FIVE-SEGMENT BOOSTER

Boosting NASA's Space Launch System

The largest and most powerful solid rocket booster ever build for flight helps launch NASA's Space Launch System (SLS) rocket on deep space exploration missions to support the agency's Moon to Mars campaign and Artemis missions. Built on a powerful, proven propulsion system, SLS and its unrivaled lift and payload capacity provides a new exploration capability for science and human exploration beyond Earth's orbit.

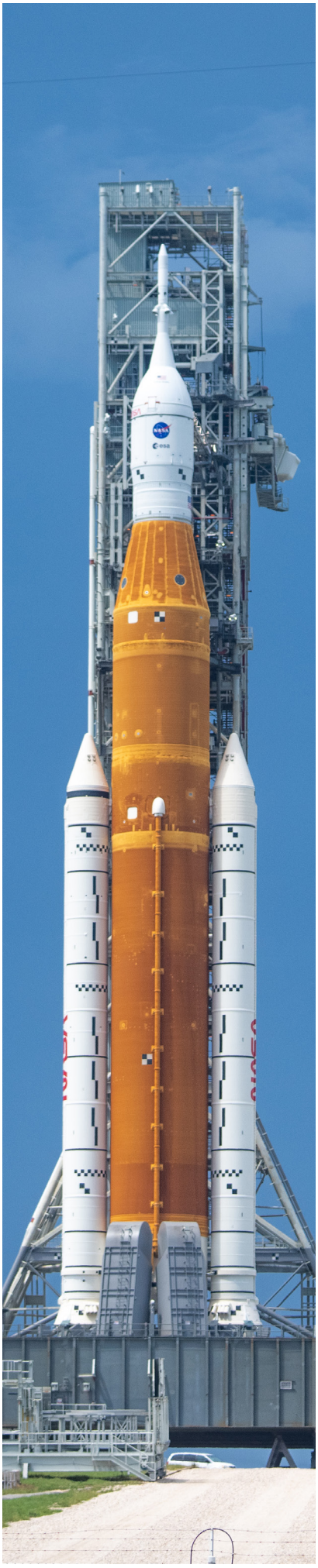
The SLS, the only rocket capable of carrying astronauts to deep space, utilizes two of Northrop Grumman's five-segment solid rocket boosters to propel the rocket with the Orion spacecraft off of the launch pad to escape Earth's gravity. The twin rocket boosters provide more than 75% of the initial thrust at launch to help SLS deliver more to the Moon in a single launch than any other rocket.

The SLS boosters performed nominally during the Artemis I mission, the first integrated test flight of NASA's SLS rocket, Orion spacecraft and Exploration Ground Systems, on November 16, 2022. The twin solid rocket boosters contributed over 7.2 million pounds of thrust and nearly identical thrust traces during the first two minutes of the SLS rocket's successful first flight.

BOOSTER FACTS

- Burns 1,385,000 pounds of propellant in two minutes – an average of 5.5 tons of propellant every second
- Each booster produces 3,600,000 pounds of maximum thrust – greater than fourteen 4-engine Boeing 747s at full take-off power
- During operation, the temperature of the five-segment booster motor chamber gases reach 5,600°F – at this temperature, steel does not melt – it boils
- The stacked booster is 177 feet tall, or as tall as a 17-story building

NORTHROP GRUMMAN



SLS FIVE-SEGMENT BOOSTER

THE FIVE-SEGMENT BOOSTER CYCLE

CASE PREPARATION

After case parts are joined into five primary or casting segments, they are insulated, lined and prepared for casting.

PROPELLANT CASTING

Each segment is filled with about 280,000 pounds of propellant. The propellant solidifies or "cures" for the next four days.

NOZZLE MANUFACTURE

The nozzle is a complex structure of glass- and carbon-cloth material, steel and aluminum. The carbon and glass materials must be able to withstand temperatures as high as 3,700°F.

MOTOR FINAL ASSEMBLY

All motor segments undergo X-ray and ultrasonic inspection before being certified for launch. The forward nozzle assembly is installed in the aft segment and the igniter is installed in the forward segment.

MOTOR SHIPPING

Loaded segments will be transported by special vehicle to Northrop Grumman's Corinne, Utah, railhead for journey by train to Kennedy Space Center, Florida.

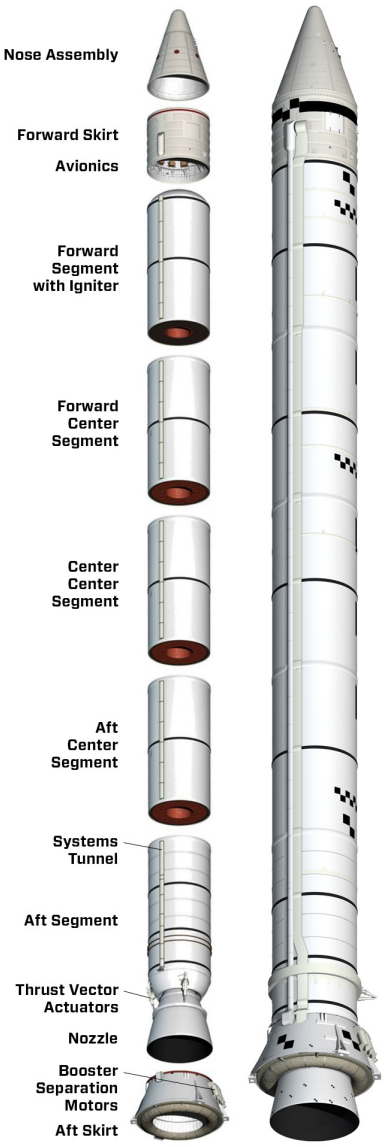
BOOSTER ASSEMBLIES

Aft skirt, forward skirt and nose assemblies are processed at KSC and are moved to the Rotation, Processing and Surge Facility and Vehicle Assembly Building where they are mated with the solid rocket motor segments.

STACKING

Once at KSC, the segments are moved to the Vehicle Assembly Building where they are stacked and mated to the core stage tank.

THE FIVE-SEGMENT BOOSTER COMPONENTS



Static Test Firing at Promontory, Utah

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