

## MODIS Team Meeting Minutes

### Minutes of the MODIS Team Meeting held on Tuesday December 7, 1993.

#### Action Items:

70. Evaluate the thermal design of the Schaeffer Magnetics' motor/encoder. Assigned to Daelemans 8/31/93. Due 10/15/93

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

76. Provide a schedule of the SBRC internal CDRs. Assigned to Bauernschub 10/27/93. Due 11/23/93

77. Transfer review and approval of Class II changes to David Jones. Assigned to Anderson 11/ 2/93. Due 11/16/93 CLOSED 12/ 7/93

78. Recommend details of agreement with SBRC for GSFC access to near-real-time test data. Assigned to Montgomery 11/16/93. Due 12/ 7/93.

79. Consider advisability of bringing bad Readout ICs to GSFC for electrical tests or destructive physical analysis. Assigned to Bob Martineau 11/23/93. Due 12/ 7/93

80. Determine what post-Software Acceptance Review (SWAR) tests need to be done to prepare MODIS for operations during the early on-orbit instrument checkout using macros. This involves determining the following:

- 1.) Who at SBRC is responsible for generating and testing these macros?
- 2.) When will this work on these macros be started?
- 3.) When will these macros be defined?
- 4.) When will these macros be tested?

Assigned to Guenther 11/16/93. Due 12/7/93.

81. Determine use of on-board calibrators during testing and on-orbit. This is a lifetime issue involving motors, diffuser degradation due to exposure to sunlight, and use of calibration bulbs. Assigned to Guenther 11/23/93. Due 12/14/93.

The following items were distributed:

- 1) Weekly Status Report #115
- 2) SBRC Memos submission from week #107
- 3) Minutes of the last team meeting



Joe Banuck, and Mary Dowler. Conclusions from testing to date is that the size of the fillets do make a difference. At the PC detector/motherboard level, the detectors with thin fillets did not crack, the detector with a thick fillet cracked. With the MARS bar invar breakaway plate, detectors with thin fillets and one detector with thick fillet were temperature cycled and did not crack. A thick fillet configuration on MARS bar in stainless steel configuration cracked on temperature cycling. As a further check, SBRC will temperature cycle thin fillet configuration using stainless steel breakaway plate.

The test dewar J-Bar was changed to invar as was the breakaway plate for the MARS bar. The mounting procedure has been changed so the MARS bar is never suspended while being integrated into the test dewar.

SBRC is assuring that the cool down rates for the test dewar are equivalent to bench test dewar cool down and cool down in thermal vacuum and on-orbit. However, it appears the greatest stress is obtained at the steady state cold condition.

The approach now is to assure the detector/motherboard cool down results in sufficiently greater stresses so that PC detectors which do not crack at this level of assembly will not crack at higher levels of assembly.

Cherie Congedo will do a stress analysis of the MARS bar setup for assembly into the test dewar under the original procedure (and assuming it could have been suspended for some reason) to see if this could have been a problem.

There still is concern about the ability of Carlsbad to deliver readout integrated circuits for the PV detectors. Another foundry (Orbit in Sunnyvale, CA) is being considered as a backup. SBRC has used Orbit multiple times in tactical (non-space) defense situations. Orbit is also under contract with NASA on Space Station. It appears that the readout design could be readily converted to Orbit capabilities and processes. The Carlsbad HVCMOS capability is not being transferred from Carlsbad to Newport Beach.

SBRC went to the 5 Volt CMOS (high voltage) in order to meet noise requirements for all the MODIS channels. The detector noise floor of about 200 to 300 micro volts was the driver. At this time, most foundries for CMOS do low voltage integrated circuits (about 2 to 3 volts). SBRC will consider the use of conventional CMOS readouts. However, there are many reasons to stay with the high voltage CMOS readouts, assuming an adequate foundry is available: 1) the design and process for these readouts was proven on the EM 2) the rest of the electronics is designed for these readouts 3) there is nothing inherently more difficult in developing these readouts

There was a discussion with Mary Dowler on December 9th. Mary mentioned that the readouts are going out for destruction physical analysis. Jim Woolaway at SBRC is following up on this.

### **STOP Analysis**

Cherie Congedo has determined that posts between the intermediate stage and the intermediate stage radiator are a major contributor to the cool down shift of the cold focal planes. If the posts were removed, the co-registration error would be reduced by an order of magnitude. Everything would be in spec, even when rssi ed with gravity.

The posts are there to conduct heat from the intermediate stage to the intermediate stage radiator (90%) and for structural reasons (10%).

For Thematic Mapper, several temperature cycles were necessary before the alignment was correct. With the current design, it might be possible to use shims to take out defocus errors. However, adjustment in the plane of the cold detectors may be difficult (possibly tapered shims).

It seems reasonable to Cherie and me to look into modifying the means of getting the heat to the radiator and providing structural support or making another design change to minimize the loads which cause the rotation of the cold focal plane on cool down.

### **Contamination Concerns**

June Tveekrem has written notes on the dry run of the CDR in a telemail message dated December 3rd. Here are some of her contamination concerns:

- 1) Electronics not being baked out except at the board level before seeing thermal vacuum at the full up system level.
- 2) Thermal vacuum area not a clean room
- 3) Bagging material may not be kept clean
- 4) Thermal vacuum test chamber in bonded storage area - store only cleanroom-compatible materials there, store them on clean metal shelves, and isolate the storage area from the thermal vacuum area with plastic walls made from cleanroom-compatible plastic; better approach do not have bonded storage there.
- 5) Cracks in tiles on the floor could hold dirt - use smooth epoxy coating instead or paint floor

### **Orbit for Readouts**

Les Thompson believes GSFC should do an audit of Orbit before relying on that foundry for our readouts. About five years ago, orbit was a small operation which did mostly prototypes. The audit team would involve engineering, quality assurance, and business people.

### **Optical Design**

In putting in the details for index of refraction as a function of temperature, Qian Gong determined that the index of refraction value used for the CdTe lens designs was for 20K rather than 300K. Preliminary indications are that the effect on image quality is significant, increasing the image size by about an order of magnitude. Qian, Gene Waluschka, and Tom Kampe are looking into this problem. Tom believes some despadding of components will solve the problem. Qian has done some preliminary design work with radius of curvature changes.

Mike Roberto

December 9, 1993