

NASA Successfully Completes Engine Hardware Tests for Ares V

May 8 2007



Engineers conduct a hot-fire test of subscale main injector hardware March 9 at the East Test Stand at NASA's Marshall Space Flight Center in Huntsville, Ala. The test, part of a series conducted at Marshall, supports development of the RS-68 engine for Ares V, the cargo launch vehicle that will deliver large-scale hardware and systems to space for exploration missions to the moon. The main injector is a key engine component. It injects and mixes hydrogen and liquid oxygen propellants in the combustion chamber, where they are ignited and burned to produce thrust. During the tests, engineers fired the injector horizontally for durations of 10 to 20 seconds. A cluster of five RS-68 engines will power the core stage of Ares V. The engine will be an upgraded version of those now used in the Delta IV, the largest of the Delta rocket family developed in the 1990s by the U.S. Air Force for its Evolved Expendable Launch Vehicle program. (NASA)

NASA engineers have successfully completed testing of subscale main injector hardware, an early step in development of the RS-68 engine that will power the core stage of NASA's Ares V -- the cargo launch vehicle that will deliver large-scale hardware and systems to space for exploration missions to the moon.

Engineers at NASA's Marshall Space Flight Center in Huntsville, Ala., recently conducted multiple hot-fire tests on the injector hardware. The injector is a major component of the engine that injects and mixes liquid hydrogen and liquid oxygen propellants in the combustion chamber, where they are ignited and burned to produce thrust.

The tests support the design and development of Ares V under the Constellation Program, which is responsible for overall development of the spacecraft and launch vehicles systems for NASA's exploration initiative to return to the moon and travel to Mars and destinations throughout our solar system.

The tests, begun in February, were part of a series investigating different injector element designs for propellant flow. During testing, engineers fired the injectors for durations of 10 to 20 seconds.

The hot-fire tests of the hardware and number of injector elements are part of efforts to investigate design options and maximize performance of the RS-68 engine. A cluster of five RS-68 engines will power the core stage of the Ares V. The engine will be an upgraded version of those now used in the Delta IV, the largest of the Delta rocket family developed in the 1990s by the U.S. Air Force for its Evolved Expendable Launch Vehicle Program.

Data from the tests also will be used to develop the J-2X engine systems for the upper stages of Ares V and for Ares I, the crew launch vehicle that will carry the Orion spacecraft and its crew of astronauts to Earth

orbit.

The injector hardware for the RS-68 and J-2X engines share design features similar to the subscale hardware, such as the type of elements and density patterns. This hardware commonality makes operations more cost effective for both the crew and cargo vehicles.

The test series was conducted by a joint Marshall Center team including members of the Exploration Launch Projects Office, Engineering Directorate and Safety and Mission Assurance Directorate.

The Ares V launch vehicle project includes teams at NASA and organizations around the nation. The Exploration Launch Projects Office at Marshall is responsible for the design and development of the Ares launch vehicles. The project reports to the Constellation Program Office, hosted by NASA's Johnson Space Center in Houston. Pratt & Whitney Rocketdyne of Canoga Park, Calif., is the prime contractor for the RS-68 core stage engines.

Source: NASA

Citation: NASA Successfully Completes Engine Hardware Tests for Ares V (2007, May 8)
retrieved 27 April 2024 from
<https://phys.org/news/2007-05-nasa-successfully-hardware-ares.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--