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Author: Dr. Jorge Soliz
Sergio Arboleda University, Colombia, jorge.soliz@usa.edu.co

Mr. Jesus Gonzalez
UNIVERSIDAD SERGIO ARBOLEDA, Colombia, jesusd.gonzalez@correo.usa.edu.co

MISSION DESIGN “SATELLITE LIBERTAD 2”

Abstract

The article shows the design and analysis of the mission satellite Libertad 2, the second satellite designed and built by the University Sergio Arboleda (Bogotá – Colombia), a Cubesat of 3U (dimensions of 30x10x10 cm approximately), a nano satellite that will have an estimate weigh of 4 kg, and which fundamental mission will be to take pictures from space. The satellite will provide us pictures of colombia’s surface to study natural resources (in this case we focus in precision agriculture).

The primary work for this paper is the design of the orbit where the satellite will travel along its lifetime, this analysis will be based on the launch options that will exist in the time in which the satellite will be launched, also based on the desired height at which the satellite will fly for acquire the best pictures.

This paper will study the satellite’s trajectory, launch site and operation modes. In the Satellite’s trajectory simulation, we take into account the orbital perturbations like J2-perturbation, atmospheric drag, and solar radiation pressure; also the best launch site to accomplish our goals of the misión (Image acquisition for Colombia) and modes of operation that will have the satellite along the entire mission; like, camera mode, communication mode, stand by mode, etc; for example, the respective simulations to forever get the data on the position of the satellite and to know the best options for communication links, along with the days and hours of passes of the satellite across the ground station will be calculated. All work is completed with a theoretical explanation of the models used in own simulations and those of a specialized software for analysis of space missions.