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Author: Dr. Daejun JUNG
Korea Aerospace Research Institute (KARI), Korea, Republic of

DESIGN AND PERFORMANCE VERIFICATION OF EOS(ELECTRO-OPTICAL SUBSYSTEM) OF THE CAP-W PAYLOAD FOR THE CAS-4 SATELLITE

Abstract

The CAP-W (Compact Advanced Payload with Wide Swath) is an electro-optics camera that is installed on the CAS-4 (Compact Advanced Satellite-4) satellite. The CAP-W payload is equipped with five multispectral channels and has the capability to capture images with a wide range of swath width. The payload is specifically designed to capture images related to national agriculture, water resources, and forests.

In order to verify the performance of the CAP-W payload, a comprehensive set of in-orbit environment tests are planned, including vibration and thermal vacuum tests. The thermal vacuum test simulates the extreme temperature and pressure conditions of space and evaluates the payload's performance under these conditions.

The MTF test measures the capability of the payload to transfer spatial information from the object being imaged to the image captured by the sensor. It is a critical factor that determines the sharpness and clarity of the images captured by the payload. The MTF test is performed under thermal vacuum conditions to simulate the extreme temperature and pressure conditions of space and ensure that the payload's performance is consistent even under these conditions.

In this paper, EOS design of CAP-W payload is introduced. Overview of EOS, design of OM(Optical Module) including optics and structure and performance of EOS are described. and the result of Optical Module performance is also analyzed. we outline the plan for the environment test and describe the method of MTF (Modulation Transfer Function) measurement test in thermal vacuum conditions. Finally, the results of MTF measurement test under thermal vacuum condition are analyzed.