

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Small Launchers: Concepts and Operations (7)

Author: Mr. Joshua Tristancho
UPC, Spain, tristancho@gmail.com

Mr. Javier Perez-Mato
University of Las Palmas de Gran Canaria (ULPGC), Spain, jperez@idetic.eu
Mr. Juan Martinez-Tristancho
UPC, Spain, picorover3@gmail.com
Prof. Rafael Perez-Jimenez
University of Las Palmas de Gran Canaria (ULPGC), Spain, rperez@dsc.ulpgc.es

ROCKOON DEMONSTATION IN THE GRANCANARIA SPACEPORT FOR FEMTO-SATELLITES

Abstract

Rockoon is the addition of two words: Rocket and Balloon. The rocket is carried into the stratosphere, avoiding the hard atmosphere drag. This part of the trajectory is a waste in propellant if the rocket should traverse through it by itself. This technique is not often used due to operational difficulties when large balloons are required to lift heavy rockets. For all that, rockoons are very often used only for solid propellant sounding rockets but not to inject satellites into orbit.

In this work we present a combination that reduces drastically the size and mass in such a way that the balloon operation is handled by a small number of people. This kind of mini-launcher that we propose, is suitable for small satellites like femto-satellites that are less massive than hundred grams. The launcher will inject a maximum of six femto-satellites in a very Low Earth Orbit (Around 250 kilometers).

To achieve such reduction, the satellite should be able to manage a basic mission that will last only one or two weeks. These kinds of mission are useful for Space Responsive applications like Disaster Management. The low-cost and the easy launch technique makes easy to have ready some of these rockoons. When a mission requires a fast response (About four hours), the balloon is inflated and released. The mini-launcher will inject autonomously the small payload into orbit.

In addition, authors present some experiences during the certification process in the GranCanaria spaceport, an island in the Atlantic Sea at 28 degrees North latitude closer to the Equator.