

Responses to Comments from Formal Review Teams

AM-1 Land Data Products

Requires stronger Cross-calibration plan for in-flight vicarious calibration	-Slater Plan not presented at this review; it is designed exactly along these lines -Plans will be developed to do comparisons of simultaneously observed scenes
Too much jargon in ATBD	-1996 ATBD Version will be much easier to read
Requires more complete validation strategy	-will have at least one science man-year in FY97 to develop and begin implementation of validation strategy

Written Comments - Joe Kline/(Anonymous)

Improve clarity, conciseness accuracy and completeness	-ATBD '96 is being developed by newly focused team efforts (Product Improvement Team, integrated vertically) with specific direction to avoid problems such as those identified here.
Move SRCA to off-line from production processing strategy	- This recommendation has been instituted in response to a recommendation at the Software Critical Design Review for Version 1. The ATBD will be adjusted accordingly as well.
Present uncertainty budgets of vicarious calibration approaches in the ATBD	-The ATBD '96 has a set of uncertainty budgets better focused on the product using measured uncertainty values of the parameters in the calibration equations. We will add the requested information in the Validation Plans as they are developed, but it will not be implemented for the ATBD '96.
Raise program priority and resources available for pre-launch calibration and characterization data collection and analysis	-These priorities are developed with careful review and consensus with the Science Team Leader and his representatives.
Provide specific performance characteristics referenced to the performance specifications.	-File Format identifies two error/uncertainty indices. One is the "flat-field" index for uncertainty and the other is the "dynamic" uncertainty index designed to estimate errors from high contrast scenes due to near-field and far-field effects.
Requires additional details, plans and test results to demonstrate robustness and improve confidence; find the will and resources to fully calibrate and characterize sensor on the ground.	-Robustness of algorithm approaches have been specifically identified and will be published. -Resources to optimize ground calibration and characterization are applied through tracking of parameters needed for algorithms in "cross-walk" format; Science Team has advised on needs to satisfy Level 1 (HQ) requirements, but not all desired characterization will be accomplished.

Written Comments - Palluconi

- Useful for geometric and radiometric aspects to be covered in same document. -These products developed by different support team, the Science Team has asked MCST to watch that development.
- Provide scientific basis for uncertainty estimates. -This will be done by the time we get to flight. Version 2.0 software will be delivered before the AM-1 sensor has completed thermal/vacuum, testing so earlier error estimate can not be based on subsystem and component test results.
- Use of SRCA measurement modes not adequately described. -These data will be processed off-line, and their inclusion into the MODIS Level 1 product and metadata are part of the Validation Plan. The strategy for Validation was presented at this Review, but more detailed plans are entwined in the Validation/Algorithm Update Workshops with the Science Team, and are not complete at this time. Development of an improved Validation Plan in 1997 should address this concern.
- Will pre-flight testing produce a matrix of instrument values for (the ir detector non-linearity) "alpha" which will bound the flight conditions? -Yes. The current test plan, the expected flight conditions are bounded.
- Describe the compromise between table size and computational speed to meet required accuracy in software design. -We will identify these compromises and trade-off in the software CDR in December.
- Improve nomenclature. -Agree.
- Level 1B ATBD Reviews may not reasonable fit review schedules for Level 2 Products. Recommend separate review of next ATBD Release. -The MODIS Science Team reviews the major components of each algorithm development (in Audits) and then has the opportunity to review and comment on the ATBD as produced. If members of the Review Panel are interested, we can make that document available to them during this review cycle for the (each) coming ATBD document.
- Provide physical description of the major uncertainty components. In particular, why is mirror reflectivity uncertainty major error source for band 24 but negligible for band 20. -Uncertainty budgets will be described more clearly in future ATBDs. Mirror reflectivity uncertainty is more important for scenes which are much colder than the on-orbit sensor temperature.
- Provide clear description of assumptions and choices made in developing algorithms. -Agreed. This needs to be done to provide complete uncertainty budgets.
- Reference directly the testing and calibration of the flight instrument. Can some of the test data be used as a test case for the algorithms? -The ~ATBD '97 documentation will include the recommended material. The strategy for production parameters and uncertainty budgets provided during this Review establish a paradigm into which the recommended data descriptions can more easily be fit than was the case for previously briefed designs. Actual MODIS test and calibration data will be used in these analyses.

Validation Plans must be better described.

-Agreed, and this will be done better during FY97 research and development.

Written Comments - Lee

Provide detailed schedule for delivering code to the DAAC.

-This delivery schedule for getting code to the MODIS Science Data Support Team (SDST) has been provided. The delivery from the SDST to the DAAC involves a minimum of four months rehosting and testing. The Version 2.1 delivery, which is our flight operations code is due to SDST in November 1997, and they will get it to the DAAC by COB February 1998 for a June 1998 launch. We are at risk for meeting this November 1997 if the sensor T/V testing is not complete before April 1997.

Written Comments - Johnson

Not possible to assess robustness of data products until test data evaluated for sensor characterization and calibration.

-Uncertainty analysis and production parameter configuration control strategies designed to focus and highlight concerns identified here. We do not know how well we will accomplish our objectives until we get the referenced test data, but we will have clear understanding of our weaknesses at that point.

Dislike approach that evaluates instrument-performance-by-committee.

-We do not use that approach. The proposed changes (indeed, call them improvements) in calibration and characterization after launch will be evaluated by committee, but their input will focus on the impact changes will have on their Level 2 algorithms. The Validation/Algorithm Update Workshops will lead to recommendations. The actual implementation of Updates is the responsibility of the MODIS Characterization Support Team, working for the Team Leader. We will be guided by the workshop recommendations, but the responsibility for accomplishment and success resides with MCST.

Problem of mirror emissivity/reflectivity was pointed out in the literature in 1982. A special space-craft maneuver is required.

-Unfortunately, we were not current on our literature search. In any case, with perfect hindsight, we do not know of a better alternative mirror coating design for a spectral range of 0.4 micrometers to 14.5 micrometers. We now believe we are assured of getting the needed maneuver.

Develop end-to-end uncertainty budget with various OBC results integrated into that analysis.

-This is a good goal. We will consider this after we understand our test program, and the test data it provides, and after we have a better understanding of the source of parameters for our production processing. This recommendation is needed as part of designing our final flight operations strategy as well..