

AirMISR Radiometric Data Quality

The science flight made by AirMISR to compare measurements with AVIRIS on June 6, 2001 was successful. Runs 1-3 were at or near the standard 20 km altitude. The camera was intentionally held in the nadir position throughout the flight. The radiometric accuracy and signal-to-noise during this mission was as good as the Science Team has reported in the literature. Individual product files contain metadata identifying dropped/corrupt lines, saturated pixels and related image quality parameters.

The radiometric calibration of AirMISR has been done using the same procedures as used to calibrate the MISR cameras; the reported radiometric calibration uncertainties are therefore the same as reported for MISR. (The exception is the camera-to-camera uncertainty, which is believed to be smaller for AirMISR, as the aircraft instrument consists of one gimbaled camera). Thus, it is believed that the radiometric uncertainties are small, and the camera signal-to-noise is high.

The values quoted for the systematic component of the radiometric uncertainty, based on vicarious calibration of the instrument, in fractional units, are:

abs_sys_error 0.030
cam_sys_error 0.000
band_sys_error 0.010
pixel_sys_error 0.005

That is, the systematic component of the absolute, camera-to-camera, band-to-band, and pixel-to-pixel are given above. The pixel-to-pixel uncertainty is large enough to cause some visible striping in the imagery where the scene contrast is low and the image display is stretched to highlight small radiometric differences.

These systematic components are combined with signal-to-noise (SNR), to determine the total error uncertainties. As SNR is signal dependent, the uncertainties are likewise signal dependent. SNR, at two radiance input levels, are as follows:

SNR(equivalent-reflectance=1.0) ~ 1000
SNR(equivalent-reflectance=0.05) ~ 200

Using these, the total radiometric uncertainties can be determined:

abs_total_error= $\sqrt{\text{abs_sys_error}^2 + (1/\text{SNR})^2}$
cam_total_error= $\sqrt{2}/\text{SNR}$
band_total_error= $\sqrt{2} * \sqrt{\text{band_sys_error}^2 + (1/\text{SNR})^2}$
pixel_total_error= $\sqrt{2} * \sqrt{\text{pixel_sys_error}^2 + (1/\text{SNR})^2}$

References on the radiometric calibration of AirMISR and MISR are listed in Section 8.0. Additional references are available from the [MISR web site](#).

AirMISR Geometric Data Quality

This is an AirMISR flight with an unusual configuration in which only nadir view imaging angle data are acquired. There was no geometric calibration conducted prior to georectification. The expected georectification error is no larger than 200 m.

Feedback:

For questions or comments on the AirMISR products, contact the NASA Langley Atmospheric Science Data Center [User Services Office](#).

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