



Space Launch System Highlights

November 2012



In Position...and Ignition!



The recently installed J-2X power pack assembly burns brightly during a hot fire test Nov. 27 at the Stennis Space Center. Engineers pulled the assembly from the test stand in September to install additional instrumentation in the fuel turbopump. The test, which ran for 278 seconds, verified the newly installed strain gauges designed to measure the turbine structural strain when the turbopump is spinning at high speeds that vary between 25,000 and 30,000 rotations per minute. *(Image: NASA/SSC)*

After recently adding more instrumentation to the assembly, workers at the Stennis Space Center in Mississippi install the J-2X power pack in the center's A-1 test stand. The power pack is a system of components on the top portion of the engine. The engine and power pack are being built by Pratt & Whitney Rocketdyne of Canoga Park, Calif., to support the Space Launch System, managed at the Marshall Space Flight Center in Huntsville, Ala., which will usher in a new capability to send humans deep into space. *(Image: NASA/SSC)*



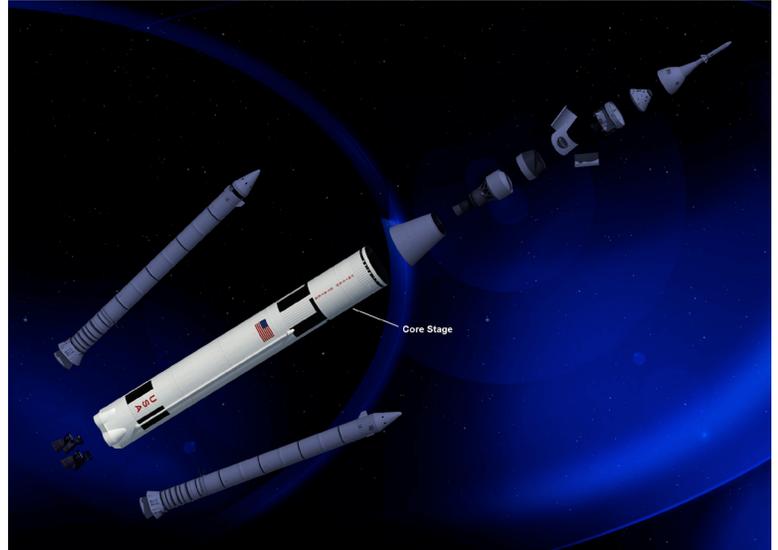
SLS Progress: Core Stage Preliminary Design Review Under Way

As progress continues on NASA's Space Launch System, one of the larger elements of the rocket is accelerating toward a major milestone, including a technical review, which began in November.

The core stage of the rocket that will take astronauts beyond low Earth orbit kicked off a preliminary design review, or PDR, the last week of November.

The PDR demonstrates that the preliminary design meets all system requirements with acceptable risk and within the cost and schedule constraints, and establishes the approval for proceeding with a detailed design. It will show that the correct design options have been selected, interfaces have been identified and verification methods have been described.

The core stage is the heart of the heavy-lift launch vehicle. It will stand more than 200 feet (61 meters) tall with a diameter of 27.5 feet (8.4 meters). The core stage will store liquid hydrogen and liquid oxygen to feed the rocket's four RS-25 engines.



An expanded view of an artist rendering of the 70-metric-ton configuration of SLS. The core stage is undergoing a preliminary design review. (Image: NASA/MSFC)

The core stage PDR board, composed of technical reviewers and an independent review board, is scheduled to deliver its findings near the end of December.

Spaceflight Partners: VACCO Industries

EDITOR'S NOTE: Every month, SLS Highlights will turn the spotlight on one of the many industry partners helping create the largest rocket ever built for human space exploration. The inaugural article in the series will discuss VACCO Industries in South El Monte, Calif., just outside of Los Angeles.



VACCO is designing and building the vent relief valves, or VRVs, for the SLS main propulsion system. VRVs protect fuel tanks by controlling the maximum and minimum gauge pressure with two distinct modes: vent and relief. During tank fueling operations, the VRV opens to vent the tanks. During launch and flight, the valve is in relief mode and will open only to relieve tank pressure if over-pressurization occurs.

(continued on page 3)

VACCO Industries

(continued from page 2)

Founded in 1954, the Vacuum and Air Components Company of America developed and manufactured high-performance valves. The company shortened its name to VACCO Industries in the 1960s and started its relationship with NASA by manufacturing thousands of components for NASA's Gemini and Apollo crew capsules, including the giant valves used for fueling the Saturn V rockets. After years of service on Delta launch vehicles and for the Space Shuttle Program, the company's valve expertise is put to use again with the Space Launch System.

At the company's South El Monte, Calif., facility, VACCO has built a custom test stand capable of simulating SLS flight conditions to ensure safe fueling, trouble-free launch and a smooth flight. *(Images: VACCO)*



Qualification Motor 1



Employees of Alliant Techsystems (ATK) carefully lower the final segment of an updated solid rocket booster design into place for propellant casting at the company's Promontory, Utah, facility. The finished booster, called Qualification Motor 1, or QM-1, will be the first of two qualification motors to be processed and static-tested to qualify design and manufacturing for SLS. The five-segment booster includes several upgrades and improvements by NASA and ATK engineers. ATK recently streamlined manufacturing of the booster using Value Stream Mapping to lower cost and reduce the build time by 46 percent. *(Image: ATK)*

SLS On the Road...

Space shuttles Endeavour and Atlantis were moved to their new permanent homes in November — Endeavour to the California Science Center in Los Angeles and Atlantis to the Kennedy Space Center Visitor Complex in Florida. When the vehicles were displayed for the public during celebratory events on both coasts, representatives from the SLS program were on hand to provide information to the public about America's new rocket and answer their questions.



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A 6-foot-tall model of NASA's Space Launch System stands near space shuttle Atlantis as the orbiter makes its final voyage on Nov. 2, rolling from the Kennedy Space Center's Vehicle Assembly Building to its permanent home at Kennedy's visitor complex. Thousands of people from across the country and as far away as New Zealand, Europe and South America were on hand for the "Atlantis Rollover" celebration Nov. 2-4. While there, they were given the opportunity to learn about the Space Launch System. (Image: NASA/KSC)



A tiny visitor to the California Science Center in Los Angeles dreams big during the space shuttle Endeavour celebration Oct. 30-Nov. 4 as Twila Schneider, a communications strategist with Analytical Services Inc., supporting the Space Launch System Program at the Marshall Center, shows him a scale model of the proposed SLS. The child was one of approximately 46,000 people who visited the science center during the event. (Image: NASA/MSFC)