SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Space Transportation Solutions for Deep Space Missions (8-A5.4)

Author: Mr. vinayak malhotra
SRM University Chennai, India, vinn99@gmail.com

Ms. C L Manasa
SRM Institute of Science and Technology, India, manasacl95@gmail.com

PARAMETRIC PREDICTION OF RE-ENTRY VEHICLE DYNAMICS

Abstract

Rocket are well known multi-utility transportation carriers which have redefined propulsion beyond atmospheric barrier. However their adaptation is still not well defined and relies more on normal gravity experimentation and conventional theories(based on assumptions). The related complexities and lack of well defined prediction system have always restricted futuristic missions. Appreciable work(experimental, theoretical, analytical, computational) had been done in the past five decades however, the complexity of the problem have necessitated active research studies on space vehicles. The work is motivated by the need to gravitate usage of space vehicles for better practical and scientific purposes.

The work attempts to address accurate prediction of rocket dynamics and trajectories aiming specifically at re-entry vehicles. A theoretical equation system is proposed for a complete space flight. A systematic through studies of conventional equation systems and assumptions used was carried out. Emphasis is put on the practical cases with minimization of assumptions. The propulsive system is investigated from all major aspects viz., propulsion, aerodynamics, structures. Diverse cases have also been taken into account for validation of the equation system.

The work will be extremely useful in futuristic space propulsion and in reentry vehicles specifically.