Lockheed Martin's Atlas V RD-180 Engine Successfully Completes Testing Program

Now Qualified for All Atlas V Missions

Lockheed Martin announced today that it has completed the test program of the RD-180 engine for the company's new Atlas V rockets. Completion of these tests firmly establishes that the RD-180's design and performance will meet all Atlas V mission requirements for commercial and government satellite customers. The RD-180 booster engine system is now fully test qualified for performance on all configurations of Lockheed Martin's Atlas III and V launch vehicles, including the Atlas V Heavy Lift Vehicle (HLV). The first Atlas V mission is scheduled for liftoff May 2002, from Cape Canaveral Air Force Station, Fla., with a commercial communications satellite.

"We are extremely pleased about what this achievement means for the success of our Atlas V program, for our commercial satellite customers and for the U.S. Air Force Evolved Expendable Launch Vehicle (EELV) program. This engine test program is done and we're ready to fly," said G. Thomas Marsh, president and general manager of Lockheed Martin Space Systems - Astronautics Operations. "The Atlas V team has done a tremendous job of partnering with RD AMROSS and NPO Energomash to design and develop what I believe is the best rocket propulsion system in the world for the Atlas V, and they did it on schedule and within the scope of all Atlas V mission requirements. This international team has successfully completed a very extensive development and test program on a new engine system in just five years, which is an amazing feat."

The RD-180 is the most tested family of expendable launch vehicle engines in the world. It also is the first variable-thrust main engine to power a U.S. expendable launch vehicle. The final test was completed successfully in Khimky, Russia, Dec. 6, consisting of a total duration burn of 350 seconds at the 100 percent and 47 percent power levels. The test caps an extensive five-year development and test period that began with the first test Nov. 15, 1996, at NPO Energomash's facilities in Khimky, Russia. NPO Energomash designs and builds the RD-180 at its facilities in Russia for RD AMROSS, a joint venture formed by Pratt & Whitney of West Palm Beach, Florida, and NPO Energomash.

"The Atlas V RD-180 EELV team has done a fabulous job bringing both the RD-180 and Atlas V on-line," said Col Bob Saxer, U. S. Air Force EELV system program director. "The completion of the RD-180 development/test program marks a major EELV program milestone. I couldn't be more pleased with the results or the outstanding international partnership we've developed during the past five years with Boris Katorgin and the NPO Energomash team. Their technical excellence and incredible commitment to meeting all our performance, reliability and cost targets have been superb. The United States Air Force and the commercial satellite community will benefit for years to come from the RD-180's impressive performance and ability to smoothly throttle across the entire power range. We look forward with great anticipation to our first EELV Atlas V/RD-180 launch in May 2002."

Since the first test in 1996, the RD-180 program has averaged a full-flight duration firing every 10 days, encompassing 135 total development and certification tests in Khimky, comprised of 91 Atlas III-class tests, 30 Atlas V Medium Launch Vehicle (MLV)-class tests and 14 Atlas V HLV-class tests. All totaled, the RD-180 has racked up an impressive 25,449 seconds of development and certification test firing, equivalent to 110 nominal Atlas V missions. Included in these tests were three separate certification test series, resulting in the test qualification of a single RD-180 engine design for both Atlas III and V. Combined with system level tests conducted at NASA's Marshall Space Flight Center in Huntsville, Ala., flight engine acceptance tests, and actual Atlas III flight time, the RD-180's total test and flight operation time is now just under 29,000 seconds.

In addition, the program ran tests significantly outside the expected run-box criteria, demonstrating the engine's margins and robustness. Above and beyond the specific RD-180 engine testing, the team completed an additional 20,000 seconds of subsystem turbo-pump tests earlier in the program, as well as 100,000 seconds of test time accumulated on the RD-170 engine program. Seventy percent of the RD-170 parts are common to the RD-180.

"What we have done is establish the fact that one engine design, the RD-180, will meet all our Atlas V mission requirements, whatever the variant," said Patric Albert, director of Lockheed Martin's RD-180 program. "It's a simple yet elegant solution for a next-generation rocket system and there have been very few surprises during this test program. The NPO Energomash and RD AMROSS team has successfully completed this test program through their professionalism and propulsion expertise," added Albert. By year-end 2001, 13 RD-180 flight-ready engines will have been delivered to Lockheed Martin Space Systems Company in Denver.

Lockheed Martin Space Systems Company, headquartered in Denver, Colo., is one of the major operating units of Lockheed Martin Corporation. Space Systems designs, develops, tests, manufactures and operates a variety of

advanced technology systems for military, civil and commercial customers. Chief products include a full-range of space launch systems, ground systems, remote sensing and communications satellites for commercial and government customers, advanced space observatories and interplanetary spacecraft, fleet ballistic missiles and missile defense systems.

Headquartered in Bethesda, Maryland, Lockheed Martin is a highly diversified global enterprise principally engaged in the research, design, development, manufacture and integration of advanced-technology systems, products and services. The Corporation's core businesses span space and telecommunications, electronics, information and services, aeronautics, energy and systems integration. Lockheed Martin had 2000 sales surpassing $25 billion.

For images and more information about Lockheed Martin Space Systems and Atlas launch systems, please visit http://www.ast.lmco.com/ or Pratt & Whitney at http://www.pratt-whitney.com/ for more information about the RD-180 engine system.

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