STEREO

IMPACT

FM2 SWEA/STE-D Thermal Vacuum Test Report

IMPACT-SWEA-FM2-TVac-Report.doc
Version A – 2005-May-19

David Curtis, UCB IMPACT Project Manager

Document Revision Record

Rev.	Date	Description of Change	Approved By
A	2005-May-19	Preliminary Draft	-

Distribution List

Dave Curtis, UCB
Jeremy McCauley, UCB
Lil Richenthal, GSFC

Table of Contents

1. Overview

1.1. *Introduction*

The Solar Wind Electron Analyzer and Supra-Thermal Electron Detector (Downstream) (SWEA/STE-D) is the part of the STEREO IMPACT instrument suite. It resides at the end of the IMPACT boom.

This document describes the results of the thermal vacuum testing performed on the FM2 SWEA/STE-D unit. This testing was performed at U.C. Berkeley following the test procedure called out in reference 1. The FM1 thermal balance test has a separate test report (see reference 4).

The SWEA/STE-D FM2 unit has satisfactorily completed its thermal vacuum test program and has met all of its requirements spelled out in reference 1 and 2. Bakeout results are still under investigation.

1.2. *Applicable Documents*

The following documents are closely interrelated with this specification. All documents can be found on the Berkeley STEREO/IMPACT FTP site unless otherwise indicated:

http://sprg.ssl.berkeley.edu/impact/dwc/

1. SWEA and STE-D Revised Test Plan1
2. APL Document APL 7381-9003 Rev A – STEREO Environment Definition, Observatory and Instrument (on APL web site)
3. IMACT-SWEA-CPT
4. BOOM_SWEA_TEST_REPORT

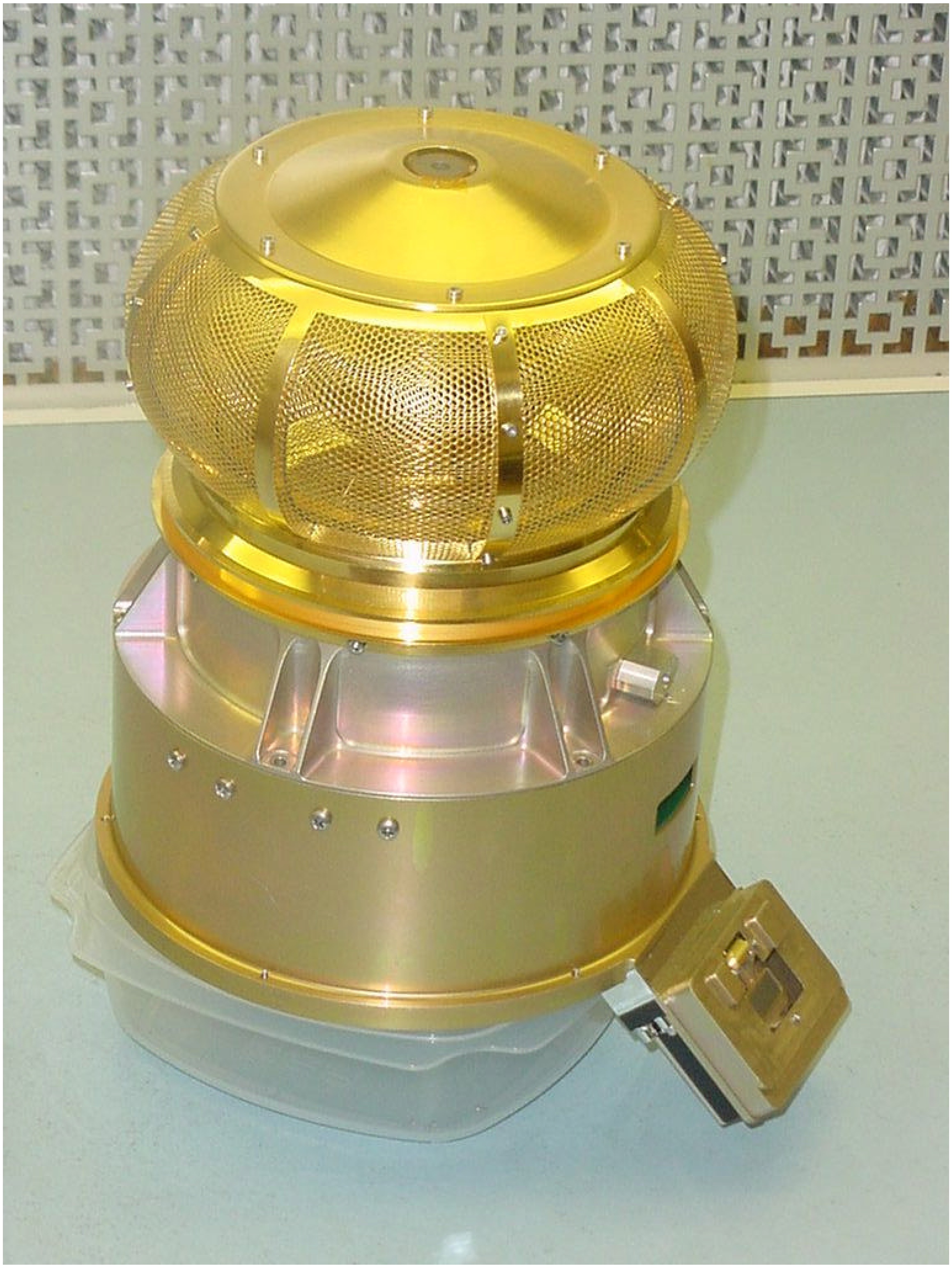


Fig 1. FM1 SWEA/STE-D

2. Test Setup

The "Jeffrey" thermal vacuum chamber at U.C. Berkeley was used for the thermal vac of the FM2 SWEA/STE-D.

The FM2 IDPU was setup outside the chamber as indicated in the test plan (reference 1).

In addition to chamber monitoring TCs (on the baseplate, and shroud), a number of chamber TCs were attached to the exterior of the instrument to monitor the temperature. These instrument-mounted TCs, together with the internal passive PRT sensor attached to the SWEA chassis, were used to determine when temperature soaks were met. We could not mount a TC to the STE-D unit due to surface issues and size, so only the internal sensor was available for that, plus a TC attached to the heat strap used to control the STE-D temperature (the heat strap typically ran 10-20C colder than STE-D due to less than ideal thermal coupling).

3. Test History

This test started on 2005-April-15, following vibration testing. Following a 58 hour bake at non-op hot (+40C), the instrument was transitioned to non-op cold. This was followed by two operational cycles with CPTs at each soak. During these CPTs the door actuation time was erratic, and failed at Hot soak #4 (see PFR 1039).

The door was fixed and a 1-axis workmanship vibration performed. After the vibration the unit failed to power up (PFR 1040). This was tracked to a transformer in the SWEA LVPS, which was repaired and again subjected to a workmanship vibration (which passed), and returned to thermal vac on April 29.

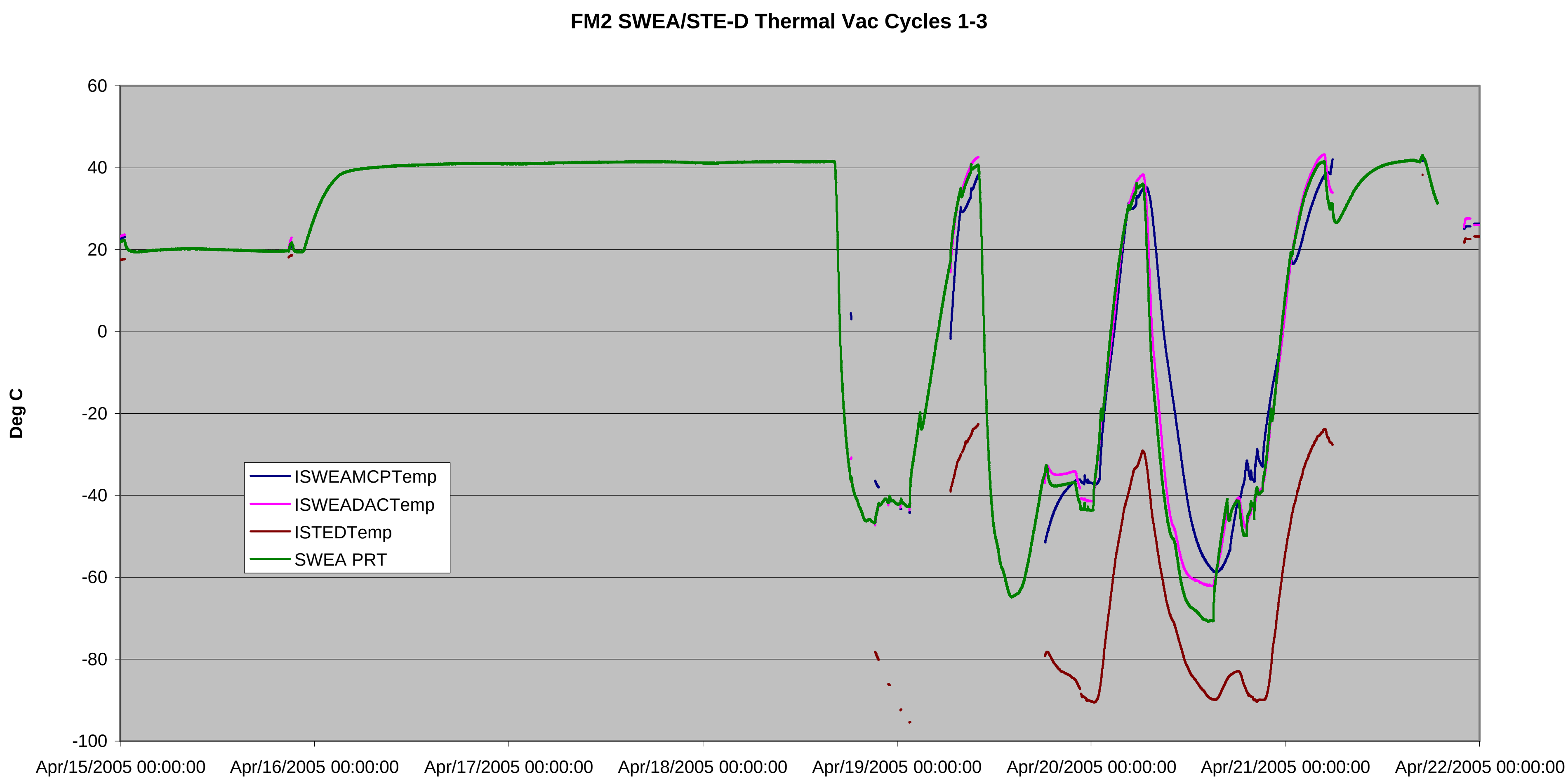
The unit was baked at +40C for ~65 hours and then hot #4 was repeated successfully, and we transitioned cold. However, we were unable to get STE cold enough, so we warmed up and broke chamber to adjust the STE heat strap to the cold plate. We add some Cho-Therm to improve conduction in the strap and returned vacuum on May 4. We were able to get cold (much faster than on any previous test), but the STE door again failed to actuate properly (see PFR1039). We warmed up and broke chamber to diagnose. We found the door actuator had been over-heated by the repeated attempts with extended timeouts, but no other problem. We believe the door actuator wires had been partially over-heated during the first door failures such that it was unable to actuate properly under the stress of cold temperatures. We replaced the actuator wires and returned to vacuum.

We then performed 4 more cycles (nominally 4-7) successfully, including cold starts on the first and last cycles, and 20 motion door cycle tests hot and cold on the first and last cycles. We then performed bakeout (see section 6).

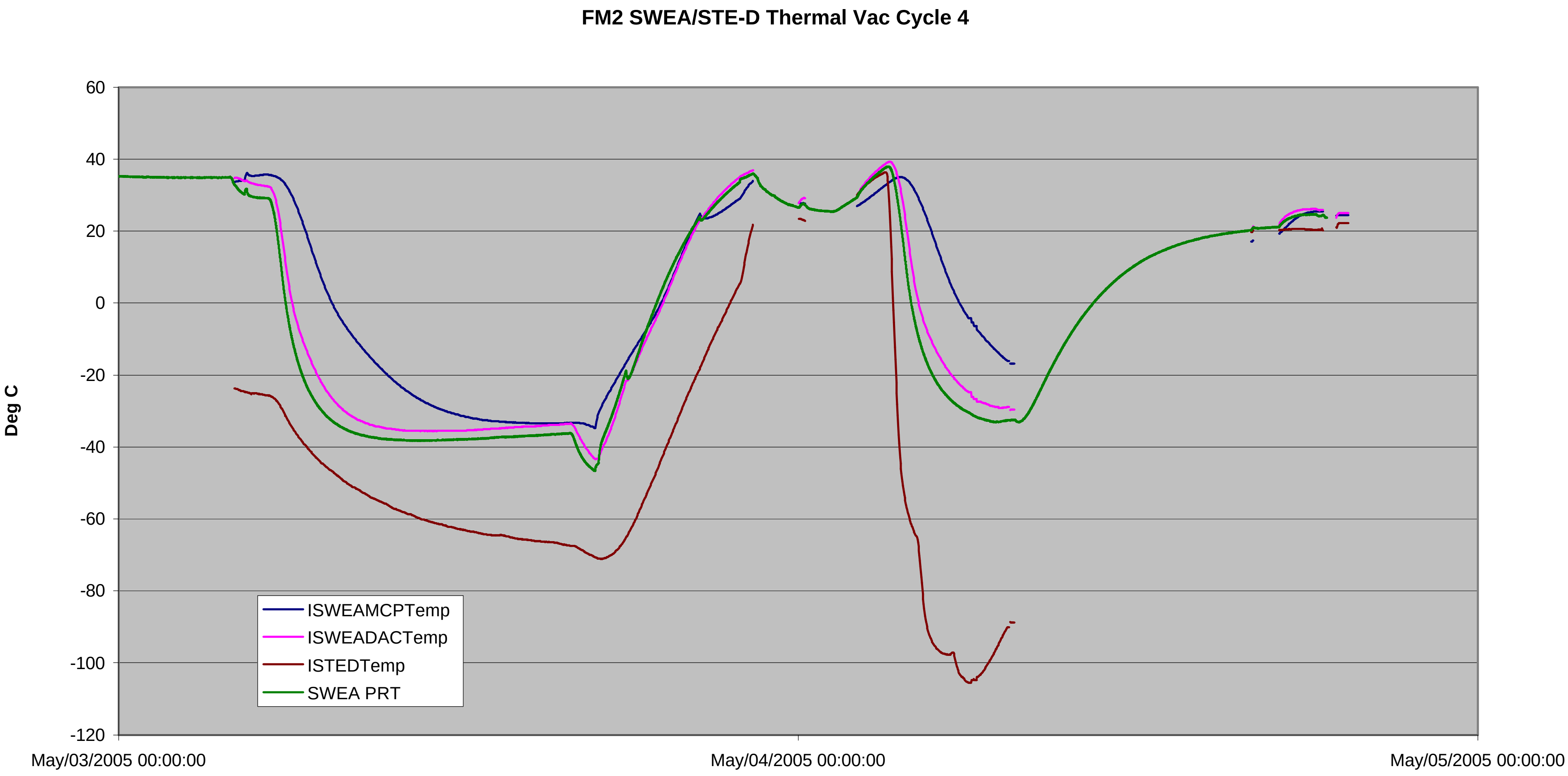
During CPTs we did SWEA functional testing using a small electron gun. STE-D was stimulated by its internal door source. We opened the SWEA door a total of 3 times, including warm and cold actuations. During transitions from cold to hot we exercised both the operational and non-operational heaters.

4. Temperature Profile

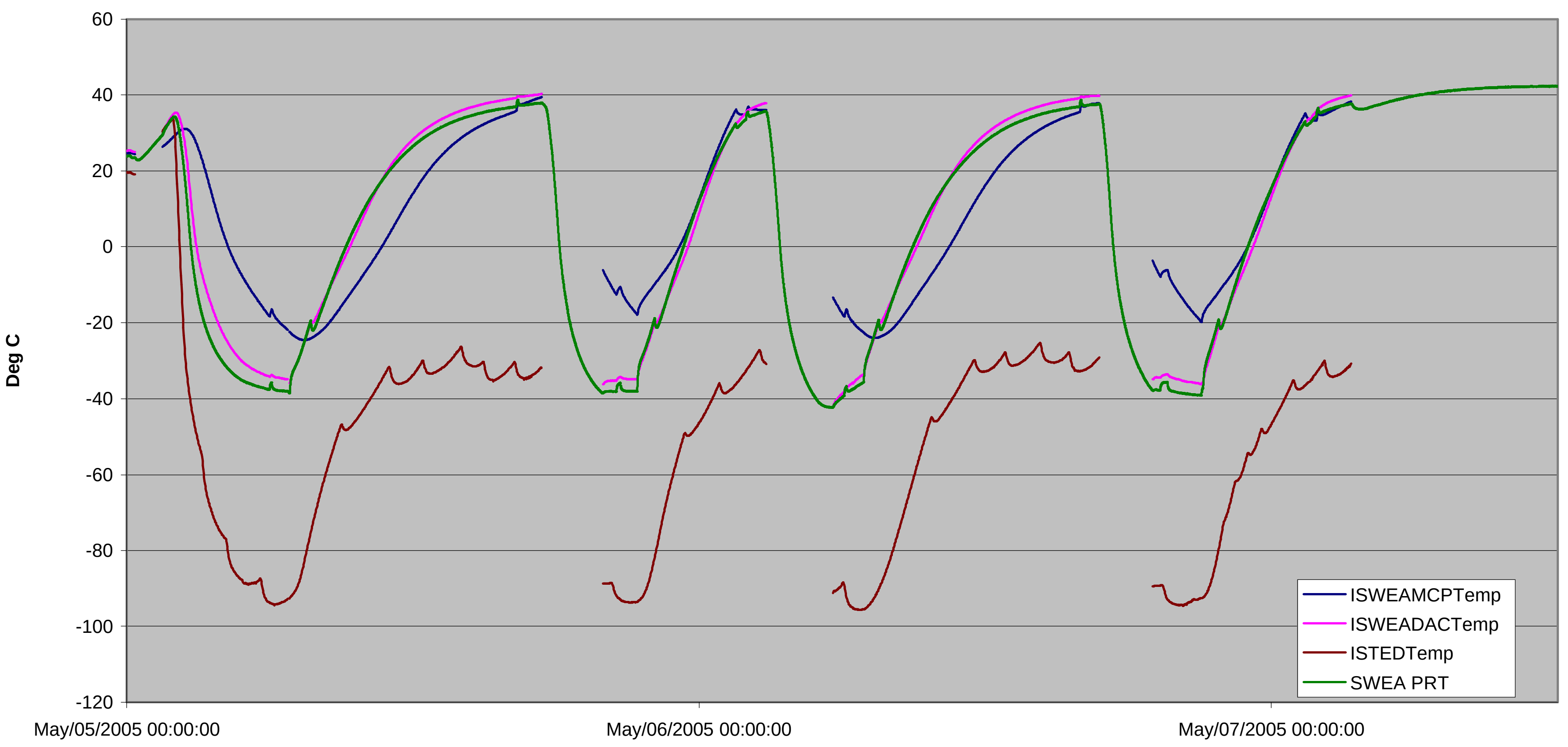
SWEA PRT is the spacecraft-monitored temperature sensor attached to the SWEA pedestal (internal). ISWEAMCPTemp is telemetry from a thermistor on the MCP board in the SWEA unit. ISWEADACTemp is telemetry from a thermistor on the DAC board in the SWEA pedestal. ISTEDTemp is telemetry from a PRT in the STE-D unit.



FM2 SWEA/STE-D Thermal Vac Cycles 1-3
Deg C
60
40
20
0
-20
-40
-60
-80
-100
Apr/15/2005 00:00:00
Apr/16/2005 00:00:00
Apr/17/2005 00:00:00
Apr/18/2005 00:00:00
Apr/19/2005 00:00:00
Apr/20/2005 00:00:00
Apr/21/2005 00:00:00
Apr/22/2005 00:00:00
ISWEAMCPTemp
ISWEADACTemp
ISTEDTemp
SWEA PRT


FM2 SWEA/STE-D Thermal Vac Cycle 4
Deg C
60
40
20
0
-20
-40
-60
-80
-100
-120
ISWEAMCPTemp
ISWEADACTemp
ISTEDTemp
SWEA PRT
May/03/2005 00:00:00
May/04/2005 00:00:00
May/05/2005 00:00:00

FM2 SWEA/STE-D Thermal Vac Cycles 4-7



5. Trending

5.1. *Trending Data Explanation*

The trending data on the previous pages is extracted from the trending file for the STE-D and SWEA plus LVPS. It is composed of values measured during the CPT, either directly, or from a post-processing fitting function which evaluates the data collected.

- The Door Open and Door Close columns show two times; from application of power to the time when the door comes off the first switch (starts moving), and the time from the application of power to the time when the door reaches the destination switch.
- Threshold values are DAC levels, corresponding to ~100eV per step. Requirement is <5keV.
- The test pulser fit data measures the electronic performance. Of particular interest is the FWHM, which measures the electronic noise in the system. Other values can be used to look for thermal drift and other trends in energy gain and offset.
- The "door source" fit data measures the calibration source on the STE door, and so is a end-to-end measurement (albeit using mostly photons rather than electrons). Again the FWHM is of interest (requirement < 2keV). In a few cases the short integration door source test was skipped due to time limitations; the long integration test is a better test for most purposes.

- SWEA trends show the primary current (data logger) and secondary voltages (instrument housekeeping). High Voltage supply monitors are also trended.

5.2. ***STE-D Trending Data***

STE-D FM2 Performance Trend

Date	File	Test	SWEA/STE-D Primary Current (mA)	STE-D Temp	SWEA / STE-D DAC Temp	ISTEDDCur (mA)	Door Open (sec)	Door Close (sec)	Bias	FitRev
Apr 11 2005	20050412051 0.fm 20050412244.fm	Pre-vib CPT	143	21.6	25.2	8.05	0.50 / 0.50	0.50 / 0.50	150	4/21/2005
Apr 14 2005	20050414292 8.fm	Post-vib, pre-Tvac	141	16.7	19.7	5.1	0.62 / 0.75	0.62 / 0.88	20	4/21/2005
Apr 19 2005	20050419083 3.fm	Tvac Hot #2	149	-29.4	34.4	10.9	0.38 / 0.50	0.38 / 0.50	20	4/21/2005
Apr 19 2005	20050419181 3.fm	Tvac Cold #2	127	-65.5	-40.7	-18.3	1.12 / 1.12	1.25 / 1.38	20	5/3/2005
Apr 20 2005	20050420030 0.fm	Tvac Hot #3	152	-34.5	34.2	10.2	0.38 / 0.50	0.50 / 0.50	20	5/3/2005
Apr 20 2005	20050420030 0.fm	Tvac Cold #3	125	-65.5	-46	-21	1.12 / 1.12	1.38 / 1.88	150	5/3/2005
Apr 21 2005	20050421030 0.fm	Tvac Hot #4 (FAIL)	165	-23.9	42.4	14.8	FAIL	FAIL		
Apr 27 2005	20050426030 0.fm	Pre-vib CPT (after door & transformer fix)	143.8	22.5	28.6	9.1	0.50 / 0.50	0.38 / 0.75	20	5/3/2005
Apr 29 2005	20050429285 7.fm	Post-vib, pre-Tvac	141	18.6	22.3	6.5	0.62 / 0.62	0.50 / 1.00	20	5/3/2005
May 3 2005	20050403000 0.fm	Tvac Hot #4	147	-23.8	33.7	11.23	0.38 / 0.50	0.50 / 0.50	20	5/3/2005
May 5 2005	20050505000 0.fm	Tvac Cold #4 (after door fix, new wires)	126	-69.1	-33.5	-15.4	1.12 / 1.12	1.12 / 1.12	20	5/3/2005
May 5 2005	20050505000 0.fm	Tvac Hot #5	152	-36	38	12.3	0.38 / 0.50	0.38 / 0.38	20	5/3/2005
May 5 2005	20050505000 0.fm	Tvac Cold #5	127	-68.7	-36	-17.2	1.12 / 1.12	1.12 / 1.25	20	5/3/2005
May 6 2005	20050506000 0.fm	Tvac Hot #6	159	-36	33.4	10	0.50 / 0.50	0.38 / 0.50	20	5/3/2005
May 6 2005	20050506000 0.fm	Tvac Cold #6	126	-90.7	-41.1	-19.4	1.12 / 1.12	1.25 / 1.25	20	5/3/2005
May 6 2005	20050506000 0.fm	Tvac Hot #7	153	-32	38.9	12.6	0.38 / 0.38	0.50 / 0.50	20	5/3/2005
May 6 2005	20050506000 0.fm	Tvac Cold #7	126	-89.3	-34.5	-18.5	1.00 / 1.12	1.12 / 1.12	20	5/3/2005
May 7 2005	20050507000 0.fm	Tvac Hot #8	148	-36	33.9	10	0.38 / 0.50	0.38 / 0.50	20	5/3/2005

Date	Det	Thresh.	Test Pulser Offset (keV)	Test Pulser Gain (keV/Bin)	Test Pulser Curv. (1/keV)	Test Gain	Test Pulser FWHM (keV)	Door Source Offset (keV)	Door Source Gain (keV/Bin)	Door Source Curv. (1/keV)	6keV c/s	22keV c/s	Door Source FWHM
Apr 11 2005	0		0.03	0.3857	1.04E-04	12.8479	0.812	-0.03	0.4006	6e-5 (F)	47.14	20.25	0.916
	1		0.07	0.3892	1.20E-04	12.2467	0.759	0.00	0.4014	6e-5 (F)	48.88	19.15	0.872
	2		0.03	0.3860	1.09E-04	12.6242	0.864	-0.03	0.4012	6e-5 (F)	37.63	19.05	0.961
	3		0.01	0.3862	1.03E-04	12.8214	0.792	-0.06	0.4030	6e-5 (F)	37.10	17.69	0.909
Apr 14 2005	0	10	-0.06	0.3861	9.33E-05	13.7273	0.792	0.00	0.4003	6e-5 (F)	49.14	20.93	0.921
	1	10	-0.01	0.3855	1.17E-04	12.5656	0.725	0.02	0.4018	6e-5 (F)	50.34	20.83	0.868
	2	18	-0.07	0.3857	1.07E-04	12.9029	0.701	-0.06	0.4021	6e-5 (F)	37.28	18.96	0.825
	3	12	-0.06	0.3857	9.45E-05	13.6780	0.773	-0.02	0.4030	6e-5 (F)	37.94	19.23	0.910
Apr 19 2005	0	9	Bad Fit					0.01	0.4021	6e-5 (F)	51.94	21.32	0.764
	1	9	No Counts					0.04	0.4032	6e-5 (F)	50.63	20.56	0.734
	2	18	-0.07	0.3864	1.07E-04	12.7709	0.581	-0.04	0.4044	6e-5 (F)	40.12	19.42	0.758
	3	11	-0.03	0.3858	1.05E-04	12.7942	0.600	0.01	0.4045	6e-5 (F)	40.35	18.45	0.742
Apr 19 2005	0	8	-0.20	0.3864	8.84E-05	13.6521	0.560	-0.07	0.4043	6e-5 (F)	48.66	19.99	0.712
	1	7	-0.15	0.3858	1.15E-04	12.3847	0.475	-0.05	0.4086	6e-5 (F)	49.21	20.68	0.640
	2	15	-0.22	0.3865	1.04E-04	12.8097	0.494	-0.12	0.4075	6e-5 (F)	39.06	18.86	0.667
	3	9	-0.22	0.3865	9.20E-05	13.5606	0.523	-0.12	0.4078	6e-5 (F)	39.90	18.04	0.706
Apr 20 2005	0	10	-0.06	0.3864	9.01E-05	13.6286	0.699	0.02	0.4028	6e-5 (F)	50.74	21.06	0.816
	1	8	No counts					0.05	0.4039	6e-5 (F)	50.56	20.83	0.761
	2	19	-0.07	0.3857	1.04E-04	12.9528	0.580	-0.02	0.4044	6e-5 (F)	40.21	18.83	0.722
	3	13	-0.04	0.3858	9.88E-05	13.5743	0.646	0.03	0.4043	6e-5 (F)	39.15	17.91	0.793
Apr 20 2005	0	10	-0.17	0.3861	9.66E-05	12.8797	0.537	-0.06	0.4042	6e-5 (F)	50.22	19.46	0.708
	1	9	No Fit					-0.04	0.4049	6e-5 (F)	49.15	19.86	0.658
	2	21	-0.19	0.3863	1.07E-04	12.5960	0.513	-0.13	0.4080	6e-5 (F)	38.43	19.52	0.654
	3	13	-0.20	0.3863	1.02E-04	12.8160	0.504	-0.09	0.4073	6e-5 (F)	38.59	18.55	0.677
Apr 21 2005	0	10											
	1	10											
	2	18											
	3	13											
Apr 27 2005	0	11	-0.06	0.3864	9.05E-05	13.7144	0.819	0.03	0.3966	6e-5 (F)	49.97	20.00	0.964
	1	10	0.02	0.3854	1.23E-04	12.5686	0.747	0.02	0.4010	6e-5 (F)	48.29	20.31	0.866
	2	21	-0.04	0.3857	1.09E-04	12.8967	0.721	-0.05	0.4009	6e-5 (F)	36.74	18.91	0.823
	3	14	-0.04	0.3859	9.70E-05	13.6763	0.807	-0.02	0.4024	6e-5 (F)	37.40	18.13	0.971
Apr 29 2005	0	10	-0.06	0.3860	9.49E-05	13.6261	0.770	-0.01	0.4011	6e-5 (F)	48.04	20.28	0.899
	1	9	-0.01	0.3857	1.20E-04	12.5064	0.705	0.02	0.4015	6e-5 (F)	49.64	19.86	0.845
	2	19	-0.09	0.3860	1.05E-04	12.8414	0.692	-0.08	0.4025	6e-5 (F)	37.92	18.97	0.826
	3	12	-0.06	0.3856	9.54E-05	13.5718	0.748	-0.04	0.4039	6e-5 (F)	38.30	18.16	0.896
May 3 2005	0	8	No fit					0.03	0.4020	6e-5 (F)	50.74	20.86	0.810
	1	8	No data					0.05	0.4036	6e-5 (F)	50.49	20.21	0.778
	2	18	-0.07	0.3862	1.07E-04	12.6449	0.611	-0.04	0.4042	6e-5 (F)	40.02	18.84	0.775
	3	12	-0.04	0.3858	9.04E-05	13.5163	0.864	0.00	0.4046	6e-5 (F)	40.24	18.17	0.808
May 5 2005	0	10	-0.17	0.3862	9.00E-05	13.5001	0.586	-0.06	0.4052	6e-5 (F)	49.54	19.77	0.727
	1	8	-0.11	0.3866	1.18E-04	12.3109	0.546	-0.03	0.4064	6e-5 (F)	49.05	19.50	0.701
	2	19	-0.19	0.3864	1.05E-04	12.7130	0.596	-0.14	0.4088	6e-5 (F)	37.42	18.14	0.719
	3	13	-0.18	0.3863	9.42E-05	13.4370	0.509	-0.09	0.4078	6e-5 (F)	38.99	18.00	0.763
May 5 2005	0	10	-0.02	0.3864	9.61E-05	13.4652	0.644	0.03	0.4032	6e-5 (F)	50.32	20.38	0.871
	1	8	0.03	0.3854	1.21E-04	12.3569	0.641	0.05	0.4043	6e-5 (F)	48.55	19.90	0.796
	2	20	-0.06	0.3857	1.07E-04	12.6640	0.666	-0.04	0.4053	6e-5 (F)	38.58	18.64	0.797
	3	13	-0.02	0.3862	9.87E-05	13.4487	0.679	0.03	0.4052	6e-5 (F)	40.03	19.02	0.884
May 5 2005	0	10	-0.15	0.3860	9.48E-05	13.5082	0.591	-0.08	0.4054	6e-5 (F)	50.08	19.58	0.778
	1	8	-0.10	0.3862	1.23E-04	12.3166	0.533	-0.05	0.4090	6e-5 (F)	47.90	19.01	0.683
	2	19	-0.16	0.3861	1.09E-04	12.7155	0.595	-0.13	0.4083	6e-5 (F)	38.36	17.80	0.719
	3	12	-0.17	0.3861	9.56E-05	13.4405	0.571	-0.10	0.4077	6e-5 (F)	38.97	18.13	0.747
May 6 2005	0	10	-0.03	0.3859	9.72E-05	13.4619	0.669	0.04	0.4027	6e-5 (F)	50.10	19.80	0.832
	1	8	0.02	0.3854	1.24E-04	12.3670	0.644	0.04	0.4044	6e-5 (F)	50.00	20.47	0.798
	2	17	-0.04	0.3855	1.11E-04	12.6872	0.650	-0.04	0.4049	6e-5 (F)	38.69	18.01	0.802
	3	11	-0.02	0.3854	1.01E-04	13.4187	0.683	0.00	0.4053	6e-5 (F)	40.53	18.07	0.837
May 6 2005	0	8	-0.17	0.3864	9.66E-05	13.5520	0.748	-0.07	0.4049	6e-5 (F)	49.01	19.43	0.748
	1	7	-0.13	0.3861	1.19E-04	12.3173	0.541	-0.06	0.4082	6e-5 (F)	43.44	16.93	0.810
	2	13	-0.20	0.3862	1.05E-04	12.7165	0.567	-0.11	0.4078	6e-5 (F)	35.94	17.91	0.978
	3	8	-0.19	0.3861	9.56E-05	13.4461	0.573	-0.10	0.4079	6e-5 (F)	37.61	17.97	0.754
May 6 2005	0	10	-0.03	0.3858	9.43E-05	13.4647	0.666	0.03	0.4029	6e-5 (F)	51.00	20.22	0.849
	1	9	0.03	0.3855	1.20E-04	12.3636	0.636	0.04	0.4045	6e-5 (F)	48.44	20.36	0.789
	2	20	-0.03	0.3858	1.08E-04	12.6777	0.634	-0.03	0.4050	6e-5 (F)	38.10	18.51	0.781
	3	13	-0.02	0.3857	1.00E-04	13.4124	0.672	0.01	0.4057	6e-5 (F)	39.36	17.92	0.834
May 6 2005	0	10	-0.15	0.3859	9.36E-05	13.5130	1.002	-0.08	0.4064	6e-5 (F)	49.65	20.24	0.758
	1	8	-0.11	0.3866	1.21E-04	12.3305	0.719	-0.05	0.4092	6e-5 (F)	48.76	19.48	0.687
	2	19	-0.15	0.3860	1.10E-04	12.7243	0.576	-0.13	0.4082	6e-5 (F)	38.29	17.81	0.688
	3	12	-0.17	0.3860	9.67E-05	13.4468	0.575	-0.09	0.4076	6e-5 (F)	38.82	17.08	0.744
May 7 2005	0	8	-0.04	0.3864	9.36E-05	13.5002	0.692	0.03	0.4030	6e-5 (F)	50.77	19.90	0.844
	1	8	0.02	0.3853	1.21E-04	12.3584	0.634	0.05	0.4041	6e-5 (F)	50.89	19.84	0.801
	2	18	-0.04	0.3855	1.07E-04	12.6853	0.644	-0.03	0.4052	6e-5 (F)	38.26	18.40	0.792
	3	11	0.00	0.3862	1.01E-04	13.4499	0.677	0.01	0.4055	6e-5 (F)	40.65	18.08	0.826

Long Integration Door Source (Door LUT)

Date	Det	AccTime (sec)	Offset (keV)	Gain (keV/Bin)	Curv. (1/keV)	6keV c/s	22keV c/s	88keV c/s	FWHM	
Apr 11 2005	0	920	-0.03	0.4005	6e-5 (F)	48.03	20.05	1.24E-02	0.906	
	1		0.00	0.4014	6e-5 (F)	48.02	20.25	1.57E-02	0.858	
	2		-0.01	0.4008	6e-5 (F)	38.28	17.85	8.70E-03	0.975	
	3		-0.07	0.4033	6e-5 (F)	37.89	18.03	1.21E-02	0.908	
Apr 14 2005	0	640	0.00	0.4005	6e-5 (F)	49.29	20.63	2.04E-02	0.923	
	1		0.02	0.4019	6e-5 (F)	49.22	20.81	5.89E-03	0.852	
	2		-0.07	0.4022	6e-5 (F)	37.75	19.13	8.38E-03	0.820	
	3		-0.02	0.4030	6e-5 (F)	38.76	18.58	4.80E-03	0.918	
Apr 19 2005	0	1370	0.02	0.4021	6e-5 (F)	50.73	20.48	1.37E-02	0.798	
	1		0.04	0.4035	6e-5 (F)	50.63	20.92		0.752	
	2		-0.02	0.4038	6e-5 (F)	38.64	18.90	1.09E-02	0.754	
	3		0.00	0.4046	6e-5 (F)	39.97	18.30		0.784	
Apr 19 2005	0	450	-0.08	0.4046	6e-5 (F)	49.25	20.29		0.706	
	1		-0.05	0.4090	6e-5 (F)	48.57	20.33		0.625	
	2		-0.13	0.4077	6e-5 (F)	37.48	18.91		0.643	
	3		-0.10	0.4074	6e-5 (F)	38.58	18.73		0.684	
Apr 20 2005	0	410	0.03	0.4023	6e-5 (F)	50.99	21.31	2.87E-02	0.828	
	1		0.04	0.4040	6e-5 (F)	50.50	20.84	4.11E-02	0.758	
	2		-0.02	0.4042	6e-5 (F)	38.93	19.34		0.728	
	3		0.02	0.4048	6e-5 (F)	39.50	18.52	4.41E-02	0.800	
Apr 20 2005	0	3330	-0.10	0.4061	6e-5 (F)	49.36	20.35	5.22E-02	0.695	
	1		-0.05	0.4094	6e-5 (F)	49.59	20.46		0.618	
	2		-0.12	0.4079	6e-5 (F)	37.86	18.78		0.661	
	3		-0.11	0.4077	6e-5 (F)	38.55	18.33		0.655	
Apr 21 2005										See PFR 1039
Apr 27 2005	0	54540	0.00	0.3999	6e-5 (F)	48.61	20.15	1.24E-02	0.953	
	1		0.01	0.4013	6e-5 (F)	48.67	20.22	1.07E-02	0.889	
	2		-0.07	0.4015	6e-5 (F)	37.51	18.71	1.28E-02	0.846	
	3		-0.02	0.4025	6e-5 (F)	38.00	18.01	1.06E-02	0.956	
Apr 29 2005	0	700	-0.01	0.4011	6e-5 (F)	45.21	18.36	2.26E-02	0.914	
	1		0.00	0.4024	6e-5 (F)	44.53	18.67	1.02E-02	0.852	
	2		-0.07	0.4023	6e-5 (F)	33.96	17.46	1.67E-02	0.815	
	3		-0.04	0.4036	6e-5 (F)	35.11	16.72	2.35E-02	0.884	
May 3 2005	0	1350	0.02	0.4021	6e-5 (F)	50.28	20.45	7.38E-03	0.821	
	1		0.03	0.4037	6e-5 (F)	50.56	20.55		0.754	
	2		-0.04	0.4041	6e-5 (F)	38.77	18.83	2.89E-03	0.762	
	3		0.00	0.4045	6e-5 (F)	39.52	18.21	3.43E-02	0.807	
May 5 2005	0	690	-0.08	0.4054	6e-5 (F)	46.90	18.97	2.21E-02	0.750	
	1		-0.05	0.4094	6e-5 (F)	45.49	18.70	1.42E-02	0.688	
	2		-0.13	0.4082	6e-5 (F)	35.08	17.05		0.702	
	3		-0.11	0.4081	6e-5 (F)	37.57	17.18		0.749	
May 5 2005	0	1200	0.03	0.4031	6e-5 (F)	50.39	20.26	1.57E-02	0.876	
	1		0.04	0.4045	6e-5 (F)	49.22	20.02	1.52E-02	0.797	
	2		-0.03	0.4050	6e-5 (F)	37.38	18.16		0.795	
	3		0.02	0.4056	6e-5 (F)	39.64	17.97		0.835	
May 5 2005	0	610	-0.07	0.4050	6e-5 (F)	49.30	19.92	2.11E-02	0.749	
	1		-0.05	0.4092	6e-5 (F)	47.67	19.41		0.691	
	2		-0.13	0.4083	6e-5 (F)	36.95	17.75		0.715	
	3		-0.10	0.4078	6e-5 (F)	39.09	18.07		0.750	
May 6 2005	0	870	0.03	0.4028	6e-5 (F)	50.66	20.14	1.90E-02	0.876	
	1		0.04	0.4042	6e-5 (F)	49.14	19.73		0.791	
	2		-0.03	0.4046	6e-5 (F)	38.22	18.39		0.797	
	3		0.01	0.4053	6e-5 (F)	39.75	17.84		0.824	
May 6 2005	0	1150	-0.08	0.4052	6e-5 (F)	49.66	19.60	1.11E-02	0.744	Microphonics
	1		-0.05	0.4094	6e-5 (F)	48.42	19.67		0.678	
	2		-0.13	0.4085	6e-5 (F)	37.03	17.83		0.697	
	3		-0.10	0.4080	6e-5 (F)	39.36	18.00		0.731	
May 6 2005	0	630	0.03	0.4029	6e-5 (F)	50.39	19.83	1.95E-02	0.858	
	1		0.05	0.4040	6e-5 (F)	49.34	19.74	8.21E-03	0.792	
	2		-0.03	0.4050	6e-5 (F)	38.13	18.48		0.791	
	3		0.01	0.4055	6e-5 (F)	40.09	17.80		0.830	
May 6 2005	0	800	-0.08	0.4052	6e-5 (F)	49.31	19.96		0.752	Microphonics
	1		-0.05	0.4094	6e-5 (F)	48.16	19.53		0.684	
	2		-0.13	0.4082	6e-5 (F)	36.58	17.49		0.700	
	3		-0.10	0.4078	6e-5 (F)	39.33	17.41		0.731	
May 7 2005	0	580	0.03	0.4030	6e-5 (F)	50.07	19.82	1.17E-02	0.838	
	1		0.04	0.4043	6e-5 (F)	49.70	19.83	3.04E-02	0.793	
	2		-0.03	0.4051	6e-5 (F)	37.54	18.14		0.784	
	3		0.02	0.4056	6e-5 (F)	39.26	17.81		0.824	

5.3. ***SWEA, LVPS Trending Data***

SWEA FM2 Performance Trend (incl SWEA/STE-D LVPS)

Date	File	Test	SWEA Temp	ISWEAM CPTemp	ISWEAD ACTemp	Bus Voltage	Primary Current	2.5V	5VD	5VA	12VA	ISWEAST EDCur	ISWEAV0 @ DAC=128	ISWEANR 5V	ISWEAAnal	ISWEADefl1	ISWEADefl2	Open Door?	MCP On?	
						28	143	2.51	4.98	5.09	11.55									
Apr 11 2005	B0504120510.tlm, B0504122244.tlm	Pre-vib CPT				24	155	2.51	4.98	5.10	11.59									
				30.7	31.7	35	143	2.51	4.98	5.11	11.53	9.8	-12.5	6.08	68.4	161.2	99.4	No	No	
						28	141	2.51	4.98	5.06	11.50									
Apr 14 2005	B0504142928.tlm	Post-vib, pre-Tvac				24	153	2.51	4.98	5.08	11.53									
			20.4	19.9	21.5	35	141	2.51	4.98	5.07	11.49	5.8	-12.5	6.03	68.4	162	99.4	No	No	
						28	149	2.51	4.98	5.14	11.66									
Apr 19 2005	B0504190633.tlm	Tvac Hot #2				24	167	2.51	4.98	5.16	11.73									
			33.3	32	40	35	149	2.51	4.98	5.14	11.67	15	-12.5	6.2	68.4	160	98.6	Yes	Yes	
						28	127	2.50	4.98	4.88	11.02									
Apr 19 2005	B0504191813.tlm	Tvac Cold #2				24	132	2.50	4.98	4.89	11.04									
			-43	-37	-41	35	127	2.50	4.98	4.90	11.02	-18.4	-12.54	5.87	70.48	165.4	103.6	No	Yes	
Apr 20 2005	B0504200000.tlm	Tvac Hot #3	34.1	30.9	35.9	28	152	2.51	4.98	5.17	11.70	11.4	-12.5	6.19	68.4	161.2	99.4	No	Yes	
Apr 20 2005	B0504200000.tlm	Tvac Cold #3	-43.8	-35.8	-44.4	28	125	2.51	4.98	4.90	11.05	-20	-12.54	5.86	70.5	166.3	103.6	No	Yes	
Apr 21 2005	B0504210000.tlm	Tvac Hot #4 (FAIL)	30.1	38.6	35.1	28	165	2.51	4.98	5.19	11.75	12	-12.5	6.19	68.4	161.2	99.4	No	No	STE-D door failure, PI
Apr 27 2005	B0504280000.tlm	Pre-vib CPT (after door & transformer fix)	27	28.3	28.6	28	143.8	2.51	4.98	5.06	11.58	9.6	-12.5	6.08	68.4	161.2	99.4	No	No	
						28	141	2.51	4.98	5.06	11.55									
Apr 29 2005	B0504292057.tlm	Post-vib, pre-Tvac				24	155.5	2.51	4.98	5.10	11.59									
			22.4	22.1	23.6	35	142.1	2.51	4.98	5.09	11.55	7.2	-12.5	6.04	68.4	161.2	99.4	No	No	
						28	147	2.51	4.98	5.14	11.67									
May 3 2005	B0504292057.tlm	Tvac Hot #4				24	161	2.51	4.98	5.12	11.67									
			30.3	34	34	35	149	2.51	4.98	5.10	11.62	10.8	-12.5	6.16	68.4	161.2	99.4	Yes	Yes	
						28	128	2.50	4.98	4.90	11.08									
May 5 2005	B0505050000.tlm	Tvac Cold #4 (after door fix, new wires)				24	134	2.50	4.98	4.90	11.07									20-motion
			-37.4	-17.9	-34.2	35	127	2.50	4.98	4.90	11.06	-16.5	-12.54	5.94	70.1	165.4	102.8	Yes	Yes	door test
						28	152	2.51	4.98	5.12	11.65									
May 5 2005	B0505050000.tlm	Tvac Hot #4				24	174	2.51	4.98	5.19	11.82									20-motion
			36.4	34.3	38.6	35	153	2.51	4.98	5.17	11.74	12.5	-12.5	6.21	68.4	161.1	98.6	No	Yes	door test
						28	127	2.50	4.98	4.88	10.99									
May 5 2005	B0505050000.tlm	Tvac Cold #5				24	132	2.50	4.98	4.87	10.99									20-motion
			-38.1	-35.3	-35.3	35	129	2.50	4.98	4.88	10.97	-16.7	-12.54	5.92	70.06	165.4	102.8	No	Yes	door test
May 6 2005	B0505060000.tlm	Tvac Hot #6	33.2	34.8	34.8	28	159	2.51	4.98	5.16	11.72	10.6	-12.5	5.3	68.37	161.2	98.6	No	Yes	MCP On
May 6 2005	B0505060000.tlm	Tvac Cold #6	-39.8	-18	-38.4	28	126	2.50	4.98	4.90	11.00	-17.6	-12.54	5.89	70.48	165.4	102.8	No	Yes	
May 6 2005	B0505060000.tlm	Tvac Hot #7	36.8	35.3	39.1	28	153	2.51	4.98	5.17	11.75	13.2	-12.5	6.2	68	160.3	98.6	No	Yes	
						28	126	2.50	4.98	4.87	11.01									
May 6 2005	B0505060000.tlm	Tvac Cold #7				24	131	2.50	4.98	4.88	11.00									20-motion
			-7.5	-34.5	-37.8	35	126	2.50	4.98	4.88	11.00	-16.5	-12.54	5.92	70.5	165.4	102.8	No	Yes	door test
						28	148	2.51	4.98	5.13	11.64									
May 7 2005	B0505070000.tlm	Tvac Hot #8				24	166	2.51	4.98	5.17	11.73									20-motion
			34.2	33.2	35.4	35	148	2.51	4.98	5.15	11.68	11.1	-12.5	6.18	68.4	160.3	98.6	No	Yes	door test

6. TQCM Data

A bakeout was added to the end of the thermal vac cycling using a TQCM monitor to verify the outgassing rate meets the requirement (2.5E-11 g/cm2/sec). A final outgassing rate of ~160Hz/hour was measured. This is significantly higher than the FM1 rate of ~50Hz/hour (which is close to pre-test chamber background). We re-measured chamber background and got ~150Hz/hour, indicating the chamber has been contaminated (but that the SWEA outgassing rate is low). We have sent a witness foil (collected during the empty chamber run) to GSFC for analysis.