

Poster Session (P)

Poster Lunch (1)

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## A RAPID AERODYNAMIC SHAPE DESIGN TOOL FOR ENTRY VEHICLES INTEGRATED WITH TRAJECTORY OPTIMIZATION

### **Abstract**

A rapid aerodynamic shape design tool is developed which integrates trajectory optimization. The parameterized shape of the vehicle is mapped with the objective function of trajectory optimization, which optimizes parachute deploying altitude and total heating with respect to downrange, g load, heat flux and parachute deploying constraints, given profile envelope and mass property. The shape parameters are optimized by particle swarm method through aerodynamics and trajectory computations starting from an initial shape. The design tool is verified by establishing a Mars entry vehicle's shape and comparing with its predecessor.