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## REUSABLE LAUNCH VEHICLE: AN EFFECTIVE WAY TO PUT THINGS IN SPACE

**Abstract**

Reusable Launch Vehicles (RLV) have captured the interest of the space community in the recent years as it is predicted to be the most cost effective mode of space transportation system. There is tremendous amount of effort put by all the space agencies and universities around the world to develop the most reliable and promising RLV. The recent development of “Grasshopper” by the SpaceX has increased the curiosity and confidence to realize the fully operational RLV. RLV has a potential to reduce the space debris to a certain extent as well. Being inspired by the book “The Rocket Company” which describes the huge potential of RLV, in this paper, we have technically analyzed the design possibilities of completely reusable two stages to orbit RLV to put a 500 kg satellite in to sun synchronous orbit. The paper mainly concentrates on the basic sizing, mass budget, required performance characteristics, and amount of propellant. The first stage is recovered back after putting the vehicle till a certain altitude, and then the second stage is ignited after modifying the attitude of the vehicle to follow the gravity turn trajectory. Later, the second stage is also recovered back after injecting the satellite in to intended orbit.