

# RS-25 Main Engine

## NASA'S Space Launch System (SLS): America's Rocket for Deep Space Exploration

### POWERFUL:

- SLS will be the most powerful rocket ever, using four RS-25 engines and a pair of 5-segment solid rocket boosters.
- At liftoff, it will generate 8.4 million pounds of thrust — 10 percent more than the Saturn V Moon rocket.

### VERSATILE:

- SLS will be able to lift 154,000 pounds to orbit, taking explorers farther than they have ever gone and supporting science missions with greater mass, faster trip times, and simpler spacecraft design. The evolved SLS will lift 286,000 pounds to orbit for Mars missions and have a payload fairing that could carry nine school buses.
- For pioneering new territories, SLS provides unmatched payload advantages and simplifies the entire off-Earth logistics and operations chain.

### AFFORDABLE:

- NASA is leveraging the nation's investments in the Space Shuttle engines, boosters and manufacturing infrastructure to develop unmatched capability to explore beyond Earth Orbit.
  - The NASA/industry SLS team is smaller than the Shuttle development team, and employing innovations like value-stream-mapping, 3D printing, and structured light scanning to streamline development.



## RS-25 Main Engine

**The powerful, proven RS-25 engine will provide the power for the SLS Core Stage, together with the 5-segment Solid Rocket Booster. Key details:**

- RS-25 engines flew with 100-percent success for 135 Space Shuttle missions from 1981 to 2011, and were refined and upgraded throughout their service life.
- The Shuttle was powered by 3 RS-25 engines, whereas SLS will use four RS-25s.
- The engines operate for 8.5 minutes through the entire launch and ascent to orbit.
- NASA has 16 engines in its inventory to support the first four SLS flights. These engines powered 42 different Shuttle missions and include all nine engines from the final three Shuttle flights.
- Engines will be selected for each mission based on previous flight time, testing, and mission needs.
- NASA and Aerojet Rocketdyne began testing in 2015 to adapt the RS-25 to the massive SLS Core Stage, now in development.

**The RS-25s selected for NASA's first four "Exploration Missions" have an incredible legacy of accomplishment. Some interesting highlights:**

### Exploration Mission-1 (ready for launch in 2018)

- Engine 2045, STS-95 – John Glenn's return to space
- Engine 2056, STS-109 – Hubble Space Telescope servicing mission
- Engine 2058, STS-133 – Last flight of orbiter Discovery
- Engine 2060, STS-135 – Final flight of the Space Shuttle Program

### Exploration Mission-2 (slated for 2021)

- Engine 2047, STS-98 – Delivered Destiny lab module to the International Space Station (ISS)
- Engine 2059, STS-117 – Longest mission for the orbiter Atlantis
- Engine 2062, New engine never flown
- Engine 2063, New engine never flown

### Exploration Mission-3

- Engine 2048, STS-92 – 100th mission of the Space Shuttle
- Engine 2054, STS-126 – Most supplies and equipment ever on a single mission
- Engine 2057, STS-125 – Final servicing mission of Hubble Space Telescope
- Engine 2061, STS-130 – Delivered the Tranquility node and its 7-window cupola to ISS

### Exploration Mission-4

- Engine 2044, STS-88 – First mission to ISS
- Engine 2050, STS-108 – Delivered U.S. Harmony module to ISS
- Engine 2051, STS-128 – Delivered Quest airlock module to ISS
- Engine 2052, STS-99 – Longest mission for Atlantis, lasting more than 13 days and 20 hours