

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 216
Week 45
13.11.06
Routine Phase

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1 General

The Flight Control Team at MOC has compiled this report with some input provided by the Flight Dynamics Team, ISOC and ISDC.

It addresses the activities from 04.11.06 until 10.11.06 (both dates inclusive) and covers the revolutions 496, 497 and 498.

2 Summary of Activities

The operations were performed according to the planning inputs from ISOC combined with some manual commanding by MOC.

The targets of these revolutions consisted of three raster dithers of the Region at $l=0$, $b=-25$ (RA 19:36:28.82, DEC -39:08:24.8), a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), and a raster dither of the Galactic Plane Region 3.

Note: Some further information concerning the activities is provided in the Appendix.

3 Satellite Status

3.1 Platform

The performance of the platform was good. No new unexpected behaviour / malfunction was identified.

3.1.1 AOCS

The AOCS operations were performed from the timeline during this period.

The Eclipse season continued with the fourth (04/11/2006), fifth (7/11/2006) and sixth (10/11/2006) eclipse passages. The eclipse passages were nominal from an AOCS point of view.

As part of the AOCS preparation for the summer eclipse season, were verified the load of the TT sequence to re-enable the IMU Auto Switch-Off function in the ACC and the Eclipse ACC\FDE\FCE timers.

No slews were missed during the observation period.

The fuel consumption over the period between 02/11/2006 and 09/11/2006 was 0.1656 Kg. The remaining propellant is in the order of 149.9868 Kg.

Note: Some more information concerning the AOCS operations and the fuel budget is provided in the Appendix.

3.1.2 Power

The EPS is working nominally, available power from the arrays is of the order of 2100W.

Eclipse Passage:

During the reporting period Integral passed through eclipses #4 (04/11/2006), #5 (07/11/2006) and #6 (10/11/2006) of eclipse season #9, details are in the table below:

Penumbra Entry	Umbra Entry	Umbra Exit	Penumbra Exit	Total Duration	Umbra duration	Observed DOD B1	Observed DOD B2	Mean discharge Current in Umbra B1	Mean discharge Current in Umbra B2	Recharge Duration Battery1	Recharge Duration Battery2
19:05:54	19:07:14	20:05:49	20:07:35	1:01:41	0:58:35	5.94Ah	5.88Ah	5.89	5.83	3:35:16	3:33:08
18:54:11	18:55:30	19:56:22	19:58:10	1:03:59	1:00:52	6.22Ah	6.15Ah	5.72	5.65	3:46:09	3:43:48
18:44:03	18:45:32	19:43:59	19:45:55	1:01:52	0:58:27	5.89Ah	5.81Ah	5.52	5.46	3:34:56	3:32:32

From the EPS point of view the eclipse passage was nominal.

3.1.3 Thermal

The thermal control of the satellite is working well. The temperatures are currently all within the specified operational limits.

3.1.4 OBDH

The OBDH subsystem is working flawlessly. No on-board communications problem has been identified.

3.1.5 RFS

The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

3.2 Payload

3.2.1 SPI

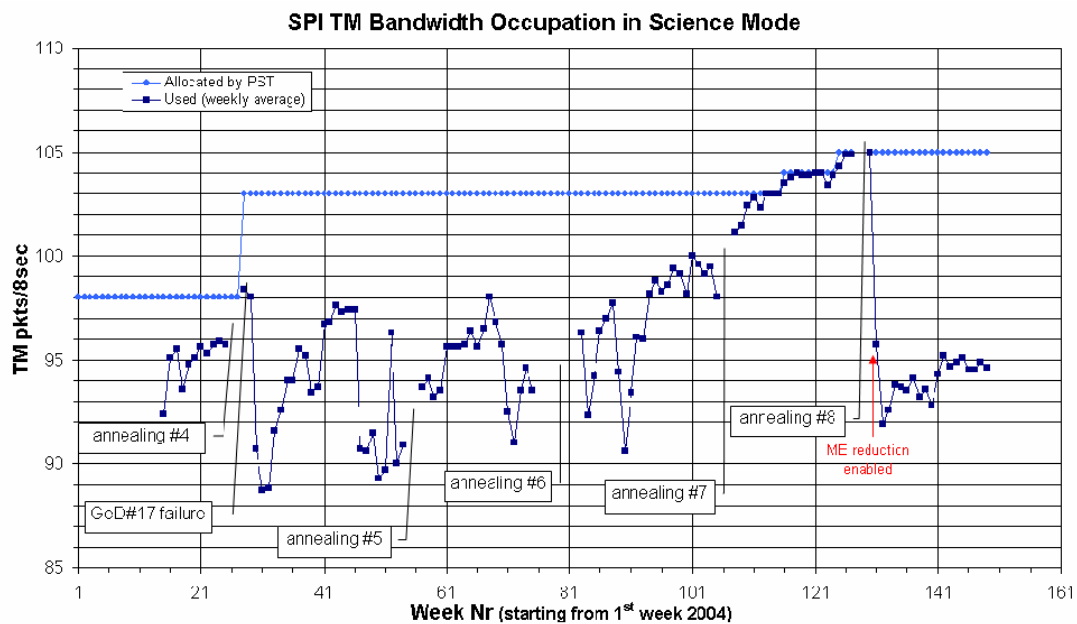
Following the 8th annealing, which ended on 26th June, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detectors #4 and #12 which are showing a slightly degraded energy resolution. The energy resolution of GeD#15 was recovered with this annealing. Detector #2 is failed since 06.12.2003 and detector #17 since 17.07.2004.

The Stirling compressors are working nominally, maintaining the Germanium detectors at 80 +/-1K.

Following analysis of the SPI FEE 81 anomaly on 2006-10-29 (INT_SC-162) and recommendation by the SPI team, the FEE 81 was switched off on 2006-11-09 starting at 16:24Z. SPI was back in Photon mode at 16:31Z.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth in the science observation windows was 105 packets/cycle and the average telemetry occupation when the allocation was 105 packets/cycle was 94.6 packets/cycle.

The following plot shows the assigned and the average occupation of the SPI TM bandwidth.



Note: Some more information concerning the SPI operations is provided in the Appendix.

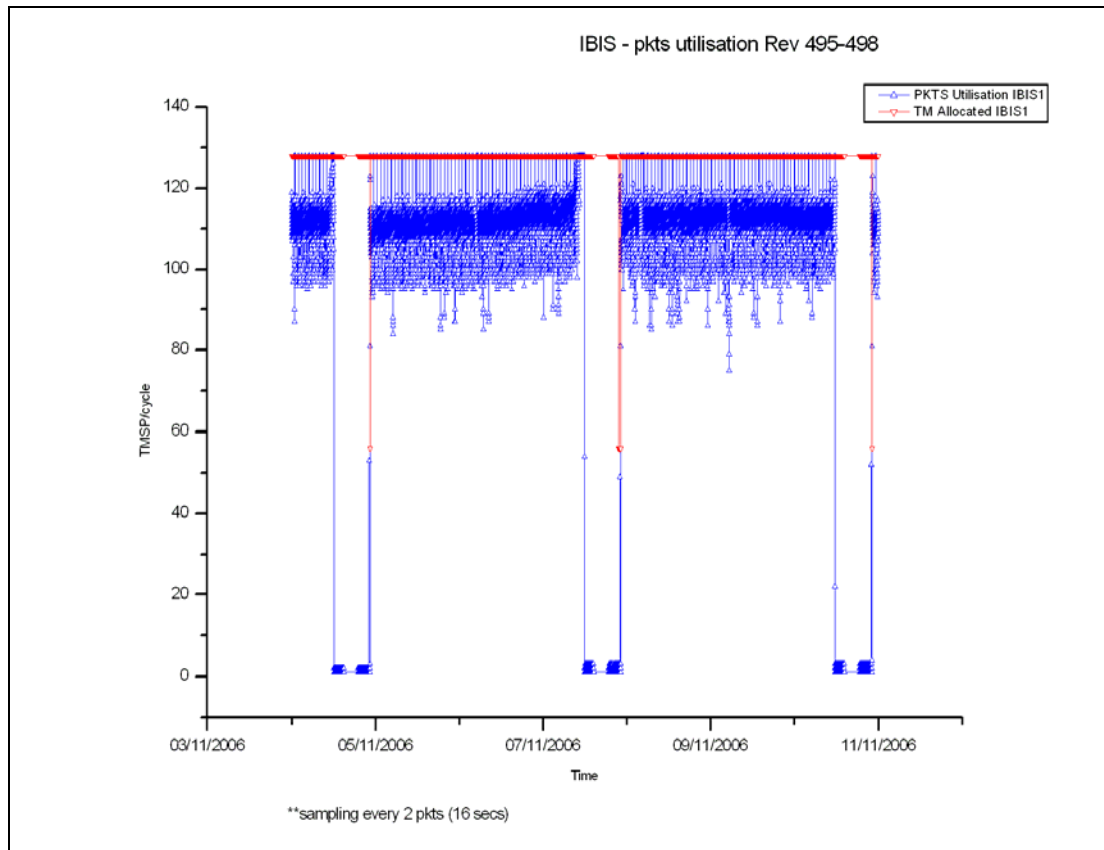
3.2.2 IBIS

The overall status of the unit is nominal.

The Eclipse season started on 26/10/2006. From the unit point of view, the eclipse passages were nominal this week.

During the reporting period, the PST allocation to IBIS was 128 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 112.38 TMPS/cycle, up 3.92 on last week.

A plot of the IBIS TM utilisation during the observation period is shown below:



Note: Some more information concerning the IBIS operations is provided in the Appendix.

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

JEM-X1 was operated in Data Taking mode with a TM allocation of 8 packets/cycle during science observations. JEM-X2 was dormant (DPE OFF) with no TM slots allocated.

Further information on the JEM-X operations can be found in the Appendix Section 8.3.4.

3.2.4 OMC

The status of OMC is nominal.

OMC operations were performed by the automatic Timeline. OMC was operated in Science Normal mode during science observations, with a TM allocation of 5 packets/cycle.

During this reporting period, all of the 131 planned science pointings for OMC were executed nominally.

Note: Some more information concerning the OMC operations is provided in the Appendix Section 8.3.5.

3.2.5 IREM

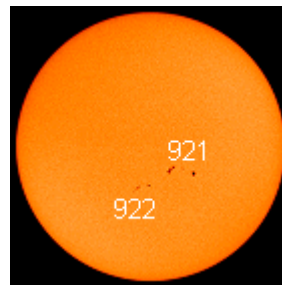
The overall status of the unit is nominal.

On 31/10/2006, at 02:18Z, the IREM CSCI SW reset #37 occurred during the science observations of revolution 494, which were interrupted as a result for IBIS and OMC (see INT_SC-164). For the first time this reset was not due to a Checksum Failure but a Watchdog Elapsed.

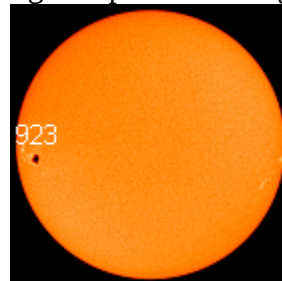
Solar Activity

The observation period was characterised by low to moderate solar activity.

At the beginning of the observation period, 2 small sunspots (921 and 922) were present on the sun (see picture on 05/11/2006). Sunspot 921 posed a threat for M-class solar flares until 06/11/2006. From 07/11/2006 to 09/11/2006 both sunspots were decaying.



From 10/11/2006 (see picture), big sunspot 923 emerged but posed no threat.



Reference: www.spaceweather.com

Note: Some more information concerning the IREM operations is provided in the Appendix Section 8.3.6.

4 Ground Facilities

The Operational ground facilities performance was excellent this week. No slews were lost, and no science lost to ground problems. The overall performance was nearly 100%.

4.1 Mission Operations Centre

The performance of the MOC was good this week. The main problem reported was the TC History task crashing. The overall performance was nearly 100%.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There was, however, a drop on the line with Redu, without impact. There were also two occasions of errors sending data to the isds. The overall performance was nearly 100%.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs have been received up to revolution 505. Observations have been planned up to revolution 502 including startracker and inertia calibrations. For further planning, also the question of a possible SPI annealing in beginning of December must be settled.

TSF's up to revolution 500 have been received.

2. Observation status

ECS have been received and processed up to revolution 489 with no gaps.

3. ISOC Science Data Archive

Further hardware problems have plagued the archive file system requiring repeated attempts from Sun to solve the problems found and support during a holiday from the computer support staff.

The ingest of ISDC data is a few weeks behind for the ScW data. For JEM-X & IBIS OG data, progress is pending on the disk expansion, which was delayed by the above mentioned problems.

Testing of the ISDA 2.6 beta 1 brought up various issues that must be resolved before a release. A progress meeting on these issues is set for 14 Nov.

4. ISOC system

The ISOC planning software is operating nominally. Work is continuing as planned on v14.0

The Mailer stopped due to a full disk on intecm, hampering proposal submission feedback. The problem was fixed and a check for sufficient disk-space will be implemented.

5. Problems

The continued problems with the Sun hardware for the Archive have delayed progress there and led to repeated downtimes for the ISDA.

Due to a general downtime at ESTEC, the ISOC Web pages had to be rolled back to a previous state during the weekend.

4.3.2 ISDC

Status of ISDC observation processing on 13/11/2006:

- Latest Standard Analysis completed: observation 04201040076 (object 2030+375, Revolution 486) on 11/11/2006.
- Latest products archived: observation 04201040076 (object 2030+375, Revolution 486) on 13/11/2006.
- Latest observation products sent to the observer: observation 04201040076 (object 2030+375, Revolution 486) on 13/11/2006.

5 Special Events

6 Anomalies

There were no problems reported that impacted operations this week.

There were no new anomaly reports entered into the ARTS system this week:

7 Future Milestones

The current eclipse season started on 26/10/2006, it consists of 8 eclipses. The maximum duration will be just over one hour on 7th November.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 496

The observations in revolution 496 consisted entirely a raster dither of the Region at l=0, b=-25 (RA 19:36:28.82, DEC -39:08:24.8), lasting ~57.9 hours, until the end of the revolution.

Revolution 497

The observations in revolution 497 began with a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), lasting ~5.6 hours. It continued with a raster dither of the Region at l=0, b=-25 (RA 19:36:28.82, DEC -39:08:24.8), lasting ~52.0 hours, until the end of the revolution.

Revolution 498

The observations in revolution 498 began with a raster dither of the Region at l=0, b=-25 (RA 19:36:28.82, DEC -39:08:24.8), lasting ~15.7 hours. It continued with a raster dither of the Galactic Plane Region 3, lasting ~41.2 hours, until the end of the revolution.

Throughout these observations all instruments were in their nominal science modes, except JEM-X2, which is switched off. The TM allocation was IBIS 128; SPI 105; JEM-X1 8; JEM-X2 0; OMC 5.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2006-10-26T12:47:23.000Z	150.3839	F	Automatic TM processing.
2006-10-26T14:45:47.000Z	150.3104	F	Automatic TM processing.
2006-10-28T06:18:39.000Z	150.2962	F	Automatic TM processing.
2006-10-29T04:24:57.000Z	150.2592	F	Automatic TM processing.
2006-10-29T12:17:06.000Z	150.2379	F	Automatic TM processing.
2006-10-29T20:59:15.000Z	150.2189	F	Automatic TM processing.
2006-11-01T12:55:14.000Z	150.2028	F	Automatic TM processing.
2006-11-01T20:57:39.000Z	150.1524	F	Automatic TM processing.
2006-11-04T14:06:18.000Z	150.1218	F	Automatic TM processing.
2006-11-04T20:53:07.000Z	150.1142	F	Automatic TM processing.
2006-11-06T05:08:30.000Z	150.0944	F	Automatic TM processing.
2006-11-07T13:59:05.000Z	150.0547	F	Automatic TM processing.
2006-11-07T20:45:22.000Z	150.0129	F	Automatic TM processing.
2006-11-08T04:13:23.000Z	150.0078	F	Automatic TM processing.
2006-11-09T05:30:21.000Z	149.9868	F	Automatic TM processing.

This report was generated Fri Nov 10 08:00:32 GMT 2006

8.3 Detailed Satellite Information

This section contains some detailed information concerning the various subsystems of the satellite and instruments.

8.3.1 AOCS SUMMARY OPERATIONS REPORT, 04/11/2006 – 10/11/2006

AOCS operations were executed from the Automatic Timeline.

During this period, 66 Open Loop Slews, 70 Closed Loop Slews and 9 Momentum Biases were executed.

No slews were missed during the observation period.

The AOCS eclipse operations were nominal. The ACC\FDE\FCE Eclipse Timers and the Time-Tagged sequence to re-enable the IMU Auto Switch-Off function of the ACC were loaded from the Timeline and the pre-eclipse IMU health checks was performed at the planned times. Some information regarding the eclipse times and IMU usage up to this stage of the eclipse season are provided below:

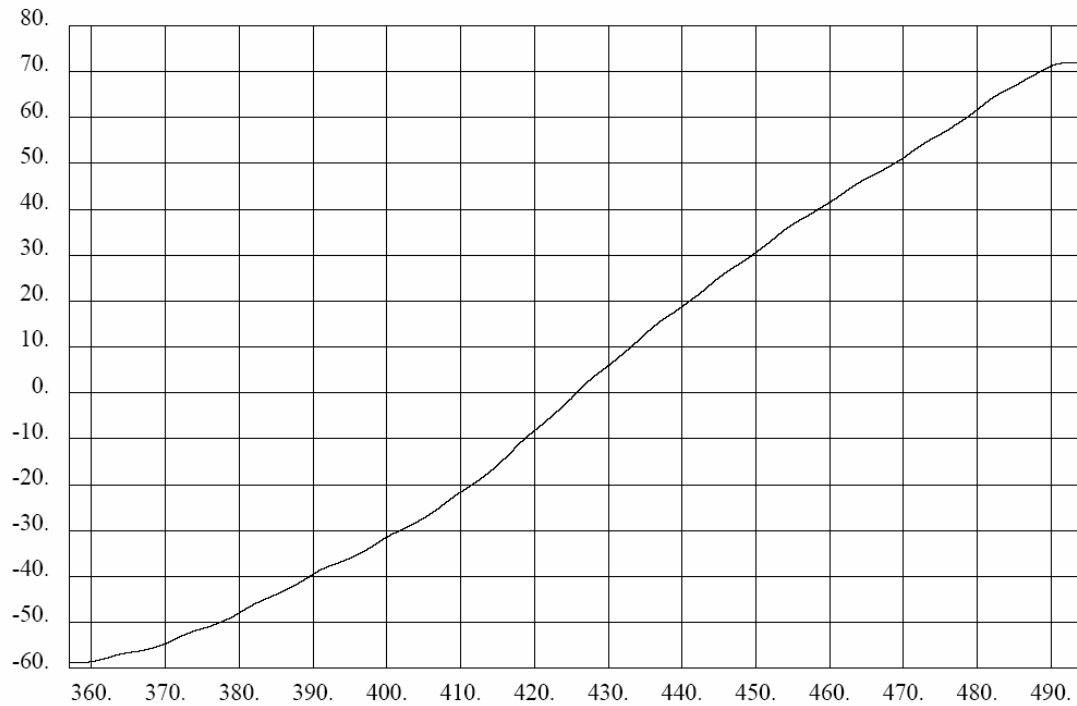
AOCS Eclipse Times															Winter 2006	
Date	LOS	AOS	ACC Eclipse Imminent	Eclipse Start						Eclipse End						Eclipse Duration
				ACC	FDE	FCE	Penumbra	FSS Sun Out	Umbra	Umbra	FSS Sun In	Penumbra	FDE/FCE	ACC		
2006-10-26	15:14:26	19:36:00	18:45:14	19:25:54	19:35:23	19:36:07	19:44:54	19:47:25	19:48:05	20:07:25	20:08:18	20:10:59	20:14:27	20:19:21	0:26:05	
2006-10-29	15:02:00	19:25:00	18:28:40	19:10:41	19:19:53	19:20:37	19:28:20	19:30:22	19:30:02	20:10:57	20:12:01	20:13:04	20:17:17	20:22:47	0:44:44	
2006-11-01	14:54:00	19:14:00	18:16:58	18:58:59	19:08:09	19:08:53	19:16:38	19:19:12	19:18:01	20:10:19	20:12:00	20:12:07	20:16:33	20:21:50	0:55:29	
2006-11-04	15:02:00	19:02:00	18:08:36	18:48:12	18:58:55	18:59:39	19:08:16	19:09:24	19:09:36	20:08:12	20:08:32	20:09:57	20:13:11	20:17:15	1:01:41	
2006-11-07	14:38:00	18:49:00	17:57:53	18:39:51	18:50:44	18:51:28	18:57:33	18:58:42	18:58:54	19:59:45	20:00:04	20:01:33	20:07:12	20:11:14	1:04:00	
2006-11-10	14:14:00	18:41:00	17:48:41	18:30:42	18:41:57	18:42:41	18:48:21	18:49:36	18:49:50	19:48:18	19:48:39	19:50:13	19:56:13	19:59:55	1:01:52	

IMU Usage during Eclipse Season						Winter 2006
IMU On	IMU Off	From Health Check		From Auto Calibration	On Time	Accumulated On Time
		Noise Roll [as/s]	Drift Roll [as/s]	Drift Roll [as/s]		
2006-10-26 12:00:41	2006-10-26 20:21:37	0.2423	0.2417	0.2313	8:20:56	8:20:56
2006-10-29 11:39:32	2006-10-29 20:25:04	0.2136	0.2138	0.2370	8:45:32	17:06:28
2006-11-01 12:15:34	2006-11-01 20:24:06	0.1956	0.2434	0.2549	8:08:32	25:15:00
2006-11-04 12:14:55	2006-11-04 20:19:34	0.2150	0.2829	0.3143	8:04:39	33:19:39
2006-11-07 11:18:36	2006-11-07 20:13:28	0.1825	0.2533	0.3144	8:54:52	42:14:31
2006-11-10 10:56:51	2006-11-10 20:02:16	0.2186	0.1431	0.1635	9:05:25	51:19:56

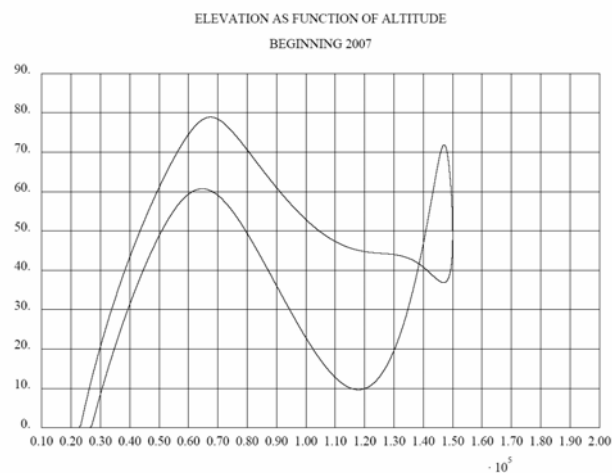
Orbit Control

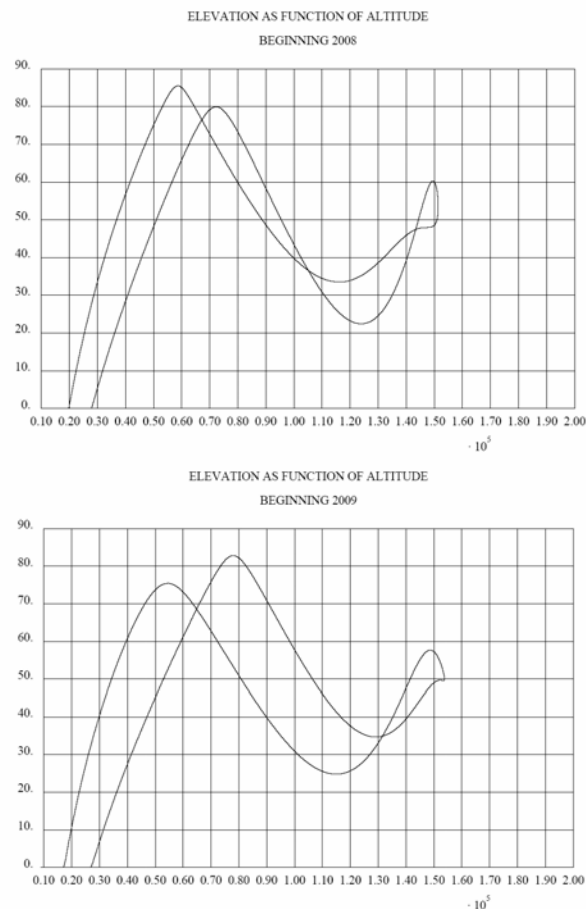
The attached plot shows the apogee longitude of Integral as a function of the orbit The attached plot shows the apogee longitude of Integral (in deg East) as a function of the orbit number for the period September 2005 - October 2006. At present time the drift rate is close to zero and there is REDU coverage starting 1h53m before ascending through altitude 40000 km after a perigee passage and ending 51m after descending through altitude 40000 km before a perigee passage.

APOGEE LONGITUDES OF INTEGRAL 16.9.2005 - 31.10.2006



The target is to maximise the coverage, before ascending through altitude 40000 km, after a perigee passage, subject to the constraint of having 1 hour of coverage, after having descended through altitude 40000 km, before a perigee passage. The resulting coverage (elevation in deg as a function of the altitude in km) is displayed in the following 3 plots:





With 1 hour coverage after having descended through altitude 40000 km the coverage before ascending through altitude 40000 km will be:

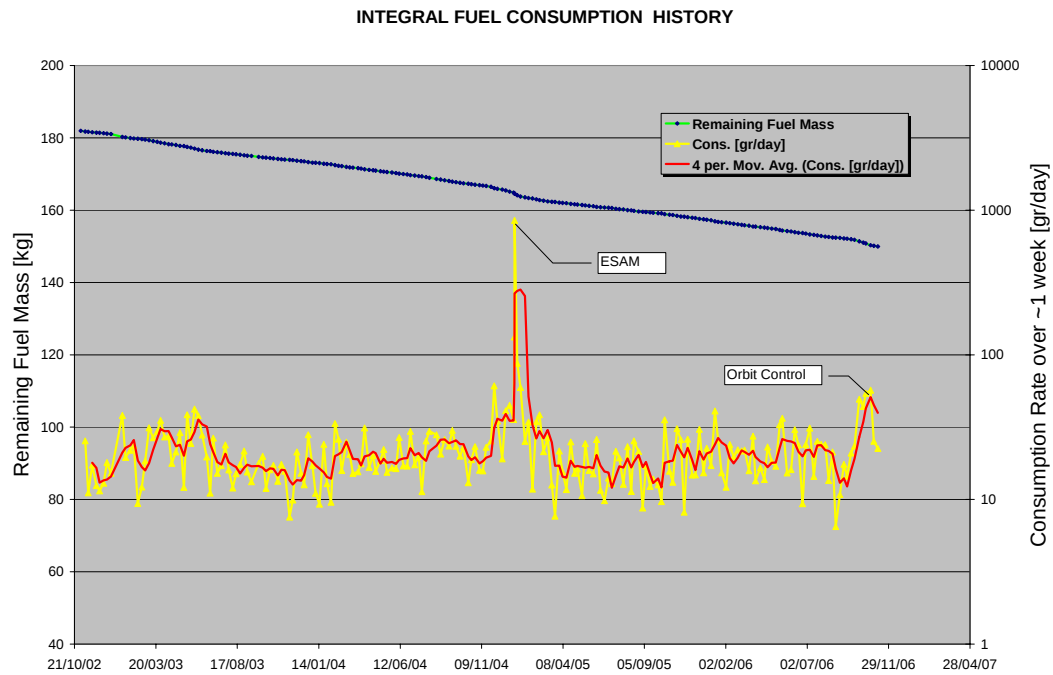
	Coverage before ascending through altitude 40000 km
Beginning 2007	1h45m
Beginning 2008	1h54m
Beginning 2009	1h59m

There is therefore no need for a second ground station.

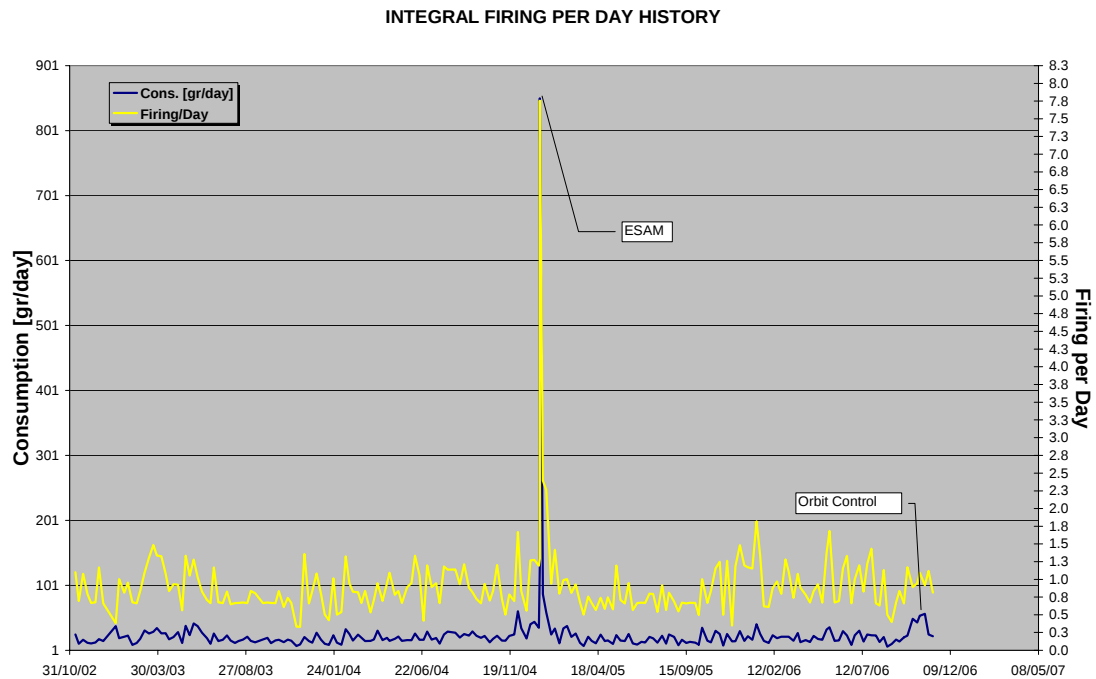
Fuel consumption

The fuel consumption (total, grams/day) over the period between 01/11/2002 and 09/11/2006 is reported in the plot below.

The large fuel consumption observed in the last weeks is due to the combination of the strategy to perform artificial large momentum dump manoeuvres when the pointing is suitable for orbit control and the starting of the eclipse season.

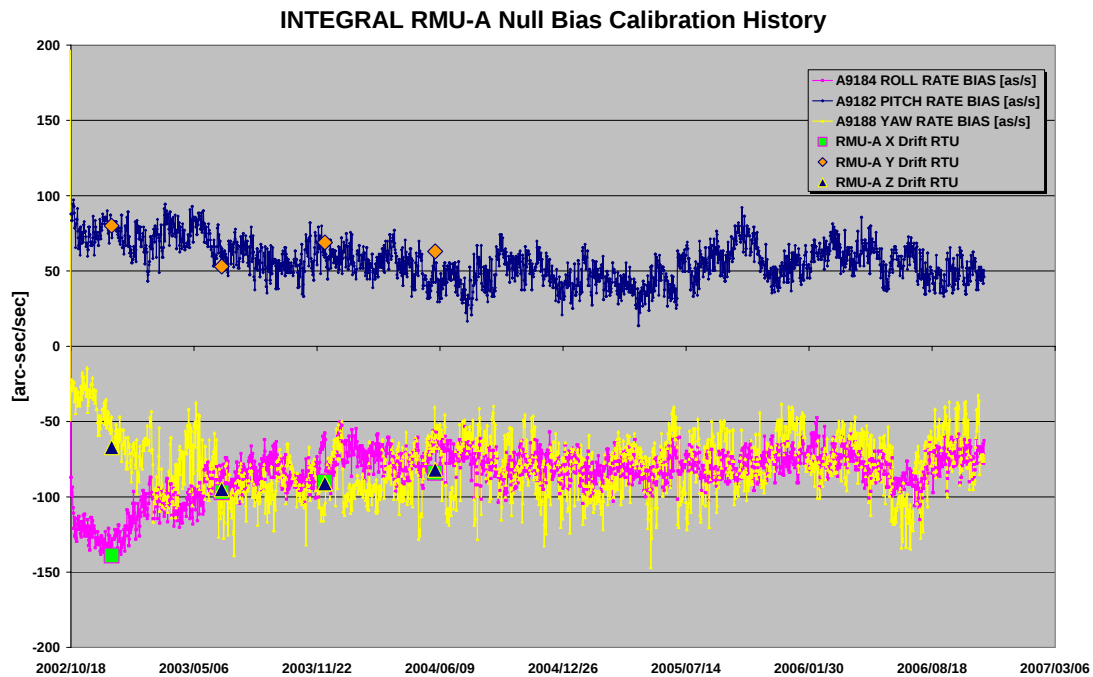


The firing\day over the period between 01/11/2002 and 09/11/2006 is reported in the plot below.

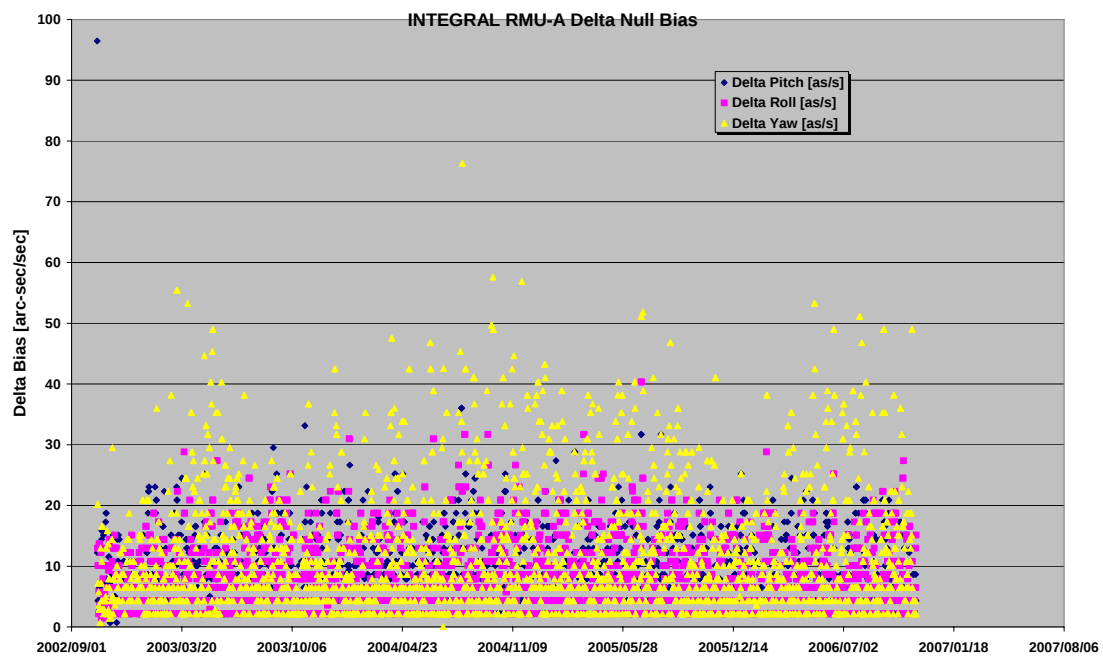


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 10/11/2006 is reported in the plot below.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 10/11/2006 is reported in the plot below



04/11/06 (Day of Year 308, Revolution 495-496)

The eclipse operations were nominal from the AOCS point of view. Hereafter is reported summary of the 4th eclipse passage during rev 496:

AOCS ECLIPSE MONITORING

Winter 2006

Revolution: 496

Date: 04/11/2006

DoY: 308

Penumbra Start: 04/11/2006 19:08:16

Umbra Start: 04/11/2006 19:09:36

Umbra End: 04/11/2006 20:08:12

Penumbra End: 04/11/2006 20:09:57

Eclipse Duration: 1:01:41

Eclipse Duration [sec]: 3701

IMU Health Check Start 04/11/2006 11:31:51

Eclipse Imminent Flag 04/11/2006 18:08:36

ACC IMU AutoCal Start 04/11/2006 18:23:02

ACC IMU AutoCal End 04/11/2006 18:43:02

Sun out of FSS FoV 04/11/2006 19:09:24

Sun back in FSS FoV 04/11/2006 20:08:32

Eclipse Timers	From Loaded Timers		Actual From Telemetry		UM [sec]	LSB [sec]
	Absolute	WRT Pen. Start [sec]	Absolute	WRT Pen. Start [sec]		
ACC Eclipse Start	04/11/2006 18:48:12	-1204.00	04/11/2006 18:48:17	-1199.00	-1064	
FDE Eclipse Start	04/11/2006 18:58:55	-561.00			-404	176
FCE Eclipse Start	04/11/2006 18:59:39	-517.00			-360	176

	From Loaded Timers		Actual From Telemetry		UM [sec]	LSB [sec]
	Absolute	WRT Pen. End [sec]	Absolute	WRT Pen. End [sec]		
FCE Eclipse End	04/11/2006 20:13:11	194	04/11/2006 20:13:38	221.00	360	176
FDE Eclipse End	04/11/2006 20:13:11	194	04/11/2006 20:13:38	221.00	360	176
ACC Eclipse End	04/11/2006 20:17:15	438	04/11/2006 20:17:21	444.00	578	

IMU	Uplink	Execution	WRT Penumbra End [sec]
IMU Auto Off Enable	01/11/2006 20:37:50	04/11/2006 20:19:14	557
IMU On	04/11/2006 12:14:55	IMU H/C Noise Roll [as/s]	0.2150
IMU Off	04/11/2006 20:19:34	IMU H/C Drift Roll [as/s]	0.2829
IMU On Time	8:04:39	IMU Auto Cal Drift Roll [as/s]	0.3143

05/11/06 (Day of Year 309, Revolution 496)

Nothing to report.

06/11/06 (Day of Year 310, Revolution 496)

Nothing to report.

07/11/06 (Day of Year 311, Revolution 496-497)

The eclipse operations were nominal from the AOCS point of view. Hereafter is reported summary of the second eclipse passage during rev 497:

AOCS ECLIPSE MONITORING

Winter 2006

Revolution: 497

Date: 07/11/2006

DoY: 311

Penumbra Start: 07/11/2006 18:57:33

Umbra Start: 07/11/2006 18:58:54

Umbra End: 07/11/2006 19:59:45

Penumbra End: 07/11/2006 20:01:33

Eclipse Duration: 1:04:00

Eclipse Duration [sec]: 3840

IMU Health Check Start 07/11/2006 11:16:00

Eclipse Imminent Flag 07/11/2006 17:57:53

ACC IMU AutoCal Start 07/11/2006 18:12:19

ACC IMU AutoCal End 07/11/2006 18:32:19

Sun out of FSS FoV 07/11/2006 18:58:42

Sun back in FSS FoV 07/11/2006 20:00:04

Eclipse Timers

Absolute

WRT Pen. Start [sec]

Absolute

WRT Pen. Start [sec]

UM [sec]

LSB [sec]

ACC Eclipse Start

07/11/2006 18:39:51

-1062.00

07/11/2006 18:39:50

-1063.00

-1064

FDE Eclipse Start

07/11/2006 18:50:44

-409.00

-404

176

FCE Eclipse Start

07/11/2006 18:51:28

-365.00

-360

176

Absolute

WRT Pen. End [sec]

Absolute

WRT Pen. End [sec]

UM [sec]

LSB [sec]

FCE Eclipse End

07/11/2006 20:07:12

339

07/11/2006 20:07:30

357.00

360

176

FDE Eclipse End

07/11/2006 20:07:12

339

07/11/2006 20:07:30

357.00

360

176

ACC Eclipse End

07/11/2006 20:11:14

581

07/11/2006 20:11:14

581.00

578

IMU

Uplink

Execution

WRT Penumbra End [sec]

IMU Auto Off Enable

04/11/2006 20:35:54

07/11/2006 20:13:07

694

IMU On

07/11/2006 11:18:36

IMU H/C Noise Roll [as/s]

0.1825

IMU Off

07/11/2006 20:13:28

IMU H/C Drift Roll [as/s]

0.2533

IMU On Time

8:54:52

IMU Auto Cal Drift Roll [as/s]

0.3144

STR SEU threshold exceeded: at 20:04:35z due to false event the guide star was lost just at the beginning of rev 497 during the ACC Eclipse period. The DCA\RGAs passed from 9/19 to 6/19, all the error signals were set to zero and an automatic mapping commanded by the ACC. This reaction is considered nominal.

The guide star at moment of the false event was Mi 6.65 at CCD location [-10622 , -10740]. A new guide star was picked after the mapping commanded by the ACC autonomously.

No manual recovery was started being the new guide star suitable for the execution of the next RWB activity.

No impact on TL.

08/11/06 (Day of Year 312, Revolution 497)

Nothing to report.

09/11/06 (Day of Year 313, Revolution 497)

Nothing to report.

10/11/06 (Day of Year 314, Revolution 497-498)

The eclipse operations were nominal from the AOCS point of view. Hereafter is reported summary of the second eclipse passage during rev 498:

AOCS ECLIPSE MONITORING

Winter 2006

Revolution: 498

Date: 10/11/2006

DoY: 314

Penumbra Start: 10/11/2006 18:48:21

Umbra Start: 10/11/2006 18:49:50

Umbra End: 10/11/2006 19:48:18

Penumbra End: 10/11/2006 19:50:13

Eclipse Duration: 1:01:52

Eclipse Duration [sec]: 3712

IMU Health Check Start 10/11/2006 10:53:00

Eclipse Imminent Flag 10/11/2006 17:48:41

ACC IMU AutoCal Start 10/11/2006 18:03:07

ACC IMU AutoCal End 10/11/2006 18:23:07

Sun out of FSS FoV 10/11/2006 18:49:36

Sun back in FSS FoV 10/11/2006 19:48:39

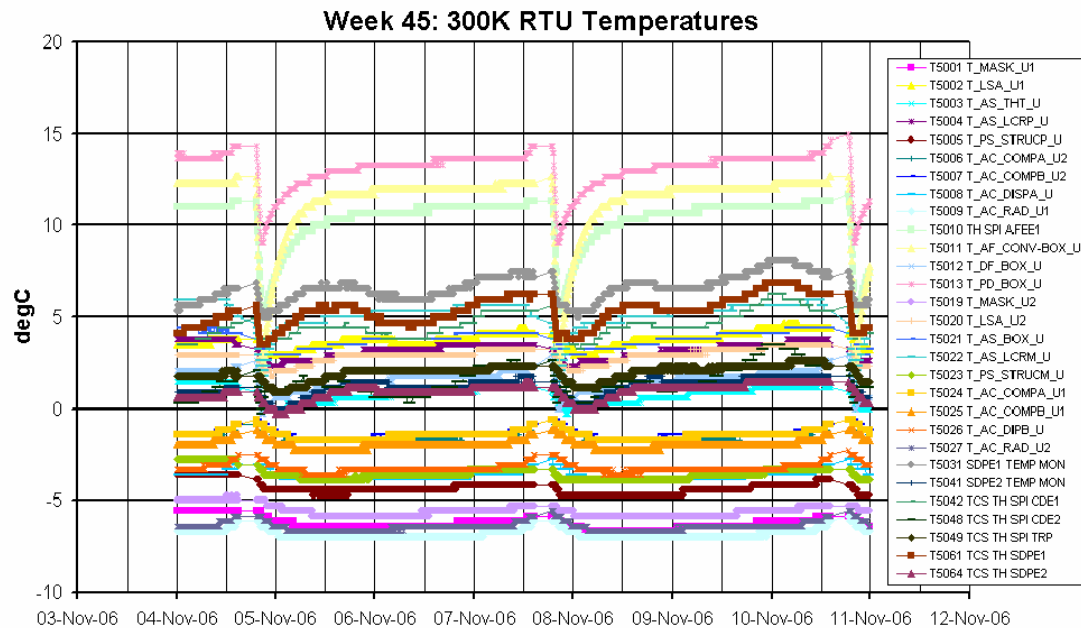
Eclipse Timers	From Loaded Timers		Actual From Telemetry		UM [sec]	LSB [sec]
	Absolute	WRT Pen. Start [sec]	Absolute	WRT Pen. Start [sec]		
ACC Eclipse Start	10/11/2006 18:30:42	-1059.00	10/11/2006 18:30:48	-1053.00	-1064	
FDE Eclipse Start	10/11/2006 18:41:57	-384.00	10/11/2006 18:42:05	-376.00	-404	176
FCE Eclipse Start	10/11/2006 18:42:41	-340.00	10/11/2006 18:42:49	-332.00	-360	176

	From Loaded Timers		Actual From Telemetry		UM [sec]	LSB [sec]
	Absolute	WRT Pen. End [sec]	Absolute	WRT Pen. End [sec]		
FCE Eclipse End	10/11/2006 19:56:13	360	10/11/2006 19:56:20	367.00	360	176
FDE Eclipse End	10/11/2006 19:56:13	360	10/11/2006 19:56:20	367.00	360	176
ACC Eclipse End	10/11/2006 19:59:55	582	10/11/2006 20:00:02	589.00	578	

IMU	Uplink	Execution	WRT Penumbra End [sec]
IMU Auto Off Enable	07/11/2006 20:25:37	10/11/2006 20:01:55	702
IMU On	10/11/2006 10:56:51	IMU H/C Noise Roll [as/s]	0.2186
IMU Off	10/11/2006 20:02:16	IMU H/C Drift Roll [as/s]	0.1431
IMU On Time	9:05:25	IMU Auto Cal Drift Roll [as/s]	0.1635

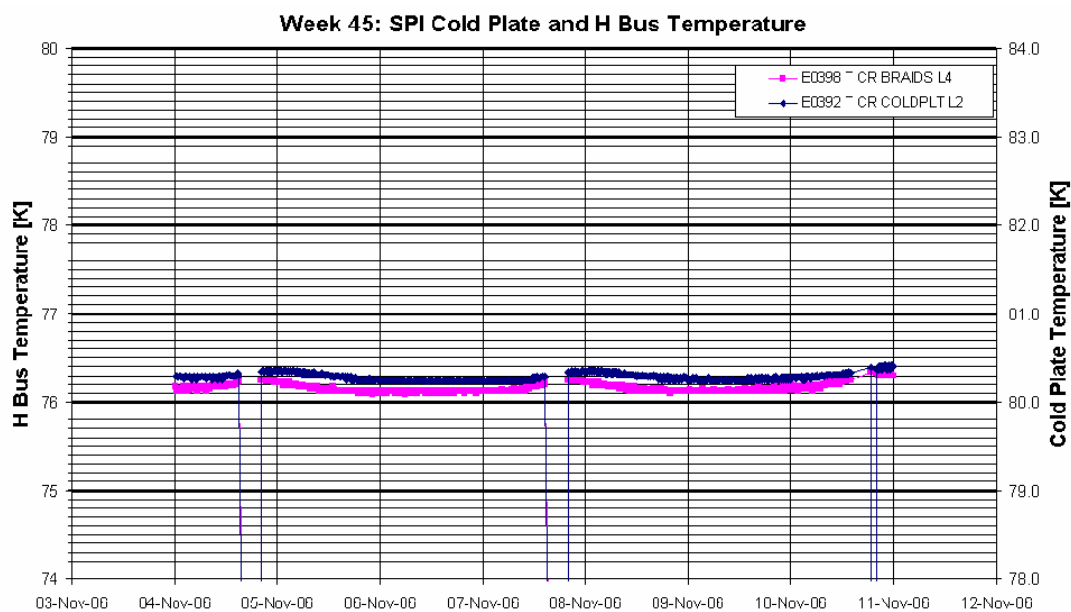
8.3.2 SPI Operations

Unit Temperatures: All the equipment temperatures are inside the operational limits. The following plot shows their evolution during the reporting period:



Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range to 80K $\pm$ 1K with a variable drift due to eclipse season activities (see plot below).

The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period.

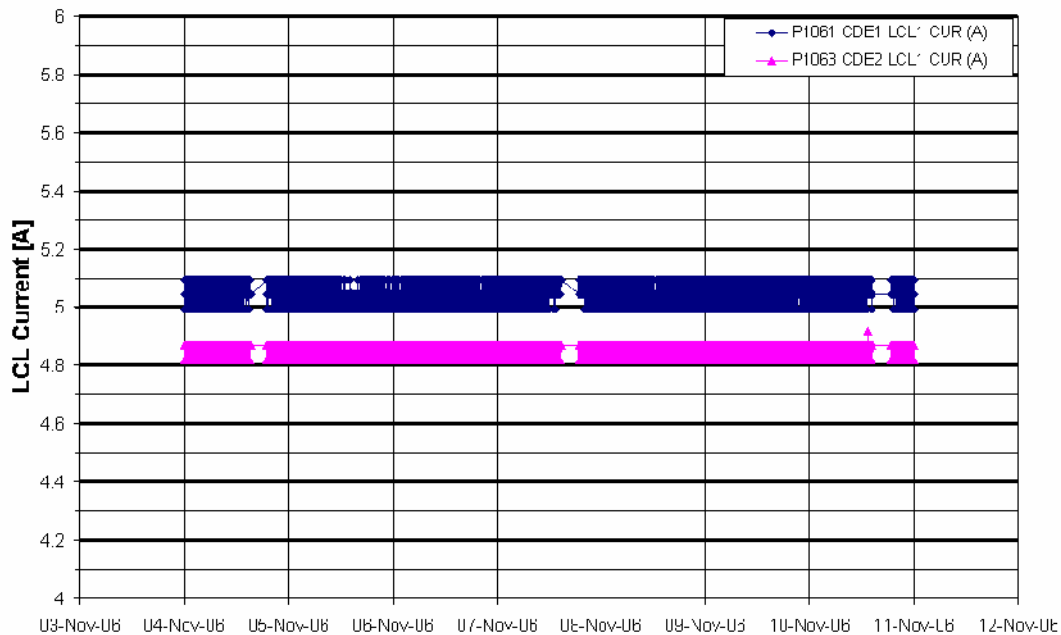


The stroke of all four compressors is currently set to 41. The average LCL currents of the CDEs over the week were:

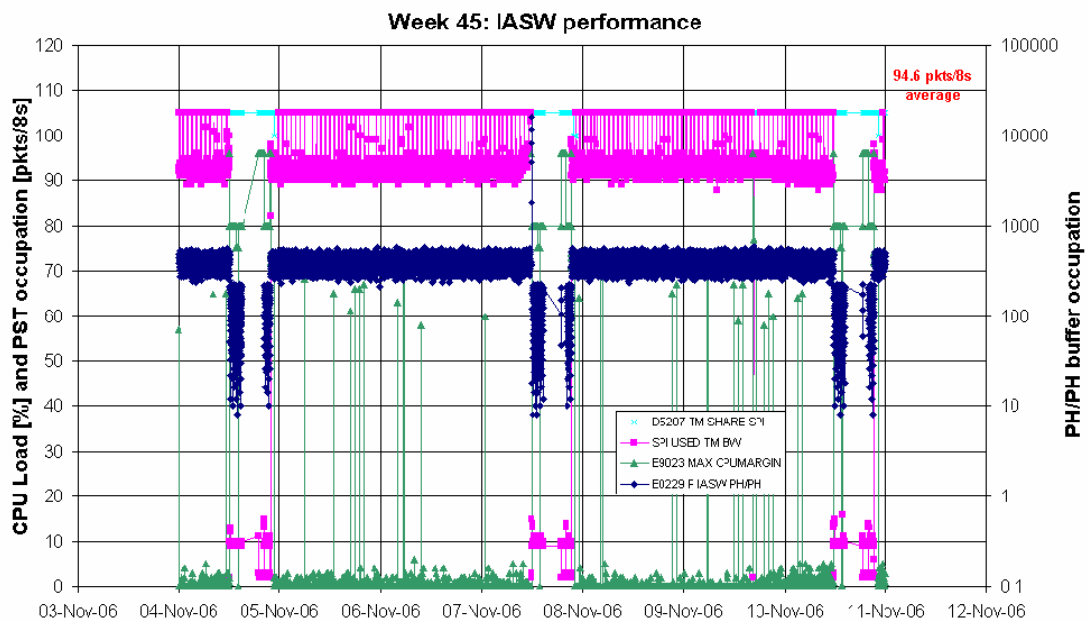
- Average CDE1 LCL Current = 5.04A
- Average CDE2 LCL Current = 4.84A

The following plot shows the evolution of the CDE currents during the reporting period.

Week 45: SPI CDE1 and CDE2 LCL Currents



DPE & IASW: The DPE health and IASW performance is nominal. The current IASW version installed is 432. The average TM bandwidth occupation of SPI was 94.6 packets/cycle over the science window, when the TM allocation was 105 packets/cycle. The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



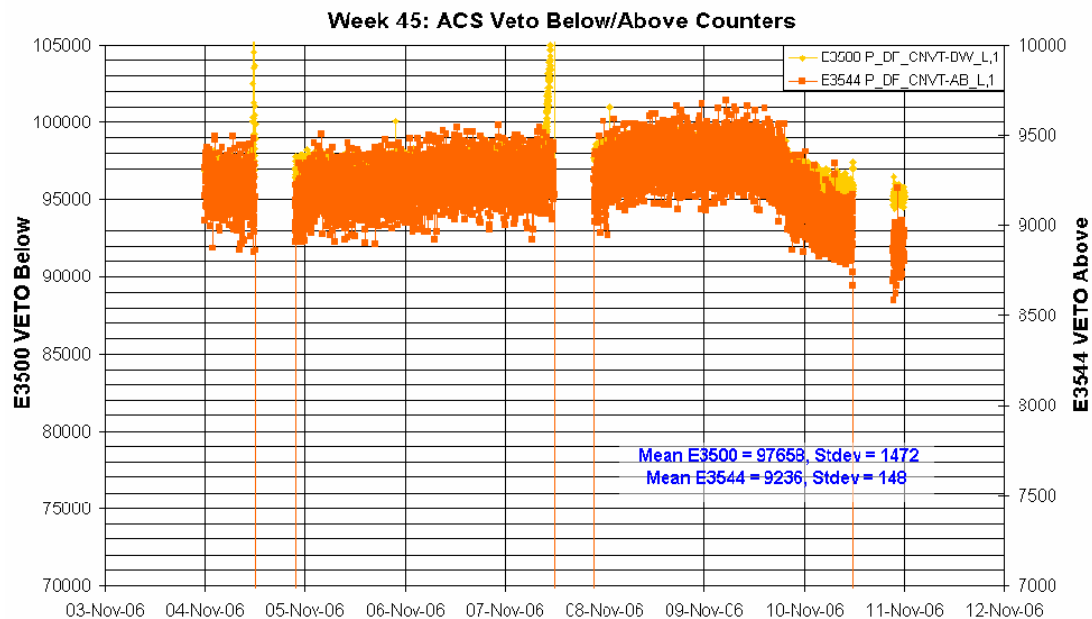
ACS: The performance of the ACS is nominal, except for FEE 81. Following the analysis of the FEE 81 anomaly on 2006-10-29 (INT_SC-162) and recommendation by the SPI team, the FEE 81 was switched off on 2006-11-09 as follows:

- 16:24:07Z FCP_SPI1_0160 SPI BACK TO CONFIGURATION MODE

- 16:28:58Z FCP_SPI1_1732 SPI LOAD/REPORT ACS SYSTEM SERVICE PARAMETERS, with the TC parameter E5581 S AS HVPS-OO L81 changed from ON to OFF.
- 16:31:36Z FCP_SPI1_0130 SPI TRANSITION TO PHOTON MODE

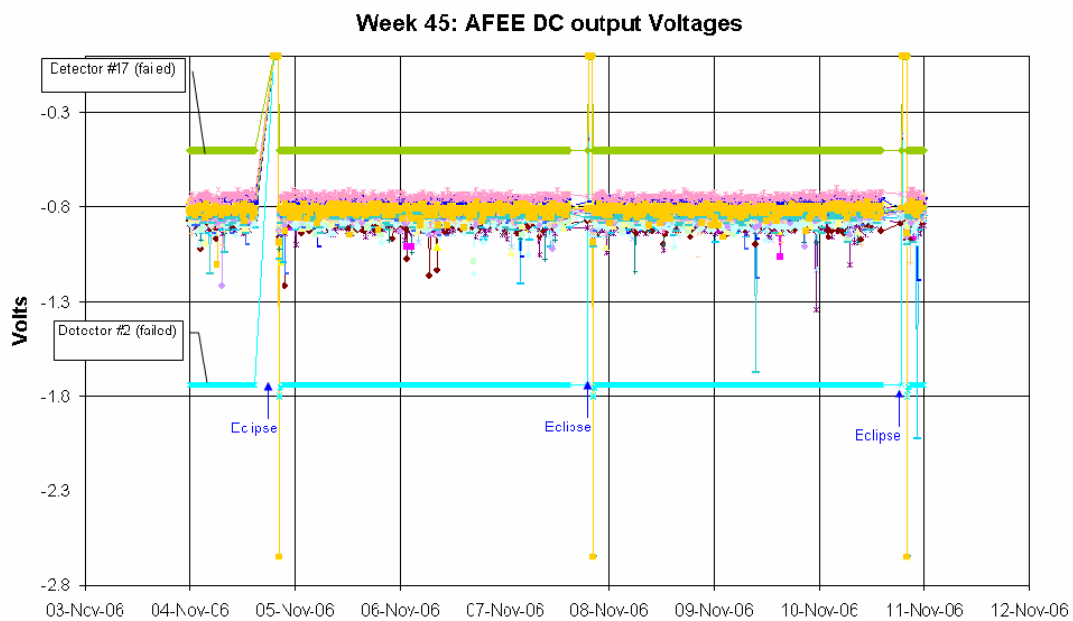
Following this switch-off, TM parameter E2135 S AS RTM L2 (Rate meter of 2nd FEE in group MSB+LSB) began to toggle OOL. The limit condition for E2135 was then updated to disregard the counts from the FEE group 10 (containing FEE81), after which this parameter remained within limits.

The following plot shows the ACS overall count rate evolution during the reporting period:

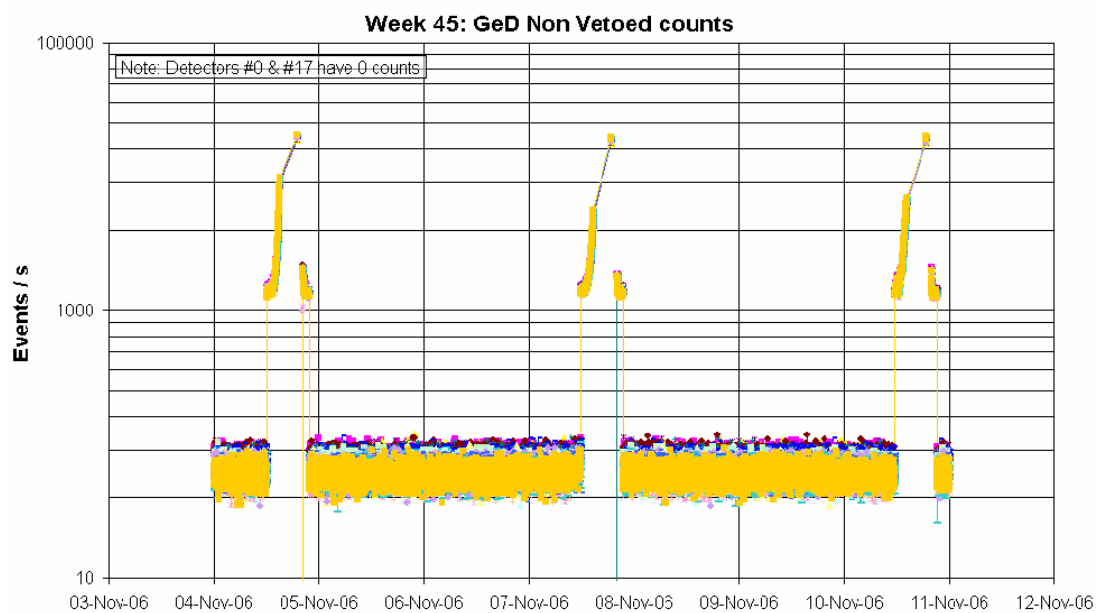


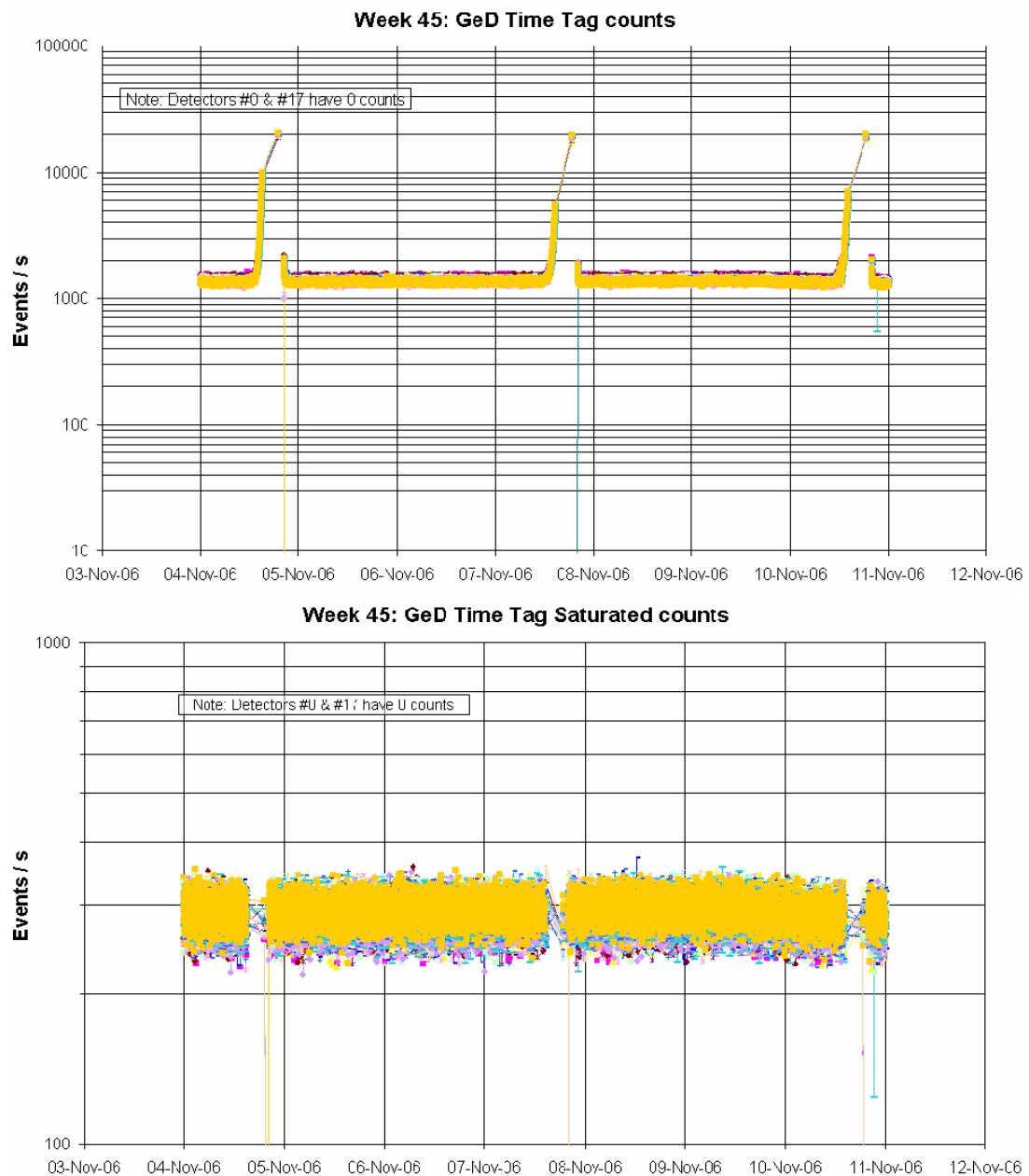
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detectors #4 and #12 which are showing a slightly degraded energy resolution. The energy resolution of GeD#15 was recovered with the last annealing.

The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004

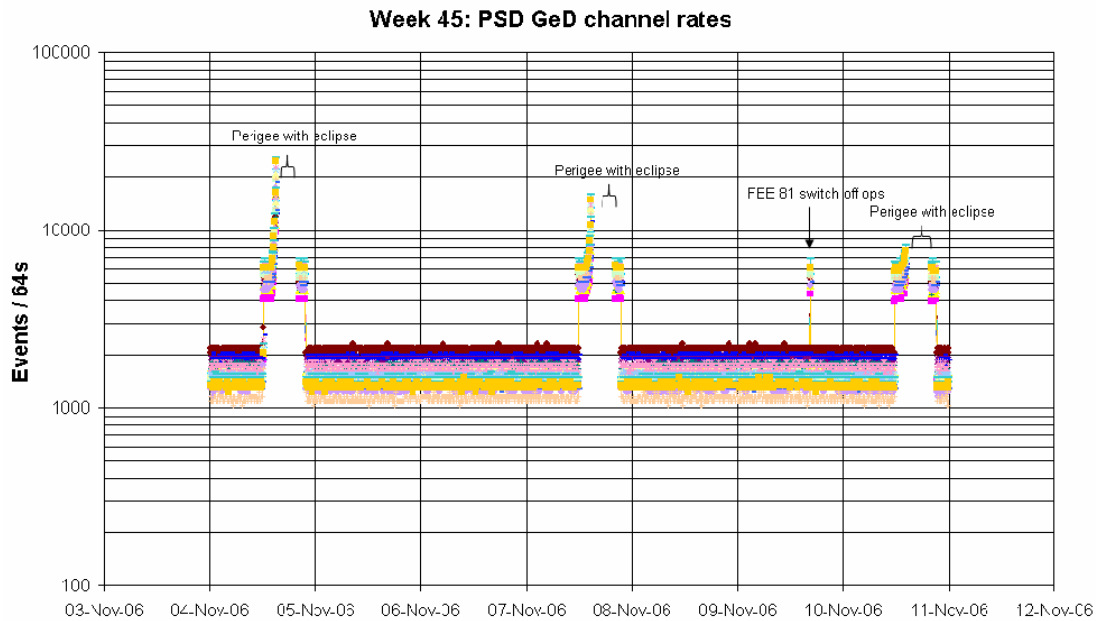


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.





PSD: The health of the unit is nominal. The following plot shows the PSD channel rates during the reporting period.



Event Log:

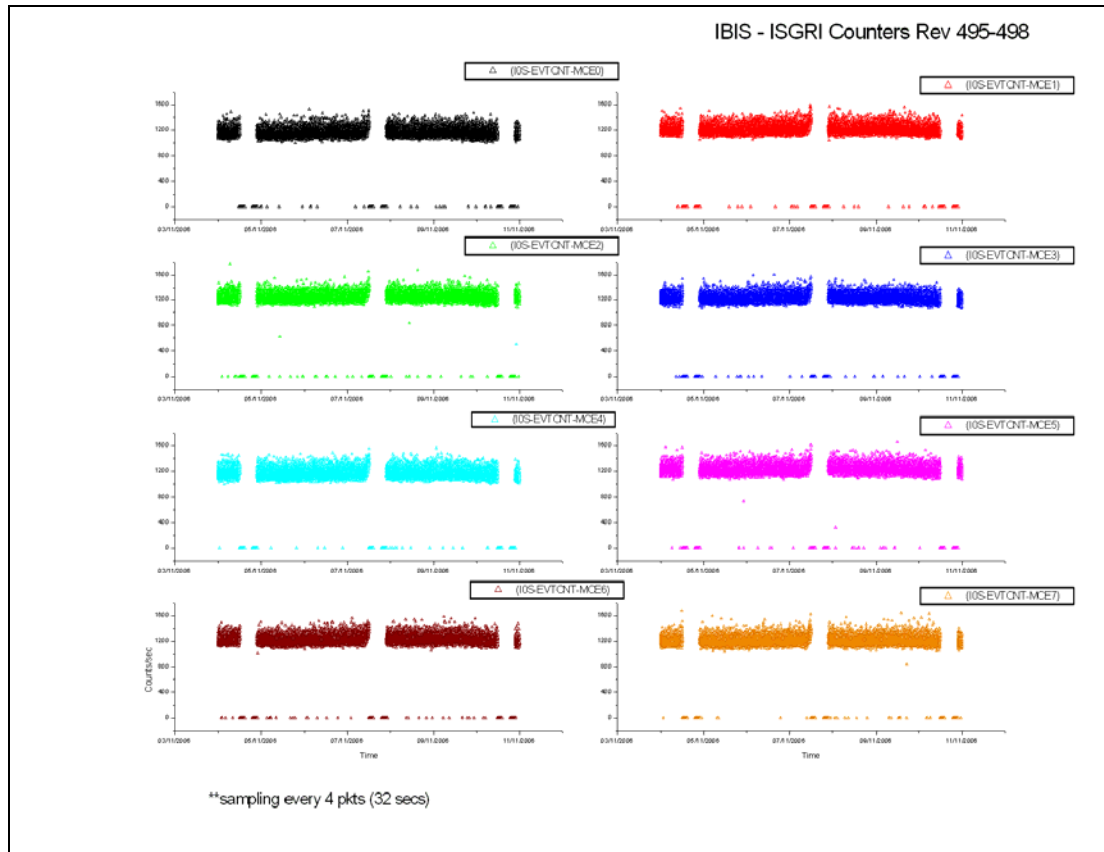
The following non-nominal OOLs and OEMs were received from SPI during the reporting period:

- On 2006-11-04 at 11:37Z the TM parameter E3500 P_DF_CNVT-BW_L starting going OOL High. This was ~20 minutes before radiation belt entry of revolution 495 and therefore no action was taken.
- On 2006-11-07 at 11:08Z the TM parameter E3500 P_DF_CNVT-BW_L starting going OOL High. This was ~40 minutes before radiation belt entry of revolution 496 and therefore no action was taken.
- On 2006-11-07 at 14:12:37Z APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the LOS_CHK window of revolution 496, when the SPI1 DPE time verification TC was sent. This OEM is sometimes received when this TC is sent and no action was taken.
- TM parameter E2116 T AS PSAC L2 (Plastic Scintillator temperature) went OOL Low several times during the week. No action was taken as this is a known and recurring problem due to this thermistor being unreliable.

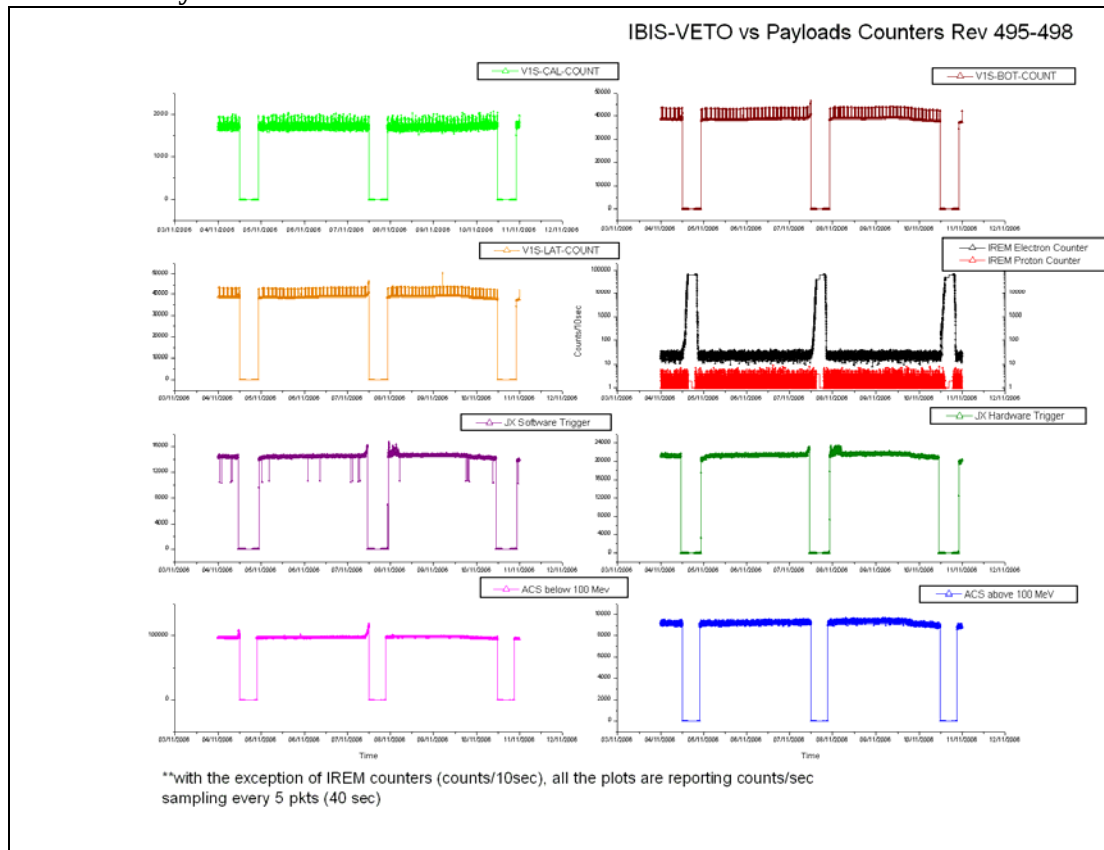
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

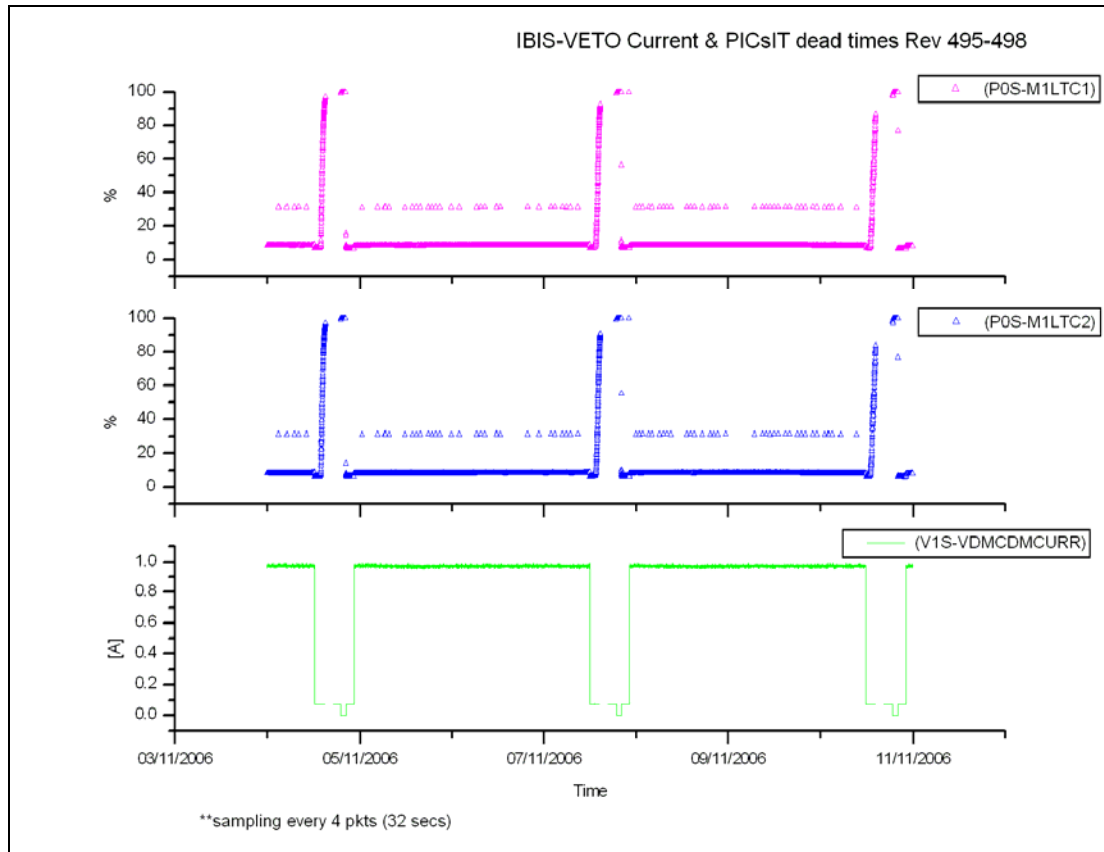


VETO vs Payloads Counters:

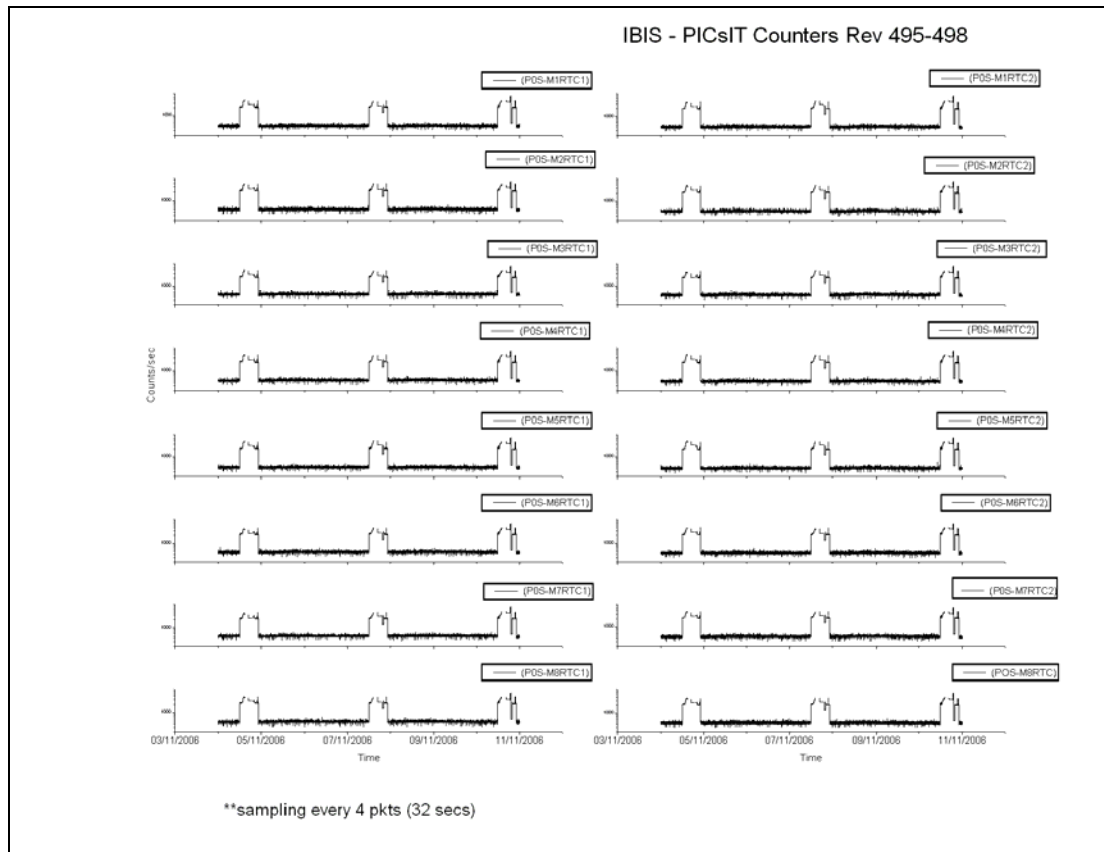


The week was characterised by low radiation.

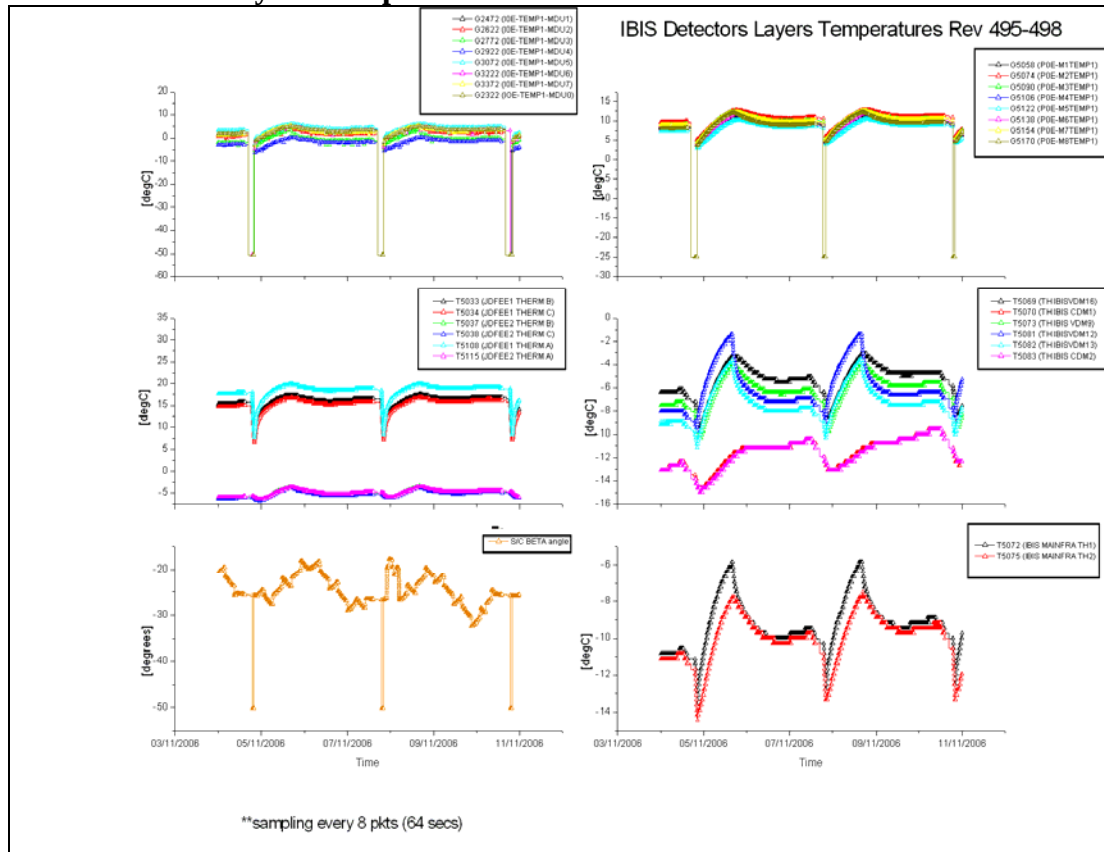
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report

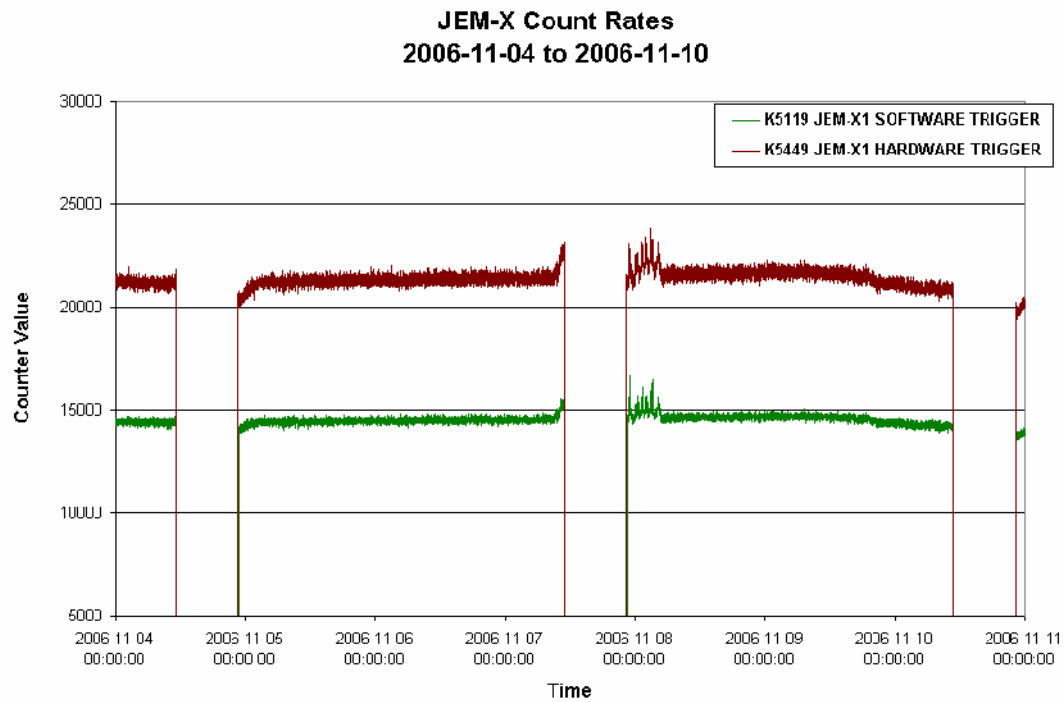
The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), families G5002 (P0S-Mi RTC1) and G5003 (P0S-Mi RTC2), families G2014 (I0E-OVFWPXADD-Mi) were reported at Radiation Belts passage.

8.3.4 JEM-X Operations

JEM-X Count Rates

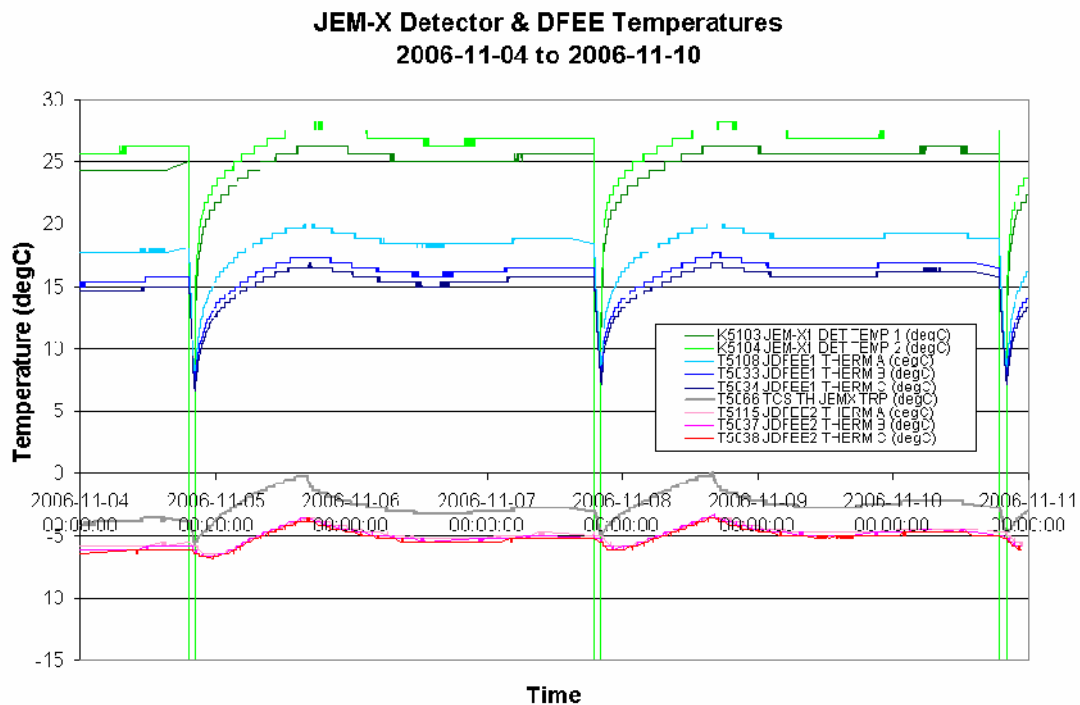
JEM-X count rates over the reporting period are displayed in the following graph¹.

¹ Data sampled (1 frame in 4) and smoothed to remove spikes in S/W Trigger due to flushing of buffer after slews.



JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph².



² Data sampled (1 frame in 8)

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JEM-X Daily Report

2006-11-04 (DOY 308, Rev 495-496) to 2006-11-10 (DOY 314, Rev 497-498)

Nothing to report

8.3.5 OMC Operations

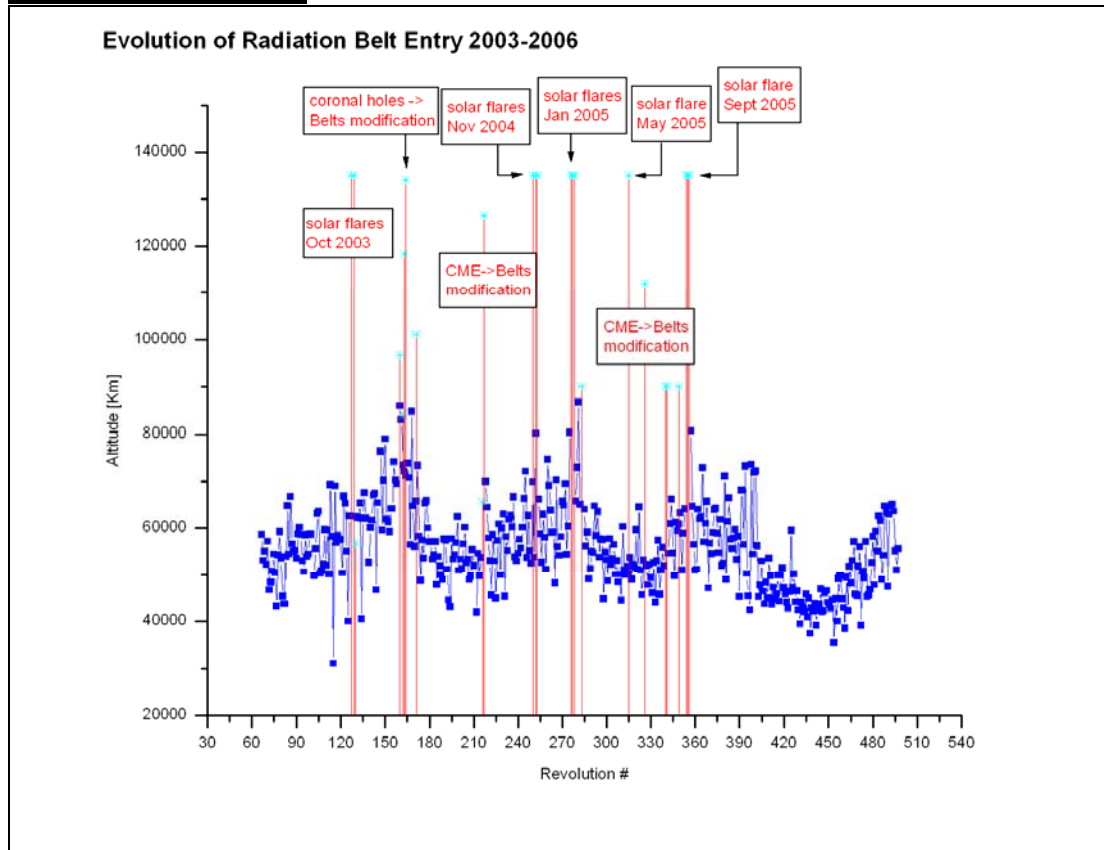
2006-11-04 (DOY 308, Rev 495) to 2006-11-10 (DOY 314, Rev 498)

Nothing to report

On DoY 308 at 12:10:36, DoY 311 at 11:58:44 and DoY 314 at 11:45:57 OMC went to SAFE mode nominally, at the radiation belt entry time as set in the Broadcast Packet.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

Nothing to report

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
495	RAD_ENTR R 2006-11-04T12:10:30Z	2006-11-04 12:15:39	55165.1	2006-11-04 12:34:16	50687
496	RAD_EXIT R 2006-11-04T21:32:35Z	2006-11-04 20:35:31	35962.2	2006-11-04 20:54:16	41738
496	RAD_ENTR R 2006-11-07T11:58:43Z	2006-11-07 12:35:23	51014.2	2006-11-07 12:23:42	49884
497	RAD_EXIT R 2006-11-07T21:20:56Z	2006-11-07 20:20:19	35958.4	2006-11-07 20:33:42	41100
497	RAD_ENTR R 2006-11-10T11:45:56Z	2006-11-10 11:48:03	55643.4	2006-11-10 12:03:42	50668
498	RAD_EXIT R 2006-11-10T21:07:41Z	2006-11-10 20:06:11	35974.5	2006-11-10 20:23:42	41786

Reference

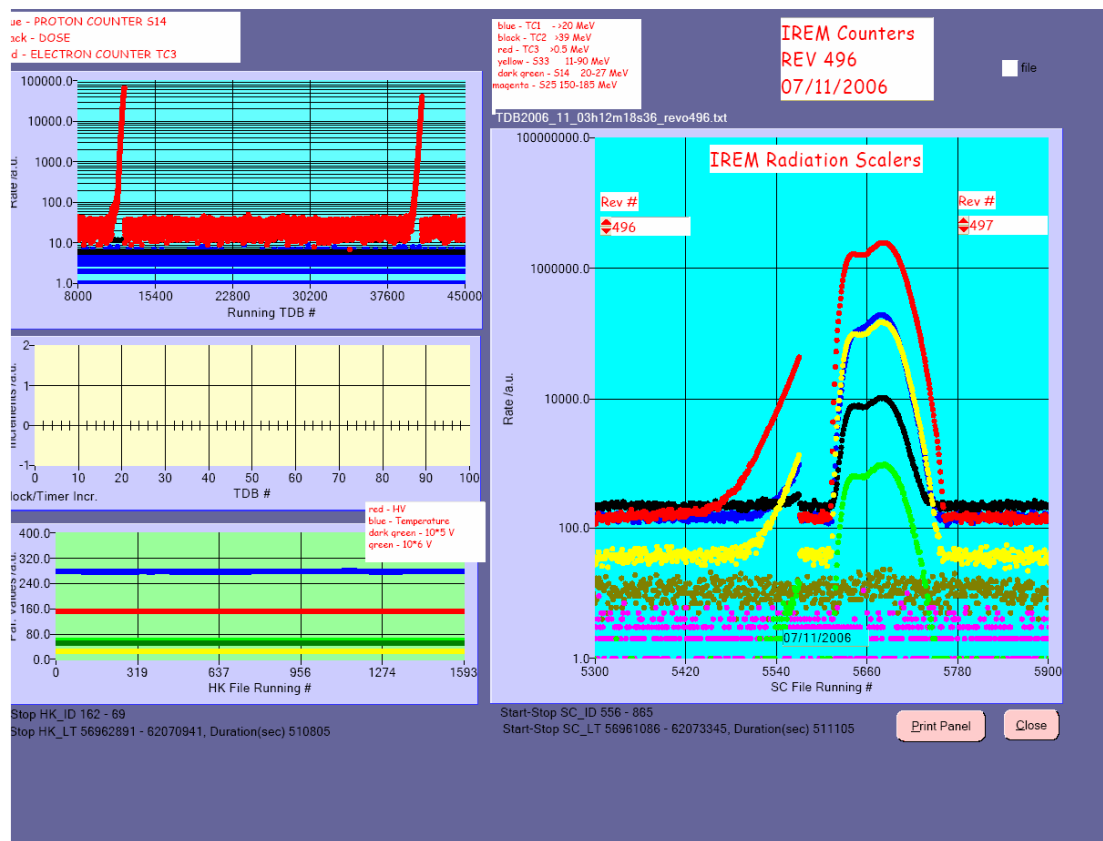
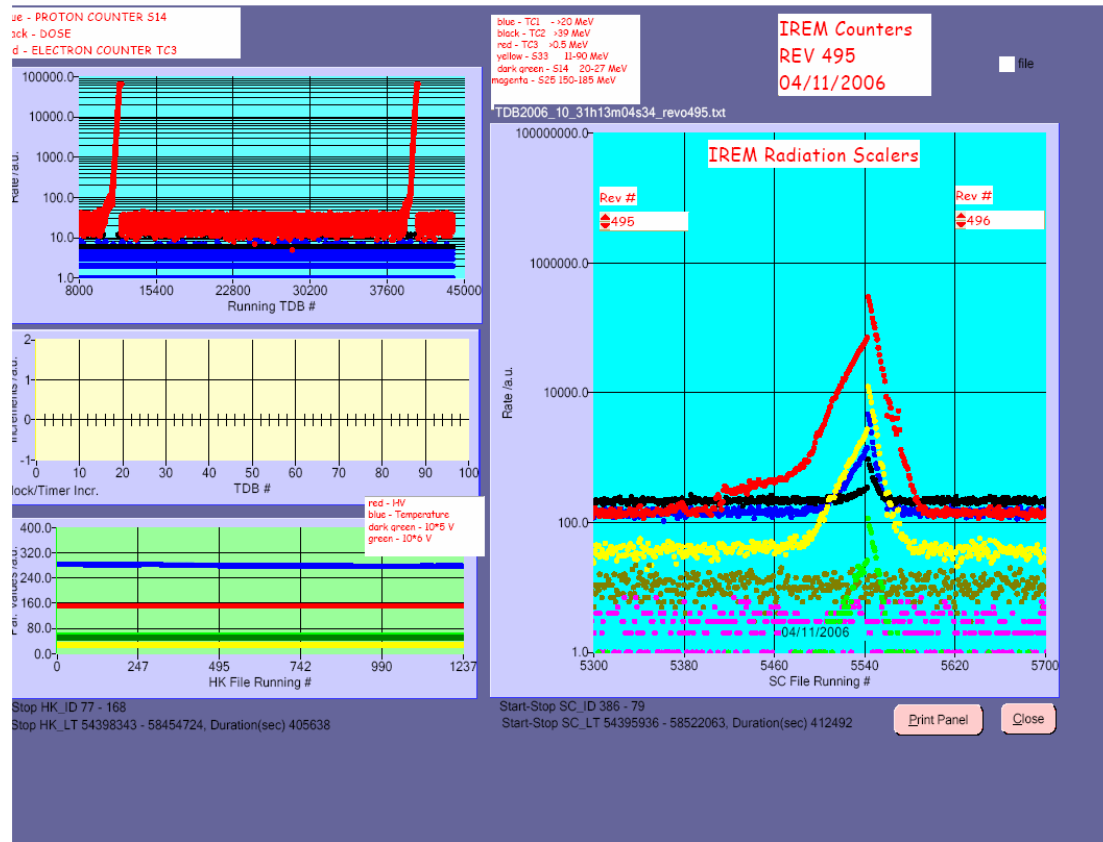
Very small error vs reference (less than 10 minutes)

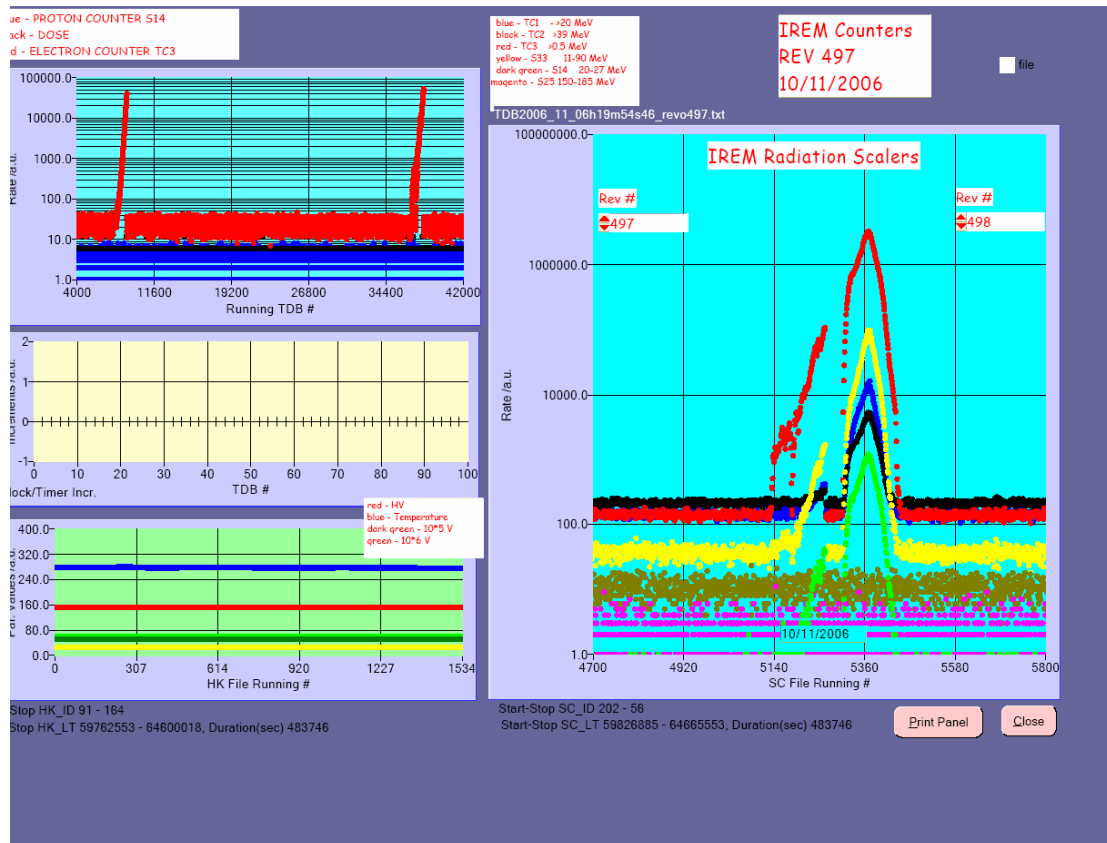
Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

Radiation Spike

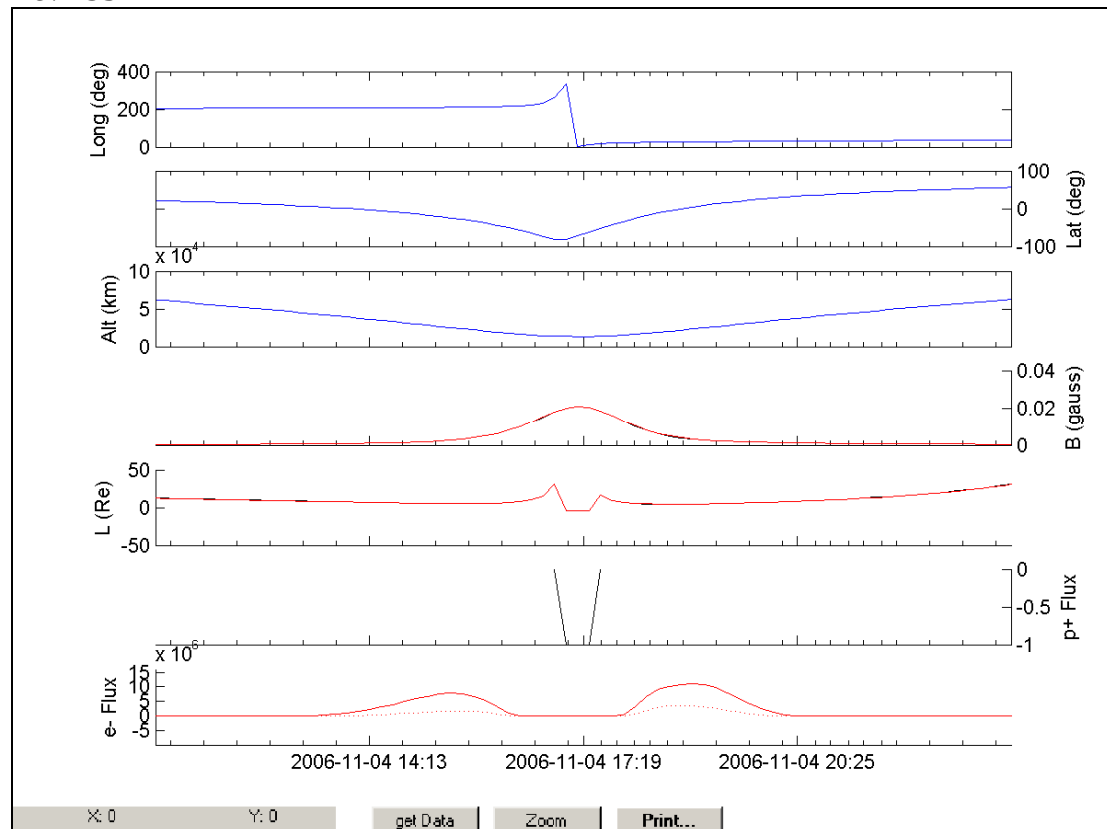
IREM radiation counters:



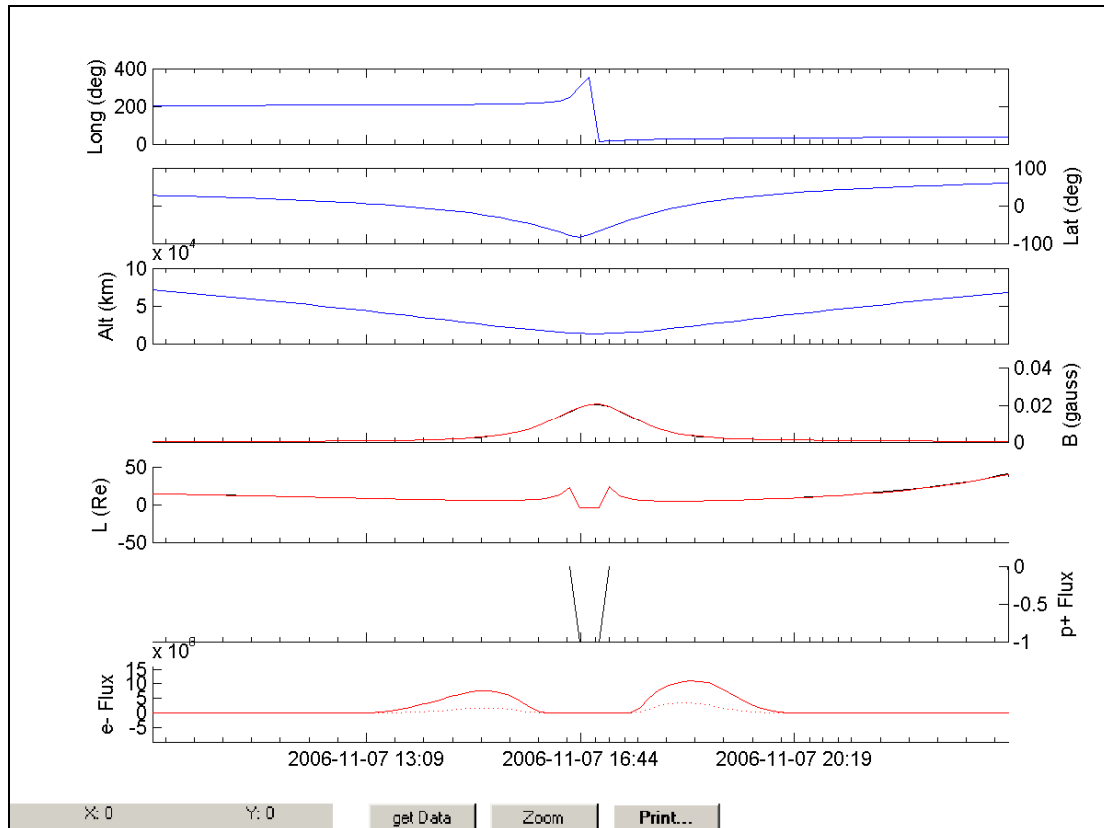


IREM Predicted Radiation Belt Passages

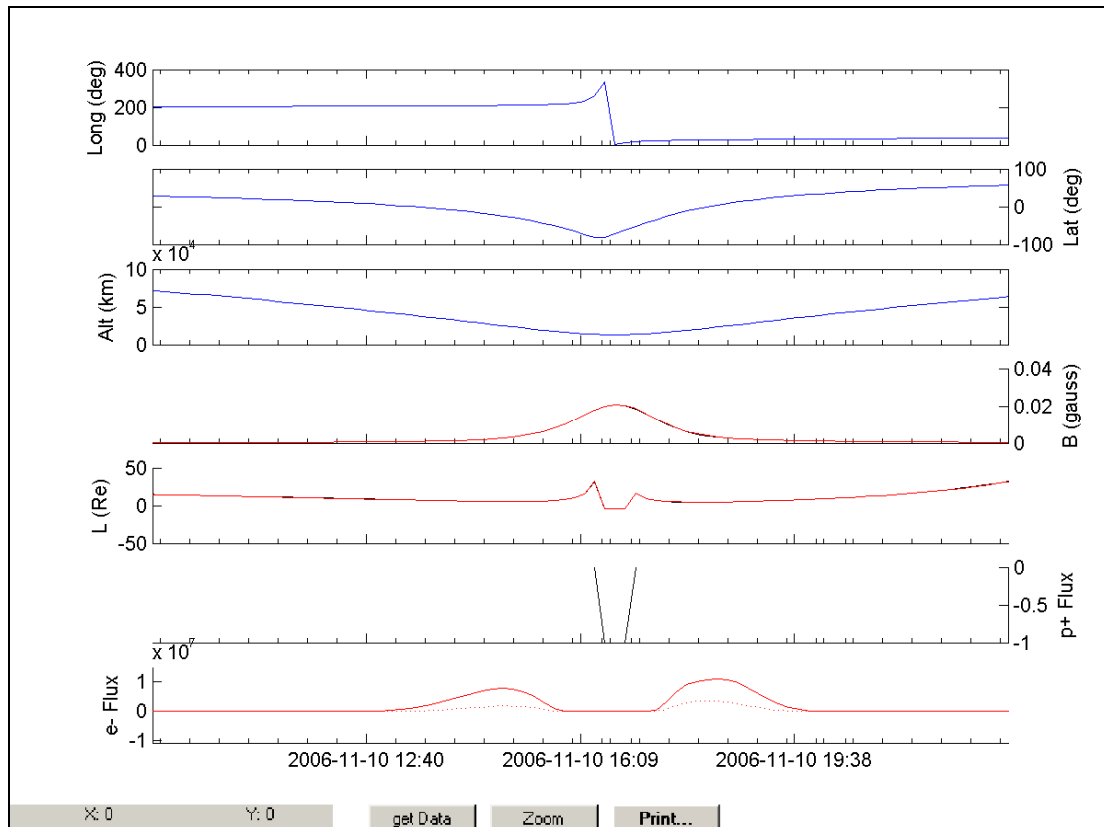
Rev 495



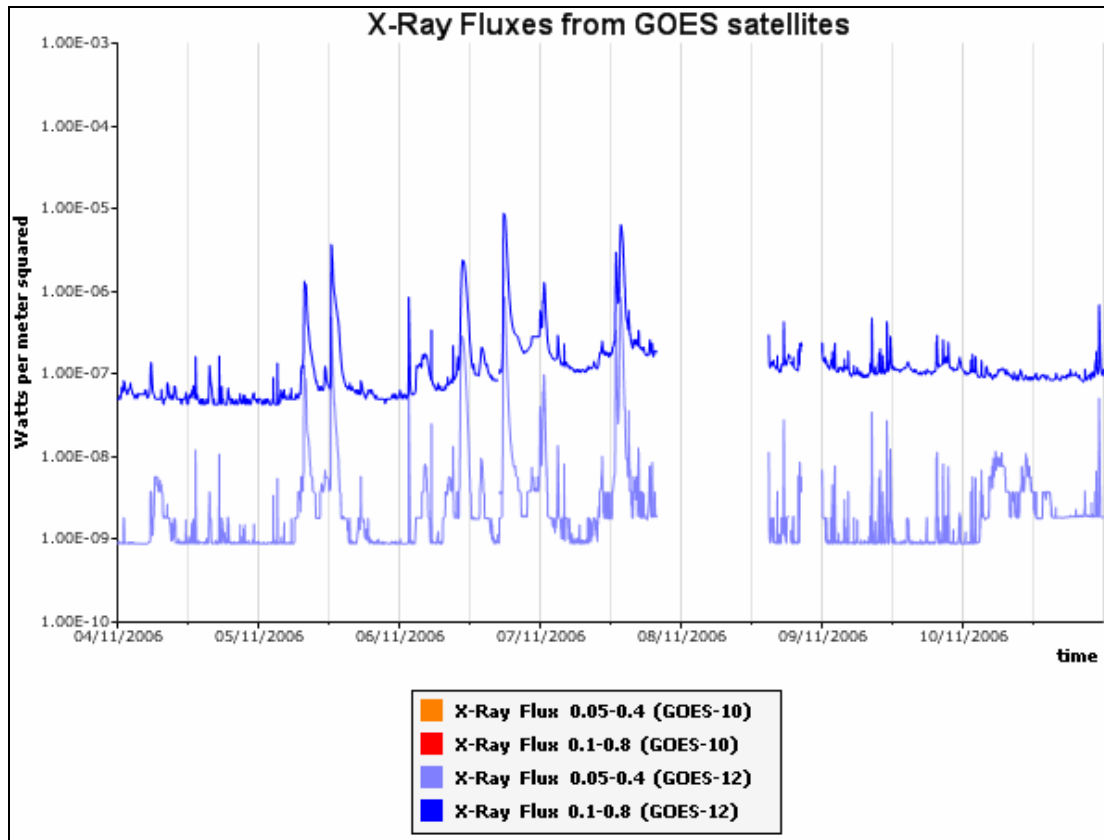
Rev 496



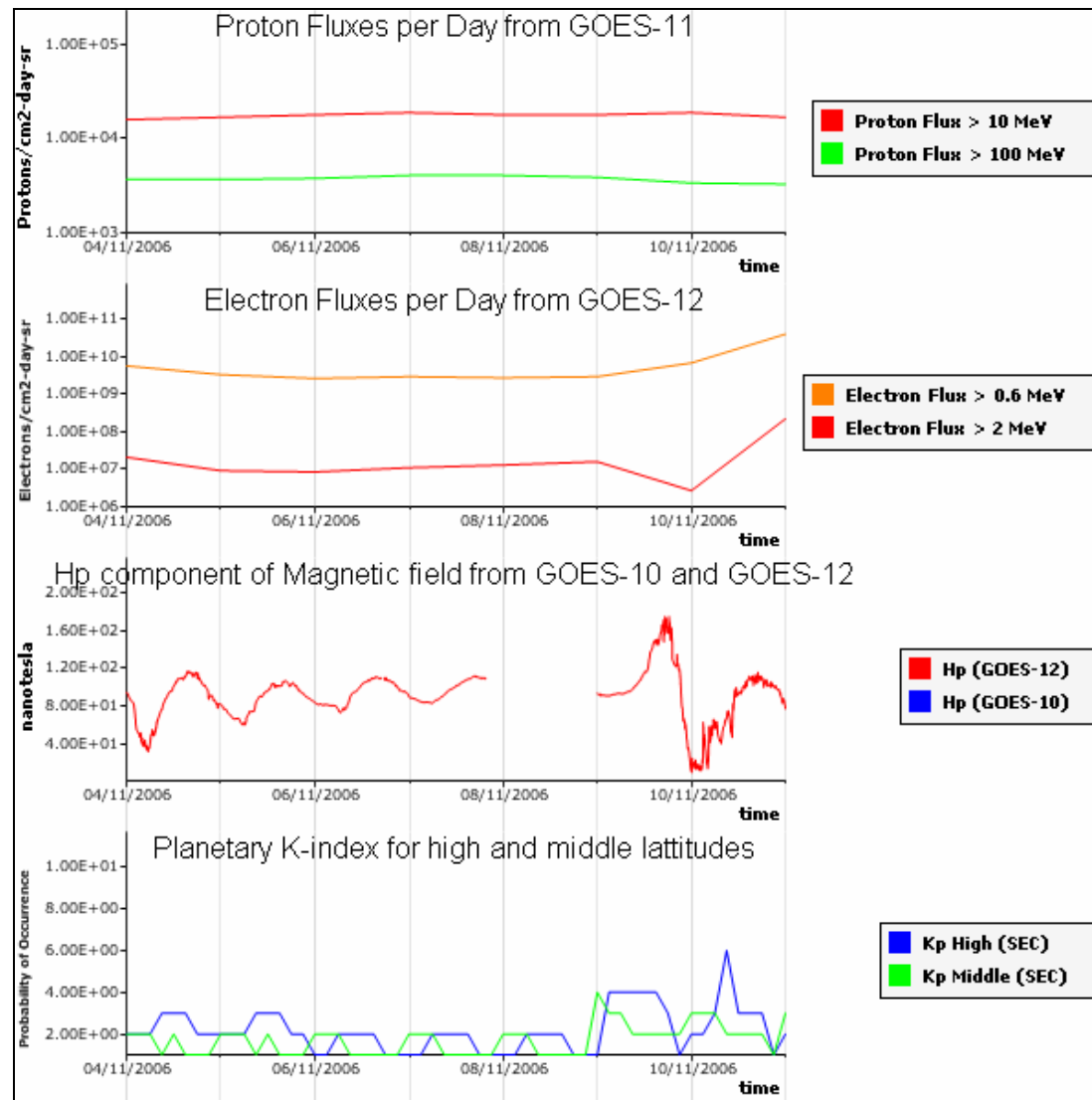
Rev 497



SEC-GOES Observed Particles Fluxes (using SEIS/RAT tool):



X-Ray fluxes start to be significant over 10^{-5} W/m^2 (corresponding to M-class flares). Above 10^{-4} W/m^2 , they correspond to strong X-class flares.



Proton and electron flux report low radiation background.

Hp component of the Geomagnetic Field is essentially parallel to the Earth's rotation axis. A drop near 0 nT is associated with a significant variation in the magnetic field.

Kp index is based on ground magnetometers. Kp >=5 features storm-level geomagnetic activity.