

MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday March 8, 1994.

Action Items:

73. Complete the MODIS brochure and released for printing. Assigned to Bauernschub 10/18/93. Due 11/15/93.
74. Prepare and submit a Configuration Change Request which revises the definition and impact of levels of software criticality for the MODIS Software Management Requirements Document. Assigned to Anderson 10/26/93. Due 12/ 1/93
75. Determine if the four electronic module boxes can be individually thermal tested in air, or must the thermal testing be done in a vacuum. Assigned to Silva 10/26/93. Due 11/ 9/93
84. Review the Performance Verification Plan with a goal to delete some activities. Assigned to Roberto 2/15/94. Due 3/ 1/94.
85. Submit a CR to split the Software Readiness Review into two reviews. Assigned to K. Anderson 2/15/94. Due 3/ 1/94.

The following items were distributed:

- 1) Weekly Status Report #128
- 2) SBRC Memos submission from week #120
- 3) Minutes of the previous team meeting

Attendees:

✓ Dick Weber	✓ Bruce Guenther	✓ Larissa Graziani
✓ 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	✓ Bill Mocarsky/ Rick Mills

MODIS Team Meeting and Other Topics **11 March 94**

General

By Tuesday of next week (March 15) at the latest, we need to know which CDR action items tentatively assigned to GSFC personnel need to go to SBRC. The action items handled locally need to be completed on or before April 5th.

Optics

According to Tom Kampe, the NIR objective assembly is complete and the VIS should be complete this week.

Gene Waluschka will be at Denton in Morristown, NJ, on Monday, March 14th for scan mirror coating inspection. He travels to Zygo in Middlefield, CT, on Tuesday, March 15th for scan mirror flatness testing.

Terry Ferguson of SBRC is doing an APART stray and scattered light analysis of the scan cavity. GSFC plans to review Terry's analysis. An independent stray light analysis may be performed by GSFC.

Conrad Wells of SBRC has done an analysis of the measurement of polarization by the MODIS instrument as a function of the degree of polarization of the polarizer. Gene Waluschka has reviewed this analysis. The bottom line is that polarization measured by MODIS = $(I_{max} - I_{min}) / (I_{max} + I_{min}) * (1 - \text{unpolarized portion of the input to MODIS} / \text{polarized portion of input to MODIS})$. I_{max} and I_{min} are the maximum and minimum intensity measurements made by MODIS when using perfectly polarized light at the input. The estimate is that the beam for the polarization test will be 3 % unpolarized at the scan mirror input to MODIS. This means if MODIS has 2% polarization, the test measurement will be about $(0.02) * (1 - 0.03/0.97) = 1.9\%$.

We are ready for the SRCA sequence file from SBRC. This can be sent over internet to Gene. Tom Kampe is putting together a package which includes this file to send to GSFC. GSFC is performing a STOP analysis on the SRCA.

Tim Carnahan believes Pro Engineer could be used for stray light modeling.

Gene did a mathematical analysis to answer a question from Conrad Wells in a teletail message of March 3rd. Gene provided Conrad the derivation which shows that phase changes which take place in MODIS do not effect linear polarization sensitivity.

Mechanics

Nelson Ferragut has worked out the load cycles for the 15 g case for the kinematic mounts. At this time, Nelson's work is documented in a hand written analysis, "Test Sequence for MODIS", received on March 8th. The third from the last page of the analysis computes the total number of cycles for each kinematic mount. This is based on the test program being run in Florida and then California with a scatter factor of 4. However, since we want the number of cycles for each kinematic mount to also include the possibility of a retest, the number of cycles for each axis remains the same as in Nelson's calculations if we just consider the Florida vibration testing. Nelson will update his analysis based on MODIS loads resulting from the use of the Atlas IIAS launch vehicle.

There is the possibility that new kinematic mounts will be needed for the modal survey. This is because of the non-linear response of the regular kinematic mounts. However, if possible, I believe we should try to use the same type of mounts we will use for flight.

Nelson will discuss some of the mechanical action items with Bob Joyce.

Contamination Control Plan

Larrisa Graziani prepared a review of the MODIS Contamination Plan dated March 3rd. The plan was found to be acceptable to Larissa contingent on a few recommended changes:

- 1) include specified outgassing rate needed before delivery to Martin Marietta Astro Space (MMAS).

- 2) specify dry nitrogen purge rate to prevent water absorption by the MLI or acceptable time off of purge during I & T.
- 3) provide further information on protecting the Spectralon from hydrocarbon contamination
- 4) the preferred pumping system for the thermal vacuum chamber is a cryo-pumped system. The thermal vacuum test should end on a hot cycle.
- 5) use consistent units throughout the document
- 6) the YB71 white paint has been reformulated and must be re qualified for flight use.
- 7) GSFC and MMAS are performing flight qualification tests for the spacecraft. If any MODIS requirements fall outside this range, SBRC may need to perform additional tests.

Performance Verification Plan (PVP)

A meeting on this plan was held on March 7th. Attendees included Dick Weber, Ken Anderson, Jack Ellis, Bob Silva, Scott Milne, Jay Levy, Charles Dan, and Mike Roberto. Comments from Code 302 on the MODIS PVP were reviewed to determine which comments could be handled by GSFC.

STOP Analysis

Cherie Congedo has documented pointing and coregistration errors during an orbit in a memo dated 1 March, "Orbital Variations in Pointing Alignment and Coregistration Errors". For beginning of life, the hot extreme case during an orbit was just after going into eclipse and the cold extreme case was just after coming out of eclipse. The variations were obtained by subtracting the cold extreme results from the hot extreme results. The pointing error variation is less than 10 arc seconds in each case, and the co-registration variation is less than 4 microns in each case. These results indicate the variations during an orbit should not be a problem for MODIS.

Systems Telecon and General Systems Topics

This telecon was held on March 7th. At SBRC, attendees were Tom Pagano, Neil Therrien, Jim Young, and Dzung Phan. At GSFC, attendees were Harry Montgomery, Ed Knight, and Mike Roberto. Included in the discussions:

- 1) We need to assure that the 300 hours burn in for the SRCA calibration lamps include ground testing, else this time seems too high.
- 2) In one or more other instruments, reflection off the back plate has been a problem for Spectralon. For MODIS, our Spectralon is about 7 mm thick, so this should not be a problem.
- 3) Florescence has been observed for Spectralon in the blue region due to contamination.
- 4) A dry run of the calibration peer review is scheduled for the 16th and 17th of March. Phil Slater and other team members will be here. A video telecon may be held on this subject with SBRC on Thursday, March 17th, if the Project approves. The tentative time would be from 1pm to 5pm.
- 5) The possibility of a clone of the TAC for GSFC.
- 6) As a cost savings, maybe we could not go the formal route with engineering evaluation software used in ground test. Harry recommended that if SBRC could make the software work at GSFC, it could reduce the need for expensive GSE software documentation.
- 7) For the MODIS simulator, Neil is working the optics and Dzung is working the analog electronics. Planned first cut by end of month.

- 8) Tom is looking at using EM hardware for the PF. The pacing issue is the electronics.
- 9) Integration of NIR by end of month.
- 10) MSAP will be updated to allow integration of quantum efficiency in about one month.
- 11) Jim Young has a question about the typical size of a cloud. He has assumed 70 x 140 km. GSFC will respond.
- 12) Jim believes near-field effects will be greater than far-field effects. The near-field effects include ghosting, scatter, etc.
- 13) A request from John Mehrten of SBRC was answered with the recommendation that the MODIS redundant circuits should not be checked out on orbit.

Thermal

George Daelemans has prepared a memo dated February 22 nd which summarizes results from the Detector/MARS fixture cool down analysis. The goal is to determine if thermal gradients during a rapid transient to test temperatures could have caused the PC detector cracking problem. This analysis should also help to determine if a coefficient of thermal expansion (CTE) mismatch between materials could be a problem. The data will be used by Cherie Congedo in her NASTRAN model of the MARS bar. George included a memo on the detailed thermal analysis from Dan Powers.

In a memo dated February 23rd, George and Dan Powers have reviewed the temperature predictions from their detailed MODIS thermal model in light of design refinements by SBRC. Internal power dissipation and radiator area are reduced. George recommends that SBRC provide several interstage suspension bands for conduction measurements and arrange for measurements of the emittance of thermally critical surfaces. A memo from Dan Powers detailing the changes in the thermal systems model was enclosed.

Finally, George and Dan have made a comparison of the Earth emitted and Albedo fluxes derived for Code 924 and the values used in the MODIS thermal analysis in a memo dated February 23rd. They reviewed data presented by Research and Data Systems Corporation (RDC). As of the memo date, there were no significant predicted effects on MODIS transient thermal simulations based on any of the differences in the RDC computations of earth reflected and earth emitted environmental heat flux data which would be seen on a nadir facing flat surface in the EOS AM orbit.

Mike Roberto

March 11, 1994