

# SORCE Weekly Status Report – 10/15/2009 to 10/21/2009

## 1. Introduction

This status report addresses the performance of the SORCE spacecraft, instruments, and ground assets during the week of Thursday, October 15, through Wednesday, October 21, 2009.

## 2a. Spacecraft Summary (submitted by D. McCabe, 10/21/09)

10/08	10/09	10/10	10/11	10/12	10/13	10/14
281	282	283	284	285	286	287
10/15	10/16	10/17	10/18	10/19	10/20	10/21
288	289	290	291	292	293	294

XPS calibration was performed on 2009/286-23:00:51.

Taper charge was stepped down the final two steps, and now is at 0.910.

On DOY 287 battery heaters were planned to be disabled during eclipse periods to decrease the load, and thereby the stress on the battery.

Unfortunately, there was a misunderstanding of how the command to disable the heaters worked. The control of the heater was commanded to disable Flight Software Control, however the heater was on when this command was sent. This resulted in the heater remaining on during the entire eclipse period, which caused an under voltage on the spacecraft. Subsequent to the commanding from Flight Software Control, the heater should have been set to off. The RTS's that control this operation have been updated and been loaded to SORCE. Their operation is now as expected.

At 2009/287-13:06:13 an under voltage situation was detected by the Fault Detection and Correction system onboard SORCE due to the battery heaters being on for nearly the entire eclipse duration. Loads were shed, and at the next ground contact at 2009/287-20:17:07, the spacecraft was found to be in contingency mode after the negative acquisition at AGO. FLAWS 85 was opened to document this event.

Observatory recovery was as follows:

2009-288-18:51 AGO 36419 Star tracker 1 and 2 turn on an initialize  
2009-288-20:00 TD171 36420 FSS turn on  
2009-288-20:33 AGO 36420 Go to Normal Mode  
2009-288-22:17 AGO 36421 MU turn on and configure  
2009-289-00:00 AGO 36422 SOLSTICE A and SOLSTICE B verified on  
2009-289-01:28 TDS configure SOLSTICE A and SOLSTICE B  
2009-289-14:00 TDS 36431 SIM A turn on and configure  
2009-289-17:26 AGO 36433 XPS turn on and configure  
2009-289-20:52 AGO 36435 TIM turn on and configure  
2009-292-16:37 AGO 36477 SIM B turn on and configure

During the recovery operations, SOLSTICE A and SOLSTICE B were powered on unexpectedly. The power up was nominal, however FLAWS 86 was opened to capture the event.

GCI lockups:			(MINUTES)		
Instrument	Lockup Time	Response Time	Duration	Lat	Lon
solstice_a	2009/281-01:13:32	2009/281-01:40:27	26.92	-37.8	-51.6
solstice_a	2009/281-04:38:35	2009/281-04:54:45	16.17	-19.7	-61.7
solstice_a	2009/282-18:55:50	2009/282-19:46:15	50.42	-20.4	-54.9
solstice_a	2009/283-01:52:51	2009/283-02:14:49	21.97	-24.7	-40.5
solstice_a	2009/283-22:39:56	2009/283-23:17:35	37.65	-39.9	-58.8
solstice_a	2009/285-23:22:32	2009/285-23:51:25	28.88	-29.2	-30.3
solstice_a	2009/286-23:31:40	2009/287-00:08:17	36.62	-37.8	-64.7
solstice_b	2009/282-01:31:49	2009/282-01:57:37	25.80	-34.3	-49.9
solstice_b	2009/282-03:16:24	2009/282-03:34:45	18.35	-20.9	-49.1
solstice_b	2009/284-02:07:51	2009/284-02:31:46	23.92	-25.4	-52.1
solstice_b	2009/284-16:16:12	2009/284-17:05:57	49.75	-27.7	-14.9
solstice_b	2009/284-19:33:02	2009/284-20:20:12	47.17	-32.4	-54.4
solstice_b	2009/286-20:00:59	2009/286-20:53:57	52.97	-27.6	-85.2
sim_a	2009/282-01:35:13	2009/282-01:56:06	20.88	-29.0	-37.7
sim_a	2009/284-16:10:24	2009/284-16:33:34	23.17	-15.6	-32.6
sim_a	2009/286-02:41:52	2009/286-03:04:05	22.22	-18.7	-63.0
sim_a	2009/286-23:45:01	2009/287-00:06:41	21.67	-14.6	-18.8
sim_b	2009/281-04:37:22	2009/281-04:53:15	15.88	-22.2	-65.2
sim_b	2009/281-17:05:34	2009/281-17:20:37	15.05	-24.7	-13.4
sim_b	2009/284-03:46:54	2009/284-04:07:29	20.58	-21.4	-70.7
sim_b	2009/285-16:28:06	2009/285-16:50:21	22.25	-20.6	-36.4
sim_b	2009/286-01:02:57	2009/286-01:27:03	24.10	-22.5	-43.7
sim_b	2009/286-02:47:13	2009/286-03:04:11	16.97	-6.5	-48.4
sim_b	2009/286-15:03:30	2009/286-15:29:55	26.42	-14.4	-30.3
tim	2009/281-01:19:35	2009/281-01:40:17	20.70	-29.5	-28.2
tim	2009/281-02:53:37	2009/281-03:17:25	23.80	-34.1	-63.4
tim	2009/281-20:24:09	2009/281-20:32:11	8.03	-32.8	-46.9
tim	2009/282-01:37:10	2009/282-01:57:31	20.35	-25.3	-31.0
tim	2009/282-17:20:44	2009/282-17:34:41	13.95	-24.2	-24.5
tim	2009/283-20:57:22	2009/283-21:05:38	8.27	-36.1	-58.3
tim	2009/284-00:25:52	2009/284-00:54:33	28.68	-34.0	-45.0
tim	2009/284-02:14:12	2009/284-02:31:41	17.48	-11.7	-33.6
XPS	2009/281-04:33:31			-29.6	-77.8
XPS	2009/281-18:43:23			-26.2	-35.5
XPS	2009/281-18:59:20			-38.9	30.5
XPS	2009/281-22:05:30			-38.0	-54.3
XPS	2009/281-23:50:50			-38.6	-41.7
XPS	2009/282-18:54:33			-17.5	-58.7
XPS	2009/283-03:33:33			-17.0	-54.3
XPS	2009/284-16:10:13			-15.2	-33.1
XPS	2009/284-19:29:57			-27.1	-65.2
XPS	2009/285-18:07:00			-24.7	-55.0
XPS	2009/286-01:04:42			-19.0	-38.7
XPS	2009/286-18:19:59			-19.8	-72.7
XPS	2009/286-18:22:45			-25.3	-64.5
XPS	2009/287-08:27:03			35.9	-13.1

	SIM A	SIM B	SOL A	SOL B	TIM	XPS*
Week	4	7	7	6	8	14
Total	2137	2722	1472	1747	2361	2223

GCI lockups:			(MINUTES)		
Instrument	Lockup Time	Response Time	Duration	Lat	Lon
solstice_a	2009/288-22:25:29	2009/288-22:27:33	2.07	-37.7	-60.7
solstice_a	2009/290-14:35:11	2009/290-15:32:43	57.53	-29.1	-25.1
solstice_a	2009/290-23:06:48	2009/290-23:38:21	31.55	-20.3	-43.3
solstice_a	2009/291-21:36:46	2009/291-22:18:04	41.30	-35.2	-58.0
solstice_b	2009/288-22:25:29	2009/288-22:27:33	2.07	-37.7	-60.7
solstice_b	2009/289-14:16:02	2009/289-15:15:52	59.83	-21.8	-27.0
solstice_b	2009/289-21:00:31	2009/289-21:44:21	43.83	-39.7	-60.8
solstice_b	2009/290-00:21:36	2009/290-00:58:35	36.98	-33.2	-81.0
solstice_b	2009/290-14:35:51	2009/290-15:32:38	56.78	-30.3	-22.8

solstice_b	2009/291-23:26:36	2009/291-23:55:03	28.45	-10.8	-41.7
solstice_b	2009/293-15:21:19	2009/293-16:23:12	61.88	-29.2	-56.3
solstice_b	2009/294-06:43:48	2009/294-06:57:22	13.57	30.2	-109.0
solstice_b	2009/294-10:40:48	2009/294-11:48:47	67.98	-19.6	-8.0
sim_a	2009/288-22:25:29	2009/288-22:27:33	2.07	-37.7	-60.7
sim_a	2009/289-22:47:48	2009/289-23:19:57	32.15	-27.6	-44.3
sim_a	2009/291-00:42:57	2009/291-01:13:51	30.90	-22.1	-70.6
sim_a	2009/291-21:40:41	2009/291-21:45:24	4.72	-29.2	-43.4
sim_a	2009/292-20:17:08	2009/292-20:25:18	8.17	-32.3	-35.8
sim_a	2009/292-23:37:31	2009/292-23:39:34	2.05	-20.5	-64.4
sim_a	2009/294-10:31:59	2009/294-11:16:43	44.73	0.9	-32.0
sim_a	2009/294-15:37:56	2009/294-16:08:09	30.22	-31.1	-62.8
sim_a	2009/294-22:31:20	2009/294-22:36:43	5.38	-20.3	-60.2
sim_b	2009/288-22:25:29	2009/288-22:27:33	2.07	-37.7	-60.7
sim_b	2009/292-18:30:59	2009/292-18:48:16	17.28	-40.0	-49.9
sim_b	2009/292-21:58:19	2009/292-22:02:31	4.20	-24.9	-46.3
sim_b	2009/293-22:11:27	2009/293-22:19:40	8.22	-29.1	-64.0
tim	2009/288-22:25:29	2009/288-22:27:33	2.07	-37.7	-60.7
tim	2009/290-16:09:57	2009/290-16:34:28	24.52	-25.0	-57.1
tim	2009/290-17:59:37	2009/290-18:11:35	11.97	-39.9	-31.6
tim	2009/290-23:04:14	2009/290-23:38:11	33.95	-25.8	-51.6
tim	2009/291-13:01:57	2009/291-13:37:08	35.18	-4.2	-44.6
tim	2009/292-18:29:30	2009/292-18:45:35	16.08	-39.7	-56.7
tim	2009/292-20:19:15	2009/292-20:22:43	3.47	-29.0	-28.7
tim	2009/293-18:49:48	2009/293-19:02:40	12.87	-38.8	-44.7
XPS	2009/293-15:19:08			-25.1	-63.6
XPS	2009/293-20:31:11			-34.3	-51.5
XPS	2009/294-20:50:12			-28.5	-48.7
XPS	2009/294-20:53:46			-21.6	-37.4

	SIM A	SIM B	SOL A	SOL B	TIM	XPS*
Week	9	4	4	9	8	4
Total	2146	2726	1476	1756	2369	2227

**3a. Ground Support / Contact Summary** (submitted by D. McCabe)

Fifteen ground station contacts were performed the week of 10/08/09 through 10/14/09.

	Captured VCDUS	Recorded VCDUS	%
SC housekeeping	322866	322867	100
IM housekeeping	41947	41948	100
Science	304197	304198	100

**3b. Ground Support / Contact Summary** (submitted by D. McCabe)

Sixteen ground station contacts were performed, 5 of them blind acquisitions. Twelve blind acquisition TDRSS contacts were performed over the week of 10/15/09 through 10/21/09. The additional contacts were scheduled for anomaly recovery.

	Captured VCDUS	Recorded VCDUS	%
SC housekeeping	318389	318390	100
IM housekeeping	31731	31732	100
Science	228342	228343	100

## 4. Instrument Status

### 4.1. TIM (submitted by Greg Kopp, October 22)

#### TIM operations during previous week

- Normal Ops (TSI data w/ Cavity B)
- Cavity A&B comparisons

#### Current work

- Normal operations
  - Version 9 data processing provides daily updated TSI values
- Started Version 10 data reprocessing
  - Updated cavity inter-comparisons show continued exponentially decreasing degradation, similar to what is applied to current Version 9 data
  - Servo gain calibrations show continued stability

#### TIM anomalies during previous week

- Instrument turned off from 14 October 12:06 to 16 October 20:54 because of spacecraft Contingency Mode due to battery under-voltage condition.

### 4.2. SIM (submitted by Jerry Harder, October 22)

For days 2009/289 (Oct. 16) to 2009/295 (Oct. 22):

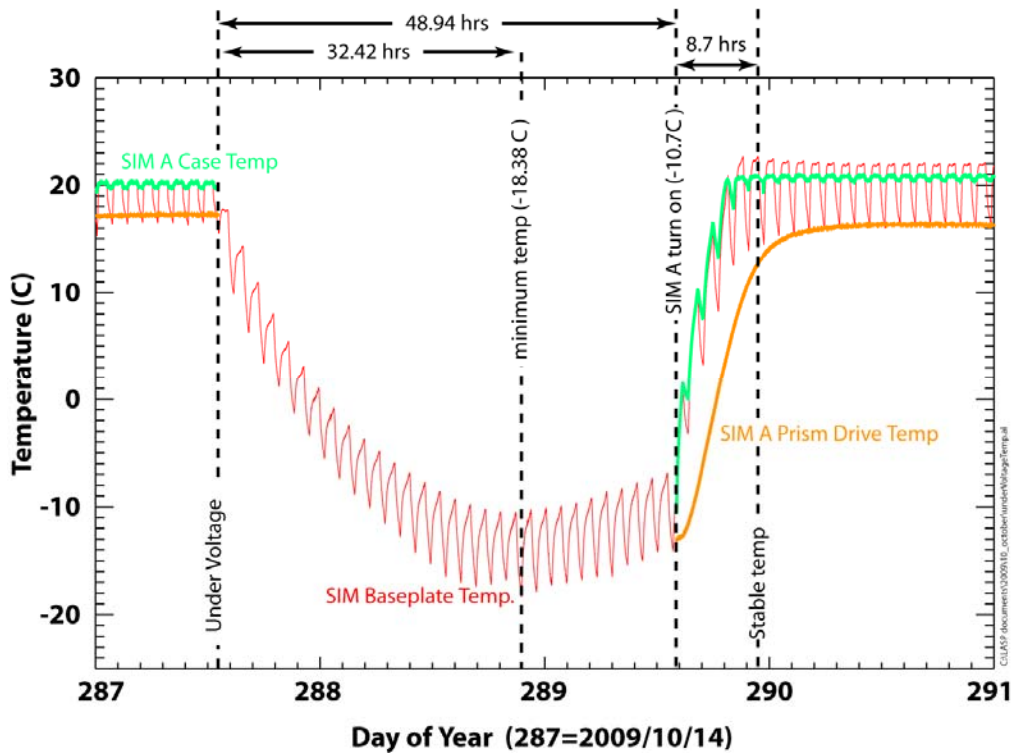
• Calibration Activities:	<u>SIM A</u>	<u>SIM B</u>
-- Prism Calibration A_cal_B	0	0
-- Prism Calibration B_cal_A	0	0
-- CCDDump	2	2
-- Image Dark	1	0
-- Image Light	1	1
-- Servo Gain 20 sec half cycle	1	1
-- Servo Gain 50 sec half cycle	0	0
-- Cruciform Scans	0	0
-- FOV Maps	0	0
• Science Activities:	<u>SIM A</u>	<u>SIM B</u>
-- ESR Full Scan Segments	0	0
-- ESR Table Scan Segments	7	0
-- 24-minute Scans	12	0
-- 24-minute Scans w/ HRT	1	1
-- IR scans	6	0

#### SIM anomalies during previous week

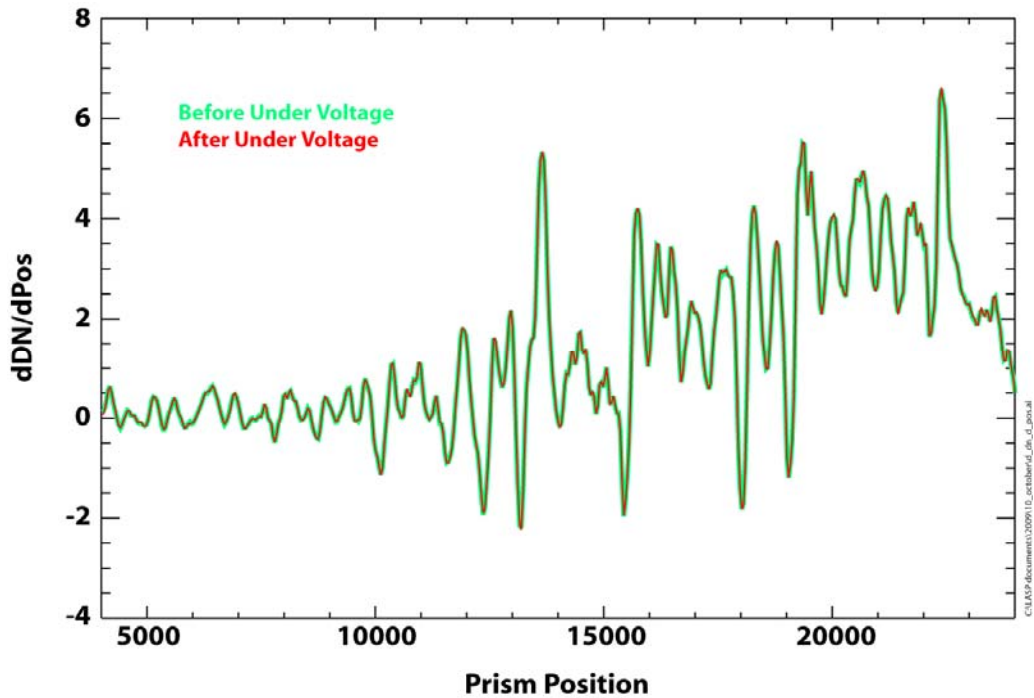
As part of the recovery for the under-voltage event which occurred Oct. 14, SIM B was turned on on Monday, Oct 19 in a nominally warmed up state because SIM A was operational for the previous 4 days. All the SIM detectors have been checked for liveness and all are operational. A quick-look check for a wavelength shift due to the temperature cold soak in SIM A was performed, and there is no significant change in the scale. Better analysis and a longer time series are required to quantify the value.

A SIM A/B comparison is scheduled for Oct. 31-Nov. 1 to ensure that no relative change in the instruments has occurred.

The two plots below show the quick-look analysis of the recovery.



This figure above shows the the recovery time-line for three important telemetry items plus additional information about temperatures. The plot below shows the rate of change of data numbers (DN) for the SIM A vis1 photodiode with respect to the prism position (Pos) before and after the undervoltage event. If a significant wavelength shift occurred, these two curves would be distinguishable. Further analysis is needed to determine the actual difference.



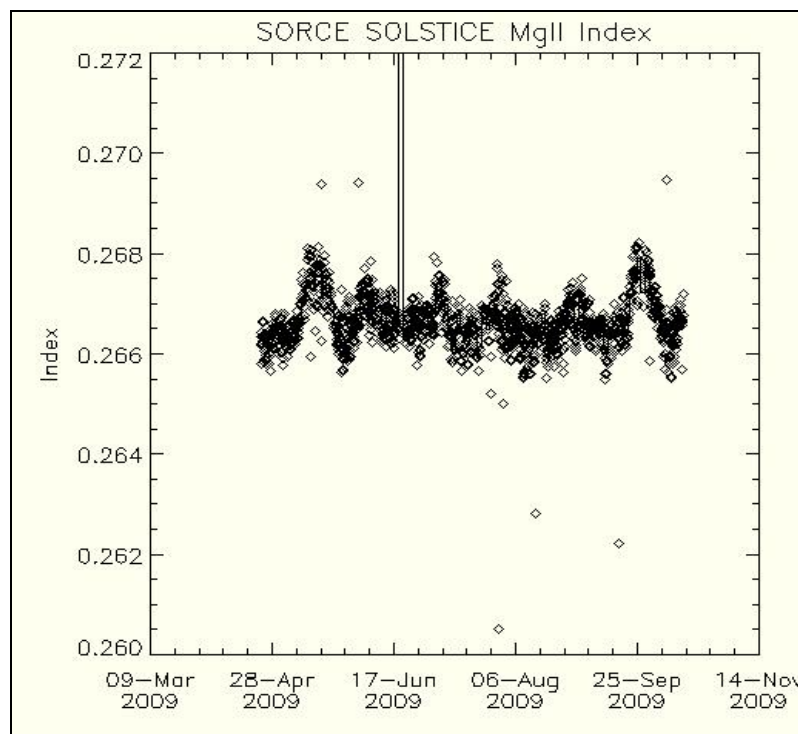
### 4.3. **SOLSTICE** (submitted by Marty Snow, October 21)

For days 2009/287 (Oct. 14) to 2009/294 (Oct. 21):

- SOLSTICE A grating drive errors:  
2009/287, 00:10:06  
2009/289, 03:58:24  
2009/290, 15:34:30
- SOLSTICE B grating drive errors:  
2009/291, 23:56:45
- Data Gaps for SOLSTICE A (date, length in minutes):  
2009/288, 23:06:02      2040 minutes  
2009/290, 15:33:36      58 minutes  
2009/290, 23:39:20      33 minutes  
2009/291, 22:18:51      42 minutes
- Data Gaps for SOLSTICE B (date, length in minutes):  
2009/288, 23:06:07      2040 minutes  
2009/289, 15:16:39      61 minutes  
2009/289, 21:45:08      45 minutes  
2009/290, 00:59:22      38 minutes  
2009/290, 15:33:40      58 minutes  
2009/291, 23:55:51      29 minutes  
2009/293, 16:23:59      63 minutes

#### SOLSTICE anomalies during previous week

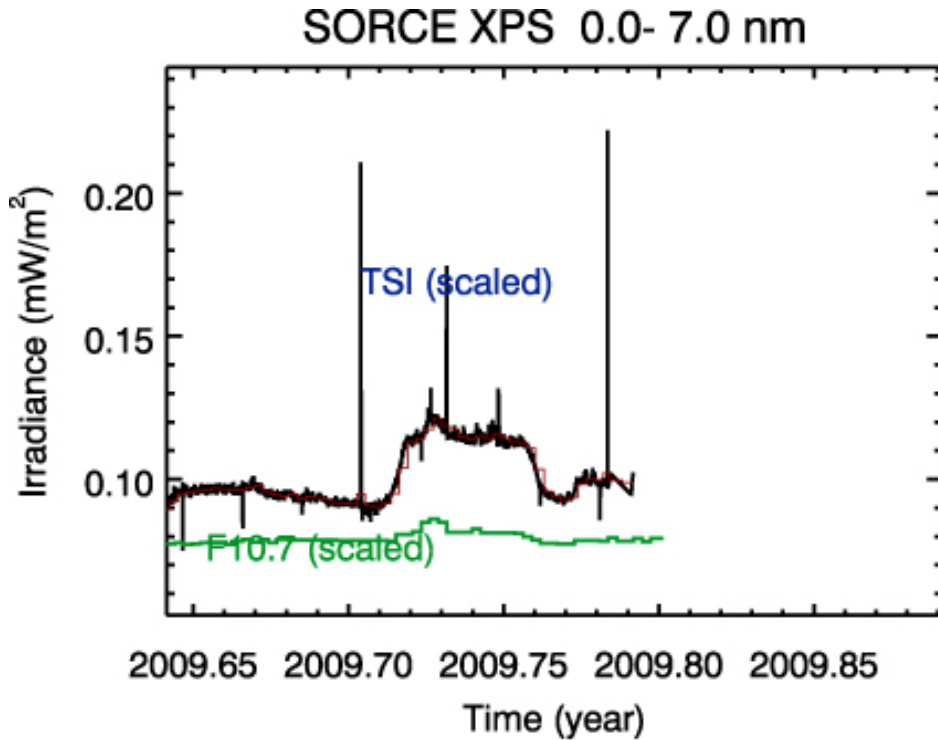
- The 2040 minute data gap starting on 2009/288 is due to the SORCE battery undervoltage event. AB Comparison experiments performed after recovery show that there were no changes to either channel of either instrument due to the event.



4.4. **XPS** (submitted by Tom Woods, 21 October)

For days 2009/282 (Oct. 9) to 2009/293 (Oct. 20):

- Number of XPS GCI errors: 12
- SORCE XPS Data Gaps:  
Wednesday, Oct. 14 for 52.385 hours
- SORCE XPS Calibration Experiment Duration:  
1121.00 sec (19 integrations) at 2009/286 23:2
- Flares: None above class M1.0



5. **Planning** (automated report submitted by Jay Kominek, October 22)

*Plans completed 15 October – 22 October:*

**SORCE Spacecraft**

Activity	Total	Total Time
Solar Rolls	339	11:32
Stellar Rolls	422	14:03
Ram Avoidance	0	0:00
Solar Alignment	4	1:29
Stellar Alignment	0	0:00
Field of View Maps	0	0:00
FSS Calibration	0	0:00
Station Contacts	14	2:33
GCI Checks	823	0:13
State Vector Upload	7	0:21
MU Checksum	1	0:12

**SIM A (Primary)**

Solar Activity	Total	Total Time
ESR Mode	7	4:26
ESR Mode with HRT	0	0:00

IR Scan	7	6:47
Quick Scan	14	5:39
Quick Scan HRT	1	0:24
<b>Calibration Activity</b>		
Fixed Wavelength	0	0:00
Servo Gain Calibration	2	1:20
Solar Alignment	0	0:00
Field of View Map	0	0:00
Prism Calibration	0	0:00
Image Light	1	0:06
Image Dark	1	0:05
ESR Full Scan	0	0:00
Dark	30	0:22
<b>Special Activity</b>		
Power Cycle Checks	207	13:48

### **SIM B (Secondary)**

<b>Solar Activity</b>	<b>Total</b>	<b>Total Time</b>
ESR Mode	0	0:00
ESR Mode with HRT	0	0:00
IR Scan	0	0:00
Quick Scan	0	0:00
Quick Scan HRT	1	0:24
<b>Calibration Activity</b>		
Fixed Wavelength	0	0:00
Servo Gain Calibration	2	1:20
Solar Alignment	0	0:00
Field of View Map	0	0:00
Prism Calibration	0	0:00
Image Light	1	0:06
Image Dark	1	0:05
ESR Full Scan	0	0:00
Dark	2	0:01
<b>Special Activity</b>		
Power Cycle Checks	207	13:30

### **SOLSTICE A (MUV)**

<b>Solar Activity</b>	<b>Total</b>	<b>Total Time</b>
Normal Scan	82	61:10
Quick Scan	47	10:54
Mini Quick Scan	41	9:24
<b>Stellar Activity</b>		
Fixed Wavelength	0	0:00
Companion	0	0:00
Stellar Scan	0	0:00
Zero Order Scan	0	0:00
Number Unique Targets	0	0:00
<b>Calibration Activity</b>		
Filter Calibration	1	1:00
Fixed Wavelength	0	0:00
AB Comparison	6	5:39
Mini 64 Scan	7	6:47
MUV Solar Alignment	0	0:00
FUV Solar Alignment	0	0:00
MUV Stellar Alignment	0	0:00
FUV Stellar Alignment	0	0:00
MUV Field of View Map	0	0:00
FUV Field of View Map	0	0:00
<b>Special Activity</b>		

Power Cycle Checks	98	4:13
Step Response Test	0	0:00

### **SOLSTICE B (FUV)**

	<b>Total</b>	<b>Total Time</b>
<b>Solar Activity</b>		
Normal Scan	83	68:08
Quick Scan	48	7:47
Mini Quick Scan	41	6:34
<b>Stellar Activity</b>		
Fixed Wavelength	376	18:53
Companion	63	3:39
Stellar Scan	10	1:11
Zero Order Scan	470	13:51
Number Unique Targets	37	38:56
<b>Calibration Activity</b>		
Fixed Wavelength	0	0:00
AB Comparison	6	5:39
Mini 64 Seam	9	6:54
MUV Solar Alignment	0	0:00
FUV Solar Alignment	0	0:00
MUV Stellar Alignment	0	0:00
FUV Stellar Alignment	0	0:00
MUV Field of View Map	0	0:00
FUV Field of View Map	0	0:00
<b>Special Activity</b>		
Power Cycle Checks	98	4:21
Step Response Test	0	0:00

### **TIM**

	<b>Total</b>	<b>Total Time</b>
<b>Solar Activity</b>		
Normal Solar	97	87:31
Normal Eclipse	105	54:30
<b>Calibration Activity</b>		
Degradation A	1	1:02
Degradation C	1	1:02
Aliveness D	0	0:00
Gain Calibration AB	1	6:00
Gain Calibration CD	0	0:00
Solar Alignment	2	1:36
Field of View Map	0	0:00
<b>Special Activity</b>		
Power Cycle Checks	200	8:36

### **XPS**

	<b>Total</b>	<b>Total Time</b>
<b>Calibration Activity</b>		
Calibration	0	0:00

Since December 2005, XPS is activated for a continuous 1-min integration at filter wheel position 6 (0.1-18 nm range) and only has a monthly calibration experiment.

## **6. Data Processing Summary**

**TIM** (submitted by Doug Lindholm, 15 October 2009)

- Status
  - Version 9 routine processing is ongoing.

- Version 9 TSI data are available on LISIRD, the SORCE web site, and the GES DISC with the new LASP ASCII file format.
- Version 10 processing code is being tested.
- Work in progress
  - Preparing for version 10 reprocessing.
  - Code modifications (generalizations) to support Glory TIM data processing.
- Future Plans
  - Field of view analysis and pointing correction.

**SOLSTICE** (submitted by Doug Lindholm, 15 October 2009)

- Status
  - Routine data processing is producing version 10 level 3 FUV and MUV SOLSTICE data products. These are available on the SORCE web site and LISIRD.
  - MgII index is being produced routinely and is available on the SORCE web site.
- Work in Progress
  - Debugging shift in wavelength correction.
  - Evaluating tasks for version 11 reprocessing.
  - Filter experiment analysis to improve dead time correction and filter transmission.
- Future Plans
  - Analysis of instrument misalignment calibration.
  - Analysis of level 3 uncertainties.
  - Improved Jan 2006 slit anomaly correction.
  - Improvement of field of view maps.

**SIM** (submitted by Doug Lindholm, 15 October 2009)

- Status
  - The routine processing of version 17 data is ongoing.
  - The level 3 data products are available on the SORCE web site and LISIRD.
- Work in Progress
  - Calibration to improve the quality of early mission data.
  - Updating SIM exposure time data.
- Future Plans
  - Process SIM B.
  - Investigate UV degradation.
  - Consider field of view correction for data affected by the filter wheel anomaly.

**XPS** (submitted by Brian Templeman, 10 September 2009)

- Version 9 XPS data are being routinely reprocessed and released.
- The safe-hold events in January did not appear to affect data quality.
- SORCE XPS Data Processing Statistics for 2009/243 to 2009/249
 

Total level 1b Observations Processed:	27031
Percent used in level 2 Processing:	54.3598
Total level 3 Observations Processed:	14694