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VALIDATION OF THE TET-SATELLITE IMAGING SENSORS

Abstract

For quality description of cameras and sensors, different metrics can be found in the literature relating to radiometric and geometric aspects. Accuracy aspects are related to the conversion of radiances into digital numbers (DN), geometric point accuracy, etc.

Performance parameter, which are summarize in the Point Spread Function (PSF) or the Modulation Transfer Function (MTF) and the signal to noise ratio (SNR), provide basic information for image validation.

But PSF and SNR are not always easy to evaluate in practice from real imagery. An alternative idea is to use particular spatial and radiometric targets to evaluate the edge response. Relative edge response (RER) is indeed easier to measure and is mathematically related to PSF and MTF.

In this paper, the PSF and SNR determination will be shown for the TET satellite from DLR. TET is specialized small satellite for hot spot recognition and fire observation and was funded by the German Aerospace Agency (DLR). The satellite is now part of the "FireBird" mission which will continue the fire monitoring topic by using two small satellites (TET-1, launched June 2012, BIROS launch planed in 2015). TET and BIORS carry a multispectral imager with 7 channels in the VIS. MIR and TIR spectral region.

This paper is dealing with algorithms for determining important parameters for sensor validation of optical remote sensing sensors. While the quantitative approach for evaluating the geometric and radiometric quality of the image data are already well established, we recognised that no consistent criteria for the determination of performance measures are available. Here we also explain problems in determining these parameters.