

IAF SPACE OPERATIONS SYMPOSIUM (B6)
Interactive Presentations - IAF SPACE OPERATIONS SYMPOSIUM (IP)

Author: Mr. sanjay Lakshminarayana
Università di Pisa (Unipi), Italy, sanjaylakshminarayana@outlook.com

DESIGN OF NON-EXPLOSIVE PAYLOAD RELEASE MECHANISMS FOR COMPLETELY
REUSABLE LAUNCH VEHICLE WITH POSSIBILITY OF ELIMINATING EXPENDABILITY OF
FAIRINGS

Abstract

With demand for improving Recoverable launch vehicle (RLV) technology and proposed development of Stage-Stage to Orbit (SSTO) vehicles by many start-ups across the world, put severe limitations on structural mass at higher performance demand. Plans to eliminate the need of expending structural parts such as payload fairing require innovative release mechanisms. In this paper, Structural design and modelling have been performed on new design configuration for orbital insertion for maximum of 100 Kg payload mass without damaging the overall vehicle structure. With dimension configuration similar to that of a microsatellite and limited moving parts with usage cycle up to 2 or more, for higher reusability performance. Structure Design with Shape Memory Alloys (SMA) and Carbon Fibre composition have been developed using theory of micro-mechanics and have been analysed with Finite Element Analysis Modelling. Suitability studies with dynamics analysis have also been performed.