

## On-orbit Operation and Performance of MODIS Blackbody

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### ABSTRACT

MODIS collects data in 36 spectral bands, including 20 reflective solar bands (RSB) and 16 thermal emissive bands (TEB). The TEB on-orbit calibration is performed on a scan-by-scan basis using a quadratic algorithm that relates the detector response with the calibration radiance from the sensor on-board blackbody (BB). The calibration radiance is accurately determined each scan from the BB temperature measured using a set of 12 thermistors. The BB thermistors were calibrated pre-launch with traceability to the NIST temperature standard. Unlike many heritage sensors, the MODIS BB can be operated at a constant temperature or with the temperature continuously varying between instrument ambient (about 270K) and 315K. In this paper, we provide an overview of both Terra and Aqua MODIS on-board BB operations, functions, and on-orbit performance. We also examine the impact of key calibration parameters, such as BB emissivity and temperature (stability and gradient) determined from its thermistors, on the TEB calibration and Level 1 (L1B) data product uncertainty.

**Keywords:** MODIS, blackbody, thermistors, calibration, stability, uniformity, uncertainty