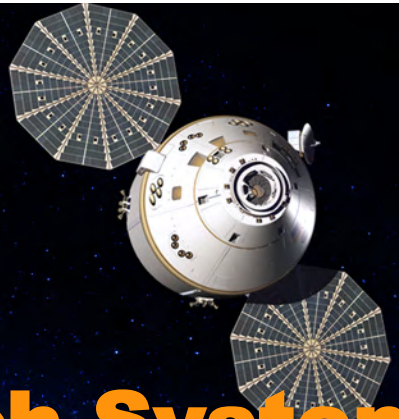
National Aeronautics and Space Administration



Space Launch System Status

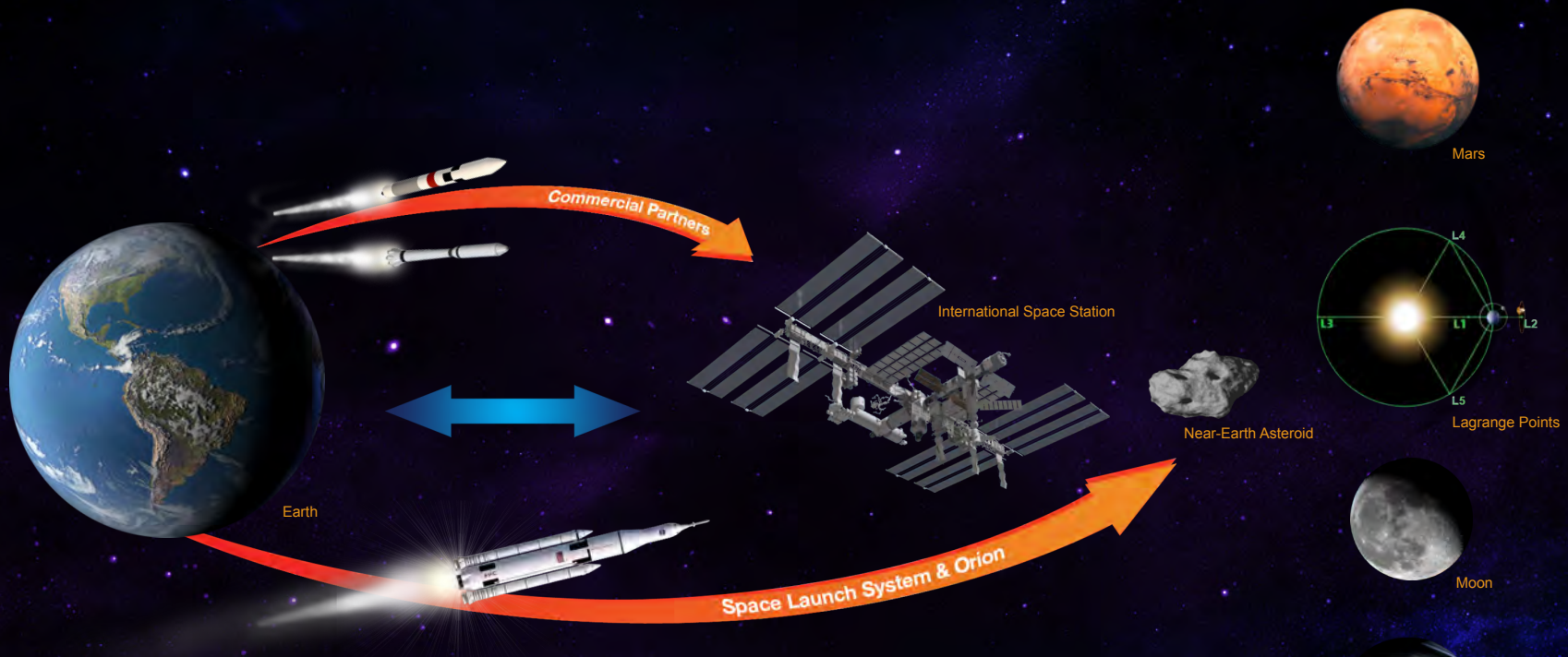
Todd A. May, Program Manager
Garry M. Lyles, Chief Engineer

May 2012

www.nasa.gov


"To reach for new heights...
and reveal the unknown so that what we do and learn
will benefit all humankind."
National Aeronautics and
Space Administration
NASA
L4
L3
L1
L2
L5
SLS Launches in 2017
"Extend and sustain human activities
across the solar system."
NASA 2011 Strategic Plan
www.nasa.gov/sls
8202_ISDC.2

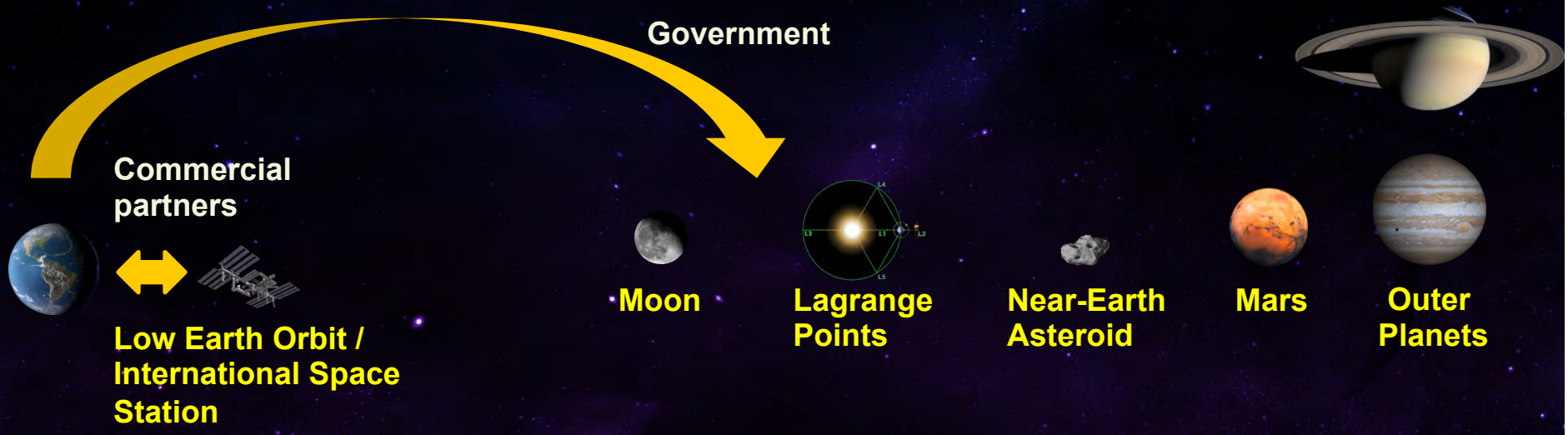
The Future of Exploration



My desire is to work more closely with the human spaceflight program so we can take advantage of synergy…. We think of the SLS as the human spaceflight program, but it could be hugely enabling for science.

— John Grunsfeld, Associate Administrator
NASA Science Mission Directorate
Nature, Jan 19, 2012

The Future of Exploration



Development

- Proven capabilities
- Proven market potential
- Understood risks and hazards
- Known costs
- Predictable return on investment
- Refining known engineering
- Using existing technology
- Existing infrastructure
- Mature research infrastructure

Exploration

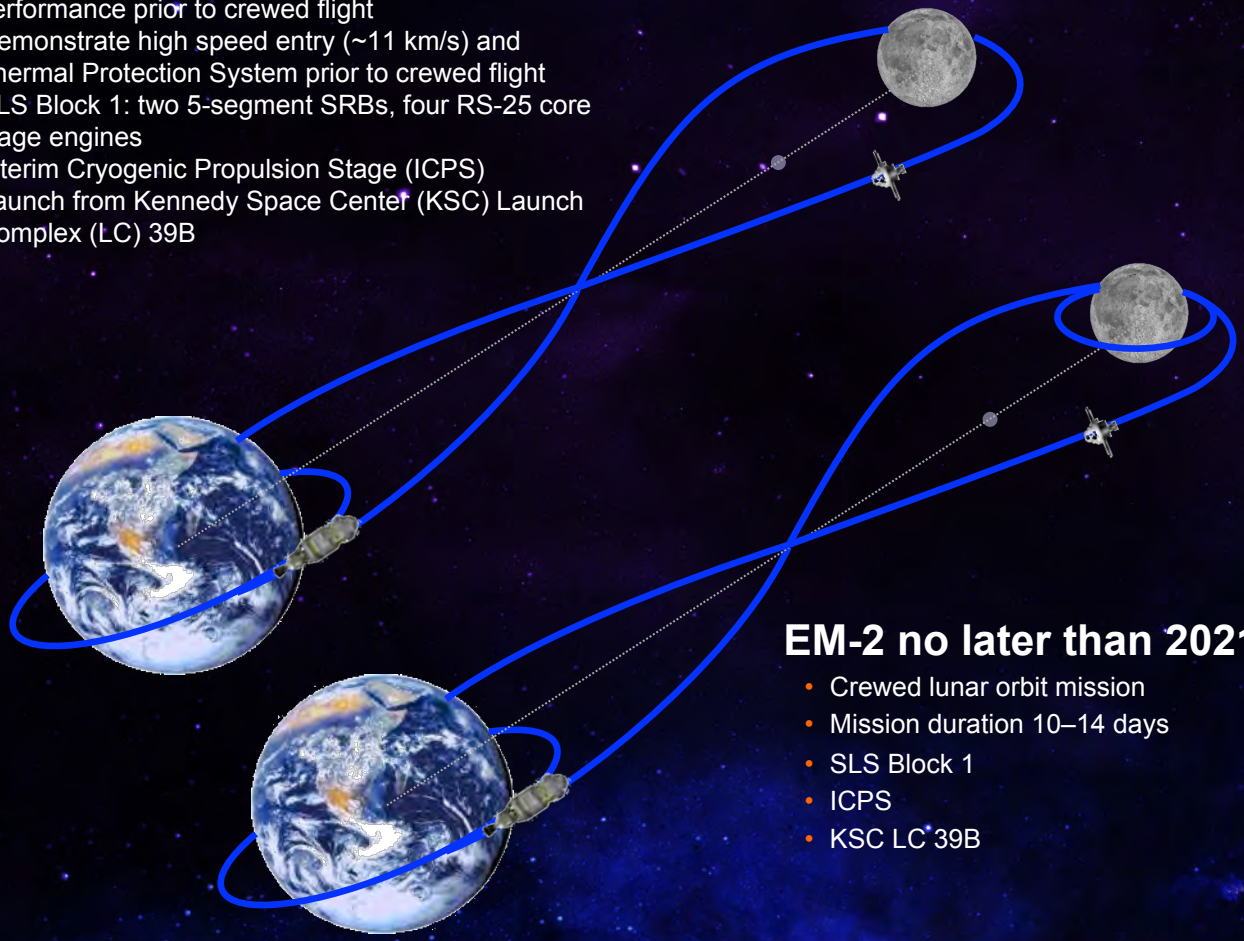
- New capabilities
- Undetermined market potential
- Undefined risks and hazards
- Indeterminate costs
- Indeterminate (or zero) ROI on indeterminate timeline
- Engineering existing hardware for new environment or developing new technologies
- No infrastructure
- Unique, groundbreaking research

A National Asset for Stakeholders and Partners

Initial Exploration Missions (EM)

EM-1 in 2017

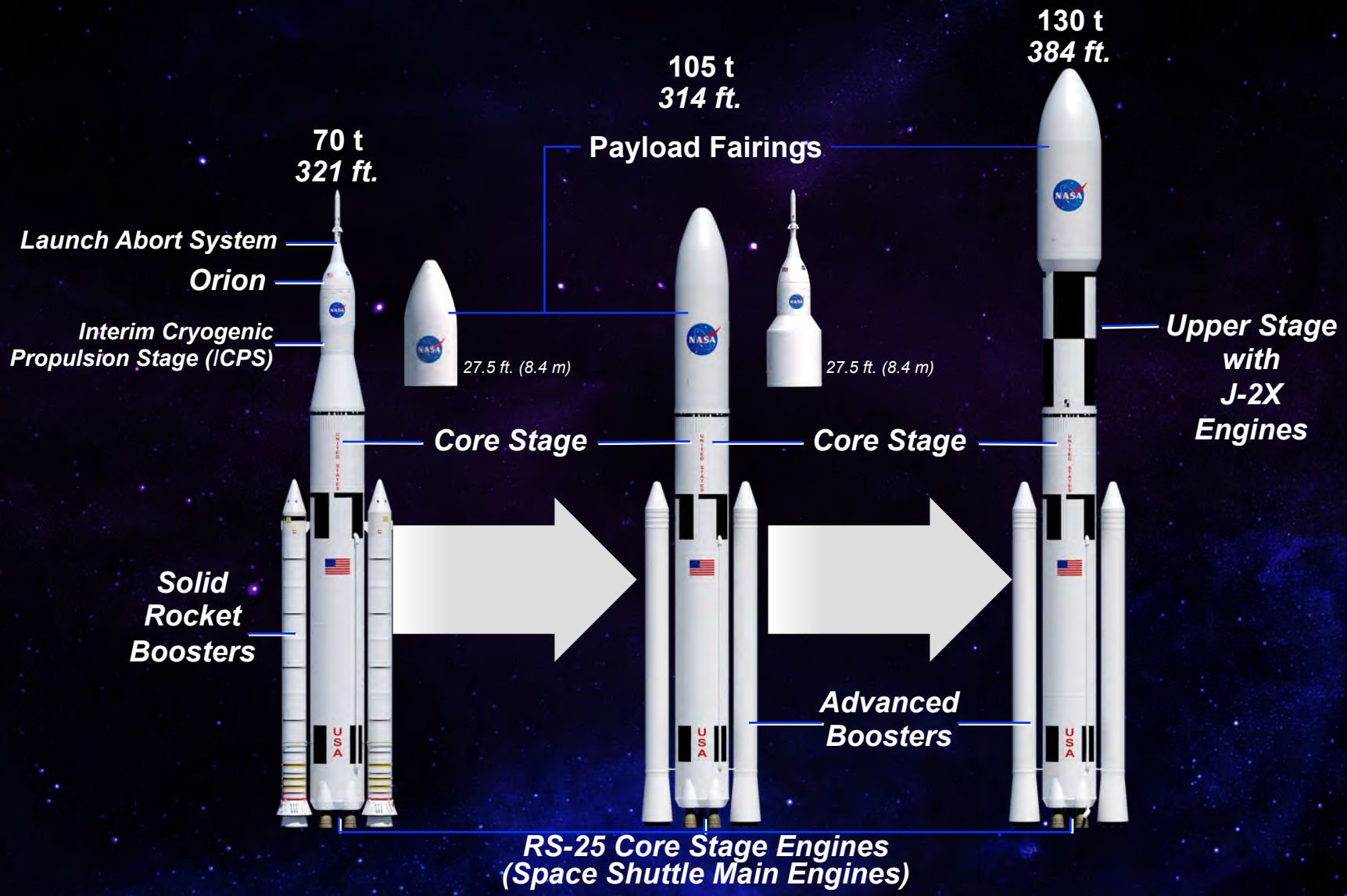
- Un-crewed circumlunar flight – free return trajectory
- Mission duration ~7 days
- Demonstrate integrated spacecraft systems performance prior to crewed flight
- Demonstrate high speed entry (~11 km/s) and Thermal Protection System prior to crewed flight
- SLS Block 1: two 5-segment SRBs, four RS-25 core stage engines
- Interim Cryogenic Propulsion Stage (ICPS)
- Launch from Kennedy Space Center (KSC) Launch Complex (LC) 39B



EM-2 no later than 2021

- Crewed lunar orbit mission
- Mission duration 10–14 days
- SLS Block 1
- ICPS
- KSC LC 39B

SLS Architecture Block Upgrade Approach

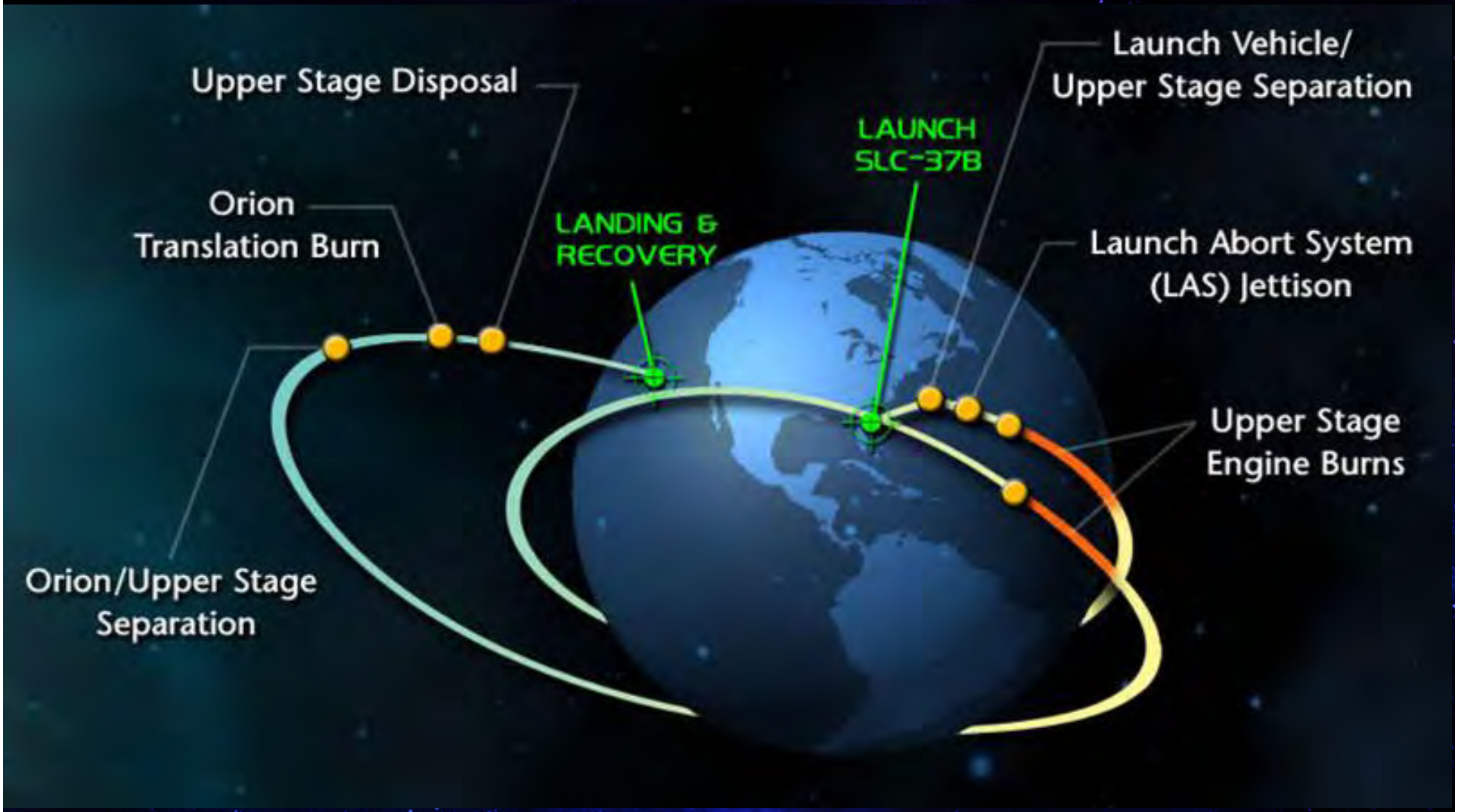


Starting with Available Assets and Evolving the Design

SLS 70 Metric Tons: *First Flight 2017*

INITIAL CAPABILITY, 2017–21

Exploration Flight Test-1 Mission Overview



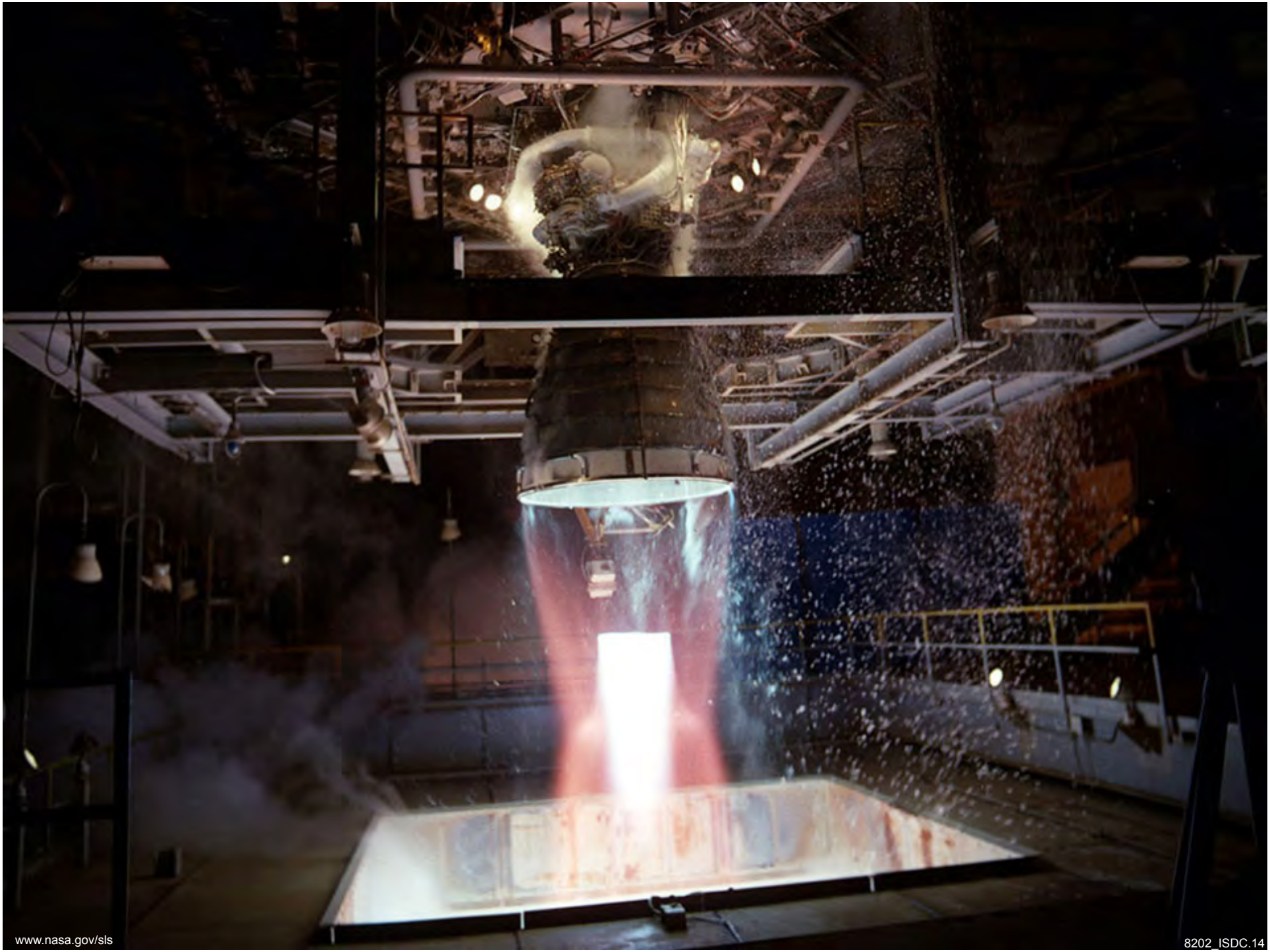
SLS will launch from Kennedy Space Center in 2017

www.nasa.gov/sls

Core Stage Engine (RS-25)

Space Shuttle Main Engine packed into a container for shipment to Stennis Space Center

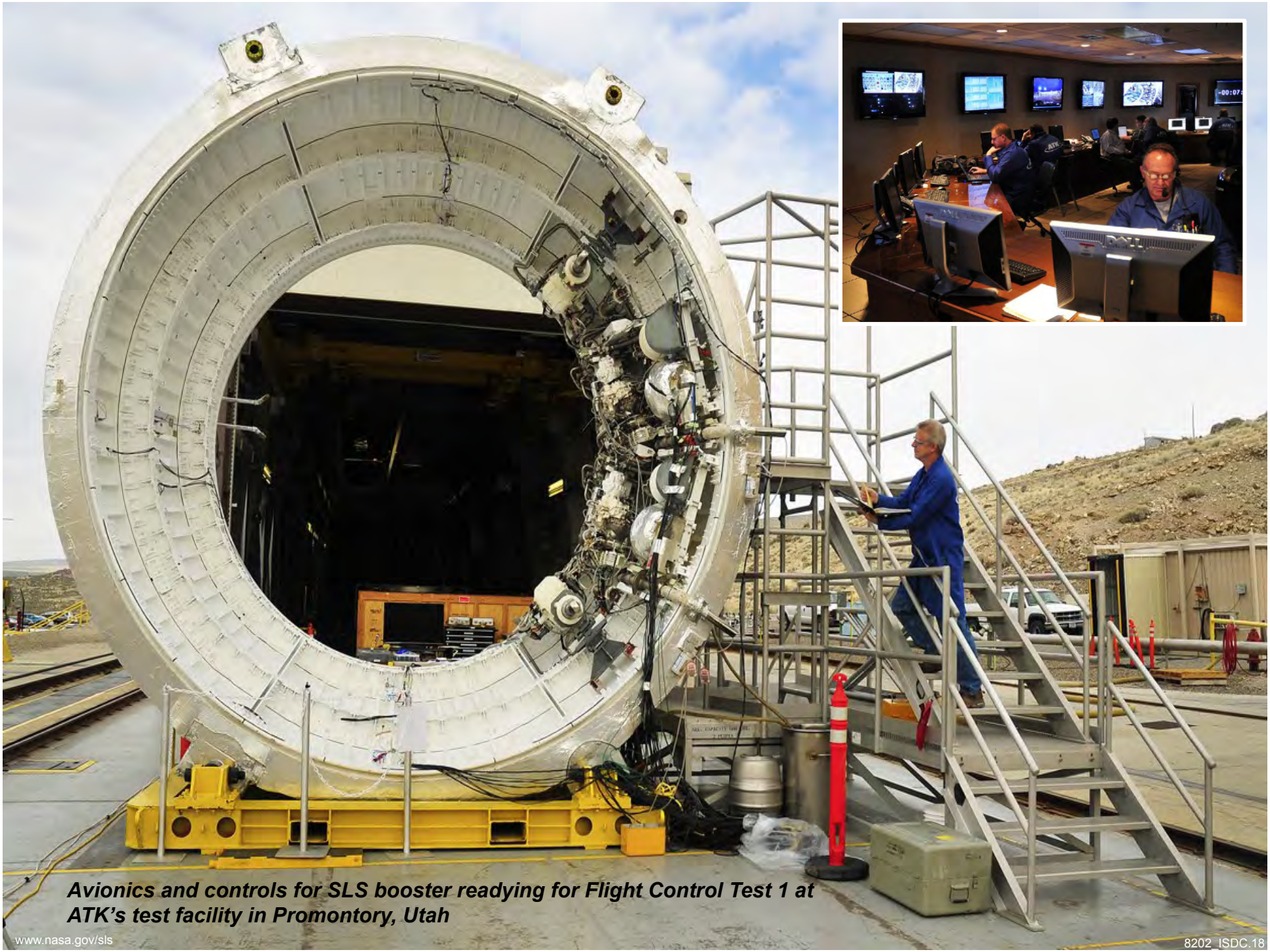
Space Shuttle Main Engines being received at Stennis Space Center, Mississippi



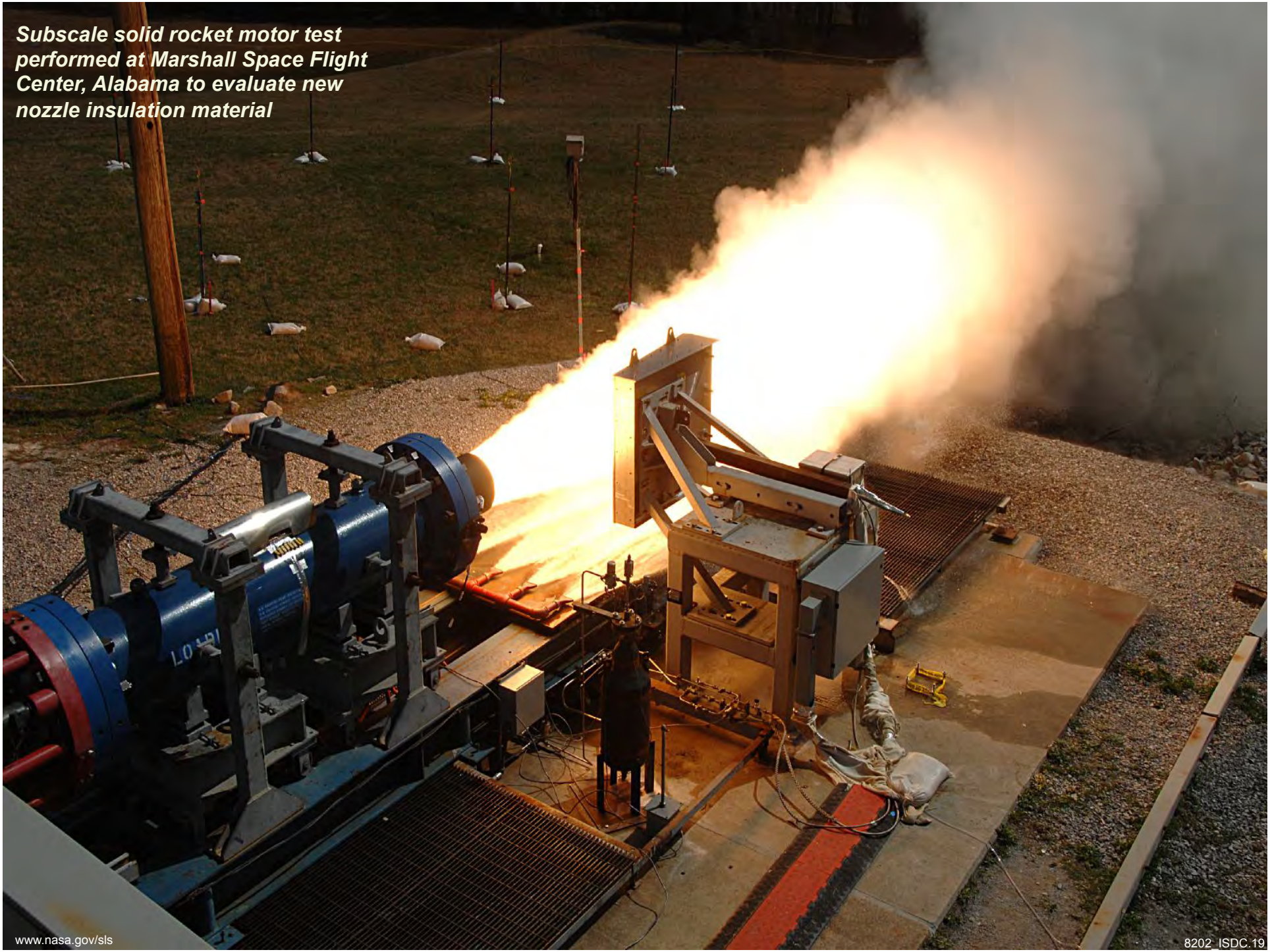
Solid Rocket Booster awaiting Development Motor Test 3 at ATK's Promontory, Utah Test Site, September 8, 2011


Development Motor Test 3
ATK Promontory, Utah
Test Site, September 8, 2011

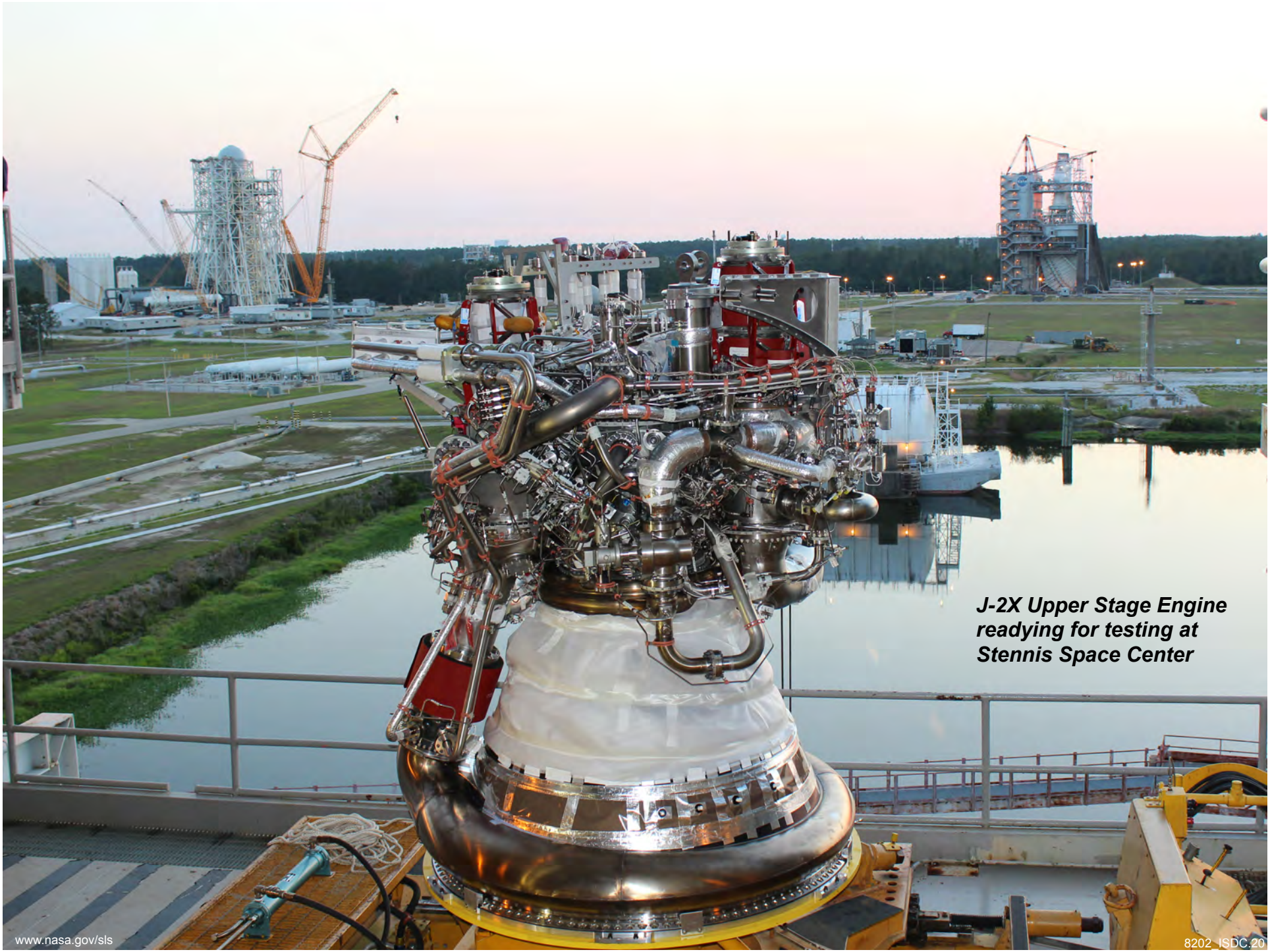
Motor casings for Qualification Motor 1 are inspected at ATK's facility in Brigham City, Utah



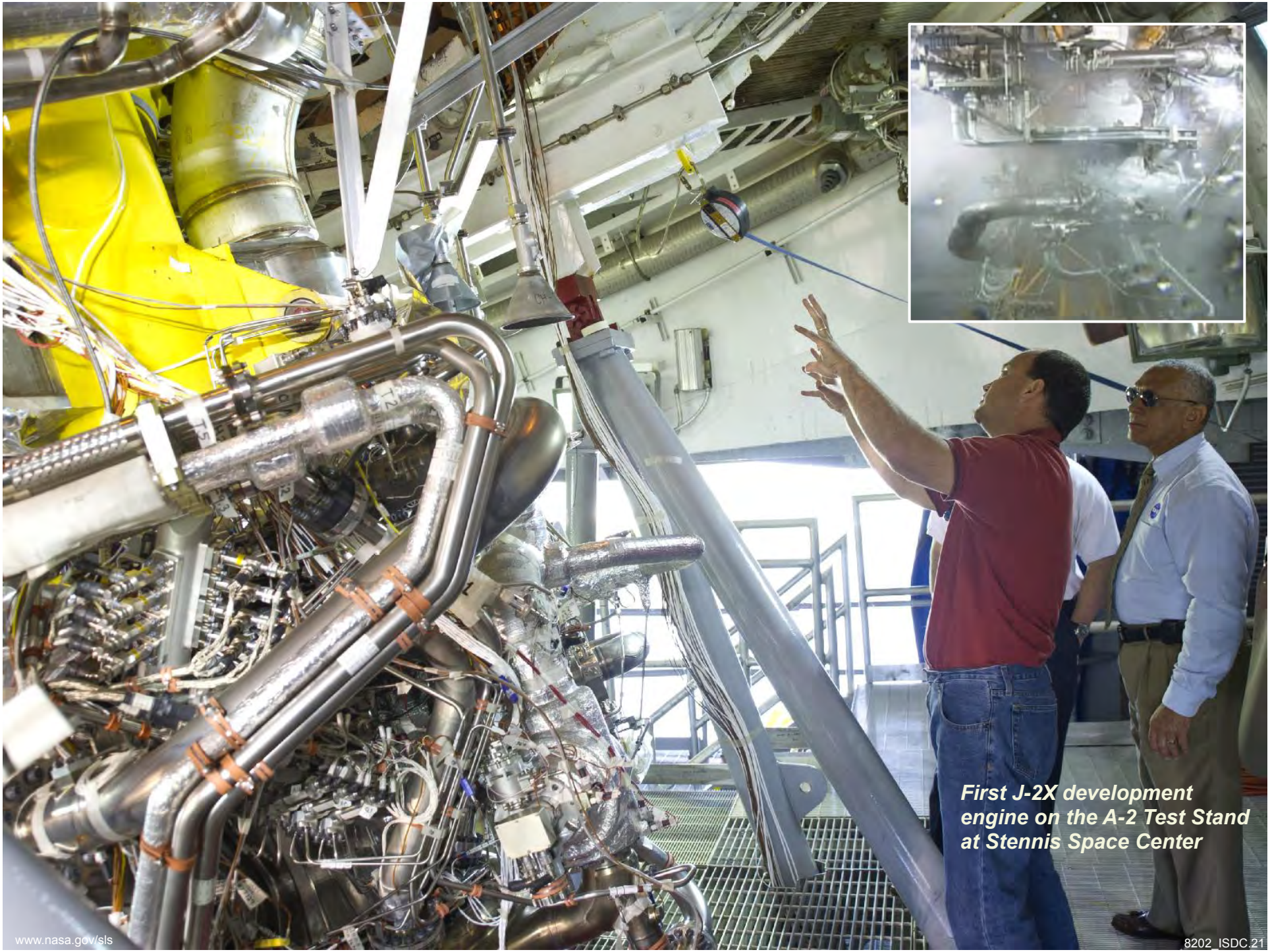
Avionics and controls for SLS booster readying for Flight Control Test 1 at ATK's test facility in Promontory, Utah



Subscale solid rocket motor test performed at Marshall Space Flight Center, Alabama to evaluate new nozzle insulation material



J-2X Upper Stage Engine readying for testing at Stennis Space Center



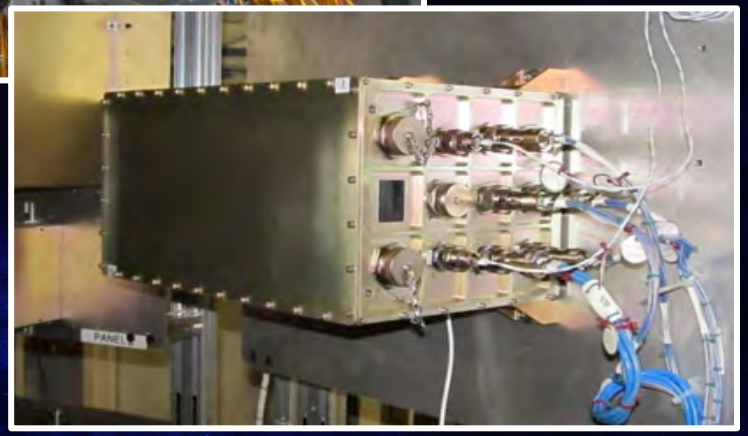
First J-2X development engine on the A-2 Test Stand at Stennis Space Center

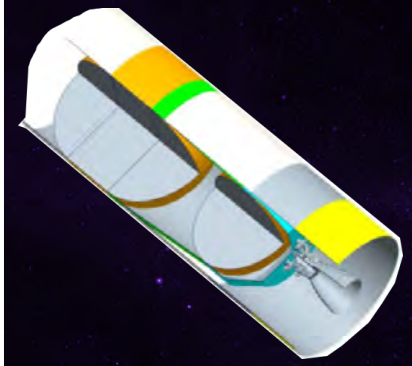
J-2X Upper Stage Engine test at Stennis Space Center, Mississippi

J-2X Upper Stage Engine subscale injector test at Marshall Space Flight Center, Alabama

J-2X Upper Stage Engine Powerpack test, Stennis Space Center, Mississippi

Stages and Avionics

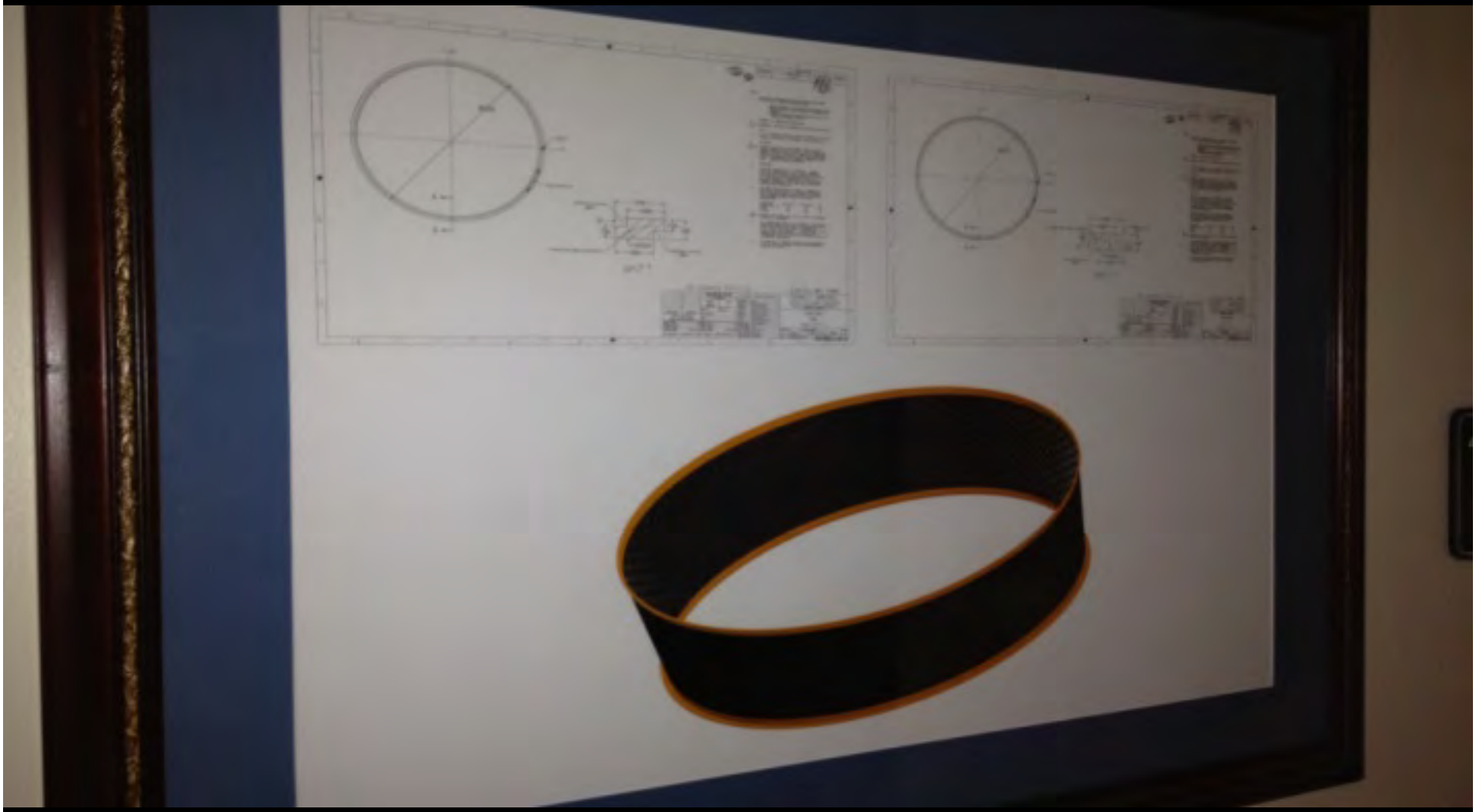




Upper Stage

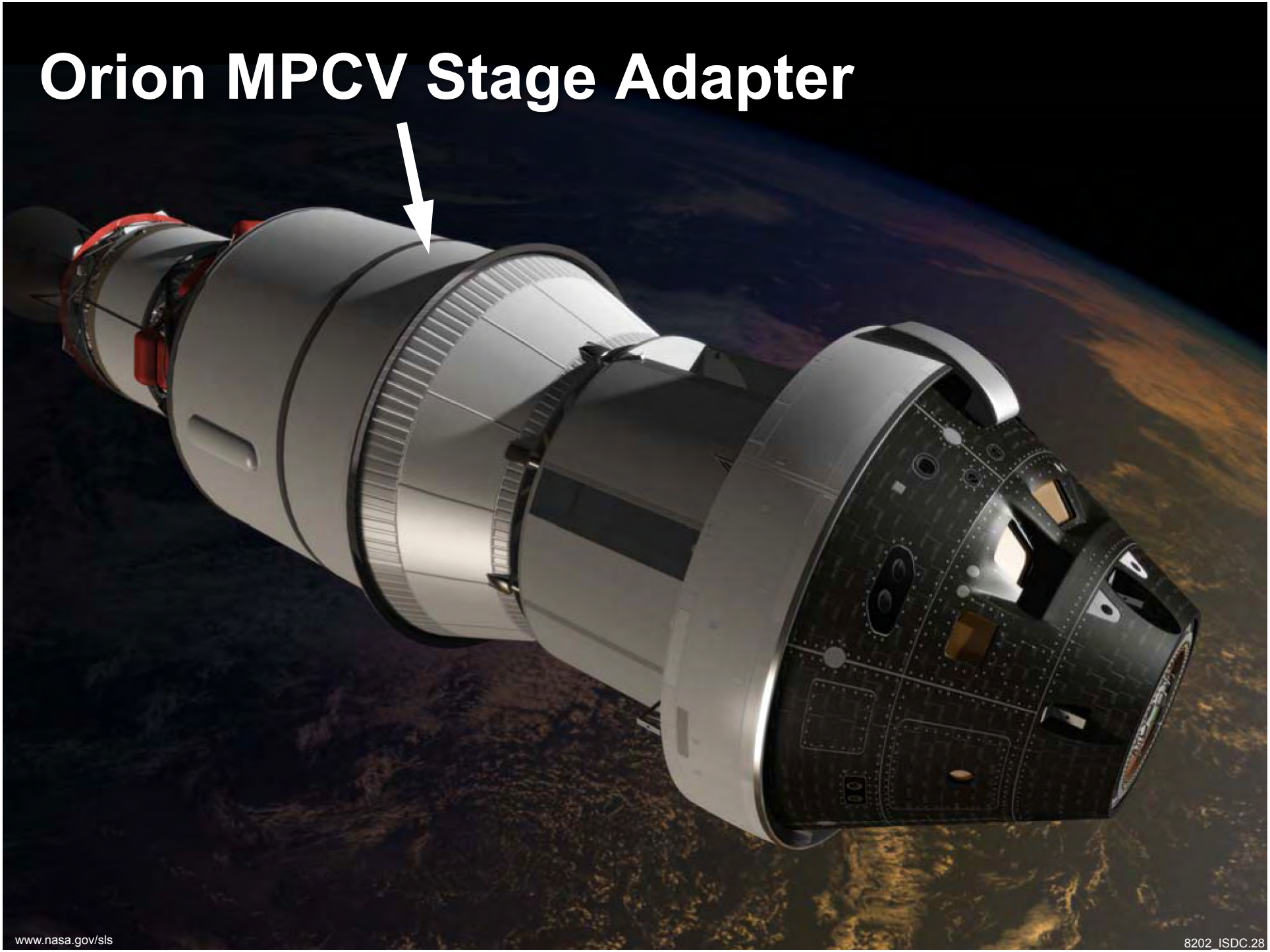
Core Stage

Barrel section buckling test, Marshall Space Flight Center, Alabama



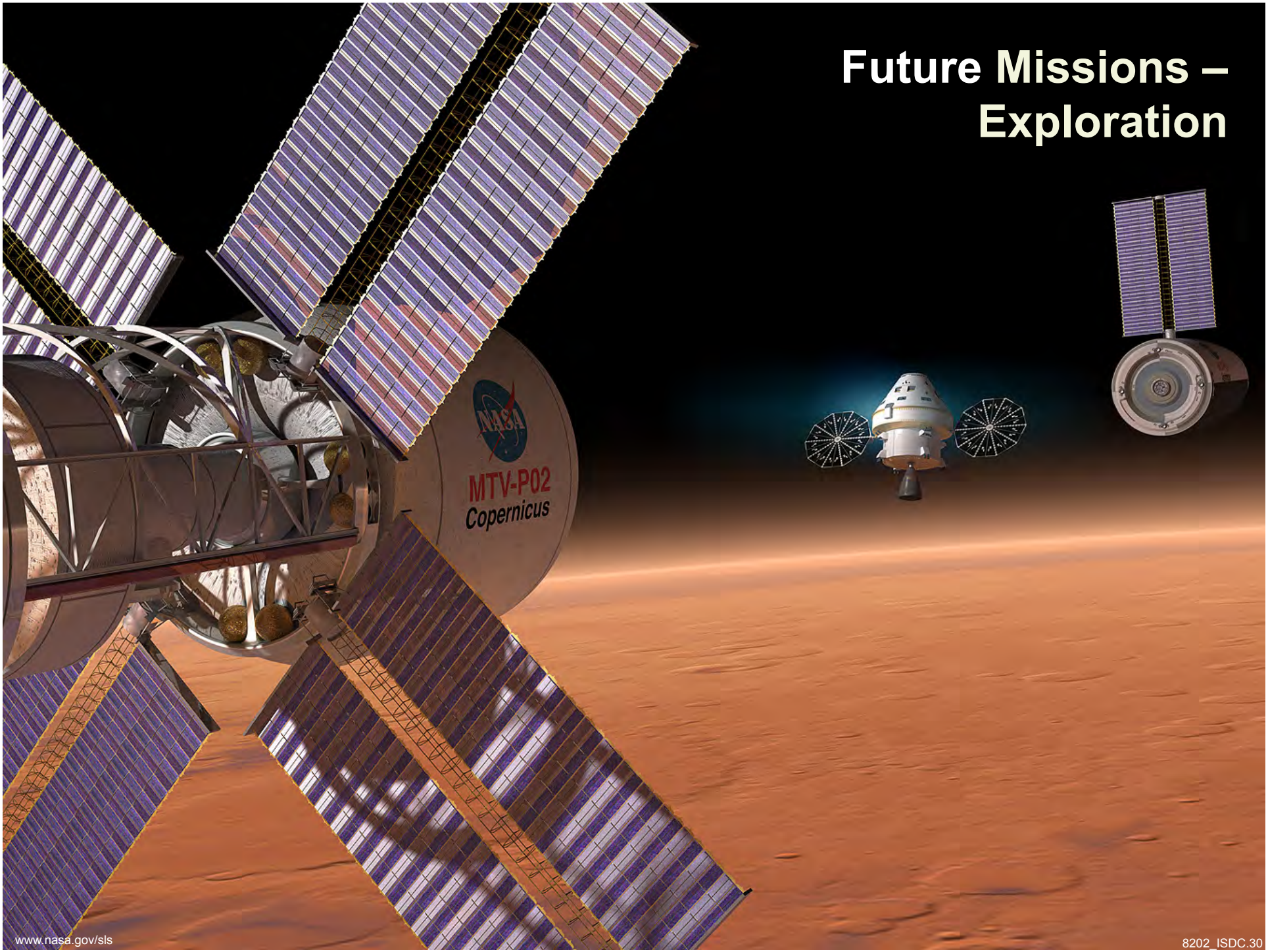
Design for Orion Multi-Purpose Crew Vehicle Stage Adapter completed for EFT-1 mission

Orion MPCV Stage Adapter

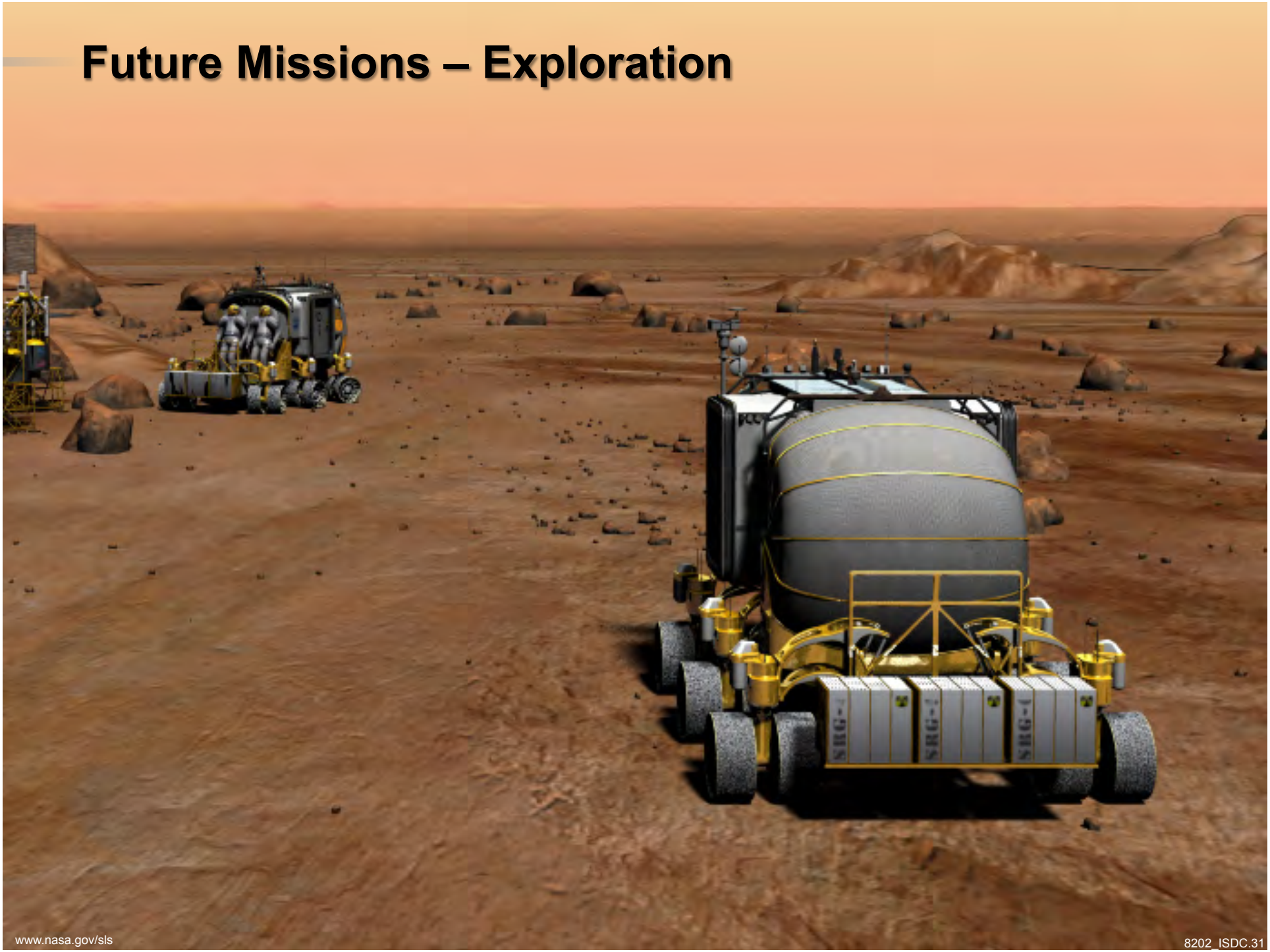


First ring forging preparation by ATI/Ladish Forging, Cudahy, Wisconsin

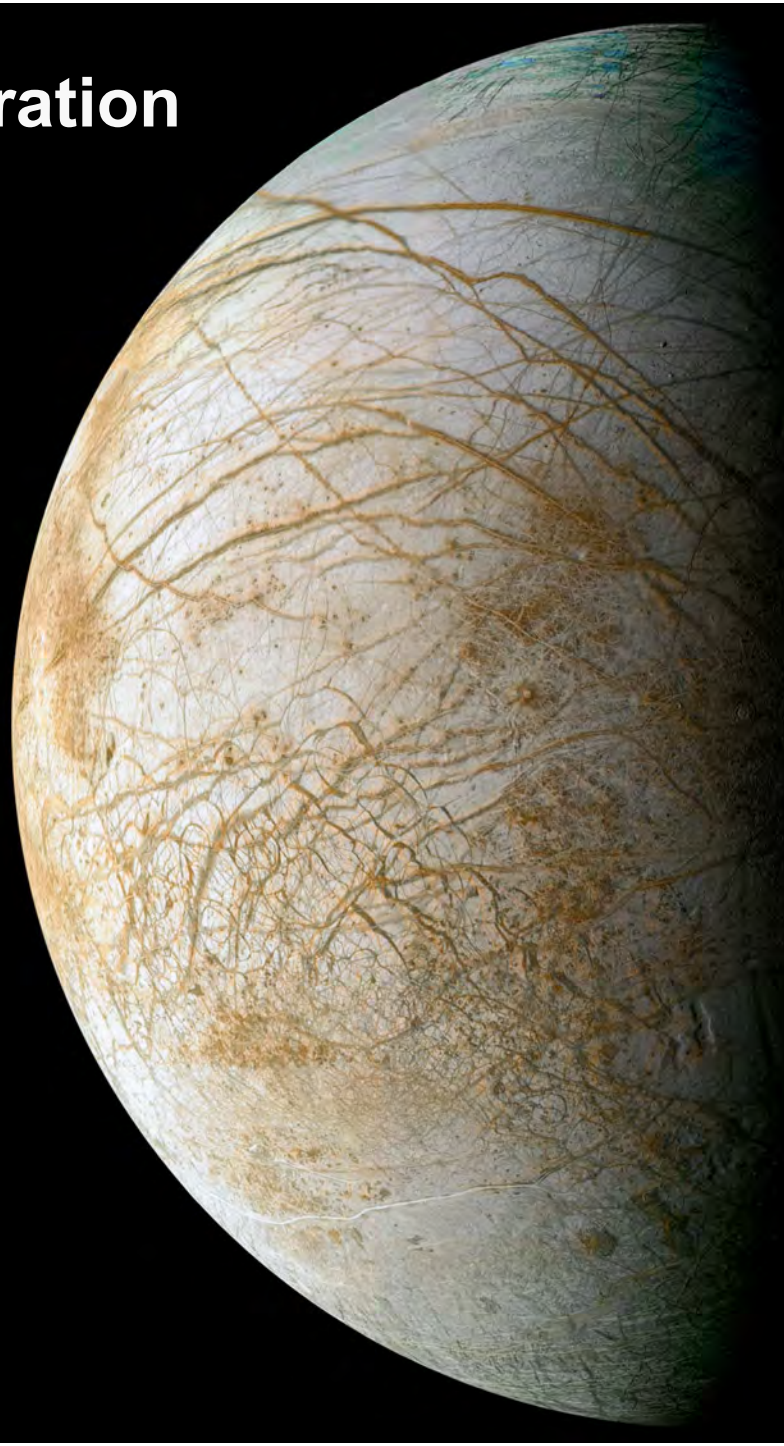
Future Missions – Exploration



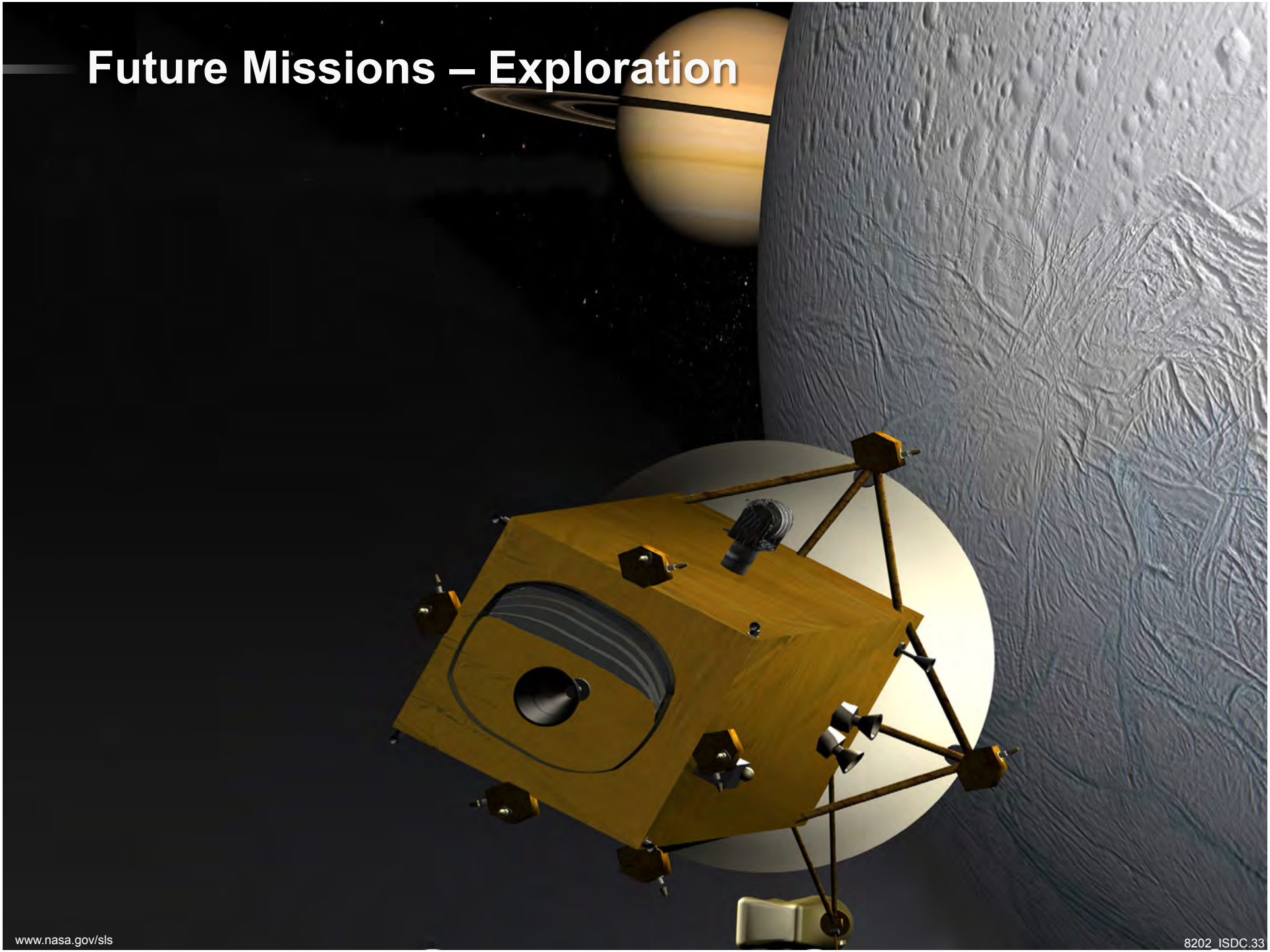
Future Missions – Exploration



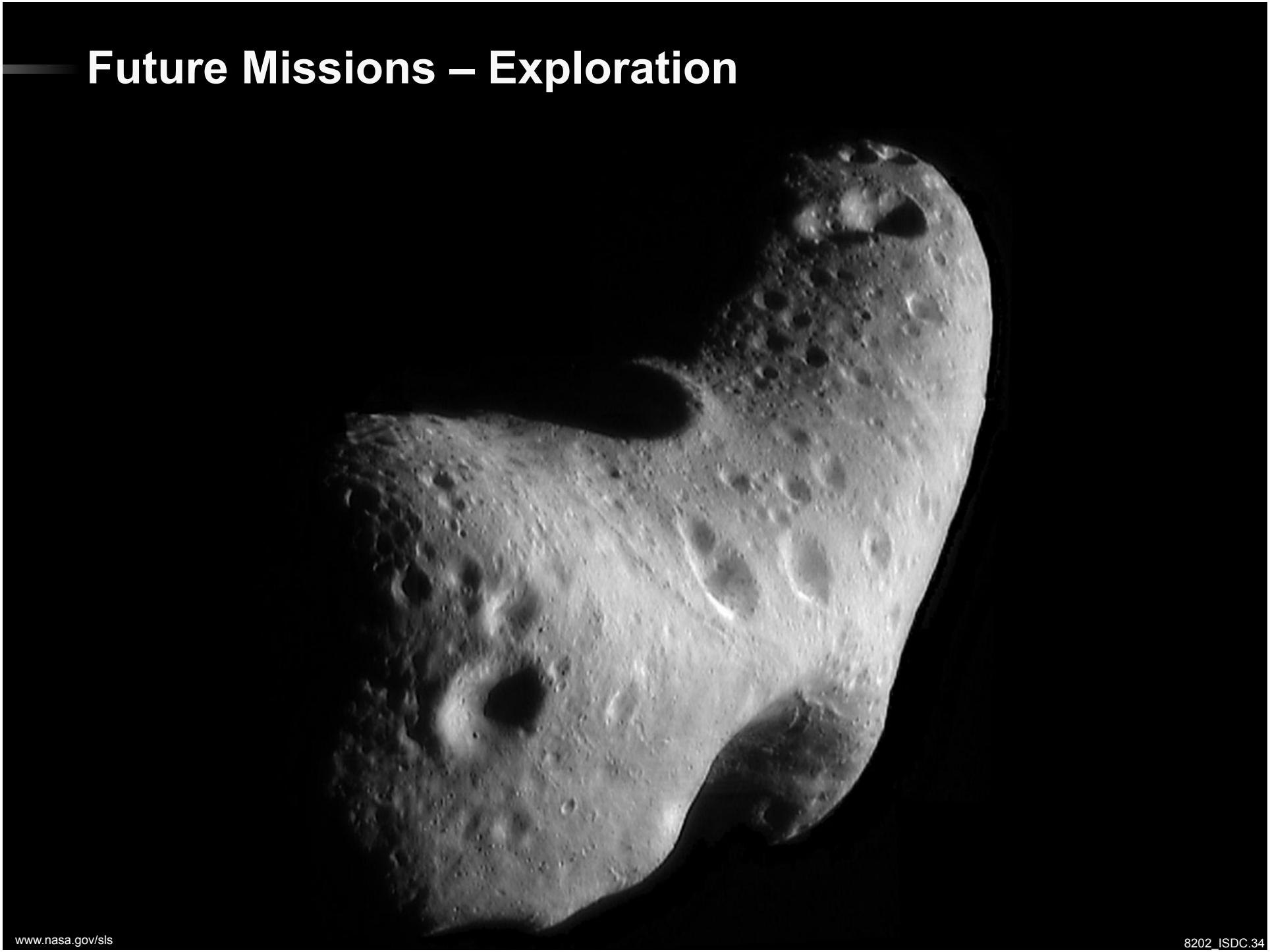
Future Missions – Exploration



Future Missions – Exploration



Future Missions – Exploration



Future Missions – Exploration

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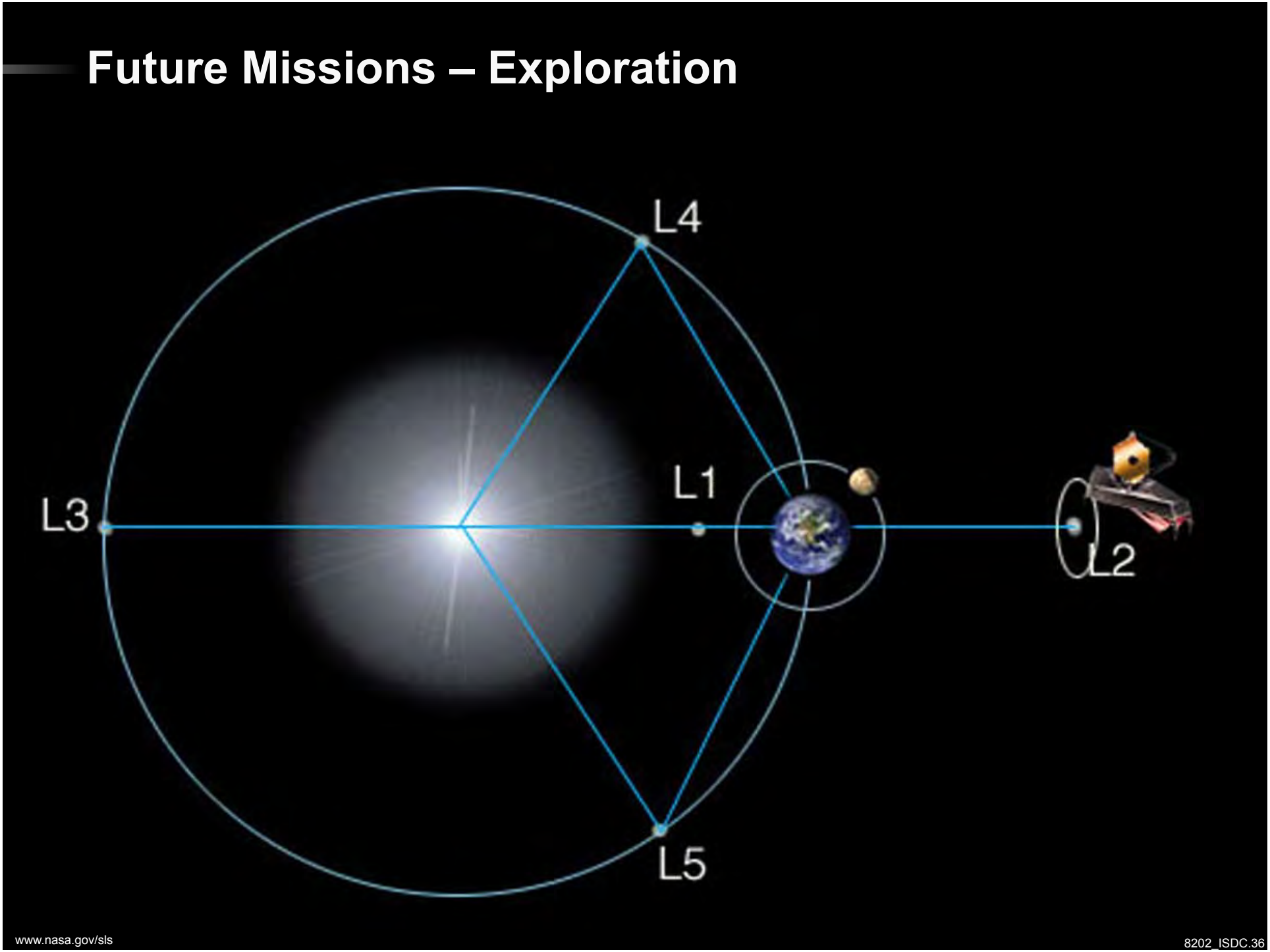
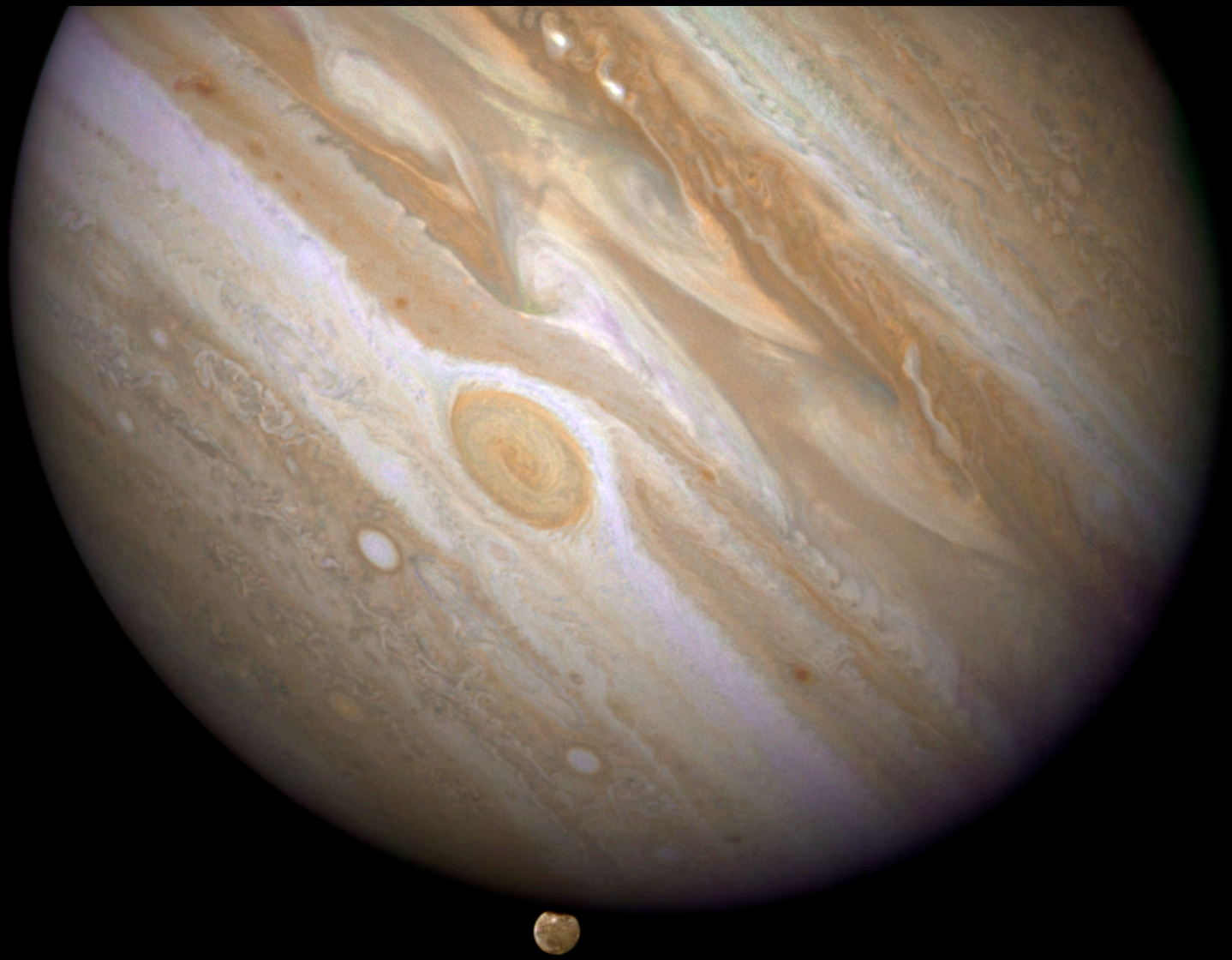
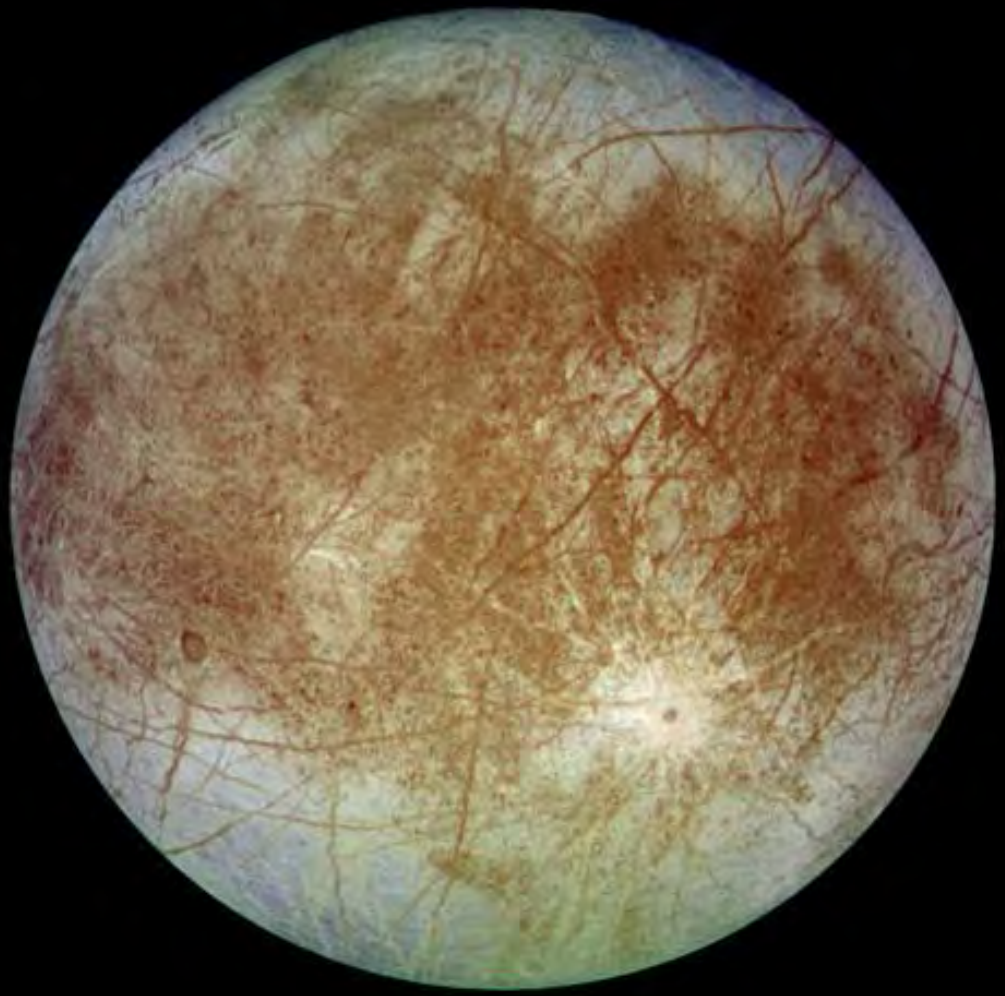


Future Missions – Planetary



Future Missions – Planetary



Future Missions – Planetary

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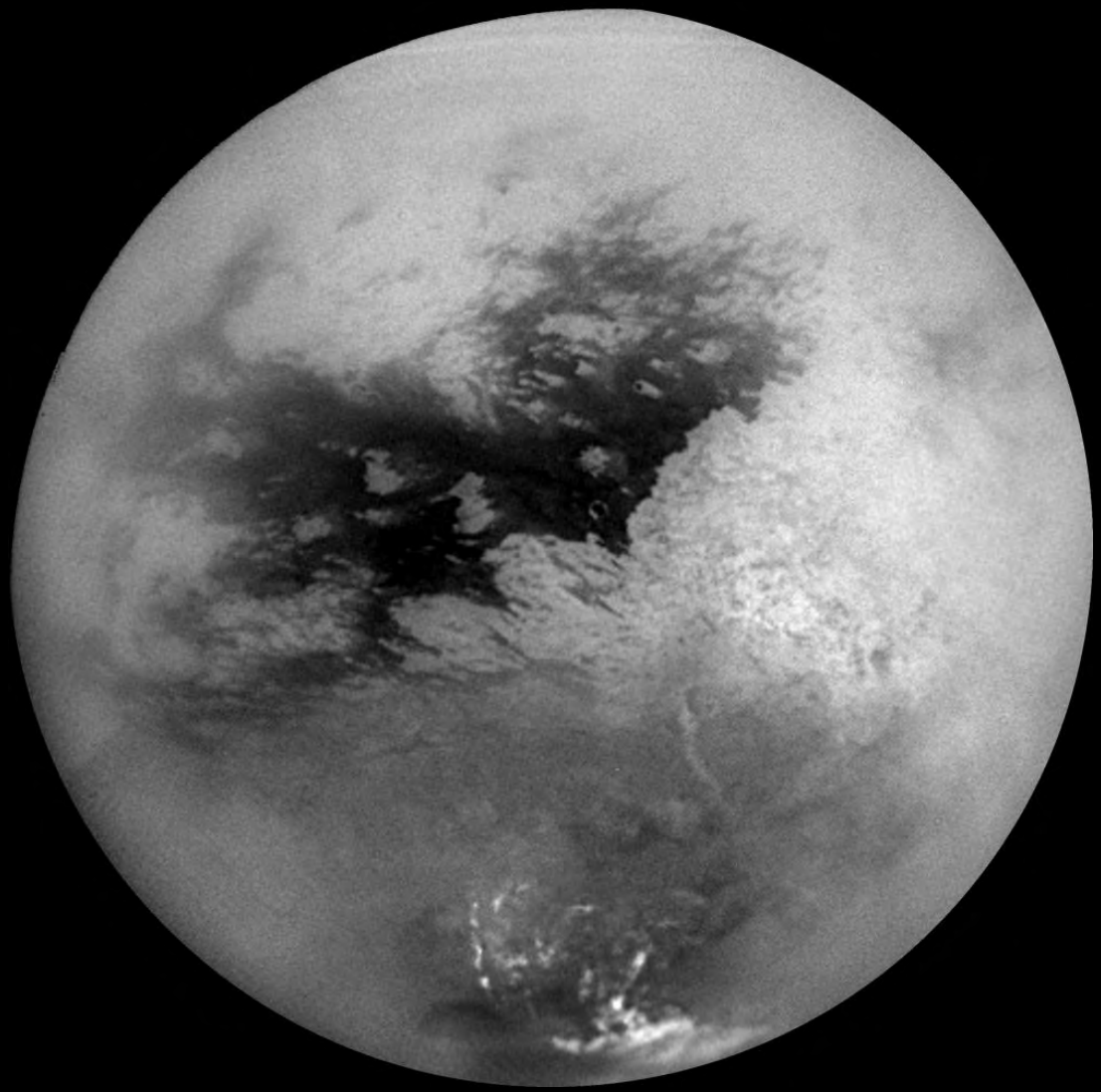
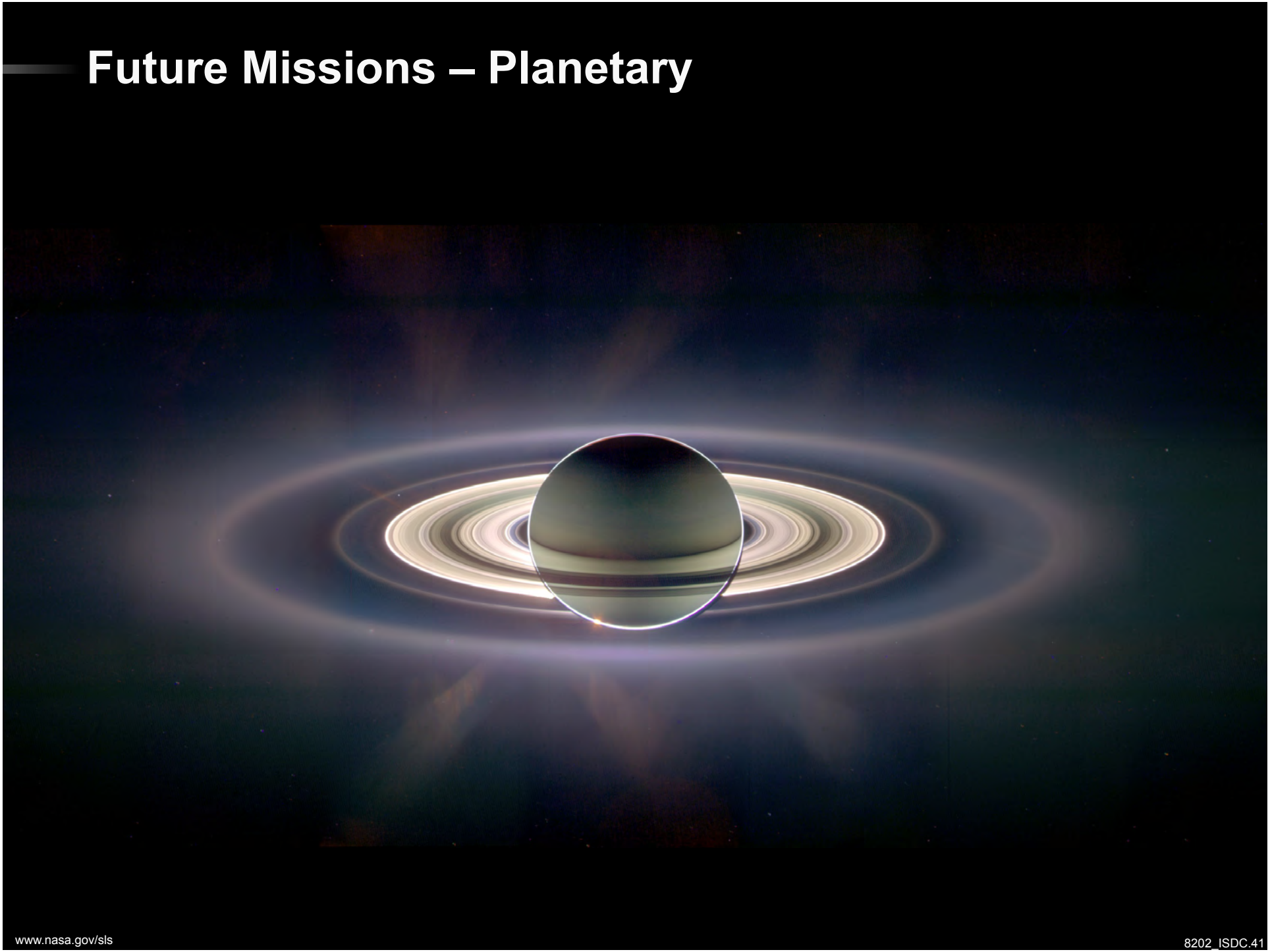
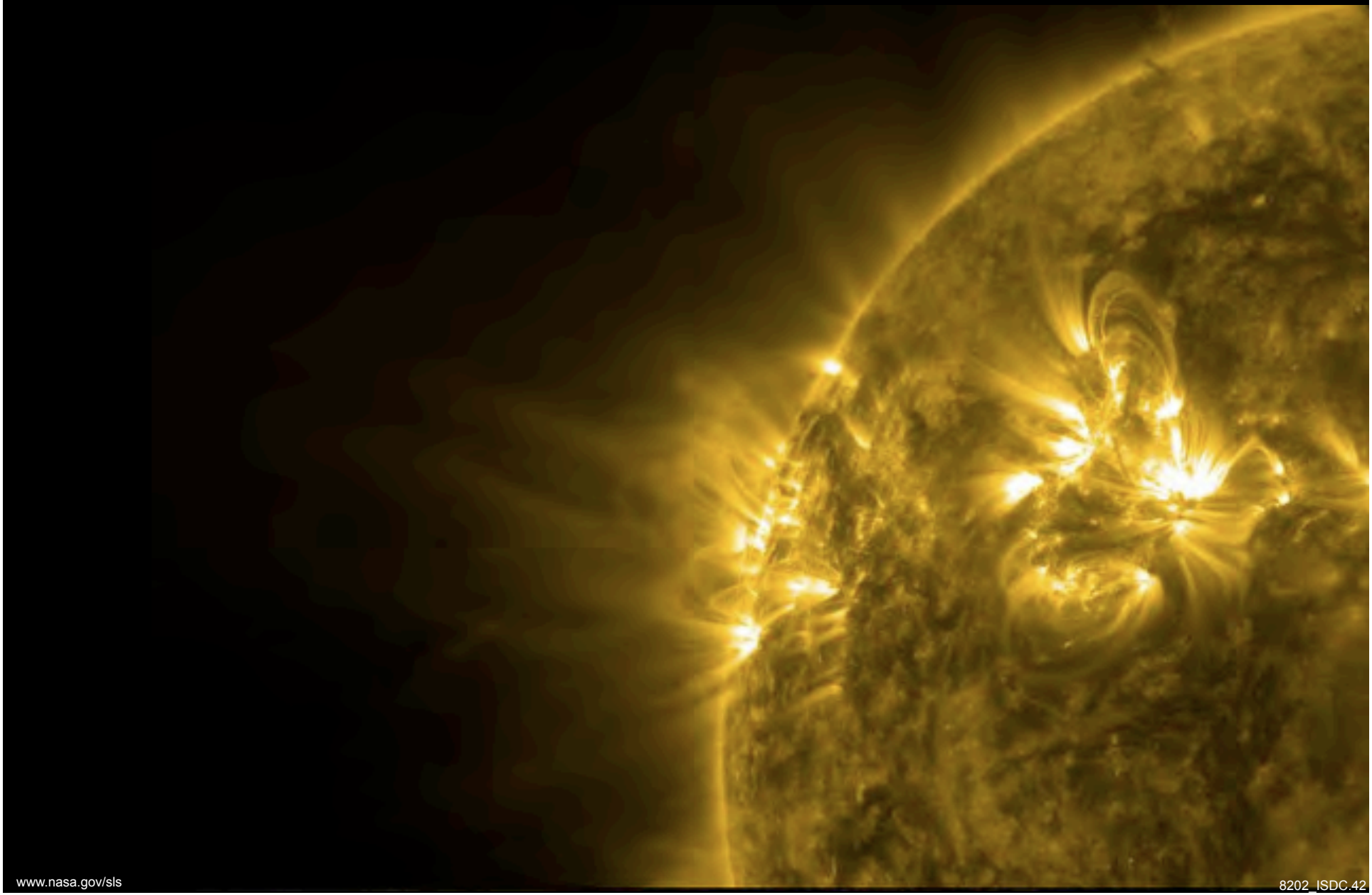


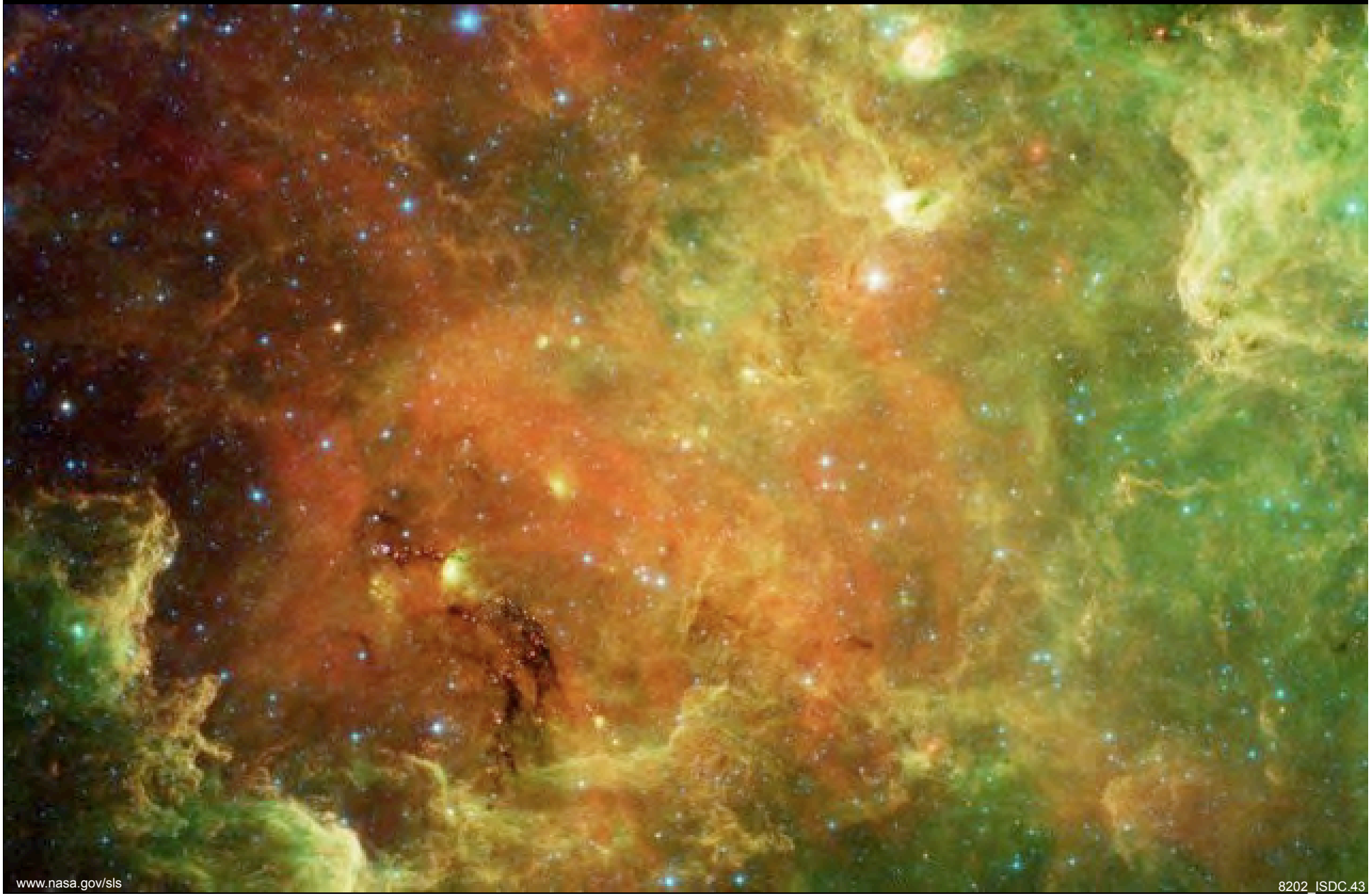
Future Missions – Planetary



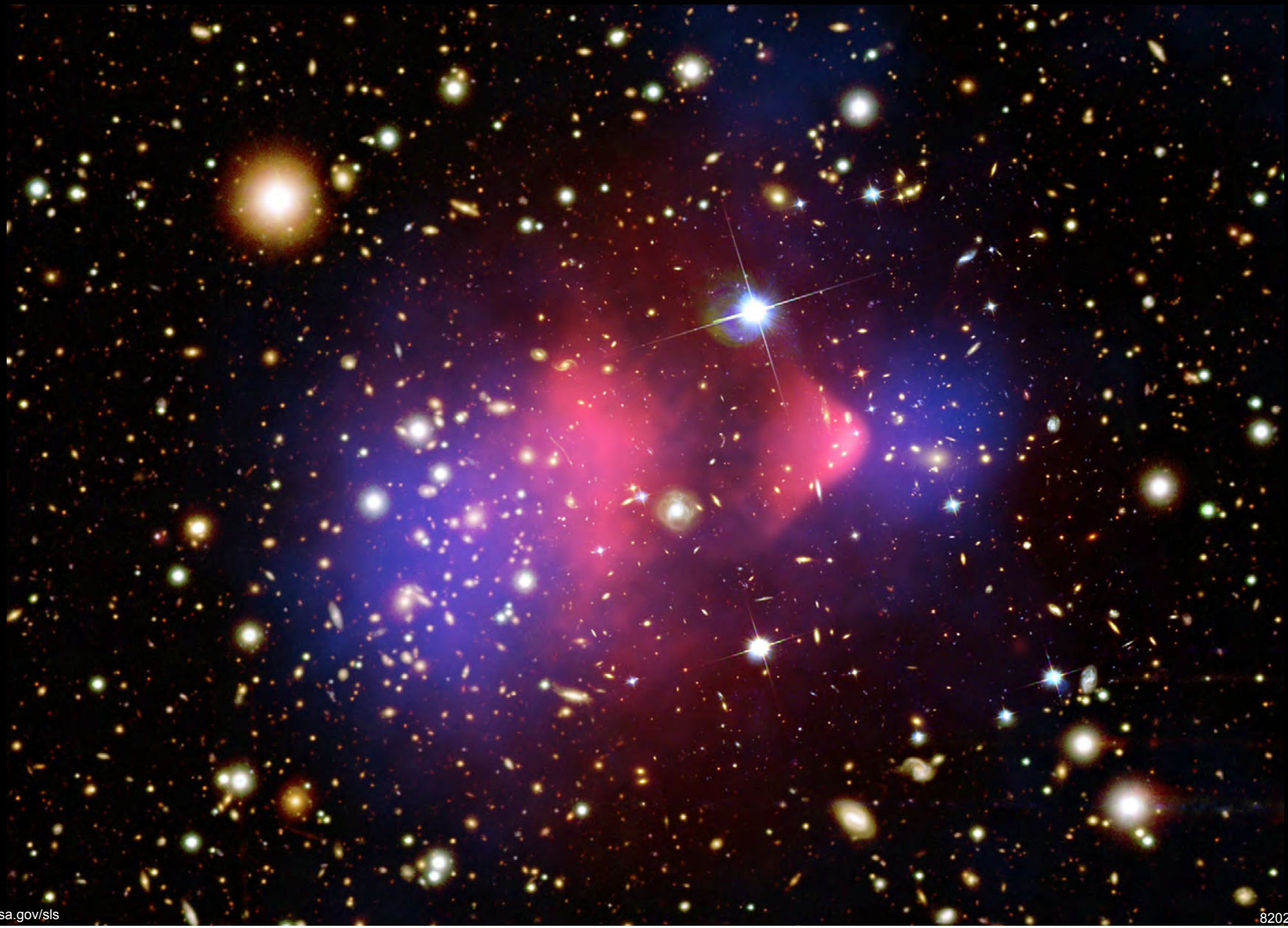
Future Missions – Solar



Future Missions – Astronomy



Future Missions – Astronomy



Future Missions – Astronomy


For More Info: www.nasa.gov/sls
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Somewhere, something incredible is waiting to be known.
— Carl Sagan
www.nasa.gov/sls
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