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Optical telescope for micro satellite: Design and analysis

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Optical design of a reflecting telescope for use in a micro-satellite mission is reported in this study. A Cassegrain type telescope for earth observation techniques is adopted in this design. The primary and secondary mirror are circular clear apertures with 380mm and 144mm in diameter. The effective focal length is 2525mm operated at 561km altitude. A commercial 5120 × 5120 CMOS image sensor with a pixel size of 4.5μm × 4.5μm is applied, which capture a corresponding 5km × 5km swath area. The ground resolution is moderate to be 1m and 2m for PAN and MS applications. The MTF is expected to be about 0.3 at camera Nyquist frequency at 111lp/mm. The

tolerance analysis is performed for further understanding on fabrication and assembly errors. The defocus and LOS equations are also evaluated in this study. These analytical results are the important reference in micro-satellite mission for self-reliant space technology development in Taiwan.

Speaker Biography

Ching Wei Chen has received his Ph.D. in electro-optical engineering from the National Chiao Tung University, Taiwan in 2008. He is currently an associate researcher with the National Space Organization (NSPO), Taiwan. His current research interests include optical design, optical testing, space technology, ultrafast optics and terahertz photonics.

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