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INVITED PAPER: MICRO-LAMBDA - A MICRO SATELLITE LAUNCH VEHICLE CONCEPT

Abstract

Authors have studied a family of launch vehicles suitable for nano/micro/small payloads. "SpaceSpike" series, developed upon flight-proven Japanese sounding rocket SS-520 technology and current solid rocket motor products, are capable of lifting up to 20kg payload to low earth orbit. Authors also develop key technologies under ALSET (Air Launch System Enabling Technology) R&D project to achieve a commercial air launch system for 150kg-class payload in the future. These R&D projects are aiming at providing ideal space access to small satellite users who have to rely on piggyback or share ride on a medium-heavy launch vehicle where they have a limited choice on launch window and orbit selection. Recent vigorous development of small space systems in US and Europe indicates 20-50kg class satellites and sophisticated 3-U and 6-U CubeSat constellations would be used for a wide variety of missions in the middle of 2010s. This paper will introduce a concept of μLambda rocket capable of lifting 50kg payload to low earth orbit. μLambda concept was initially developed in early 1990s as an upgrade of TR-1A microgravity research experiment rocket and μLambda modernization study has recently been carried out. Trade studies to develop low-cost μLambda launch system and its launch service business in a short period of time will be presented.