

EARTH OBSERVATION SYMPOSIUM (B1)
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EFFECTS OF IMAGE MOTION AND MICRO-VIBRATIONS ON IMAGE QUALITY OF TDICCD IN
TERMS OF MODULATION TRANSFER FUNCTION

Abstract

The remote sensing satellites are designed and built to image the earth for various applications; weather forecasting, cartography, natural resource management and disaster management are a few to mention. The stability of the platform plays a vital role for quality imageries by the instruments on-board the spacecraft. Any type of instability, caused by various sources specially the rotating elements, on the platform may lead to the undesired degradation of the quality of the images. The TDICCD (Time Delay and Integration CCD) sensor is preferred over the conventional CCD as the former has the advantages of enhanced photosensitivity, increased signal to noise ratio, low-light-level imaging etc. TDI CCD is very sensitive to the micro-vibrations that lead to the distorted image. In high resolution satellites, pointing accuracy requirements are very high thereby requiring exemplary platform stability. Any sort of platform vibration has to be studied in terms of its effects on the imagery before finalising the spacecraft's configuration. In this paper, a study has been carried out to see the effects of some frequencies observed on the already flown Cartosat series satellites of IRS (Indian Remote Sensing Satellite) class. The effects are studied in terms of MTF (Modulation Transfer Function). The MTF is most widely used indicator for assessing the image quality. The effect of dominating frequencies of 100 Hz and 180 Hz and velocity mismatch on MTF is brought out. The impact of these frequencies manifests with increasing number of TDI stages.