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SPACE EXPLORATION SYMPOSIUM (A3)
Interactive Presentations (IP)Author: Mr. ROSHAN THOMAS EAPEN
India, roshanthomase@gmail.comA STUDY OF THE PARAMETERS INVOLVED IN DESIGNING AN INTERPLANETARY
TRAJECTORY USING LAGRANGIAN POINTS**Abstract**

With the increase in complexities of interplanetary missions, the main focus has shifted to reducing the total delta-V for the entire mission and hence increasing the payload capacity of the spacecraft. This paper discusses the parameters involved in developing an interplanetary trajectory using the Lagrangian points of a Sun-Planet system in the framework of the Circular Restricted Three-Body Problem (CRTBP). It shows that for a trajectory to Mars using the Sun-Earth L2 and Sun-Mars L1 libration points, the delta-v consumed is 35 percent lesser than those consumed by conventional trajectories. Photogravitational Restricted Three-Body Problem (PGRTPB) is considered to study the halo orbits in the vicinity of the Sun-Mars L1 Lagrangian point. Deviation of properties such as time period, size and velocity variation in the halo orbits with Sun as a source of radiation is discussed. The variation in the behavior of invariant manifolds with change in radiation pressure is also computed.