

ATTITUDE ERRORS DUE TO MISALIGNMENTS IN CONICAL SCANNING EARTH SENSORS

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ABSTRACT

Infrared horizon sensors are accurate instruments employed in satellites for Earth referred sensing and attitude control. These optical devices are affected in accuracy by several sources of errors. One of these sources, namely the misalignment between the rotating axis and the optical axis of a conical scanning horizon sensor, has been mentioned in the literature but hasn't being studied in sufficient detail. This paper aims to model and to study such a misalignment. The operation principle of a typical conical scanner in a low Earth sun-synchronous orbit is described as much as the mathematical modelling of the misalignment and the simulation procedure. Numerical simulations are presented and they show that the magnitude of the errors vary with orbital parameters and the sensor position with respect to the spacecraft. These simulations also show that the attitude errors are small for ordinary misalignments. Results for two sensor heads are also shown.

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