Jet Propulsion Laboratory
California Institute of Technology

MISR Multi-angle Imaging Spectro-Radiometer

SCIENCE DESIGN FILE MEMORANDUM #229

DATE: June 5, 2000
FROM: Carol Bruegge
SUBJECT: Diode response verification
FILENAME: sdfm229_diode_response.fm

Executive Summary

This memo describes the basis of some newly created HQE photodiode response functions, computed as a verification of the one curently used in our IFRCC data analysis. The baseline response function has been documented in DFM#952 (Duval, 1996) and DFM#995 (Chrien, 995).Measured spectral response data were originally acquired between the wavelengths 400-900 nm, using the MISR monochromator. The functions described in these DFMS assume that the response outside of these wavelengths is negligible. However, to put an upper bound on this response, the functions were set to a value of 0.0001 for wavelengths 200-400 nm, and 900-1200 nm.

Similarly, the new diode response functions make use of the as-built system response, as measured between 400-900 nm. Here however, component data were included to build a model outside of the system-measured spectral region. This is only permissiable for the HQE photodiodes, as the quantum efficiency can be modelled with greater confidence (the quantum efficiency was not otherwise measured independently.) These data are not necessarily "better" in the sense that we know out-of-band scattering has affected both the MISR cameras and photodiodes (Korechoff, 1995). This high out-of-band response is not detected at the component level of testing. For this reason the component data were multiplied by a scalar, such that these data were comparable to the system data, near the boundary wavelengths (400 and 900 nm).

A comparison of the integral $\int_{200}^{900} E_o R_{diode} \lambda d\lambda$ using both the old and new integrals is given below:

Table 1. Diode response integrals, as computed by several techniques

HQE	DFM#995	Component data (1200 nm cutoff)	Component data (1100 nm cutoff)	Flight data using HQE_Red as a standard
Blue				

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HQE	DFM#995	Component data (1200 nm cutoff)	Component data (1100 nm cutoff)	Flight data using HQE_Red as a standard
Green				
Red				
NIR				

References

Chrien, Nadine. Photodiode spectral response data summary. DFM#995, January 8, 1997.

Duval, Valerie. Calibration of the flight calibration photodiodes. DFM#952, October 28, 1996.

Korechoff, R.P, D.J. Diner, D.J. Preston, C.J. Bruegge (1995). In Advanced and Next-Generation Satellites. Spectroradiometer focal-plane design considerations: lessons learned from MISR camera testing. EUROPTO/ SPIE Vol. 2538, pp. 104-116, 25-28 September.