

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No.
Week 45
10.11.08
Routine Phase

Prepared by: F.Schmidt (OPS-OAI) and INTEGRAL FCT

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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 01.11.08 until 07.11.08 (both dates inclusive) and covers the revolutions 739, 740 and 741.

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 2 hexagonal dithers of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), a raster dither of the Cygnus Region (RA 20:35:53.00, DEC +40:39:49.0), a raster dither of mid-latitude 1 (RA 18:36:17.05, DEC -60:24:50.7) and a raster dither of mid-latitude 2 (RA 19:42:44.23, DEC -15:04:03.4).

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.

No slews were missed from TL, during the observation period.

The fuel consumption over the period between 01/11/2008 and 07/11/2008 was 0.0895 Kg. The remaining propellant is in the order of 137.7047 Kg.

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

3.1.2 Power

All the other units of EPS are working nominally; available power from the arrays is of the order of 2100W.

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.

The PST was over-subscribed by 3 packets, which were allocated to SPI during the Instrument window for the entire reporting period.

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

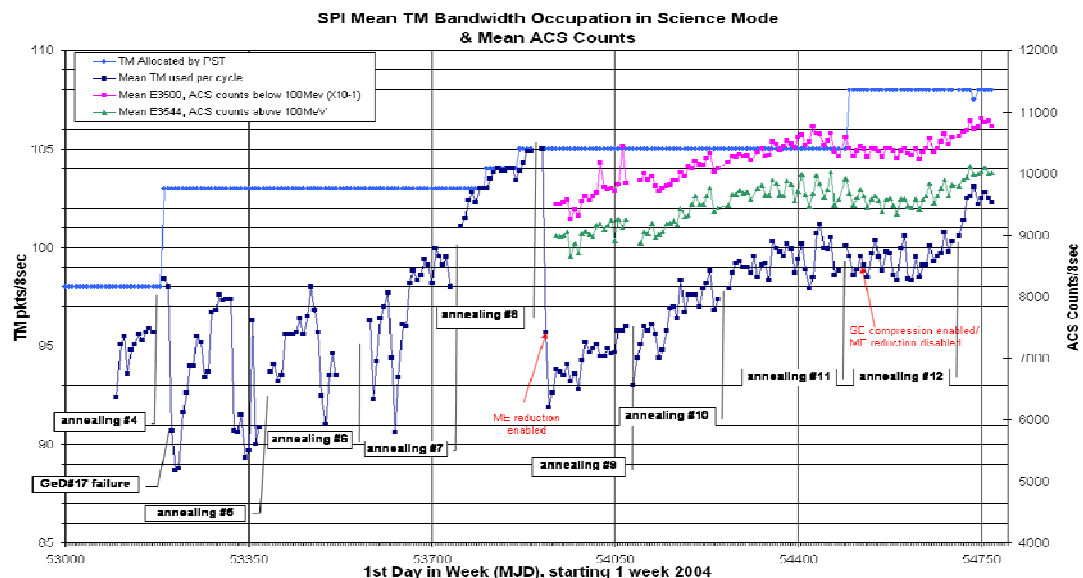
3.2.1 SPI

Following the 12th annealing, ended on 04/09/2008 at 23:50Z, the overall status of the gamma-ray spectrometer is nominal, except for detector #2 (failed since 06/12/2003) and detector #17 (failed since 17/07/2004). The energy resolution of the previously degraded GeD#12 has improved following this annealing and the bias of this detector is now set to 4kV as for the other detectors.

The Stirling compressors are working nominally. The Germanium detectors temperature was kept in the range 80K $\pm$ 1K throughout the week.

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 108 packets/cycle and the average telemetry occupation was 102.3 packets/cycle.

The following plot shows the evolution of the assigned and the average occupation of the SPI TM bandwidth along with the mean ACS count rate evolution (since July 2006). As can be seen, there is a strong correlation between the evolution of the background as measured by the ACS and the overall TM bandwidth usage.



Note: Some more information concerning the SPI operations is provided in the Appendix 8.3.2.

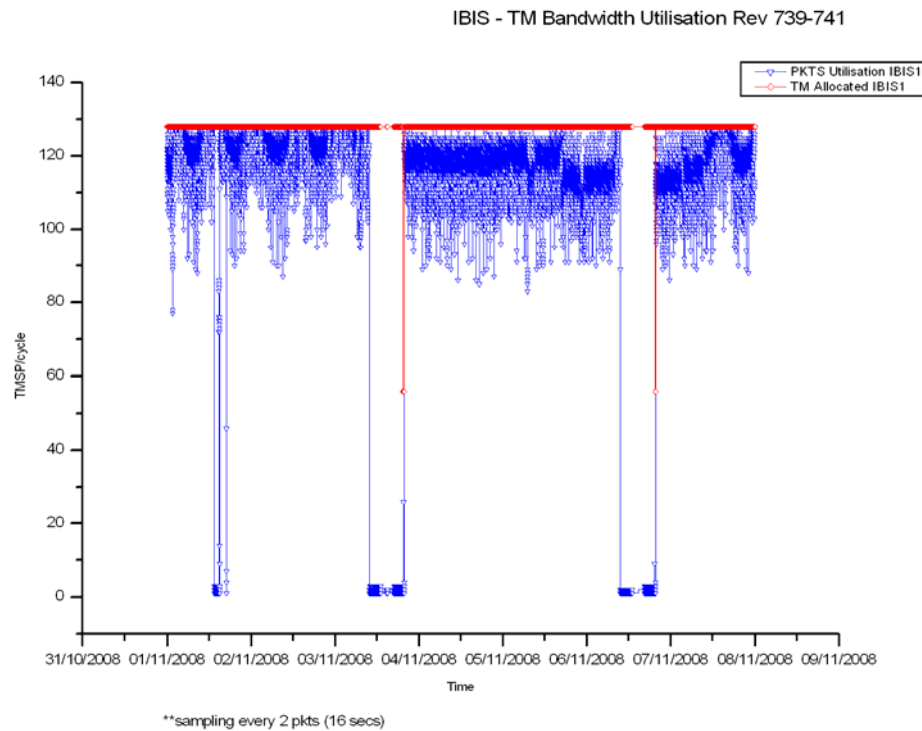
3.2.2 IBIS

The overall status of the unit is nominal.

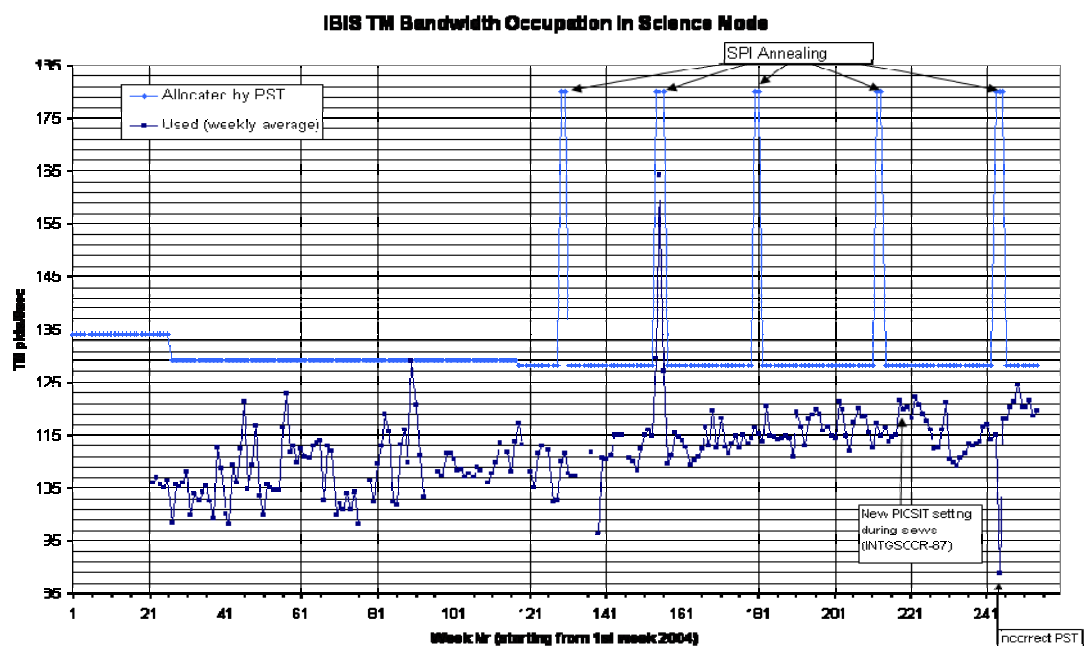
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 128 packets/cycle
- IBIS mean bandwidth utilisation in science mode: 119.75 packets/cycle (up 1.16 on previous week)
- Percentage of TM cycles in which full bandwidth was used: 22.41%

The plot below shows the IBIS TM utilisation during the observation period.



A plot of the IBIS weekly bandwidth utilisation since 2004 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. JEM-X2 was dormant (DPE OFF) with no TM slots allocated.

Note: Some more information concerning the JEM-X operations is provided 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 per cycle.

During this reporting period, 189 of the 191 planned science pointings were executed nominally, 1 was interrupted, and 1 lost.

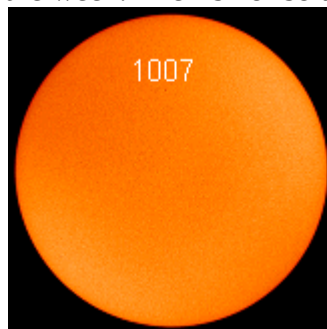
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. A small sun spot, #1007 was visible throughout the week. The risk of solar flares was very low.



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 good this week. No pointings were lost due to ground problems. The overall performance though was above the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was very good this week. No pointings were lost to MOC related issues.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There was one link drop reported from Redu for a few seconds with no impact. On DoY 308 a MPLS test with Perth was performed. There was another link drop for about 10 minutes on Doy 310 at 14:00Z from Goldstone due to a power glitch. No commands were lost from the Timeline.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

A new PSF has been received for revolution 748. Observations have been planned for revolution 745 and 746.

New TSFs have been received for revolutions 741 to 744.

2. Observation status

A new ECS files has been received for revolution 728.

3. ISOC Science Data Archive

Data has been ingested up to revolution 727.

4. ISOC system

ISOC system v20, especially PGT, has been tested in depth by users within ESAC and from remotely. Some issues have been found and partially fixed. The final release is foreseen for 24 November.

5. Problems

No new problems.

4.3.2 ISDC

Status of ISDC observation processing on 03/11/2008:

- Latest Standard Analysis completed: observation 06200210002 (GRS 1915+105, Revolution 726) on 29/10/2008.

- Latest products archived: observation 05200320004 (X Per, Revolutions 724) on 30/10/2008.

- Latest observation products sent to the observer: observation 05297000004 (Perseus OB2 Cloud, Revolutions 706-710) on 13/09/2008.

5 Special Events

6 Anomalies

The following problem was reported this week that impacted operations:

- On DoY 306 at 13:28:02Z, a local reset of the IREM CSCI S/W (SEU #69) occurred. The status of the unit, before the local reset of the IREM CSCI S/W was nominal. Some more detailed information concerning the IREM SEU is provided in the Appendix.
- The OTF was not reached during PIDs 07390097(DoY 308) and, 07400009 (DoY 309) due to loss of guide star.

The following anomaly reports were entered into the ARTS system this week.

AR id	Date Created	Subject	Segment	Status
INT-3036	2008-11-03	DSS27 - NO RX LOCK for 15 minutes (DOY 301)	NASA Station	Pending
INT-3037	2008-11-05	SCOS - Event logger printout - misses events	IMCS	Pending
INT-3038	2008-11-05	DSS27 - NO TM due to power failure - with 5 min warning (DOY 310)	NASA Station	Pending

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 739

The observations in revolution 739 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. They continued with a raster dither of the Cygnus Region (RA 20:35:53.00, DEC +40:39:49.0) lasting ~51.1 hours until the end of the revolution.

Revolution 740

The observations in revolution 740 began with a raster dither of mid-latitude 1 (RA 18:36:17.05, DEC -60:24:50.7), lasting ~42.5 hours. They continued with a raster dither of mid-latitude 2 (RA 19:42:44.23, DEC -15:04:03.4), lasting ~14.5 hours until the end of the revolution.

Revolution 741

The observations in revolution 741 began with a raster dither of mid-latitude 2 (RA 19:42:44.23, DEC -15:04:03.4), lasting ~7.7 hours. They continued 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. Finally a raster dither of the Cygnus Region (RA 20:35:53.00, DEC +40:39:49.0) lasting ~42.8 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 108; JEM-X1 8; JEM-X2 0; OMC 5.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2008-10-17T20:02:57.000Z	138.0024	F	Automatic TM processing.
2008-10-19T13:38:13.000Z	137.9825	F	Automatic TM processing.
2008-10-19T18:24:53.000Z	137.9744	F	Automatic TM processing.
2008-10-21T03:57:21.000Z	137.9492	F	Automatic TM processing.
2008-10-22T18:12:22.000Z	137.9326	F	Automatic TM processing.
2008-10-24T03:31:13.000Z	137.9108	F	Automatic TM processing.
2008-10-25T17:57:17.000Z	137.8982	F	Automatic TM processing.
2008-10-27T03:15:21.000Z	137.8806	F	Automatic TM processing.
2008-10-28T17:45:49.000Z	137.8618	F	Automatic TM processing.
2008-10-30T03:38:56.000Z	137.8052	F	Automatic TM processing.
2008-10-31T17:35:24.000Z	137.7942	F	Automatic TM processing.
2008-11-02T02:58:40.000Z	137.7738	F	Automatic TM processing.
2008-11-03T17:23:08.000Z	137.7612	F	Automatic TM processing.
2008-11-05T02:44:56.000Z	137.7177	F	Automatic TM processing.
2008-11-06T17:13:16.000Z	137.7047	F	Automatic TM processing.

This report was generated Fri Nov 7 08:00:21 GMT 2008

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, 01/11/2008 – 07/11/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 128 Open Loop Slews, 73 Closed Loop Slews and 4 Momentum Biases were executed (as reported by ACC OEM).

No slews were missed from TL, during the observation period.

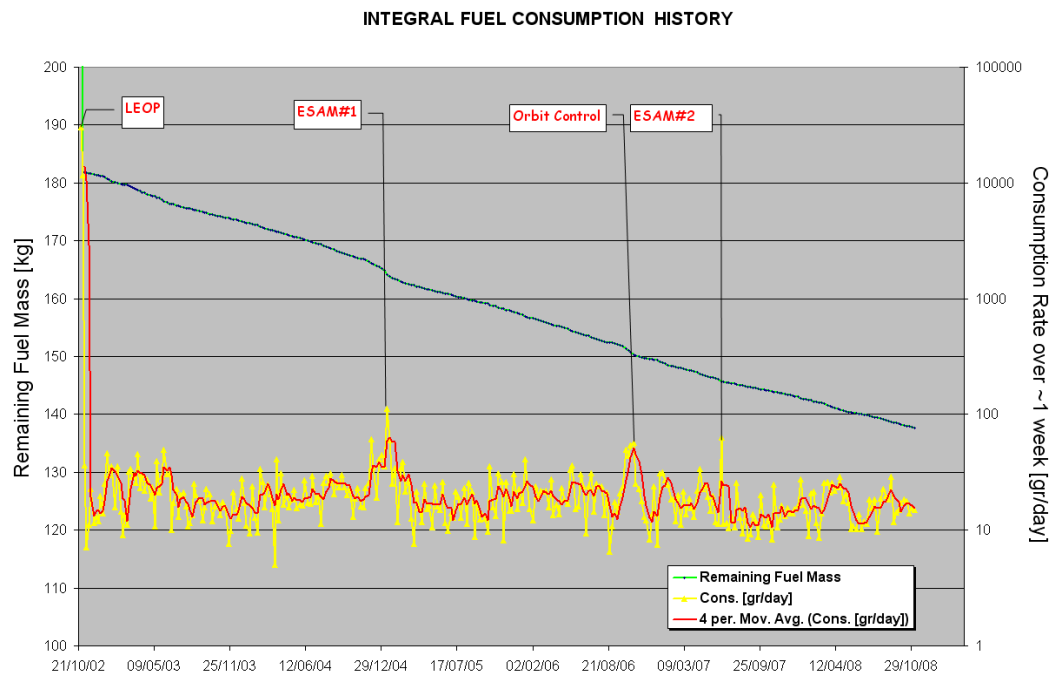
The OTF was not reached during PIDs 07390097, 07400009 due to loss of guide star.

Orbit Control

No update

Fuel consumption

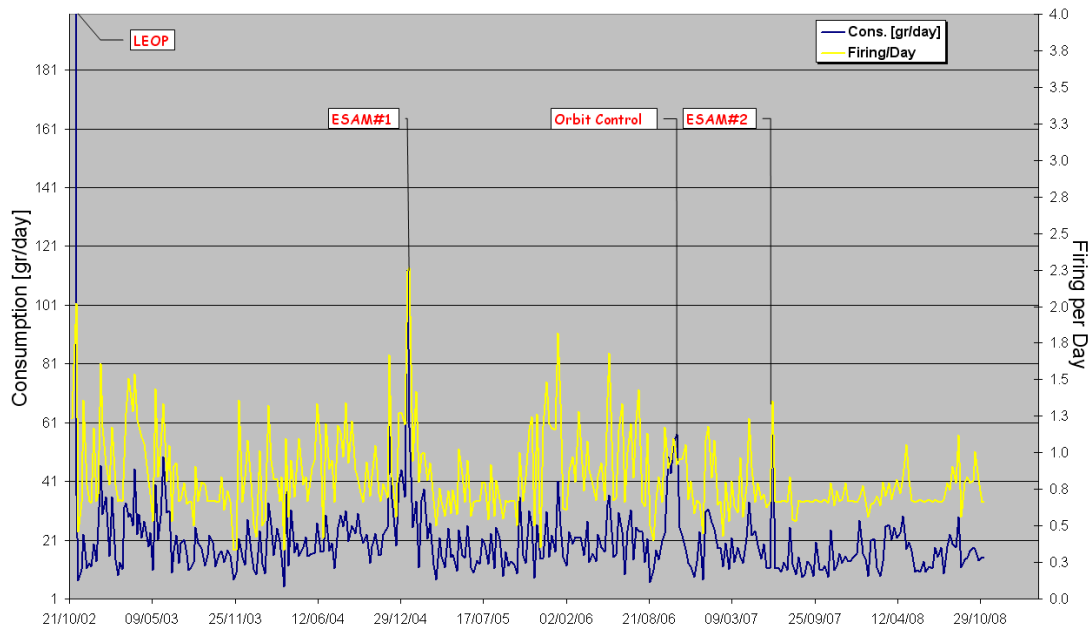
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 07/11/2008 is reported in the plot below.



The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The firing per day over the period between 01/11/2002 and 07/11/2008 is reported in the plot below.

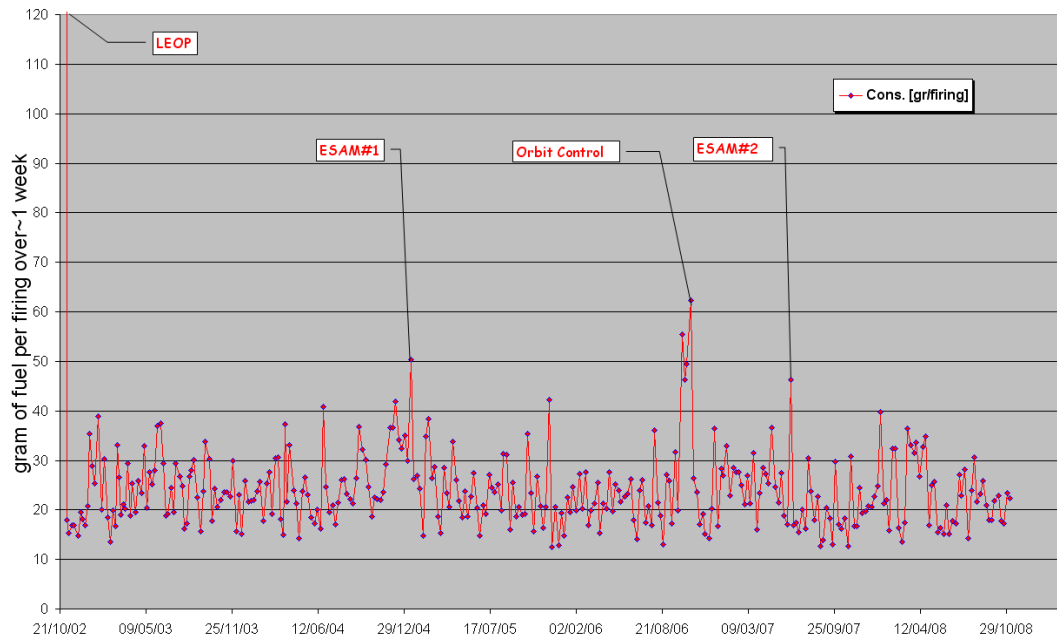
INTEGRAL FIRING PER DAY HISTORY



The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The fuel per firing over the period between 01/11/2002 and 07/11/2008 is shown in the plot below.

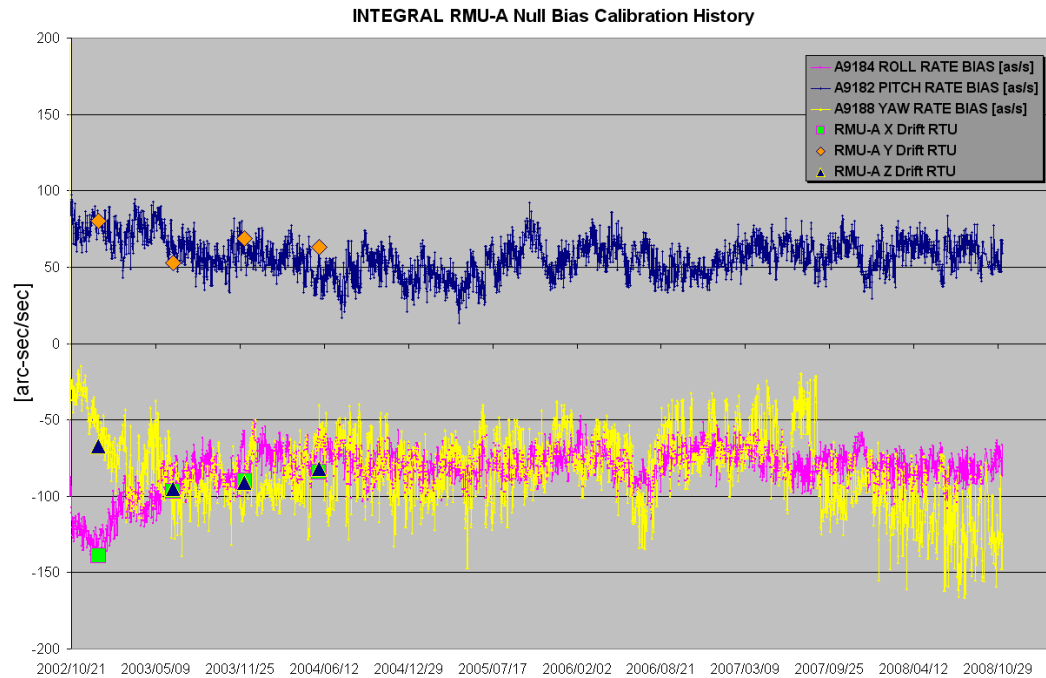
INTEGRAL FUEL MASS PER FIRING HISTORY



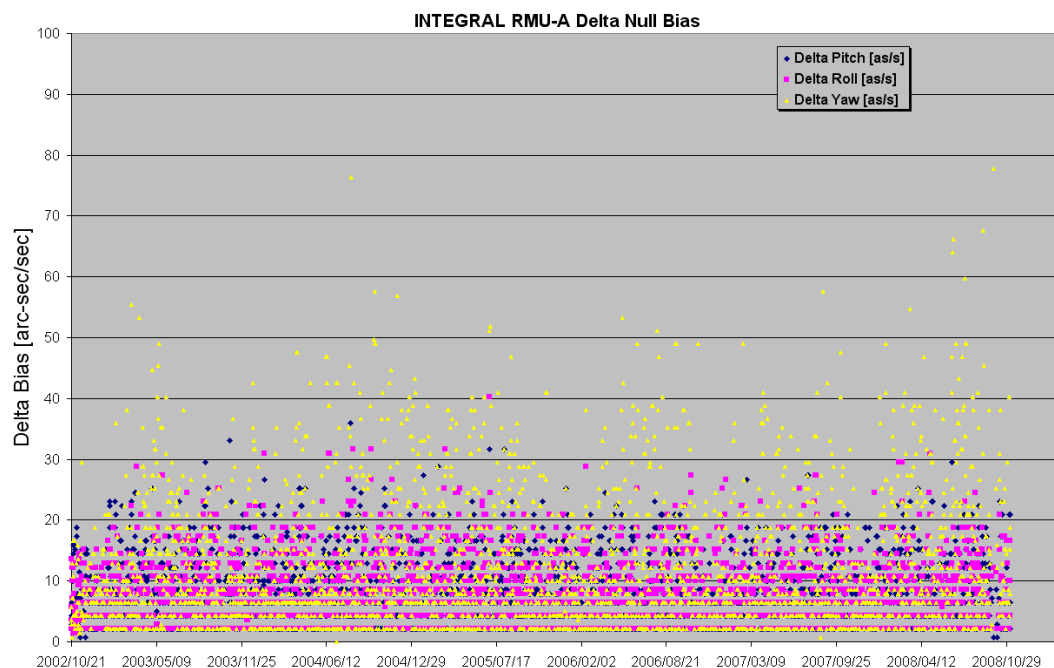
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 07/11/2008 is reported in the plot below.

The evolution of the drift on yaw channel is under constant monitoring but the values are still well within the specs. At moment the current constraints (for drift update generation) on the FDS have been relaxed to cope with the current situation.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over period between 01/11/2002 and 07/11/2008 is reported in the plot below.



01/11/2008 (Day of Year 306, Revolution 739)

Nothing to report.

02/11/2008 (Day of Year 307, Revolution 739)

Nothing to report.

03/11/2008 (Day of Year 308, Revolution 739-740)

Loss of guide star: at 06:29z a loss of the current guide star occurred. As foreseen by the IPS logic, the IMU1 went on until a new guide star was picked.

The operator performed a manual mapping and the next slew was manually updated in TL.

The OTF was not reached during PID 07390097.

No impact on TL.

04/11/2008 (Day of Year 309, Revolution 740)

Loss of guide star: at 03:29z a loss of the current guide star occurred. As foreseen by the IPS logic, the IMU1 went on until a new guide star was picked.

The operator performed a manual mapping and the next slew was manually updated in TL.

The OTF was not reached during PID 07400009.

No impact on TL.

05/11/2008 (Day of Year 310, Revolution 740)

Nothing to report.

06/11/2008 (Day of Year 311, Revolution 740-741)

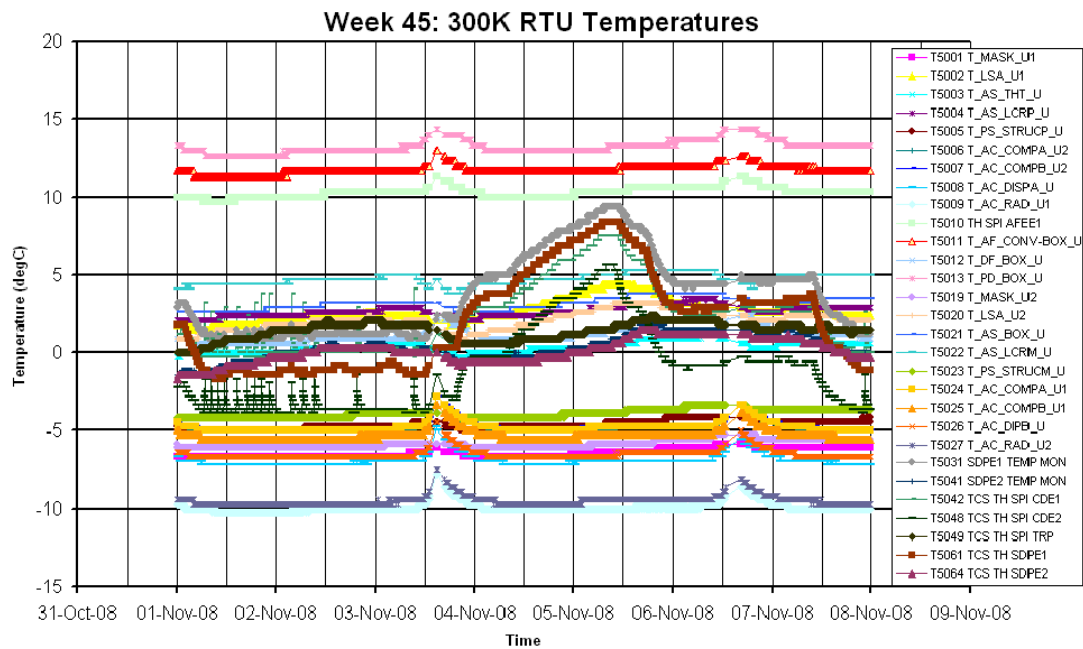
Nothing to report.

07/11/2008 (Day of Year 312, Revolution 741)

Nothing to report.

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.



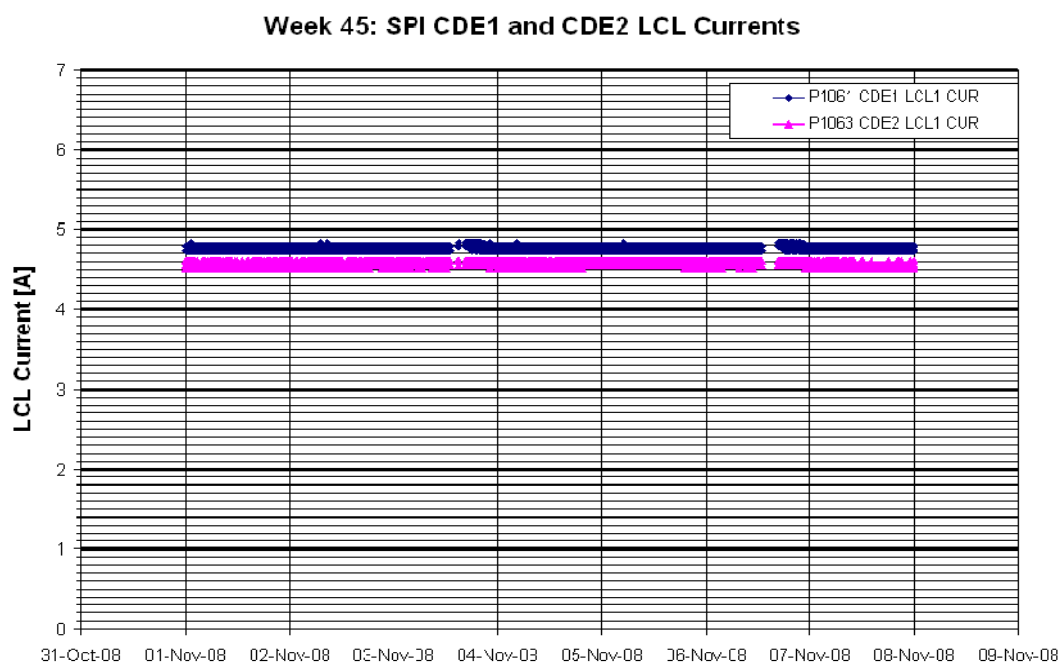
Stirling Compressors and Cryostat: The performance of the compressors is nominal.

The cold plate temperature was maintained in the range 80K +/-1K.

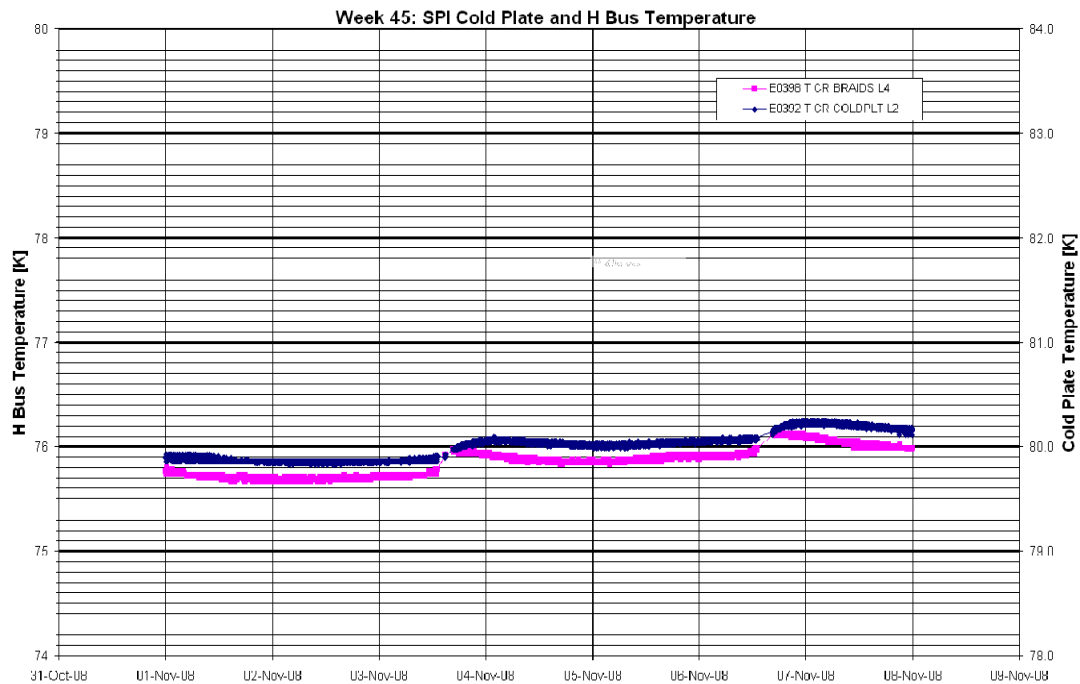
The stroke of all four compressors was set to 40 throughout the week and the average CDE LCL currents were as follows:

- CDE1 LCL Current = 4.77A
- CDE2 LCL Current = 4.56A

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



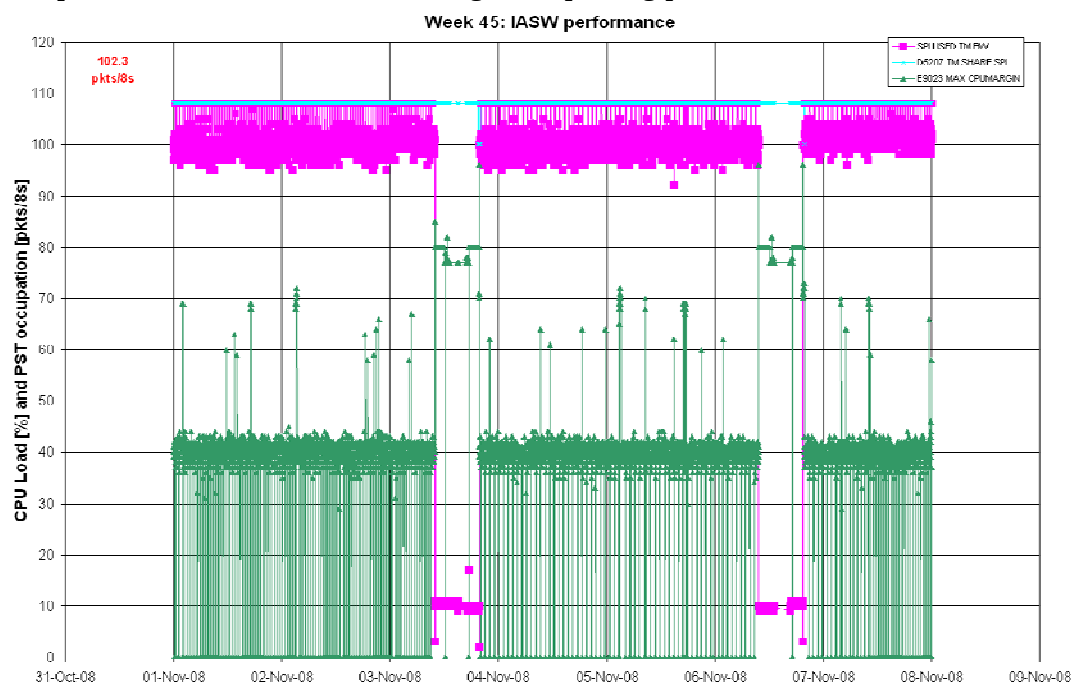
The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period.



DPE & IASW: The DPE health and IASW performance are nominal.

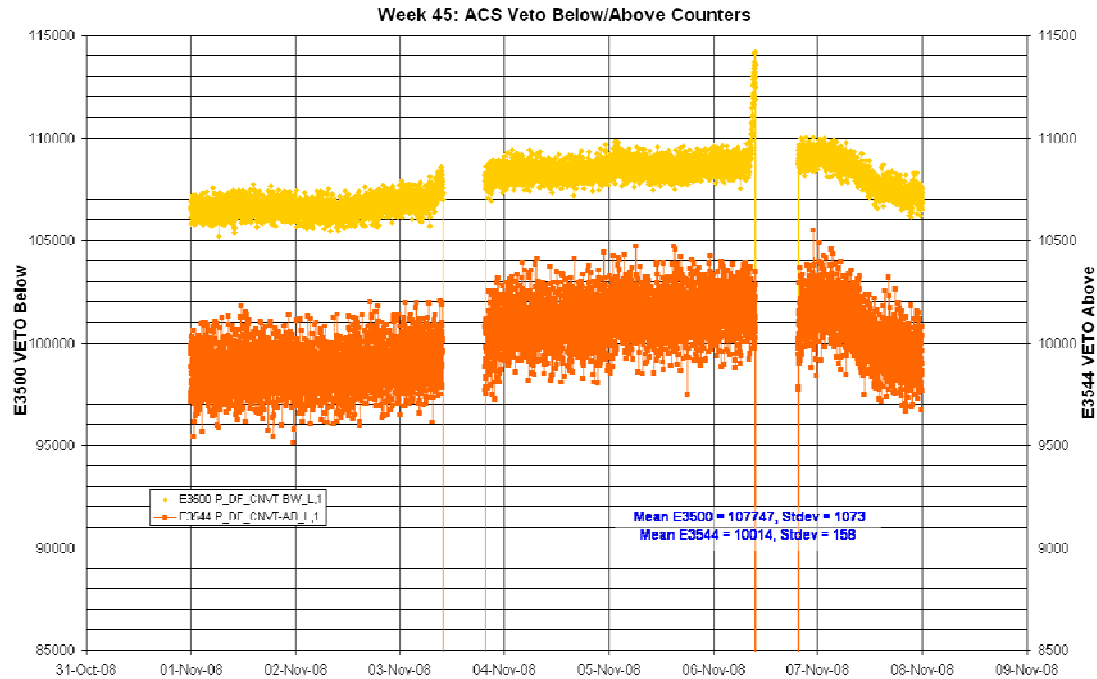
The IASW version installed is v4.3.4 with SE compression only enabled and the spectra scaling factor set to 8/19 SE. The average TM bandwidth occupation of SPI was 102.3 packets/cycle over the science window when the TM allocation was 108 packets/cycle.

The following plot shows the IASW performance in terms of TM bandwidth occupation and DPE CPU load during the reporting period.

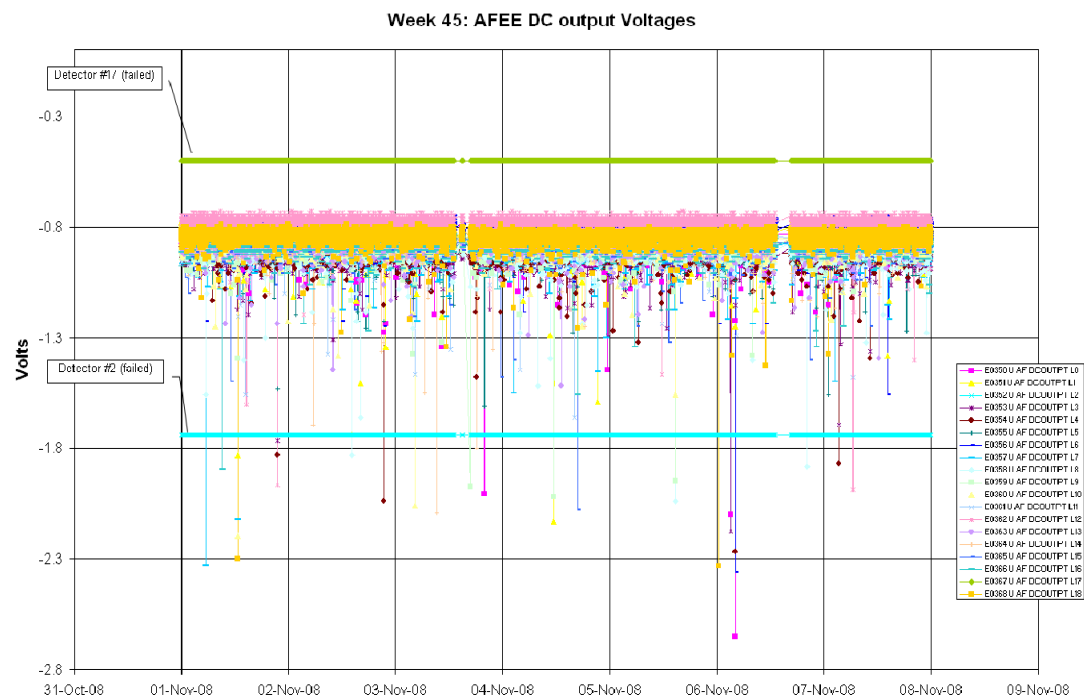


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

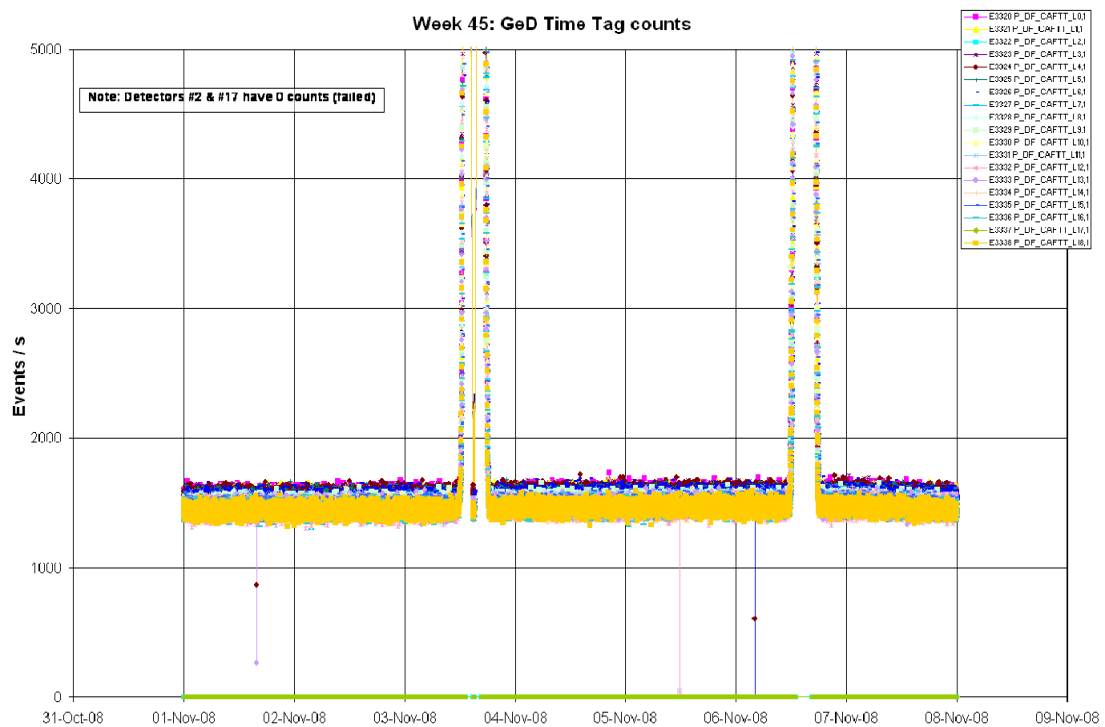
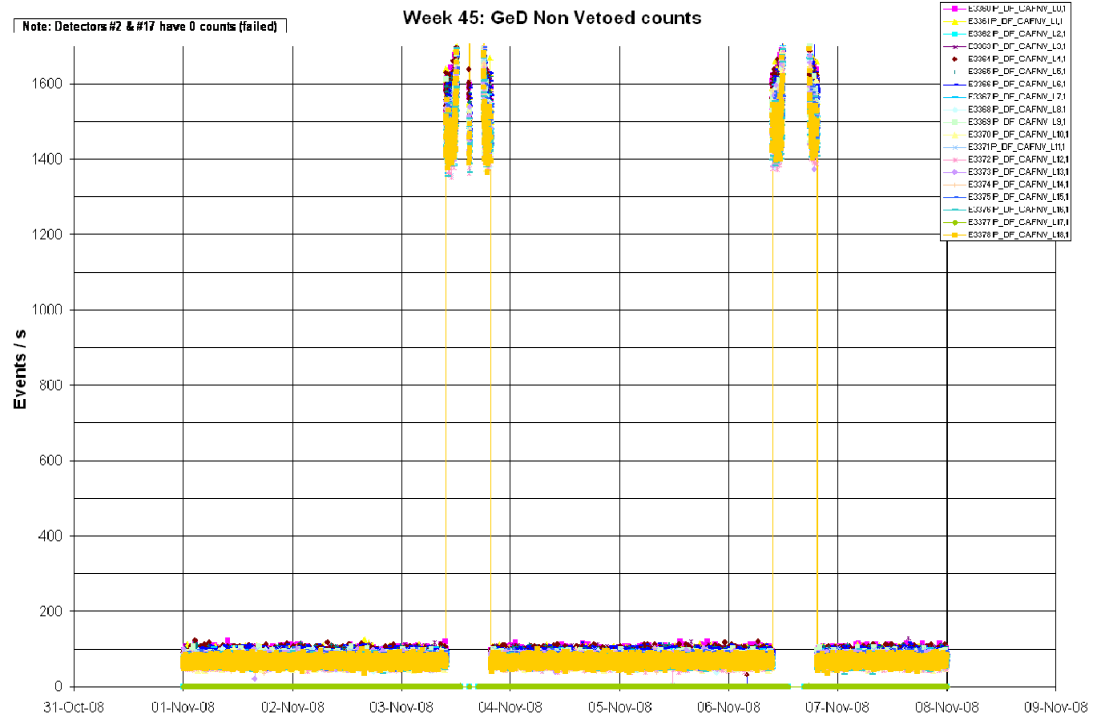
The following plot shows the ACS overall count rate evolution during the reporting period:

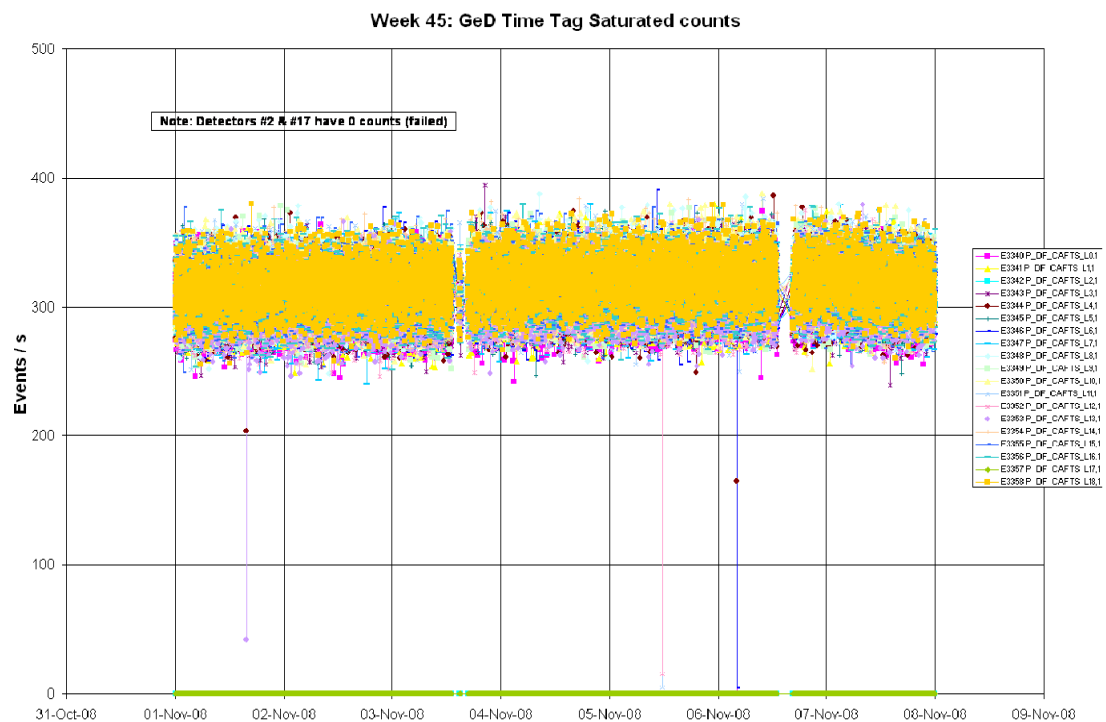


AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.

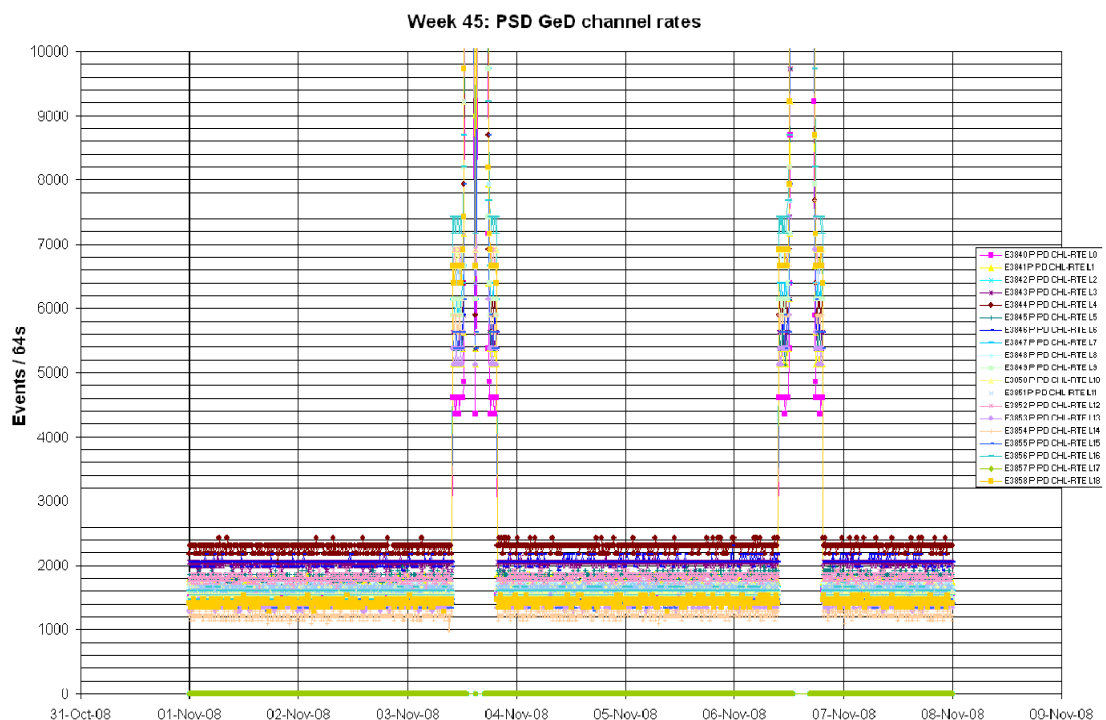


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event count rates during the reporting period.





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



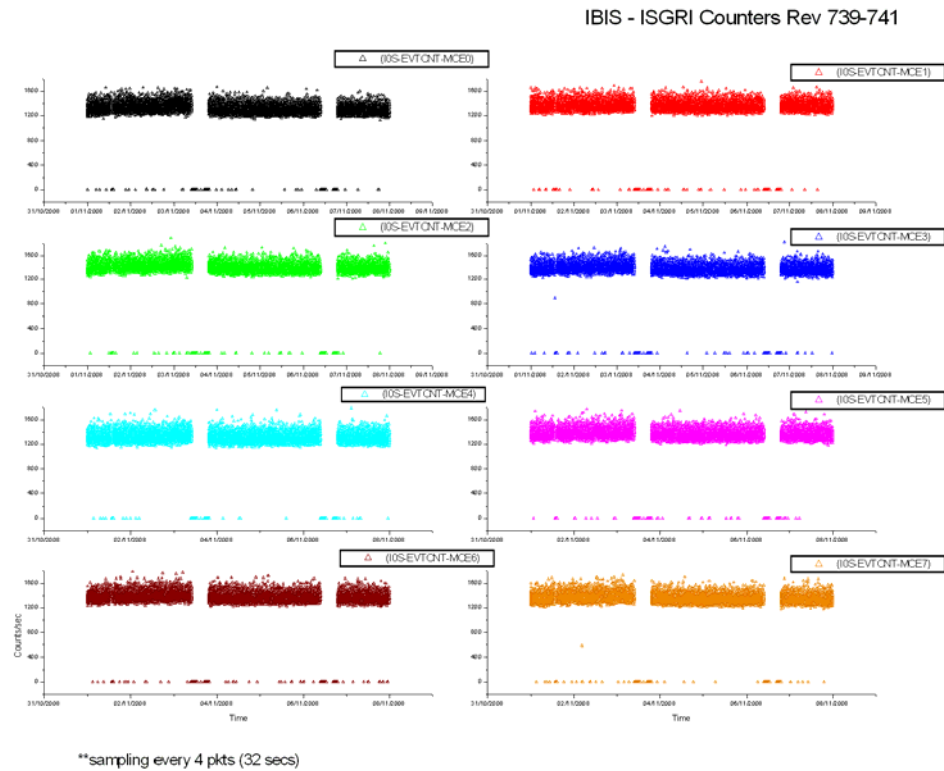
Event Log:

No non-nominal events occurred on SPI over the reporting period.

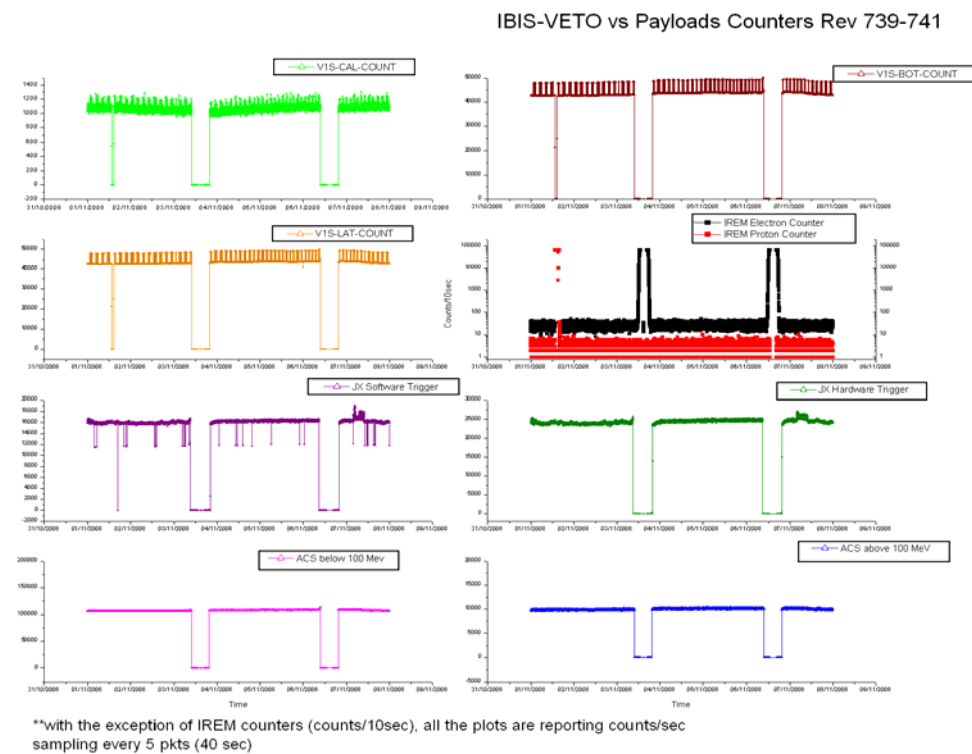
8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

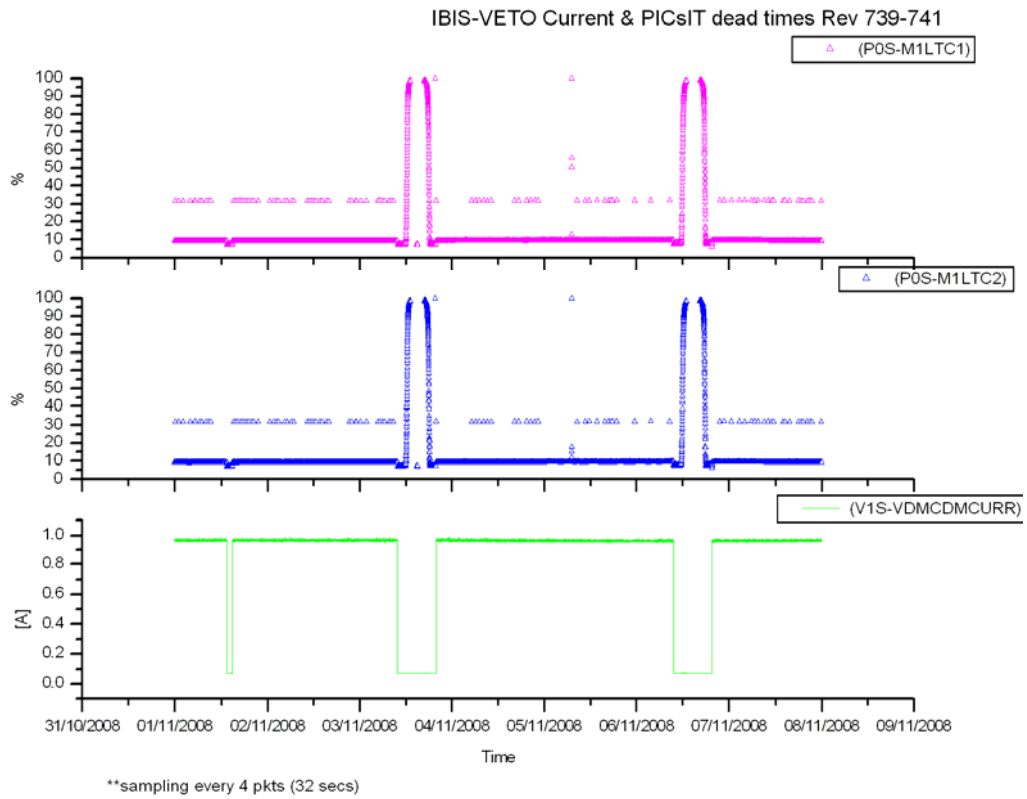


VETO vs Payload Counters:

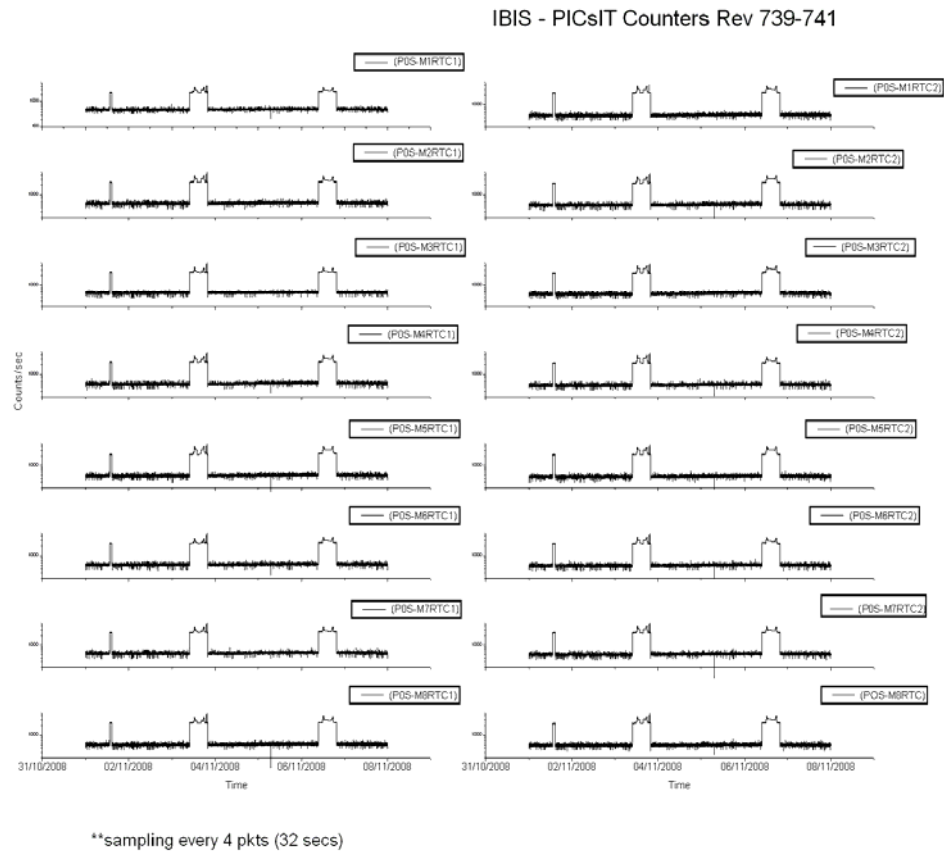


The week was characterised by low radiation as reported by the payload.

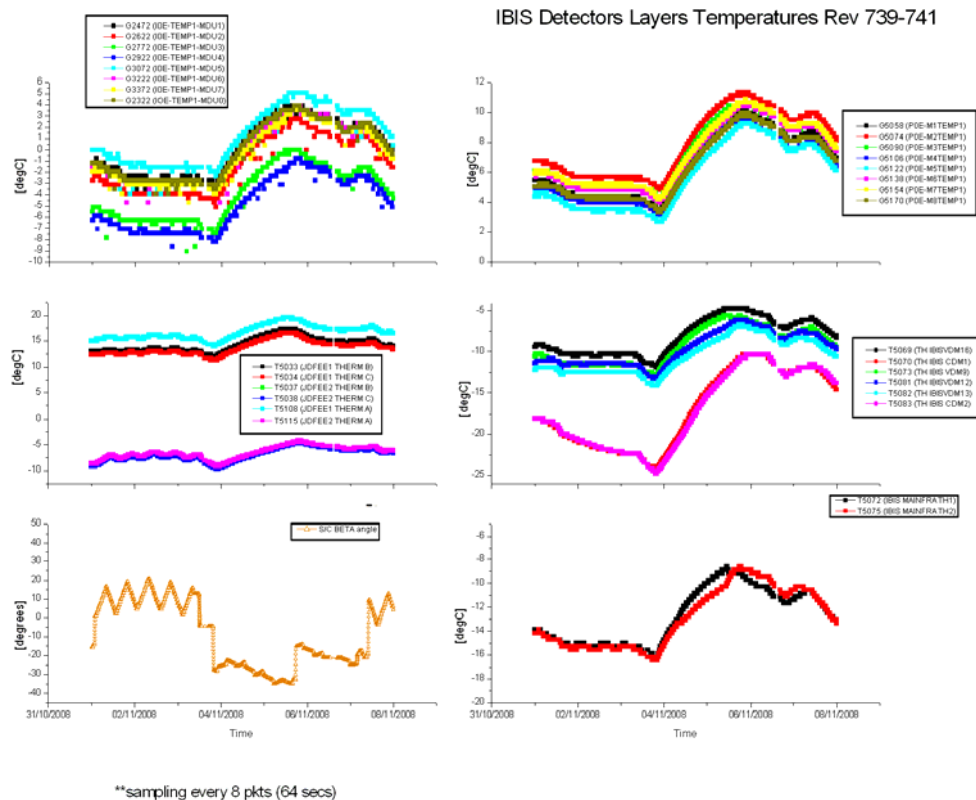
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report:

The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), G5002 (POS-Mi_RTC1) and G5003 (POS-Mi_RTC2) families and G2000 family (IOE-OVFWPXADD-Mi) were received during the radiation belt passages.

2008-11-01 (DOY 306, Rev 739)

Due to an IREM SEU, IBIS transitioned autonomously to Safe configuration at 13:28:11Z. It was recovered as follows:

- At 14:42:58Z FCP_IBIS1_0803 IBIS EXIT FROM SAFE MODE
- At 15:04:09Z ED GESTAN02 uplinked with the planned observation parameters and commanding to IBIS from the Timeline re-enabled.

IBIS operations continued nominally.

2008-11-02 (DOY 307, Rev 739) to 2008-11-04 (DOY 309, Rev 740)

IBIS operations executed nominally.

2008-11-05 (DOY 310, Rev 740)

At 07:09:18Z the TM parameters families G5068 and G5072 failed status consistency check (value = TRUE). These are the PDM semi-module FIFO error flags. At 07:10:01Z the TM parameter families G5002 and G5003 for the PDM semi-module counters started going OOL Low. As all the above parameters had returned within limits of their own accord by 07:10:33Z, no action was taken.

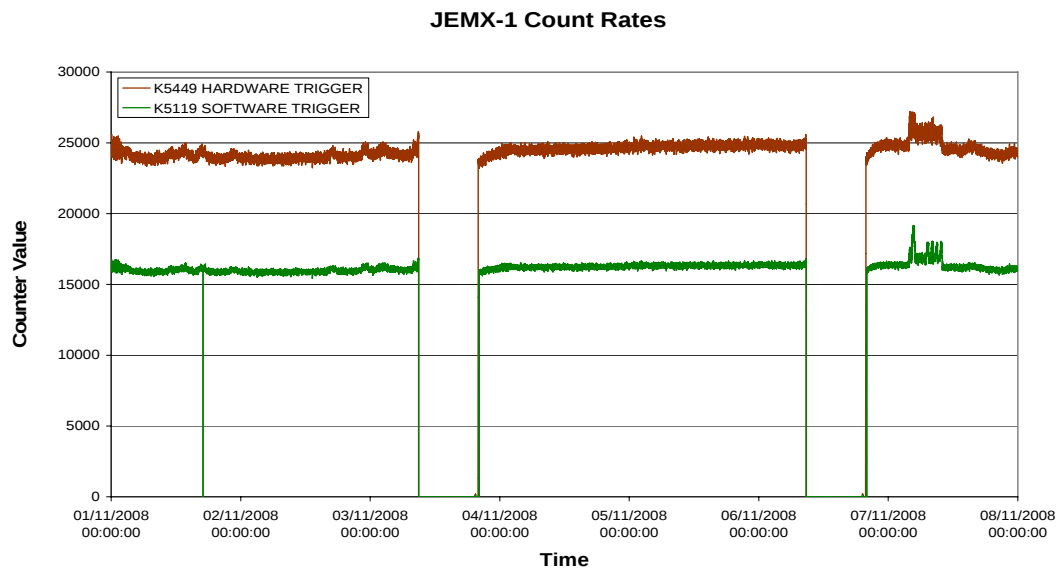
2008-11-06 (DOY 311, Rev 740-741) to 2008-11-07 (DOY 312, Rev 741)

IBIS operations executed nominally.

8.3.4 JEM-X Operations

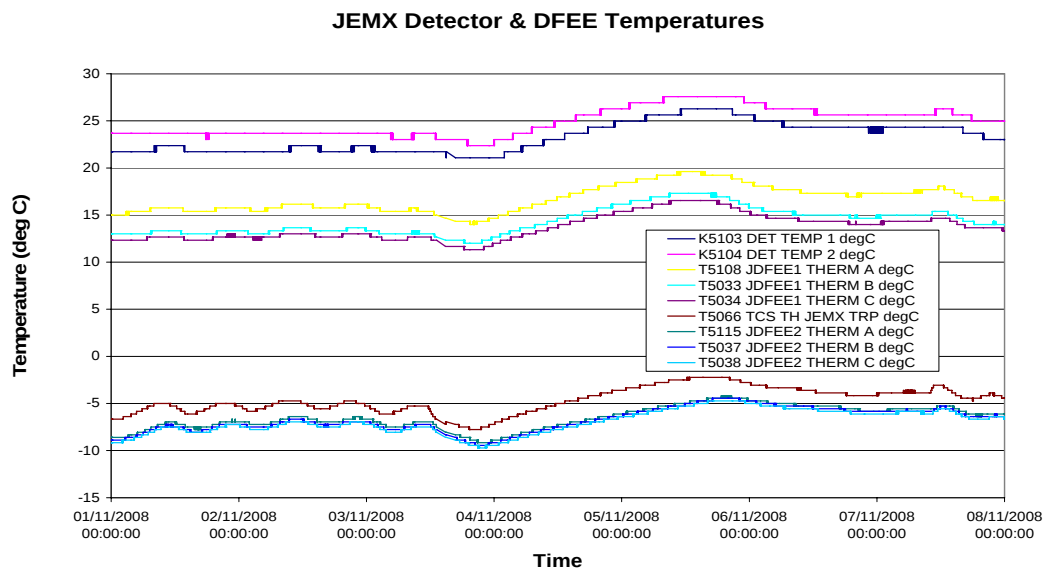
JEM-X Count Rates

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



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.



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

² Data sampled (1 frame in 8)

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JEM-X Daily Report:

2008-11-01 (DoY 306, Rev 739)

At 13:28:43 JEMX parameters K5315, K5316 & K5317 went Out-of-Limits due to an IREM SEU (#69). There was no impact as the reaction has been disabled.

The following OEMs were received at the indicated times:

2008.306.13.48.24.059	2008.306.13.48.27.051	1536	RealTime	5		EXCEPTION
JEM-X1 EXC IACS INTERF EXID			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	1				
K9080	MESS ID	5				
K9065	CSSW OPERAT ID	START				
K9066	TASK ID 8	IASW				
K9067	LOGICAL ADDRESS	4989				
2008.306.13.48.24.059	2008.306.13.48.27.078	1536	RealTime	6		EXCEPTION
JEM-X1 EXC IACS INTERF CULP			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	1				
K9080	MESS ID	6				
K9065	CSSW OPERAT ID	START				
K9066	TASK ID 8	IASW				
K9067	LOGICAL ADDRESS	19726				

No action was taken and there was no impact.

The following OEMs were received at the indicated times:

2008.306.19.01.46.071	2008.306.19.01.47.315	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.306.19.01.46.071	2008.306.19.01.47.331	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.306.19.01.46.071	2008.306.19.01.47.331	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.306.19.01.46.071	2008.306.19.01.47.332	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.306.19.01.46.071	2008.306.19.01.47.333	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				

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2008.306.19.01.46.071	2008.306.19.01.47.333	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.306.19.01.46.071	2008.306.19.01.47.334	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	5336				
2008.306.19.01.46.129	2008.306.19.01.58.867	1536	RealTime	154		EVENT
JEM-X1 HSL PROB 11			0	0	65535	PR N
E E						
FIX6		11				
K9079	MESS CLASS	0				
K9080	MESS ID	154				
FIX16		0				
FIX16		0				

No action was taken and there was no impact.

2008-11-02 (DoY 307, Rev 739) to 2008-11-06 (DoY 311, Rev 741)

JEM-X 1 operations executed nominally.

2008-11-07 (DoY 312, Rev 741)

The following OEMs were received at the indicated times:

2008.312.14.54.02.378	2008.312.14.54.05.347	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.312.14.54.02.378	2008.312.14.54.05.430	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.312.14.54.02.378	2008.312.14.54.05.431	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.312.14.54.02.378	2008.312.14.54.05.432	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				
K9080	MESS ID	5				
K9074	TASK ID 16	12				
K9067	LOGICAL ADDRESS	4989				
2008.312.14.54.02.378	2008.312.14.54.05.432	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079	MESS CLASS	2				

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K9080	MESS ID	5					
K9074	TASK ID 16	12					
K9067	LOGICAL ADDRESS	4989					
2008.312.14.54.02.378	2008.312.14.54.05.433	1536	RealTime	5		ANOMALY	
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR	N
E E							
FIX6		0					
K9079	MESS CLASS	2					
K9080	MESS ID	5					
K9074	TASK ID 16	12					
K9067	LOGICAL ADDRESS	4989					
2008.312.14.54.02.378	2008.312.14.54.05.434	1536	RealTime	5		ANOMALY	
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR	N
E E							
FIX6		0					
K9079	MESS CLASS	2					
K9080	MESS ID	5					
K9074	TASK ID 16	12					
K9067	LOGICAL ADDRESS	5336					
2008.312.14.54.02.440	2008.312.14.54.12.487	1536	RealTime	154		EVENT	
JEM-X1 HSL PROB 11			0	0	65535	PR	N
E E							
FIX6		11					
K9079	MESS CLASS	0					
K9080	MESS ID	154					
FIX16		0					
FIX16		0					

No action was taken and there was no impact.

8.3.5 OMC Operations

2008-11-01 (DoY 306, Rev 739)

At 13:28:03, OMC was sent to SAFE mode by an IREM SEU (#69). A recovery was performed, and the instrument returned to Stand-by at 14:30:59, and back into Science at 14:34:10. The impact was pointing 07390029 was cut short after 265 from a planned 2000 seconds, and pointing 07390030 was lost.

2008-11-02 (DoY 307, Rev 739) to 2008-11-07 (DoY 312, Rev 741)

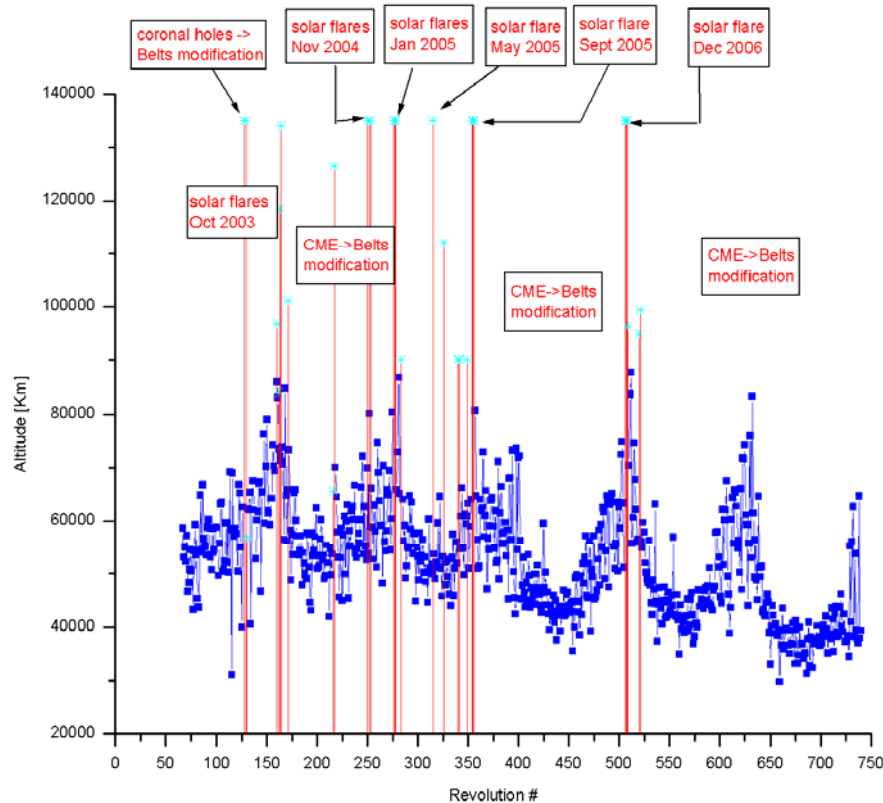
Nothing to report.

On DoY 308 at 09:50:27 and DoY 311 at 09:40:11 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

Evolution of Radiation Belt Entry 2003-2008



IREM daily report:

DoY 2008.306 (01/11/2008):

At 13:28:02Z, a local reset of the IREM CSCI S/W (SEU #69) occurred. The status of the unit, before the local reset of the IREM CSCI S/W, was nominal, here is a summary:

- 1) The temperatures were nominal;
- 2) The LCL current was nominal;
- 3) The last HK before the anomaly showed HV, 5V and 6V voltages inside limits;
- 4) The anomaly occurred at 2008.306.13:28:02Z (137278.4 km). The unit had performed an automatic transition to Standard Mode (i.e. no block counter increasing, all the TM words= FFFF hex); just before the anomaly, radiation counters reported nominal values considering the position of the S/C along the orbit;
- 5) The recovery of the unit started immediately using procedure CRP_SYS_2570. The first dump of the status word after the anomaly reported a value of BCC0 HEX = 48320 DEC = 1011110011000000, i.e. the Checksum Failure Flag ON. The unit was still reporting the status as if it was in Integral mode with counting ON and accumulation ON. This value of the status word is assumed to be an old one written by the S/W at the moment of the anomaly.

6) The patch was performed successfully with the correct re-starting of the S/W following procedure FCP_RM_0081. The operation was completed at 16:31:00Z.

The IREM automatic transition to Standard Mode affected the instruments by forcing them to automatically enter Safe configuration, except for SPI and JEM-X whose automatisms are disabled according to the PIs request. OMC was recovered at 14:30:59Z and IBIS at 15:05:00Z.

The cause of these S/W resets is apparently due to the unit's memory device that is sensitive to high energy radiation, as proved during test campaign on-ground.

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]
739	RAD_ENTR R 2008-11-03T09:50:25Z	03/11/2008 11:50:18	37895.9	03-Nov-2008 11:53:19	37320.69
740	RAD_EXIT R 2008-11-03T19:38:20Z	03/11/2008 18:22:34	>>33744.6	03-Nov-2008 18:53:19	46522.17
740	RAD_ENTR R 2008-11-06T09:40:06Z	06/11/2008 11:34:18	39330.2	06-Nov-2008 11:39:18	37063.36
741	RAD_EXIT R 2008-11-06T19:28:03Z	06/11/2008 18:01:54	>>33743.2	06-Nov-2008 18:39:18	46666.37

Reference

High radiation

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)

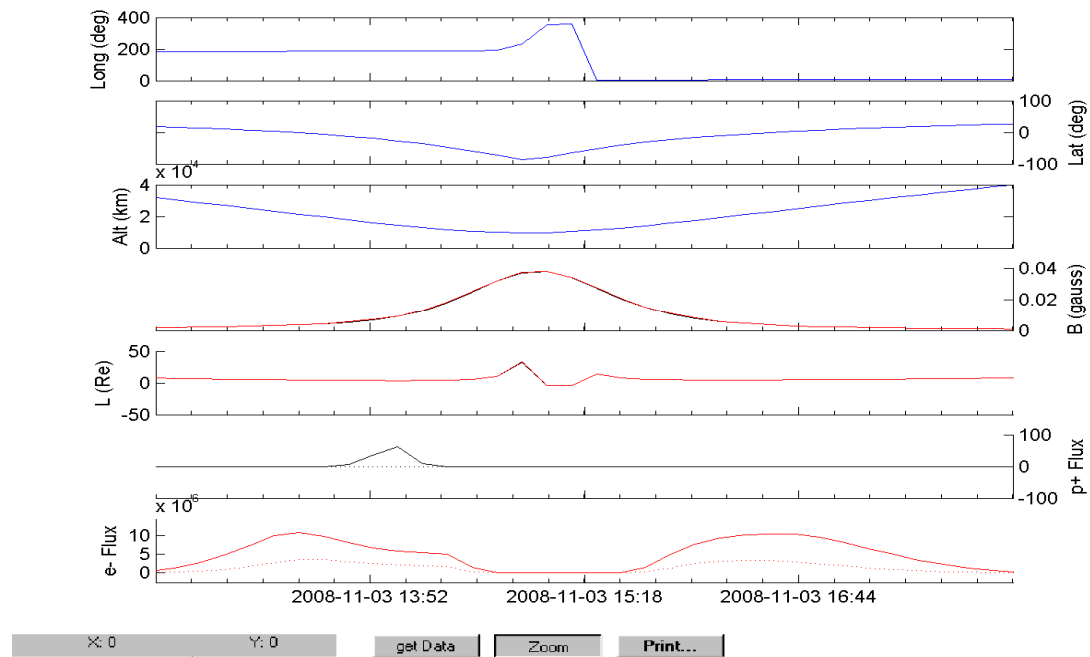
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

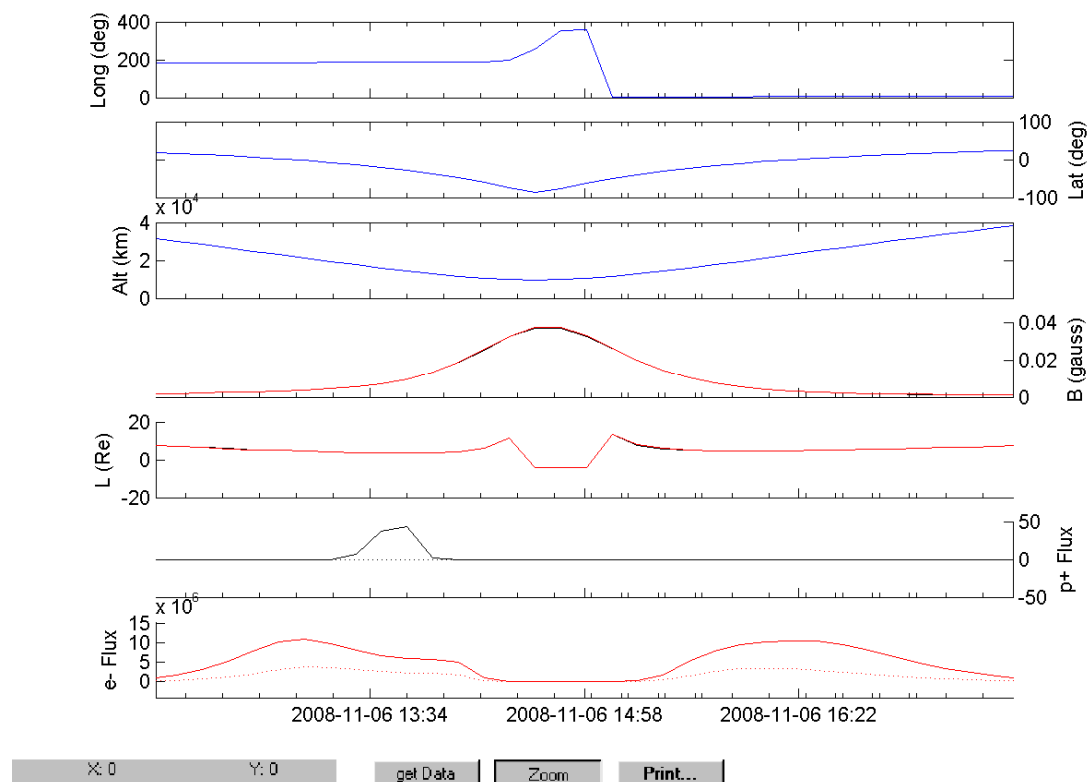
The IREM radiation counter plots are not available this week.

IREM Predicted Radiation Belt Passages

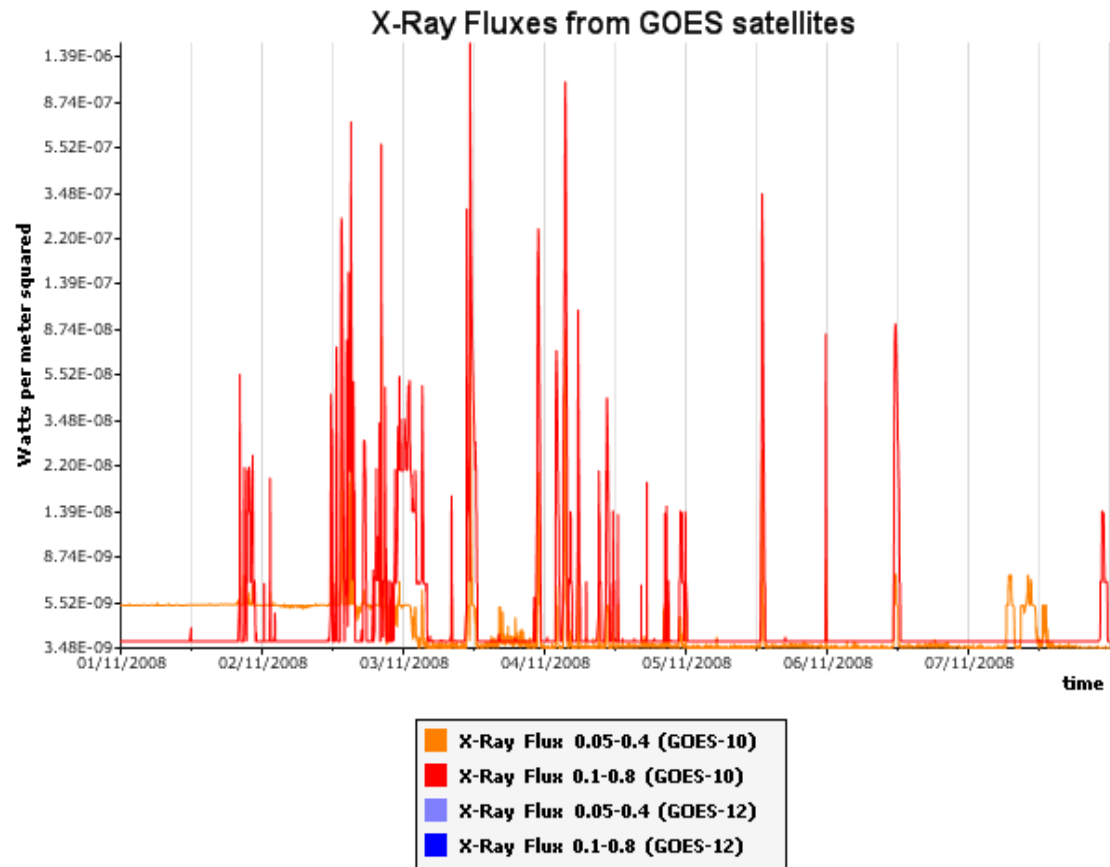
Rev 739



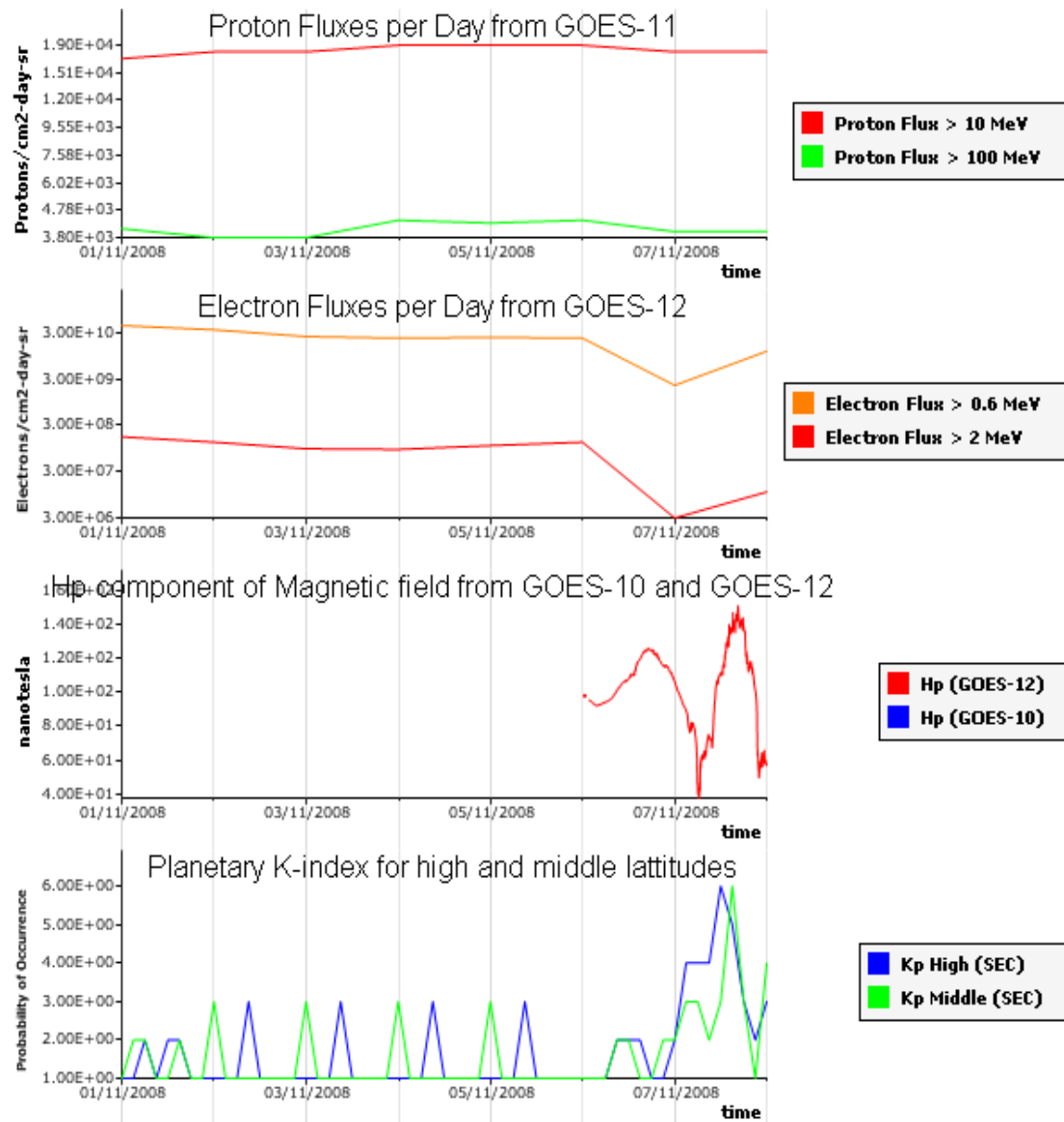
Rev 740



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



X-Ray fluxes start to be significant over 10^{-5} W/m² (corresponding to M-class flares). Above 10^{-4} W /m², 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.