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CONCEPTUAL DESIGN OF POLARIMETRIC CAMERA FOR KOREAN LUNAR ORBITER

Abstract

This paper presents conceptual designs of wide angle polarimetric camera(PolCam) to perform polarimetric observations of the whole surface of the Moon at wavelengths of 430 nm and 650 nm for phase angles between 0 and 120 degrees and to obtain the reflectance ratios at 320 nm and 430 nm for the whole surface of the Moon with a spatial resolution of 80 m. It has two optics systems, both of which are tilted from the nadir toward the scanning direction by 30 degree and toward the lateral direction by 30 degree. The former tilt allows us to obtain 3D images, and the latter tilt allows us to obtain phase angles larger than 90 degrees. The unusual combination of polarization angles, 0, 90, 60 and 120 degrees is to minimize the data transmission rate. For 430 nm, 0, 60 and 120 degree images will be used to obtain both degree and angle of polarization, whereas only 0 and 90 degree images will be used for 650 nm. The basic configuration for designing a camera system for polarized imaging in lunar orbit are illustrated for the Korean Lunar Orbiter. The orbiter is planned to launch into 100 km circular lunar orbit at end of 2018.