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SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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DEVELOPMENT STATUS OF JAPAN'S EPSILON SOLID ROCKET LAUNCHER AND ITS EVOLUTION

Abstract

The development of the Epsilon launch vehicle, Japan's next generation solid rocket launcher, was officially approved last year by the Space Activities Commission (SAC) of Japan and the project started the detailed design phase in spring 2011 in order to prepare for its first launch scheduled for 2013 carrying the planetary telescope satellite SPRINT-A. It should be emphasized that SAC strongly appreciates the advantages of combined power of the standardized small satellites and the Epsilon's highly efficient launch system, both developed by JAXA. Quite recently, JAXA declared the launch site of the Epsilon launch vehicle as the Uchinoura Space Center (USC), the home of the Japan's solid rockets, which is well known as a highly compact launch complex. The efficient Epsilon launch vehicle and the compact Uchinoura Space Center will become one of the most powerful tools to contribute to small missions.

The purpose of the Epsilon rocket is to provide small satellites with a responsive launching, which means in this study we focus on a low cost, user friendly and ultimately efficient launch system. To realize this, the design concept of the Epsilon involves the innovative next generation technologies such as the highly intelligent autonomous checkout system, which will reduce the associated time and labor on the ground and also make the ground facilities absolutely compact. Now the launch control can be conducted by using a single laptop computer, which is called a mobile launch control, and the lift-off will be executed in less than 5 days after the first stage motor stand-on. The prototype model of the intelligent mobile launch control has already been established to demonstrate its effectiveness.

Now that the scope of the development has been defined and the full-scale development has been approved, the most important is what the next step should be beyond Epsilon. JAXA has already announced the post Epsilon development to launch the low cost version Epsilon in 2017. It will be based on the study on the radically low cost technologies, primarily in avionics and structural systems, which are planned to be developed in parallel with Epsilon development. The idea and the scope of the study were also approved by SAC and the targeted launch cost is set at below USD30 million to be competitive in the world market at that time. This paper provides the details of the development status of the Epsilon launch vehicle and reveals its possible evolution.