

NPP VISIBLE/INFRARED IMAGING RADIOMETER SUITE (VIIRS) RADIOMETRIC CALIBRATION AND PREDICTED DATA PRODUCT PERFORMANCE

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The NPOESS Preparatory Program (NPP) Visible/Infrared Imaging Radiometer Suite (VIIRS) is designed to collect radiometric and imagery data in 22 spectral bands within the visible and infrared region ranging from 0.4 to 12.5 μm . VIIRS data will be used to generate 22 Environmental Data Records (EDRs) including two Key Performance Parameters (KPPs): Sea Surface Temperature (SST) and Imagery. The data quality requirements imposed on these EDRs collectively drive stringent quality requirements on the fundamental VIIRS data product, the Sensor Data Record (SDR), comprised of calibrated and geolocated Earth radiances. This paper describes VIIRS radiometric performance requirements and the calibration strategy for meeting these requirements, including the on-board calibration subsystems that generate calibration data on orbit, the instrument characteristic databases derived from the pre-launch test program, and the algorithmic methodology for combining Earth observations with on-orbit calibration data, telemetry and instrument characterization data to generate calibrated radiances. We also report predicted SDR quality in terms of the metrics prescribed by the instrument specification and describe how these predictions are derived from error propagation analyses that relate instrument measurement errors, instrument characterization errors and radiometric modeling errors to calibrated radiance errors.