



NASA'S SLS SUPER HEAVY-LIFT ROCKET IN PROCESS FOR ARTEMIS II AND BEYOND



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NASA Marshall Space Flight Center
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OVERVIEW

- SLS Basics
- Artemis II Mission
- Artemis II SLS
- Progress to Artemis III
- Progress to Block 1B and Beyond



THE POWER OF SLS

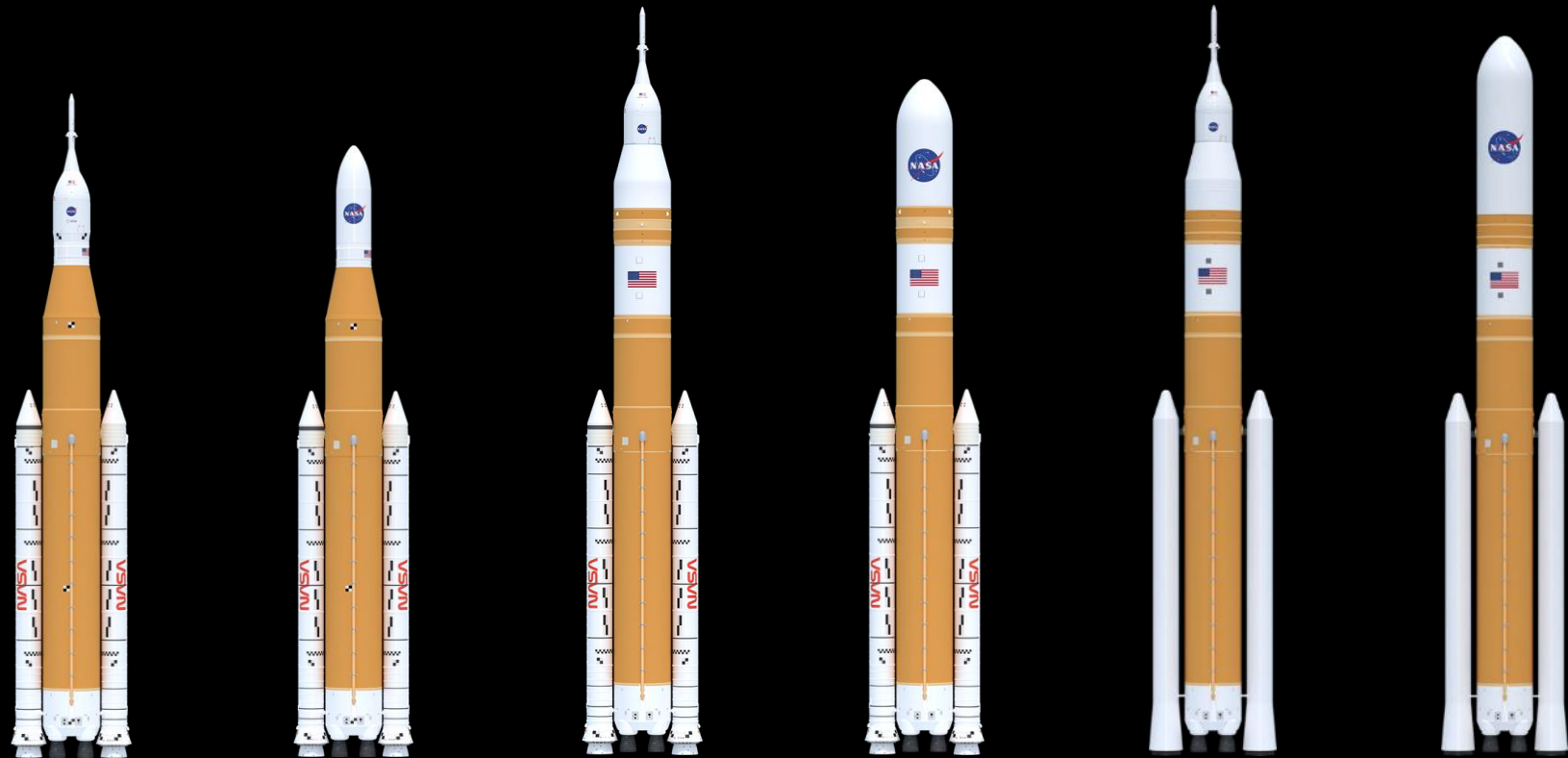
FOUNDATION FOR A GENERATION OF DEEP SPACE EXPLORATION

Payload to LEO	95 t (209,439 lbs.)	95 t (209,439 lbs.)	105 t (231,485 lbs.)	105 t (231,485 lbs.)	130 t (286,601 lbs.)	130 t (286,601 lbs.)
Payload to TLI/Moon	> 27 t (59,525 lbs.)	> 27 t (59,525 lbs.)	38 t (84,000 lbs.)	42 t (93,000 lbs.)	43 t (95,000 lbs.)	46 t (101,000 lbs.)
Payload Volume	516 ft ³ (14.6 m ³)	8,118 ft ³ (230 m ³)	10,100 ft ³ (286 m ³)**	21,930 ft ³ (621 m ³)	10,100 ft ³ (286 m ³)**	34,910 ft ³ (989 m ³)

Low Earth orbit (LEO) represents a typical 200 km circular orbit at 28.5 degrees inclination

Translunar injection (TLI) is a propulsive maneuver used to set a spacecraft on a trajectory that will cause it to arrive at the Moon. A spacecraft performs TLI to begin a lunar transfer from a low circular parking orbit around Earth.

The numbers depicted here indicate the mass capability at the TLI point.



SLS Block 1 Crew

SLS Block 1 Cargo

SLS Block 1B Crew

SLS Block 1B Cargo

SLS Block 2 Crew

SLS Block 2 Cargo

** Not including Orion/Service Module volume

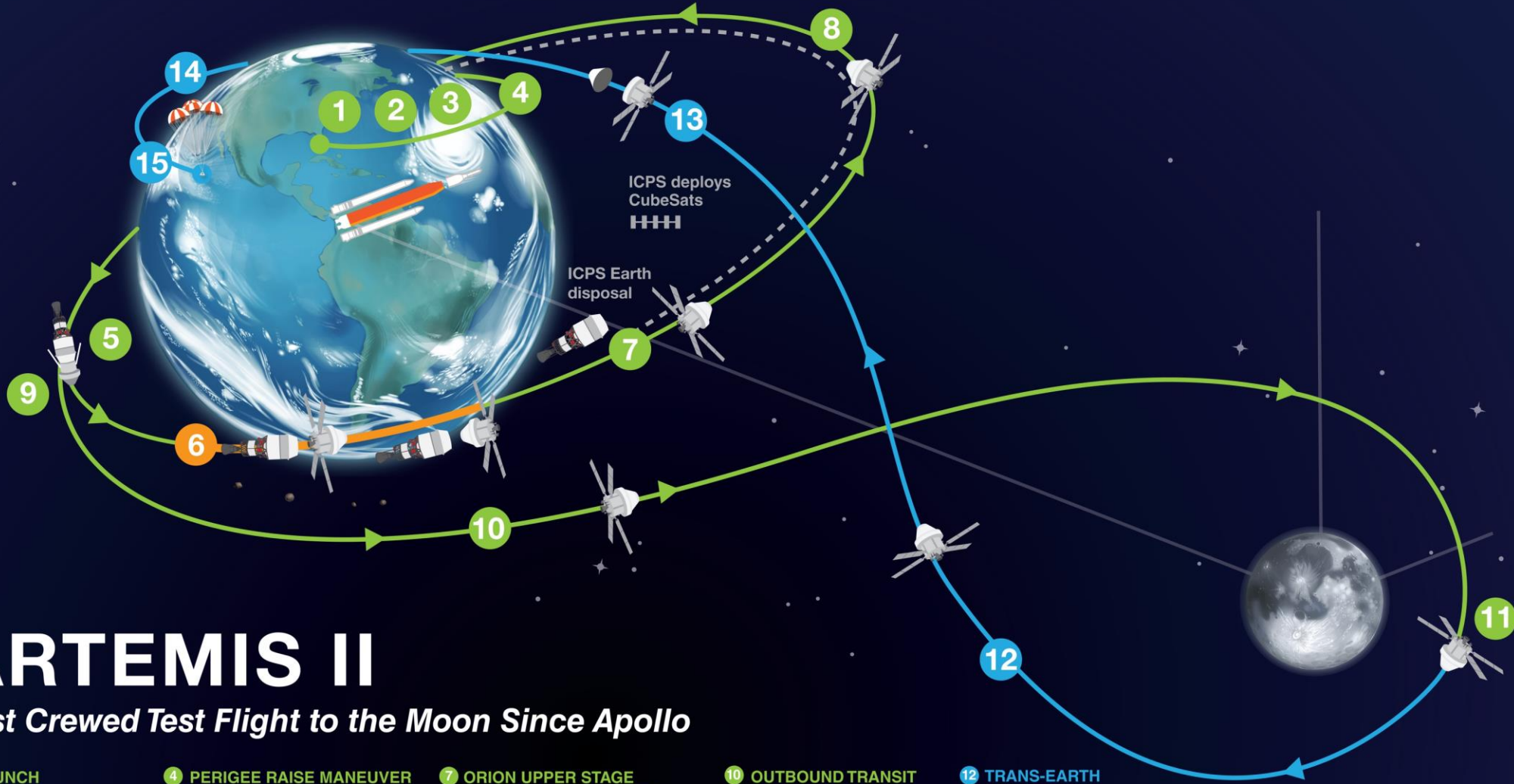
Maximum Thrust	8.8 M lbs.	8.8 M lbs.	8.84 M lbs.	8.84 M lbs.	9.44 M lbs.	9.44 M lbs.
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SLS (SPACE LAUNCH SYSTEM)

BASIC STATISTICS

- **Height:** 322 ft. including Orion spacecraft (Block 1)
- **Diameter:** Core stage - 27.6 ft.; Boosters - 12 ft.
- **Thrust:** 8.8 M lbs.
- **Weight:** 5.75 M lbs. at liftoff; 3.5 M lbs. unfueled with Orion
- **Upper Stage:** Interim cryogenic propulsion stage (ICPS) (Block 1); Exploration Upper Stage (EUS) (Block 1B/2)
- **Payload:** Orion spacecraft and more
- **Payload Capacity:** 59k lbs. to TLI in crewed Block 1 configuration
 - 84k lbs. to TLI in crewed Block 1B configuration
 - 95k lbs. to TLI in crewed Block 2 configuration





ARTEMIS II

First Crewed Test Flight to the Moon Since Apollo

- 1 LAUNCH**
Astronauts lift off from Launch Pad 39B at Kennedy Space Center.
- 2 JETTISON SOLID ROCKET BOOSTERS, FAIRINGS, AND LAUNCH ABORT SYSTEM**
- 3 CORE STAGE MAIN ENGINE CUT OFF**
With separation.
- 4 PERIGEE RAISE MANEUVER**
- 5 APOGEE RAISE BURN TO HIGH EARTH ORBIT**
Begin 23.5-hour checkout of spacecraft.
- 6 ORION SEPARATION FROM INTERIM CRYOGENIC PROPULSION STAGE (ICPS) FOLLOWED BY PROX OPS DEMO**
Plus manual handling qualities assessment for up to 2 hours.
- 7 ORION UPPER STAGE SEPARATION (USS) BURN**
Begins high Earth orbit checkout. Life support, exercise, and habitation equipment evaluations.
- 8 PERIGEE RAISE BURN**
- 9 TRANS-LUNAR INJECTION (TLI) BY ORION'S MAIN ENGINE**
Lunar free return trajectory initiated with European service module.
- 10 OUTBOUND TRANSIT TO MOON**
Outbound trajectory correction (OTC) burns as necessary for lunar free return trajectory; travel time approximately 4 days.
- 11 LUNAR FLYBY**
4,607 miles/7,414 km (mean) lunar far side altitude.
- 12 TRANS-EARTH RETURN**
Return trajectory correction (RTC) burns as necessary to aim for Earth's atmosphere; travel time approximately 4 days.
- 13 CREW MODULE SEPARATION FROM SERVICE MODULE**
- 14 ENTRY INTERFACE (EI)**
Enter Earth's atmosphere.
- 15 SPLASHDOWN**
Ship recovers astronauts and capsule.

PROXIMITY OPERATIONS DEMONSTRATION SEQUENCE	9
1	10
2	11
3	12
4	13
5	14
6	15
7	16
8	17



THE ARTEMIS II CREW

The Artemis II crew represents thousands of people working tirelessly to bring us to the stars. This is their crew. This is our crew. This is humanity's crew.



Jeremy Hansen

Mission Specialist

CSA (Canadian Space Agency) Astronaut



Reid Wiseman

Commander

NASA Astronaut



Victor Glover

Pilot

NASA Astronaut

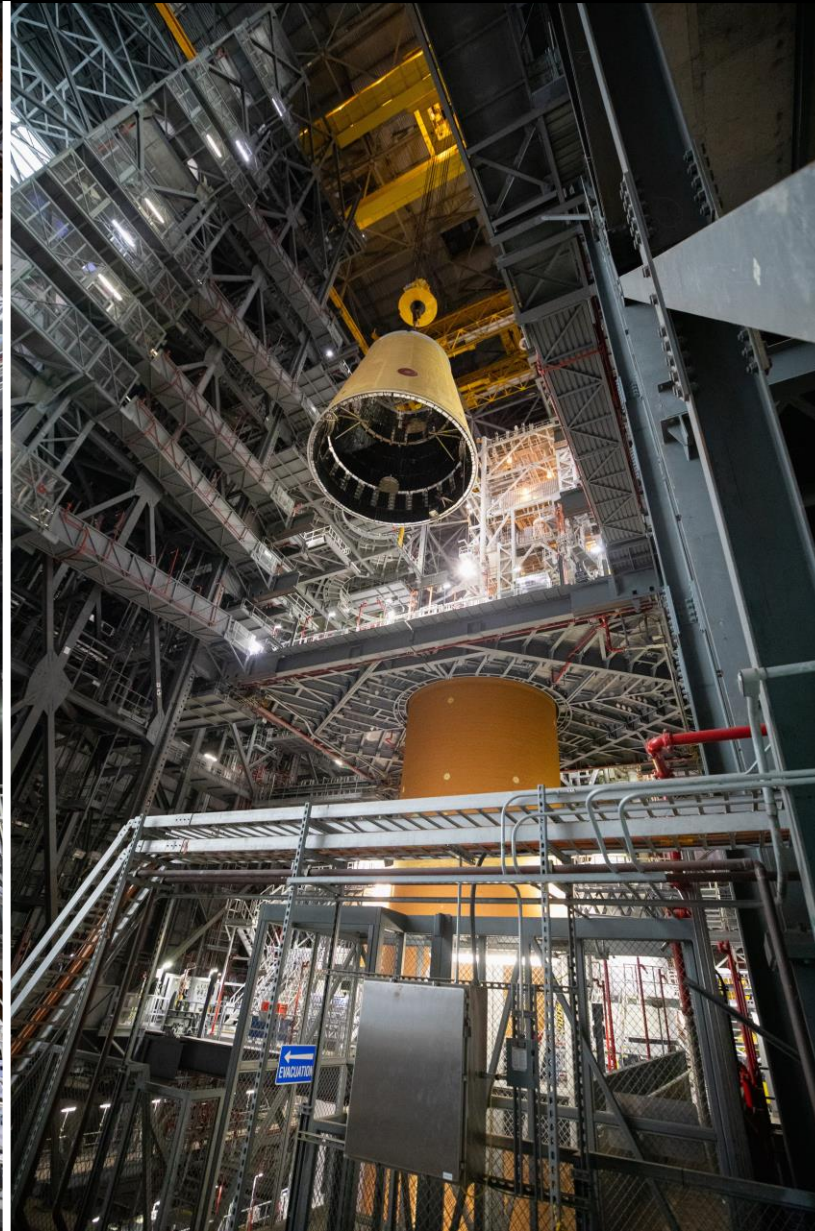


Christina Hammock Koch

Mission Specialist

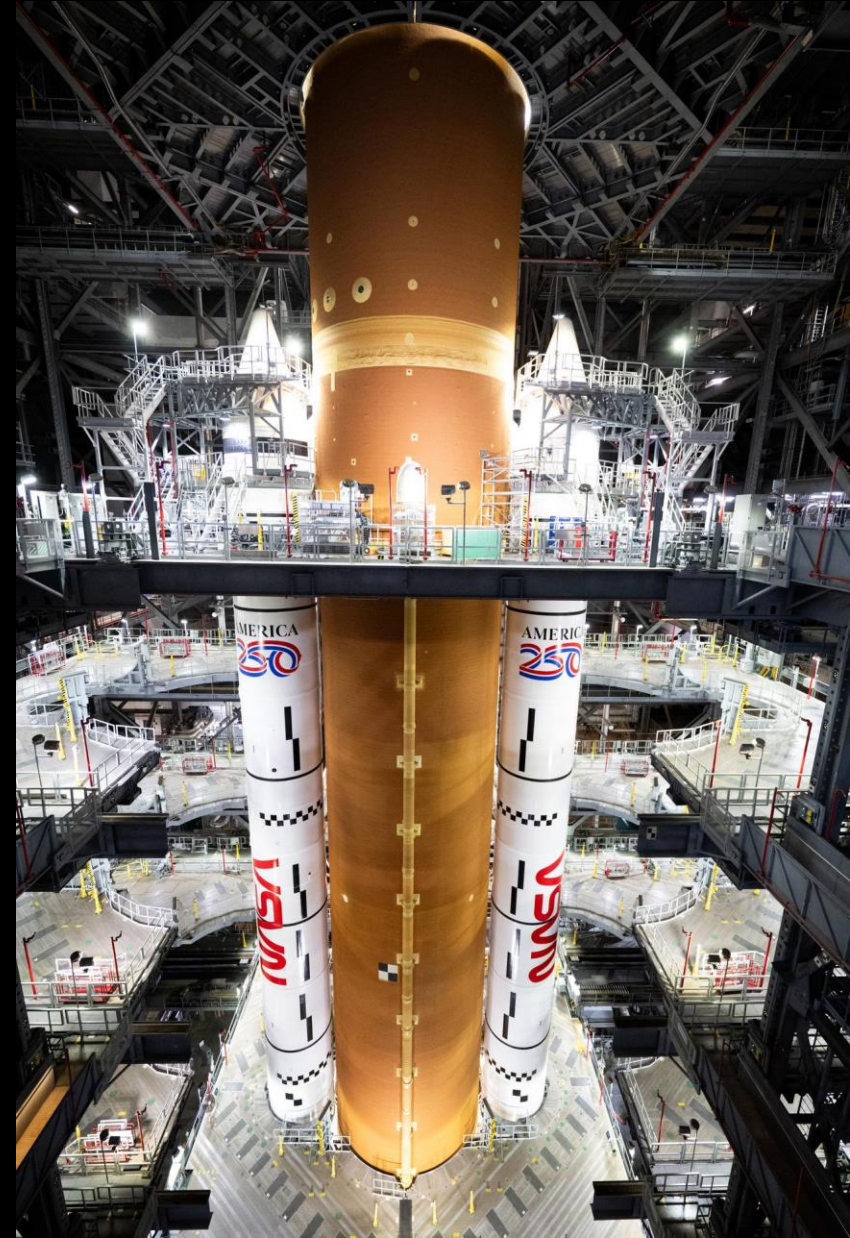
NASA Astronaut

ARTEMIS II PROGRESS – SLS

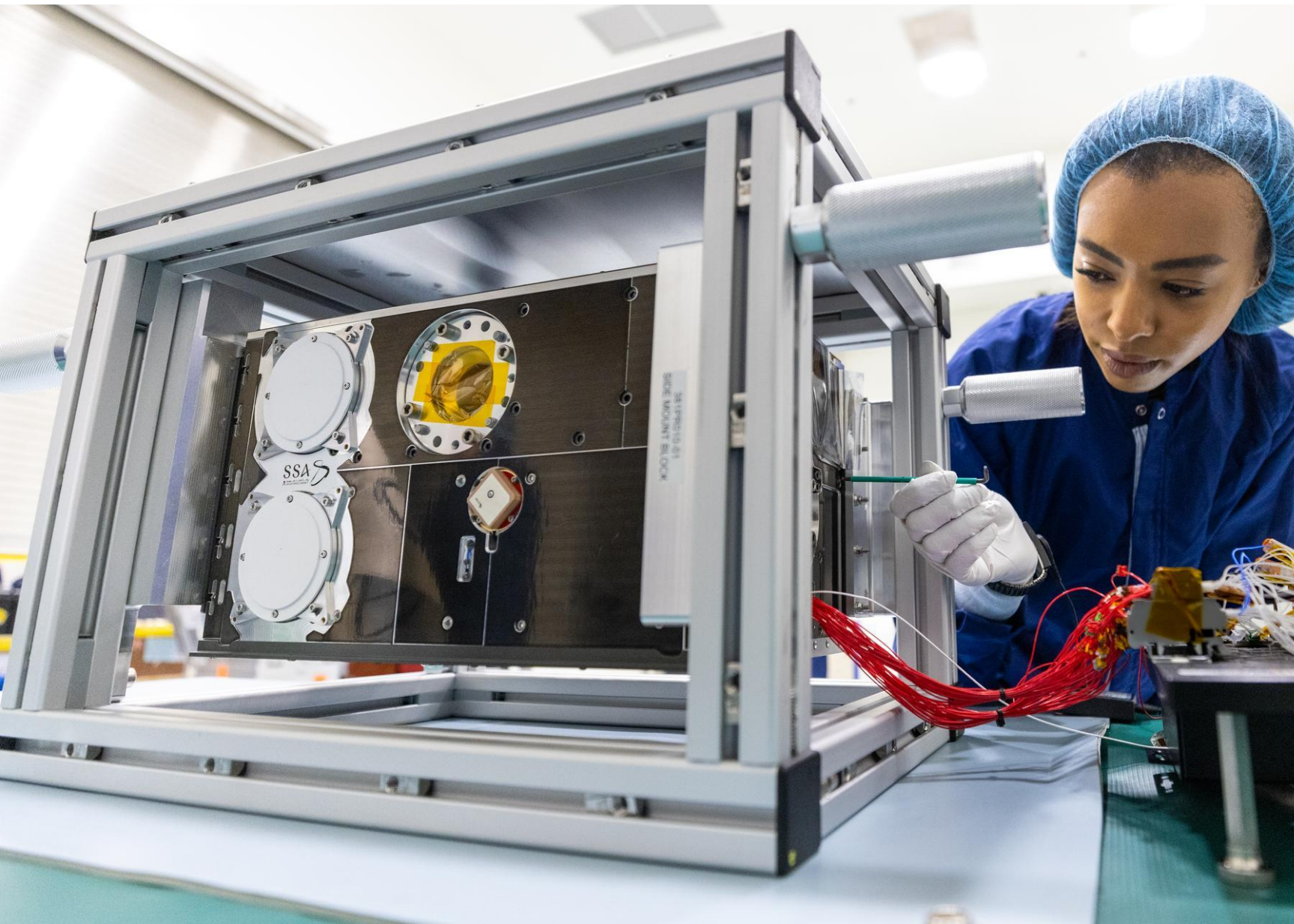


ARTEMIS II SLS NOTABLE DIFFERENCES

- **ADDED:** Optical targets on the ICPS and Orion stage adapter
- **ADDED:** Strakes to core stage intertank
- **ADDED:** America 250 emblem
- **ADJUSTED:** Booster separation motor angle
- **ADJUSTED:** Booster jettison time
- **ENABLED:** Emergency detection system on ICPS
- **IMPROVED:** Navigation and communications
- **UPDATED:** Core stage power distribution control unit

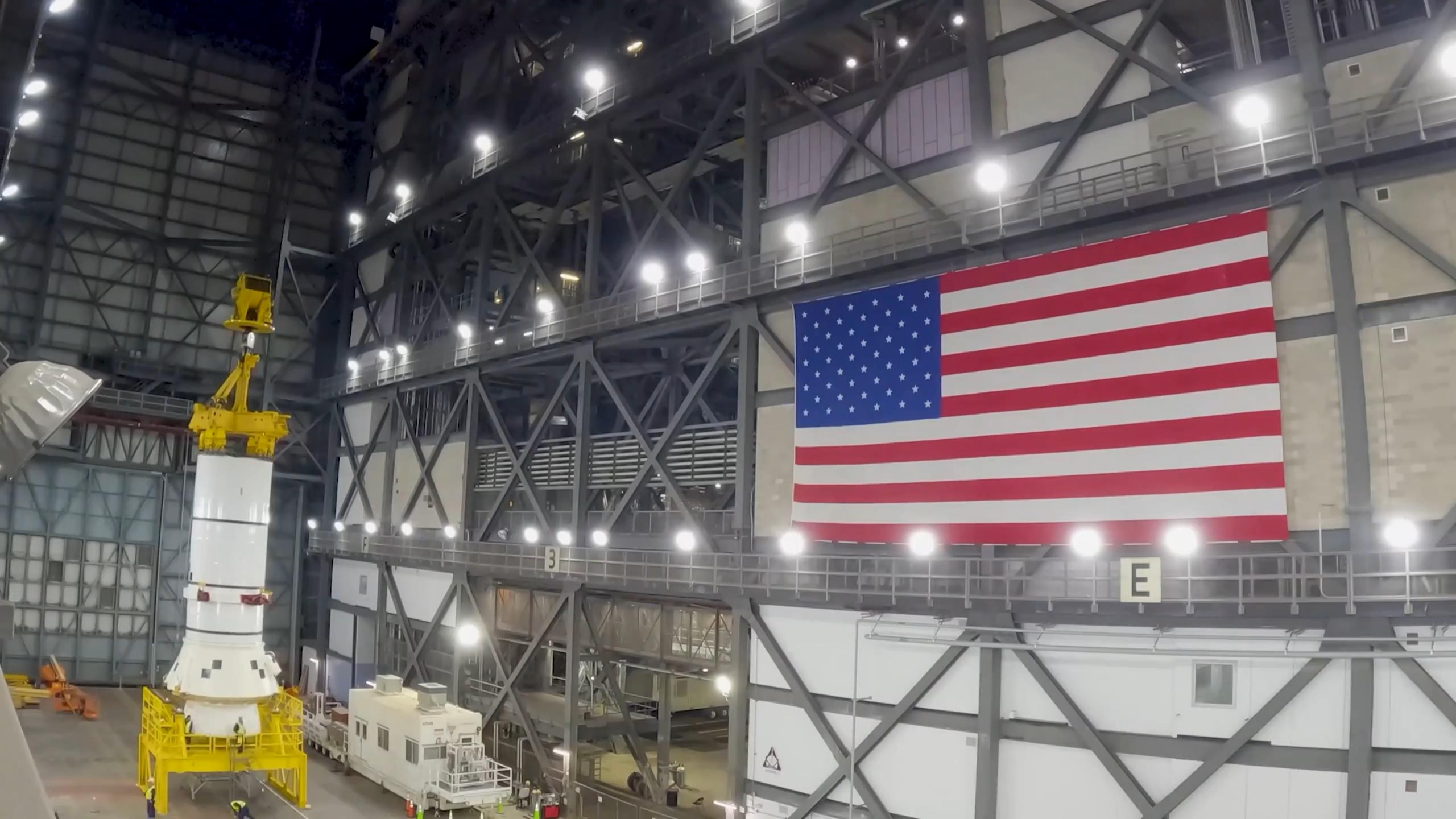


ARTEMIS II SECONDARY PAYLOADS



ARTEMIS II PROGRESS – MISSION SIMULATIONS

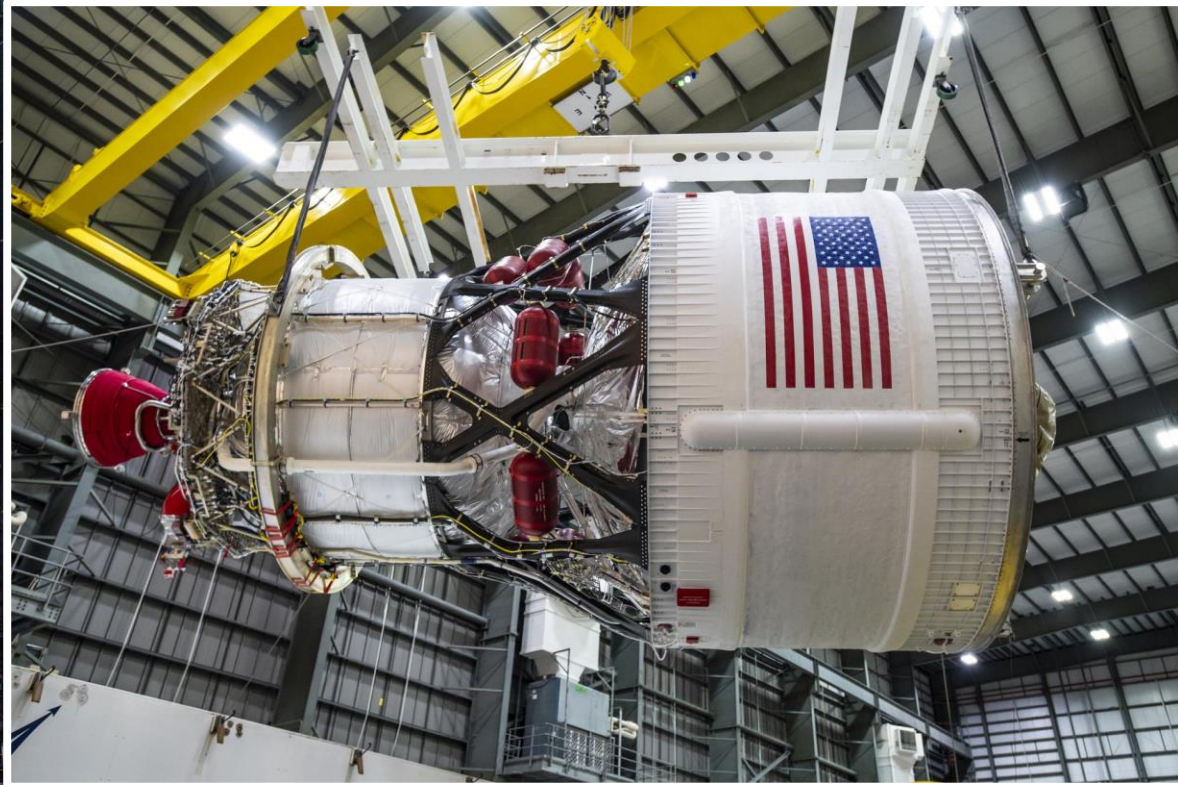
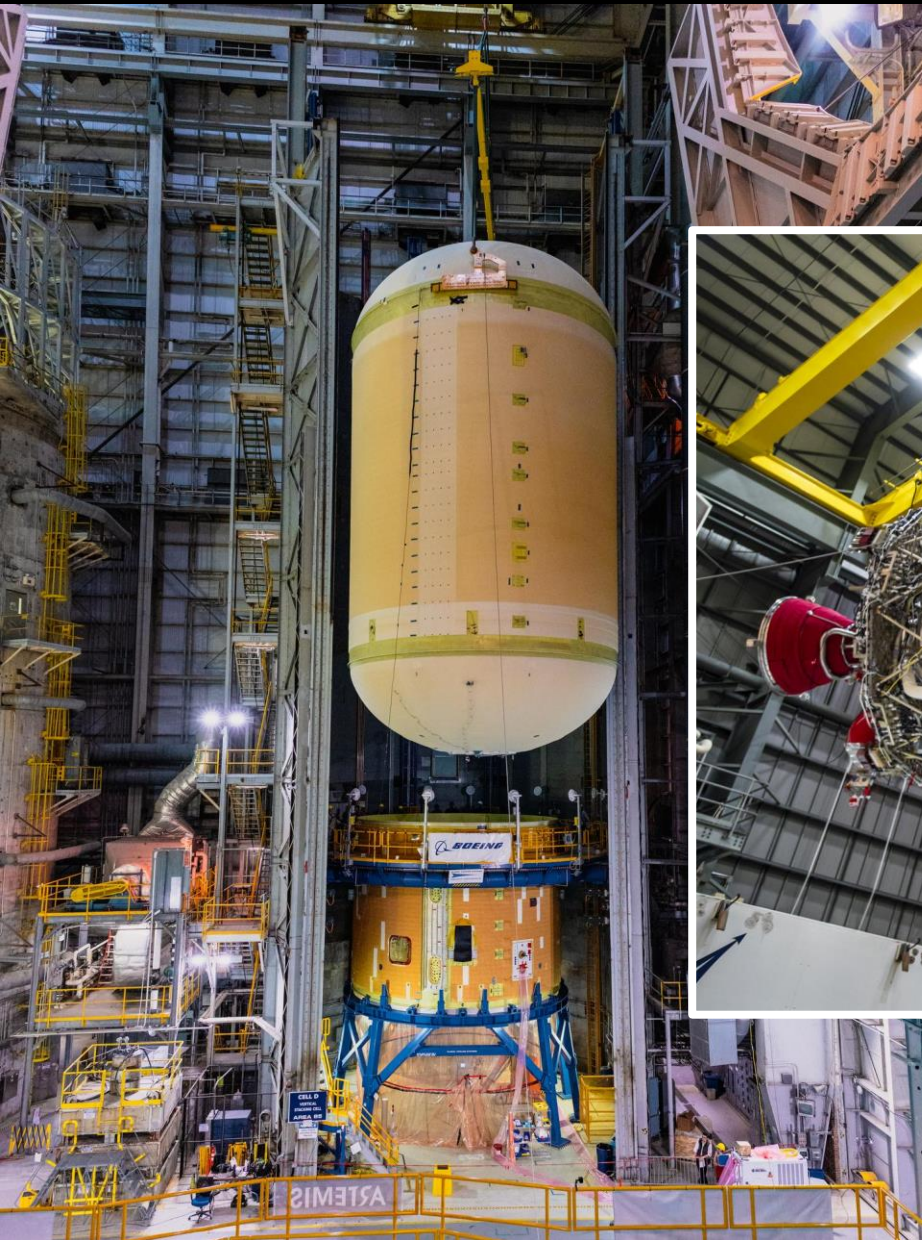




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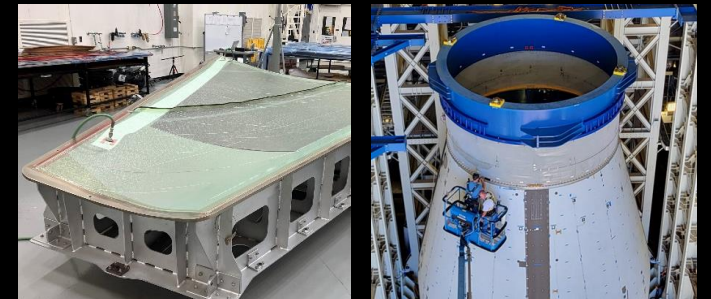
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SLS PROGRESS TOWARD ARTEMIS III



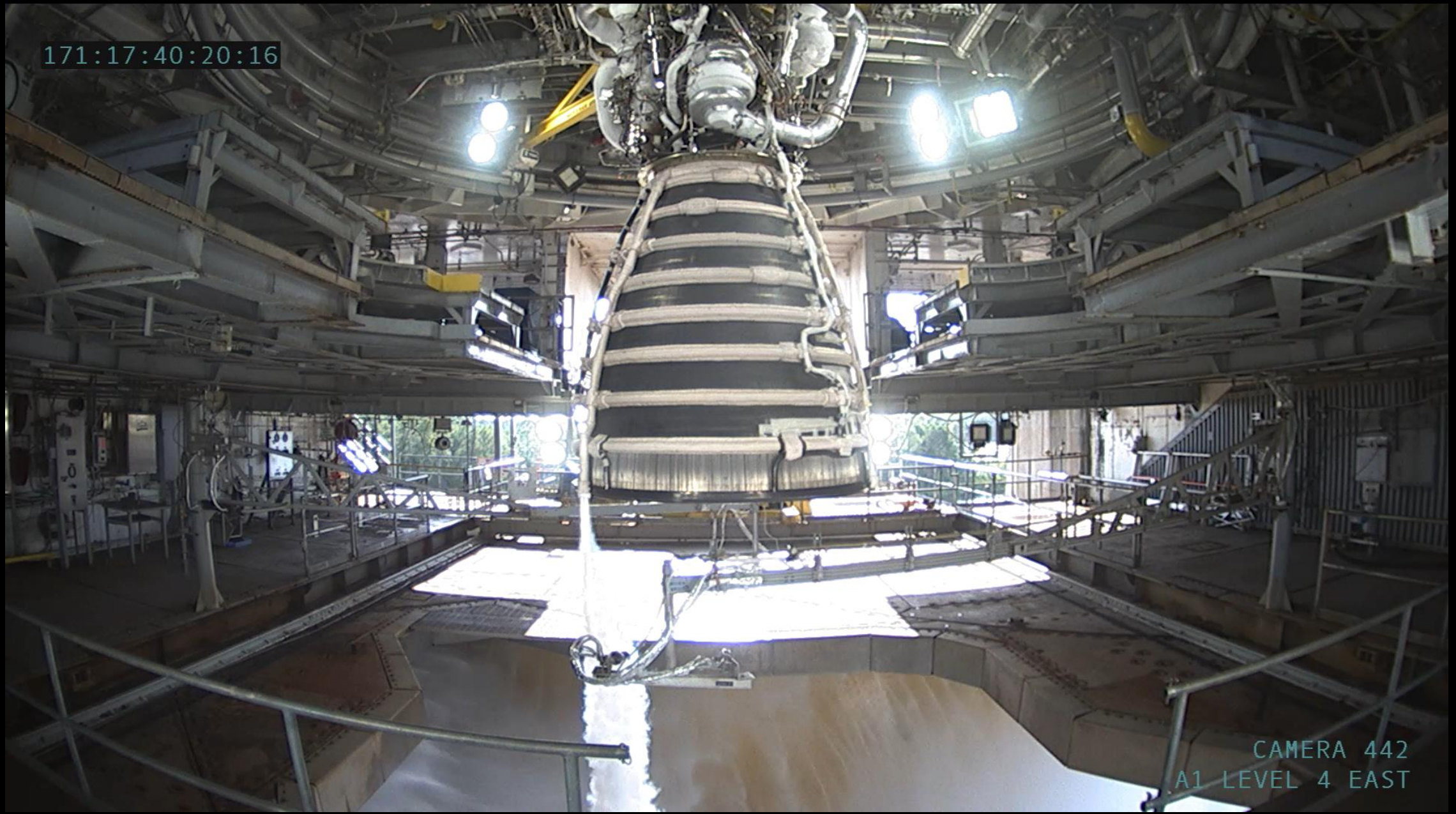
SLS PROGRESS TO BLOCK 1B AND BEYOND

ARTEMIS IV



ARTEMIS V & BEYOND

SLS RS-25 CERTIFICATION



171:17:40:20:16

CAMERA 442
A1 LEVEL 4 EAST

THE BACKBONE OF ARTEMIS

HUMAN DEEP SPACE EXPLORATION CAPABILITY



SLS

The only rocket with the power and capability required to carry astronauts to deep space onboard the Orion spacecraft.

ORION

The only spacecraft capable of carrying and sustaining crew on missions to deep space, providing emergency abort capability, and safe re-entry from lunar return velocities.

NATIONAL CAPABILITY

The SLS and Orion programs (including Exploration Ground Systems at NASA Kennedy Space Center) leverage over 3,800 suppliers and over 60,000 workers across all 50 states.



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