

Z123b Current Status Report on the Detector for VERTECS

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VERTECS is a 6U-sized astronomical micro-satellite for observing cosmic background radiation in the visible region. The refractive telescope (35 mm aperture, F2.0) and the detector with a built-in CMOS sensor (SONY IMX533) are placed in VERTECS. In front of the light-receiving surface, there are four 100 nm-bandwidth photometric filters covering wavelength ranges from 400 nm to 800 nm. These filters are arranged in a 2×2 square configuration, dividing the telescope's field of view ($6^\circ \times 6^\circ$) into squares by the wavelength. Images with 60-second exposures are captured by dithering, allowing us to obtain images across the entire wavelength range. Dark current noise and readout noise, which determine detection sensitivity, are required to be low enough for observing faint cosmic background radiation. We designed the detector housing that maintains dark condition, then evaluated the performance of IMX533. The evaluation includes the measurements of dark current, noise, spectral sensitivity, linearity relative to exposure time, and defective pixels. The results showed that the readout noise dominates over the dark current noise below 0 °C, and the amount of the readout noise is lower than or equal to that of the noise of the zodiacal light. Therefore, the detection limit is determined by these two dominant noises. This report will show the detail of the evaluation described above.