

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Launch Vehicles in Service or in Development (1)

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SOLID ROCKET BOOSTER FOR NASA SPACE LAUNCH SYSTEM (SLS)

Abstract

ATK has designed a new Advanced Booster and identified upgrades to the existing Boosters for the Space Launch System (SLS) to enhance its overall capability and improve the ability of SLS to capture a broader range of potential NASA Exploration Missions. The Advanced Booster proposed by ATK provides NASA the capability for the SLS to achieve 130 mT payload with 10 per cent margin, utilizing a booster that is 40 percent less expensive and 10 percent more reliable than the current SLS booster. The Booster upgrades identified provide incremental capability increases that enhance the ability to capture near term Beyond Earth Orbit missions like L2 outpost and lunar sorties deployed from L2. Since starting work on the development of the Advanced Booster in December 2012, ATK has made progress in maturing some of the characteristics of the Advanced Booster that have been identified by NASA as important for the next generation booster such as: an energetic propellant to improve performance and reduce cost, a composite case using low cost fiber/resin, electric TVC, and an adaptable core attach design to minimize interface concerns. This paper will describe the progress made to date in the maturation of the Advanced Booster, and the enhanced mission capture capability for Beyond Earth Orbit missions using the Advanced Booster and upgrades to the current SLS Booster. The Advanced Booster concept and incremental Booster upgrades will allow NASA to achieve their goal of evolving the current demonstration flight configurations of SLS to achieve payload capabilities in excess of 130 mT to meet their long term human exploration goals for beyond Low Earth Orbit (LEO) human Exploration missions. By leveraging the ATK heritage boosters from Shuttle and Titan this goal can be achieved with minimal development cost, while maintaining the demonstrated human rated capability needed for NASA's Beyond LEO missions.