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OBSERVATION OF ACTIVE VOLCANOES IN MEXICO WITH A CUBESAT OF 3U “GXIBA”

Abstract

In Mexico, there are currently 12 active volcanoes, the one with the greatest activity is the Popocatepetl volcano in Puebla-Mexico. The proposal is the creation of a payload to observe the volcanoes, which will be installed in a 3U Cubesat called “Gxiba”, the “Gxiba” satellite, will be in a solar synchronous orbit with an inclination of about 98 degrees and between 400 -800 km above the earth, which allows the 3U satellite to cross the equator twelve times a day at approximately 15 hours local to allow the use of a sunlit view of the earth’s surface, both in visible and infrared wavelengths. Thus the 3U Gxiba cubesat considers: (1) a base unit system, (2) a positioning control system, (3) a spectroscopy system unit and (4) an on-site image processing system. This proposal focuses on the development and integration of a multispectral system, with 3U cubesat payload, using spatial spectroscopy in the bands covering 350nm to 950nm, in this region the most relevant gases are located for the analysis of volcano emissions or chemical reactions caused by aerosols. In the development of the multispectral system, a relevant and novel part of this system is the image processing performed on the satellite’s flight computer, in order to reduce data in smaller packets that can be transmitted to the ground in Low frequencies, in this way the data recovered on land will be correlated with pre-established maps for later analysis.