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IMPLEMENTATION OF A 80MM REFRACTOR TELESCOPE IN A 2-U CUBESAT

Abstract

Nowadays, miniaturized satellites play an important roll not only in the academics, but also in scientific projects for observing, monitoring and imaging because of small instruments can be integrated into the payload. On the other hand, the emerging technologies are also used for both education and research to reinforce the future of space engineering [1-3].

The cost for constructing small satellites is very low compared with those of the standard sizes; for instance, a space telescope for astronomical science could exceed the cost in several magnitude orders compared with a small cubesat.

In this paper, we propose the implementation of a refractor telescope (80mm, f/5) into a 2U-Cubesat, which will be used for photometric studies of point-sources such as planets, the brightest stars and asteroids.

The system uses a 1600X1220 CCD camera, coupled to an achromatic lens of 80mm of diameter at f/5. The images are transmitted by a XTEND900, operating from 902 to 928 MHz at 9600 bauds. Attitude control is made by a 3-axis mechanical gyroscope for its positioning to the point-sources. The maximum power consumption of the full system is around 15 Watts. A ground optical telescope of 8 inches at f/10, is configured for tracking the satellite by means the received coordinates from a GPS installed on the satellite.

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Keywords: Cubesat; Telemetry; Photometry.

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