Calibration Report: Spectroradiometer
s/n: 6207
ECN: 2008990

30 June 2003

Bryan Fabbri
Analytical Services & Materials, Inc.
Hampton, Virginia

SUMMARY

Calibration date: 12 May 2003 Next Calibration due: 12 May 2005

A collection, analysis and calibration of data from Analytical Spectral Devices, Inc. (ASDI), Full Range Fieldspec Radiometer, has been completed. The calibration was performed by the manufacturer, ASDI. These data were collected by ASDI, on 12 May 2003.

Model: FR
Serial Number: 6207

The instrument response files for each foreoptic are installed on the computer operating the instrument. Instrument response files are as follows: **Ni62073.RAW, 1i62073.RAW, 5i62073.RAW, 8i62073.RAW, 18i62073.RAW, COS62073.RAW**.

Irradiance Standard Vendor, Lamp number and File Name, used for Irradiance and Radiance calculations: *Optronic Laboratories, Lamp F627,* **LMP62073.ILL**

Reflectance Standard Vendor, Standard ID, and File Name, used for Radiance calculations: *Labsphere, Target #12137–A,* **BSE62073.REF**

Application: The instrument response files are utilized by the computer operating the instrument at the time of data collection.

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Website: www.asdi.com

SPECTRORADIOMETER CERTIFICATE OF CALIBRATION

UNIT AND CALIBRATION NO.: *FSFR 6207/3*

CALIBRATION DATE: *5/12/03* **LAMP NO.:** *F626* **PANEL NO:** *12137-A*

Applicable entries:

☑ Wavelength ☑ Radiometric

Foreoptics:

☑ Bare Fiber	☐ 3 Degree	☐ 10 Degree	☐ Jumper
☐ 1 Degree	☑ 5 Degree	☑ 18 Degree	☐ Jumper with RCR
☐ 2 Degree	☑ 8 Degree	☑ RCR	

All calibrations have been performed according to Analytical Spectral Devices' accepted procedures, using verifiable NIST-traceable irradiance, reflectance and wavelength standards.

Calibration data resides on the ASD instrument's controlling computer's hard drive and/or the controlling software system disk. Instrument response files: ***Ni62073.RAW, 5i62073.RAW, 8i62073.RAW, 18i62073.RAW and Cos62073.RAW.***

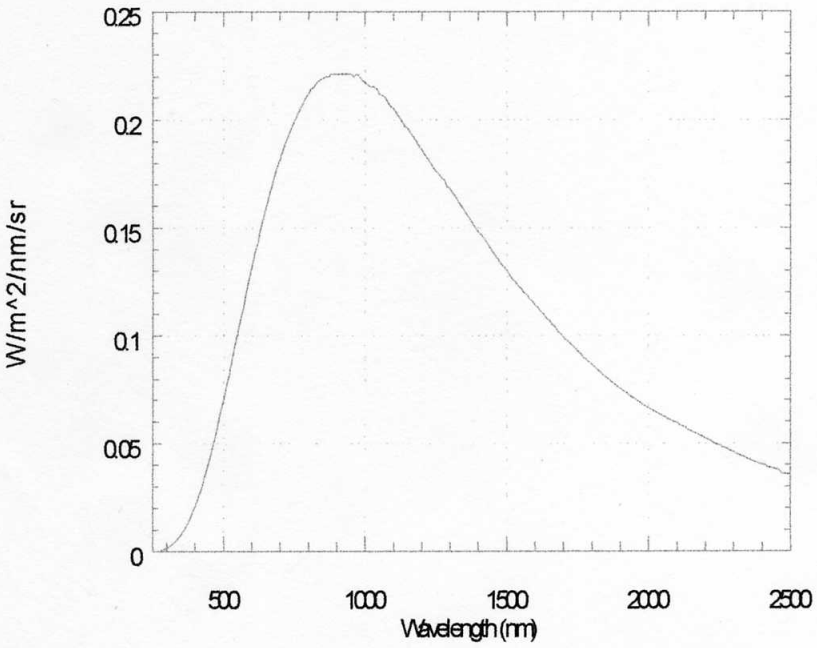
Irradiance Standard Vendor, Lamp number and File Name, used for Irradiance and Radiance calculations: *Optronic Laboratories, Lamp F626,* ***LMP62073.ILL***

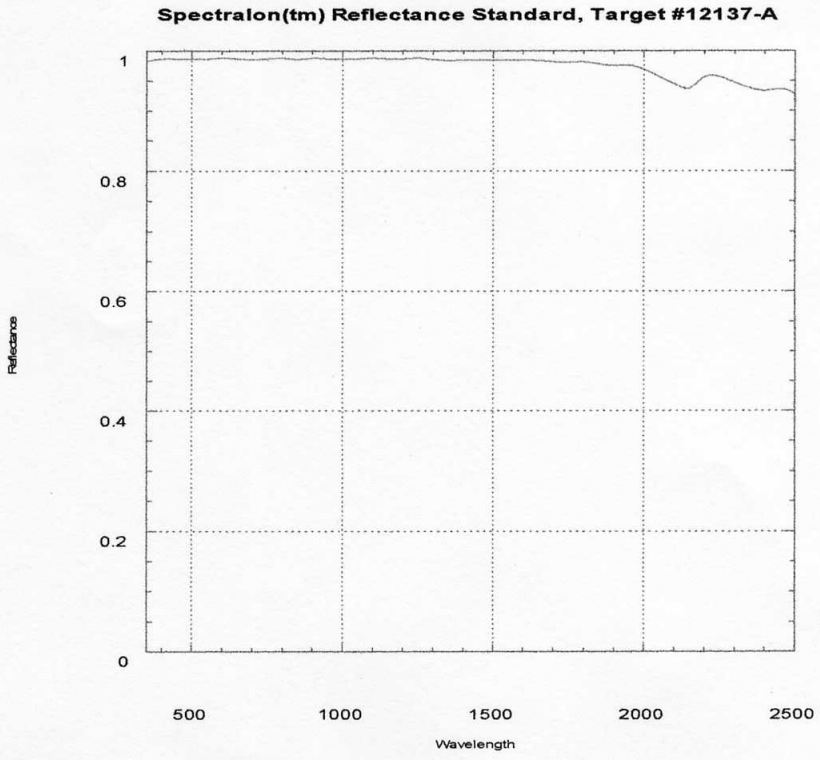
Reflectance Standard Vendor, Standard ID, and File Name, used for Radiance calculations: *Labsphere, Target #12137-A,* ***BSE62073.REF***

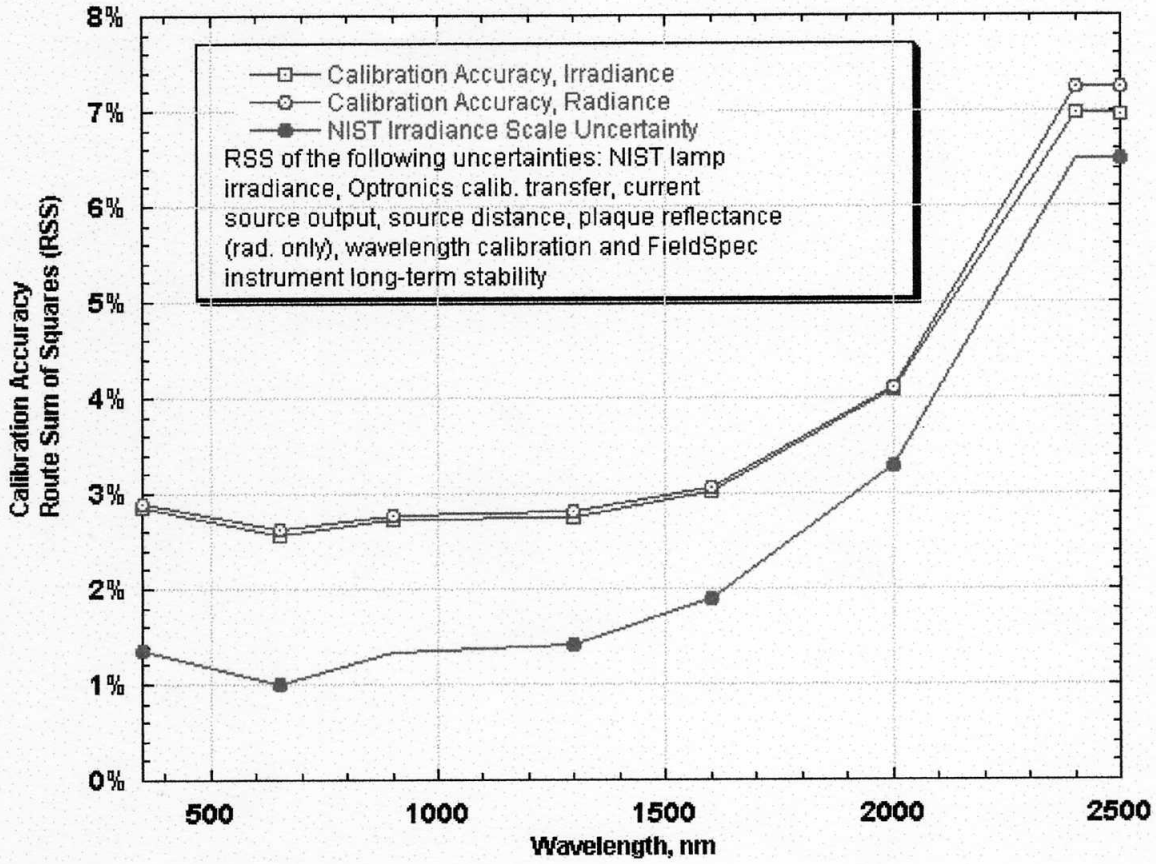
ASD Certified Calibration Engineer/Technician:

Signature Margaret C Hulbert Date 5/30/03

Optronics Laboratory 1000 Watt Irradiance Standard, FEL-626





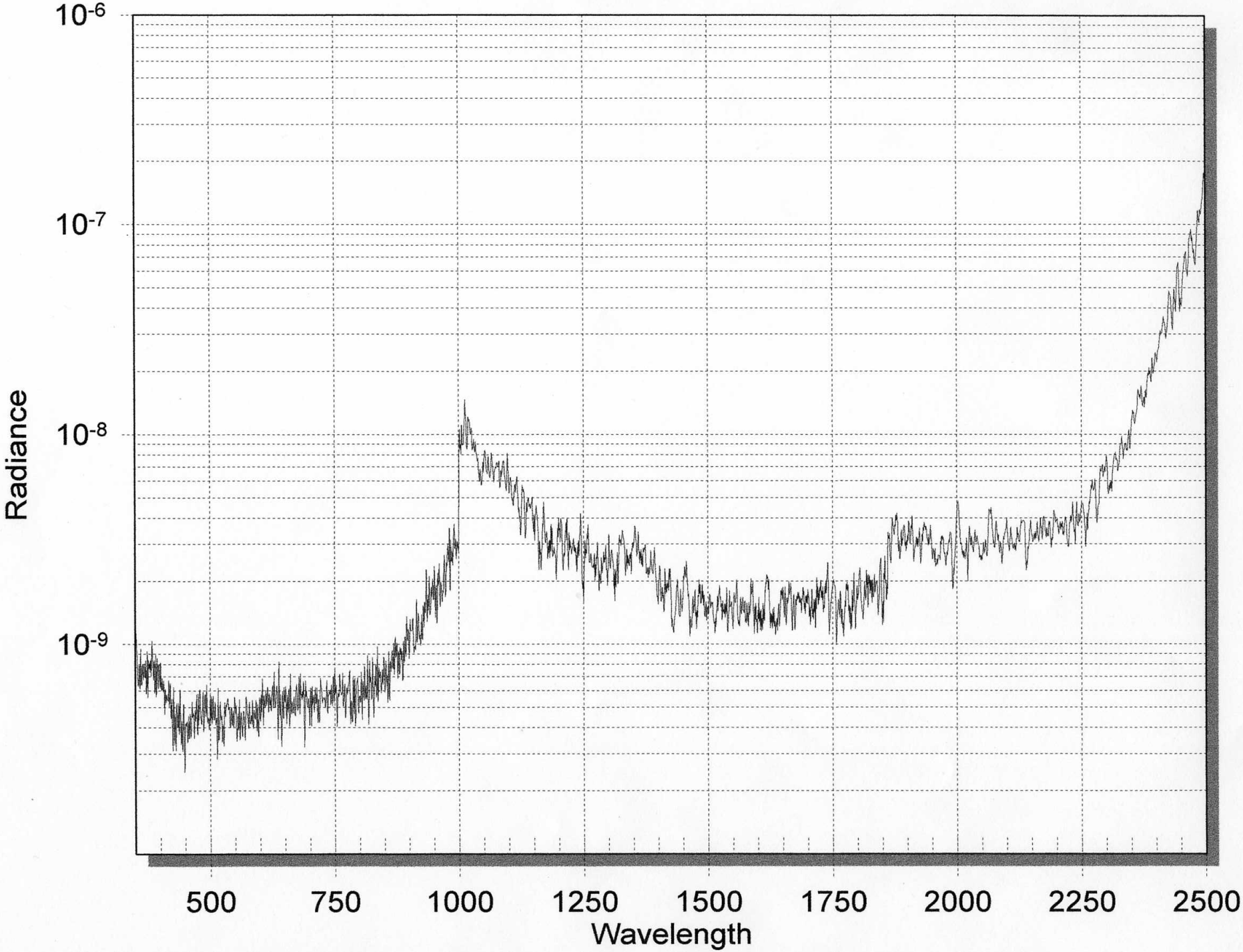


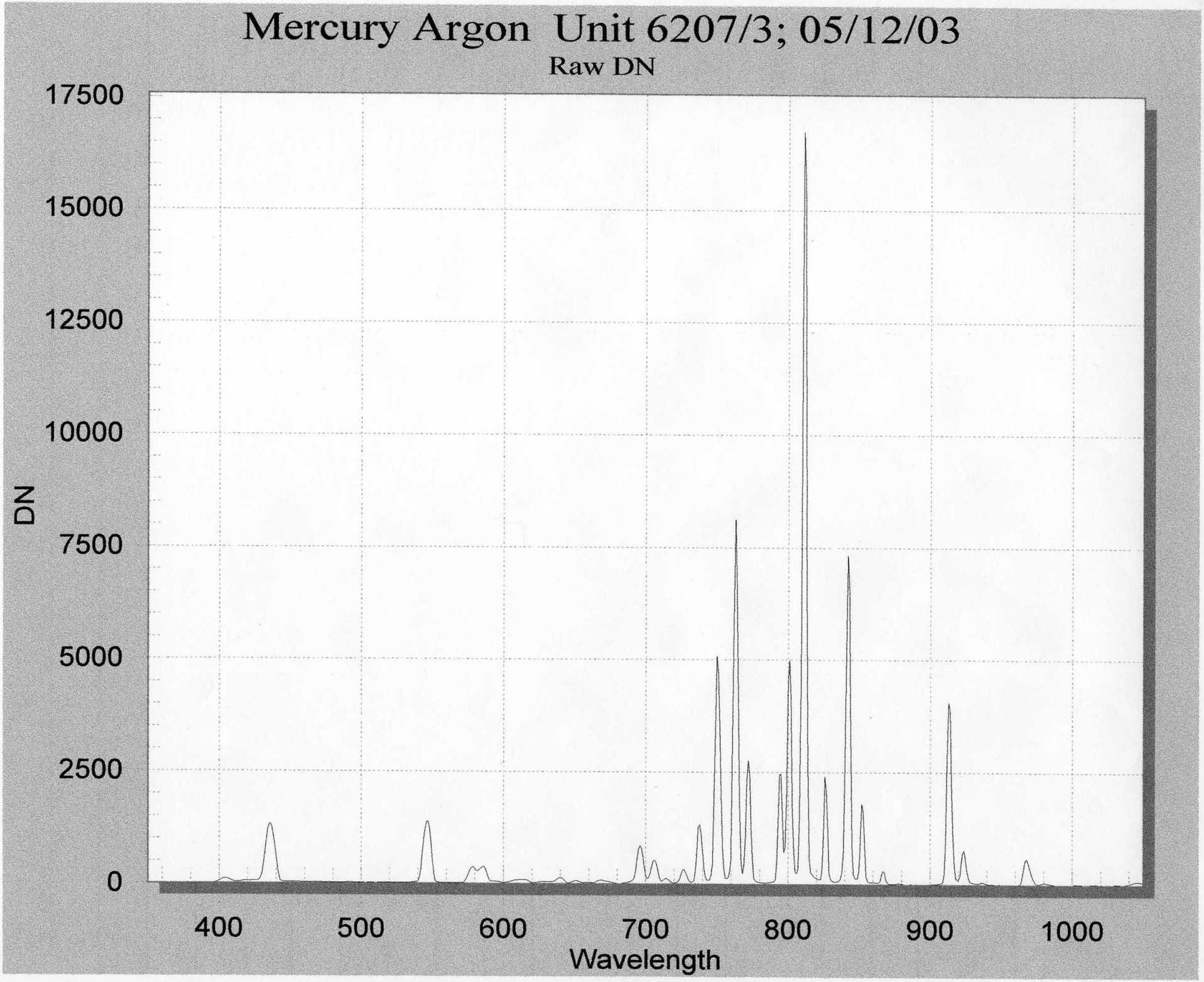
Calibration Accuracy Calculations

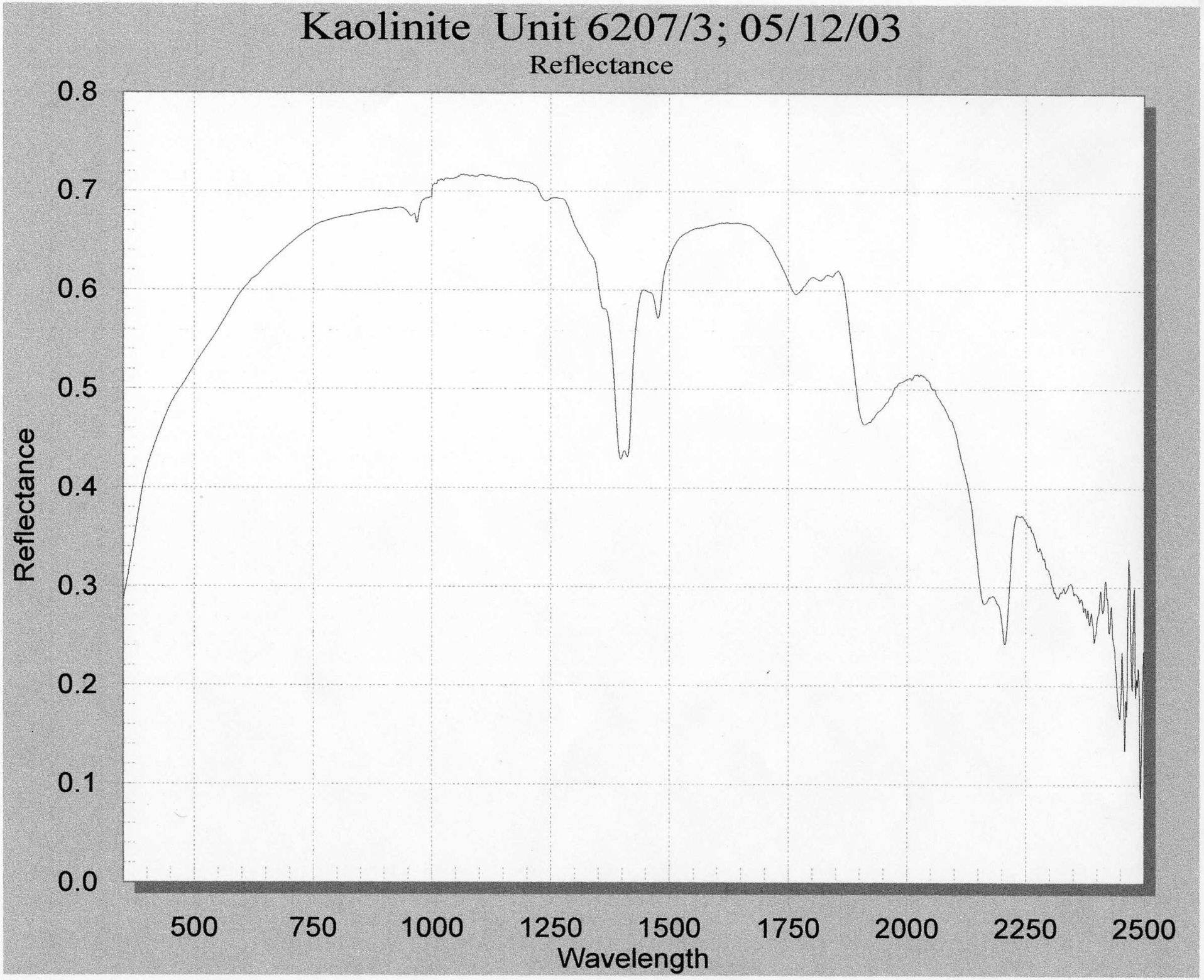
λ nm	NIST	Optronics Transfer	.1% Current Error	2mm Position Error	λ cal.	RSS Non Inst.	FR	Irr. RSS	Labsph. Refl.	Rad. RSS
350	1.35%	0.70%	0.75%	0.80%	2.50%	2.04%	2%	2.85%	0.50%	2.90%
654.6	1.01%	0.40%	0.40%	0.80%	0.88%	1.62%	2%	2.57%	0.50%	2.62%
900	1.34%	0.50%	0.35%	0.80%	0.20%	1.86%	2%	2.73%	0.50%	2.77%
1300	1.42%	0.50%	0.30%	0.80%	0.04%	1.91%	2%	2.76%	0.50%	2.81%
1600	1.89%	0.50%	0.20%	0.80%	0.04%	2.27%	2%	3.02%	0.50%	3.06%
2000	3.29%	0.75%	0.14%	0.80%	0.04%	3.56%	2%	4.08%	0.50%	4.11%
2400	6.51%	1.00%	0.14%	0.80%	0.04%	6.68%	2%	6.98%	2.00%	7.26%
2500	6.50%	1.00%	0.14%	0.80%	0.04%	6.67%	2%	6.97%	2.00%	7.25%

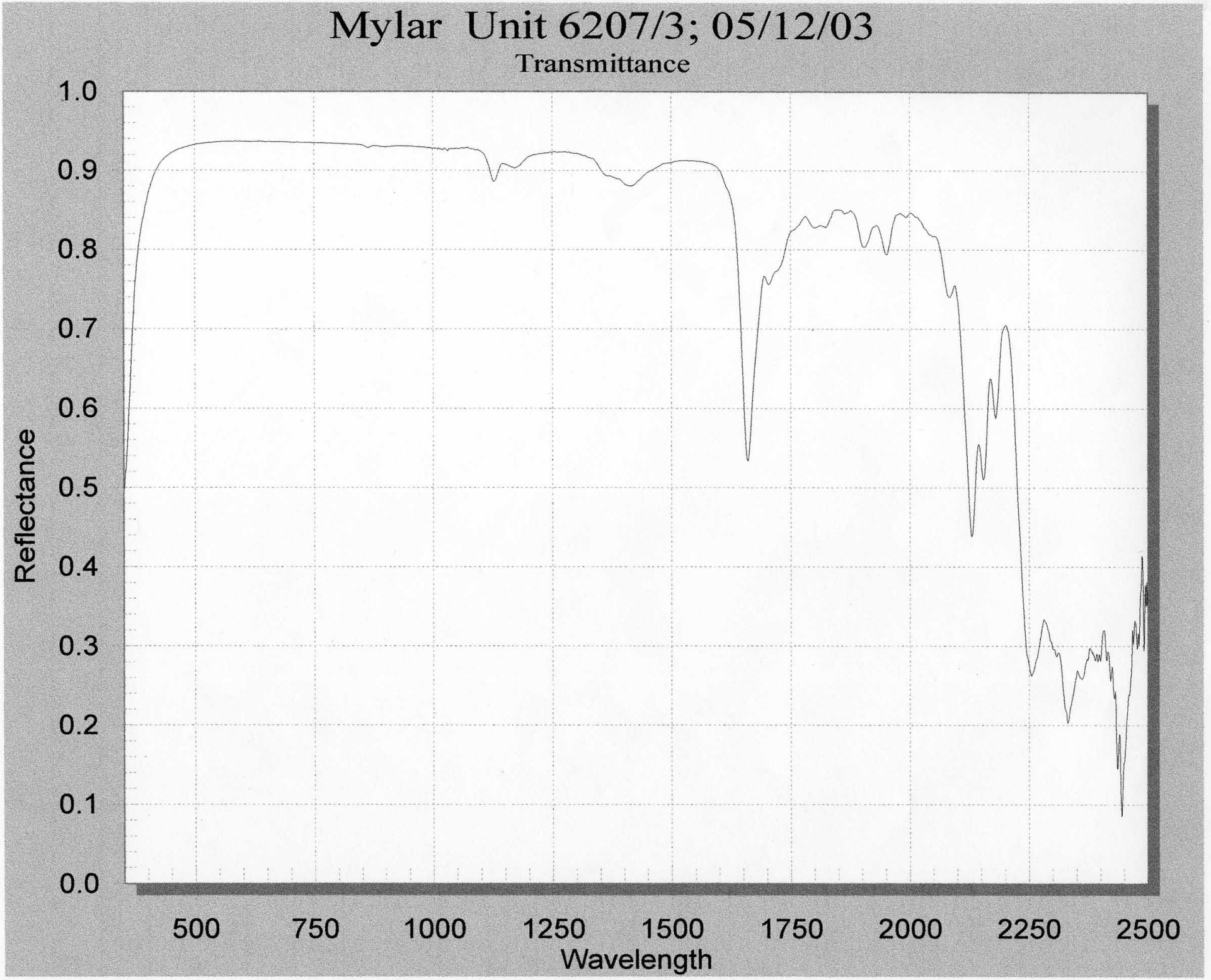
NEdL Unit 6207/3; 05/30/03

W/cm^2/sr/nm




Mercury Argon Unit 6207/3; 05/12/03
Raw DN
17500
15000
12500
10000
7500
5000
2500
0
DN
400
500
600
700
800
900
1000
Wavelength


Kaolinite Unit 6207/3; 05/12/03
Reflectance
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Reflectance
500
750
1000
1250
1500
1750
2000
2250
2500
Wavelength


Mylar Unit 6207/3; 05/12/03
Transmittance
Reflectance
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
500
750
1000
1250
1500
1750
2000
2250
2500
Wavelength

Instrument Information

Unit # : 6207 Cal # : 3
SO # : C993740A RMA # : 1142
PC Make: NEC
SN # : 74009951
Operating System: DrDOS

	Computer Boot & Setup
②	AC Power up sequence
②	Processor speed
NA	Ram
NA	Hard Drive
NA	Display Settings Cleared
②	Parallel Port Mode: Bi-directional
②	Power Savings Turned Off
NA	Install ViewSpec Pro supplied diskettes
②	Install RS^2
NA	Black and white option
NA	Install Technical Guides

	FieldSpec Power
②	Power on
NA	Battery status light
NA	Battery power

	Software and System Operation
②	Optimization
②	Vnir Noise level
②	Swir Noise level
②	White reference
②	Masked pixels
②	Shutter operation
②	NEdL
②	Radiometric tests - VS Pro & Realtime
NA	CD/Floppy drive test - transferring files
②	Spectrum save features - multiple
②	ForeOptic check

	Wavelength Checks
②	Mylar transmittance, 14 mil thicknes
②	Kaolinite sample reflectance
②	HgAr in DC corrected Raw Digital Numbers

	Configuration File - ASD.INI
②	Calibration number
②	Start/Step
②	Masked pixels listing
②	Foreoptics listing

	Shipping
②	QA plots: Mylar, Kaolinite, HgAr, NEdL
②	Final cal data re-installed and backed up
②	RS^2 Software Package Ver. 2.16
②	ViewSpec Pro Software Package Ver. 3.09
N/A	Special Release Notes, if applicable
②	Radiometric Calibration Certificate
	lamp #: F627 panel #: 12137-A
②	Packing list printed
②	Packing list matches Sales Order
②	Label computer, disks, p-grip

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FieldSpec Full Range

Quality Assurance Certificate

This document certifies that the instrument listed meets Analytical Spectral Devices, Inc. standard of quality. The instrument has passed and completed all tests and procedures listed and has been found to meet or exceed the following specifications.

Spectral Range: 350-2500nm
Spectral Resolution: 3nm at 700nm
10nm at 1400nm and 2100nm
Scanning Time: 100ms
Sampling Interval: 1.4nm at 350-1050nm
1nm at 1000-2500nm
Wavelength Accuracy: ± 1nm
Noise Equivalent Radiance: 1.4E-9 W/cm^2/nm/sr at 700nm
2.4E-9 W/cm^2/nm/sr at 1400nm
8.8E-9 W/cm^2/nm/sr at 2100nm

Comments:

Date: 5/12/2003
Quality Assurance Signature:

Margaret C Mahan