

MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday September 26, 1995.

Action Items:

113. Determine the best method to display a fixed pattern noise (herringbone, Spec 3.4.5.3.3). Assigned to Knight 8/15/95. Due 10/15/95.

114. Determine the extent of ghosting from the SMIR and LWIR polished cold shields. Assigned to Waluschka 8/29/95. Due 9/22/95.

Distribution:

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

The following items were distributed:

- 1) Weekly Status Report #208
- 2) SBRC Memos submission from week #200
- 3) Minutes of the previous team meeting

MODIS Technical Weekly September 29, 1995

sent to MODIS.Review 10/2/95 at about 8:45 am

1.0 Introduction

Thermal vacuum testing of the radiative cooler with the aft optics platform is scheduled to begin the week of October 1. The tests are to demonstrate radiative cooler performance and performance of the shields for the LWIR and S/MWIR objective assemblies. George Daelemans, Dan Powers, and Larissa Graziani will be at SBRC for the test.

GSFC comments on the September QMR have been compiled and emailed to MODIS team members at Goddard.

Bob Silva reported that GSFC will perform life testing of the 1W and 10W lamps for the SRCA. Testing will begin within a month and run for at least five weeks.

In this report, Larissa comments on the MODIS contamination requirements:

level 300 is required. Tom Pagano mentions that the PFM S/N ratios are expected to fall back within spec. A review memo on SBRC stress analyses and an SRCA risk assessment memo from Cherie Congedo are summarized. Eugene Waluschka describes his estimate of far-field scattered light for MODIS and his plan for a more detailed analysis. Bob Martineau provides flight model detector status.

2.0 Larissa Graziani (MODIS Contamination Requirements)

Author: Larissa Graziani at 420/421/422/424
Date: 9/27/95 6:36 PM
Subject: MODIS Contamination Requirements

The most recent monthly report refers to an internal contamination level of 450 for MODIS. The MODIS contamination control plan states that the instrument will be maintained at level 300. This requirement was developed by SBRC and determined (at CDR) to be feasible. The difference in scatter due to this change could be quite large. I would not agree to the change in requirement unless it could be proved--to the science team's satisfaction--that performance would not be significantly degraded. Level 300 has been achieved for many optical instruments in recent years and should be attainable without resorting to "heroic" methods.

It is true that level 300 was not achieved during EM development and testing. However, it should be noted that the cleanroom procedures as specified in SP80220 and the MODIS contamination control plan were not stringently followed. In order to meet Level 300 upon delivery, it is imperative that the MODIS team implement correct cleanroom procedures and coordinate activities with ETM+ so that the optics can be protected during high contamination-generating activities. This may take some extra time, but the EM proved that shortcuts do not work.

Once at Valley Forge, the goal is to have the instrument bagged and purged as close to continuously as possible. LMAS will be implementing standard cleanroom procedures during spacecraft I&T. If any special precautions will be necessary, a request should be made in the near future. I have opened discussions with my LMAS counterpart about utilizing every opportunity to clean and inspect MODIS--including just prior to encapsulation in the fairing. (Note: Cleaning during I&T is the instrumentor's responsibility.) However, the instrument cannot be any cleaner at launch than it is at delivery.

3.0 Tom Pagano (PFM SNR's expected to fall back in spec)

Author: "Pagano, Thomas S" <tpagano@msmail3.hac.com> at Internet
Date: 9/28/95 5:36 PM
Subject: PFM SNR Calculations

I investigated the cause of the low SNR's in the modeling for PFM and tracked them to incorrect (2x low) transimpedances for the PFM FPAs. This caused the same electronics noise to appear 2x larger when referenced at the detectors. I am in the process of recalculating the SNRs but expect them to fall back in spec.

4.0 Cherie Congedo (Review of MODIS Stress Analyses, SRCA Risk Assessment)

In a memo dated August 29, Cherie indicates there are concerns resulting from the reviews of each of four SBRC stress analysis reports which she and Nick Galassi feel should be addressed. The comments and concerns about the reports were provided by Nick Galassi of Swales. The four analyses are the MODIS

CLAM Structural Analysis, Structural Analysis of the MODIS Forward Analog Module, MODIS SIS Structural Analysis, and MODIS Space View Door Fail-Safe Opening Event Stress Analysis.

In a memo dated August 17, Cherie has indicated that Code 721 and Qian Gong of Swales & Associates recommend that the complete STOP analysis of the SRCA with the SRCA connected to the MODIS instrument be performed. References with the technical details are included with the memo. The first reference is a memo by Cherie, dated August 15, and entitled NASTRAN Modeling for the SRCA Risk Assessment Analysis (referenced in the August 25 technical weekly); and the second reference is Preliminary SRCA STOP Analysis (Reduced Version) by Qian Gong, dated August 18.

5.0 Eugene Waluschka at (Far Field Scatter)

Date: 9/29/95 10:25 AM

I have made a estimate of the maximum amount of far-field scatter which we can expect. The estimate goes something like this.

Assume we are looking at a typical (clear) square kilometer of ground at nadir completely surrounded by clouds. The amount of light reaching a pixel in the visible focal plane is then the "primary" specular light, I_t , plus all for the scatter light, I_s . The scattered light contribution from the scan, fold and primary mirrors is approximately given by the following expression,

$$I_s = I_c * (0.001) * (W_{sg} + W_{fsg} + W_{fg} + W_{pfsg}).$$

Where I_c = cloud intensity,

W_{sg} = fraction of 2 pie steradians as seen from scan mirror of the ground,

W_{fsg} = fraction of 2 pie steradians as seen from fold mirror to scan mirror of the ground,

W_{fg} = fraction of 2 pie steradians as seen from fold mirror to the ground directly,

W_{pfsg} = fraction of 2 pie steradians as seen from primary to fold mirror to scan mirror of the ground.

0.001 = total integrated scattered (measured).

Using reasonable values for the W's (I spoke with Jim Bell about what would be reasonable values) we get that the scattered contribution is

$$I_s = I_c * (0.001) * (1/2 + 1/10 + 1/10 + 1/20)$$

$$I_s = I_c * (0.001) * 15/20.$$

Putting all of this together and using

$$I_c = 50 * I_t$$

we get that total amount of light reaching the focal plane is

$$I_t * (1 + 0.05)$$

that is a 5% error.

Keep in mind that this is a estimate but one which (sort of) places a upper bound on the bright field - dark target type of observation.

We are going to check this with a more detailed calculation.

Eugene Waluschka

6.0 Martineau (FM1 NIR and VIS FPAs delivered; progress on FM1 and FM2

SCAs, and FM1 and FM2 Detective Assemblies,)

Author: Robert Martineau at 710

Date: 9/27/95 7:05 AM

1) Flight Model SCAs:

- S/N FS201 SCA and S/N PFS 110 meet spec with 1 bad pixel each and are the designated FM1 and FM2 SMWIR SCAs respectively. Two more SMWIR SCAs are planned to be hybridized to obtain a spare.
- S/N PFL11 has been designated the FM2 LWIR SCA.

2) Flight Model 1 Detective Assemblies and FPAs:

- The FM1 NIR and VIS FPAs have been delivered.
- The FM1 LWIR DA has completed radiometric tests. Results to date are good. Crosstalk tests are to be done next. Delivery of the FPA is expected about Oct 11.
- The FM1 replacement SMWIR DA has been started. FPA delivery is paced by replacement Band 26 filter fabrication. Delivery is expected Oct 31.

3) Flight Model 2 Detective Assemblies:

- The FM2 VIS DA is into test.
- The FM2 NIR DA is ready for test.
- The FM2 LWIR and SMWIR DAs will be kitted with designated SCAs this week.
- The FM2 VIS filter assembly is in. The FM2 NIR filter assembly is expected Oct 3.

MR

10/2/95

MODIS Technical Weekly October 6, 1995

sent to MODIS.Review 10/10/95 at about 9 am

1.0 Introduction

There was no team meeting on October 3. This report covers from October 2 through October 6.

On October 5, a telecon was held with SBRC to discuss GSFC comments on the last version of the Performance Verification Plan and Specification. In addition to our regular team members, Charles Dan of Code 300 participated. SBRC will update the PVP/PVS based on the written GSFC comments and the telecon review.

On October 6, a meeting was held to discuss S/C maneuvers for lunar calibration. Dr. Brij Gambhir of SSAI presented a spread sheet analysis for a possible set of maneuvers. In this simplified analysis, the Earth shield was not modeled. Joe Bolek attended the meeting and will look into the impact of the having the spacecraft provide these maneuvers. Other attendees at the meeting included Bill Barnes, Gerry Godden, and Mike Roberto.

George Daelemans and Larissa Graziani are at SBRC for the testing of the Aft Optics Platform/Radiative Cooler.

Eugene Waluschka and Shi-Yue Qiu have started a detailed far field scatter analysis for MODIS.

2.0 Bob Martineau (Flight Model FPAs)

10/3/95 10:21 PM

Attached is the Weekly Input for 10/3/95

This information, as usual, comes from a weekly fax sent by SBRC.

1) Cable/Pedestal Assemblies:

- All assemblies needed for the program are completed.

2) Flight Model SCAs:

- The F2 SMWIR and LWIR SCAs are ready for inspection and mounting.
- Two additional SMWIR SCAs are in for hybridization.

3) Flight Model 1 Detective Assemblies and FPAs:

- The F1 VIS and NIR FPAs have been delivered.
- F1 LWIR crosstalk tests are in process. The filter/bezel assembly is expected this week. CTI is expected about Oct 13.
- The F1 SMWIR DA is awaiting wire bonding of the SCA. CTI is expected mid November.

4) Flight Model 2 Detective Assemblies:

- The F2 VIS DA is into radiometric test.
- The F2 NIR DA is ready for test and will follow the VIS DA.
- The F2 LWIR and SMWIR DAs are ready for kitting.

3.0 Mitch Davis (IR imaging on EM cards nearly complete; Microprocessor speed problems; CLAM cable stiffness problem; Harris PROMs programmed and in burn-in; Possible CLAM hybrid schedule slip)

Date: 10/3/95 10:03 AM

Subject: Weekly Telecon With Ed Clement
FOR WEEK SEPTEMBER 25-29, 1995

There has been little reportable progress this week. However, here are the "headlines":

- The IR thermal imaging on the EM cards is nearly complete. (No PFM cards will have thermal imaging.) Ed Clement mentioned that he will have to talk directly to George Daelemans to "clarify" the number of boards to be IR tested, and which ones need testing in vacuum.
- The Single Board Computer (SBC) testing has shown a potential problem. During initial testing the board was shown to be able to read and write to memory. Since then, the SBC has not been able to read or write to memory reliably at the required 12 MHz. However, it operates at 8 MHz. Ed believes that the problem may be related to a design change from the EM, but he has no proof at this time. For the PFM additional buffers were added around the Memory Management Unit which may be affecting the timing on the board. Clay Stanford (original designer) was in as a consultant last Friday for a couple of hours. However, he will be out of town next week for his new company.
- The CLAM Housing Issue (i.e. The stiff cable that may damage the focal planes) still has not been resolved. The current plan is to build a mockup with the current design to demonstrate the cable stiffness. The new design with the 30 AWG mockup will also be built. The last option is a flex cable. If SBRC has to go to a flex cable, it will require a "custom" built connector and will have an impact in the schedule.
- The Harris PROMs have been programmed and are currently in a two week burn-in test.
- The current schedule shows the CLAM hybrids coming in Nov. 3rd. If Sipler misses this date, which looks likely, the CLAM schedule will slip.

Mitchell & Jose

MR
10/10/95