Jet Propulsion Laboratory
California Institute of Technology

MISR Multi-angle Imaging Spectro-Radiometer

SCIENCE DESIGN FILE MEMORANDUM #228

DATE: May 30, 2000
FROM: Carol Bruegge
SUBJECT: In-flight ARP Version 3
FILENAME: sdfm228_arp_v3.fm

ARP product summary

The pre-ship review for Inflight ARP Version 3 was held today, May 3, 2000. This ARP is named MISR_AM1_ARP_INFLTCAL_T002_F01_003.hdf, where T002 indicates it is our second ARP table, F01 indicates it is in Format 1, and 003 that it is our third version. (Version 002 represents a format change to Version 001, and has not yet been delivered to the DAAC.) This ARP was developed with the following constraints:

- ARPGen is the name of the in-flight data processing code. For this ARPGen run we constrained G_0 and G_2 to zero, and made use only of the the HQE photodiode standard. Thus we did not "trend" or "weight" the output coefficients, and we did not follow the procedure specified in the IFRCC ATB. Only data from Orbit 1911, April 27, 2000, were used in the present delivery.
- The channel-average gain coefficient, $\overline{G_{1,\,V3}}$, was maintained at the same average as for the Preflight ARP, Version 1. To perform this scaling the channel averages were first taken for both the preflight ARP, and ARPGen output using the equation

$$\overline{G_1} = \sum_{p} G_1(p) \tag{1}$$

  Here the summation is over pixels p=1,1504 for all cameras with one exception. In creating the most recent channel average, $\overline{G_{1,\,ARPGen}}$ for Af and Aa, all bands, the summation was set to p=300,1300. This eliminated the vignetted regions from the channel average calcultion. To scale each coefficient computed by ARPGen, we used the formula

$$G_{1,\,V3}(p) = G_{1,\,ARPGen}(p)\left(\overline{G_{1,\,V1}} / \overline{G_{1,\,ARPGen}}\right) \tag{2}$$

- All other ARP parameters, including the uncertainties and SNR were left as originally published in V1.

It is believed this ARP will remove regional errors in pixel response, such as those attributed to interference fringing and vignetting.

Calibration experiments to date

MISR opened its cover on February 24, 2000, and has acquired calibration data on the following dates:

Calibration experiments to date

Experiment	Date	Time, UT	Orbit
Cal_North	27-Feb-00, Sunday	23:34:24	1043
Cal_South	28-Feb-00, Monday	00:33:53	1043
Cal_North	01-Mar-00, Wednesday	05:57:26	1076
Cal_South	01-Mar-00, Wednesday	06:56:53	1076
Cal_North	13-Mar-00, Monday	19:31:21	1259
Cal_North[1]	17-Mar-00, Friday	14:09:48	1314
Cal_North	27-Apr-00, Thursday	14:01:01	1911
Cal_South[2]	27-Apr-00, Thursday	16:39:15	1911

1. Flight software modified. Removed averaging modes. Now 18 channels set to 1x1 including Cal_North An_blue and An_green and Cal_south An_red and An_nir. Began Cal_North 40 seconds earlier. Next Cal_South will move up by 10 seconds.
2. Goniometer positioned to 58° in order to eliminate anomalous motor currents, attributed to panel/ goniometer blanket rubbing.

Only data from the most recent calibration experiment were used. Data earlier than March 17th did not cover the full dynamic range, due to periods where the cameras went into low resolution modes. Also, only our most recent calibration experiment included the forward cameras, as prior to this there had been a prohibition against performing the Cal_South experiment.

New G1 coefficients

For reference, the V1 coefficients were plotted in SDFM TBD.

The ratio of the V3 to preflight_V1 coefficients is shown in Figs. 1-9 for the Df through Da cameras, respectively. The most obvious effects seems to be that of high frequency oscillations, with a periodicity of 20-40 pixels (low frequency in the center). This is speculated to be due to interference fringing between the focal plane detector and filter surfaces.

The next effect to note is that of some brightening in the center of the arrays. As this is only on the order of a few percent, it is unlikely to be due to vignetting. Rather some other phenomena, such as reflections between the camera front lens elements and diffuse panel, could be the cause.

Some cameras

ns, effects of vignetting is found to be on the order of 40% at the extreme field-of-view edges, for the Af and Aa cameras. There appears to be an unexplained 8% drop in Pixel 950, Aa_blue.

Data products

In order verify DAAC processing with this code, the following has been created:

- Orbit 995 (James Bay, first light) data named
  version 10 = mean-based cosmetic
  L1A: /data/production_2/scf/FM_SCI/database/path020/<camera>/
  MISR_AM1_FM_SCI_P020_O00/0995_<camera>_<10 or 11>.hdf

  L1B1: /data/production_2/scf/RP/...etc
  L1B2: /data/production_2/scf/GRP_ELLIPSOID/...etc.
  /data/production_2/scf/GRP_TERRAIN/...etc.

  10 blocks of Imagine imagery for the L1B2 ellipsoid product for blocks 47-56, all cameras: /data/production_2/scf/imagine/ellipsoid/
  MISR_AM1_GRP_ELLIPSOID_GM_P020_O000995_<camera>_10_Radiance_47-56.img

ARPGen summary