

NASA's Space Launch System Takes Shape: Progress Toward Safe, Affordable Exploration

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Abstract

Development of NASA's Space Launch System exploration-class heavy lift rocket has moved from the formulation phase to implementation in 3 years and will make significant progress this year toward its first launch, slated for December 2017. In recognition of the current fiscal realities, SLS represents a safe, affordable, and evolutionary path to development of an unprecedented capability for future human and robotic exploration and use of space. Current development is focused on a configuration with a 70 metric ton (t) payload to low Earth orbit (LEO), more than double any operational vehicle. It is this version that will launch NASA's Orion Multi-Purpose Crew Vehicle (MPCV) on its first autonomous flight beyond the Moon and back, as well as the first crewed Orion flight. This configuration is also designed to evolve to 130 t lift capability that offers several benefits, such as reduced mission costs, simplified payload design, faster trip times, and lower overall risk for missions of national significance. The SLS Program formally transitioned from the formulation phase to implementation during the past year, passing its Preliminary Design Review in 2013 and completion of Key Decision Point C in early 2014. NASA has authorized the Program to move forward to Critical Design Review, scheduled for 2015. Among the Program's many accomplishments are manufacture of core stage test hardware, as well as preparations for testing the world's most powerful solid rocket boosters and the main engines that flew 135 successful Space Shuttle missions. The Program's success to date is due to prudent use of existing technology, infrastructure, and workforce; streamlined management approach; and judicious use of new technologies. The result is a launch vehicle that will carry human and robotic exploration on the history-making missions in the coming decades. This paper will discuss the program and technical successes over the past year and provide a look at the milestones and challenges ahead.