National Aeronautics and Space Administration

NASA's Space Launch System:
A Launch Capability for Exploration

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Space Launch System

www.nasa.gov/sls

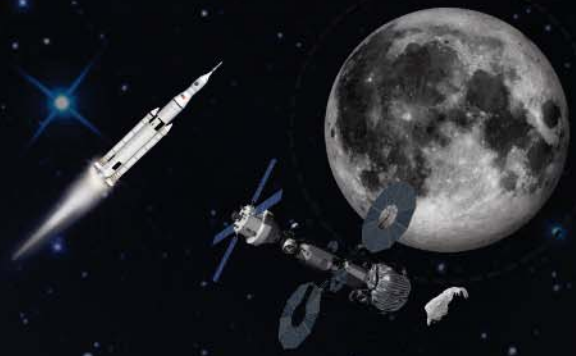
The Path to Mars

EARTH RELIANT
MISSION: 6 TO 12 MONTHS
RETURN TO EARTH: HOURS

Mastering fundamentals aboard the International Space Station

U.S. companies provide access to low-Earth orbit

PROVING GROUND
MISSION: 1 TO 12 MONTHS
RETURN TO EARTH: DAYS



Expanding capabilities by visiting an asteroid redirected to a lunar distant retrograde orbit

The next step: traveling beyond low-Earth orbit with the Space Launch System rocket and Orion spacecraft

MARS READY
MISSION: 2 TO 3 YEARS
RETURN TO EARTH: MONTHS

Developing planetary independence by exploring Mars, its moons and other deep space destinations

We reach for new heights and reveal the unknown for the benefit of humankind.

—NASA 2014 Strategic Plan

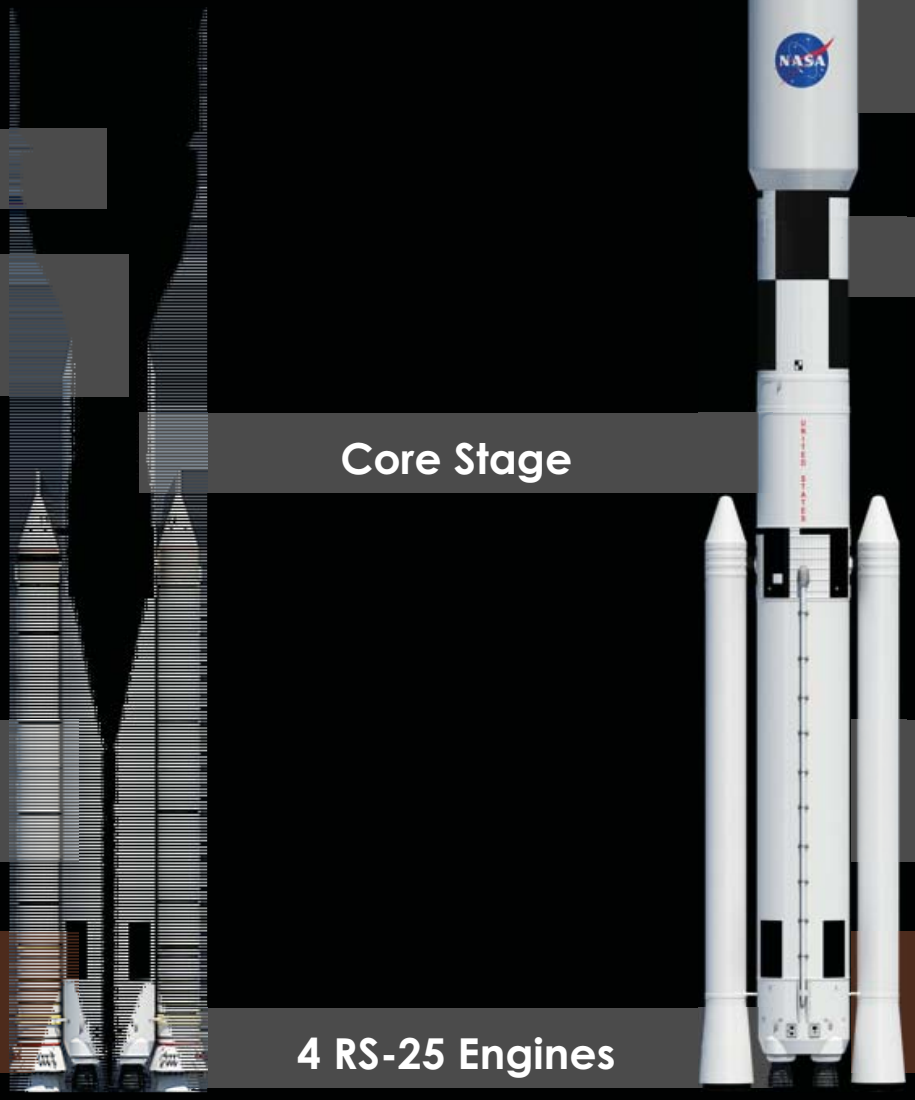
Revolutionary Evolution

Orion

Interim Cryogenic Propulsion Stage

Five-Segment Solid Rocket Boosters

Block I
70 metric tons



Core Stage

4 RS-25 Engines

5, 8.4 or 10 Meter Payload Fairings

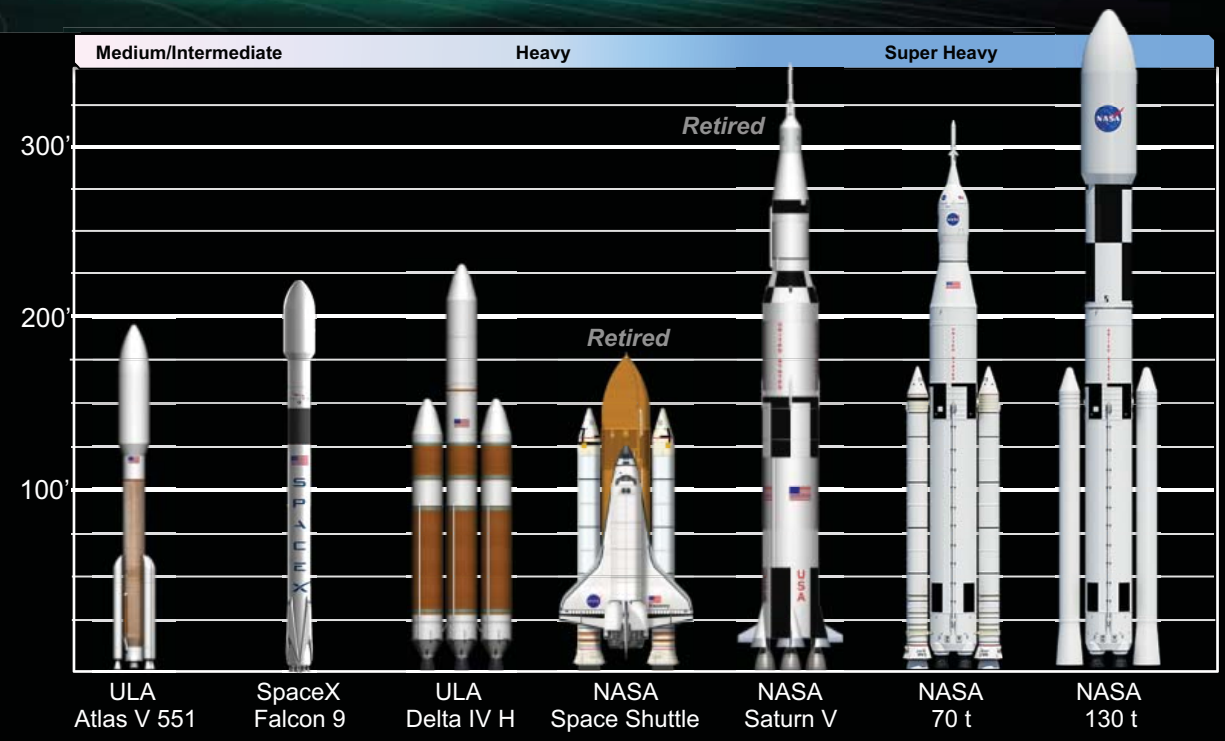
Upper Stage

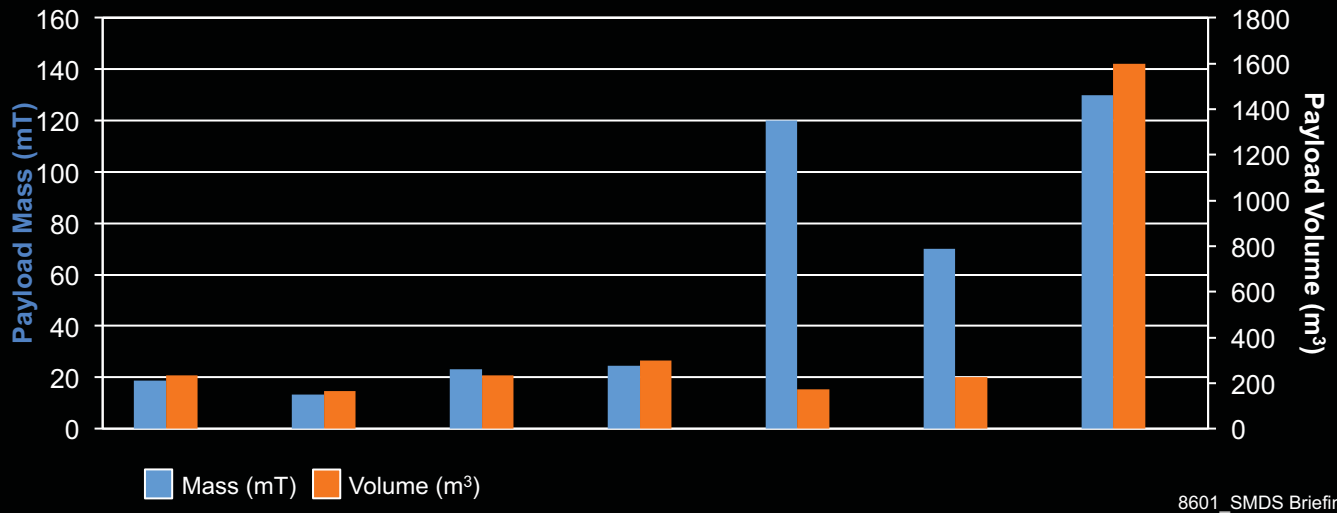
Liquid or Solid Advanced Boosters

Block II
130 metric tons

Benefit: SLS Mass Lift Capability

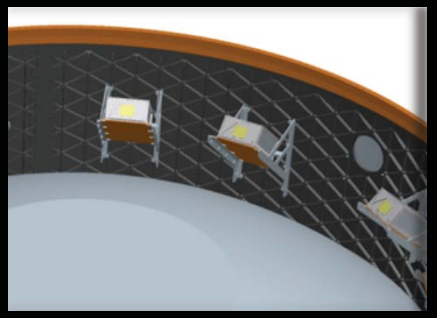
- SLS initial configuration offers 70 t to LEO.
- Future configurations offer 105 and 130 t to LEO.
- Mass capability benefits mean larger payloads to any destination.





SLS Secondary Payload Capability

- **SLS is providing accommodations for secondary payloads on EM-1 and subsequent launches**
- **Secondary payloads will be accommodated in the Orion- MPCV Spacecraft Adapter (MSA) on EM-1**
- **6U equivalent volume/mass is the current standard; 12U volume can be accommodated**
  - 12U mass still being evaluated
  - Additional mounting locations are being evaluated
- **SLS provides secondary payload science opportunities beyond EELVs capabilities (Lunar and beyond)**



Recent Progress

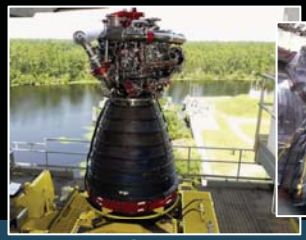
Launch Vehicle Stage Adapter (Teledyne Brown):
Contract awarded in February 2014.

MPCV-to-Stage Adapter:
First flight hardware currently in Florida for Exploration Flight Test-1 in Fall 2014.

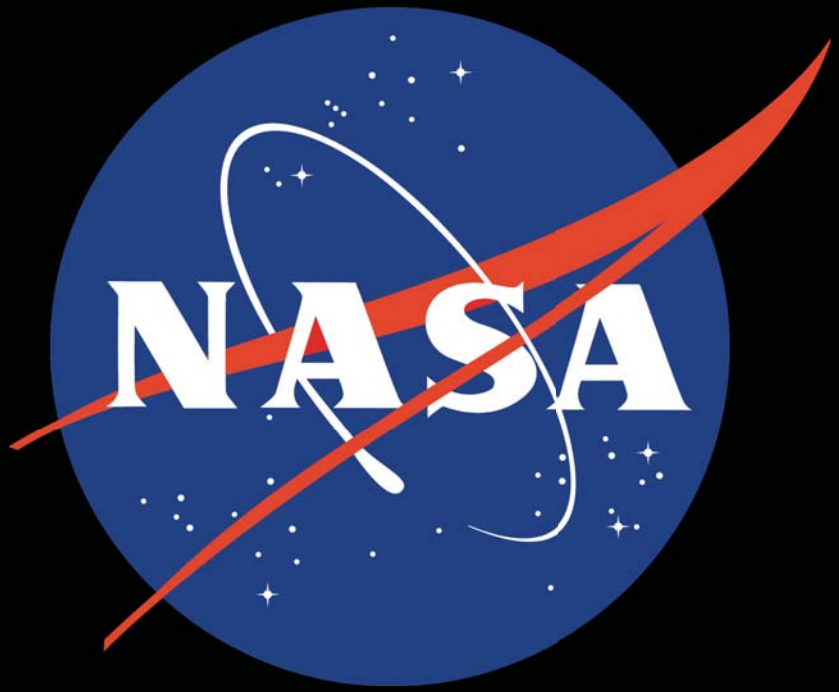
Avionics (Boeing): Avionics "first light" marked in January 2014; currently testing most powerful flight system computer processor ever.

Core Stage (Boeing): Initial confidence barrels and domes completed; Vertical Assembly Center to be completed in September 2014.

Boosters (ATK): Forward Skirt test completed May 2014; preparations underway for QM-1.



Engines (Aerojet Rocketdyne): First RS-25 engine fitted to A-1 stand at Stennis Space Center; testing begins Fall 2014.



Man cannot discover
new oceans
unless he has the
courage to lose
sight of the shore.

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