National Aeronautics and Space Administration

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SPACE LAUNCH HIGHLIGHTS

Welcome to SLS Boosters 101

Have your pencils and notebooks handy because school is in session. Welcome to Boosters 101 for SLS. Read the story, and watch a video of how a booster is made **here**.
(Orbital ATK)

Eruptions Evicted: Anti-geyser Testing Completed for SLS Liquid Oxygen Tank

NASA and Boeing engineers finish anti-geyser testing and monitor data from those tests in a control room at NASA's Marshall Space Flight Center in Huntsville, Alabama. More than 120 hours of anti-geyser testing have been completed on a full-scale, 40-foot replica of the SLS liquid oxygen tank feed system — which will be housed in the SLS core stage. Read the full story, and watch the video **here**. *(NASA/MSFC)*

The State of the Programs

NASA Marshall Space Flight Center Deputy Director Teresa Vanhooser, at podium, opens the SLS monthly all hands meeting Feb. 11 at Marshall's Building 4220. Sharing updates on Exploration Systems Development, including the SLS, Orion and Grounds Systems Development and Operations programs, with Marshall team members are, from left, SLS Program Manager Todd May; NASA Exploration Systems Devetlopment Director Bill Hill; Orion Program Manager Mark Geyer; and Ground Systems Development and Operations Division Manager Mike Bolger. The Marshall Center manages the SLS Program for the agency. *(NASA/MSFC/Emmett Given)*

Spaceflight Partners: Alcoa Forgings and Extrusions

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 Alcoa Forgings and Extrusions of Cleveland, Ohio.

Alcoa, a global leader in lightweight metals engineering and manufacturing, is supporting Aerojet Rocketdyne in supplying the hot gas manifold for the RS-25 engines on SLS from its forging operations in Cleveland, Ohio.

Alcoa has been working with Aerojet Rocketdyne to develop an improved hot gas manifold design with today's advanced modeling technologies and finite element analysis. "Our collaborative engineering mindset, in partnership with Aerojet Rocketdyne, has led to a fully optimized forging design and process for these high-strength components, which help deliver the high-pressure fuel and oxygen into the combustion chamber. Alcoa is excited to be working with Aerojet Rocketdyne in manufacturing these large inconel forgings for the SLS Program," said Dustin Bush, the Cleveland-based Forging Technology Manager for Alcoa Forgings and Extrusions.
The inconel forgings will be hot forged on the 50,000-ton press, one of the world's largest, closed-die presses since its startup in 1955. Recently enhanced, the press' structural components weigh 8,200 tons and stand 91 feet tall, with about 56 feet above floor level. The press exerts the force equal to the pressure that would be exerted by the weight of a steel ingot 612 feet high, placed on end to cover a 26-foot-by-12-foot die bed.

The powerhead assembly is the central element of an RS-25 engine and the hot gas manifold is its "ductwork." The hot gas manifold ties together and serves as a structural base for seven key components of the powerhead assembly, the injectors, the heat exchanger coil, the high-pressure turbopumps and the main combustion chamber.

The Aerojet Rocketdyne RS-25 engine burns a mixture of hydrogen and liquid oxygen to create the 512,000 pounds of vacuum thrust for SLS. The hot

Alcoa Forgings and Extrusions of Cleveland, Ohio, is supporting Aerojet Rocketdyne on work for the RS-25 engines used on SLS missions. The forgings will be produced on the business's 50,000-ton, closed-die press, one of the world's largest and equipped with the most advanced electronic and hydraulic controls. *(Alcoa)*

gas manifold manufactured by Alcoa is instrumental to SLS and the RS-25 engine with its unique strength, shape and weight characteristics enabling the success of the powerhead design.

Alcoa is a long-standing supplier to our nation's space endeavors. In addition to being a crucial supplier to the RS-25 program, Alcoa has supported Aerojet Rocketdyne on the RS-68 program, as well as provided aluminum powder to the NASA space shuttle, airfoils for the shuttle's main engines, and high-strength precision aerospace fasteners to hold together Curiosity, the Mars rover that landed in 2012.

NASA Representatives Visit Louisiana to See Pegasus Progress

All hands on deck! On Feb. 5, SLS Program Manager Todd May, left, Marshall Center Operations Director Steve Doering, and other agency representatives, including NASA astronaut Steve Bowen, visit Conrad Industries Shipyard near Morgan City, Louisiana. The purpose of the visit was to thank employees for their work on the Pegasus barge. Conrad has made modifications to the barge, which is almost completed, so that it can carry the large core stage of the SLS. *(NASA/Michoud)*

At Conrad to see Pegasus progress is, from left, Marshall Center Operations Director Steve Doering; Michoud Deputy Director Mike Kynard; Daniel Conrad, senior vice president with Conrad Shipyard; NASA astronaut Steve Bowen; Johnny Conrad, president and chief executive officer of Conrad Shipyard; Marshall Center Deputy Director Teresa Vanhooser; SLS Program ManagerTodd May; and Malcolm Wood, deputy chief operating officer at Michoud. *(NASA/Michoud)*

NASA, Orbital ATK Preparing Solid Rocket Booster Avionics for Mission Success

An Orbital ATK technician checks the avionics control panels at Orbital ATK's Avionics Lab in Clearfield, Utah. The avionics were delivered in early February to NASA's Marshall Space Flight Center in Huntsville, Alabama, where development testing will continue through the end of the year. A flight-like set of the avionics system will be part of the major qualification test coming up for the booster March 11 at Orbital ATK's test facilities in Promontory, Utah. Read the full story **here**. *(Orbital ATK)*

On the Road...

SLS Strategic Communications team member Shannon Raleigh talks about the rocket with attendees of the 21st annual Space Exploration Educators Conference, held Feb. 5-8 at Space Center Houston. *(NASA/MSFC)*

Bruce Tiller, center, deputy manager of the SLS Boosters Office, takes questions during a Feb. 23 "Booster 101" Museum Alliance webcast. *(NASA/MSFC)*

SLS Program Manager Todd May discusses the rocket's progress and the journey to Mars Feb. 19 at the Marshall Small Business Alliance Meeting, held at the U.S. Space & Rocket Center in Huntsville, Alabama. *(NASA/MSFC)*

Follow SLS on:

SLS on Deck:

- SLS at South by Southwest
- RS-25 engine testing
- SPIE CDR kickoff