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NASA's Space Launch System: Progress Report

Jerry Cook
SLS Deputy Program Manager
Garry Lyles
SLS Chief Engineer
NASA Marshall Space Flight Center

Abstract

NASA and its commercial industry team achieved significant progress in 2016 in manufacturing and testing of the Block 1 vehicle for the first launch of the Space Launch System (SLS). Test and flight article hardware for the liquid hydrogen fuel tank as well as the engine section for the core stage were completed at Michoud Assembly Facility (MAF) in New Orleans. Test stands neared completion at Marshall Space Flight Center for the propellant tanks, engine section, intertank and payload section. Stennis Space Center completed major structural renovations on the B2 test stand, where the core stage "green run" test program will be conducted. The SLS team completed a hotfire test series at Stennis to successfully demonstrate the ability of the RS-25 engine to operate under SLS environments and performance conditions. The team also test fired the second qualification five-segment solid rocket motor and cast the first six motor segments for the first SLS mission. The Interim Cryogenic Propulsion Stage (ICPS) test article was delivered to Marshall for structural tests, and work is nearly finished on the flight stage. Flight software testing completed at Marshall included power quality and command and data handling. In 2017, that work continues. SLS completed Preliminary Design Review (PDR) on the Exploration Upper Stage (EUS), a powerful, human-rated spacecraft that will propel explorers to cis-lunar space. In 2017, hardware will continue to be integrated at MAF for core stage structural test articles and the first two operational flights. RS-25 hotfire testing will continue to explore engine performance, as well as test flight-like software and four new Engine Controller Units (ECUs) for the first mission. Production of development components for a more affordable RS-25 design is underway. Core stage structural test articles have begun arriving at Marshall. While engineering challenges typical of a new development are possible, SLS is working toward launch readiness in late 2018. This paper will discuss these and other technical and programmatic successes and challenges over the past year and provide a preview of work ahead before first flight.