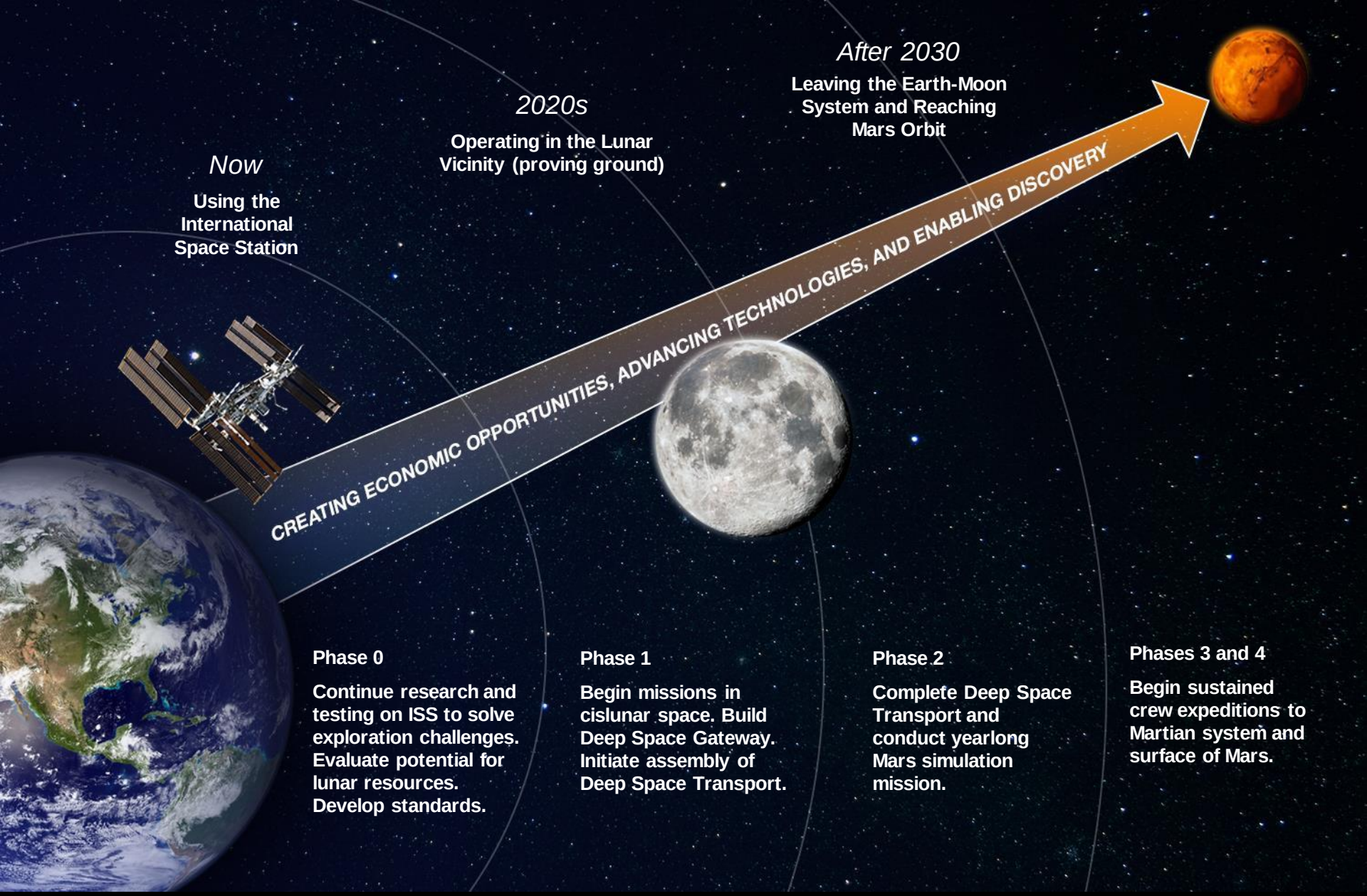
National Aeronautics and Space Administration

SLS OVERVIEW AND ELEMENTS PROGRESS

Jerry Cook

Deputy Program Manager
Space Launch System Program

November 2, 2017

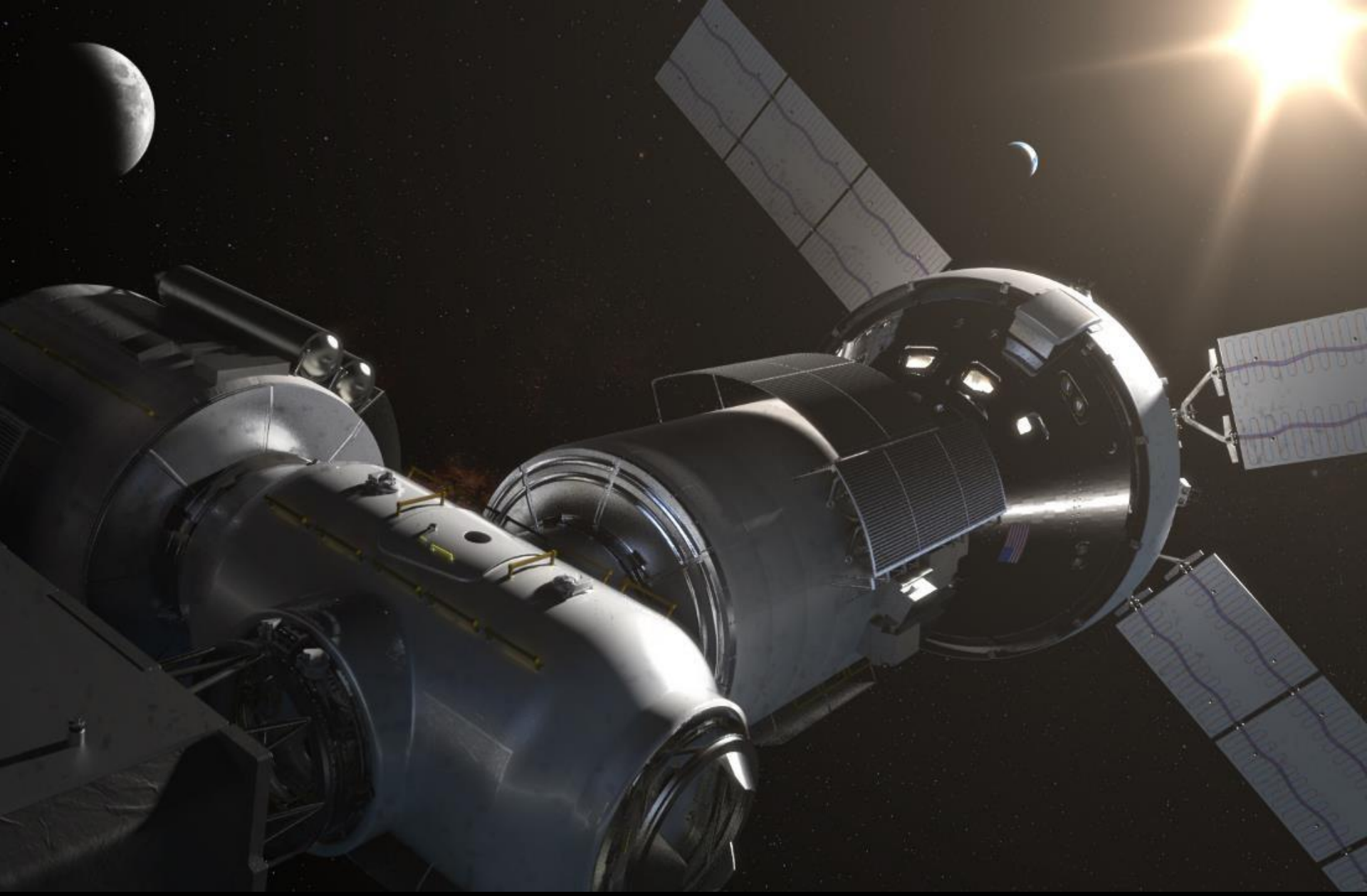


A PHASED APPROACH

SLS PLAYS A KEY ROLE INTO THE 2030s

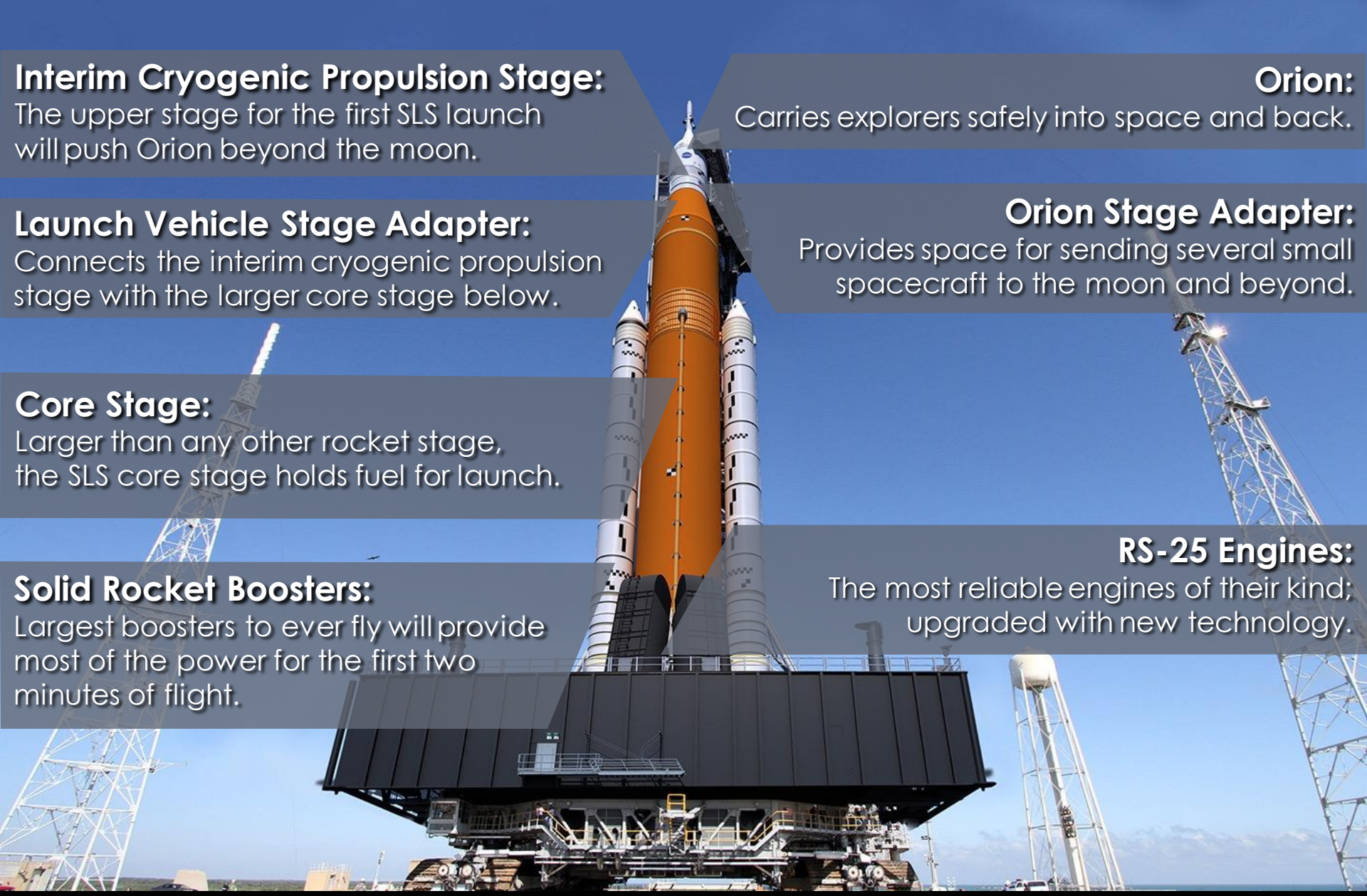
EXPLORATION MISSION-1

FULL SYSTEMS CHECKOUT PRIOR TO CREWED MISSIONS



NASA'S DEEP SPACE GATEWAY

STEPPING STONE TO THE SOLAR SYSTEM

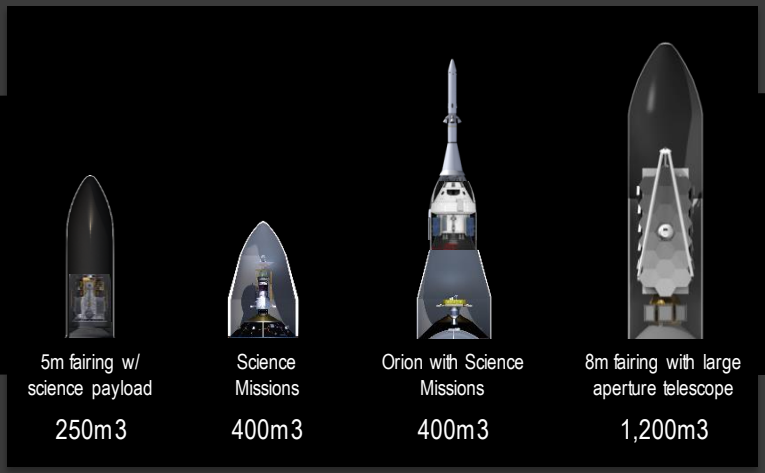


THE WORLD'S MOST POWERFUL ROCKET

NASA'S SPACE LAUNCH SYSTEM

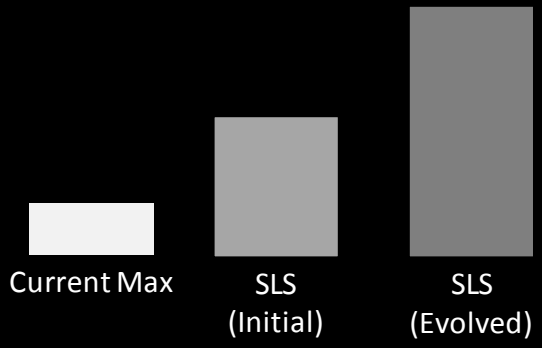
VOLUME

- Space Launch System will be able to offer payload accommodations with five times more volume than any contemporary launch vehicle
- Greater volume enables less complex spacecraft design, reducing risk



MASS

- Space Launch System will offer an initial capability of greater than 70 metric tons to low Earth orbit; current U.S. launch vehicle maximum is 28 t
- Evolved version of SLS will offer Mars-enabling capability of greater than 130 metric tons to LEO

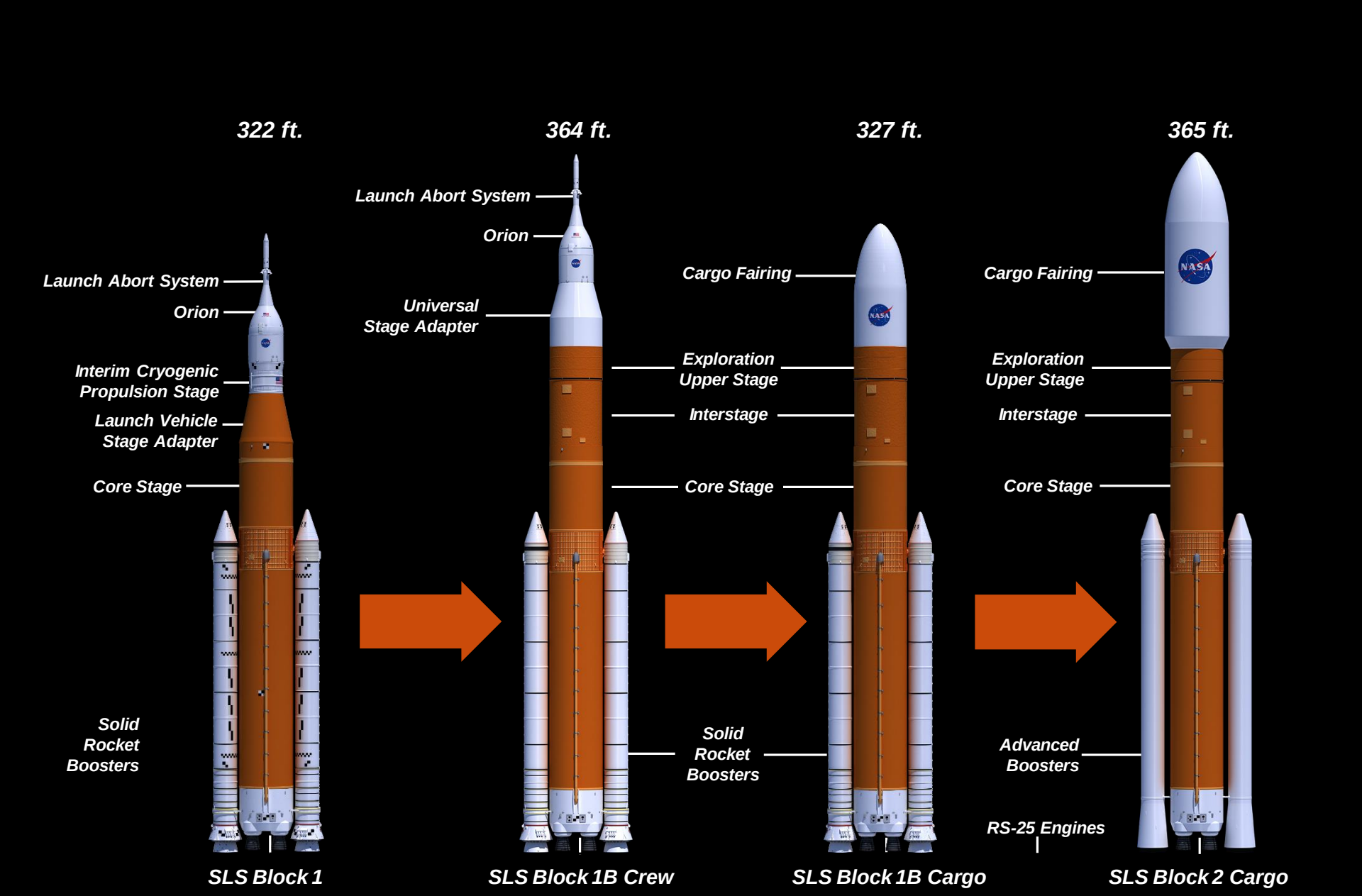


DEPARTURE ENERGY

- SLS offers reduced transit times to the outer solar system by half or greater
- Higher characteristic energy (C3) also enables larger payloads to destination

BENEFITS OF SPACE LAUNCH SYSTEM

VEHICLE CAPABILITIES



NASA SLS – SPACE LAUNCH SYSTEM

IT'S HAPPENING NOW!

www.nasa.gov

@NASA_SLS

NASASLS

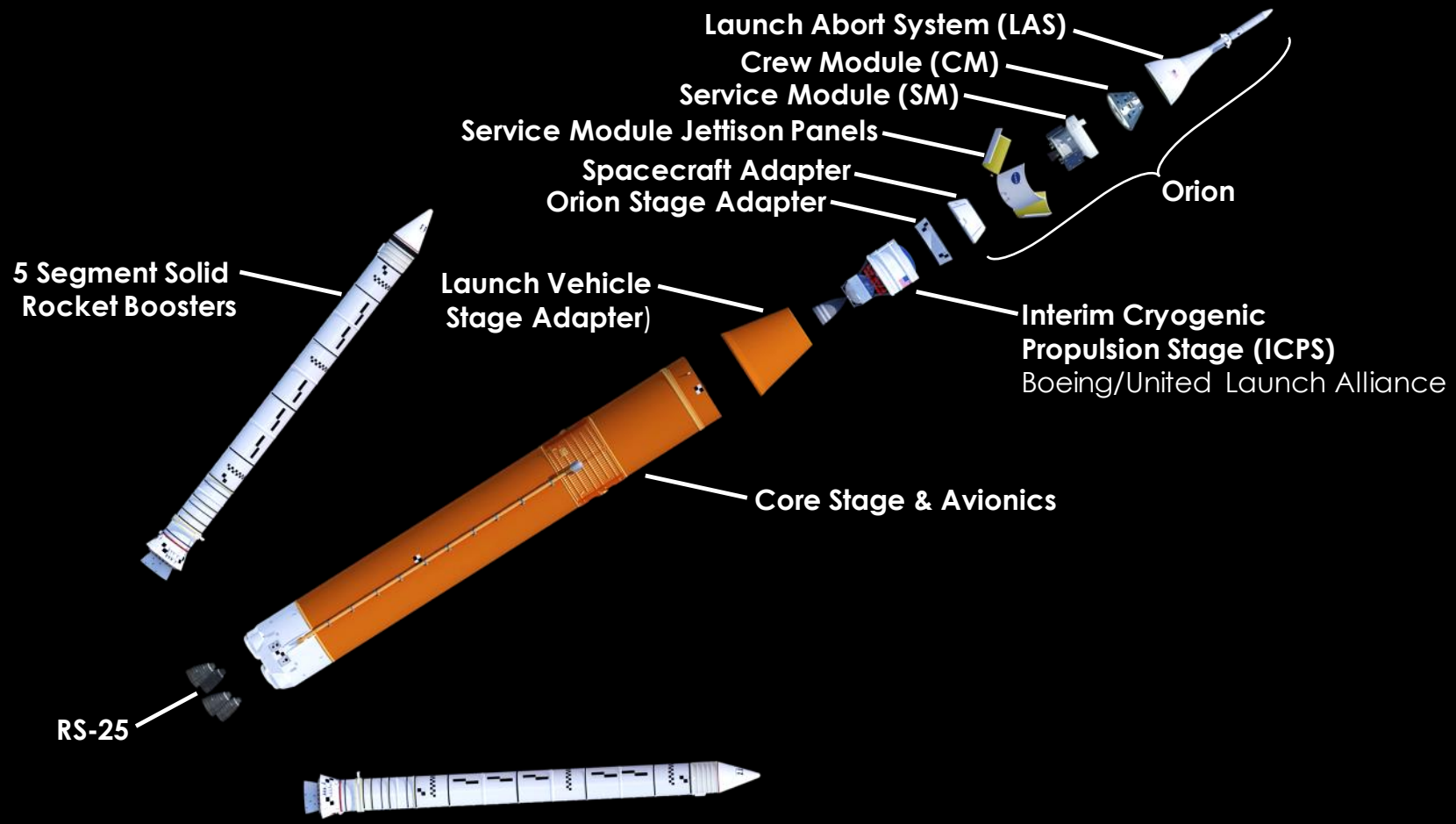
google.com/+nasa

youtube.com/nasa

@explorenasa

0404

BACKUP



SLS BLOCK 1 CONFIGURATION FOR EM-1

- **Engaging the U.S. Aerospace Industry**
- **Strengthening Sectors such as Manufacturing**
- **Advancing Technology and Innovation for Deep-Space Exploration**

NASA Facilities

NASA Centers

SLS NATIONWIDE TEAM

WORKING WITH OVER 1100 CONTRACTORS IN 42 STATES

National Aeronautics and Space Administration

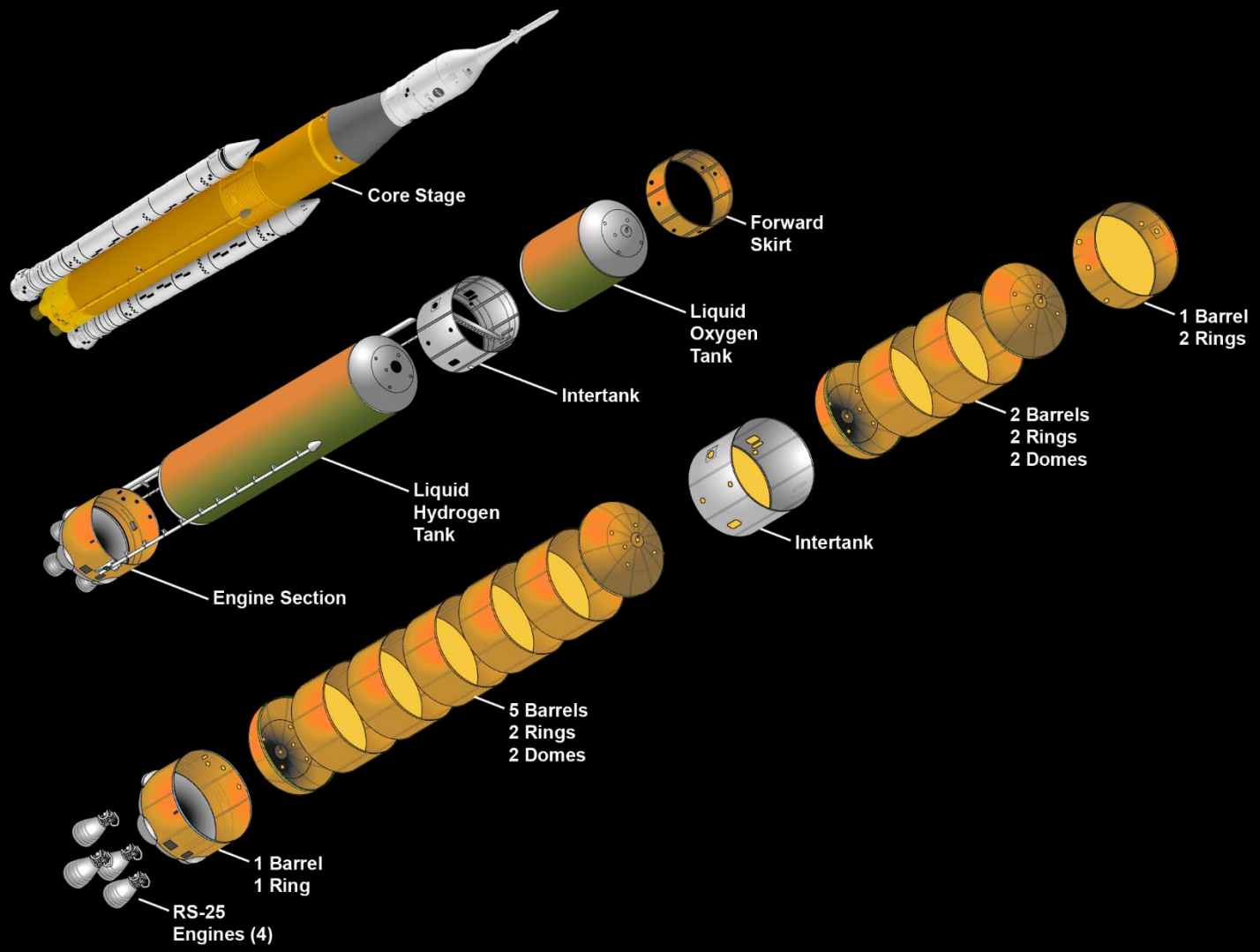
SLS OVERVIEW AND PROGRESS

CORE STAGE

D. K. Hall

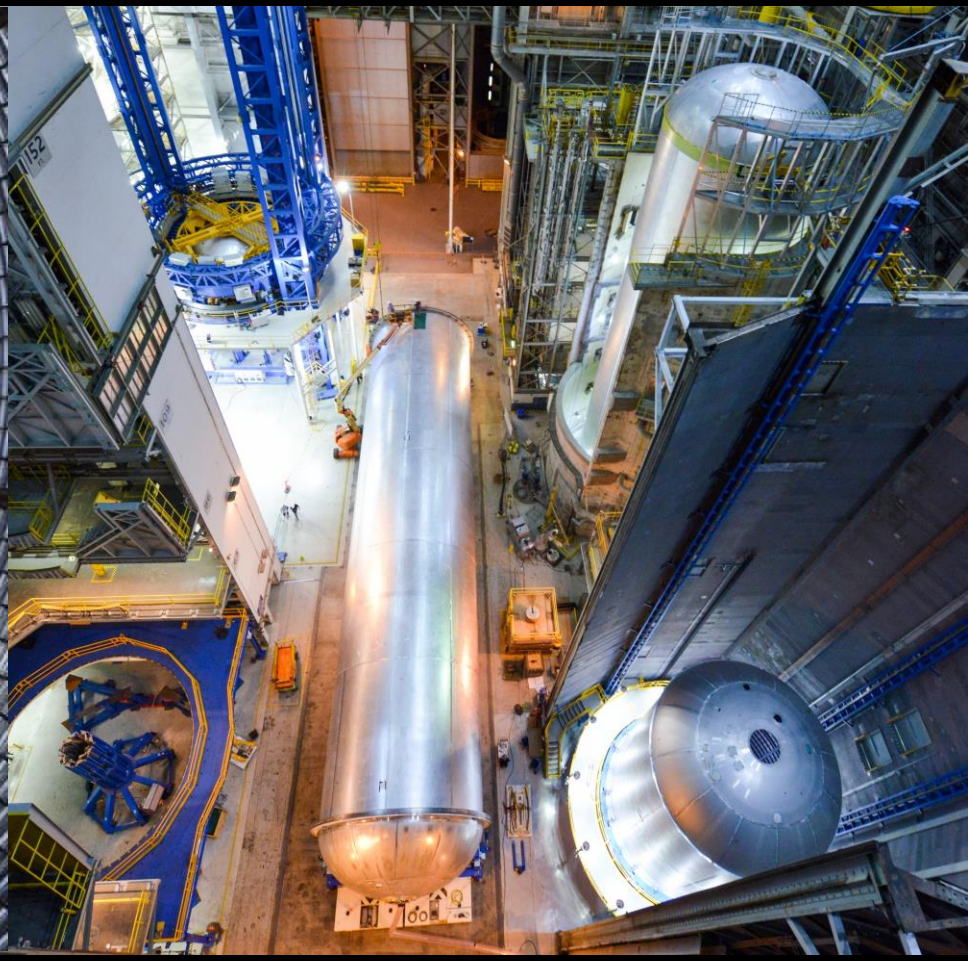
Stages Office Assistant Manager
Space Launch System Program

November 2, 2017



DESIGNING THE WORLD'S LARGEST ROCKET

ADVANCED TOOLING AND WELDING, SMALLER FACTOR FOOTPRINT

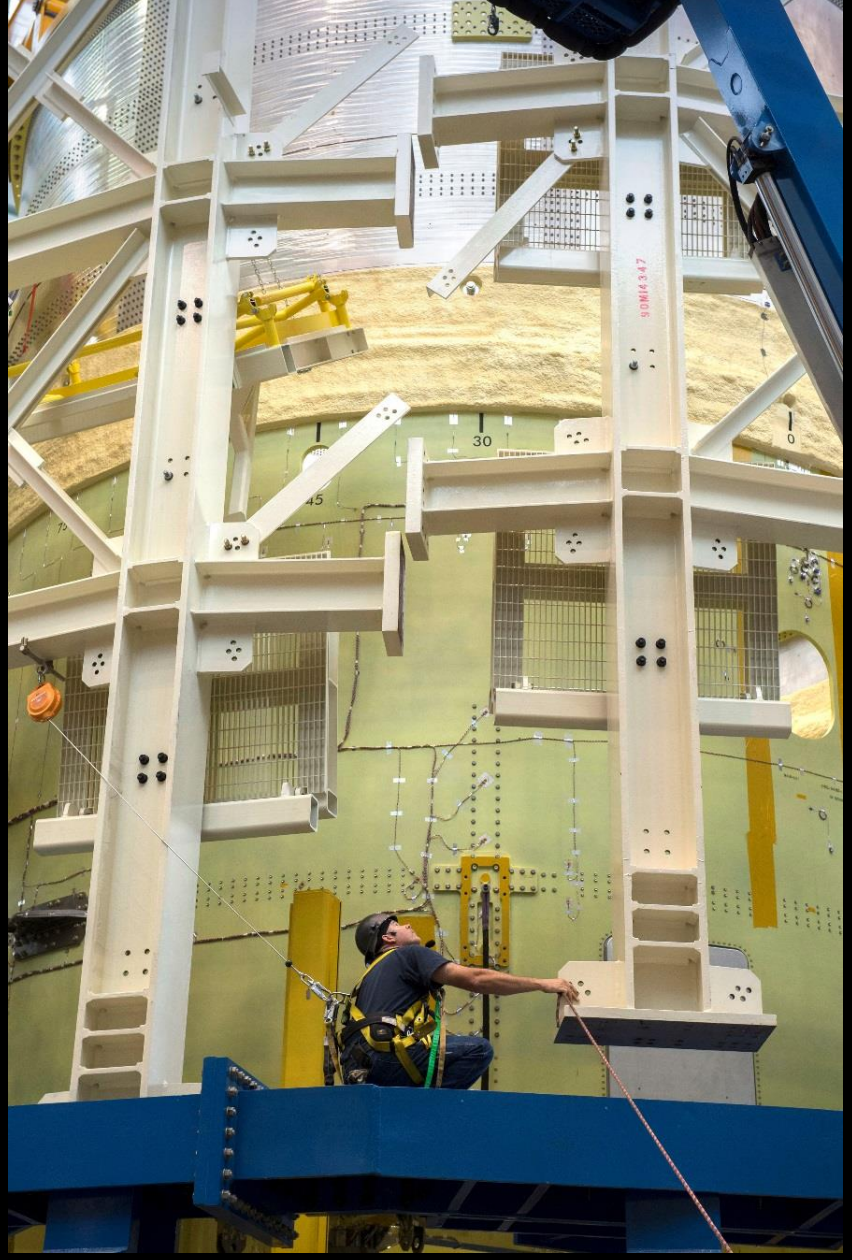


BUILDING THE WORLD'S LARGEST ROCKET

NASA'S MICHOUD ASSEMBLY FACILITY, LOUISIANA

GETTING TO THE LAUNCH PAD

CORE STAGE PATHFINDER AND PEGASUS BARGE



TESTING THE WORLD'S LARGEST ROCKET

NASA'S MARSHALL SPACE FLIGHT CENTER, ALABAMA

National Aeronautics and Space Administration

SLS OVERVIEW AND PROGRESS

FIVE-SEGMENT SOLID ROCKET BOOSTER

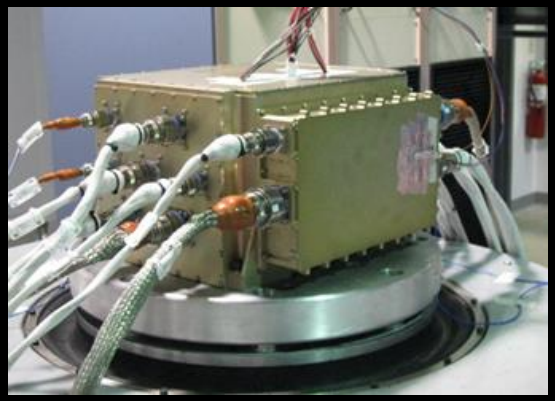
Eric Corder

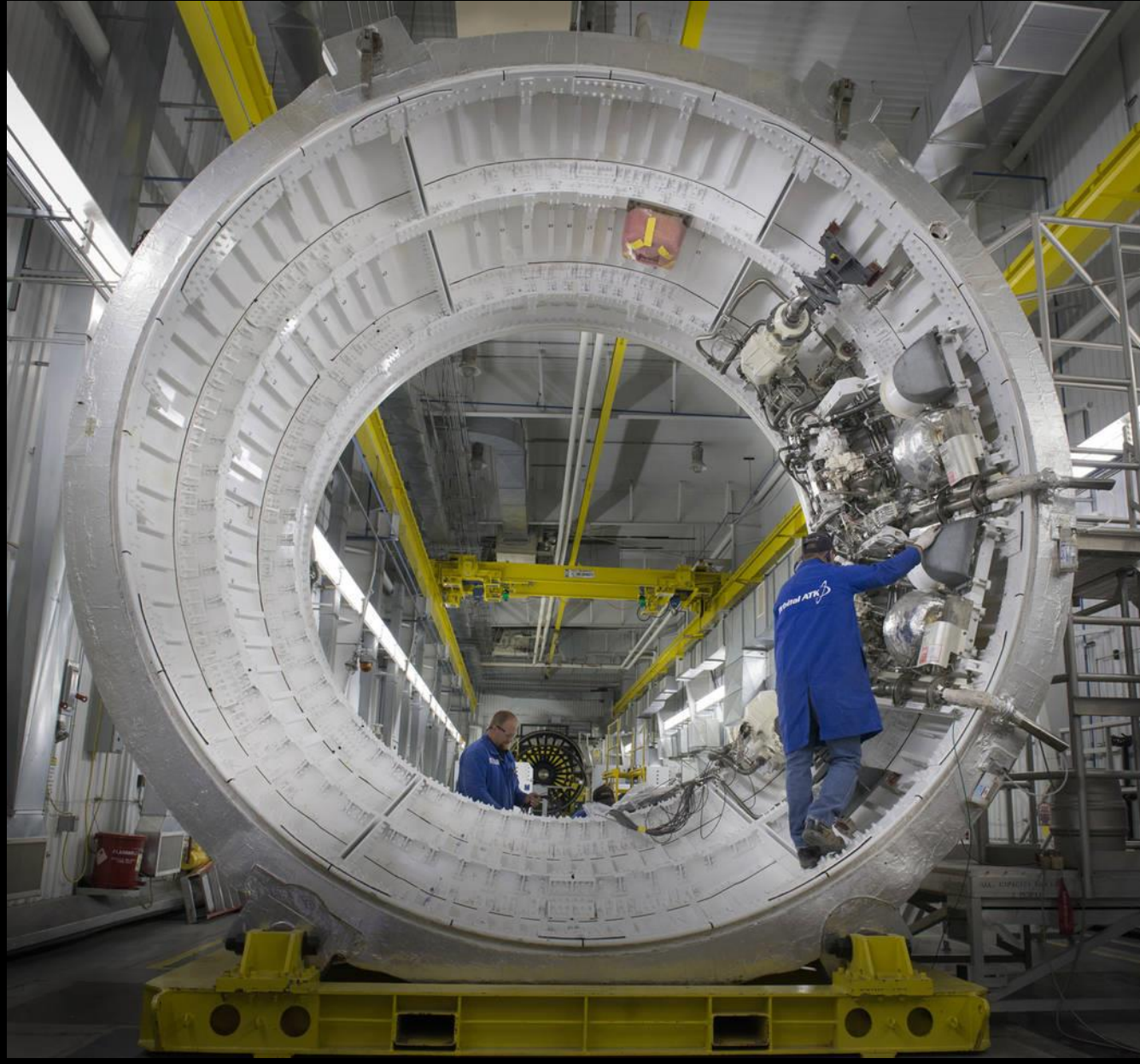
Booster Control Systems Manager
Space Launch System Program

November 2, 2017

SLS BOOSTER 5-SEGMENT MOTOR MANUFACTURING

ORBITAL ATK, PROMONTORY, UTAH





NEW BOOSTER AVIONICS WITH HERITAGE TVC SYSTEM

ORBITAL ATK, PROMONTORY, UTAH

BOOSTER TESTING

ORBITAL ATK TEST FACILITY, PROMONTORY, UTAH

National Aeronautics and Space Administration

SLS OVERVIEW AND PROGRESS

RS-25 CORE STAGE ENGINE

Steve Wofford

Liquid Engines Office Manager
Space Launch System Program

November 2, 2017

RS-25: AFFORDABLE, RELIABLE, PROVEN, POWERFUL

NASA'S STENNIS SPACE CENTER, MISSISSIPPI

RS-25 ROCKET ENGINE TESTING

NASA'S STENNIS SPACE CENTER, MISSISSIPPI

EM-1 ENGINES READY FOR INTEGRATION

SHIPPING TO MICHOUD FOR INTEGRATION IN 2018

National Aeronautics and Space Administration

SLS OVERVIEW AND PROGRESS

IN-SPACE STAGE

Andy Schorr

Deputy Manager, Spacecraft/Payload Integration & Evolution Office
Space Launch System Program

November 2, 2017

CONNECTING SLS PAYLOADS – OSA AND LVSA

MARSHALL SPACE FLIGHT CENTER

INTERIM CRYOGENIC PROPULSION STAGE

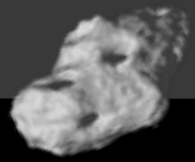
NOW AT KENNEDY SPACE CENTER

INTEGRATED STRUCTURAL TEST

MARSHALL SPACE FLIGHT CENTER

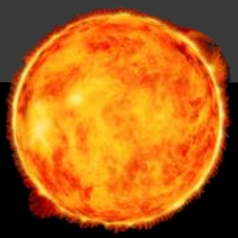
MOON

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



ASTEROID

- NEA Scout (NASA)



SUN

- CuSP (Southwest Research Institute)

EARTH

- EQUULEUS (JAXA)
- Skyfire (Lockheed Martin)

AND BEYOND

- Biosentinel (NASA)
- ArgoMoon (ESA/ASI)
- Cislunar Explorers (Cornell University)
- CU3 (University of Colorado Boulder)
- Team Miles (Fluid & Reason)

EM-1: ONE LAUNCH, MULTIPLE DISCIPLINES

SMALLSATS TO BE DEPLOYED FROM THE ORION STAGE ADAPTER