SPACE LAUNCH SYSTEM

DEEP-SPACE DEPLOYMENT FOR SMALLSATS

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NASA Space Launch System
<table>
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<tr>
<th>SLS Block</th>
<th>Availability</th>
<th>Provides</th>
<th>Enables</th>
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<td>1</td>
<td>As Early As 2019</td>
<td>Initial Heavy-Lift Capability</td>
<td>Orion Test</td>
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<td>SmallSats to Deep Space</td>
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<tr>
<td>1B Crew</td>
<td>As Early As 2022</td>
<td>105 t lift capability via Exploration Upper Stage</td>
<td>Deep Space Gateway</td>
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<td>Co-manifested payload capability in Universal Stage Adapter</td>
<td>Larger CubeSat- and ESPA-Class Payloads</td>
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<td>1B Cargo</td>
<td>As Early As 2023</td>
<td>8.4-meter fairings for primary payloads</td>
<td>Europa Clipper/Lander</td>
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<td>Regular flight cadence for additional launches</td>
<td>Deep Space Transport</td>
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<td>10-meter fairings for primary payloads</td>
<td>Large-Aperture Space Telescopes</td>
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<td>Ice or Ocean Worlds Missions</td>
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<td>Interstellar Medium</td>
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<td>2</td>
<td>As Early As 2028</td>
<td>130 t lift capability via advanced boosters</td>
<td>Crewed Mars Orbit Missions</td>
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<td>Crewed Mars Surface Missions</td>
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Accommodations

- SLS for Exploration Mission-1 will include thirteen 6U payload locations of up to 14kg per CubeSat.

EM-1 Trajectory

- Orion will enter Distant Retrograde Orbit around the moon.
- Additional cislunar trajectories being studied for future missions.
ONE LAUNCH, MULTIPLE DISCIPLINES

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

Asteroid
- NEA Scout (NASA)

Sun
- CuSP (Southwest Research Institute)

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

And Beyond
- Biosentinel (NASA)
- ArgoMoon (ESA/ASI)
- Cislunar Explorers (Cornell University)
- CU³ (University of Colorado Boulder)
- Team Miles (Fluid & Reason)
BLOCK 1B SMALL PAYLOAD OPTIONS

VOLUME AND MASS RANGE

1U Soccer Ball
6U 14kg
12U 25kg
27U 54kg

Ring Payload Interface (Notional) ~180kg

10 cm

www.nasa.gov/sls
Summary

• SLS provides a unique opportunity for the CubeSat/smallsat community
  - Enables access to Earth, Moon, Sun & Deep Space
  - Opportunity to manifest payloads from 6U/12U/27U to ESPA-Class

• First Flight (EM-1) hardware production in-progress
  - Block 1B initiating procurement/production activities

More Information

• SLS Mission Planner’s Guide (ESD 30000)
  - Provides future payload developers/users with information to support preliminary SLS mission planning
  - Covers Block 1B (105mT*) & Block 2 (130mT*) configurations
  - Copies can be requested by email to: NASA-slspayloads@mail.nasa.gov

* Payload Mass to Low Earth Orbit