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STRUCTURAL DESIGN AND ANALYSIS OF AN AEROSHELL FOR A HUMAN CREW ENTRY
VEHICLE IN MARTIAN ATMOSPHERE**Abstract**

An entry vehicle for Mars would undergo a speed envelope of hypersonic speed, at which the stresses, pressure and heat on the external skin of the capsule is very high. This technical paper proposes computer aided model and computational analysis of a modified aeroshell structure for a human-crew exploration vehicle designed for the martian atmosphere. Design frameworks have been studied and flow simulations have been prepared for the entry aerodynamic pressure and velocity. The aeroshell structure is then further analyzed under uniform pressure to buckling failure. With the resultant data derived, an attempt to solve the aerodynamic drag, terminal velocity ballistic coefficient has been concluded for the vehicle under Martian conditions. The structural model of the vehicle along with the modified aeroshell is then employed to simulate a number of critical loading events associated with high speed entry to assess structural integrity in the Martian atmosphere.