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Author: Mr. Daniel Adams

United Launch Alliance LLC (ULA), United States, daniel.d.adams@ulalaunch.com

Mr. John Reed

United Launch Alliance LLC (ULA), United States, john.g.reed@ulalaunch.com

A CRITICAL EXAMINATION OF LAUNCH SOLUTIONS FOR SMALL SATELLITES SEEKING
HIGH ENERGY ORBITS

Abstract

In recent years, high capability small satellites have led a revolution in the space industry. From technology development to interplanetary exploration, small satellites are proliferating across the full range of space domains and orbital regimes. Many new small rocket companies have entered the market in hopes of capturing the burgeoning demand for small satellite launch. While providing new launch options, the majority of these new small rockets provide limited capability to reach orbits above low Earth orbit (LEO).

As small satellites have matured, many new applications for small spacecraft are developing in higher energy orbits from geosynchronous orbit to interplanetary deep space. This paper and presentation presents a characterization of the small satellite market for orbits above LEO. The paper and presentation continues with a critical exploration of the range of solutions for small satellites to achieve orbits above LEO, including a critical review of in-space tugs and direct insertion by a traditional large launch vehicle upper stage. This critical examination includes the mission design and programmatic implications for small satellites seeking a rideshare launch on a traditional large launch vehicle.