



NASA SPACE LAUNCH SYSTEM COMPLETES KEY HOTFIRE TEST AND BEGINS VEHICLE INTEGRATION

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THE POWER OF SLS AND ORION



ORION

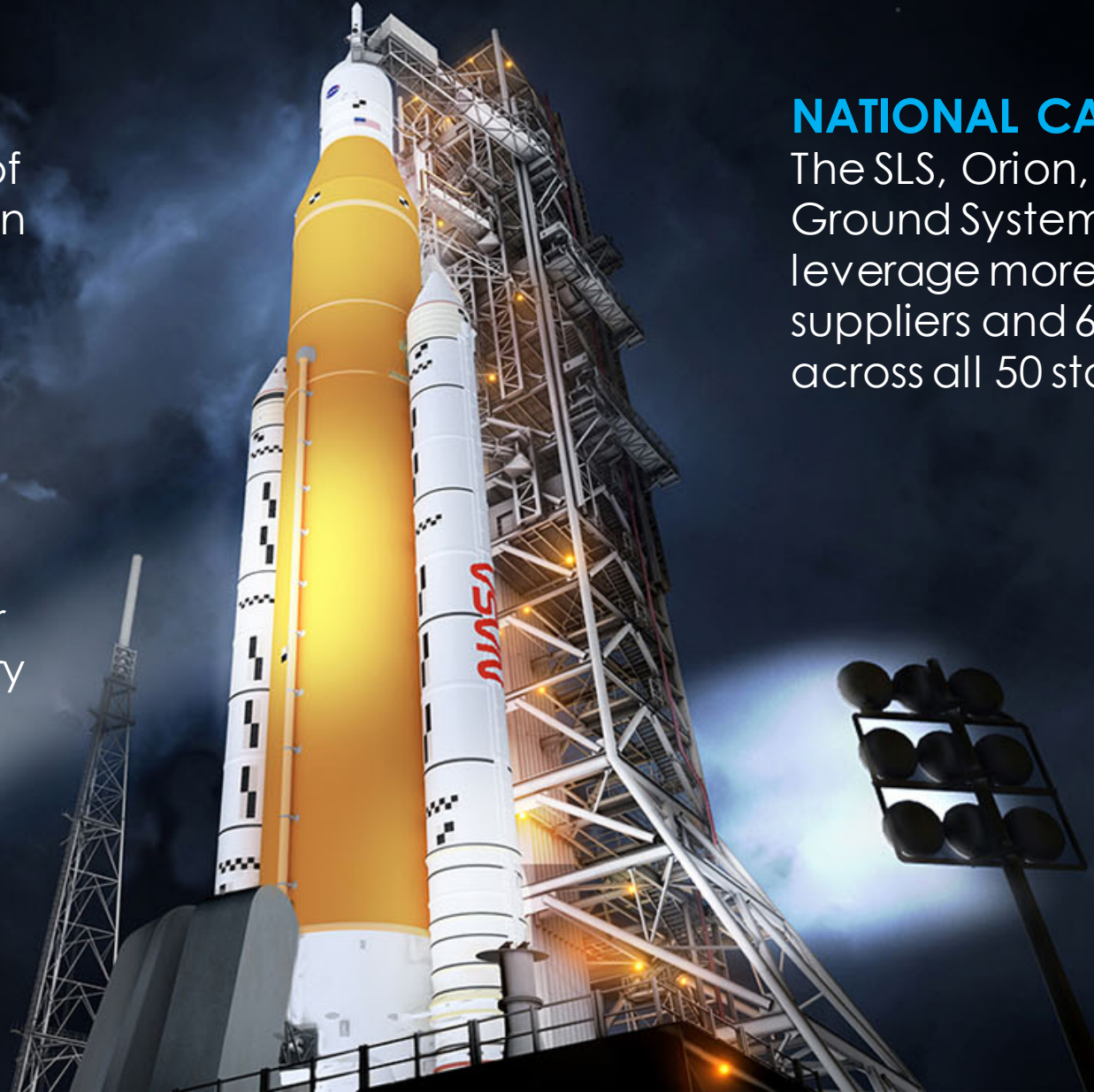
The only spacecraft capable of carrying and sustaining crew on missions to deep space, providing emergency abort capability, and safe re-entry from lunar return velocities

SLS

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

NATIONAL CAPABILITY

The SLS, Orion, and Exploration Ground Systems programs leverage more than 3,800 suppliers and 60,000 workers across all 50 states



THE POWER OF SLS

FOUNDATION FOR A GENERATION OF DEEP SPACE EXPLORATION

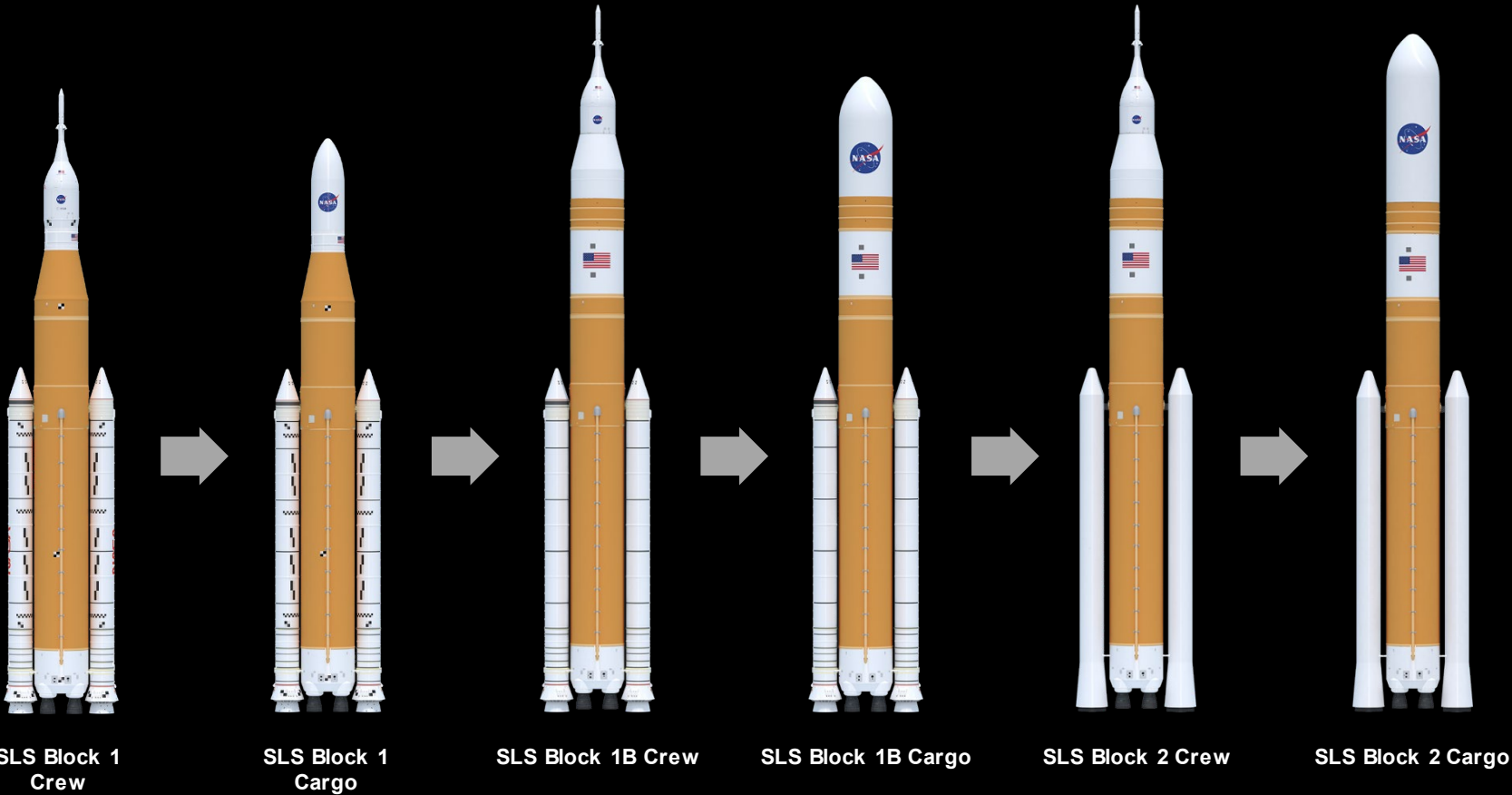


Payload to LEO	95 t (209.4k lbs)	95 t (209.4k lbs)	105 t (231.4k lbs)	105 t (231.4k lbs)	130 t (286.6k lbs)	130 t (286.6k lbs)
Payload to TLI/Moon	> 27 t (59.5k lbs)	> 27 t (59.5k lbs)	38 t (83.7k lbs)	42 t (92.5k lbs)	> 43 t (94.7k lbs)	> 46 t (101.4k lbs)
Payload Volume	516 ft³ (14.6 m³)	8,118 ft³ (229.9 m³)	10,100 ft³ (286 m³)**	21,930 ft³ (621.1 m³)	10,100 ft³ (286 m³)**	34,910 ft³ (988 m³)

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

Trans Lunar 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
Trans-Lunar Injection point.



** Not including Orion/Service
Module volume

Maximum Thrust	8.8 M lbs	8.8 M lbs	8.9 M lbs	8.9 M lbs	9.5 M lbs	9.5 M lbs
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NASA'S SPACE LAUNCH SYSTEM

UNIQUE CAPABILITY FOR HUMAN AND ROBOTIC EXPLORATION



VOLUME

- Block 1B/2: **Double the volume** of any currently flying heavy lift vehicle
- Only vehicle that can launch Orion and a **10 ton co-manifested payload** to the Moon



8.4 m x 27.4 m
fairing with
large-aperture
telescope

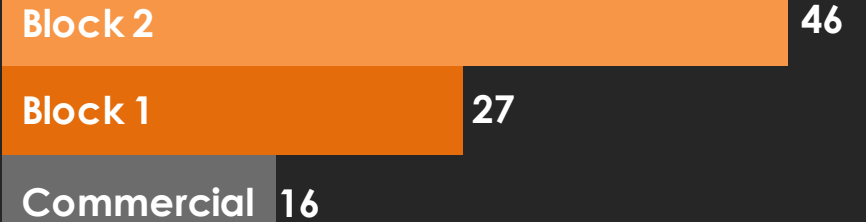


Orion with Co-
Manifested
Payloads

MASS

- Block 1: Launches **nearly 70% more mass** than any currently operational vehicle
- Block 2: Mars-enabling capability of **greater than 46 tons to the Moon** or **36 tons to Mars**

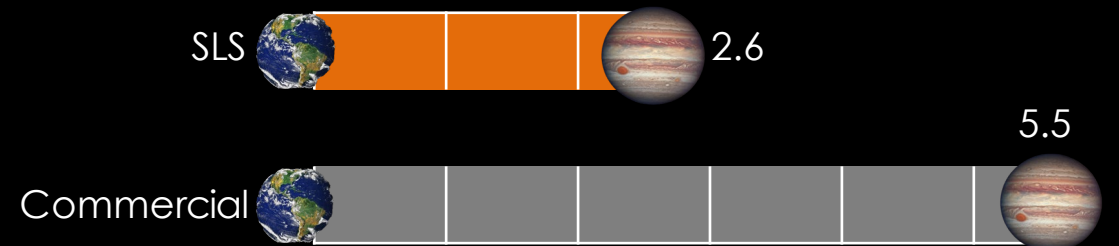
Mass to TLI (t)



DEPARTURE ENERGY

- Can **reduce transit times by half or greater** to the outer solar system
- Block 1B/2 provides **more frequent launch availability**

Transit time to Jupiter in years

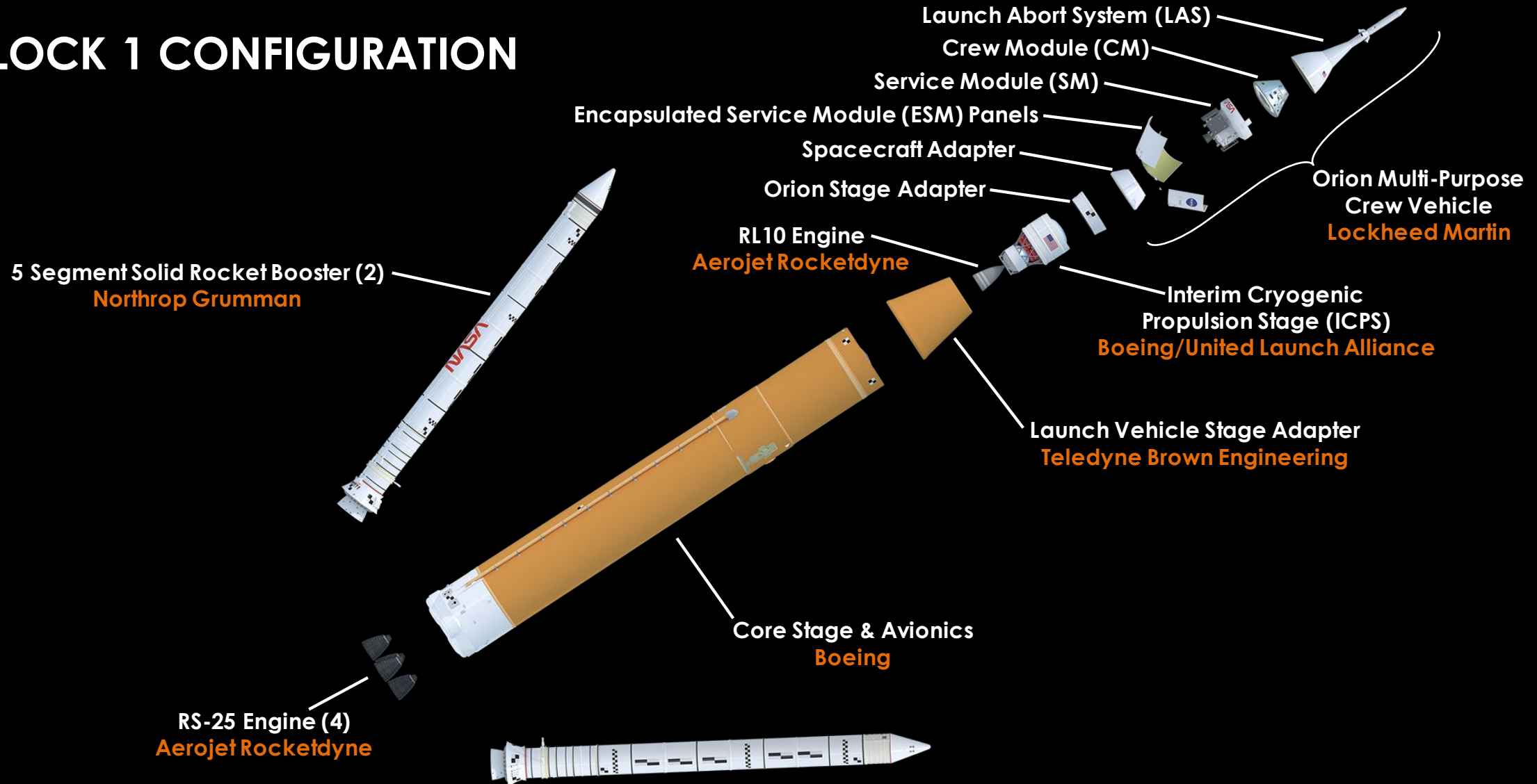


NASA'S SPACE LAUNCH SYSTEM

BACKBONE OF DEEP SPACE EXPLORATION



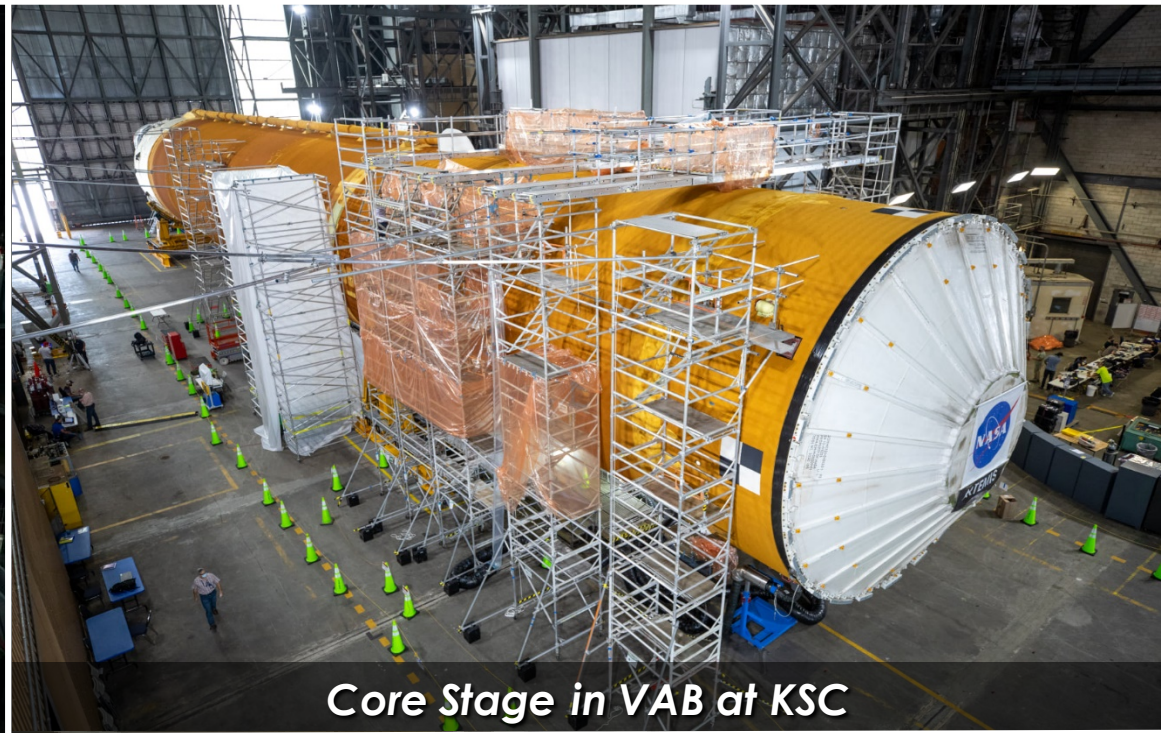
BLOCK 1 CONFIGURATION



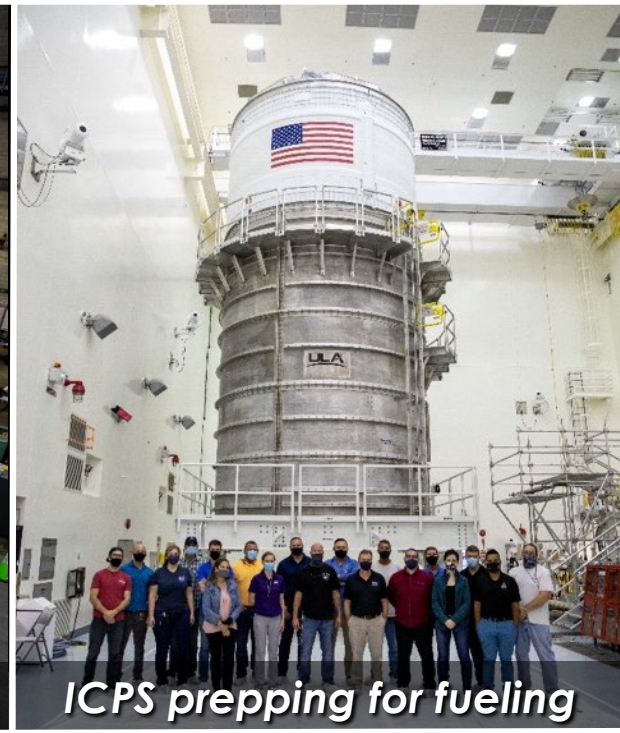
SLS ARTEMIS I ELEMENTS DELIVERED



Boosters stacked at KSC



Core Stage in VAB at KSC



ICPS prepping for fueling



Orion Stage Adapter complete

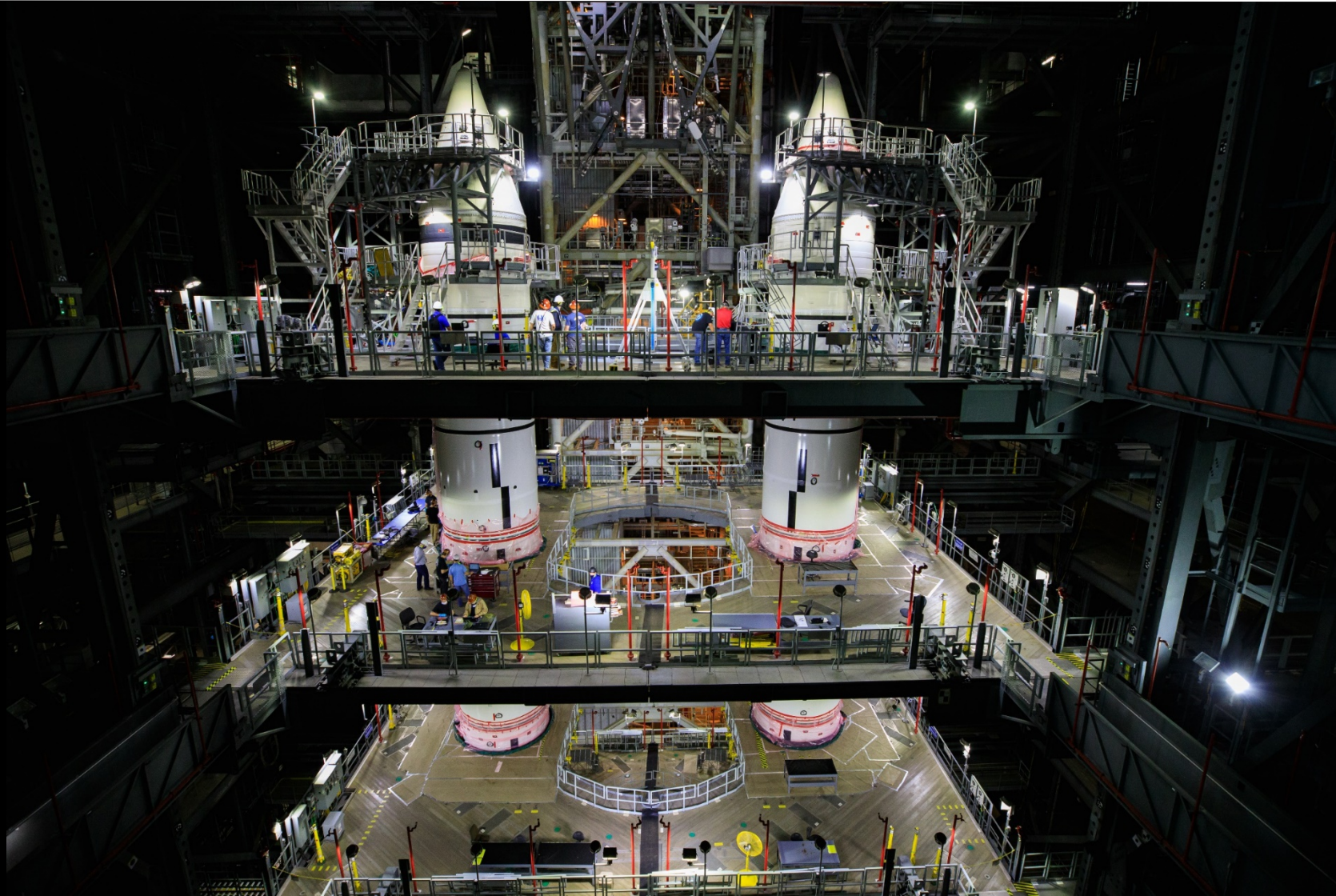


Core Stage engines
Green Run tested at SSC

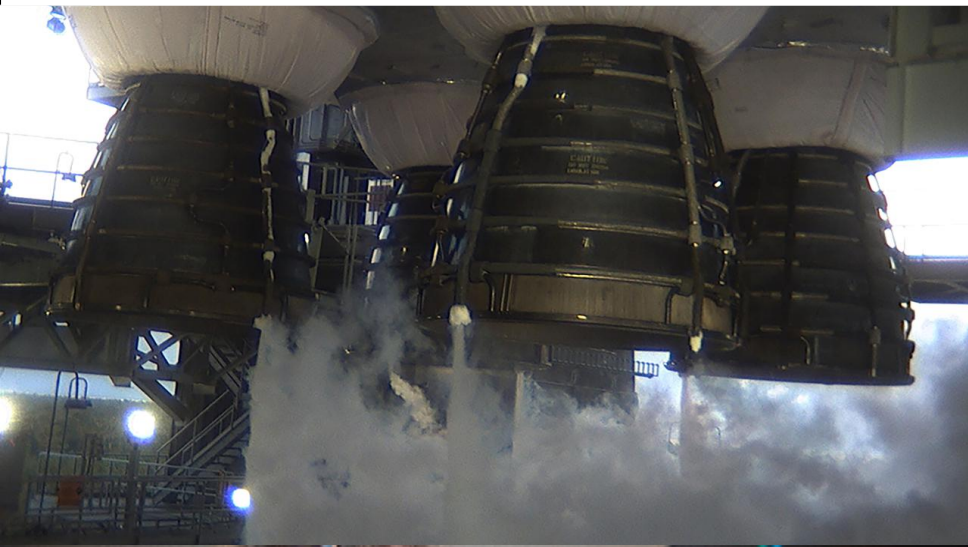


Launch Vehicle Stage
Adapter complete

SLS ARTEMIS I SOLID ROCKET BOOSTERS STACKED



GREEN RUN TEST SERIES COMPLETE



SPACE LAUNCH SYSTEM

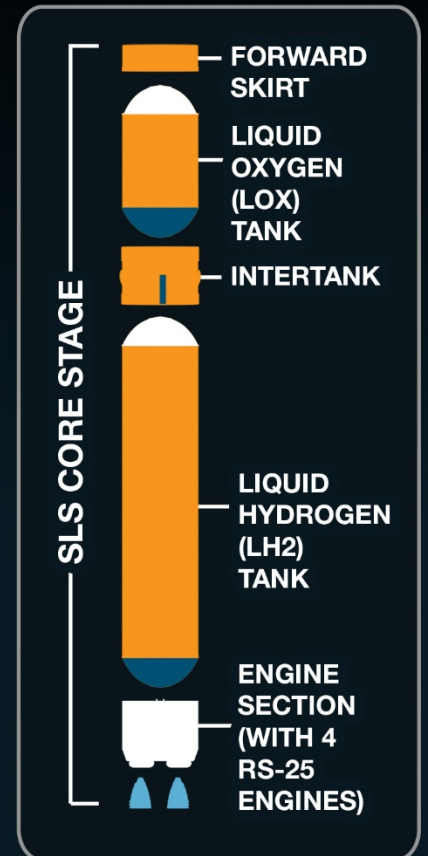
ARTEMIS TESTING: GREEN RUN CHECKLIST

TESTING THE WORLD'S LARGEST ROCKET STAGE

A total of eight Green Run tests minimize risk to the **ARTEMIS I** core stage and ensure the flight hardware satisfies design objectives and validates design models:

- | | | |
|---------------|----------------------------------------------------------------------------------------------|---|
| TEST 1 | Apply forces simulating launch to the unpowered, suspended core stage. | ✓ |
| TEST 2 | Turn on and check out core stage avionics. | ✓ |
| TEST 3 | Simulate potential issues to test systems that shut down other systems if there's a problem. | ✓ |
| TEST 4 | Test main propulsion system components that connect to the engines. | ✓ |
| TEST 5 | Test thrust vector controls and check out all the related hydraulic systems. | ✓ |
| TEST 6 | Simulate launch countdown to validate timeline and sequence of events. | ✓ |
| TEST 7 | Load and drain more than 700,000 gallons of cryogenic propellants. | ✓ |
| TEST 8 | Fire all four RS-25 engines for up to 8 minutes. | ✓ |

National Aeronautics and
Space Administration



#ARTEMIS

GREEN RUN HOT FIRE TEST COMPLETE



SLS ARTEMIS I CORE STAGE DELIVERED



RS-25 PRODUCTION RESTARTED



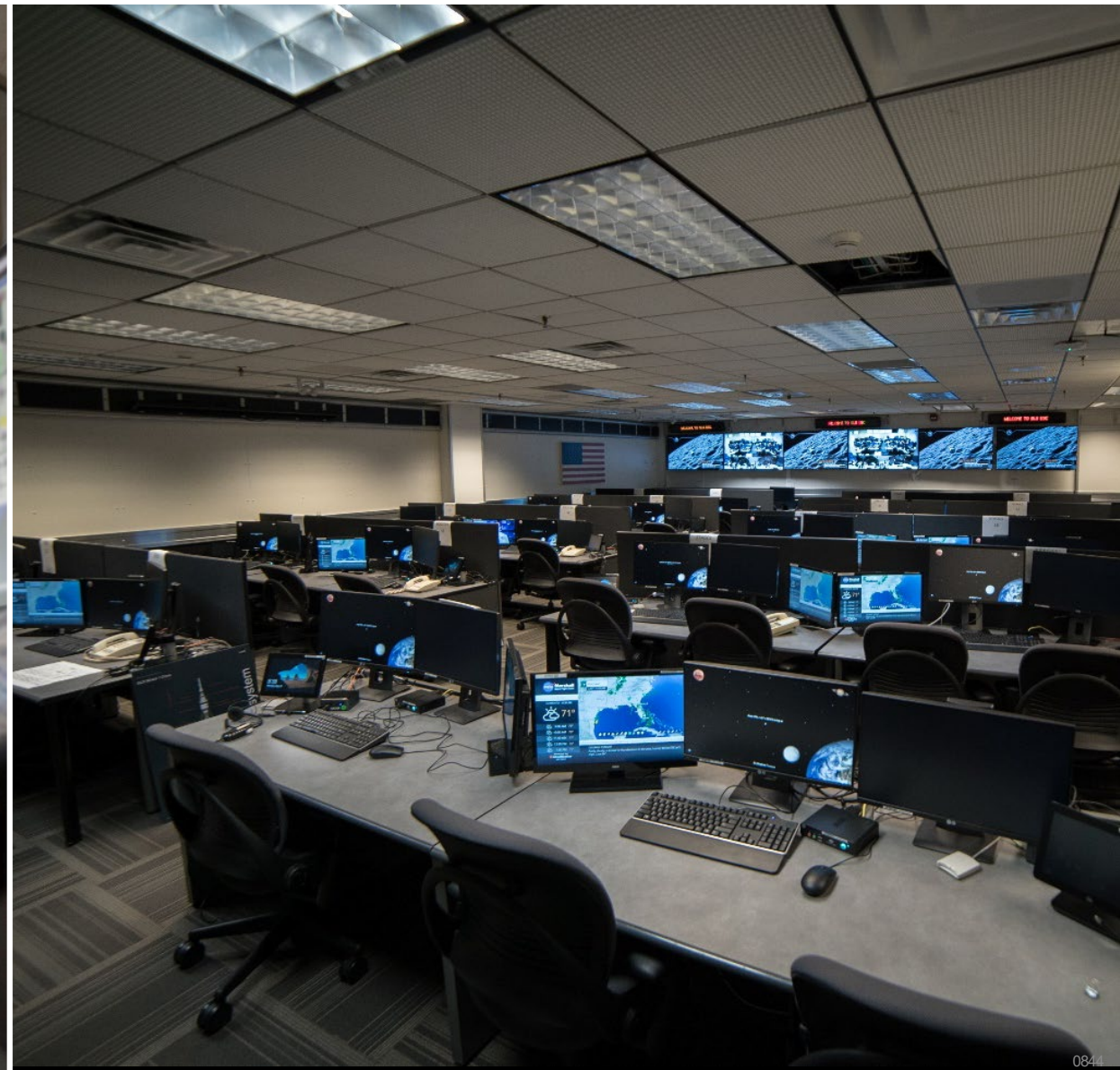
SLS ARTEMIS I ICPS IN-SPACE STAGE DELIVERED



SLS ARTEMIS I ADAPTERS DELIVERED



MISSION SIMULATIONS UNDER WAY



SLS PROGRESS TOWARD ARTEMIS II



Booster motor segments complete



ICPS RL10 engine complete



Intertank complete



Major join in progress; LH2 tank



RS-25 engines complete

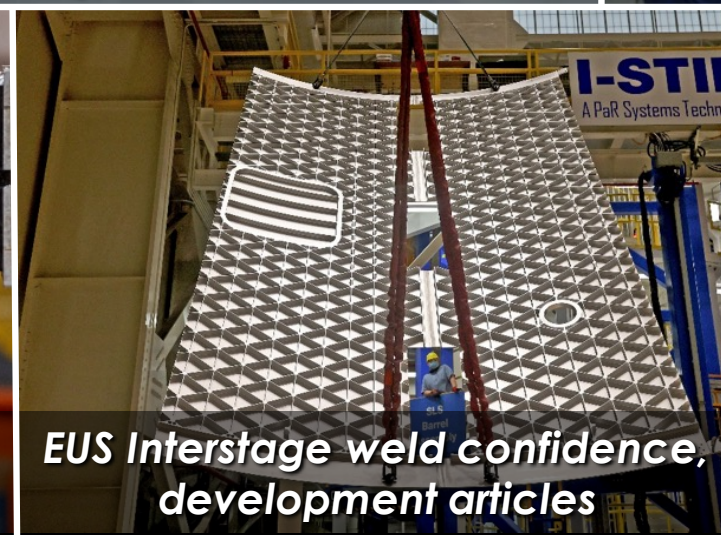
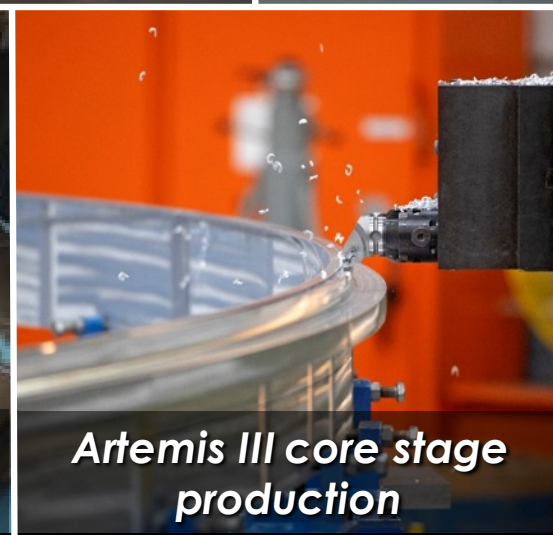
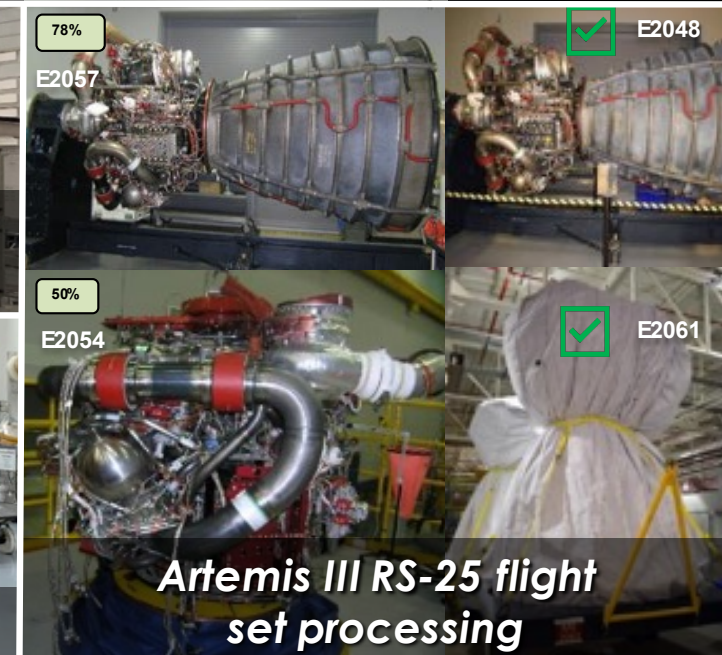
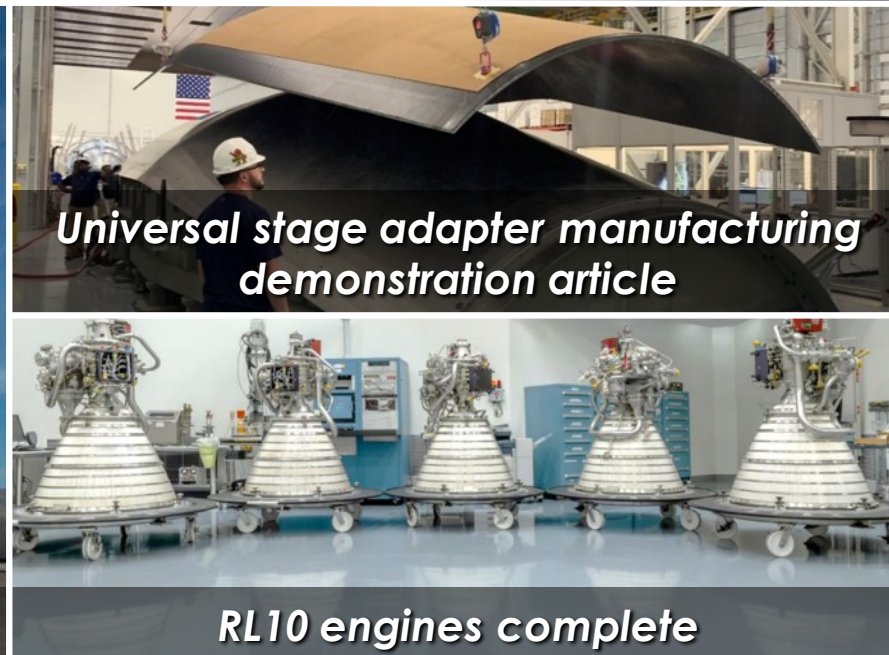


LVSA welding at MSFC



ICPS LOX tank

SLS PROGRESS TOWARD ARTEMIS III AND BEYOND





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