

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

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THE DEVELOPMENT STATUS OF THE STRUCTURE SUBSYSTEM FOR ENHANCED EPSILON
LAUNCH VEHICLE

Abstract

The Epsilon launch vehicle, the newest version of Japan's solid propulsion rocket, made its maiden flight in September of 2013 carrying a ultra-violet planetary telescope satellite into its elliptic orbit. After the first launch, JAXA has started the development of Enhanced Epsilon in order to launch heavier payloads and to minimize launch cost. The biggest feature of the Enhanced Epsilon is the enlargement of the second stage motor. Therefore the second stage is exposed from nose fairing, and consequently the structure subsystem for the Enhanced Epsilon is newly developed except for the nose fairing and the first stage motor. For example, the main structure of 1st and 2nd interstage joint is changed drastically from the semi-monocoque (skin-stringer) structure made of aluminum alloy to the CFRP skin aluminum honeycomb sandwich with CFRP flange to get the lower cost and lighter structure mass. Although the 2nd and 3rd interstage joint is conventional semi-monocoque (skin-stringer) structure made of aluminum alloy, the 2nd stage avionics bay is newly designed circular table which located in the 2nd stage. In addition, low shock payload attach fitting using a non-pyrotechnic device is newly applied in accordance with the user friendly concept of Enhanced Epsilon. This paper describes the detail of Enhanced Epsilon's structure subsystem and development results.