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THE TECHNIQUES AND IN-ORBIT APPLICATION OF GF-2 SATELLITE CAMERA

Abstract

GF-2 (Gaofen-2) is the second high resolution imaging satellite of China High Resolution Earth Observation System(CHEOS). It was launched on August 19, 2014 on a Long March-4B vehicle from TSLC (Taiyuan Satellite Launch Center), China. GF-2 was configured with two identical cameras with 0.8 m Pan(Panchromatic)/3.2 m MS (Multispectral) Ground Sample Distance(GSD) and more than 45 km swath width. The camera adopt three-mirror reflection aspheric optical structure and acquires images through push-broom mode. This new generation is the first civilian high resolution imager with GSD under 1m in China. The camera is the first one in China designed with small relative aperture equal 1/15, which leads to relatively light weight and small volume of the whole system compared to the traditional design. All key techniques are conquered in this project such as high resolution Pan/MS camera system design strategies, the long focal length optical system assembly and alignment techniques under the zero-gravity, vibration suppression, thermal control and etc. The components of the 1m/4m camera are firstly introduced in this paper and more details about the camera's novel techniques are illustrated next, which are system optimize strategies, large aperture long focal length optical telescope assembly and align techniques, vibration suppression structure design tips, high speed low noise video processing techniques and high accuracy thermal control techniques. The in-orbit applications demonstrate that the performance of cameras meet all the customers' specification.