

National Aeronautics and Space Administration

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SPACE LAUNCH SYSTEM

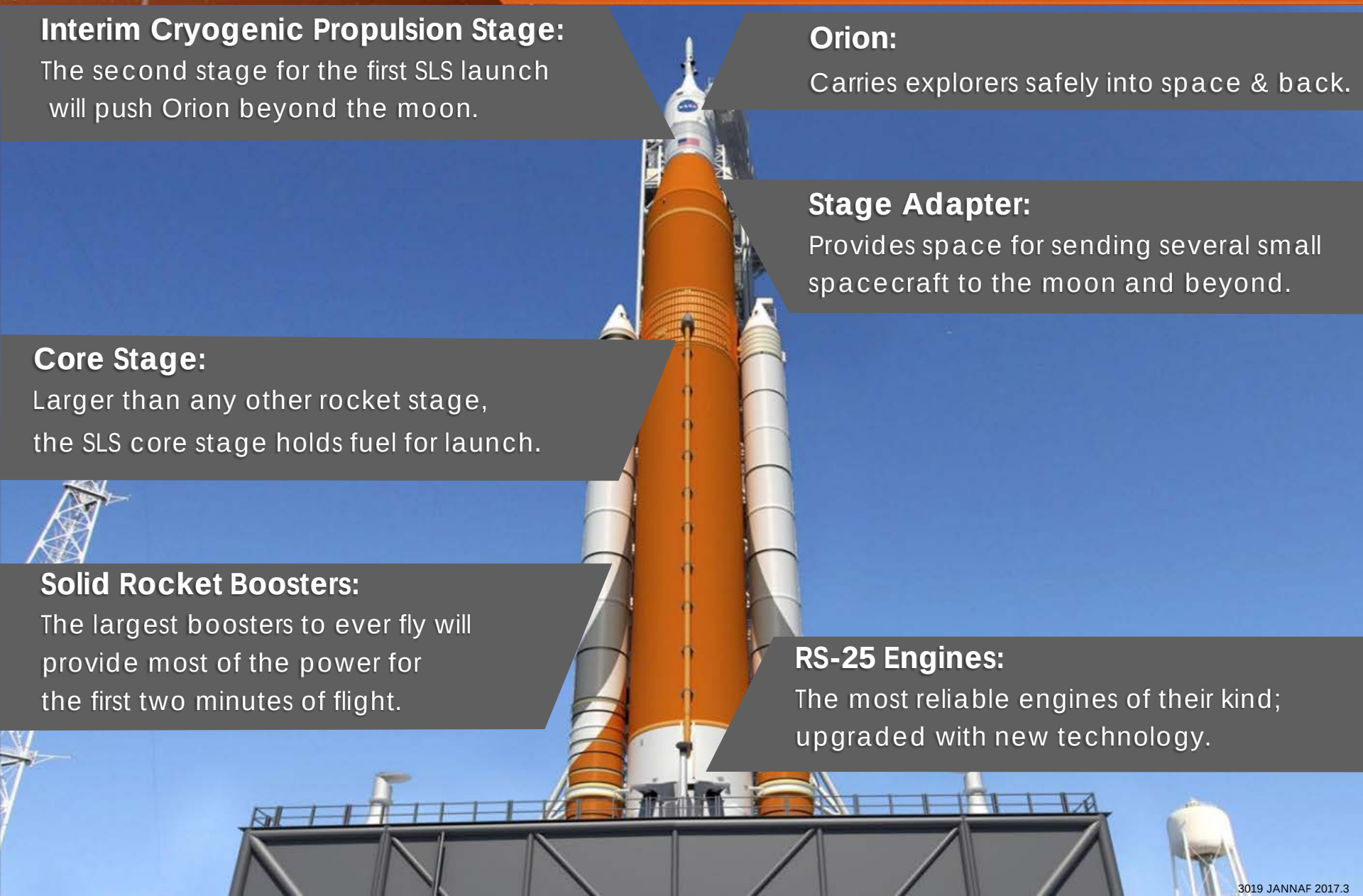
NASA’s Space Launch System Takes Shape

Bruce Askins,
SLS Infrastructure Management Lead
NASA Marshall Space Flight Center

EXPANDING HUMAN PRESENCE



NASA'S SPACE LAUNCH SYSTEM:
AMERICA'S NEXT GREAT ROCKET



Interim Cryogenic Propulsion Stage:
The second stage for the first SLS launch will push Orion beyond the moon.

Orion:
Carries explorers safely into space & back.

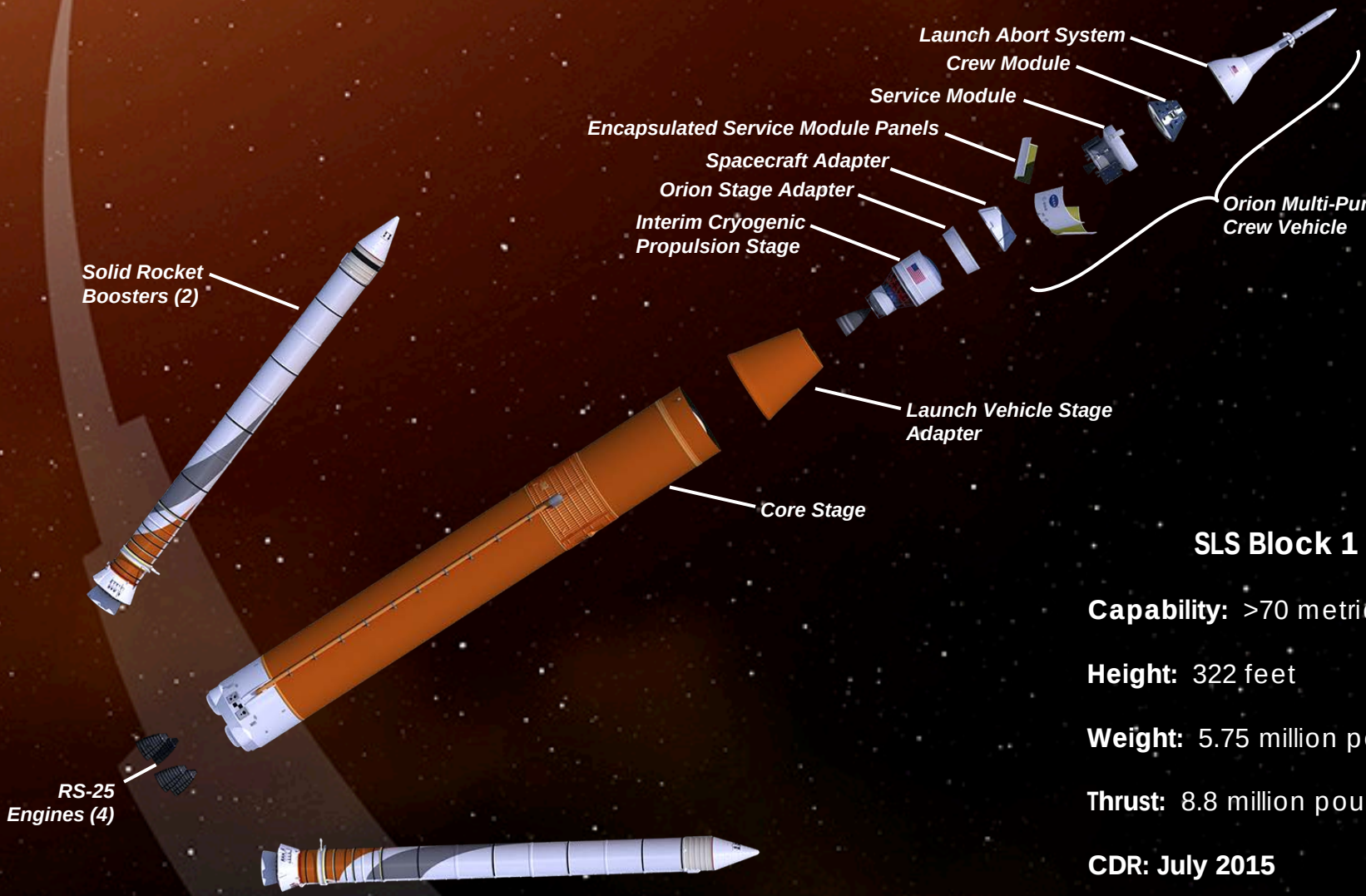
Stage Adapter:
Provides space for sending several small spacecraft to the moon and beyond.

Core Stage:
Larger than any other rocket stage, the SLS core stage holds fuel for launch.

Solid Rocket Boosters:
The largest boosters to ever fly will provide most of the power for the first two minutes of flight.

RS-25 Engines:
The most reliable engines of their kind; upgraded with new technology.

BLOCK 1 EXPANDED VIEW



SLS Block 1

Capability: >70 metric tons

Height: 322 feet

Weight: 5.75 million pounds

Thrust: 8.8 million pounds

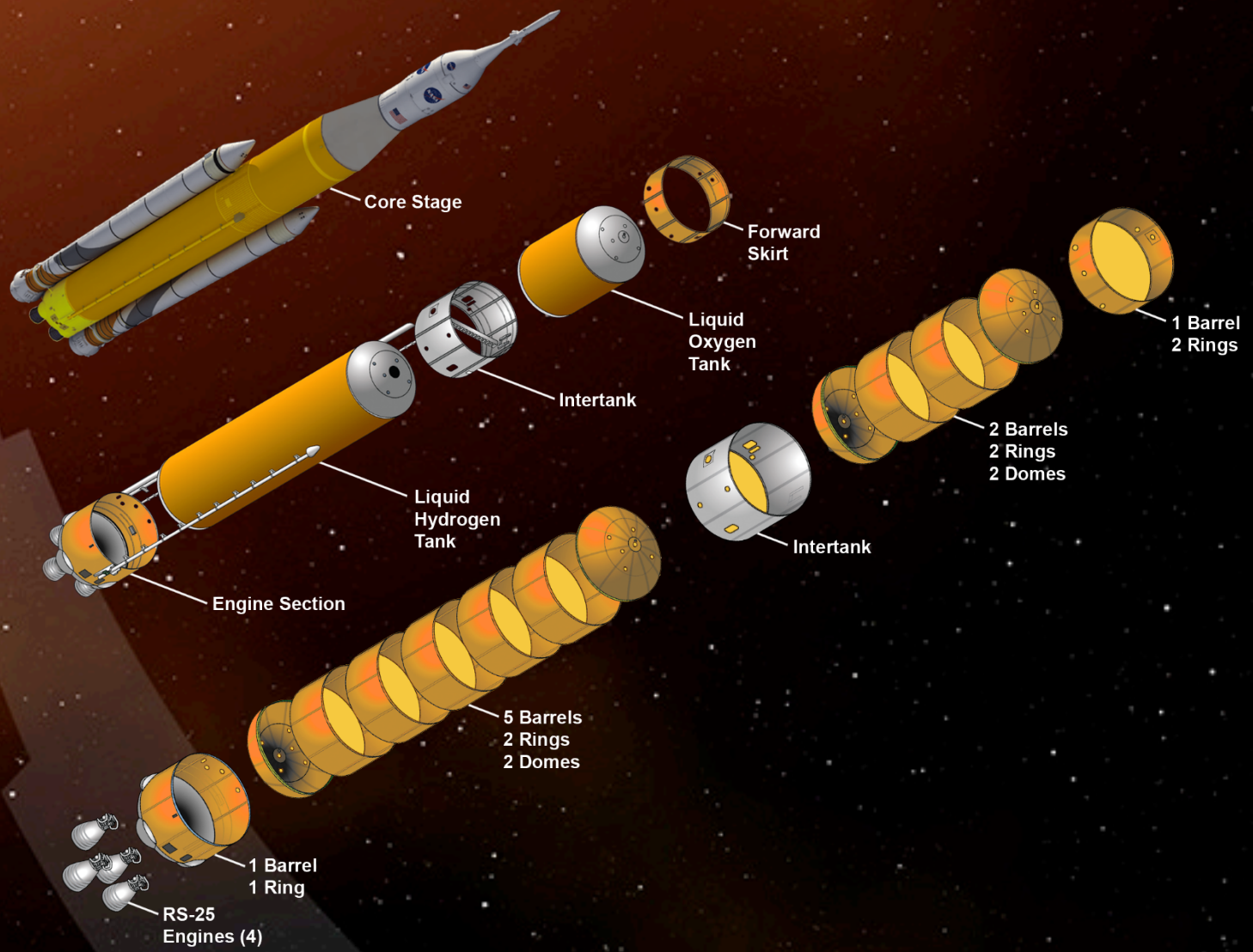
CDR: July 2015

Available: 2018

SLS SPACE LAUNCH SYSTEM

www.nasa.gov/sls

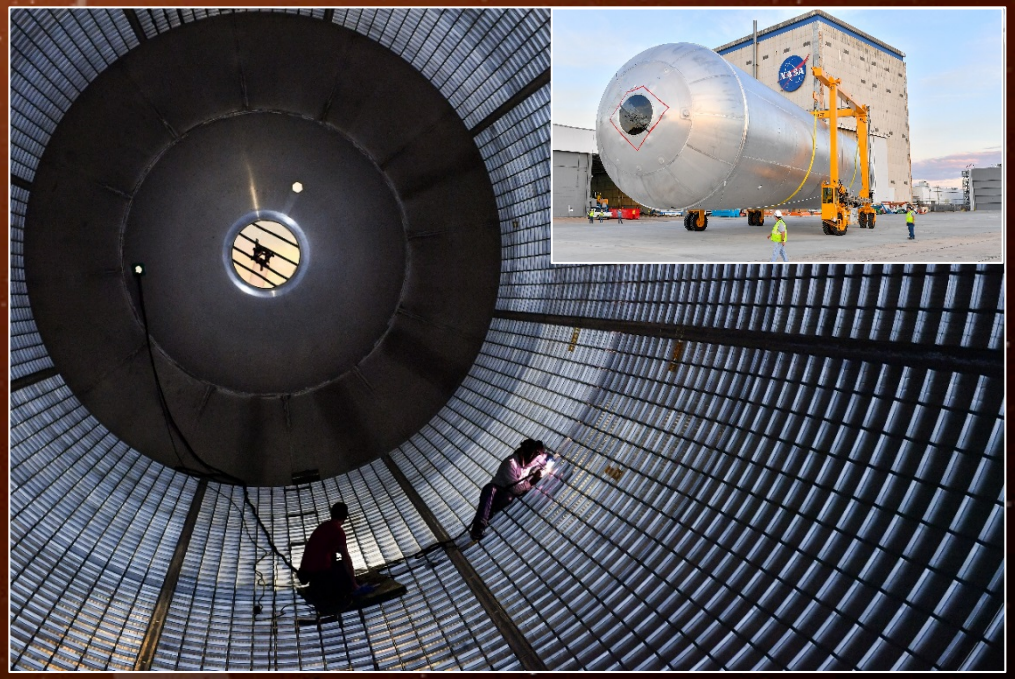
CORE STAGE DESIGN



SLS SPACE LAUNCH SYSTEM

www.nasa.gov/sls

CORE STAGE MANUFACTURING PROGRESS



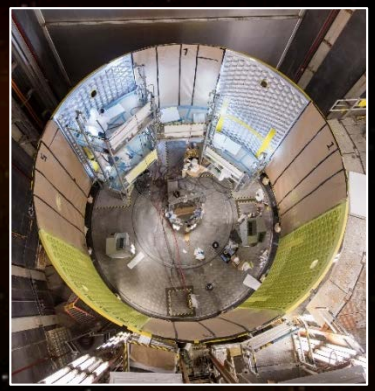
Liquid hydrogen qualification tank



LOX WCA on VAC



Pegasus arrives at MAF





Engine section qual article outfitting and rollout to barge

CORE STAGE STRUCTURAL QUALIFICATION TESTS

Forward Skirt

Qualify by Analysis

LOX Tank



Test Facility
MSFC 4697

Intertank



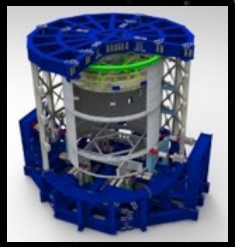
Test Facility
MSFC 4619

LH_2 Tank



Test Facility
MSFC 4693

Engine Section

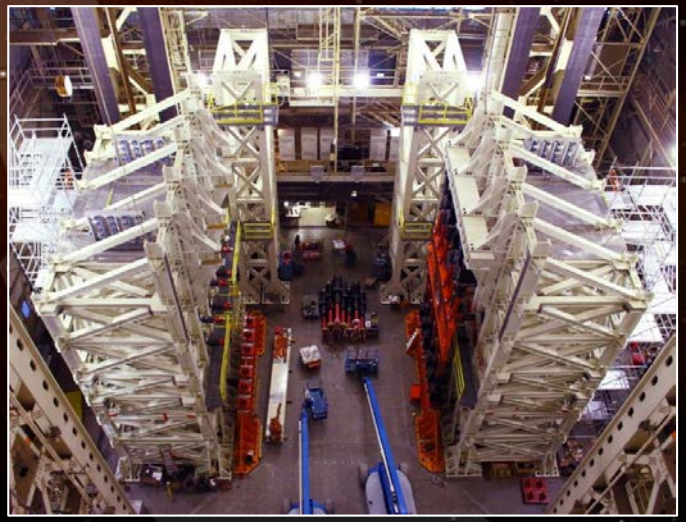


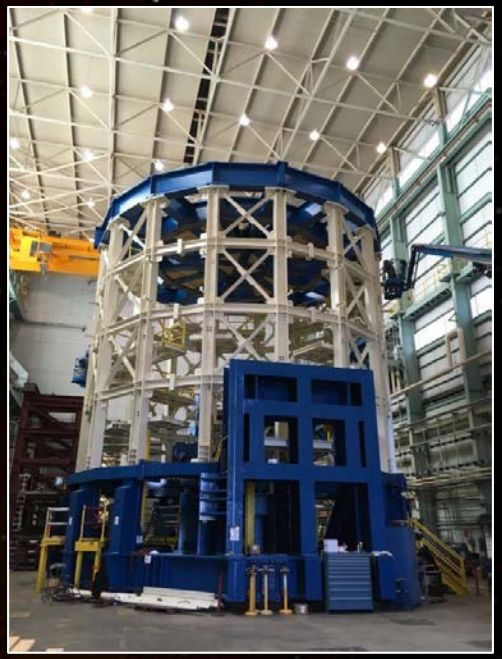
Test Facility
MSFC 4619
LTAE

CORE STAGE TESTING

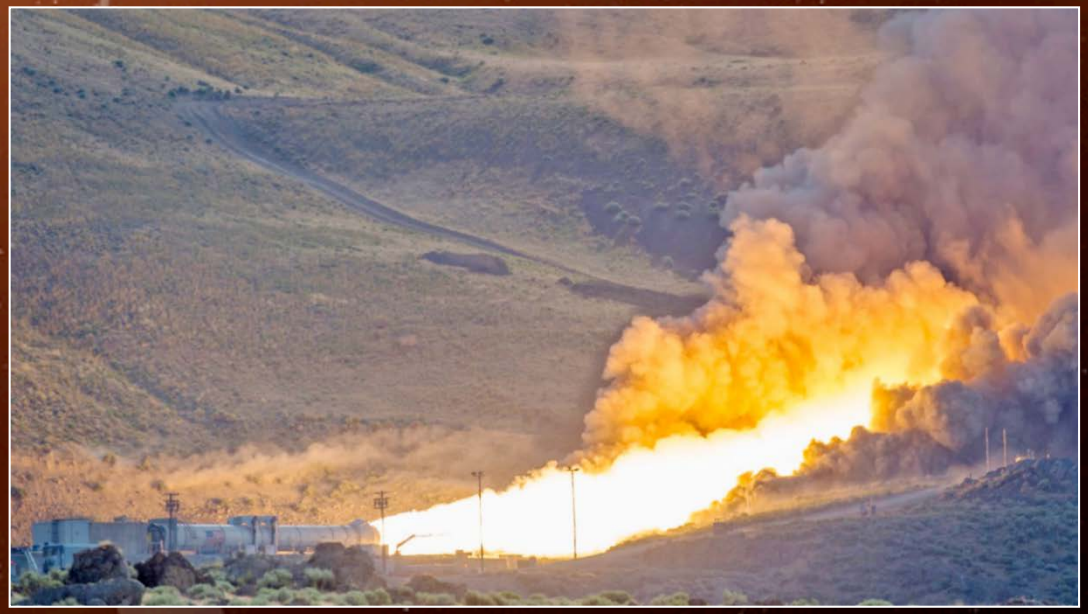








SOLID ROCKET BOOSTER PROGRESS



QM-2 motor test firing



EM-1 booster forward skirt painting

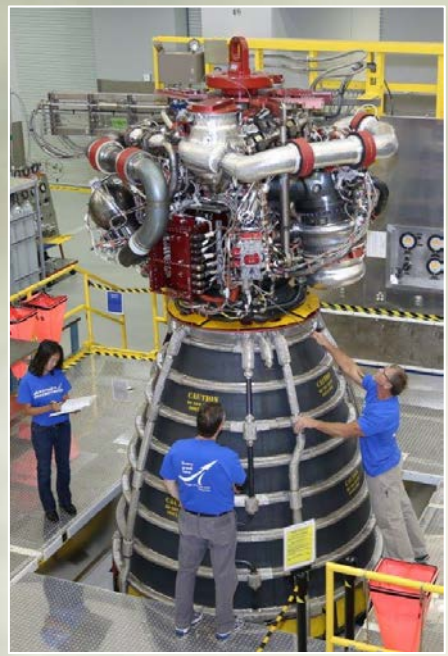


EM-1 motor segment completed



EM-1 painted aft skirt

RS-25 PROGRESS





UPPER STAGE, PAYLOAD HARDWARE PROGRESS









BLOCK 1B PROGRESS



EM-2 Core Stage Welding



Block 1B Wind Tunnel Testing



EUS Development Panel Forming

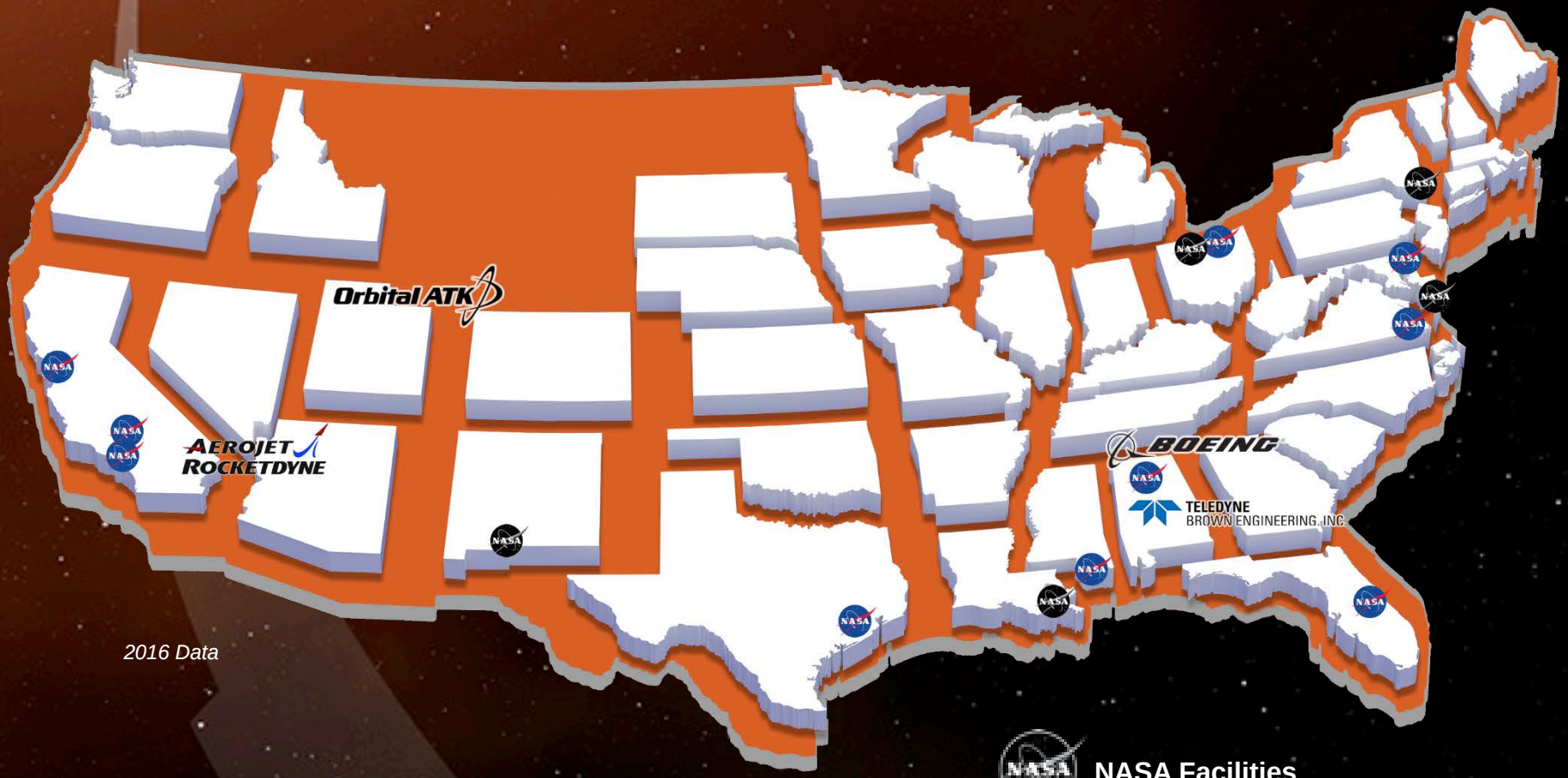


EM-2 Flight Engine Testing



EM-2 Booster Motor Insulation

THE SLS GOVERNMENT INDUSTRY TEAM



2016 Data

SLS SPACE LAUNCH SYSTEM

www.nasa.gov/sls

SLS EVOLUTIONARY CAPABILITY

SLS Block 1
As Early As 2018

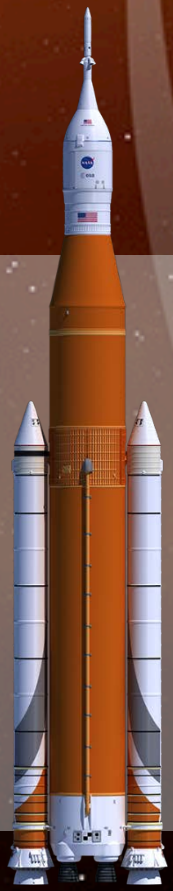
Provides

Initial Heavy-Lift Capability

Enables

Orion Test

SmallSats to Deep Space



SLS Block 1B Crew
As Early As 2021

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 2022

Provides

8.4-meter fairings for primary payloads

Regular flight cadence for additional launches

Enables

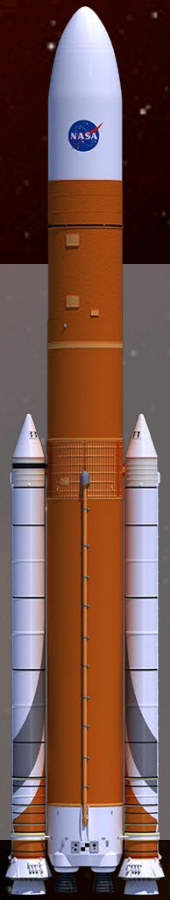
Europa Clipper/Lander

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

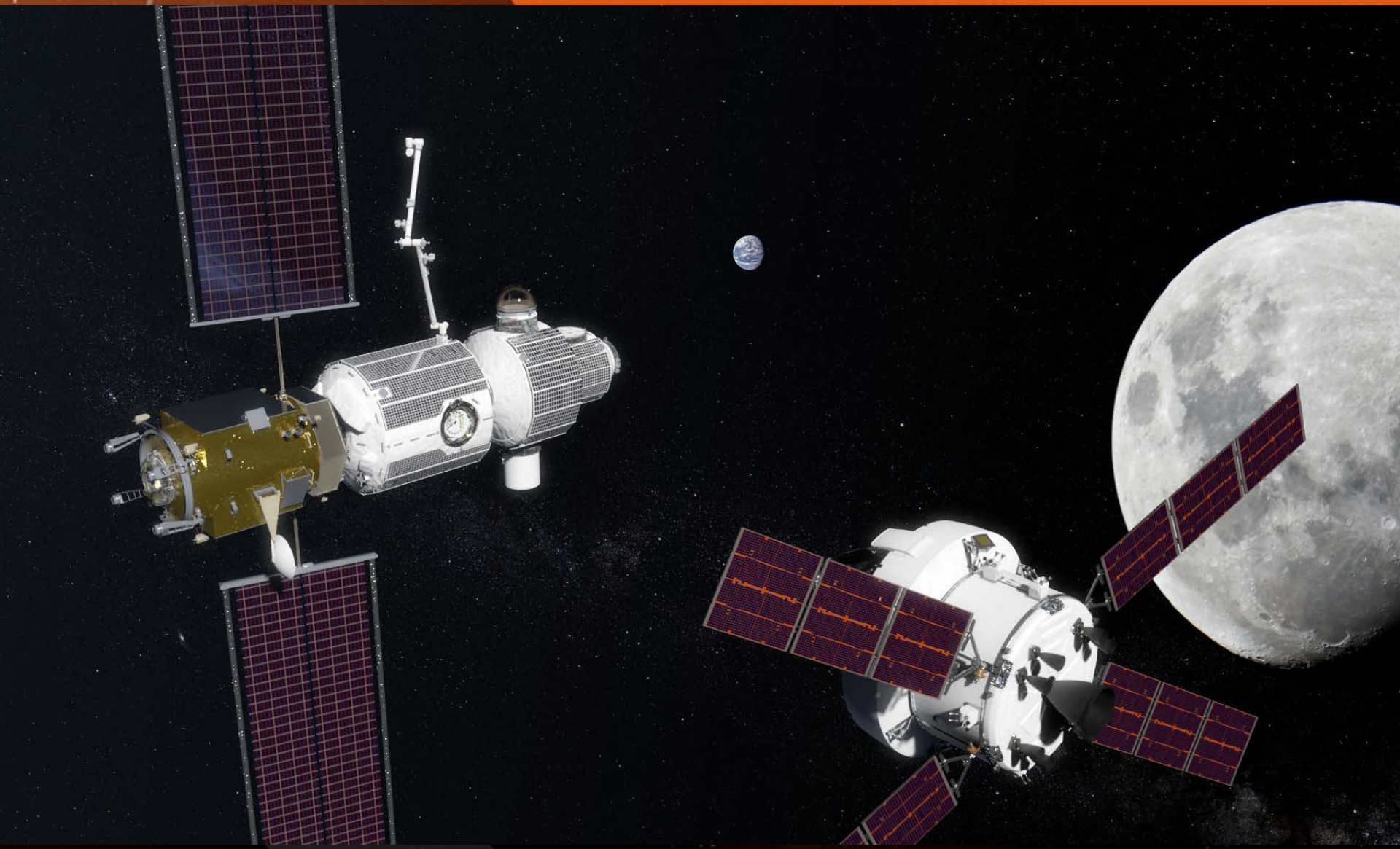


SLS SPACE LAUNCH SYSTEM

www.nasa.gov/sls

3019 JANNAF 2017.14

PROVING GROUND MISSIONS



HIGHLIGHTS FROM OUR PROGRESS

FOLLOW SLS DEVELOPMENTS

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SLS



QUESTIONS?