

MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday March 7, 1995.

Action Items:

94. Provide a detailed (high fidelity) analysis of scatter in the scan cavity. The results would determine the need for PF near field scatter measurements vs scan angle. Assigned to Guenther 8/23/94 Preliminary results due 10/15/94. Final due 2/28/95.
108. Prepare a report addressing the status of the MODIS Reliability Program. Reliability elements will include: FMEA, Worst Case, CIL, Reliability Assessment and Parts Device Stress Analysis and Trend Analysis. Assigned to Silva 1/3/94. Due 1/17/95
109. Determine if there are any technical problems associated with the different instrument orientations with respect to gravity when testing MODIS at SBRC versus testing MODIS at the spacecraft integrator. Assigned to Roberto 1/10/95. Due 2/13/95 CLOSED 2/17/95
110. Write up the disposition of the reduced -5°C torque margin on the scan mirror, given increasing torque requirement of test bearings. If the decision is to accept as is, document the rationale. Assigned to Roberto 1/17/95. Due 1/31/95
111. Recommend an optical design for the diffuser screen. Assigned to Waluschka 1/31/95. Due 2/28/95
112. Analyze the ScMA optical design. Assigned to Waluschka 1/31/95. Due 2/7/95

Attendees:

✓ Richard Weber	✓ Bruce Guenther	✓ Larissa Graziani
✓ John Bauernschub	George Daelemans	✓ Bob Martineau
Rosemary Vail	Patricia Weir	✓ Bob Silva
✓ Lisa Shears	Mitch Davis	✓ Robert Kiwak
✓ Mike Roberto	✓ Ken Anderson	Harvey Safren
Nelson Ferragut	✓ Rick Sabatino	✓ Ed Knight
✓ Gene Waluschka	✓ Cherie Congedo	✓ Harry Montgomery
✓ Bill Barnes	Jose Florez	Marvin Maxwell
✓ Les Thompson	✓ Gerry Godden	✓ Bill Mocarisky
✓ John Bolton	✓ Sal Cicchelli	Helen Phillips
Pat Delosa		

The following items were distributed:

- 1) Weekly Status Report #179
- 2) SBRC Memos submission from week #171
- 3) Minutes of the previous team meeting

MODIS Technical Weekly

10 March 95 Sent out 3/10/95 at about 6 PM to MODIS.REVIEW

1. Summary

Mitch Davis and George Daelemans were at SBRC this week. Mitch was working with SBRC personnel who are tracking down electronics problems related to the Space Analog viewing Module (SAM). George worked with Ron Choo, who is Paul Bortfeldt's replacement.

Mitch has reported that the electronic noise problems with the Engineering Model (EM) SAM have been mostly corrected. The only known EM SAM error now is an occasional random skip of the Least Significant Bit (LSB) of the Analog to Digital Converter (ADC) output.

David Jones wrote in his weekly that due to the limitations on heat-sinking "hot" electronic components in the EM, the thermal balance tests in the EM Thermal/Vacuum (T/V) may be restricted to 295 - 275K, instead of the original plan of 320 - 290K. David also noted that Tom Pagano desires the wider temperature range for better radiometric characterization; and that a higher temperature range at the later stages of the T/V test program, is under consideration to accommodate Tom's wishes. If we can not test the EM instrument over the planned temperature range in thermal vacuum, then we are adding more risk to the Protoflight Model (PFM) test program.

The cryogenic quartz crystal microbalance (CQCM) and associated electronics, manuals, etc. should arrive at SBRC on March 10. It was sent attention of David Jones. This device is on loan from GSFC. The plan is to have the CQCM installed in the MODIS Calibration Chamber (MCC) for use in the EM and PFM thermal vacuum tests. MODIS paid for half of the CQCM and will share this device at SBRC with the VIRS program.

Gene Waluschka has designed a hole pattern for the solar diffuser screen.

2. Mitch Davis (Electronics)

The following are status reports sent from SBRC by Mitch Davis: Status from Mitch as of 3/7/95:

The last remaining electrical problem is the "missing Codes" problem in the SAM. As of last night, SBRC modified all Analog Control Electronics (ACE)/CLK_BIAS and all ACE/ACE boards to connect the analog and digital grounds at the power input. The ACE/CLK_BIAS boards no longer show missing codes. However, the ACE/ACE boards still show missing codes.

* The ACE/ACE boards were modified to disable one ACE circuitry and the remaining 1/2 ACE was checked. The 1/2 ACE showed missing codes.

* The 1/2 ACE board was then modified to power the entire ADC from the analog supplies. (This is not the standard way!). The 1/2 ACE showed no missing codes! However, the ACE/CLK_BIAS board (that didn't have missing codes before) now showed a 1 Digital Number (DN) missing codes. (The missing codes before any SAM modifications was ~ 8 DN).

* An ACE/CLK_BIAS and the other 1/2 of the ACE/ACE boards were modified to power the ADC off the analog supplies. The full ACE/ACE board does not show any missing codes. The ADC-analog ground modified ACE/CLK_BIAS card showed one DN of missing code. The ADC-analog ground modified

ACE/CLK_BIAS card was replaced with yesterday's copy (analog & digital grounds connected at the input connect) ACE/CLK_BIAS card and the missing code was 1 DN.

As of 6:00 PM, we are reviewing the criteria for no missing codes for the ACE/CLK_BIAS card. It appears that when you display multiple detectors of a single band, it does not show missing codes. That is, a single trace may have a 1 DN missing code. However, with multiple traces all codes are displayed (or rather unique codes are not over-written on the screen).

The other ACE/ACE is currently being modified. More time will be spent tonight trying to identify if the ACE/CLK_BIAS card got worse or a different criteria was used to "pass" the card.

status from Mitch as of 3/9/95:

* The search for the lost codes will officially end at midnight tonight! At this point in time, the problem has been reduced to a random skip of 1 DN count on all ACE/CLK_BIAS and all ACE/ACE cards**. SBRC will try a few more fixes on a noninterference basis. However, the design appears to be as good as it is going to get. One extremely important task that must happen is to obtain a "quick and cheap" copy of the SAM boards to be tested in the EM. The boards are on order but most likely will not be available until after thermal-vacuum.

* The system baseline noise test was completed. The noise has not changed and remains at 1 DN count.

* The characterization of the system transfer function was completed yesterday.

* The gain and offset measurements were completed yesterday, but the data has not been reduced to a usable format.

* The system SNR has been measured but the data has not been reduced.

*The "phase delay" bug has been found and corrected, however the software has not been tested.

* The re-measure of the polarization test started last night and should finish this morning.

*The MCC appears not to be able to reach vacuum. Sorry, I do not have more details.

Finally, the meeting with MM is scheduled to begin Tuesday afternoon and continue all day Wednesday. Therefore, my return day will be Thursday, March 16.

** The "missing code" problem is defined as a reduced number of "XXXX,XXXX,XXXX,0000" (binary) occurrences on all ACE/CLK_BIAS and all ACE/ACE cards. That is to say that the A/D converter sometimes counts in this way:

[...0,1110] > [...0,1111] > [...1,0001] > [...1,0010] (increment) or
[...1,0010] > [...1,0001] > [...0,1111] > [...0,1110] (decrement).

Where [...1,000] is skipped.

Telecon with Mitch on March 10 at 11:30 AM:

Participants: Mitch Davis, Dick Weber, and Mike Roberto

- a) Polarization tests were completed on the instrument. This time the polarization was 3%. Tom Pagano believes the alignment was not as good as before. SBRC personnel believe the instrument polarization is less than 3%.
- b) Scatter tests are scheduled for today and tomorrow. A decision on consent to de-integrate will be made on Monday.
- c) The leak problem with the MCC was traced to a plumbing leak associated with the Space Background Simulator (SBS). SBRC will work on this problem off-line using the BEMCO thermal/vacuum chamber.
- d) For some electronic board(s), the calculated currents for the parts on the board exceed the total current input to the board. This may mean some part(s) will run cooler than the present prediction.
- e) SBRC is considering thermal tape and copper straps for some SAM electronic components which are predicted to run hot.

3. Bob Martineau (Focal Planes)

- a) The PF SMWIR FPA has completed 90% assembly tests. Delivery of unit is expected to be April 5, and is predicated on delivery of the bezel/filter assembly by March 15. Delivery of the bezel/filter assembly has been delayed due to difficulties in dicing the filters, which operation has caused excessive chipping.
- b) The PF LWIR FPA detective assembly testing will be completed March 8. Delivery of this unit is expected to be March 31, and this delivery date depends on receiving the LWIR FPA filter assembly by March 17. Delivery of the LWIR FPA filter assembly has been delayed due to problems in producing the filter mask, an item manufactured in-house.
- c) Two pathfinder SMWIR detector subarray sets were damaged when they slipped out of an ESD bag and fell to the floor while being transported. (Does SBRC also need a new Secretary of Transportation?) Potentially one good subarray set could be yielded for hybridization. These pathfinder sets were at the bottom of the list of SMWIR detector subarray assets, so SBRC believes this incident will not impact expected deliveries.

4. Eugene Waluschka (Solar Diffuser Screen Hole Pattern)

Email from Eugene, March 10, 1:56 PM:

"I am working on the pin hole pattern for the 8.5% solar diffuser attenuation screen. The goal is to have the MODIS pupil have a uniform distribution of light. The basic procedure of accomplishing this is to start with a uniform distribution of points in the pupil. The points are all equidistant from their nearest neighbors. Hence the unit cell is an equilateral triangle, i.e., each point is at a corner of the triangle. The spacing between points is chosen such that a 2 mm diameter hole in the screen provides 8.5% attenuation. The distribution of holes in the screen is determined by "parallel" projecting the points from the pupil to the solar diffuser and then on to the screen. Details of all of the calculation should be available Monday (13 March 1995). With 2 mm diameter pinholes the number of "projected" spots in the pupil is about 300. This gives some indication of the magnitude of the expected variation as the solar angles change and as the scan mirror rotates, namely a few parts in a few hundred. Actually the variation will be less as the light is not concentrated at a spot but is distributed about that point. Again details will follow."

5. Systems Telecon with SBRC

This telecon was held at 4 PM on Monday, March 6:

Participants included Tom Pagano, Neil Therrien, Jim Young, Ed Knight, Harry Montgomery, Rick Sabatino, Gerry Godden, Jeff Bowser, Tim Zukowski, and Mike Roberto.

Tim Zukowski:

a) In the data, are bands 1 and 2 (and 25 and 26) being handled properly by the TAC software?

Tom: yes

b) What is in the TAC *.err files?

Tom: The *.err files include diagnostics so you can find out why the program crashed or programmer diagnostics. You should probably just delete these files.

c) There is a question about some of the polarization data sets: 20i(?), pol1, pol60.

Tom: 20i was an early, early set. Pol1 was a 35 degree case, and Pol60 had a jerry rigged lamp.

d) What is the size of the PSA beam on the focal plane?

Jim: The PSA is about 1 degree angularly, about 12 to 14 pixels.

Tom Pagano:

a) The bar charts for the TAC are done in Excel.

b) Joe Auchter is working on the signal to noise routine for the TAC.

c) Tom has finished the near field response routines for the TAC. An original data set was looked at. After averaging data, the noise in the wings for the VIS was down to 10 to the minus 5.

d) The four parameter fit for the polarization data was mentioned. The reason for the slope to some of the polarization data is not known at this time. (Editor's note: If possible, I believe that polarization data should include data taken at 0 degrees and at 360 degrees.)

Jeff Bowser:

Jeff requested smaller file sizes for the GSFC TAC. For some files, he needed 600 MB to get the data out.

Tom: will send 50 or 100 MB files which should be helpful.

Tom Pagano:

a) Tom believes the scatter measurement assembly is working good enough to get data.

b) Tom provided his beeper number which is (805) 645-3915.

(Editor's note: I recommend that this number be used very sparingly.)

c) Finishing up loose ends. Getting ready for thermal vacuum.

Neil Therrien:

Neil provided an update on the status of the electronics work. This status was also reported in an email message I sent out on March 6 at 10:15 AM.

Jim Young:

a) completed the write-up for the polarization test results. The approximately 40 page memo is number N04685. It may be sent out tomorrow.

b) Jim mentioned that Bill Barnes had asked last week if the on-board blackbody was thermally isolated. It is thermally isolated from conductive paths.

c) An analysis has been performed with regard to using a truncated Line Spread Function (LSF) (N04674).

Ed Knight:

a) Analysis shows that the curved edges for the on-board blackbody calibrator are okay.

b) There is interest about lunar rolls, etc.

c) Several technical memos at the CDR did not have PL numbers. This list will be faxed to Jim. Jim will provide PL numbers, where possible.

d) What about radiometric analysis for thermistor on a stick for the scan mirror temperature?

Tom: The thermistor on a stick for measuring the temperature of the scan mirror did not work. Al DeForrest now has a new concept for this.

Mike Roberto
10 March 95