

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Sensors and Technology (3)

Author: Dr. Ayman Ahmed
Egyptian Space Agency (EgSA), Egypt, ayman.ahmed@narss.sci.eg

Mr. Mohamed Metwally
Egyptian Space Agency (EgSA), Egypt, md.metwally@gmail.com

EARTH OBSERVATION PAYLOAD FOR SMALL SATELLITES

Abstract

The telescope design of earth observation satellite is a complex task due to its several constraints, including the size, mass, performance, tolerance and environmental aspects. In the same time, the need for earth satellite imagery has increased day by day due to the numerous commercial and military applications. In this paper, the Egyptian Space Agency present an optical configuration for an integrated imaging system with ground sampling distance (GSD) of 7m; the system is designed and manufactured successfully, according to a definite mission constraints. The configuration presented is, modified Maksutov scheme with the advantage of small spherical optical elements without conic constants or higher-order parameters. Which gives the design a high simplicity in manufacturing process. Also the tolerance analysis study is presented using Monte Carlo algorithm for predicting the worst performance case. The thermal adjusting mechanism is presented to keep spatial resolution on the pixel size level. Finally, we concluded that the size of the telescope is applicable to be used into small space satellite; in addition, and since the system is compact and based on commercially available components; we used a fault tolerant technique in order to increase the lifetime of the system in space environment. The image sensor and processing system is designed and implemented in one small size electronic board with mass storage memory and configurable interface for multi-mission platform.