

MATERIALS AND STRUCTURES SYMPOSIUM (C2)

Poster Session (P)

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STUDY ON PREDICTION METHOD OF AERODYNAMIC CHARACTERISTICS ANALYSIS FOR
MARS ENTRY CAPSULES**Abstract**

The entry, descent and landing(EDL) is a key technology for Mars exploration. It is a huge challenge to land the space vehicle on the surface of Mars because of the great difference between Mars and Earth. Accurate prediction of the aerodynamic characteristics while capsules entering the Martian atmosphere during EDL procedure is very important for security. A new aerodynamics prediction method considering the Mars entry environment is presented in this paper. The aerodynamic data is acquired by using a three-dimensional Navier-Stokes equations solver in continuous flow regime, and by introducing an engineering prediction method in free molecule flow regime. The aerodynamic forces in transition flow regime are estimated using the bridging function technique. Based on the method, aerodynamic characteristics of different capsule configurations for Mars exploration at typical hypersonic flight conditions during EDL are investigated. The results provide useful insight and reference for developing Mars exploration capsules.