

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Heavy Lift Launchers Capabilities and New Missions (8)

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## ADVANCED BOOSTER FOR NASA SPACE LAUNCH SYSTEM (SLS)

**Abstract**

ATK has designed a new Advanced Booster for the Space Launch System (SLS). 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 per cent less expensive and 10 per cent more reliable than the current SLS booster. This will ensure that the SLS will be sustainable and flexible in its ability to support a wide variety of exploration, science and DoD missions. The ATK Advanced Booster human rated design offers a safe, affordable, and sustainable concept that supports NASA's future crew and cargo missions of National importance. With the emphasis on achieving enhanced performance while improving affordability and increasing reliability, ATK created an Advanced Booster Concept that incorporates features that simultaneously achieves these objectives. The Advanced Booster design is also anchored in the successful heritage of 221 launches of the Reusable Solid Rocket Booster (RSRB), and the 34 launches of Titan Solid Rocket Motor Upgrade (SRMU). Some of the characteristics of the Advanced Booster include features that have been identified by NASA as important for the next generation booster are: 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 Advanced Booster concept 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 beyond Low Earth Orbit (LEO). 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.