

AN END TO END AIRFRAME DESIGN CYCLE FOR A HYPERSONIC RE-USABLE LAUNCH VEHICLE

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Abstract

Design of aerospace Re-usable Launch Vehicle (RLV) structures offer diverse challenges due to stringent specifications in geometry, structural mass, integrity for Thermal Protection System (TPS) and interfaces with propulsion, avionics and power systems. Airframe structures for RLVs should cater to the specified strength, stiffness and stability and should meet the functional and integration requirements of aerospace vehicles. To address these challenges, an integrated design cycle comprising of load estimation, layout design, torsion box analysis and sizing of structural components is devised and presented. Verification of structural design is done by FE analysis of integrated airframe. Qualification of airframe by an integrated airframe test is also discussed.

Keywords: RLV, Airframe, Bulkhead, Spar, Whiffle Tree