



5...4...3...2...1...

# SPACE LAUNCH SYSTEM

DEEP-SPACE DEPLOYMENT FOR SMALLSATS

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NASA Space Launch System



# SLS CAPABILITY AVAILABILITY

**SLS Block 1**  
As Early As 2019

**Provides**

Initial Heavy-Lift Capability

**Enables**

Orion Test  
SmallSats to Deep Space

**SLS Block 1B Crew**  
As Early As 2022

**Provides**

105 t lift capability via Exploration Upper Stage

Co-manifested payload capability in Universal Stage Adapter

**Enables**

**Deep Space Gateway**

Larger CubeSat- and ESPA-Class Payloads

**SLS Block 1B Cargo**  
As Early As 2023

**Provides**

8.4-meter fairings for primary payloads

Regular flight cadence for additional launches

**Enables**

Europa Clipper/Lander

**Deep Space Transport**

Large-Aperture Space Telescopes

Ice or Ocean Worlds Missions

Interstellar Medium

**SLS Block 2**  
As Early As 2028

**Provides**

130 t lift capability via advanced boosters

10-meter fairings for primary payloads

**Enables**

**Crewed Mars Orbit Missions**

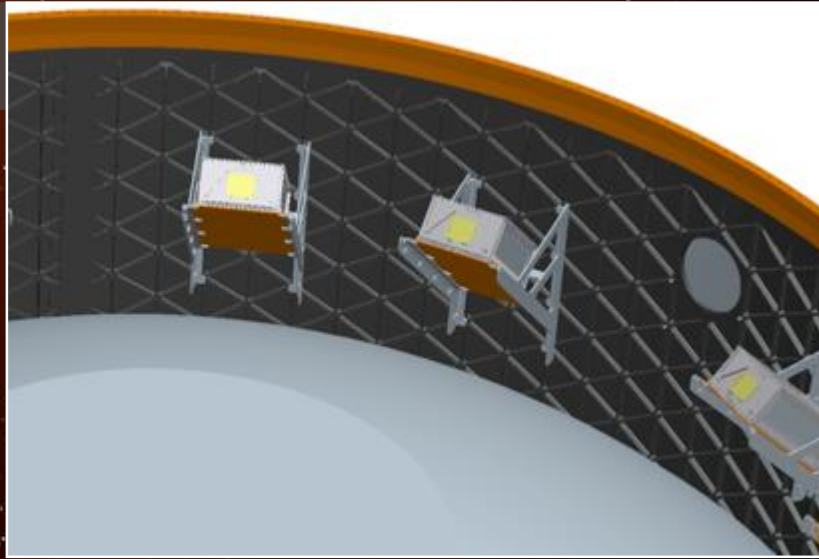
**Crewed Mars Surface Missions**



# EM-1 SECONDARY PAYLOAD CAPABILITY

## 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)

## Earth

- EQUULEUS (JAXA)
- Skyfire (Lockheed Martin)

## Asteroid

- NEA Scout (NASA)

## And Beyond

- Biosentinel (NASA)
- ArgoMoon (ESA/ASI)
- Cislunar Explorers (Cornell University)
- CU-E3 (University of Colorado Boulder)
- Team Miles (Fluid & Reason)

## Sun

- CuSP (Southwest Research Institute)

# PROGRESS TOWARD FIRST LAUNCH



Core Stage Production



Engine Testing



Second Stage Preparation



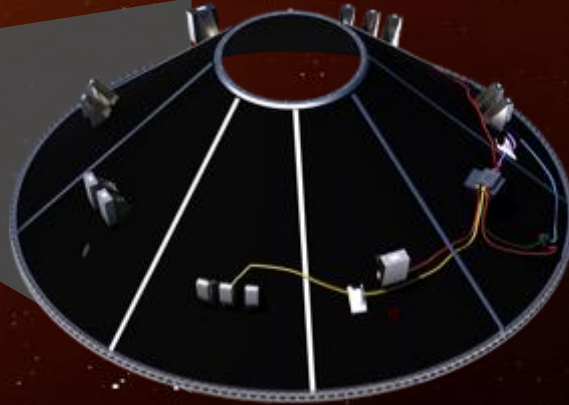
Structural Testing



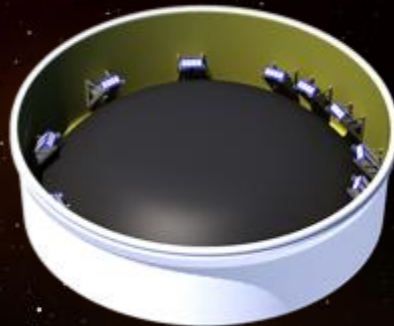
Booster Testing

# BLOCK 1 & BLOCK 1B COMPARISON

**BLOCK 1B**

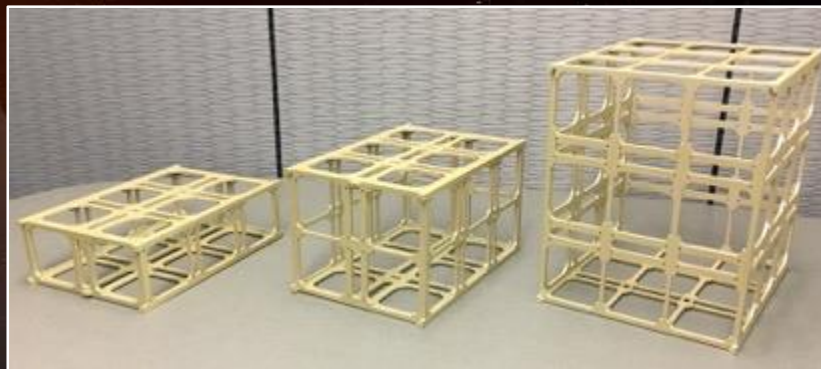
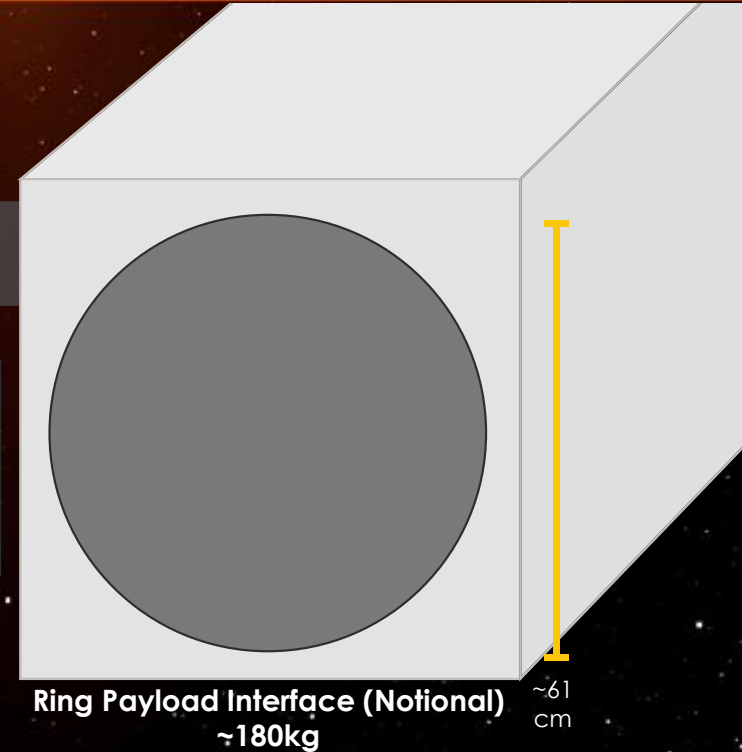
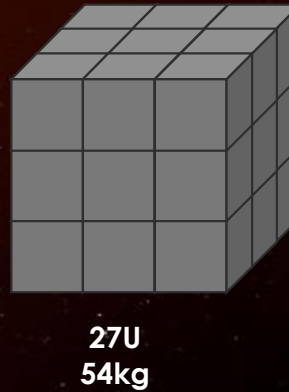


**BLOCK 1**



# BLOCK 1B SMALL PAYLOAD OPTIONS

## VOLUME AND MASS RANGE



# 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

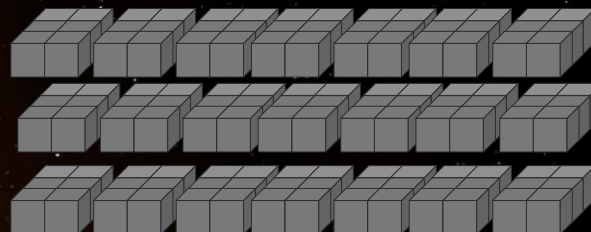
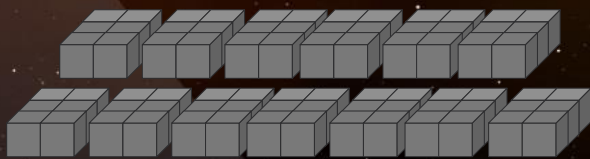
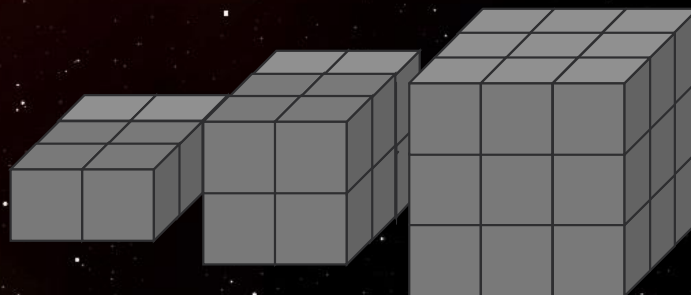
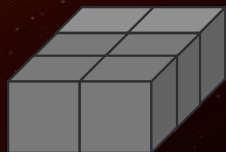
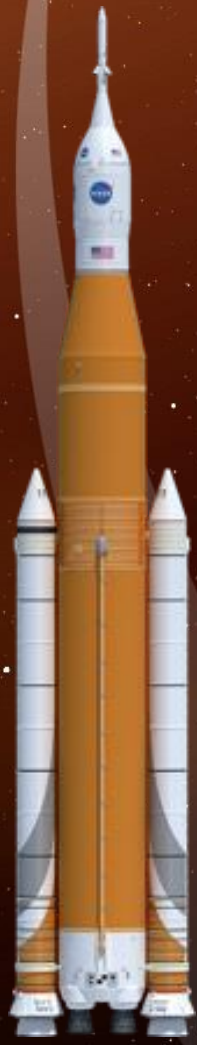
- SLS Mission Planner's Guide (ESD 30000)
  - Provides future payload developers/users with information to support preliminary SLS mission planning
  - Covers Block 1B (105mT\*) & Block 2 (130mT\*) configurations
  - Copies can be requested by email to:  
[NASA-slspayloads@mail.nasa.gov](mailto:NASA-slspayloads@mail.nasa.gov)



\* Payload Mass to Low Earth Orbit



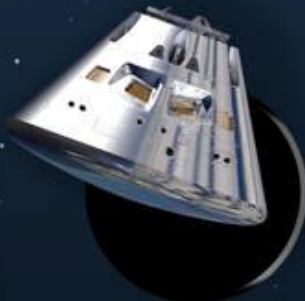
# SLS SECONDARY PAYLOAD EVOLUTION



# EXPLORATION MISSION-1: LAUNCHING SCIENCE & TECHNOLOGY SECONDARY PAYLOADS

**1**  
**PRIMARY MISSION**  
TESTING SLS  
AND ORION  
**SPACE LAUNCH SYSTEM (SLS)**  
LIFTS MORE THAN ANY EXISTING LAUNCH VEHICLE

**ORION STAGE ADAPTER**  
SUPPORTS BOTH PRIMARY MISSION AND SECONDARY PAYLOADS



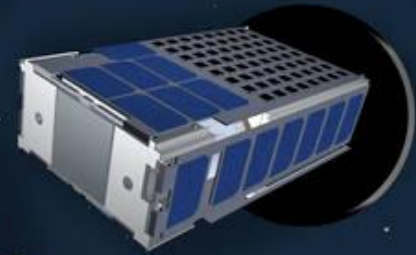
**ORION SPACECRAFT**  
TRAVELING THOUSANDS OF MILES BEYOND THE MOON, WHERE NO CREW VEHICLE HAS GONE BEFORE



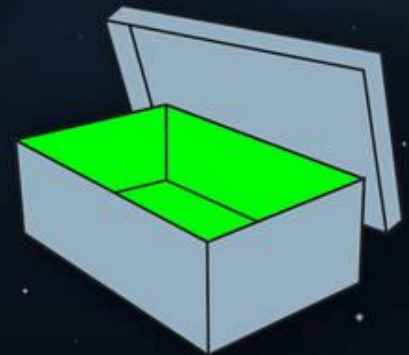
**2**  
**SECONDARY PAYLOADS**  
THE RING THAT WILL CONNECT THE ORION SPACECRAFT TO NASA'S SLS ALSO HAS ROOM FOR 13 HITCHHIKER PAYLOADS

**AVIONICS**  
(SELF-CONTAINED AND INDEPENDENT FROM THE PRIMARY MISSION)  
SEND CUBESATS ON THEIR WAY

**13**  
**CUBESAT EXPLORERS**  
GOING TO DEEP SPACE WHERE FEW CUBESATS HAVE EVER GONE BEFORE.



**SHOEBOX SIZE**  
PAYLOADS EXPAND OUR KNOWLEDGE FOR THE JOURNEY TO MARS



**#RIDEONSLS**