National Aeronautics and Space Administration

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SPACE LAUNCH SYSTEM

A NEW OPPORTUNITY FOR SMALLSATS

David Hitt
NASA Space Launch System
May 2016

www.nasa.gov/sls

SLS Block 1 Configuration

Overview

- Initial configuration of vehicle optimized for near-term heavy-lift capability.
- Completed Critical Design Review in July 2015.

SLS Block 1

Capability: >70 metric tons

Height: 322 feet

Weight: 5.75 million pounds

Thrust: 8.8 million pounds

Available: 2018

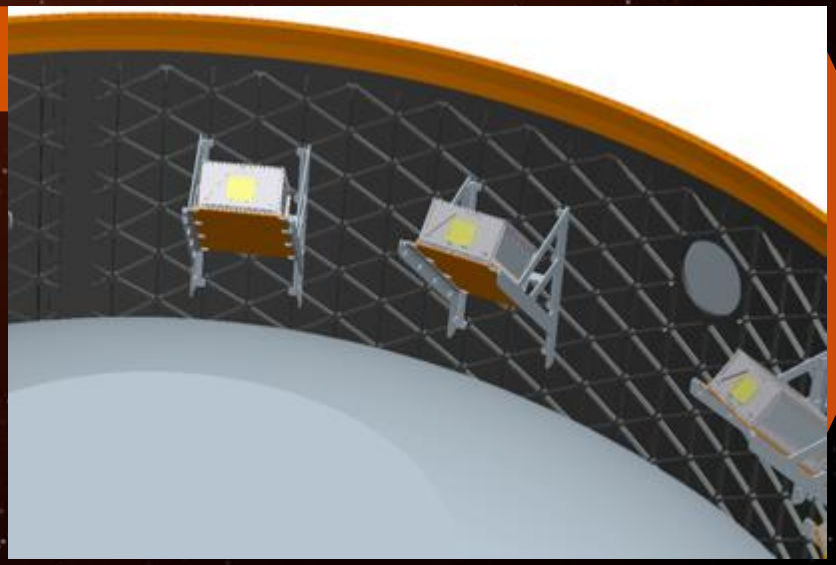
Utilization

- Initial demonstration of Space Launch System and Orion capabilities
- Supports launch of Orion into distant retrograde orbit around the moon

EM-1 Secondary Payload Capability

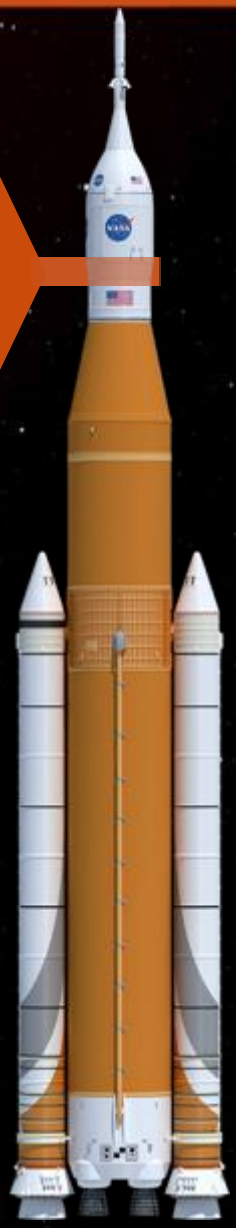
Accommodations

- SLS for Exploration Mission-1 will include thirteen 6U payload locations
- 6U volume/mass is the current standard (14 kg payload mass)



EM-1 Trajectory

- Orion will enter Distant Retrograde Orbit around the moon
- Additional cislunar trajectories being studied for future missions



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One Launch, Multiple Disciplines

Moon

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

Earth

- EQUULEUS (JAXA)
- Skyfire (Lockheed Martin)

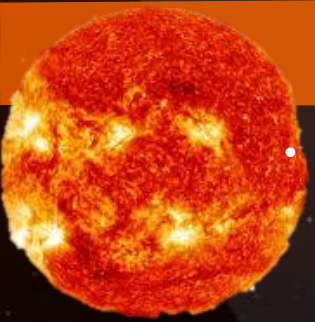
Asteroid

- NEA Scout

And Beyond

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

Sun



- CuSP (Southwest Research Institute)

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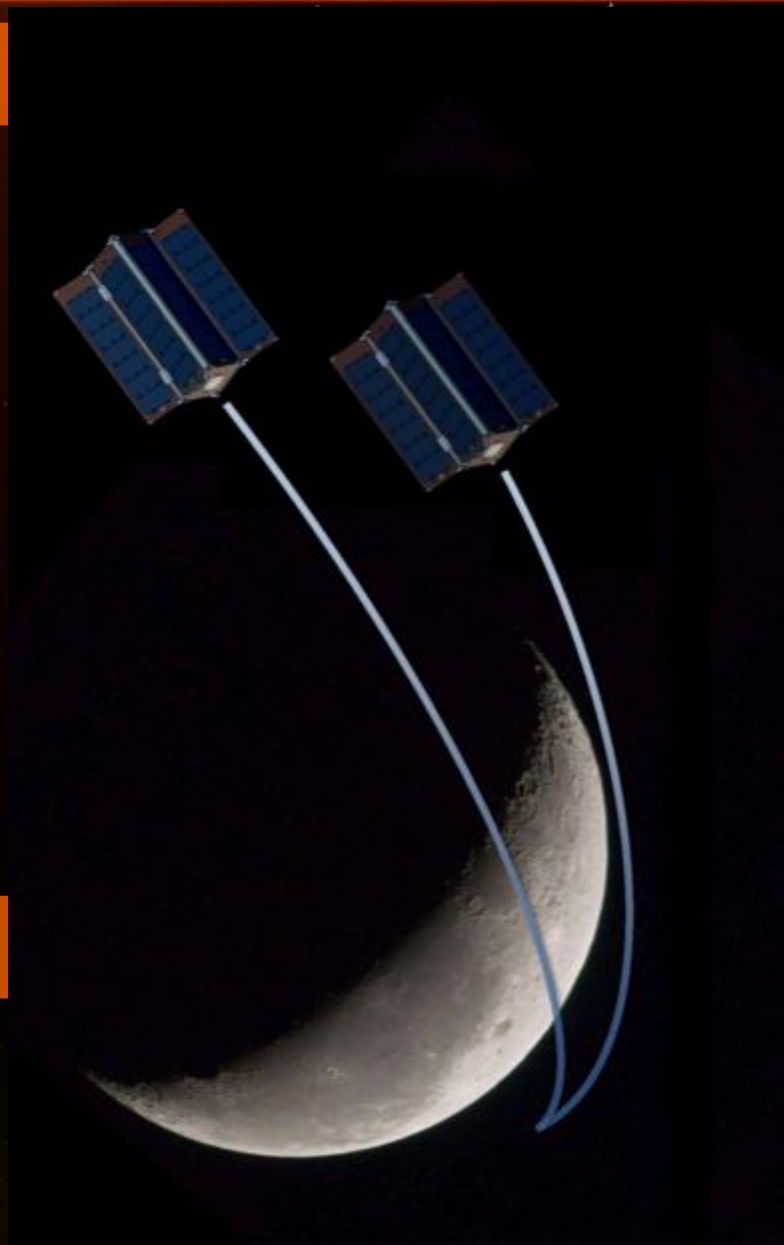
NASA Centennial Challenges

Ground Tournaments

- Four Rounds
- Purposes:
    1. Gain insight into competitor's mission designs
    2. Provide feedback to teams
    3. Award intermediate prizes
- Judging based on technical maturity, compliance with Challenge Rules and with SLS requirements
- GTs culminate in down-select for EM-1 integration and launch
- GTs not required of teams that elect to procure 3rd party launches

In-Space Competitions

- Lunar Derby Prize
- Deep Space Derby Prize (> 4 million km)



Recent Progress Toward Launch

Core Stage production at Michoud

Booster testing at Orbital ATK

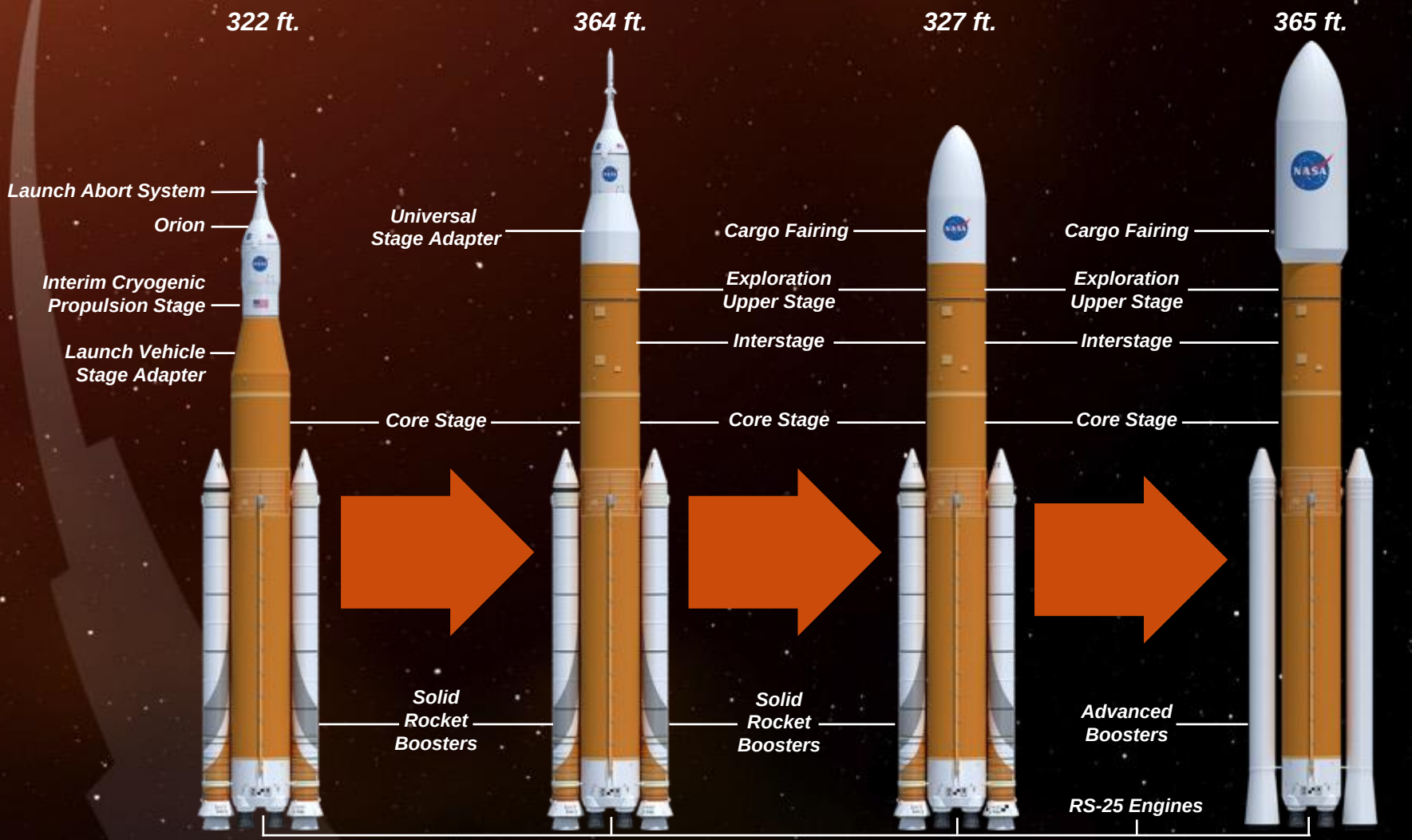
Engine testing at Stennis Space Center

Test stand construction at Marshall

Stage adapter welding at Marshall

Upper stage production at ULA

SLS Evolution Overview



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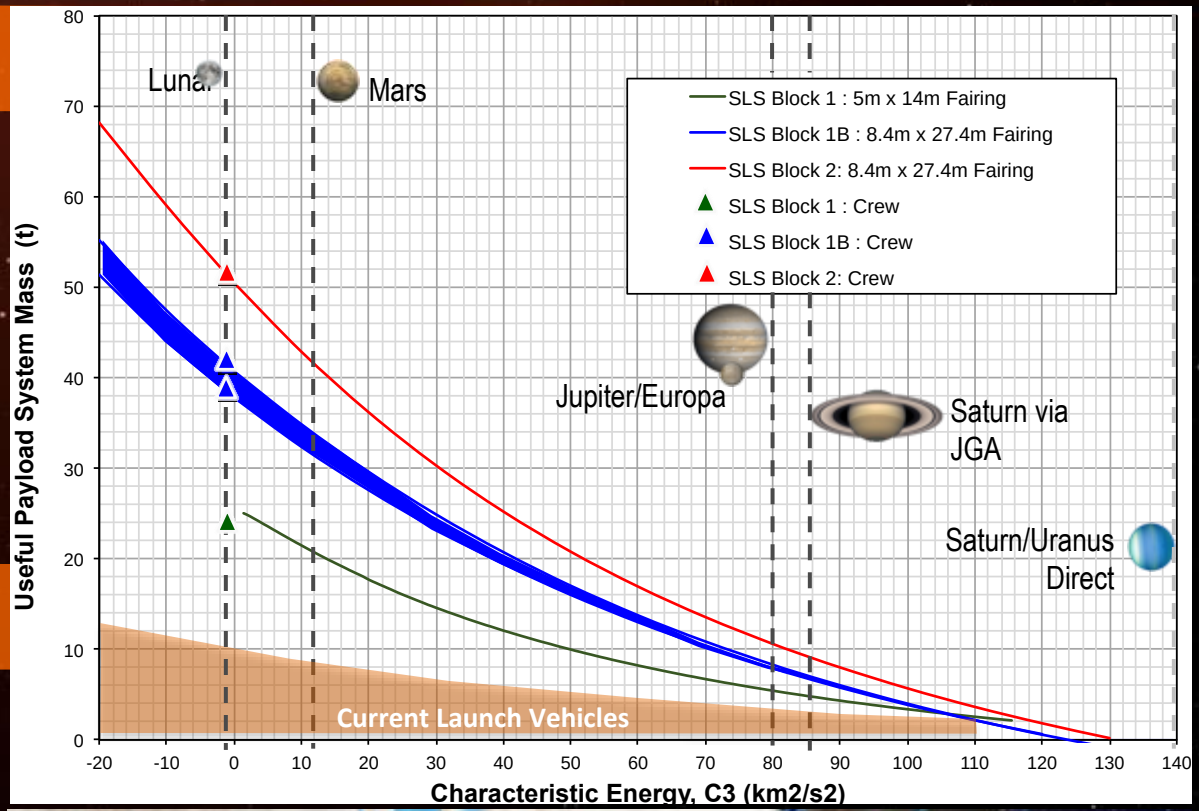
Evolved SLS Payload Mission Capture

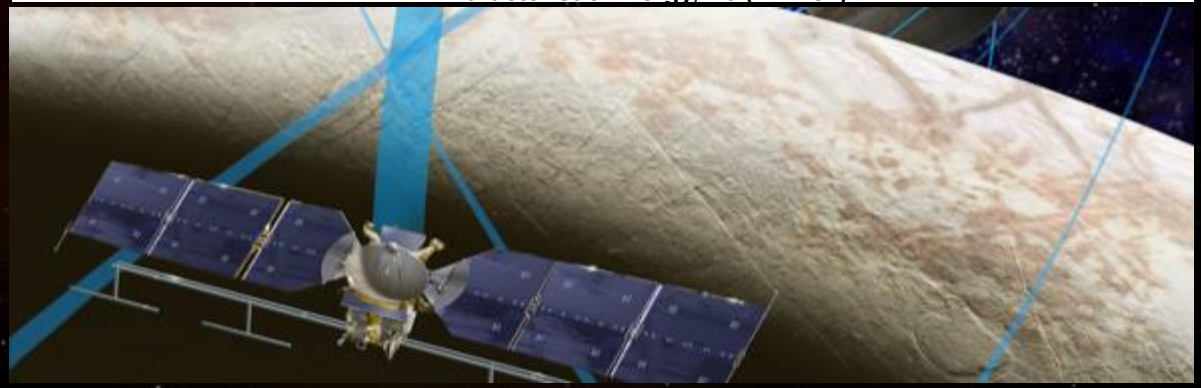
SLS Benefits

- SLS offers unrivaled mass, volume and departure energy capabilities.
- Enables reduced transit to outer solar system.

SLS for SmallSats

- Primary payload mission capture enables unique ride-along opportunities to interplanetary destinations.
- Trade space for mass and volume.





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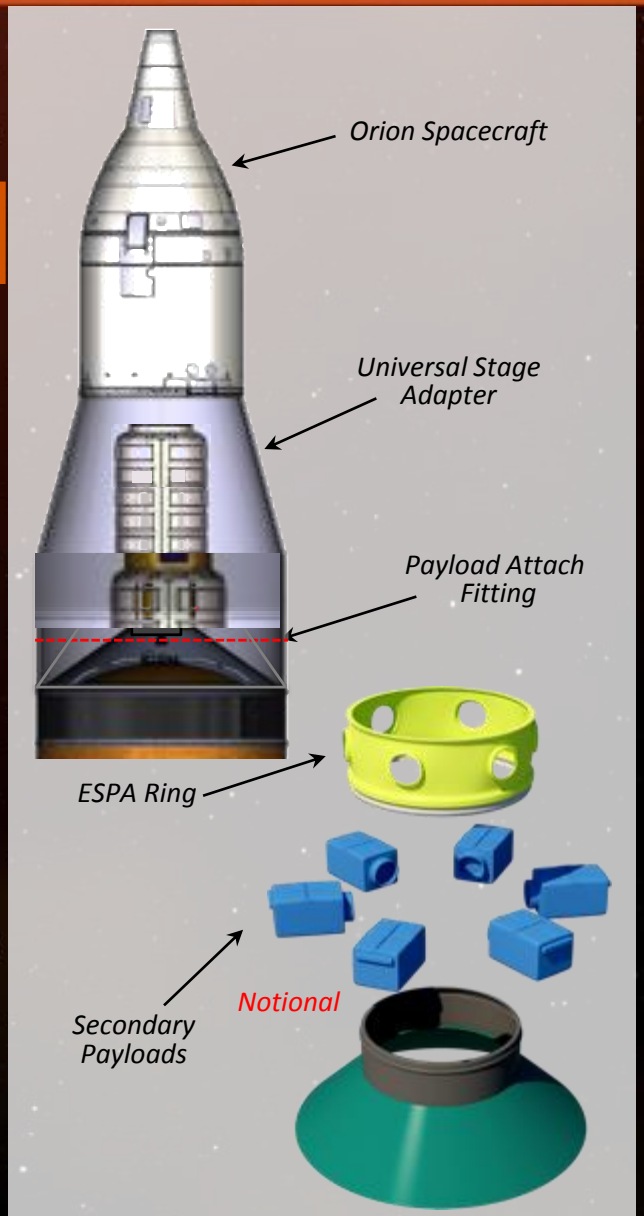
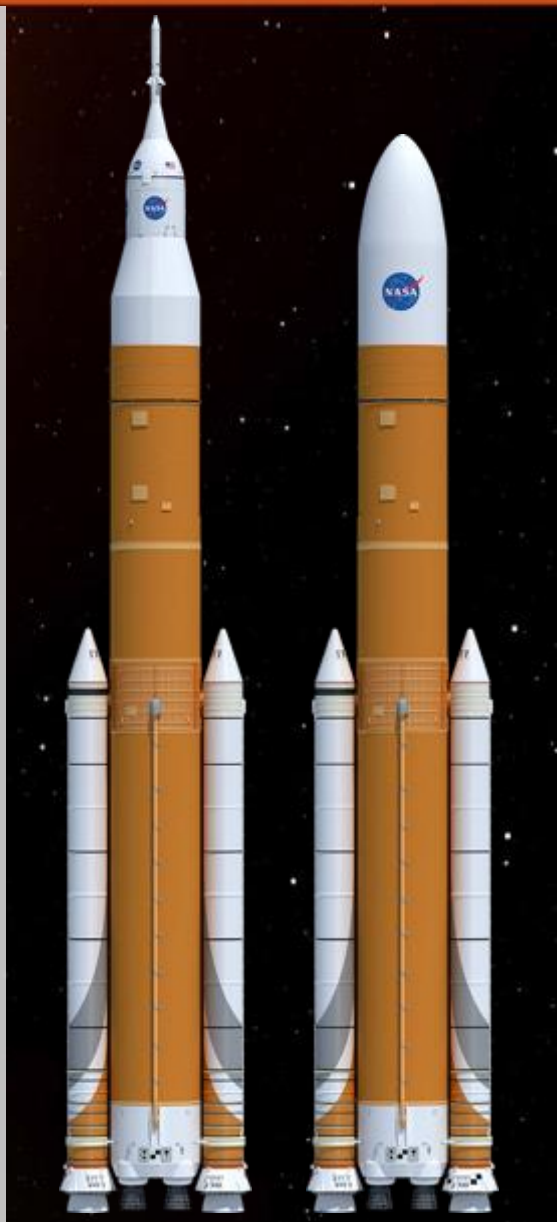
Evolved Capability Trade Space

Questions

- Who are the communities of interest for evolved SLS secondary payloads?
- What is optimal size for deep-space secondary payloads? (Cost versus size versus capability)
- What deployment targets are optimal?





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