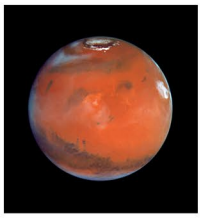
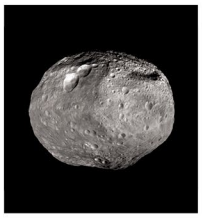
National Aeronautics and Space Administration

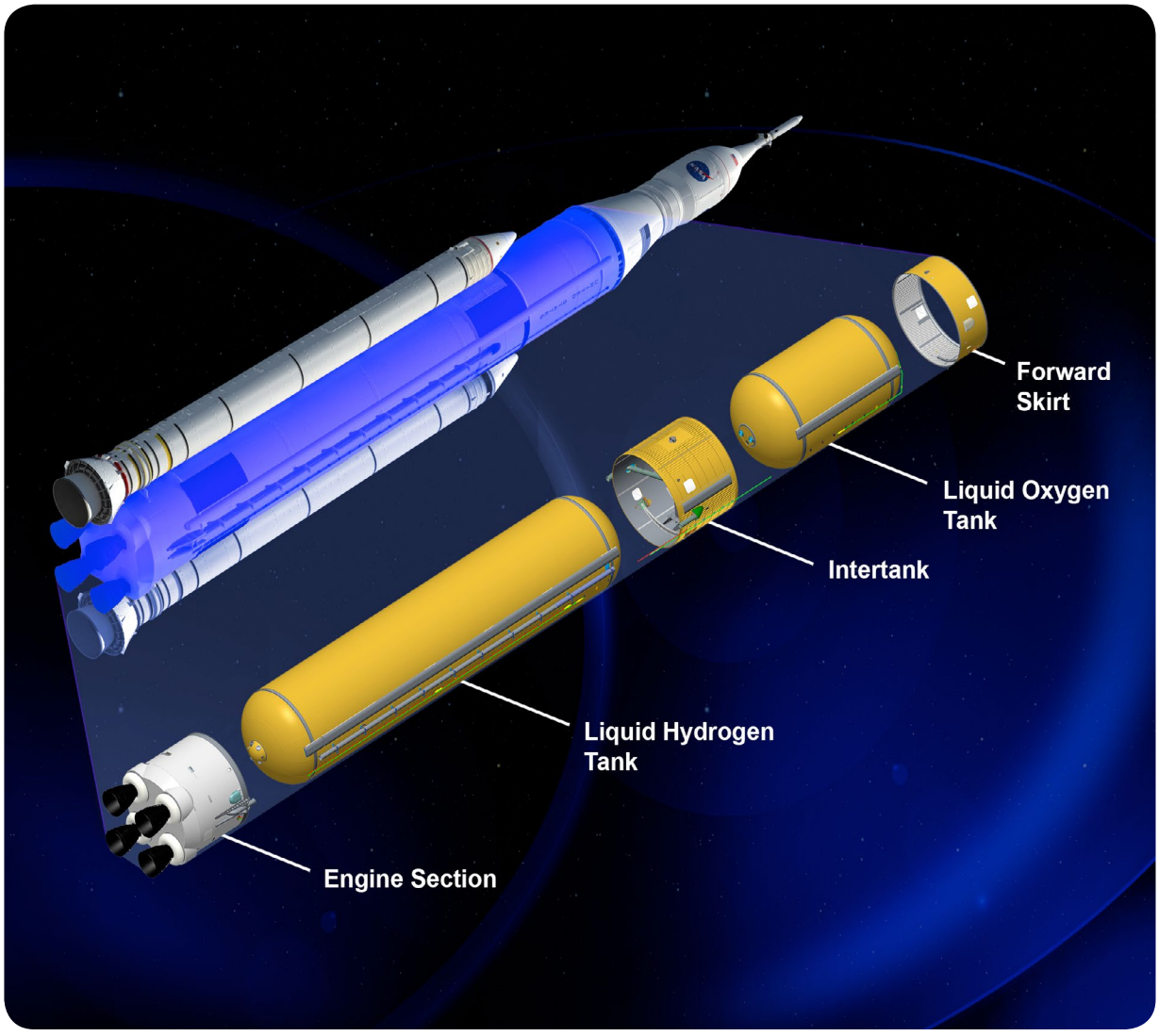
Space Launch System
Highlights

July 2014

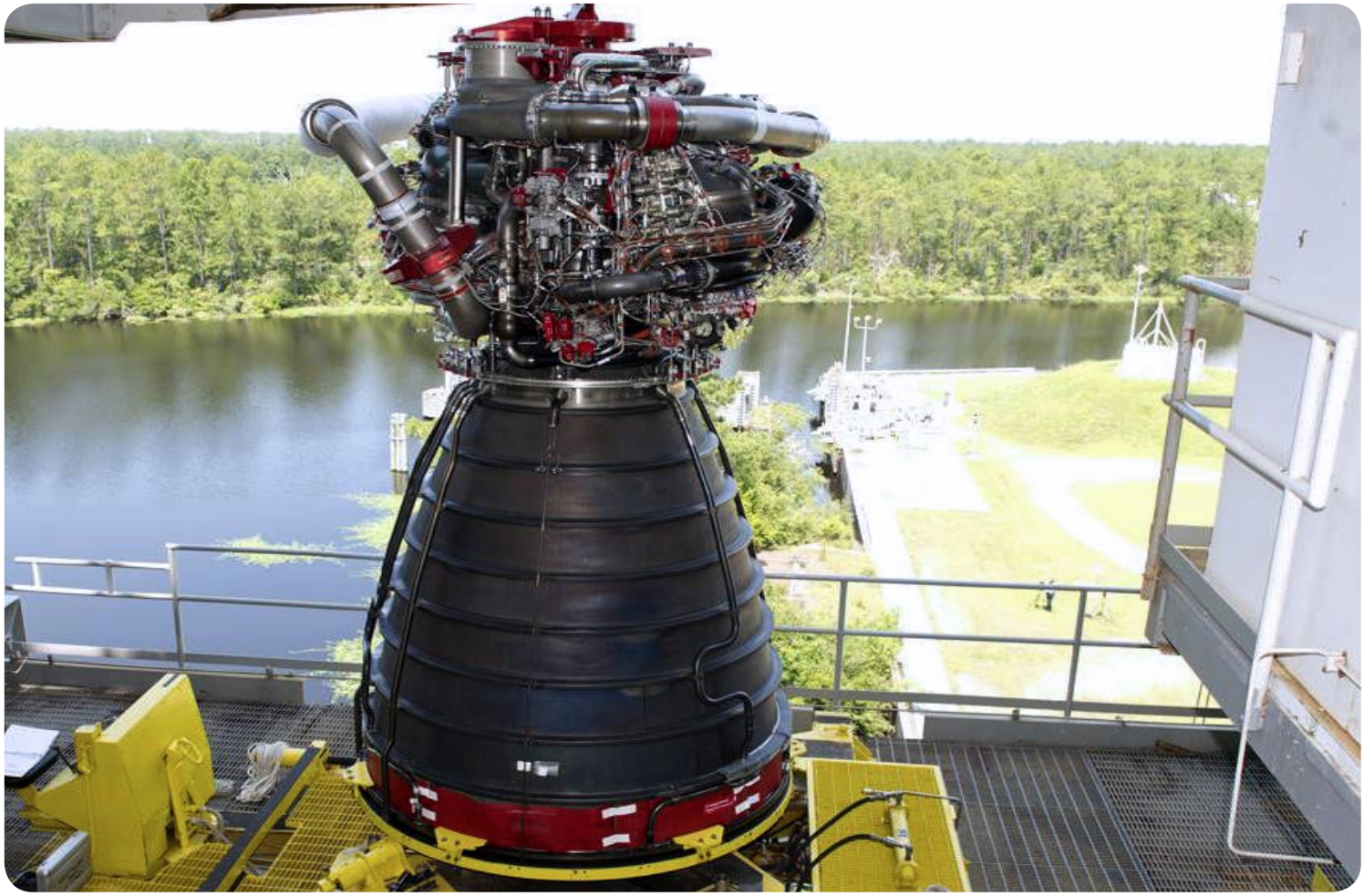



NASA's SLS Core Stage Passes Critical Design Review

On July 1, the core stage for SLS passed its Critical Design Review—a major milestone for the program, proving the first new design for America's next great rocket is mature enough for production. Representatives from various NASA centers and The Boeing Co.—prime contractor for the core stage, including its avionics—met June 30 and July 1 for the Critical Design Review board at NASA's Marshall Space Flight Center. More than 3,000 core stage artifacts were reviewed by 11 individual technical discipline teams. Marshall manages the SLS Program for the agency. For the full story, click **here**. *(NASA)*

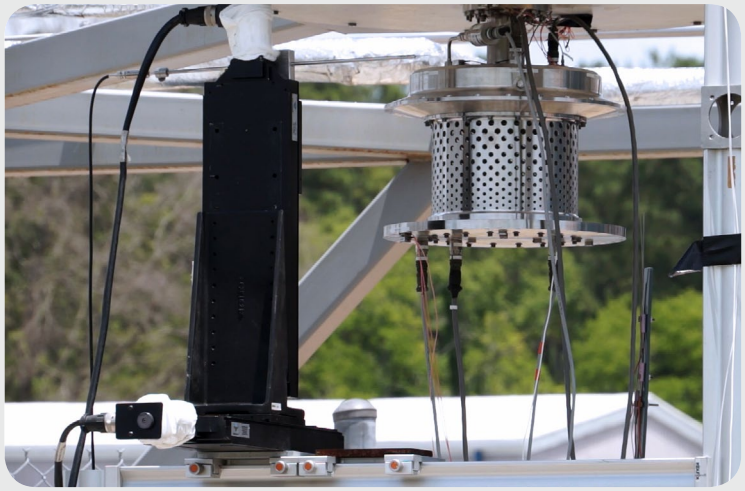


SLS RS-25 Engine Installed at Stennis for Testing



RS-25 rocket engine No. 0525 is positioned onto the A-1 test stand July 17 at NASA's Stennis Space Center. Four RS-25 engines will power the SLS core stage. Early tests on the engine will collect data on the performance of its new advanced engine controller and other modifications. For the full story, click **here**. *(NASA)*

'Diffusing' the Situation: Marshall-Developed Hardware for Propellant Tanks May Benefit Future SLS Missions



A low-profile diffuser, left, undergoes a round of tests at NASA's Marshall Space Flight Center. The low-profile diffuser, about half the size of current flight diffusers, is used to flow gas uniformly and at the lowest velocity possible in liquid propellant tanks. "Using a smaller diffuser can allow us to raise the liquid level up higher and add more rocket fuel," said Mike Martin, lead on the low-profile diffuser project at the Marshall Center. "When you do that, you have the potential to increase the amount of payload that you can carry on future launch vehicles, like the Space Launch System." For the testing, the hardware is mounted to a test rig, and run for two to three minutes to gather velocity data and validate computational fluid models used to design it. For the full story and video, click **here**. *(NASA/MSFC)*

Spaceflight Partners: Marine Travelift Inc.

EDITOR'S NOTE: Every month, SLS Highlights turns the spotlight on one of the industry partners helping to create the largest rocket ever built for human space exploration. In this issue, we profile Marine Travelift Inc. of Sturgeon Bay, Wisconsin.

Marine Travelift Inc., located in Sturgeon Bay, Wisconsin, is developing a lift system for the SLS core stage that will handle and transport two of the massive cryogenic tanks and their subassemblies individually at NASA's Michoud Assembly Facility in New Orleans.

NASA's SLS core stage, towering more than 200 feet tall with a diameter of 27.6 feet, will store cryogenic liquid hydrogen and liquid oxygen that will feed the vehicle's RS-25 engines.

Traditionally a premier manufacturer of boat-handling equipment, Marine Travelift is using its expertise in safely handling very large systems for localized transport. The system, called the ShuttleLift 150 II series, is an affordable, motorized, all-wheel-drive gantry crane powered by liquid propane that will transport the 188,000-pound core stage when it is removed from assembly on the 170-foot-tall Vertical Assembly Center (VAC) at Michoud.

The system, designed in Sturgeon Bay and tested at Michoud, is a critical component in the testing and integration of the SLS system. Five large tools at Michoud manufacture the barrels, domes, caps and rings that make up the elements of the core stage, and the Vertical Assembly Center welds those pieces together to form the two individual large cryogenic structures. Once assembled, the individual tanks must be lifted from the VAC and lowered for transport to testing facilities. The size and weight of the assembled core stage requires the unique Marine Travelift equipment to move it safely and reliably.

Marine Travelift Inc. is developing a lift system for the SLS core stage that will handle and transport two of the cryogenic tanks and their subassemblies individually at NASA's Michoud Assembly Facility in New Orleans. *(Boeing)*

A 'Weld' of Progress at Michoud

Construction is almost complete on the Vertical Assembly Center (VAC) at NASA's Michoud Assembly Facility. The 170-foot powerhouse will be used to weld parts for the SLS core stage. *(NASA)*

National Aeronautics and Space Administration

THE NEXT GIANT LEAP

Creating New Opportunities:

The yellow square at left represents the distance from Earth once covered by NASA's Space Shuttle Program and currently traveled by Russian Soyuz spacecraft transporting astronauts to and from the International Space Station. The space station allows us to master the fundamentals required for deep space exploration while relatively close to Earth.

Our Home Base:

Planet Earth has a circumference of 24,901 miles and a diameter of 7,918 miles. Using this as a handy reference, we see the blue sphere representing our home planet grow smaller as the relative distance involved in sending humans into space increases.

Moon

Apollo 11

1

1. Looking Beyond LEO:

The yellow line between the moon and Earth represents 238,000 miles. This is the distance the Apollo astronauts traveled to be the first humans to reach the moon.

Orion spacecraft

Earth

2

Apollo 13

2. The Farthest We've Ever Been:

The moon's orbit around Earth is marked by the dotted circular line. Beyond that, the solid white line above represents a mark in space 249,000 miles away, the farthest distance any human has ever traveled from Earth, set during the Apollo 13 mission.

3

EM-1

NASA's SLS
70 Metric Ton
Launch Vehicle

3. Where We're Headed:

During Exploration Mission-1, or EM-1, NASA's Space Launch System, or SLS, will carry an uncrewed Orion spacecraft into space on a mission that will take it 280,000 miles away from Earth.

This is only the beginning!

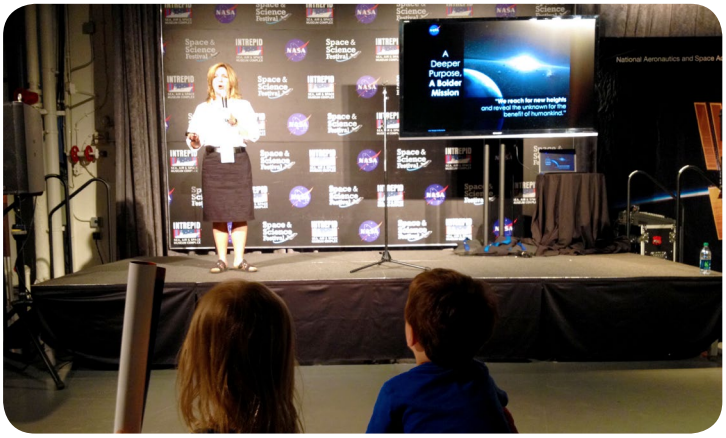
While EM-1 is a test of SLS and Orion for human exploration, the power and flexibility of the rocket also enable future game-changing science missions that will expand our knowledge of our solar system and beyond.

www.nasa.gov/sls #SLSinspires

To see more SLS infographics, click here. *(NASA/MSFC)*

SLS On the Road…

SLS engineer Tim Owen talks to youngsters July 9 about America's next great rocket at Sci-Quest Hands-On Science Center in Huntsville, AL. *(NASA/MSFC)*



SLS Assistant Program Manager Sharon Cobb discusses NASA's path to Mars with SLS at the Intrepid Museum's Space & Science Festival in New York City. *(NASA/MSFC)*

The SLS inflatable is on display outside the Mercedes-Benz Superdome in New Orleans for a Boeing employee event. *(NASA/MSFC)*

The SLS and Orion inflatables at the Intrepid Museum's Space & Science Festival in New York City. *(NASA/MSFC)*

For more SLS news, updates and resources, visit www.nasa.gov/sls

Follow SLS on:

SLS on Deck:

- Boosters critical design review
- Vertical Assembly Center first weld
- Anti-geyser testing