

NASA Conducts First Test On New Motor For The Ares I Rocket

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Engineers at NASA's Marshall Space Flight Center in Huntsville, Ala., completed first-round testing on Sept. 11 of a key motor for the next-generation Ares I rocket. The ullage settling motor is a small, solid rocket motor that will assist in vehicle stage separation and provide the forward motion needed to push fuel to the bottom of the fuel tanks during the launch to orbit of the Ares I rocket. Ares I is the first launch vehicle in NASA's new Constellation Program family of space vehicles that will transport astronauts to the International Space Station, the moon and beyond in coming decades. Image: NASA/MSFC

(PhysOrg.com) -- Engineers at NASA's Marshall Space Flight Center in Huntsville, Ala., have completed first-round testing of a critical motor for NASA's new Ares I rocket. The Ares I is a two-stage rocket that will launch astronauts aboard the Orion crew capsule on missions to the International Space Station and to the moon by 2020.

The ullage settling motor is a small, solid rocket motor that serves two key roles during the launch of the Ares I rocket. During first stage separation, which occurs 125.8 seconds into flight, the motor will fire for four seconds, producing the forward thrust needed to push the second, or upper, stage away from the first stage. This forward thrust also ensures the rocket's liquid fuel is properly pushed to the bottom of the upper stage fuel tank prior to ignition of the J-2X engine that powers the upper stage.

The successful hot-fire test of this new development motor -- the first test in this series -- was conducted Sept. 11 at Marshall. All test objectives were achieved, bringing NASA one step closer to developing America's new space transportation system. This first series of early development testing will consist of four motors. It is scheduled to run through 2009. The second test series is planned for February 2009.

"We are extremely excited about the success of this test that proves we are headed down the correct development path for this program," said Danny Davis, upper stage manager for Ares Projects at Marshall. "We have the right team in place, and we are working a design that will secure America's future in space."

The word "ullage" is taken from the French term "ouillage," which is used in winemaking to describe the space between wine and the top of a storage container, such as a barrel or bottle. In this case, it refers to the space at the top of the first stage fuel tank and the need to push the fuel, or settle it, to the bottom of the tank.

The ullage motor, 9 inches in diameter and 47 inches in length, is similar in design to the booster separation motor used on the space shuttle's reusable solid rocket motor. Eight ullage motors will be arranged in four pairs on the Ares I upper stage aft skirt, which also houses the reaction control system. The aft skirt is located between the upper stage core,

which contains the liquid hydrogen and oxygen fuel tanks, and the interstage, which houses the rocket's roll control system.

"We are very excited about this opportunity for our team to practice the basic principles of solid rocket motor design for the Ares I," said Steve Harvison, ullage settling motor design lead at Marshall. "It has been especially beneficial to newer team members who are fresh out of college and eager for this challenge. We are working every engineering aspect of these motors, from technical analysis, modeling and simulations to propellant tailoring work and hands-on developmental testing."

The first Ares I test flight, called Ares I-X, is scheduled for 2009.

NASA's Johnson Space Center in Houston manages the Constellation Program, which includes the Ares I rocket, the Ares V heavy-lift launch vehicle, the Orion crew capsule and the Altair lunar lander. Marshall manages the Ares Projects.

Provided by NASA

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