SPACE PROPULSION SYMPOSIUM (C4)
Propulsion System (2) (2)

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DEVELOPMENT OF SOLID PROPULSION SYSTEM FOR ENHANCED EPSILON LAUNCH VEHICLE AND EPSILON'S SECOND LAUNCH RESULTS

Abstract

The Epsilon Launch Vehicle, the newest version of Japan's solid propulsion rocket, has been further developed under the name of "Enhanced Epsilon" since its first flight in 2013. The second Epsilon (Epsilon-2), the first application of Enhanced Epsilon, succeeded in launching the satellite Arase, the Exploration of energization and Radiation in Aerospace (ERG), into orbit as planned in December 2016. The aims of Enhanced Epsilon's development are the increase of the launch capacity and payload usable volume. In order to realize these improvements, powerful second stage motor (M35 motor) is newly developed and exposed from nose fairing. The second flight achieved these aims and confirmed the new design's validity. The development of Enhanced Epsilon is mainly the renewal of the second stage, and also includes each subsystem's improvement. The main change of the solid propulsion system is exposure of the second motor M-35. The outside diameter of the motor case is expanded into approximately 2.5 m in order to increase the amount of the solid propellant and the outer shell of the motor case is used as the outer shell of the launch vehicle. Solid propellant which can the high-performance equal to a conventional upper-stage motor developed newly, reducing the cost. This paper describes the detail of development and flight results of solid propulsion system for Enhanced Epsilon launch vehicle.