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Author: Mr. Roberto David Aleman Ramos
Instituto Politécnico Nacional, Mexico

Mr. Kevin Eduardo Guillen Sosa
Universidad Tecnológica de Querétaro, Mexico
Mr. Edgar Rafael Hernandez Rios
Mirai Innovation Research Institute, Japan
Dr. Rodrigo Cordova
Kyushu Institute of Technology, Japan
Dr. Christian Penaloza
Mirai Innovation Research Institute, Japan

DESIGN, STANDARDIZATION AND SIMULATION OF A CUBESAT NANOSATELLITE
TRANSPORTER FOR PICO-LANDERS TO MOON'S ORBIT

Abstract

This project focuses on the design and first approximation steps of standardization of an ejection system (ES) intended for deployment within a CubeSat (CS), starting from two units onwards. The purpose of this system is to facilitate the transportation and deployment of Pico-Landers (PL) on celestial bodies such as the Moon. The design process included some of the relevant standards and specifications outlined by the International CubeSat Standard project but modified it to survive launch to the Moon. Furthermore, the material selection process considered the strength-deformation diagram to determine whether the chosen material is capable of withstanding factors like forces caused at the moment of deployment, space radiation and temperature. To ensure the mechanical viability of the ejection system and be able to perform the deployment of the PL once in Moon's orbit, comprehensive analyses were performed to evaluate the physical implications associated with the launch process, performing a static and dynamic analysis during launch using finite element method and performing rocket launch environments such as quasi-static forces, vibrations, and shock loads; Space X rockets and NASA Gevs' standards were consider to perform those studies. Overall, this project enables the transportation of PL to space through the proposal of a standardized model facilitating the connection between the ES and a connecting piece, giving freedom to develop other PL, following these rules.