Image Sensing and Processing of BCCSAT-1 Satellite Missions using 4 Multispectral Cameras

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Abstract. Every CubeSat needs a personalized aerospace mission. In the case of BCCSAT-1, our team has sought out the importance of agricultural practices and its significant contribution to Thailand. The payload system is designed using only commercial off-the-shelf components, and its primary mission is to capture geographical images of the Earth using 4 CMOS cameras with 3 different filters to produce a multispectral image. By extracting each band from the multispectral image and processing it, we can generate an image showing the relative biomass. We are using two standardized vegetation indexes that allow us to estimate the relative biomass: NDVI and NDRE. NDVI is a standardized vegetation index and often used for many applications. However, NDVI result images are usually oversaturated in dense vegetation area. This can be compensated by using NDRE. A series of experiments are performed to verify the function of the payload system under simulated space environment and the resulting vegetation indexes.

Keywords: 1U CubeSat, Multispectral Camera, Image Processing, NDVI, NDRE