solid Rocket Booster Improvements

- 25 percent more propellant
- New nozzle design
- New asbestos-free insulation
- New liner configuration
- New avionics

Artemis I booster aft assembly stacked on the mobile launcher in the Vehicle Assembly Building at Kennedy.

Booster Components

The other booster components are assembled in the Booster Fabrication Facility at Kennedy.

The booster forward skirt houses booster avionics that communicate with the SLS avionics to monitor booster conditions and steer the booster exhaust nozzle.

The aft skirt contains the thrust vector control system that steers the nozzle based on commands from the booster avionics. The frustum and nose cone serve as the aerodynamic fairing for the booster.

The boosters are the first SLS element stacked on the mobile launcher. After stacking, each booster is integrated to the SLS core stage by braces on the forward and aft booster segments.

On the launch pad, the boosters carry the entire weight of the fueled SLS rocket. After launch, the boosters operate for about two minutes before separating from the core stage and landing in the Atlantic Ocean.

Evolved Boosters

Northrop Grumman has enough remaining shuttle booster hardware for seven more flight sets. Beginning with Artemis IX, the SLS rocket in its Block 2 configuration will use the booster obsolescence and life extension (BOLE) booster. The more powerful solid rocket motor will give the SLS rocket the capability to send even heavier payloads to the Moon and other areas of deep space for future Artemis missions.

NASA is working to land the first woman, first person of color, and its first international partner astronaut on the Moon under Artemis.

A booster obsolescence and life extension (BOLE) motor segment being transported to final assembly at Northrop Grumman in Utah.

National Aeronautics and Space Administration

George C. Marshall Space Flight Center
Huntsville, AL 35812
www.nasa.gov/marshall

www.nasa.gov

For more information about SLS, visit:

http://www.nasa.gov/artemis
http://www.nasa.gov/sls
http://www.twitter.com/NASA_SLS
http://www.facebook.com/NASASLS
http://www.instagram.com/nasaartemis