

SORCE Weekly Status Report – 9/24/2009 to 9/30/2009

1. Introduction

This status report addresses the performance of the SORCE spacecraft, instruments, and ground assets during the week of Thursday, September 24, through Wednesday, September 30, 2009.

2. Spacecraft Summary (submitted by Deb McCabe, October 1)

SORCE team members from Orbital, NASA GSFC, and LASP met in Dulles, Virginia, at the Orbital Sciences facility on Tuesday, Sept. 29 for a Technical Interface Meeting (TIM). The group included Ed Chang, Dave Mangus, and David Jung from NASA; Dave Oberg, Grace Baird, Brian Class, Jim Bobbett, Dominick Bruno, and Robin Harris from Orbital; and Tom Woods, Tom Sparr, Sean Ryan, Deb McCabe, Bill Possel, Jerry Harder, Brian Boyle, and Mike McGrath from LASP.

The purpose of the meeting was to discuss the progress made on addressing two SORCE spacecraft anomalies and future plans. The group first addressed the SORCE reaction wheel 3 (RW3) issue. In September 2008 the operations group first noticed that RW3 was not performing properly. After weeks of analysis and exploring options RW3 was turned off, and the spacecraft continues to operate under 3-wheel control (rather than 4). Engineers have been studying and testing 2-wheel control flight software options as a back-up plan, while the scientists and data processing investigate how to maximize science results, if the spacecraft pointing were to be severely impacted.

The second half of the meeting addressed the SORCE spacecraft battery performance. In early 2009 during routine housekeeping observations, the operations team noticed that the battery was showing signs of degradation. Three of the CPVs (common pressure vessels) on the battery are experiencing reduced voltage. Engineers from LASP, Orbital, NASA, and the battery manufacturer have been investigating why this is happening and how to slow further degradation. Many options have been explored and the group met to review the best plan to maximize battery life for the remainder of the mission.

With the goal being to do everything possible to optimize the chances of SORCE flying for many years, several action items resulted from this TIM. Areas determined for further analysis and possible action for the reaction wheel situation included:

- Define planning tool constraints and update planning software
- Provide new TM data of magnetic field vector
- Simulate 2-wheel control under various scenarios
- Review all wheel failure scenarios and desired recovery plan
- Determine if the TSL-2 patch flight performance matches simulation results
- Study option/risks with patch plan for 2-wheel control software

Action items coming from the battery performance discussion included:

- Reduce eclipse load by changing control of battery heater
- Fine-tune the taper charge function
- Reduce charge rate (now 11.5 Amp) during safe mode to 9.0 Amp as table patch in APE
- Examine cell data sheets for how CPV4, 9, 10 capacity compared to others

The group will continue discussing options and progress at weekly telecons, as they have been doing over the past months. Action will be taken on items determined to be low risk and in the best interest of the spacecraft.

Regular spacecraft weekly report:

09/24	09/25	09/26	09/27	09/28	09/29	09/30
267	268	269	270	271	272	273

On DOY 267 a taper charge was applied verifying the function of this section of flight software. This was done in preparation for fine-tuning the amount of taper applied when charging the battery.

Clock slew was completed nominally on DOY 267.

There were three MU Read 0 events reported during the past week.

- 2009/267-19:18:45
- 2009/269-07:55:42
- 2009/271-19:54:2

GCI lockups:

(MINUTES)

Instrument	Lockup Time	Response Time	Duration	Lat	Lon
solstice_a	2009/268-02:28:17	2009/268-02:43:30	15.22	-28.4	-58.8
solstice_a	2009/268-09:20:36	2009/268-10:49:11	88.58	-25.9	-59.1
solstice_a	2009/269-01:01:46	2009/269-01:23:25	21.65	-18.2	-60.2
solstice_a	2009/271-02:05:02	2009/271-03:35:09	90.12	-18.8	43.7
solstice_a	2009/271-06:48:06	2009/271-08:26:38	98.53	-33.9	-57.6
solstice_a	2009/271-20:55:43	2009/271-21:23:59	28.27	-15.8	-20.5
solstice_b	2009/268-11:02:51	2009/268-12:26:13	83.37	-14.6	-67.9
solstice_b	2009/270-03:01:50	2009/270-03:17:40	15.83	-33.0	-69.8
solstice_b	2009/270-23:57:27	2009/271-00:20:43	23.27	-22.7	-50.1
solstice_b	2009/272-07:14:10	2009/272-08:44:07	89.95	-12.7	-33.2
sim_a	2009/267-02:11:19	2009/267-02:25:00	13.68	-25.4	-53.7
sim_a	2009/267-08:59:48	2009/267-10:01:53	62.08	-34.8	-67.8
sim_a	2009/268-09:15:45	2009/268-10:19:27	63.70	-34.2	-76.5
sim_a	2009/269-00:57:29	2009/269-01:21:50	24.35	-8.8	-71.7
sim_a	2009/269-02:45:20	2009/269-02:58:59	13.65	-31.2	-63.5
sim_a	2009/271-22:34:30	2009/271-22:59:35	25.08	-19.8	-40.0
sim_a	2009/272-07:01:48	2009/272-07:05:27	3.65	-36.0	-74.2
sim_a	2009/273-00:39:14	2009/273-00:54:25	15.18	-38.8	-30.2
sim_b	2009/267-03:52:29	2009/267-04:02:13	9.73	-32.7	-64.0
sim_b	2009/267-09:04:32	2009/267-10:01:57	57.42	-27.1	-50.7
sim_b	2009/267-10:53:07	2009/267-11:39:07	46.00	-1.1	-42.2
sim_b	2009/268-02:41:51	2009/268-03:50:50	68.98	-39.6	-2.1
sim_b	2009/268-09:24:29	2009/268-10:19:32	55.05	-17.5	-46.9
sim_b	2009/270-01:25:01	2009/270-01:39:06	14.08	-33.3	-44.4
sim_b	2009/270-08:19:05	2009/270-09:17:52	58.78	-15.9	-40.9
sim_b	2009/271-01:45:01	2009/271-01:56:28	11.45	-38.5	-35.8
sim_b	2009/271-08:30:57	2009/271-09:35:46	64.82	-23.3	-61.5
sim_b	2009/272-05:23:47	2009/272-05:28:21	4.57	-37.1	-53.6
sim_b	2009/272-22:50:40	2009/272-23:17:19	26.65	-21.5	-48.0
tim	2009/268-09:24:33	2009/268-10:16:53	52.33	-17.5	-46.9
tim	2009/268-23:17:55	2009/268-23:46:06	28.18	-2.6	-53.9
tim	2009/270-10:09:09	2009/270-10:52:24	43.25	15.1	-30.5
tim	2009/270-15:08:21	2009/270-15:43:58	35.62	31.3	-78.9
tim	2009/270-20:44:31	2009/270-21:06:18	21.78	-24.8	2.6
tim	2009/271-03:19:22	2009/271-03:34:59	15.62	-35.9	-71.9
tim	2009/272-01:59:52	2009/272-02:15:20	15.47	-38.1	-48.7
XPS	2009/267-04:08:00			-35.7	3.3
XPS	2009/267-09:05:43			-24.8	-46.9
XPS	2009/267-21:36:38			-27.3	13.3
XPS	2009/267-23:08:49			-17.3	-26.4
XPS	2009/268-09:23:14			-20.4	-50.8

XPS	2009/270-01:19:07	-22.8	-64.3
XPS	2009/270-04:50:51	-38.9	-42.3
XPS	2009/270-04:59:35	-27.3	-8.2
XPS	2009/270-06:35:21	-29.5	-37.0
XPS	2009/271-01:56:32	-34.5	14.9
XPS	2009/271-20:55:19	-15.1	-21.4
XPS	2009/273-00:30:33	-27.1	-63.9

	SIM A	SIM B	SOL A	SOL B	TIM	XPS*
Week	8	11	6	4	7	12
Total	2129	2699	1463	1739	2347	2199

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

Fourteen ground station contacts and two TDRSS contacts were performed over the past week.

	Captured VCDUS	Recorded VCDUS	%
SC housekeeping	316683	316684	100
IM housekeeping	43076	43077	100
Science	309485	309486	100

4. Instrument Status

4.1. TIM (submitted by Greg Kopp, September 30)

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
- Preparing for 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 showing continued stability

TIM anomalies during previous week

- None

4.2. SIM (submitted by Jerry Harder, October 1)

For days 2009/267 (Sept. 24) to 2009/274 (Oct. 1):

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	2	2
-- Servo Gain 50 sec half cycle	1	1
-- 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	14	0
-- 24-minute Scans w/ HRT	0	0
-- IR scans	7	0

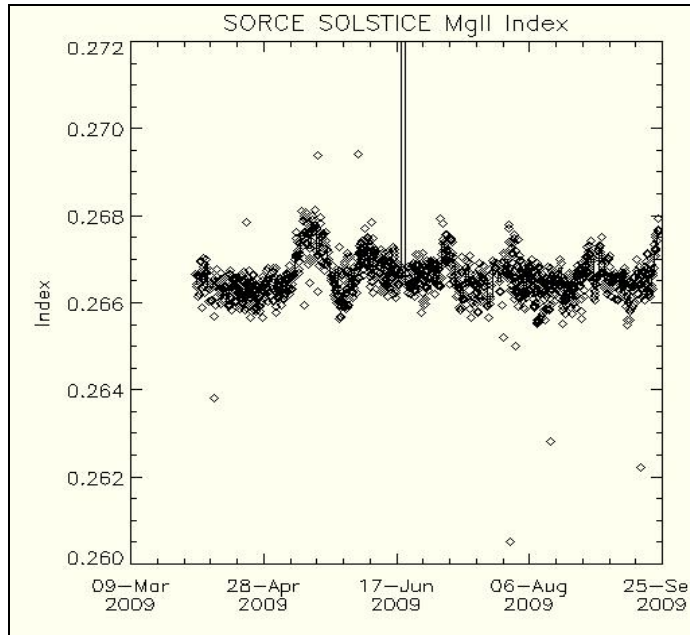
SIM Additional Activities

- None

4.3. SOLSTICE (submitted by Marty Snow, Sept. 30)

For days 2009/266 (Sept. 23) to 2009/273 (Sept. 30):

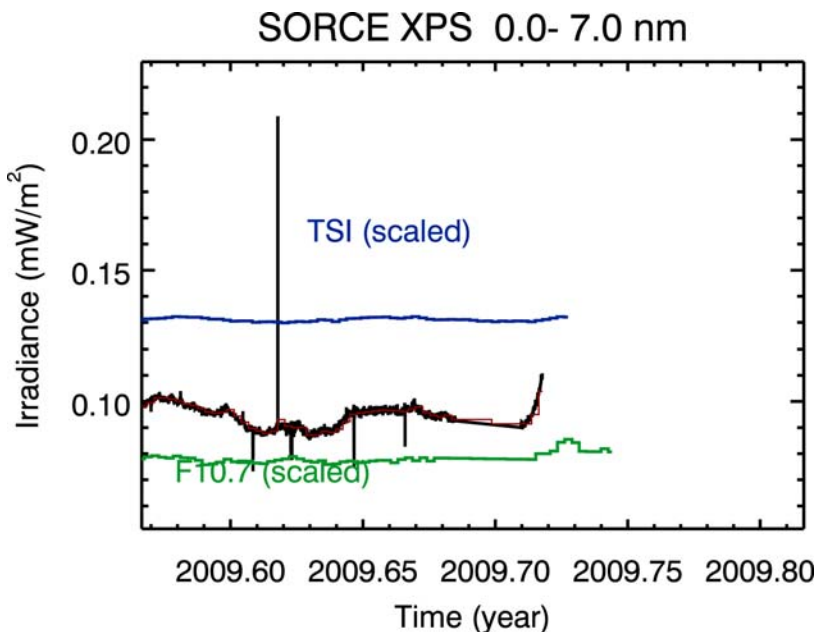
- SOLSTICE A grating drive errors:
2009/269, 01:25:03
- SOLSTICE B grating drive errors:
2009/271, 00:22:23
- Data Gaps for SOLSTICE A (date, length in minutes):
2009/266, 10:16:13 88 minutes
2009/268, 02:44:17 16 minutes
2009/268, 10:49:58 89 minutes
2009/269, 01:24:12 22 minutes
2009/271, 03:36:11 91 minutes
2009/271, 08:27:25 99 minutes
2009/271, 21:24:46 29 minutes
- Data Gaps for SOLSTICE B (date, length in minutes):
2009/266, 10:16:20 88 minutes
2009/268, 12:27:00 84 minutes
2009/270, 03:18:27 17 minutes
2009/271, 00:21:30 24 minutes
2009/272, 08:44:54 91 minutes



4.4. **XPS** (submitted by Tom Woods, 30 September)

For days 2009/261 (Sept. 18) to 2009/272 (Sept. 29):

- Number of XPS GCI errors: 19
- SORCE XPS Data Gaps: None
- SORCE XPS Calibration Experiment Duration: None
- Flares: None above class M1.0



5. **Planning** (automated report submitted by Jay Kominek, October 1)

Plans completed 24 September – 01 October:

SORCE Spacecraft

Activity	Total	Total Time
Solar Rolls	359	12:10
Stellar Rolls	449	13:42
Ram Avoidance	0	0:00
Solar Alignment	4	1:23
Stellar Alignment	0	0:00
Field of View Maps	0	0:00
FSS Calibration	0	0:00
Station Contacts	14	3:13
GCI Checks	834	0:13
State Vector Upload	7	0:21
MU Checksum	1	0:12

SIM A (Primary)

Solar Activity	Total	Total Time
ESR Mode	7	5:26
ESR Mode with HRT	0	0:00
IR Scan	7	7:24
Quick Scan	16	6:28
Quick Scan HRT	0	0:00

Calibration Activity		
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	2	1:14
Dark	32	0:24
Special Activity		
Power Cycle Checks	209	13:56

SIM B (Secondary)

Solar Activity	Total	Total Time
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	0	0:00
Calibration Activity		
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	0	0:00
Special Activity		
Power Cycle Checks	209	13:38

SOLSTICE A (MUV)

Solar Activity	Total	Total Time
Normal Scan	93	77:30
Quick Scan	43	11:47
Mini Quick Scan	35	10:06
Stellar Activity		
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
Calibration Activity		
Filter Calibration	1	1:04
Fixed Wavelength	0	0:00
AB Comparison	1	0:54
Mini 64 Scan	7	7:25
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
Special Activity		
Power Cycle Checks	104	4:28
Step Response Test	1	0:02

SOLSTICE B (FUV)

Solar Activity	Total	Total Time
Normal Scan	94	85:16
Quick Scan	44	8:18
Mini Quick Scan	37	6:58
Stellar Activity		
Fixed Wavelength	590	21:19
Companion	36	2:06
Stellar Scan	19	2:40
Zero Order Scan	291	8:33
Number Unique Targets	41	35:24
Calibration Activity		
Fixed Wavelength	0	0:00
AB Comparison	1	0:54
Mini 64 Seam	7	7:25
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
Special Activity		
Power Cycle Checks	104	4:37
Step Response Test	1	0:02

TIM

Solar Activity	Total	Total Time
Normal Solar	103	111:48
Normal Eclipse	115	51:59
Calibration Activity		
Degradation A	1	1:07
Degradation C	0	0:00
Aliveness D	0	0:00
Gain Calibration AB	0	0:00
Gain Calibration CD	0	0:00
Solar Alignment	2	1:27
Field of View Map	0	0:00
Special Activity		
Power Cycle Checks	209	8:59

XPS

Calibration Activity		
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, 1 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.
 - Calibration updates are complete and preparations are being made for version 10 reprocessing.

- 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, 1 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.

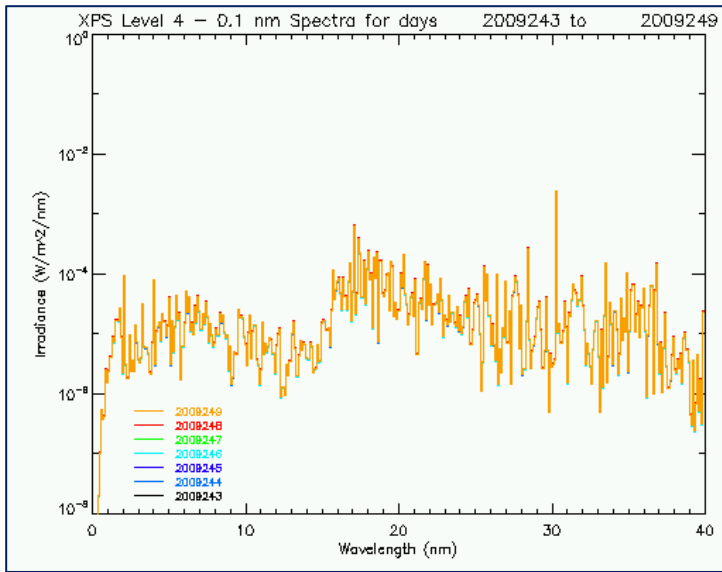
SIM (submitted by Doug Lindholm, 1 October 2009)

- 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.
 - Testing of new SIM exposure time algorithm.
- Future Plans
 - Process SIM B.
 - Investigate UV degradation.
 - Consider field of view correction for data affected by the filter wheel anomaly.

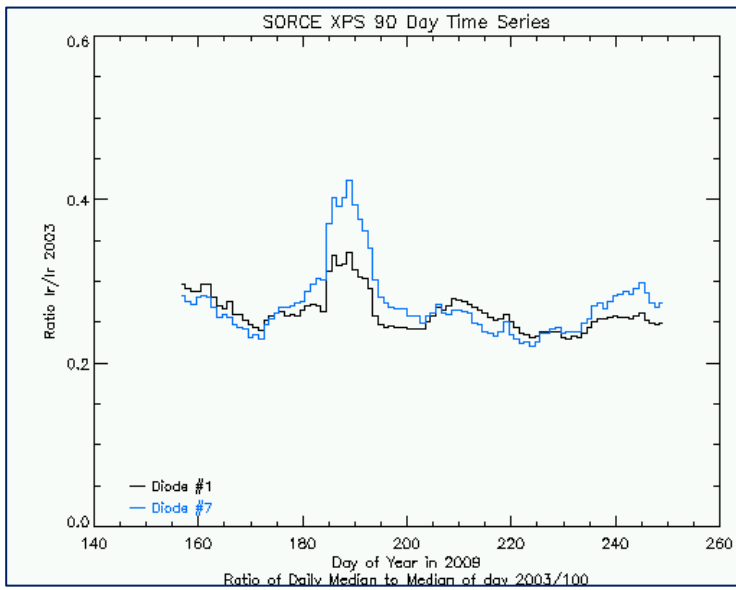
XPS (submitted by Brian Templeman, 10 September 2009)

- 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



Weekly Image



Diode Time Series