NASA’s Space Launch System: An Enabling Capability for Discovery

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The Future of Human Space Exploration

**NASA’s Building Blocks to Mars**

- **Earth Reliant Proving Ground**
  - Missions: 6 to 12 months
  - Return: hours
  - Missions: 1 month up to 12 months
  - Return: days
  - Missions: 2 to 3 years
  - Return: months

- **Exploring Mars and other deep space destinations**
  - Missions: 1 month up to 12 months
  - Return: days
  - Missions: 2 to 3 years
  - Return: months

- **U.S. companies provide affordable access to low Earth orbit**
- **Learning the fundamentals aboard the International Space Station**
- **Expanding capabilities at an asteroid redirected to lunar orbit**
- **Traveling beyond low Earth orbit with the Space Launch System rocket and Orion crew capsule**
- **Exploring Mars and other deep space destinations**
Core Stage Development
Engines and Boosters
SLS Recent Accomplishments

**Launch Vehicle Stage Adapter:** Contract awarded in Feb. 2014 to Teledyne Brown Engineering.


**Multi-Purpose Crew Vehicle-to-Stage Adapter:** First flight hardware delivered to ULA for Exploration Flight Test-1 in Fall 2014.

**Boosters:** Thrust Vector Control test conducted by ATK in Oct. 2013; preparations under way for first qualification motor test.

**Core Stage:** Initial confidence barrels and domes completed by Boeing; tooling installation to be completed at MAF in July 2014.

**Engines:** Thrust frame adapter fitted to Stennis A-1 stand; Aerojet-Rocketdyne RS-25 testing begins July 2014.
# SLS Development Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
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<tr>
<td>2011</td>
<td>MCR</td>
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<tr>
<td>2012</td>
<td>SRR/SDR</td>
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<tr>
<td>2013</td>
<td>PDR</td>
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<td>2014</td>
<td>CDR</td>
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<td>2015</td>
<td>SIR</td>
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<td>2016</td>
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<td>2017</td>
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**Program Progress:***

- SLS Design Chosen
- Engines Delivered to Inventory
- Manufacturing Tooling Installation
- Production of First New Flight Hardware
- Wind Tunnel Testing
- Main Engine Test-Firing
- Orion Flight Test
- STA Production Begins
- Booster Test-Firings
- Core Stage Assembly
- Core Stage Test-Firing
- Booster Assembly at KSC
- Vehicle Stacking at KSC
- First Flight

**Key Acronyms:**

- MCR: Mission Concept Review
- CDR: Critical Design Review
- SRR: System Requirements Review
- SIR: System Integration Review
- SDR: System Definition Review
- FRR: Flight Readiness Review
- PDR: Preliminary Design Review
- PLAR: Post-Launch Assess. Review