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Progress is being made toward the ultimate flight of the X-33 reusable launch vehicle as aerospike engine components continue to pass rigid testing. Most recently, a gas generator to be used on the linear aerospike engine (XRS2200) and designed and developed by Rocketdyne, a part of The Boeing Company, was successfully hot-fire tested at Marshall Space Flight Center (MSFC) in Huntsville.

The aerospike engine will power the X-33 technology demonstration prototype for a next-generation Reusable Launch Vehicle (RLV). Two engines will use 40 thrusters like those just tested to achieve aircraft velocities exceeding Mach 13. Ultimately, seven derivative advanced linear aerospike engines built by Rocketdyne will power the Venturestar RLV to be built by Lockheed Martin.

Over a seven-day period a sequence of 14 tests verified that the gas generator can operate in the flow-rate range of the X-33 operating conditions. The gas generator essentially is a J2 gas generator modified for the higher chamber pressure and flow-rate required for the XRS2200. The gas generator must be able to operate in conditions significantly higher than normal J2 operating conditions.

A review of the data showed not only could the gas generator operate in these conditions but the combustor shell wall temperatures are within an acceptable region. Post test inspection also found the hardware to be in good condition.

"The engineers at MSFC were able to demonstrate that the gas generator can be started with a softer ramp, to minimize overpressure of the combustor shell, by accurately sequencing valve timings and ramps," said Lou Rojas of Rocketdyne. "The expertise and hard work by Marshall personnel directly affected the success of this test program."

This successful aerospike component test follows a recent series of aerospike multi-cell engine tests at MSFC that successfully demonstrated hydrogen oxygen combustion at full power, emergency power and low throttle conditions.

The pressure-fed thrusters and aerospike nozzle are developed at Rocketdyne by Boeing under a technology agreement with NASA and Lockheed Martin.

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