IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Upper Stages, Space Transfer, Entry and Landing Systems (3)

Author: Mr. Kanishka Deepak
R V College of Engineering, Bengaluru, India, kanishkaaaaaa@gmail.com

Mr. Aaditya Wangikar
R V College of Engineering, Bengaluru, India, aadityawangikar2702@gmail.com
Mr. Hrithik Patil
R V College of Engineering, Bengaluru, India, hriths66@gmail.com
Mr. Sumedha Y D
R V College of Engineering, Bengaluru, India, sumedhayd@gmail.com

COMPUTATIONAL ANALYSIS OF DRAG CHARACTERISTICS AND OPTIMIZATION OF A PARACHUTE BY VARYING DENSITY OF INLET GASES FOR DIFFERENT PLANETARY ATMOSPHERIC CONDITIONS

Abstract

Parachutes have historically proven to be very reliable recovery and landing devices, and have been used for many applications in the aerospace and space technology industries. We observe that the atmospheric density of any planet has a huge effect on the drag characteristics of the parachute. In this paper, a computational study is presented on the effect of increased density at inlet of a parachute, on drag force and descent velocity in a steady environment. This is done by using drag equations and relevant payload mass values. The relation between the gases' density and the descent velocity is tabulated and a graphical plot using MATLAB is shown. Due to weak atmospheres in other planets, the parachute size is usually very large, and takes up a lot of space to pack in the spacecraft. Therefore, a mechanism to release gases heavier than that of the atmosphere of the respective planet is discussed, hence designing smaller and better parachutes for landing. The above research can have extensive usage in future manned and unmanned interplanetary missions for space optimization in the spacecraft for payloads.