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DISASTER MANAGEMENT OF REMOTE AREAS BY CONSTELLATION OF CUBESATS

Abstract

CubeSats have become very popular in the last decade, mostly as a low cost means to train students and young researchers in the space engineering and science. Since the cost of accessing the space is still quite relevant for planning and execute traditional Earth Observation (EO) missions, the CubeSat could be an interesting solution to reduce mission costs maintaining the performances and reducing the time of the design phase to have a full functional constellation. For these reasons several countries, agencies and organizations are looking to CubeSat platforms to access space taking advantage of the potential availability of tens of remote sensing satellites. During disaster management, real-time, fast and continuous information broadcast is a fundamental requirement. In this sense, a constellation of small satellites can considerably increase the revisit time (defined as the time elapsed between two consecutive observations of the same point on earth by a satellite) over remote areas, by increasing the number of spacecrafts properly distributed in orbit. This allows to collect and send as much data as possible to Disasters Management Centers. This paper describes the characteristics of a constellation of CubeSats built to enable access over the most remote regions of Brazil. In particular, the paper defines the number of cubesat and the orbital planes required to minimize the revisit time, depending on the application that is the mission objective. Each CubeSat is equipped with the suitable optical payloads and possesses the autonomy and pointing capabilities in order to meet the requirements of the mission. Thanks to the orbital features of the constellation, this service could be exploited by the other countries in the tropical region of the Earth. Coverage of other areas of the Earth might be provided adjusting the number and in orbit distribution of the spacecrafts.