

DESIGN AND ANALYSIS OF VERTICAL TAIL FOR REUSABLE LAUNCH VEHICLE TECHNOLOGY DEMONSTRATOR (RLV-TD)

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Abstract

Reusable Launch Vehicle is configured as a winged body vehicle, designed to fly in hypersonic, supersonic and subsonic regimes. The aerodynamic control is achieved using control surfaces mainly rudder and elevon. The vertical tail acts as a supporting structure for the rudder. It is located at the aft end of the RLV-TD. The twin vertical tail with 30° inclination in place of single vertical tail is configured to provide better stability to the vehicle. The design of the vertical tail is carried out for pressure and thermal loads. The design is validated through analysis and qualification tests. The vertical tail is connected to bulkheads of the airframe using four lugs and shear pins. The joint being a critical is qualified separately. The paper gives the design, analysis, qualification test and post flight comparison of vertical tail for RLV-TD HEX-01 mission.

Keywords: Vertical Tail, RLV-TD, 15CD-V6, Inconel, Thermostructural Qualification Test, Post Test Analysis