

MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday October 19 1993.

Action Items:

69. Determine if the Schaeffer Magnetics' plans to calibrate the encoder are adequate. Assigned to Roberto 8/31/93. Due 10/ 1/93
70. Evaluate the thermal design of the Schaeffer Magnetics' motor/encoder. Assigned to Daelemans 8/31/93. Due 10/15/93
71. Provide technical input which addresses the definition and impact of levels of software criticality for the MODIS Software Management Requirements Document (SMRD) Configuration Change Request (CCR). Assigned to Sabatino 9/21/93. Due 10/19/93
72. Investigate the adequacy of SBRC capability to maintain temperature plateaus during instrument testing in thermal vacuum. Assigned to Daelemans 10/12/93. Due 11/ 2/93
73. Complete the MODIS brochure and released for printing. Assigned to Bauernschub 10/18/93. Due 11/15/93.

The following items were distributed:

- 1) Weekly Status Report #109
- 2) SBRC Memos submission from week #101
- 3) Minutes of the last team meeting

Attendees:

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|--------------------|--------------------|--------------------|
| ✓ Dick Weber | ✓ Bruce Guenther | June Tveekrem |
| ✓ John Bauernschub | ✓ George Daelemans | Bob Martineau |
| Rosemary Vail | John Barker | ✓ Bob Silva |
| Lisa Shears | Joann Harnden | Ken Brown |
| ✓ Mike Roberto | ✓ Patricia Weir | ✓ Robert Kiwak |
| Nelson Ferragut | Mitch Davis | ✓ Harvey Safren |
| ✓ Gene Waluschka | Jack Ellis | ✓ Ed Knight |
| Kate Forrest | Ken Anderson | ✓ Harry Montgomery |
| Bill Barnes | Rick Sabatino | Marvin Maxwell |
| ✓ Les Thompson | ✓ Cherie Congedo | |

MODIS Weekly Technical Report for October 26, 1993

Gene Waluschka has submitted all runs for determining ghosting along and cross track with the SBRC fixes to reduce ghosting. He illuminates 1/12 of the focal plane. Results will show the contribution of each surface to ghosting. He has S/MWIR, and VIS are done now (5000 rays for each run). NIR computer run is in today (October 19), and the LWIR will be submitted by end of week (takes about a day to run).

Tom Kampe will be sending optical component positional sensitivity file to Gene within one week.

SBRC now has all EM filters except for bands five and six. SBRC expects mask by end of month for S/MWIR from Barr.

Gene has been reviewing image motions at the four focal planes with Chen Gung of Swales. The purpose is to assure the correct signs are used for image motion relative to focal plane motion and the correct relative motions between focal planes.

A trip report is being prepared with inputs from Bob Martineau, Les Thompson, and Mike Roberto on the status of the PC detector recovery program.

The Tinsley PDR resulted in unresolved issues. Expect a form of "delta" PDR as a follow-up.

Cherie Congedo has almost completed the NASTRAN model for the PC detector. She needs material properties for the epoxies, specifically the Poisson ratio for Ablebond 642-1 from Able Stick, and the density of Scotch Weld 3M-2216 and Ablebond 642-1. Ideally, she needs these values as a function of temperature. She also needs to know the stresses that the CdZnTe can withstand without failure.

Cherie has preliminary results indicating most of the misregistration is due to initial cool down of the cold focal planes. Preliminary indications are that the initial cool down results in a cooler rotation with becomes a translation of the S/MWIR and LWIR detectors, mostly in the scan direction. The scan direction misregistration should be able to be taken out by a detector sample timing change between the warm and cold focal planes. Cherie's results show the various contributors to the overall cooler rotation due to cool down. The on orbit thermal variations cause minor registration changes once the initial cool down is complete. The STOP team will look into whether or not the cooled focal planes should be misaligned during warm assembly to come into alignment cold.

George Daelemans stated that SBRC is working on better spec for the bench test cooler (refrigerator). The MODIS BTC will be more stable and colder than the BTC for PMIRR. The thermal model for STOP is complete. For the hot cases, there is good agreement between GSFC and SBRC. SBRC is predicting colder temperatures for the normal and cold cases.

Harry Montgomery is concerned about the instrument ability to operate in the SBRC thermal vacuum chamber at a constant plateau temperature.

Harry and Ed Knight are looking into a couple of approaches by SBRC for converting MODIS counts to radiance. The ideal conversion is one which can be unambiguously transferred to on-orbit. Neil Therrien has developed a conversion technique which assumes the first derivative of the conversion curve is linear. With Neil's approach, the background level does not have to be considered. Although Tom Pagano does not make assumptions on the shape of the conversion curve; he assumes he can calculate the background. The traditional approach is to determine the counts output on the ground for a wide variety of instrument and detector temperatures and known input radiances.

Ed Knight is using Excel to develop models of transmission curves for filters for bands 18 and 19. He is using a generic filter model from SBRC until he gets the actual data. Ed is using the actual bandwidth and center wavelength for each filter. The goals are to make a preliminary determination if these two filters are okay and to be ready for the actual transmission data when it is received in about 2 weeks.

Bruce Guenther discussed lunar observations and considerations that Martin Marietta Corporation may not want to do large S/C maneuvers in light of recent S/C failures. MMC may be able to rock the S/C on a monthly basis. The action is on the MODIS science team to determine just how much of the moon we have to see.

Bob Silva is looking into the materials for MODIS and halogen lamps. Bob will be consulting with Bruce Guenther.

The regular weekly calibration and systems telecon with SBRC was held on Monday, October 18th. Participants included Tom Pagano, Neil Therrien, Jim Young, and Jerry Hyde from SBRC and Harry Montgomery, Ed Knight, and Mike Roberto from GSFC. SBRC is making filter measurements on band 19. Tom is working on the radiometric math model. There was some discussion of converting from counts to radiance (see above).

In terms of getting ready for CDR, Les Thompson mentioned how measurements on the hardware are pretty thin right now.

Bob Martineau mentioned the MODIS PV detector readouts are rad hard to 30K (apparently VIS and S/MWIR readouts have been tested; LWIR readouts to be tested next and are expected to be okay on rad hardness). Carlsbad is closing in about the December time frame. Possible impact on the silicon CTIAs for the PV detectors. Carlsbad is building a second new lot with the new design because of problems with the first lot. Carlsbad operations are likely moving to Newport Beach. No indication yet on whether the new lot will be complete before the move. SBRC is having yield problems again with the S/MWIR PV detectors.

Bill Mocarsky attended the meeting from Code 733. Bill is available to provide some help in the integration and test and GSE areas.

Bob Kiwak received an update on the polymeric materials list from SBRC on Monday, October 18. An update on the inorganic list is due by the end of the week. In May, Bob received an interim materials list which included subsets of the above and lubrication and processes lists. SBRC has information on where the materials are used and Bob will try to get this information.

In a teleconference with SBRC on October 21, Lloyd Candell indicated the area of reliability engineering is the area of most concern in terms of SBRC being prepared for the Critical Design Review (CDR). The reliability areas of most concern in terms of being prepared include materials approval (expect 40% complete by December 7), worst case analyses and trend analyses (0% complete but detailed plans ready on how they will be done), and very little on limited life items list and safety. At this time Failure Mode and Effects Analysis (FMEA), stress analysis, and the critical items list are expected to be 90 percent complete by December 7, and reliability predictions are expected to be 95% complete. Two other areas of concern in terms of being ready for CDR include the Performance Verification Plan and open issues with some of the test equipment. Other participants in the telecon included Dick Weber, David Jones, Ed Schultz, Don Anna, and Mike Roberto.

On October 21, a list was sent to Rod Durham of recommended modifications and additions to the outline for the Critical Design Review and Software CDR.

Mike Roberto October 22, 1993

*** Notes for October 12th meeting ***

The following notes were sent out on teletail October 8, 1993 to MODIS. REVIEW. These are for the time period from September 27th to October 8th.

Mitch Davis would like to get a listing of all documents that come in to Stephanie Gorman. This should become part of our weekly minutes.

The attendees for the October 5 team meeting were: Bob Martineau, Mitch Davis, Nelson Ferragut, Mike Roberto, Bob Kiwak, Ed Knight, Harry Montgomery, Bruce Guenther, Cherie Congedo, Harvey Safren, Gene Waluschka, Bob Silva, Rick Sabatino, Les Thompson and Larissa Graziani. Many MODIS personnel were at the PMS readiness review.

There was no meeting on September 28th because of the MODIS Calibration Working Group Meeting chaired by Phil Slater. Jim Young made a presentation on MODIS calibration and other presentations were made by members of the MODIS Characterization Support Team (MCST).

The MODIS science team meeting was held September 29 thru October 1st at GSFC. MODIS instrument development team members giving presentations included Tom Pagano and Dick Weber. John Barker gave an MCST presentation.

A teleconference was held with SBRC on October 4th. Attendees included Harry Montgomery, Bill Barnes, Ed Knight, and Mike Roberto from GSFC. SBRC personnel included Neil Therrien and Tom Pagano. One of the items discussed involved the importance of being able to operate in the SBRC thermal vacuum chamber at temperature plateaus. A question to be resolved by the MODIS science team members is whether or not the center wavelength of band 19 is acceptable. Tom was informed of a small team of GSFC personnel planning to visit SBRC on October 13 and 14 in regard to the problem of cracks forming in the PC detectors during temperature cycling and the PC detector crosstalk measurements.

Discussions were held with Oscar Weinstein and Tom Pagano on October 4th about the trip. Oscar faxed a preliminary copy of the recovery plan to GSFC. The plan was being revised to include effects from the stainless steel mounting fixture.

During the afternoon of October 4th, the MODIS video was reviewed with Advanced Technology and Research (ATR) by Bill Barnes, Ed Knight, and Mike Roberto. A number of changes were recommended to make the video more representative of the current instrument. The new video should be out in the November time frame.

The Schaeffer CDR is scheduled for November 4th. Nelson is trying to get John Sudey to attend. Mike Hagopian also may be available as a backup.

Mitch Davis attended the S/C electronics PDR at Valley Forge. Not very much detail was provided at the review.

The spacecraft accommodation review will be at the end of October. MMC will be here.

Bob Martineau discussed the fractures in the PC detector array that was temperature cycled between ambient and about 80K. Bruce Guenther asked the question of how fast the detector arrays will cool down on orbit. In the test setup, SBRC was allowing for cooling of 270K per hour. George Daelemans has stated that cooling of 20K per hour is more typical here.

Gene Waluschka has determined that for the S/MWIR focal plane with a pre-filter, there is no problem with light which passes thru the pre-filter, reflects off the optics, reflects off the back of the pre-filter and goes to the focal plane. This is no problem in the track or scan direction. Gene spent September 28th at Barr Associates to determine reasons for the delays associated with the delivery of the MODIS SWIR focal plane filter mask. The reasons seem to be more schedule oriented than technical. Gene has sent SBRC material related to polarization analysis, and plans to visit SBRC on this topic late this month.

Bob Silva mentioned a safety group meeting to be held Thursday and Friday which will have SBRC participation. Rick Stickle is reviewing the safety data package developed by SBRC. This package will be presented at CDR. Bob is working on a letter outlining the cracking problems in the welds and pads for Vishay resistors. SBRC has completed ESD testing of the detector arrays. Bob is also looking at the TAXI chip for another program.

The halogen lamps seem to be good for 1000 hours. There could be a problem getting them qualified for 3000 hours. Bruce Guenther wants to be involved with the decisions on the lamps. We do not plan to go beyond the present capabilities of the lamps.

Harry Montgomery would like to know the uncompensated momentum for the solar diffuser door. MODIS might want to use this every orbit for part of the mission. We need to be sure this is not a problem.

Rick Sabatino mentioned that SBRC can go to the CDR confident that the recommended changes in OASIS will be made by December.

Les Thompson, Bob Martineau, and Mike Roberto will be at SBRC on October 13 and 14 to get involved with the effort to understand the problem of cracking of PC detectors during temperature cycling and also understand the measurements of detector crosstalk for the PC detectors. A list of items the GSFC team would like to see covered by SBRC was faxed to SBRC on October 5.

On October 6, there was a meeting to discuss error budgets in relation to the STOP analysis. Attendees included Bill Case, Sandra Irish, Cherie Congedo, and Mike Roberto. Cherie will perform independent analyses to back up STOP results. Mike will assure Cherie receives a written STOP error budget.

A follow up call was made to Gary Barnett on October 7th in regard to getting the power dissipation numbers for the motor/encoder electronics. Schaeffer did not want to release the numbers until they complete the analysis and write the report. The report is due October 14th. Gary will contact Schaeffer on Monday. The needed power numbers were for total power input to each of the two boards, all areas of high power dissipation and locations on the boards, and the LED power. This needs to be known for either eight or twelve read heads.

Mike Roberto October 8, 1993