

MODIS Calibration & Characterization Report

Status of Calibration-Related Action Items

By

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MODIS Calibration Working Group Meeting
NASA/Goddard Space Flight Center (GSFC)
Building 22, Room 365
Greenbelt, MD 20771

28 September 1993

MCST Action Items

- 1) Band 29 Filter Approval Study
- 2) Potential OBC Calibration Frequencies (On-Orbit)
- 3) Proposed Calibration ATBD Science Team Review
- 4) Proposed Calibration ATBD and Calibration Peer Review
- 5) Action Items from March Science Team Meeting
- 6) Items Being Tracked Since March, 1993

BAND 29 STUDY

TASK

Evaluate acceptability of 2 different filter wafers for Band 29

Wafer A: Center Wavelength 5 nm beyond Specification tolerances,
Lower Edge Range 31.5 nm beyond Specification

Wafer B: Lower Edge Range 66 nm beyond Specification

METHOD

Compared to Ideal Filter

Examined Sensitivity to Spectral Shift

Examined Effects due to Out-of-Band Radiance

RESULTS

Wafer B and Wafer A show similar sensitivity to potential after-launch wavelength Shifts

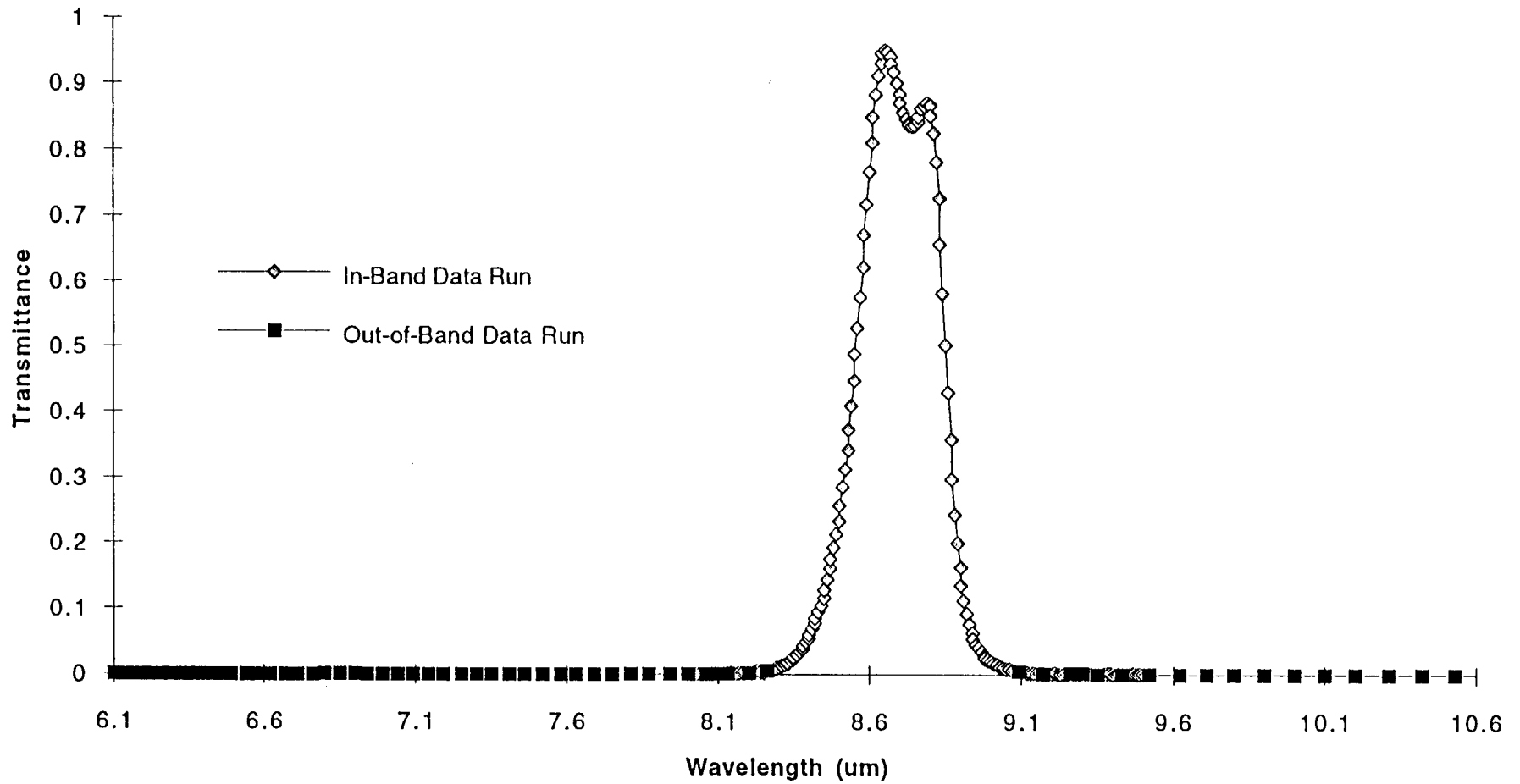
Wafer B displayed shifts/radiances comparable to Ideal Filter

Out-of-Band Radiance contributions minimal

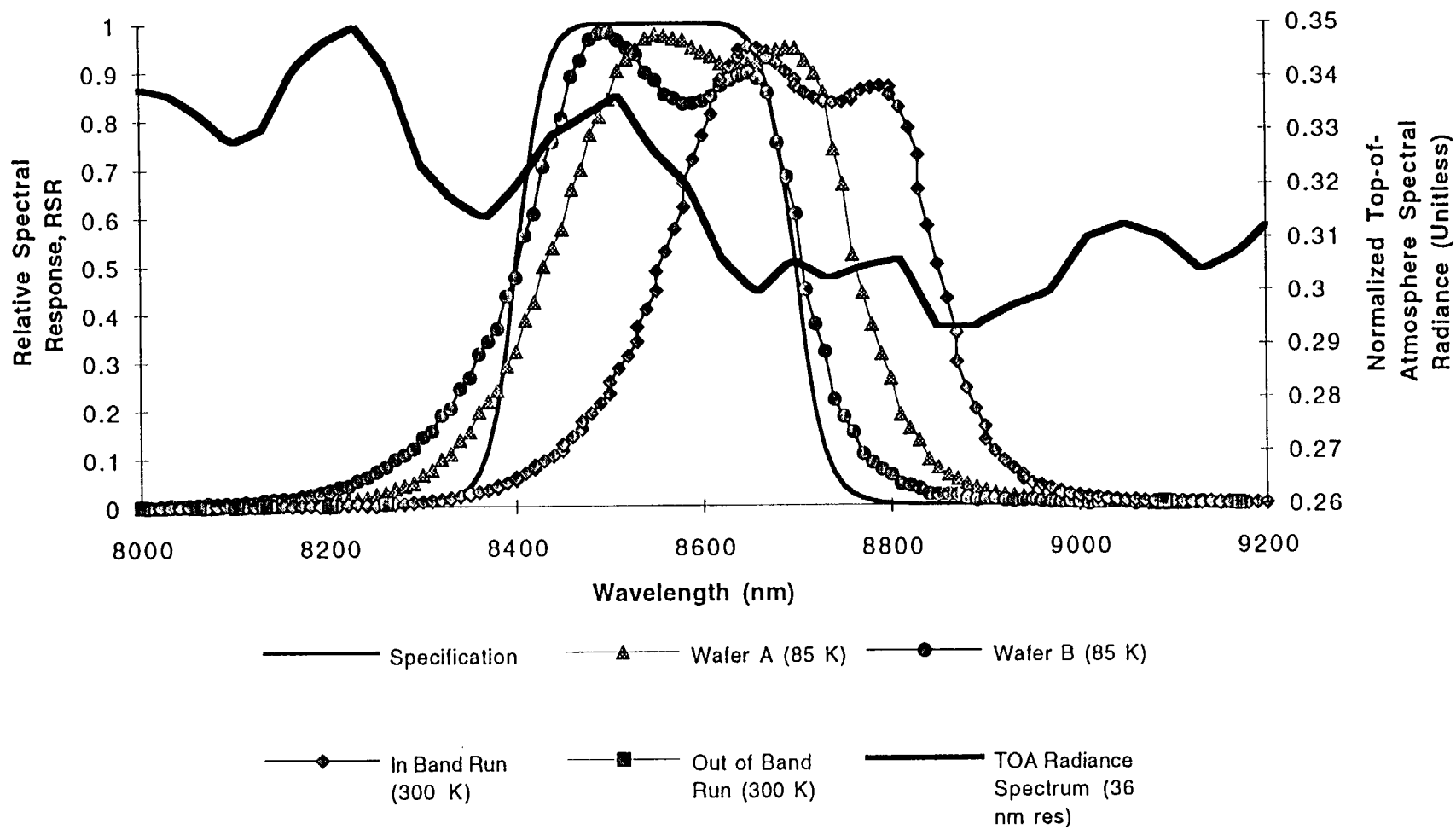
CONCLUSION

Wafer B deemed acceptable

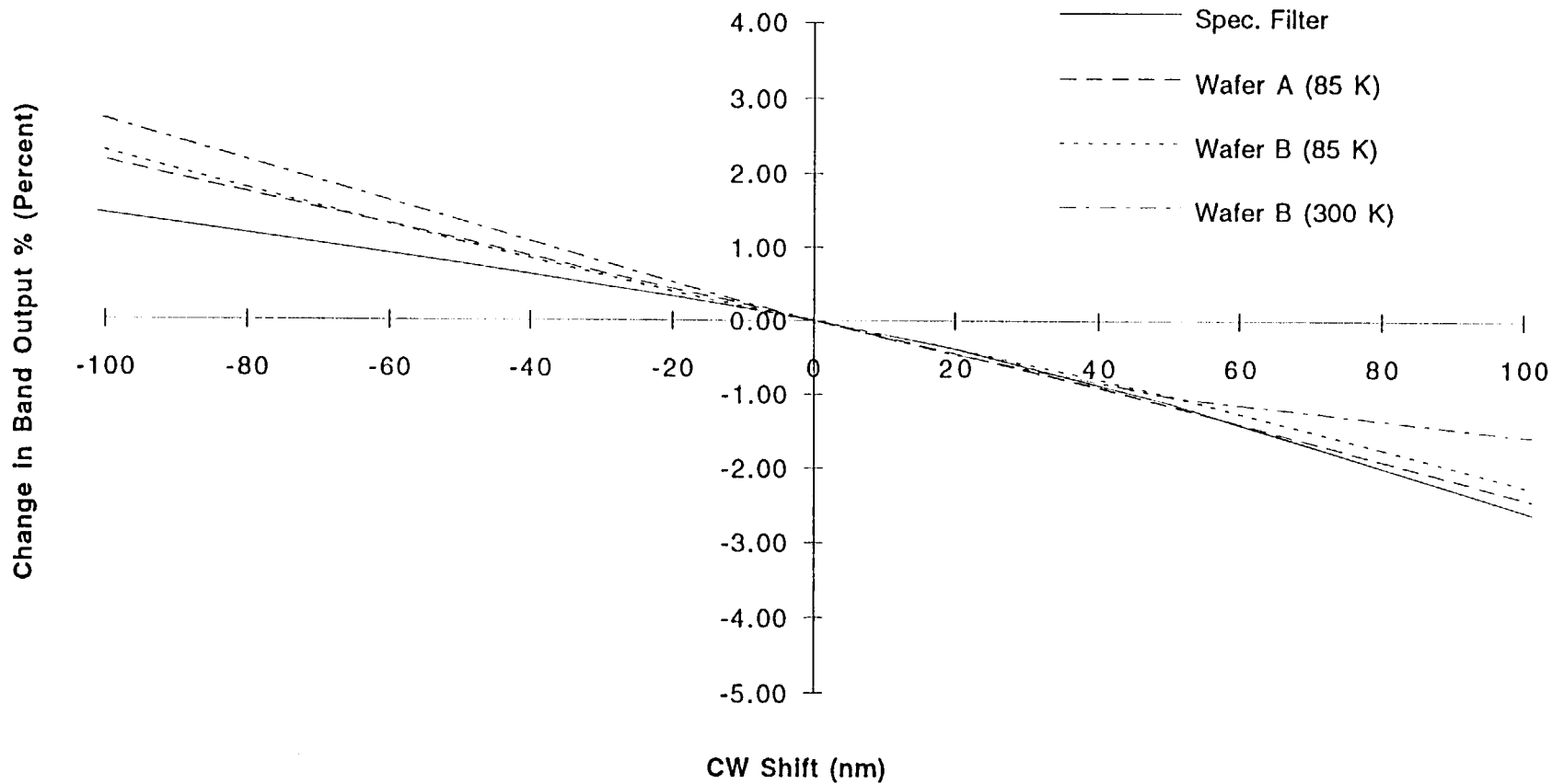
Band 29 Transmittance (Ambient Run)



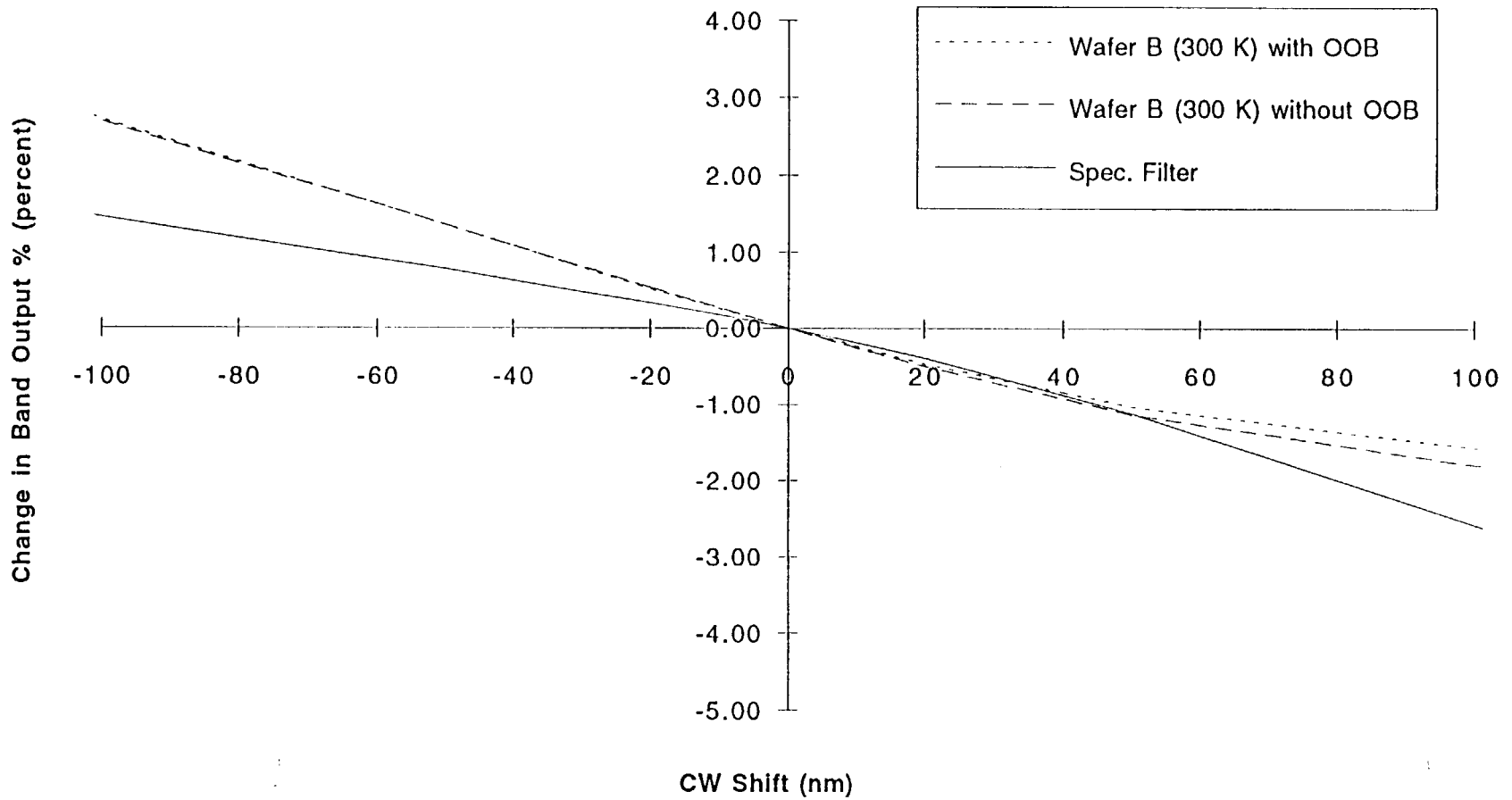
Band 29 with TOA Radiance Spectrum



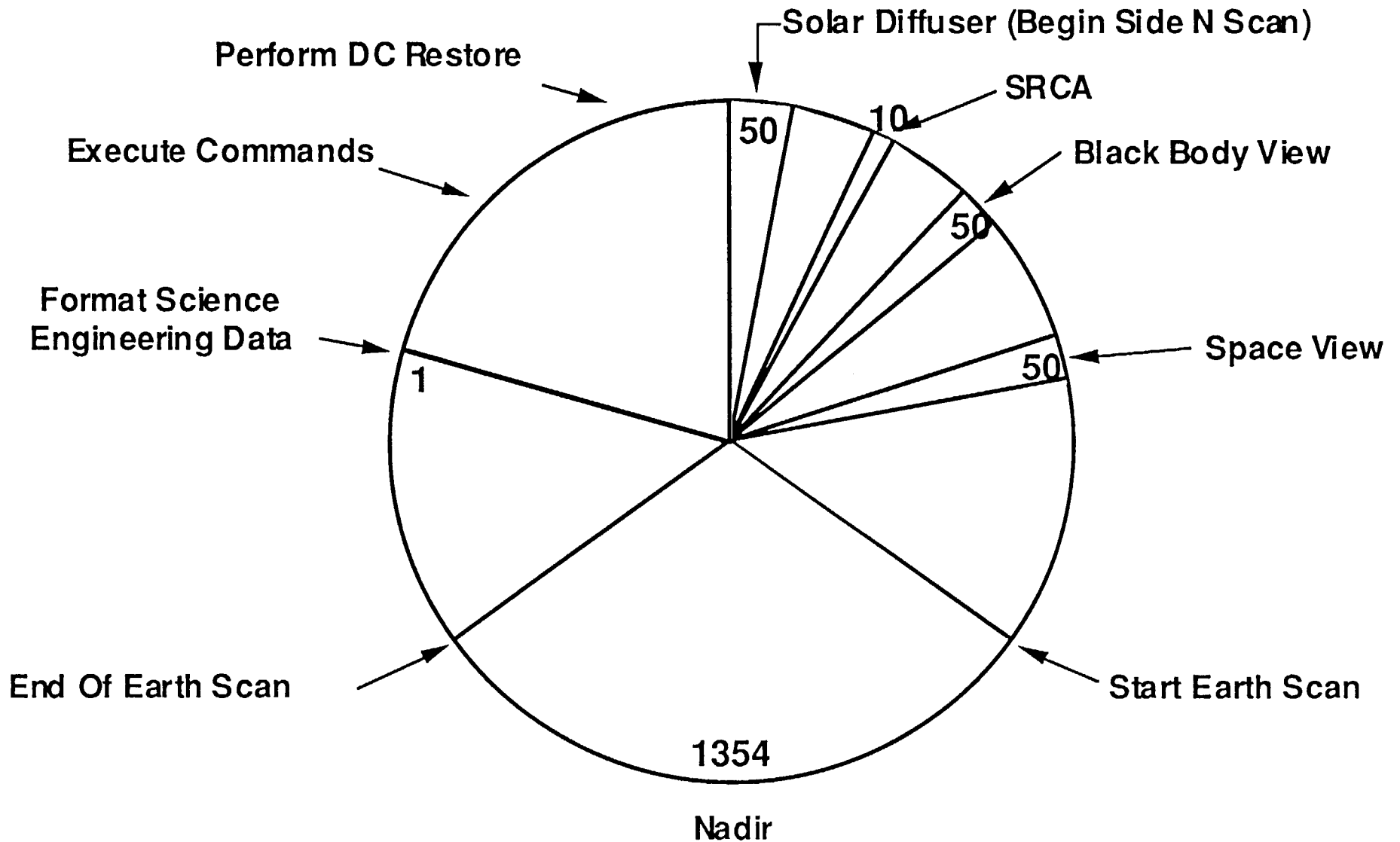
Change In MODIS Band-29 Output due to Shift in Center Wavelength
(Spec. CW = 8550 nm, CW Tolerance = 43 nm)



Change in MODIS Band-29 Output due to Shift in Center Wavelength



Operational On-Orbit Collection of OBC Data (Frames Per Scan)



Potential On-Orbit MODIS OBC Calibration Frequencies*

<u>Instrument Specification</u>	<u>Characterization</u>	<u>Duration</u>	<u>Frequency</u>
Radiometric			
Reflective Bands 2% reflective 5% absolute	SD/SDSM SRCA Radiometric Mode All Lamp Levels <i>level subset</i> <i>1W bulb</i>	3 min @ NP 17 min 4-17 min continuous	1/orbit 1/month 1-20/month 5-20% mission life
Thermal Bands 1% absolute	BB and SV Elevated BB (315 K)	continuous 100 min	every scan 1-10/year
Spectral			
CW +/- 1 nm shortest band, scales linearly with λ to 1 μm . BW (less accurate)	SRCA Spectral Mode Bands 1-19,26 <i>band subset</i>	75 min 10-75 min	1/month 1-5/month
Geometric			
Band-to-Band Registration 0.2 IFOV req., 0.1 IFOV goal MTF	SRCA Geometric Mode both directions <i>one direction</i>	37 min 18.5 min	4/year 1-6/year

MODIS Science Team Review of Calibration ATBD

Option #1	Thursday/ Friday	7-8 October	11-5, 9-5	
Option #2	Tuesday/ Wednesday	12-13 October	9-5, 9-5	(Monday is a Holiday)
Option #3	Tuesday, Wednesday	26-27 October	9-5, 9-5	

MODIS Instrument CDR:

6-10 December 1993

MODIS L-1 Cal ATBD and Cal Plan Peer Review:

2nd Quarter, 1994

Action Items MODIS Calibration Working Group

23-March-93

1. To MCST: Carry forward to Project the recommendation that SBRC perform thermal analyses on the operation of the SRCA for duty cycles greater than 20%. It is desired by MCST that an extensive checkout of the SRCA be performed following launch to ensure its operability and stability.

STATUS: DONE

2. To MCST: Carry forward to Project the recommendation that SBRC examine the possibility of using the solar diffuser every orbit. Use of the solar diffuser every orbit for a period of time following launch will ensure rapid transfer of the calibration of the SRCA to the solar diffuser and will minimize the chances of component failure affecting this calibration transfer.

STATUS: In L-1 Cal ATBD Document

3. To MCST: Carry forward to Project the request that a contamination monitor be flown. Information from the contamination monitor will be extremely valuable in determining the operating times at which contamination will be minimized.

STATUS: Dropped

4. To MODIS Discipline Groups: Provide the specific radiometric, spectral, and geometric requirements placed on MODIS performance by your data products.

STATUS: Open

5. To J. Barker, P. Slater: Provide B. Guenther information on how the following items shall be accomplished: 1) the calibration methodology used in generating the MODIS Level-1A algorithm, 2) the MODIS calibration plan, and 3) the MODIS calibration peer review process.

STATUS: Done

Items Being Tracked by MCST Since March, 1993

1. Present issue of allowing MODIS to view the Moon at near 0° phase on a monthly basis. Response anticipated from Project.

STATUS: Martin-Marietta starting EOS-AM1 feasibility study.

2. MODIS day/night duty cycle (40:60 changed to 50:50). Response anticipated from Project.

STATUS:

3. IR Filter Radiation degradation. Response anticipated from Inrad.

STATUS: No Significant Change.

4. Narrow band filters at longer wavelengths "present increasingly greater difficulty in registering channels" (Figoski, SBRC). Issue if within-band spectral striping calibration priority. Response anticipated from SBRC.

STATUS: Open.

5. Dichroics show considerable transmittance structure and a large polarization contribution and variation (Figoski). Issue is analysis of effect on MODIS Products. Response anticipated from SBRC.

STATUS: Open

MODIS MCST Calibration and Characterization Issues

From 23-26 March, 1993 CWG/MST Meeting

- ✓ • Generate Calibration Algorithm Theoretical Basis Document (ATBD) by July 31, 1993
- Delivered:

Version 0 Preliminary DRAFT June 30, 1993,

Version 1 DRAFT July 31, 1993,

Version 1 FINAL Sept 3, 1993.

- ✓ • Schedule Periodic Calibration Algorithm Review Panels separate from Cal WG/MST.-
Review implemented via ATBD DRAFT distribution. ✓

- ✓ • Evaluate Ghosting Correction in Software - On-Going.

- ✓ • Modify Plans or verify ability of data users to obtain all spectral Calibration samples
from SRCA. - Established procedure to receive 18 to 20 samples.

- ✓ • Review SRCA spectral calibration - SBRC to generate new plan. *did*

- ✓ • Calibration plan status - inputs obtained from 6 of 10 authors. [^]