

Landsat-8 TIRS Radiometric Performance

J.A. Barsi^{a,*}, M. Montanaro^b, B.L. Markham^c, S.J. Hook^d, J.R. Schott^e, N.G. Raqueno^e

^a Science, Systems and Applications, Inc., NASA/GSFC, Greenbelt MD – julia.barsi@nasa.gov

^b Sigma Space Corporation, NASA/GSFC, Greenbelt MD – matthew.montanaro@nasa.gov

^c Code 618, NASA/GSFC, Greenbelt MD – brian.l.markham@nasa.gov

^d NASA/JPL, Pasadena CA – simon.j.hook@jpl.nasa.gov

^e Center for Imaging Science, Rochester Institute of Technology, Rochester NY – schott@cis.rit.edu, nina@cis.rit.edu

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ABSTRACT:

Launched in February 2013, the Landsat-8 continues the long record of earth imaging by Landsat sensors. The Thermal Infrared Sensor (TIRS) is the satellite's thermal band imager. The TIRS design is a significant departure from the previous Landsat thermal bands: the pushbroom imager acquires data in two spectral bands and the spatial resolution has increased from 60m to 100m.

TIRS was well characterized and calibrated prelaunch and the monitoring of the calibration continues on-orbit. The TIRS instrument has an on-board blackbody and the ability to look at deep space to provide a regular check of its internal calibration. The on-board calibration is validated by in-site measurements of large water bodies. Periodic views of the moon have been used to study stray light.

While the TIRS instrument has been stable to within 0.2% based on the on-board calibrator, stray light from far outside of the field of view has affected the absolute calibration. Analysis of the in situ validation data revealed a calibration error, which has since been attributed to the stray light. A bias correction was made to the TIRS calibration parameters in February 2014 for account for the additional radiance reaching the focal plane. Studies are on-going to better characterize the stray light and to determine if a more specific correction can be implemented.

* Corresponding author. This is useful to know for communication with the appropriate person in cases with more than one author.