With design and development work mostly complete, the SLS Program is now building and testing components of the world’s most powerful rocket to be ready for launch in 2018. Each of these steps advances NASA on the Journey to Mars.
Recent Progress Toward Launch

- Core Stage production at Michoud
- Booster testing at Orbital ATK
- Engine testing at Stennis Space Center
- Test stand construction at Marshall
- Stage adapter welding at Marshall
- Upper stage production at ULA
Benefits of Space Launch System

**Volume**
- Space Launch System will be able to offer payload accommodations with five times more volume than any contemporary launch vehicle.
- Payload fairings of up to 10-meter diameter are planned.

**Mass**
- Space Launch System will offer an initial capability of greater than 70 metric tons to low Earth orbit; current U.S. launch vehicle maximum is 28 t.
- Evolved version of SLS will offer greatest-ever capability of greater than 130 t to LEO.

**Departure Energy**
- SLS offers reduced transit times to the outer solar system by half or greater.
- Higher characteristic energy (C3) also enables larger payloads to destination.
Range of SLS Spacecraft/Payload Types

Orion Spacecraft

Orion Co-Manifested Payload (CPL)
- Smaller CPL
  Mounted to ring adapter between Spacecraft and Payload Adapter
- Payload Ring type Interface
- Multiple Payloads
- Payload Adapter

Secondary Payloads (SPL)
- ≤ 27U Cubesat type Secondary Payloads
  Mounted to Payload Adapter PAF
- Payload Interface Adapter
- 27U Secondary Payload & Deployment System
- Payload Attach Fitting
- 12U Secondary Payload & Deployment System

Primary Payload (PPL)
- Fairing
- PPL
SLS Payload Accommodations

Fairing Availability

- Universal Stage Adapter offers opportunity for co-manifested payloads with Orion spacecraft or near-term 8.4-meter lower-height accommodations.
- USA can also support dual-payload launch with industry-standard 5-m fairing, which could also fly on Block 1 configuration.
- Universal Stage Adapter accommodations early as soon as 2023; 8.4- and 10-meter fairings available in the mid- and late-2020s, respectively.

<table>
<thead>
<tr>
<th>Fairing Availability</th>
<th>Volume (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5m fairing w/ science payload</td>
<td>250</td>
</tr>
<tr>
<td>Science Missions</td>
<td>400</td>
</tr>
<tr>
<td>Orion with short-duration hab module</td>
<td>400</td>
</tr>
<tr>
<td>8m fairing w/ large aperture telescope</td>
<td>1200</td>
</tr>
<tr>
<td>10m fairing w/ notional Mars payload</td>
<td>1800</td>
</tr>
</tbody>
</table>

Total mission volume = ~ 3250 m³
• Block 1B vehicle offers up to seven 12U to 27U payload locations (or their volume equivalent) on the PAF outer face

• Payloads will be “off” from roll-out through Orion separation and payload deployment

• Payload Deployment System Sequencer; payload deployment will begin with pre-loaded sequence following Orion separation and Upper Stage disposal burn

• Payload requirements captured in a Interface Definition and Requirements Document
The first SLS launch will carry 13 6U smallsats, representing multiple disciplines and partners. The smallsats will be deployed from the Orion Stage Adapter.

**Moon**
- Lunar Flashlight (NASA)
- Lunar IceCube (Morehead State University)
- LunaH-Map (Arizona State University)
- Omotenashi (JAXA)

**Asteroid**
- NEA Scout

**Sun**
- CuSP (Southwest Research Institute)

**Earth**
- EQUULEUS (JAXA)
- Skyfire (Lockheed Martin)

**And Beyond**
- Biosentinel (NASA)
- ArgoMoon (ESA/ASI)
- Three Centennial Challenge Winners (TBD)
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