

NASA's Space Launch System Advanced Booster Engineering Demonstration and Risk Reduction Efforts

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Abstract

The National Aeronautics and Space Administration (NASA) formally initiated the Space Launch System (SLS) development in September 2011, with the approval of the program's acquisition plan, which engages the current workforce and infrastructure to deliver an initial 70 metric ton (t) SLS capability in 2017, while using planned block upgrades to evolve to a full 130 t capability after 2021. A key component of the acquisition plan is a three-phased approach for the first stage boosters. The first phase is to complete the development of the Ares and Space Shuttle heritage 5-segment solid rocket boosters for initial exploration missions in 2017 and 2021. The second phase in the booster acquisition plan is the Advanced Booster Risk Reduction and/or Engineering Demonstration NASA Research Announcement (NRA), which was recently awarded after a full and open competition. The NRA was released to industry on February 9, 2012, and its stated intent was to reduce risks leading to an affordable Advanced Booster and to enable competition. The third and final phase will be a full and open competition for Design, Development, Test, and Evaluation (DDT&E) of the Advanced Boosters. There are no existing boosters that can meet the performance requirements for the 130 t class SLS. The expected thrust class of the Advanced Boosters is potentially double the current 5-segment solid rocket booster capability. These new boosters will enable the flexible path approach to space exploration beyond Earth orbit, opening up vast opportunities including near-Earth asteroids, Lagrange Points, and Mars. This evolved capability offers large volume for science missions and payloads, will be modular and flexible, and will be right-sized for mission requirements. NASA developed the Advanced Booster Engineering Demonstration and/or Risk Reduction NRA to seek industry participation in reducing risks leading to an affordable Advanced Booster that meets the SLS performance requirements. Demonstrations and/or risk reduction efforts were required to be related to a proposed booster concept directly applicable to fielding an Advanced Booster. This paper will discuss, for the first time publicly, the contract awards and how NASA intends to use the data from these efforts to prepare for the planned Advanced Booster DDT&E acquisition as the SLS Program moves forward with competitively procured affordable performance enhancements.