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CERES PROJECT - CONSTELLATION OF CUBESATS FOR PRECISION AGRICULTURE IN BRAZIL

Abstract

Brazil has the third largest grain production of the world and the agriculture is the sector which had the best growth in GPD in 2017. The investments in agriculture available is 58 billion dollars for 2018/19 harvest. It is mainly focused on sugarcane, soybean, orange and other essential, therefore being an important worldwide player at the primary sector of the production.

The aerospace sector plays an important support role in agriculture by providing imaging for best management of crop, thus improving the results over a monitored area. To help it, there is many earth observation satellites that provide those images with a required revisit time, spatial resolution and time resolution able to take the right information for agriculture precision. Those mission failed to work with agriculture precision because it is usually planned to a general earth observation proposal.

With 8.516.000 km of territory, Brazil requires its own Earth Observation mission to target this area. To do so, a group of students from University of Brasilia - Brazil, are developing a project called CERES. This project consists in idealizing a constellation of CubeSats that fulfill the requirements: revisit time of 3 days, (covering Brazil's center west, southeast and south mainly), best sensor on RGB and NIR bands, those satellite are based on a 3U cubesat, using a crosslink communication through the Brazilian geostationary satellite SGDC.

This paper presents the constellation of small satellite idealized for earth observation applied in precision agriculture and the impacts that it can cause on the agricultural production. As a result, it presents the calculation for the amount of small satellites, payload cost, revisit time necessary for precision agriculture in Brazil, orbit of satellite and the expected results that can be reach with the project.