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Author: Dr. Na Yao
Qian Xuesen Laboratory of Space Technology, China, nyao@cantab.net

Ms. Wenwen Qi
Beijing Institute of Space Mechanics and Electricity, China, qleaves@126.com
Dr. Yue Shi
Qian Xuesen Laboratory of Space Technology, China, shiyue.cast@gmail.com

DEVELOPMENT OF A PLUG-N-PLAY MODULAR RECONFIGURABLE SPACE REMOTE SENSING PAYLOAD FOR RESPONSIVE EARTH OBSERVATION MISSIONS

Abstract

Responsive Earth observation missions need not only start their services as quickly as possible, but perform their on-orbit roles for a variety of observation targets. The development of a plug-n-play (PnP) modular reconfigurable CMOS camera (PMRC2) payload that addresses both of these issues has been presented in this paper. The PMRC2 is a cost-effective remote sensing payload aimed at dramatically improving the performance of the responsive Earth observation missions. By assembling various PnP optical lens units and focal planes (FP) units via standardized interfaces, the camera can be promptly put into use to achieve multiple combinations of resolution and swath. General functional circuit modules have been developed to adapt the camera to different satellite platforms and enable it to be reconfigurable. In addition, the camera has ability to operate in six modes (i.e., simplex imaging mode, pre-imaging mode, tracking mode, simplex image motion compensation mode, intelligent image motion compensation mode, and digital filtering mode) and switch the operating mode with minimal delay for different observation missions. Finally, the paper will also summarize the performance envelope of the payload and describe the applications that it is targeting.