

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 317
Week 42
20.10.08
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 11.10.08 until 17.10.08 (both dates inclusive) and covers the revolutions 732, 733 and 734.

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 Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), 3 pointings of a Galactic disk scan (RA 19:13:40.80, DEC +10:43:26.4), (RA 19:08:05.28, DEC +08:03:46.8), and (RA 19:00:42.00, DEC +04:30:32.4), a raster dither of the Galactic Centre (RA 17:45:40.03, DEC -29:00:28.1), and another Target of Opportunity: a raster dither of H 1743-322 (RA 17:46:15.61, DEC -32:14:00.6).

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 started on 22/09/2008 and was completed on 16/10/2008. The eighth (13/10/2008) and ninth (16/10/2008) eclipse passages were nominal from an AOCS point of view.

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 were verified for the 8th and 9th eclipse passages.

Four slews were missed from TL, during the observation period due to problem on DSS27 station.

The fuel consumption over the period between 11/10/2008 and 17/10/2008 was 0.1067 Kg. The remaining propellant is in the order of 138.0140 Kg.

Winter Eclipse Season 2008 Summary

The AOCS eclipse operations were nominal. After the end of the season the ACC/FDE/FCE Eclipse Timers were stopped and the AMD thresholds were set to their non-eclipse season values. The complete eclipse times and IMUs usages are provided below:

Complete Eclipse Times

AOCS Eclipse Times															Winter 2008	
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		
2008-09-22	16:10:00	19:36:00	18:16:47	18:57:52	19:07:14	19:07:58	19:16:27	na	na	na	na	19:26:47	19:30:10	19:36:34	0:10:20	
2008-09-25	15:43:00	19:24:00	17:54:17	18:36:23	18:47:40	18:48:24	18:53:57	19:29:19	19:30:55	19:28:33	19:45:58	18:55:53	19:37:00	19:40:41	0:36:50	
2008-09-28	15:18:00	19:11:00	17:39:06	18:21:08	18:29:44	18:30:28	18:38:45	18:39:56	18:40:13	19:26:28	19:26:49	19:28:21	19:32:16	19:38:06	0:49:36	
2008-10-01	16:19:00	18:40:00	17:26:22	18:08:10	18:17:14	18:11:52	18:26:02	18:27:06	18:27:17	19:22:23	19:22:41	19:24:09	19:21:44	19:33:47	0:59:07	
2008-10-04	15:08:00	18:45:00	17:16:18	17:58:21	18:08:17	18:09:01	18:15:58	18:16:59	18:17:10	19:17:39	19:17:57	19:19:21	19:24:45	19:29:06	1:03:23	
2008-10-07	18:34:00	16:00:00	17:08:33	17:50:27	18:01:27	18:02:10	18:08:13	18:09:16	18:09:29	19:11:46	19:12:04	19:13:32	19:19:22	19:23:08	1:05:19	
2008-10-10	15:05:00	18:26:00	17:02:20	17:44:11	17:55:11	17:55:54	18:02:00	00:00:00	00:00:00	18:03:24	19:03:19	19:05:15	19:10:54	19:14:48	1:03:15	
2008-10-13	14:39:00	18:12:00	16:56:41	17:38:35	17:49:35	17:50:18	17:56:21	17:57:45	17:58:05	18:49:52	18:50:21	18:52:10	18:57:58	19:01:45	0:55:49	
2008-10-16	14:36:00	17:58:00	16:52:42	17:34:40	17:45:40	17:45:53	17:52:22	17:54:32	18:27:52	18:31:21	18:28:43	17:55:14	18:36:41	18:40:59	0:38:59	

IMU1 Usage during Eclipse

IMU Usage during Eclipse Season				Winter 2008		
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]		
						0:00:00
2008-09-22 13:25:43	2008-09-22 19:37:46	0.2654	0.2714	na	6:12:03	6:12:03
2008-09-25 13:57:53	2008-09-25 19:43:03	0.2341	0.3217	na	5:45:10	11:57:13
2008-09-28 12:17:51	2008-09-28 19:40:12	0.3597	0.2517	na	7:22:21	19:19:34
2008-10-01 12:20:00	2008-10-01 19:36:07	0.3340	0.2131	na	7:16:07	26:35:41
2008-10-04 12:04:00	2008-10-04 19:31:35	0.1985	0.2267	na	7:27:35	34:03:16
2008-10-07 12:10:00	2008-10-07 19:25:30	0.2213	0.2150	na	7:15:30	41:18:46
2008-10-10 11:42:47	2008-10-10 19:17:13	0.2049	0.1908	na	7:34:26	48:53:12
2008-10-13 11:43:53	2008-10-13 19:04:00	0.2259	0.2291	na	7:20:07	56:13:19
2008-10-16 11:13:37	2008-10-16 18:43:20	0.2799	0.1883	na	7:29:43	63:43:02

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.

During the reporting period the last 2 eclipses of the 13th eclipse season took place.

The details of the complete eclipse season are summarised in the table below:

Date	Penumbra Entry	Umbra Entry	Umbra Exit	Penumbra Exit	Total Eclipse Duration	Umbra Duration Only	DOD1 (Ah)	DOD2 (Ah)	Recharge Duration Battery 1	Recharge Duration Battery 2
22/09/08	19:15:26			19:25:48	0:10:22	0:00:00	0	0	n/a	n/a
25/09/08	18:54:02	18:55:58	19:28:38	19:31:00	0:36:58	0:32:40	3.17	3.14	1:52:19	1:51:25
28/09/08	18:38:49	18:40:16	19:26:31	19:28:25	0:49:36	0:46:15	4.55	4.5	2:42:23	2:40:48
01/10/08	18:26:07	18:27:24	19:22:28	19:24:14	0:58:07	0:55:04	5.34	5.28	3:11:06	3:08:58
04/10/08	18:16:05	18:17:17	19:17:43	19:19:28	1:03:23	1:00:26	5.78	5.72	3:26:56	3:24:48
07/10/08	18:08:13	18:09:29	19:11:45	19:13:33	1:05:20	1:02:16	6.16	6.09	3:40:43	3:38:11
10/10/08	18:01:56	18:03:20	19:03:13	19:05:11	1:03:15	0:59:53	5.86	5.8	3:29:53	3:27:29
13/10/08	17:56:15	17:57:59	18:49:46	18:52:05	0:55:50	0:51:47	5.14	5.09	3:03:31	3:01:39
16/10/08	17:52:19	17:55:11	18:27:48	18:31:16	0:38:57	0:32:37	3.27	3.23	1:55:17	1:53:57

From the EPS point of view all eclipse passages were completely normal.

Following the end of the eclipse season the EPS was reconfigured to its nominal configuration for use outside of the eclipse season:

- FCP_EPS_1260 Set MRU Timer to 0 and allow EOC
- FCP_EPS_1273 Select Full Charge Rate C/26 Battery 1
- FCP_EPS_1274 Select Full Charge Rate C/26 Battery 2

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

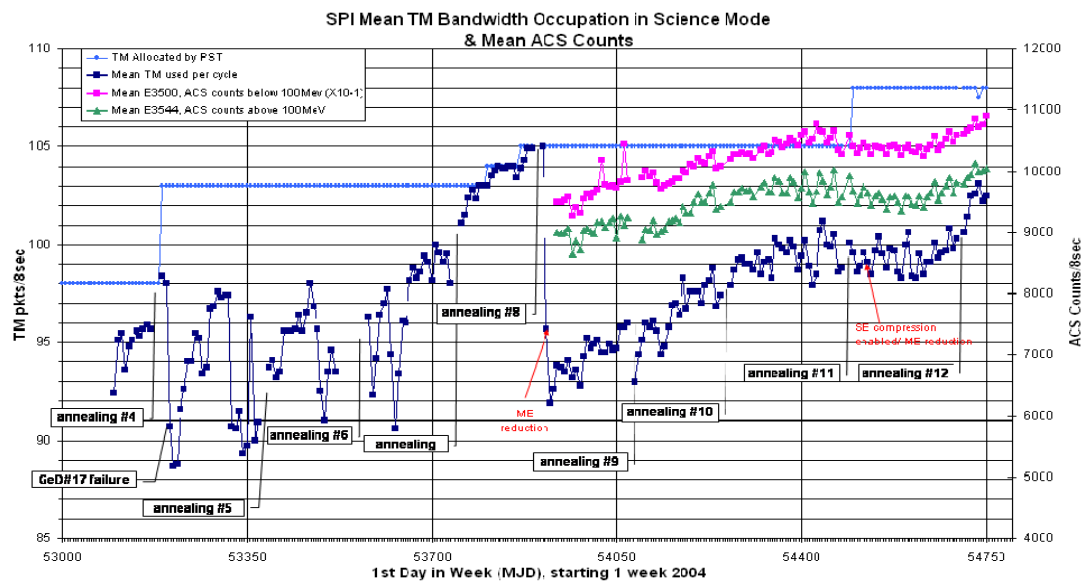
Following the 12th annealing, ended on 04/09/2008 at 23:50Z, the overall status of the gamma-ray spectrometer is nominal, except for detector #2 (failed since 06/12/2003) and detector #17 (failed since 17/07/2004). The energy resolution of the previously degraded GeD#12 has improved following this annealing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

Eclipse operations for SPI were executed nominally.

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 102.5 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

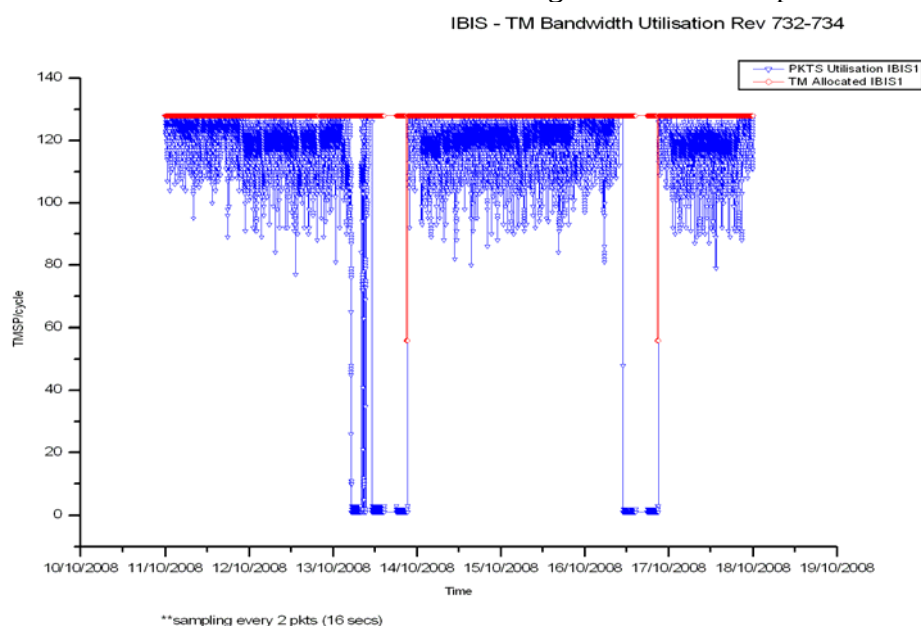
The overall status of the unit is nominal.

Eclipse operations for IBIS continued to be executed nominally.

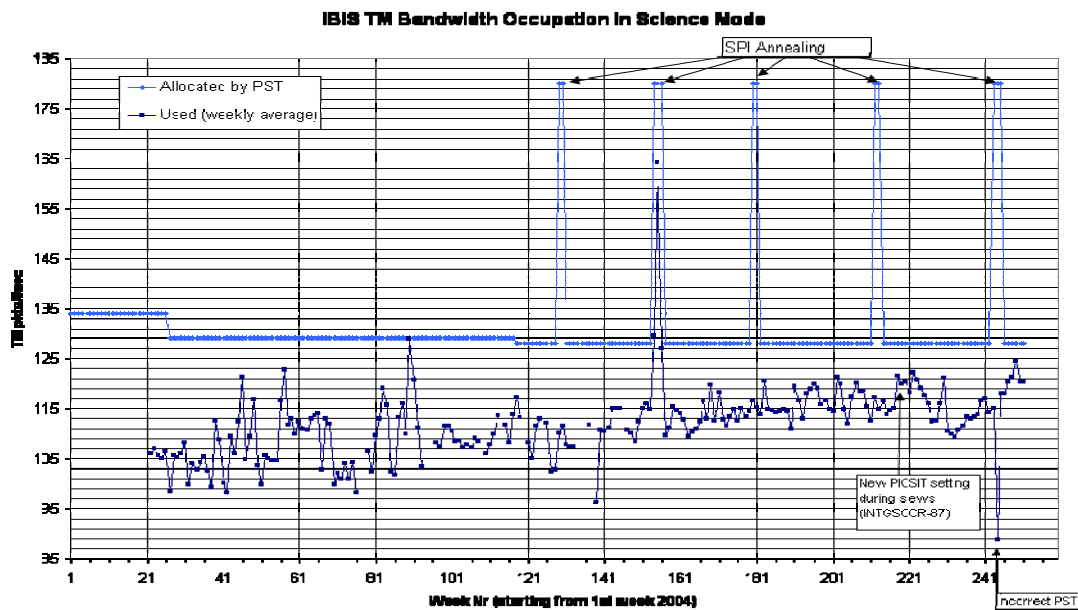
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 128 packets/cycle
- IBIS mean bandwidth utilisation in science mode: 120.28 packets/cycle (up 0.06 on previous week)
- Percentage of TM cycles in which full bandwidth was used: 18.57%

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, 212 of the 215 planned science pointings were executed nominally, 3 were lost.

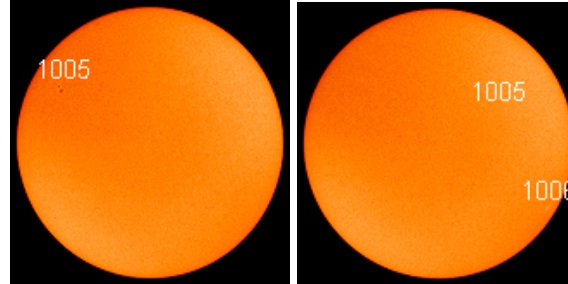
Note: Some more information concerning the OMC operations is provided in the Appendix.

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, #1005 appeared on the 11th October, and gradually rotated across the sun. A second spot, #1006 joined it on the 17th. 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. Four pointings were lost due to ground problems. The overall performance though was still 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. One problem was that the the Antenna in Goldstone DSS27 stopped, the impact was the loss of 1 pointing, and the interruption of another. There were two link drops reported from DSS27, probably due to RFI, the impact was the loss of one pointing, and the interruption of another. There was also one occasion when the links with ISDC briefly dropped, without impact.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

No new PSFs have been received. The last available PSF is for revolution 739.

Revolution 734 has been replanned due to a TOO observation of Black Hole Transient H 1743-322. This source has also been observed in revolution 736.

New TSFs have been received for revolutions 734 and 735.

A new TOO request has been received on Saturday 18 October and is being evaluated.

2. Observation status

No new ECS files have been received. The last available ECS is for revolution 723.

3. ISOC Science Data Archive

Data has been ingested up to revolution 721.

4. ISOC system

ISOC system v19.4.1 still working. Work is underway for v20.

5. Problems

Transmission of TOO requests to mobile phones is still not reliable.

4.3.2 ISDC

Status of ISDC observation processing on 20/10/2008:

- Latest Standard Analysis completed: observation 06200290001 (SS433, Revolution 722) on 13/10/2008.
- Latest products archived: observation 06200290002 (SS433, Revolutions 722-723) on 13/10/2008.
- 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 problems were reported this week that impacted operations.

- On DoY 286 at 19:50, a drop in the links with DSS27 (Antenna stopped) forced an interruption in the Timeline. The links were recovered at 20:18, and a recovery commenced. The timeline was rejoined at 20:54. The impact was the loss of pointings 07320071 & 07320072.
- On DoY 289, at 20:36, a drop on both links from DSS27 occurred and forced an interruption in the timeline. The links were recovered at 20:38, and a recovery commenced. The impact was the loss of pointings 07330082 & 07330083.

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

AR id	Date Created	Subject	Segment	Status
INT-3035	2008-10-12	DSS27 - NO TM & TC (DOY 274 - 275)	NASA Station	Pending
INT-3034	2008-10-16	DSS27 - NO TM & TC (DOY 286)	NASA Station	Pending
INT_SC-239	2008-10-14	SPDU-A TM Invalid due to Busy Status.	Spacecraft	Pending
INT_SC-240	2008-10-17	IREM Anomaly: Reset of IREM_CSCI S/W #67, 27/09/2008	Payload	Pending

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 732

The observations in revolution 732 began with a Target of Opportunity: a raster dither of H 1743-322 (RA 17:46:15.61, DEC -32:14:00.6), lasting ~23.1 hours. This was followed by 2 pointings of a Galactic disk scan, first at (RA 19:00:00.00, DEC +05:24:00.0), lasting ~15.7 hours, then at (RA 19:12:00.00, DEC +09:48:00.0), lasting ~15.7 hours, until the end of the revolution.

Revolution 733

The observations in revolution 733 began with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 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. This was followed by 2 pointings of a Galactic disk scan (RA 19:13:40.80, DEC +10:43:26.4), and (RA 19:08:05.28, DEC +08:03:46.8), both lasting ~16.8 hours. Finally a raster dither of the Galactic Centre (RA 17:45:40.03, DEC -29:00:28.1), lasting ~10.6 hours, was performed until the end of the revolution.

Revolution 734

The observations in revolution 734 began with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. This was followed by 1 pointing of a Galactic disk scan (RA 19:00:42.00, DEC +04:30:32.4), lasting ~16.8 hours, plus a Target of Opportunity: a raster dither H 1743-322 (RA 17:46:15.61, DEC -32:14:00.6) lasting ~33.9 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

2008-10-02T04:01:12.000Z	138.2808	F	Automatic TM processing.
2008-10-04T14:37:03.000Z	138.2470	F	Automatic TM processing.
2008-10-04T20:10:24.000Z	138.2343	F	Automatic TM processing.
2008-10-06T04:47:31.000Z	138.2022	F	Automatic TM processing.
2008-10-07T20:03:59.000Z	138.1892	F	Automatic TM processing.
2008-10-08T20:31:22.000Z	138.1679	F	Automatic TM processing.
2008-10-10T14:14:30.000Z	138.1399	F	Automatic TM processing.
2008-10-10T19:55:27.000Z	138.1207	F	Automatic TM processing.
2008-10-11T22:05:53.000Z	138.0753	F	Automatic TM processing.
2008-10-13T14:02:30.000Z	138.0634	F	Automatic TM processing.
2008-10-13T19:42:30.000Z	138.0406	F	Automatic TM processing.
2008-10-15T04:22:10.000Z	138.0349	F	Automatic TM processing.
2008-10-16T13:48:53.000Z	138.0212	F	Automatic TM processing.
2008-10-16T19:06:54.000Z	138.0140	F	Automatic TM processing.

This report was generated Fri Oct 17 08:00:20 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, 11/10/2008 – 17/10/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 141 Open Loop Slews, 97 Closed Loop Slews and 7 Momentum Biases were executed (as reported by ACC OEM).

4 (2 CSL, 2 OSL) slews were missed from TL, during the observation period, due to problem on the antenna at DSS27 station.

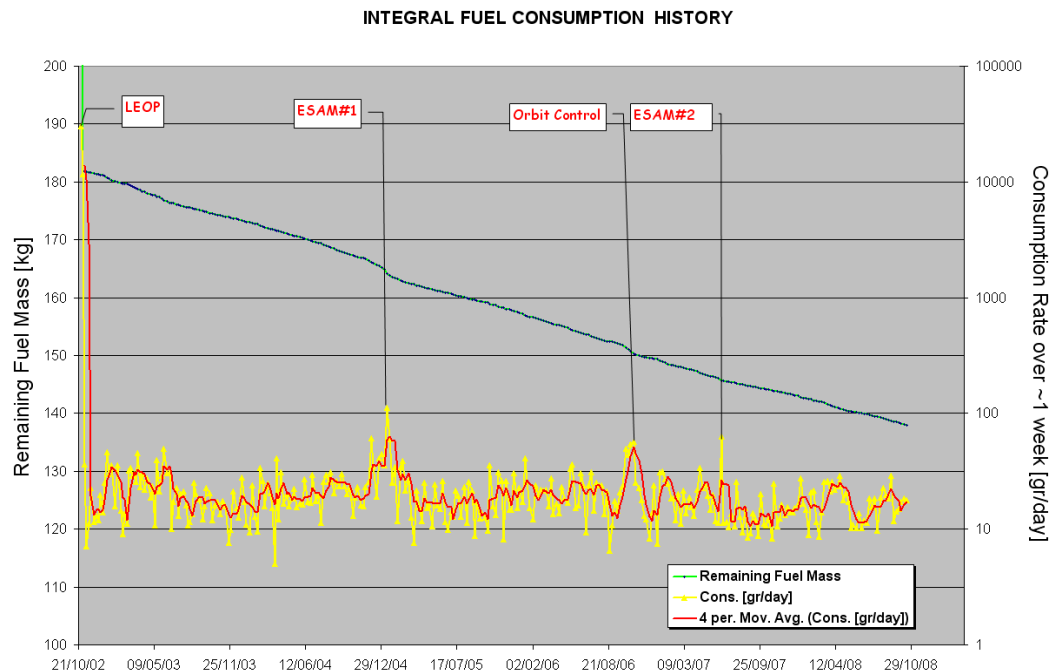
This is equivalent to ~ 1.6 % of the total number of slews planned (240).

Orbit Control

No update

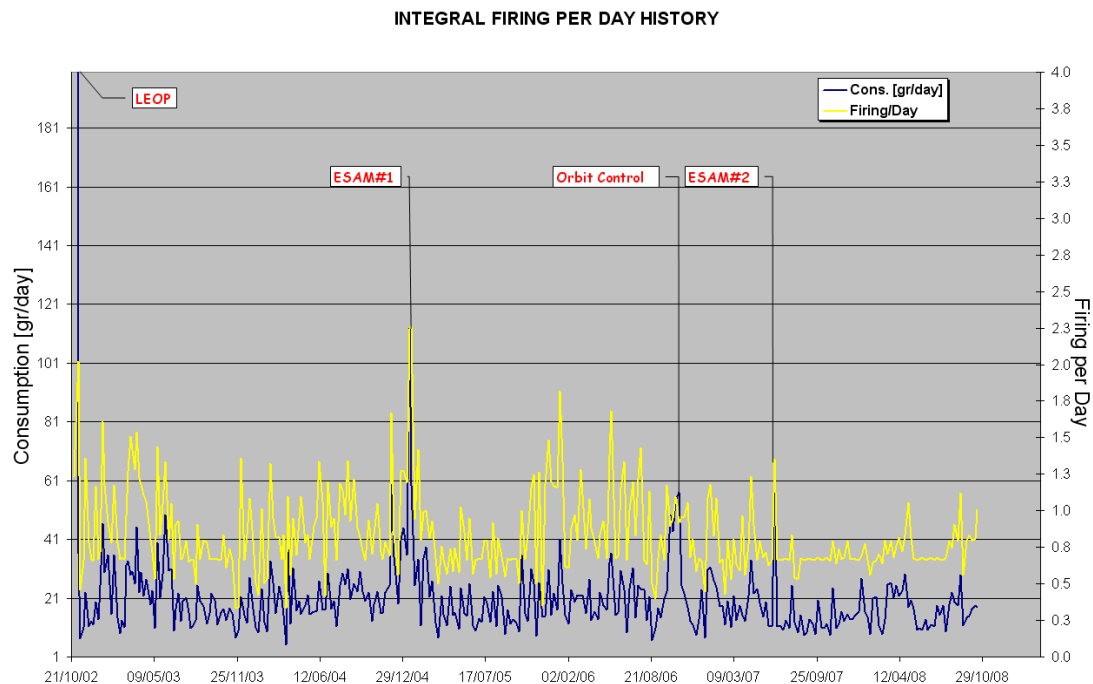
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 17/10/2008 is reported in the plot below.



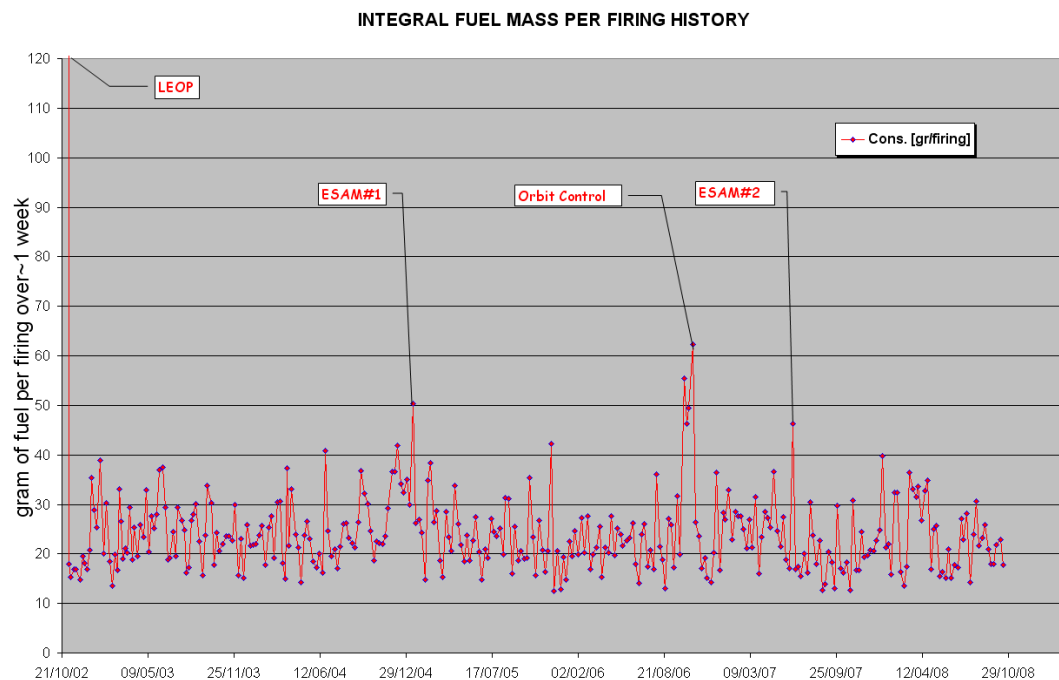
The above plot considers the ESAM fuel consumption spread over period of ~ 1 week.

The firing per day over the period between 01/11/2002 and 17/10/2008 is reported in the plot below.



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

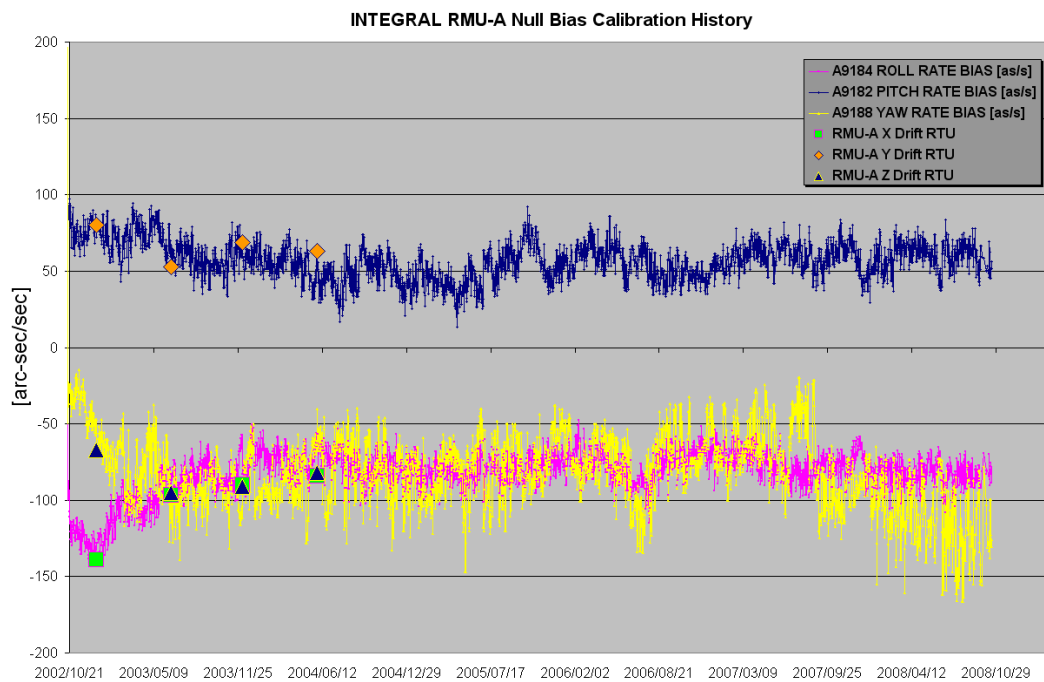
The fuel per firing over the period between 01/11/2002 and 17/10/2008 is shown in the plot below.



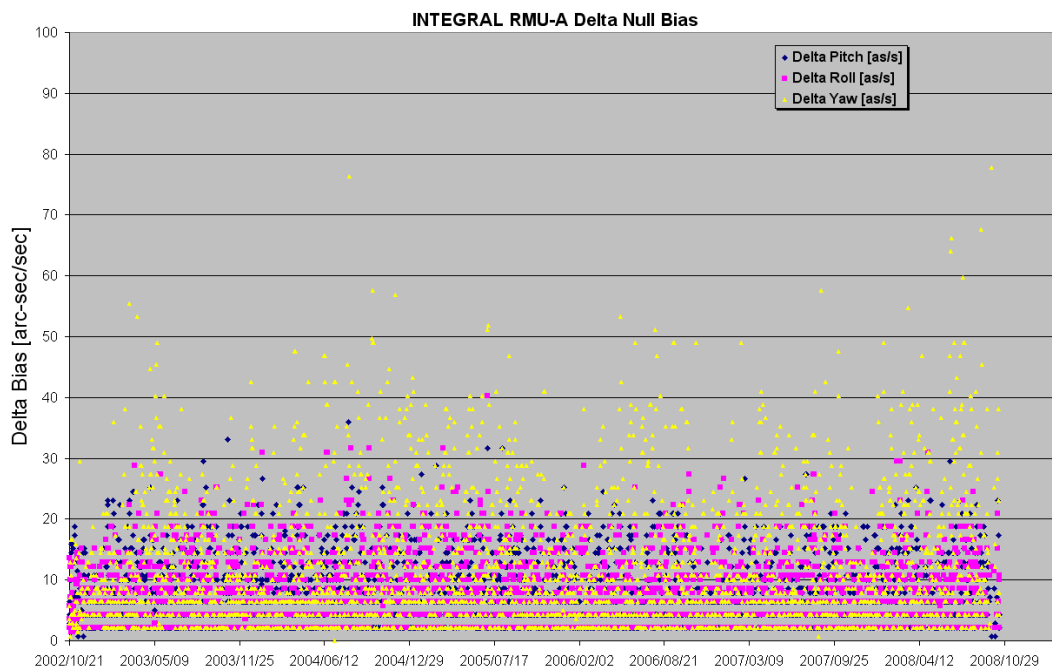
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 17/10/2008 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 17/10/2008 is reported in the plot below.



11/10/2008 (Day of Year 285, Revolution 732)

Nothing to report.

12/10/2008 (Day of Year 286, Revolution 732)

DSS27 station problem during slew commanding: at 19:50z a drop in TM links from DSS27 station (due to antenna failure) caused the commanding to fail for slew ID 07320071.

The TC/TM links were re-established and a manual recovery was then performed from the attitude of PID 07320070 to the attitude of PID 07320072 and the next slew (ID 07320073) in TL updated.

The following slews were not executed in TL: PID 07320071(CSL)-72(OSL).

13/10/2008 (Day of Year 287, Revolution 732-733)

The Eighth eclipse passage operations were nominal from the AOCS point of view. A summary of the eclipse passage during rev 732 is given below:

INPUT		AOCS ECLIPSE MONITORING Winter 2008				Revolution: 732 Date: 13/10/2008 DoY: 287	
Penumbra Start	13/10/2008 17:56:21	Penumbra Start:	13/10/2008 17:56:21	LOS:	13/10/2008 14:39:00		
Penumbra End	13/10/2008 18:52:10	Umbral Start:	13/10/2008 17:58:05	AOS:	13/10/2008 18:12:00		
Umbral Start	13/10/2008 17:58:05	Umbral End:	13/10/2008 18:49:52				
Umbral End	13/10/2008 18:49:52						
ACC Sample Time	10/10/2008 19:45:18	Eclipse Duration:	0:56:49				
FDE Sample Time	10/10/2008 19:49:17	Eclipse Duration [sec]:	3349				
FCE Sample Time	10/10/2008 19:49:18						
ACC Eclipse Counter	0	IMU Health Check Start	13/10/2008 11:40:00				
ACC Eclipse Start	261599	Eclipse Imminent Flag	13/10/2008 18:56:41				
ACC Eclipse End	266589	ACC IMU AutoCal Start	13/10/2008 17:11:07				
		ACC IMU AutoCal End	13/10/2008 17:31:07				
		Sun out of FSS FoV	13/10/2008 17:57:46				
		Sun back in FSS FoV	13/10/2008 18:50:21				
FDE Eclipse Start	252018	Eclipse Timers					
FDE Left to Eclipse Start	303018	From Loaded Timers					
FDE Eclipse Duration	4104	Actual From Telemetry					
		Absolute	WRT Pen. Start [sec]	Absolute	WRT Pen. Start [sec]	UM [sec]	LSB [sec]
FCE Eclipse Start	252002	13/10/2008 17:30:35	-1066.00	13/10/2008 17:30:40	-1063.00	-1064	176
FCE Left to Eclipse Start	252002	13/10/2008 17:49:35	-406.00			-404	176
FCE Eclipse Duration	4000	13/10/2008 17:50:18	-363.00			-360	176
		From Loaded Timers					
		Actual From Telemetry					
		Absolute	WRT Pen. End [sec]	Absolute	WRT Pen. End [sec]	UM [sec]	LSB [sec]
FCE Eclipse End		13/10/2008 18:57:58	340			360	176
FDE Eclipse End		13/10/2008 18:57:59	349			360	176
ACC Eclipse End		13/10/2008 19:01:45	575	13/10/2008 19:02:01	591.00	578	
		IMU	Uplink	Execution	WRT Penumbra End [sec]		
		IMU Auto Off Enable	13/10/2008 18:38:06	13/10/2008 18:03:47	687		
		IMU On	13/10/2008 11:42:53	IMU H/C Noise Roll [arc/s]	0.2269		
		IMU Off	13/10/2008 19:04:00	IMU H/C Drift Roll [arc/s]	0.2291		
		IMU On Time	7.20.07	IMU Auto Cal Drift Roll [arc/s]			

14/10/2008 (Day of Year 288, Revolution 733)

Nothing to report.

15/10/2008 (Day of Year 289, Revolution 733)

DSS27 station problem during slew commanding: at 20:36z a drop in TM links from DSS27 station caused the commanding to fail for slew ID 07330082.

The TC/TM links were re-established and a manual recovery was then performed from the attitude of PID 07330081 to the attitude of PID 07330083 and the next slew (ID 07330084) in TL updated.

The following slews were not executed in TL: PID 07330082(OSL)-83(CSL).

16/10/2008 (Day of Year 290, Revolution 733-734)

The Ninth eclipse passage operations were nominal from the AOCS point of view. A summary of the eclipse passage during rev 733 is given below:

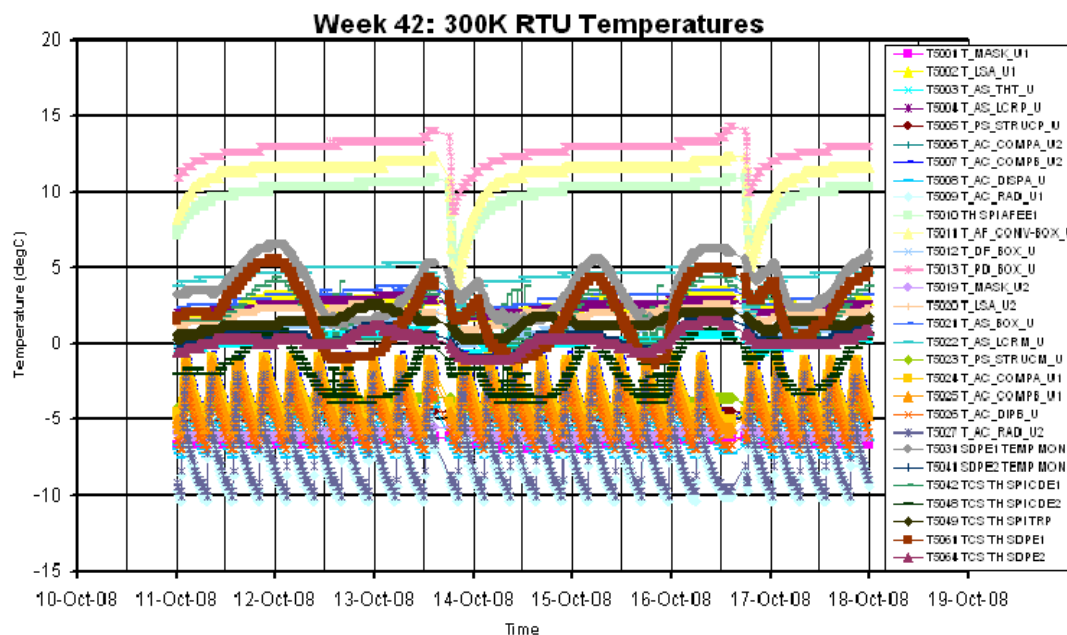
		AOC'S ECLIPSE MONITORING		Revolution: 733	
		Winter 2008		Date: 16/10/2008	
				DoY: 290	
INPUT					
Penumbra Start	16/10/2008 17:52:22	Penumbra Start:	16/10/2008 17:52:22	LOS:	16/10/2008 14:35:00
Penumbra End	16/10/2008 18:31:21	Umbra Start:	16/10/2008 18:27:52	AOS:	16/10/2008 17:58:00
Umbra Start	16/10/2008 17:55:14	Umbra End:	16/10/2008 18:31:21		
Umbra End	16/10/2008 18:27:52	Penumbra End:	16/10/2008 17:55:14		
ACC Sample Time	13/10/2008 19:32:33	Eclipse Duration:	0:38:59		
FDE Sample Time	13/10/2008 19:36:34	Eclipse Duration [sec]:	2359		
FCE Sample Time	13/10/2008 19:36:03	IMU Health Check Start	16/10/2008 11:36:00		
ACC Eclipse Counter	0	Eclipse Imminent Flag	16/10/2008 18:52:42		
ACC Eclipse Start	252127	ACC IMU AutoCal Start	16/10/2008 17:07:00		
ACC Eclipse End	256106	ACC IMU AutoCal End	16/10/2008 17:27:08		
FDE Eclipse Start	252540	Sun out of FSS FoV	16/10/2008 17:54:32		
FDE Left to Eclipse Start	30365	Sun back in FSS FoV	16/10/2008 18:20:43		
FDE Eclipse Duration	3085				
FCE Eclipse Start	252690				
FCE Left to Eclipse Start	252590				
FCE Eclipse Duration	3048				

17/10/2008 (Day of Year 291, Revolution 734)

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.



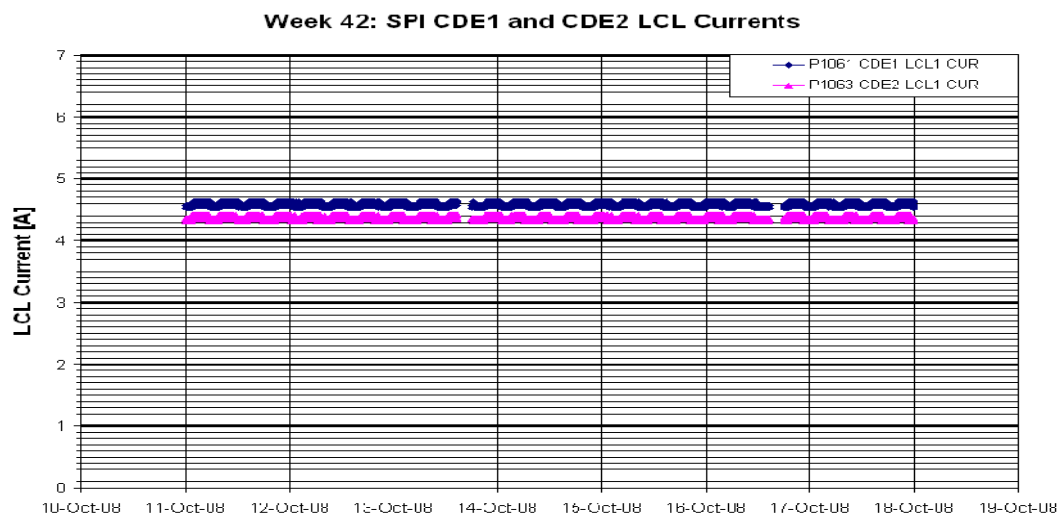
Stirling Compressors and Cryostat: The performance of the compressors is nominal.

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

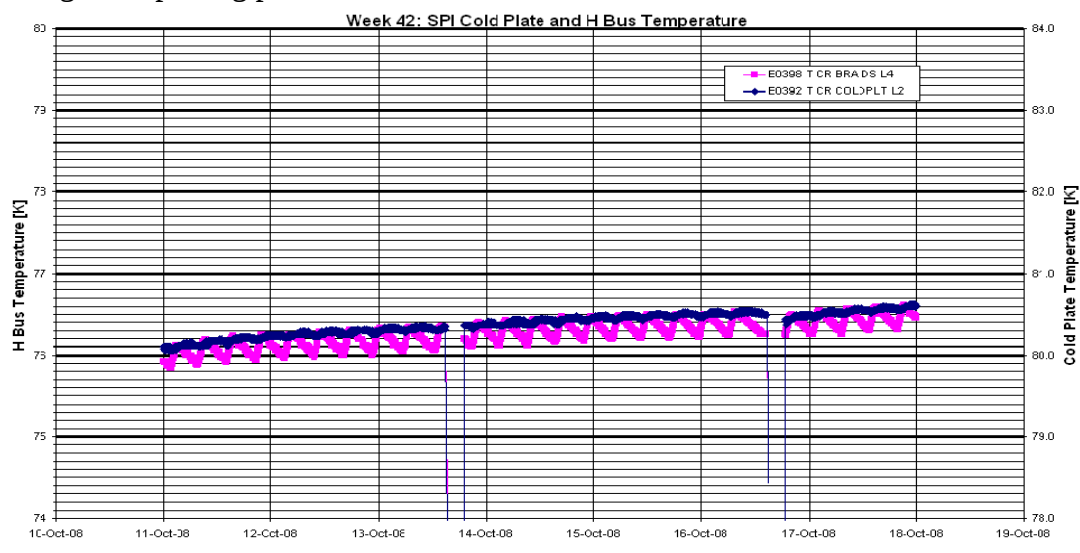
The stroke of all four compressors remained at 39 throughout the week. The average CDE LCL currents were as follows:

- CDE1 LCL Current = 4.58A
- CDE2 LCL Current = 4.36A

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



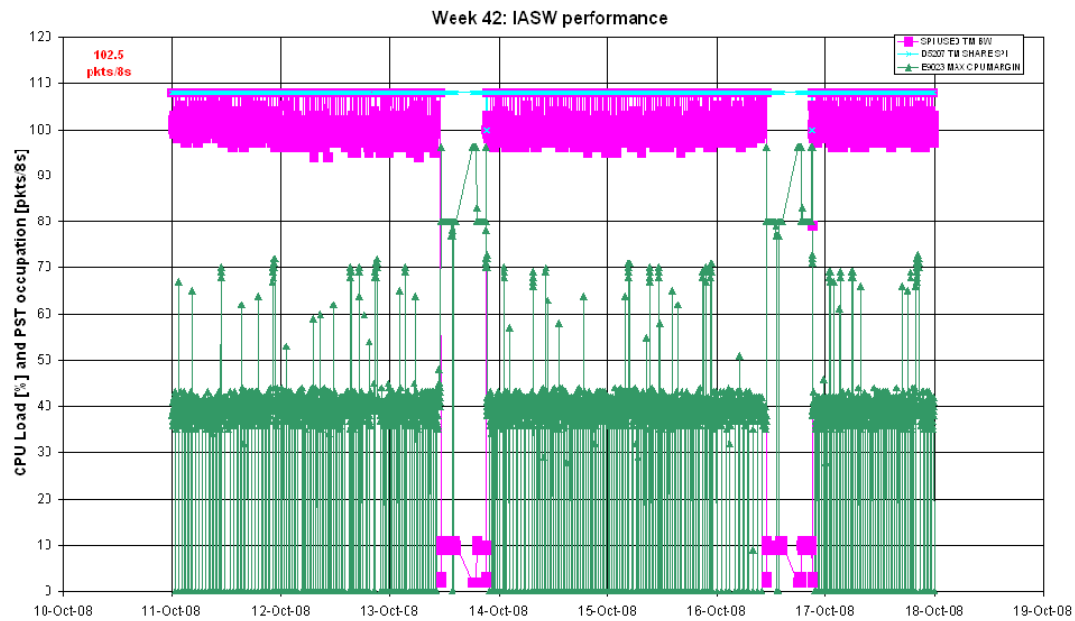
The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period.



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

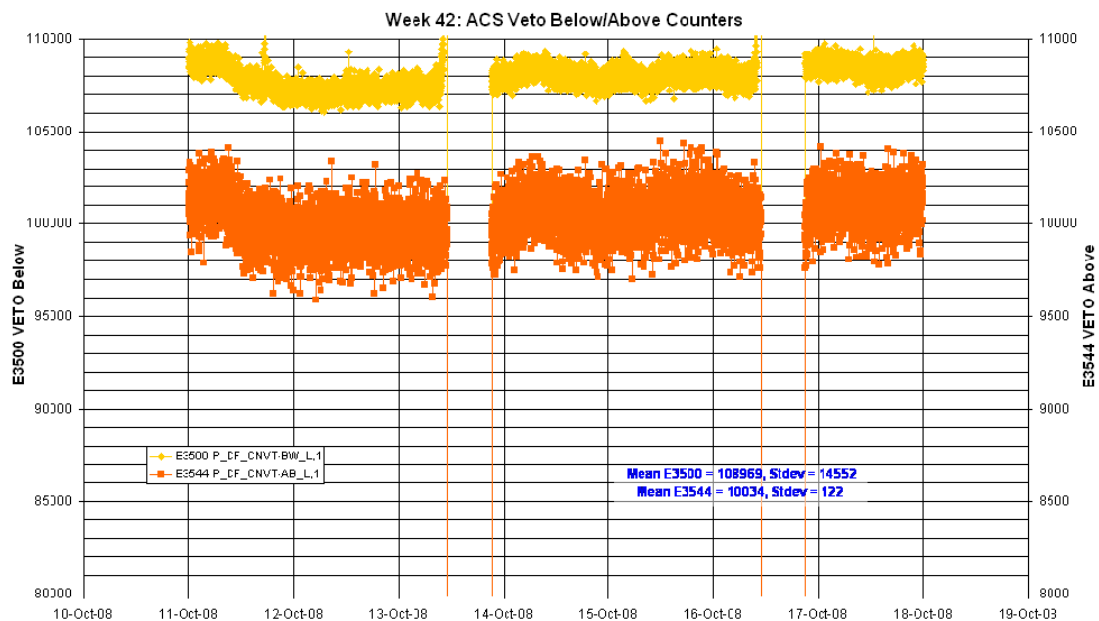
The IASW version installed is v4.3.4 with SE compression only enabled and the spectra scaling factor set to 8/19 SE. The average TM bandwidth occupation of SPI was 102.5 packets/cycle over the science window when the TM allocation was 108 packets/cycle.

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

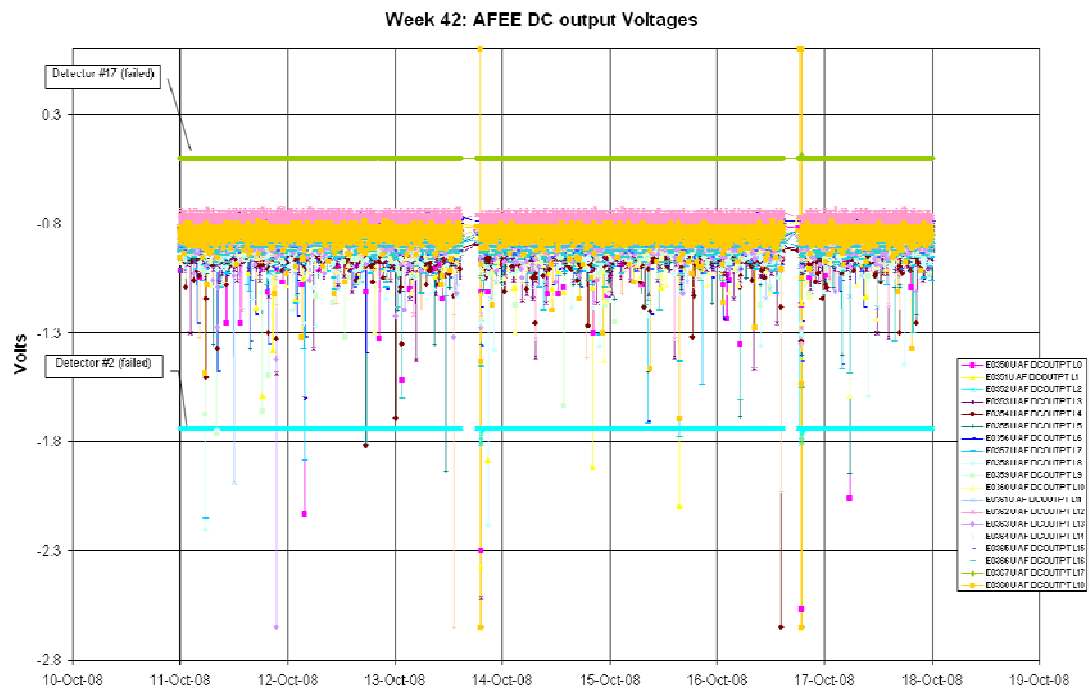


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

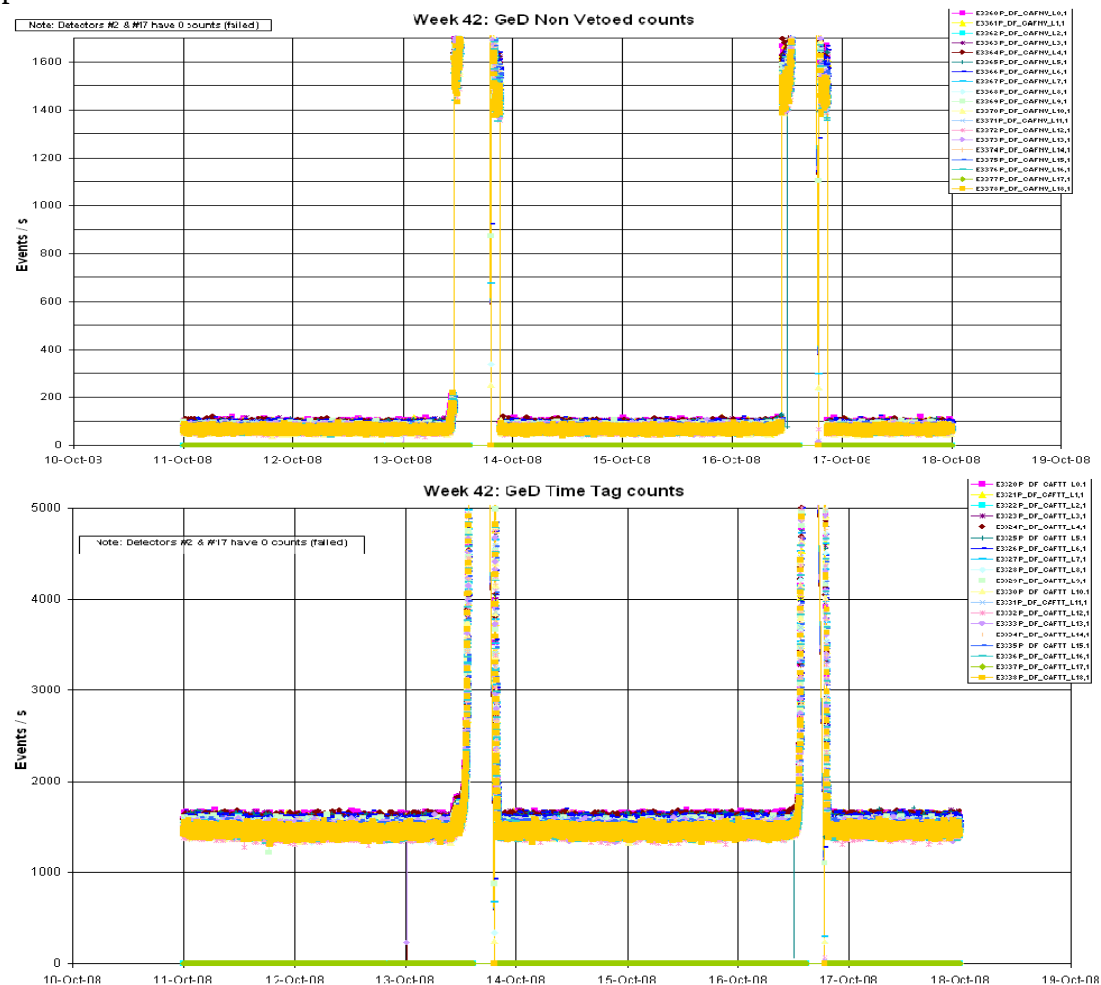
The following plot shows the ACS overall count rate evolution during the reporting period:

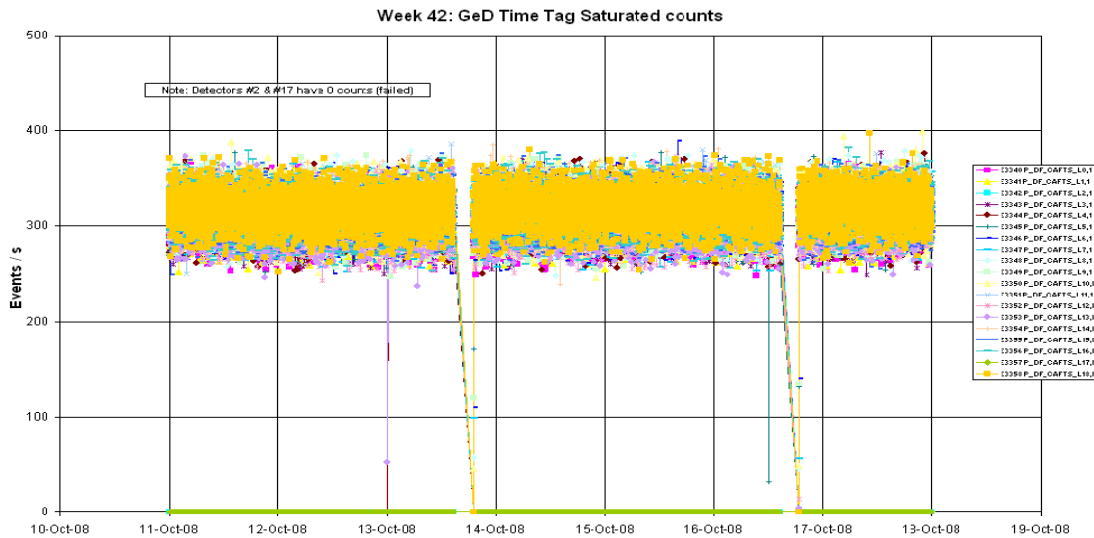


AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.

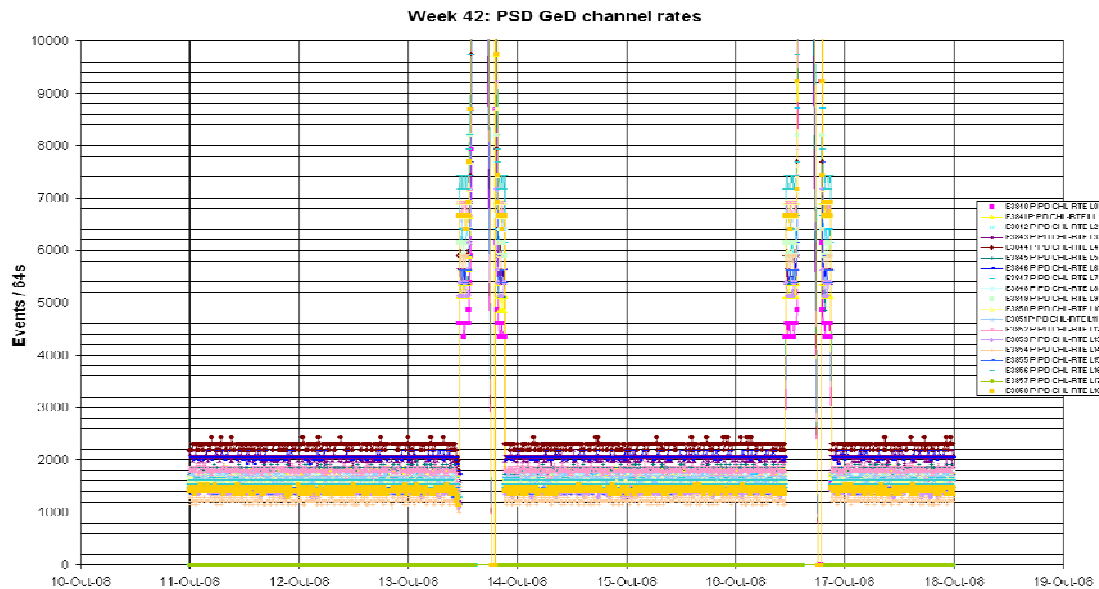


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event count rates during the reporting period.





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



Event Log:

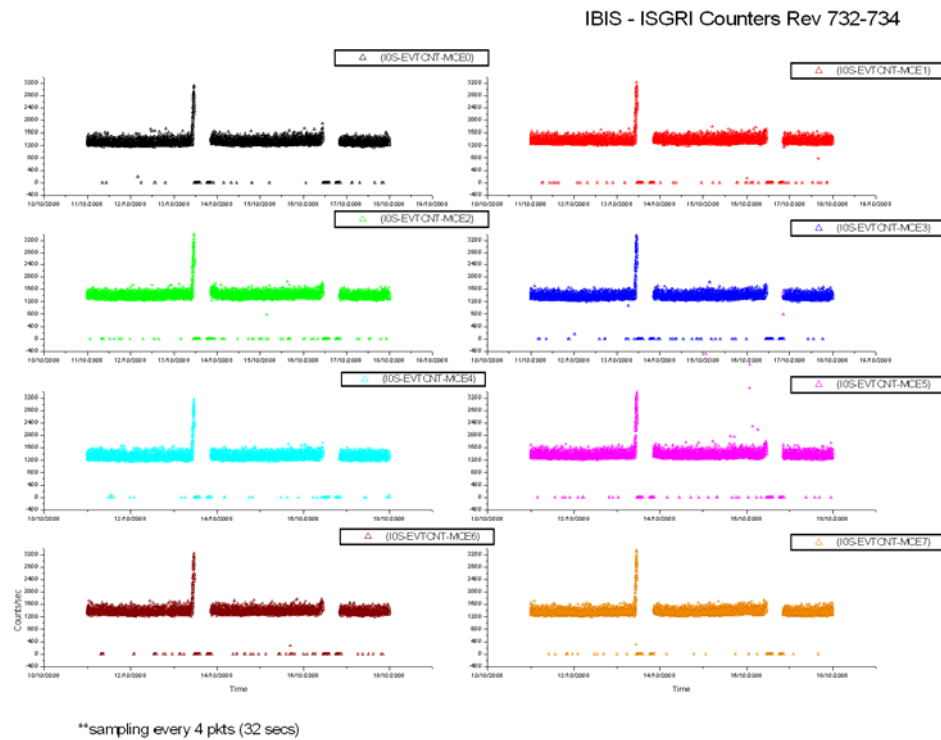
The following non-nominal event occurred on SPI over the reporting period:

- Due to slightly high radiation before the expected radiation belt entry of revolution 732, TM parameter E3500 (ACS CntVetoBelow) toggled OOL High on 2008-10-13 from 10:20:21Z until 11:09:46Z, when SPI was configured for radiation belt entry via the ED EENTRY02.
- On 2008-10-13 at 10:28:50Z OEM APID 1024 ID 243 EXCEPTION SPI1 SPECTRA BUILDING NOT COMPLETED was received, with parameter E9780 (DETECTOR ID) = 11. This was during pointing ID 07320095. As this was a single occurrence, no action was taken.
- Due to slightly high radiation before the expected radiation belt entry of revolution 733, TM parameter E3500 (ACS CntVetoBelow) toggled OOL High on 2008-10-16 from 10:07:39Z until 10:56:10Z, when SPI was configured for radiation belt entry via the ED EENTRY02.

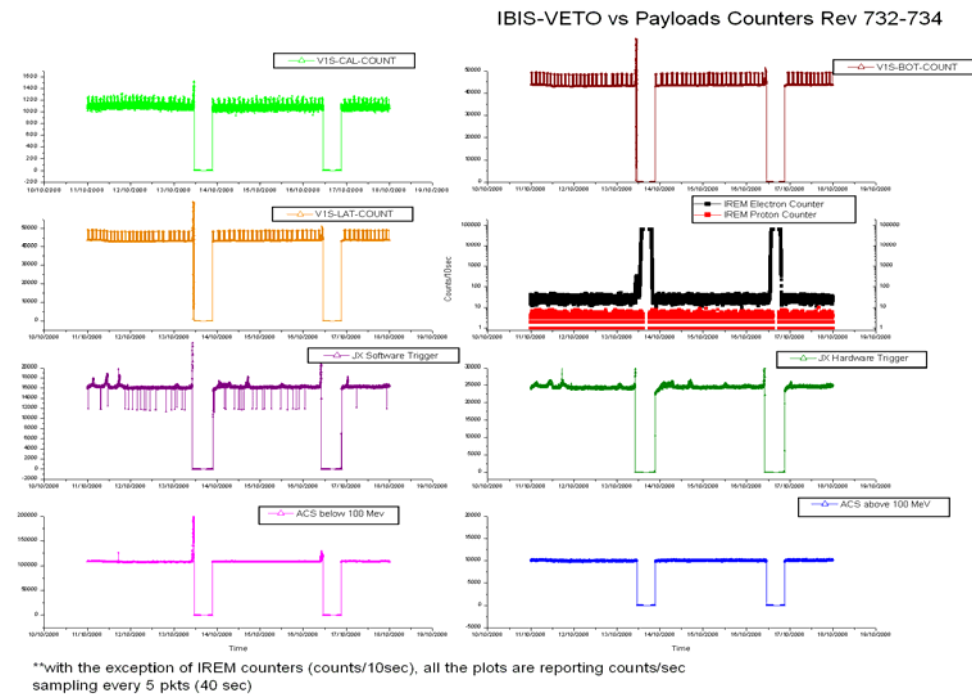
8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

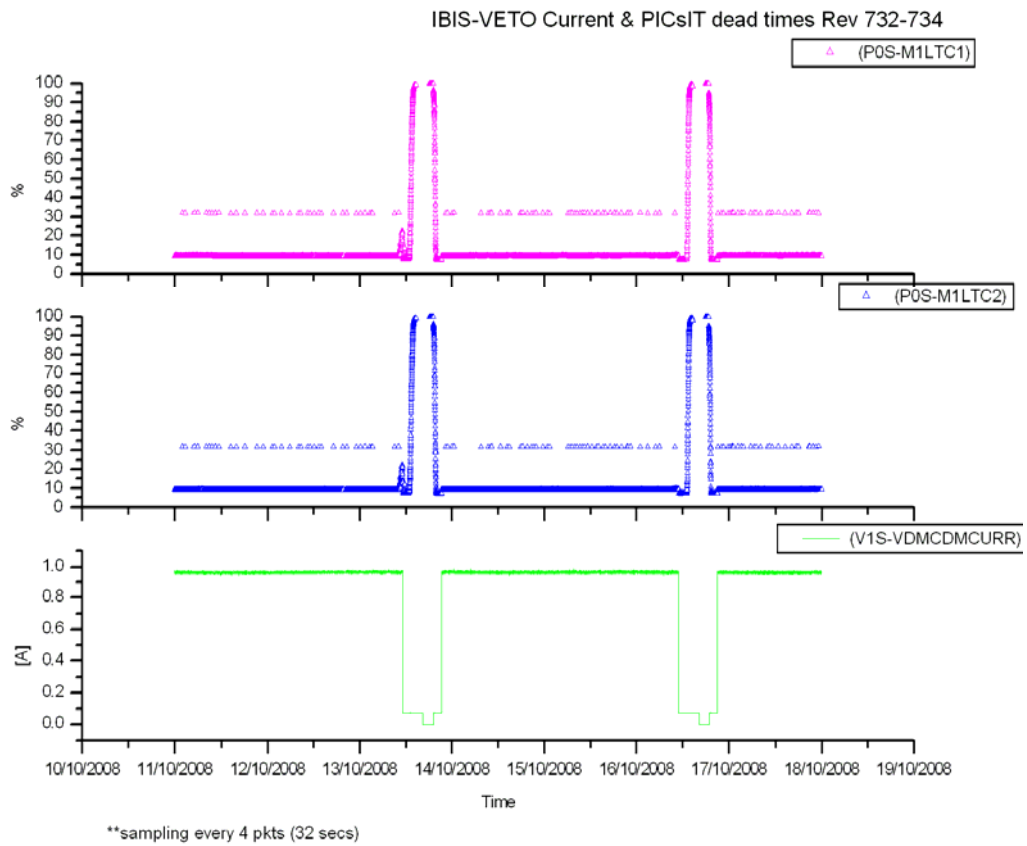


VETO vs Payload Counters:

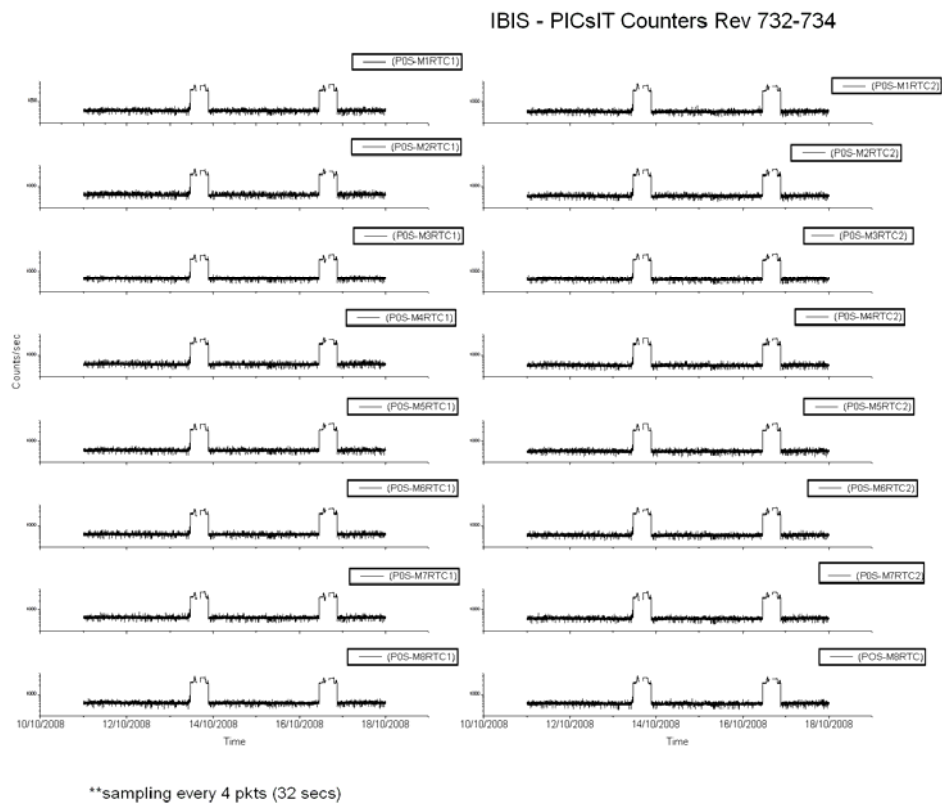


The week was characterised by slightly high radiation before the expected radiation belt entry of revolution 732 as reported by the payload.

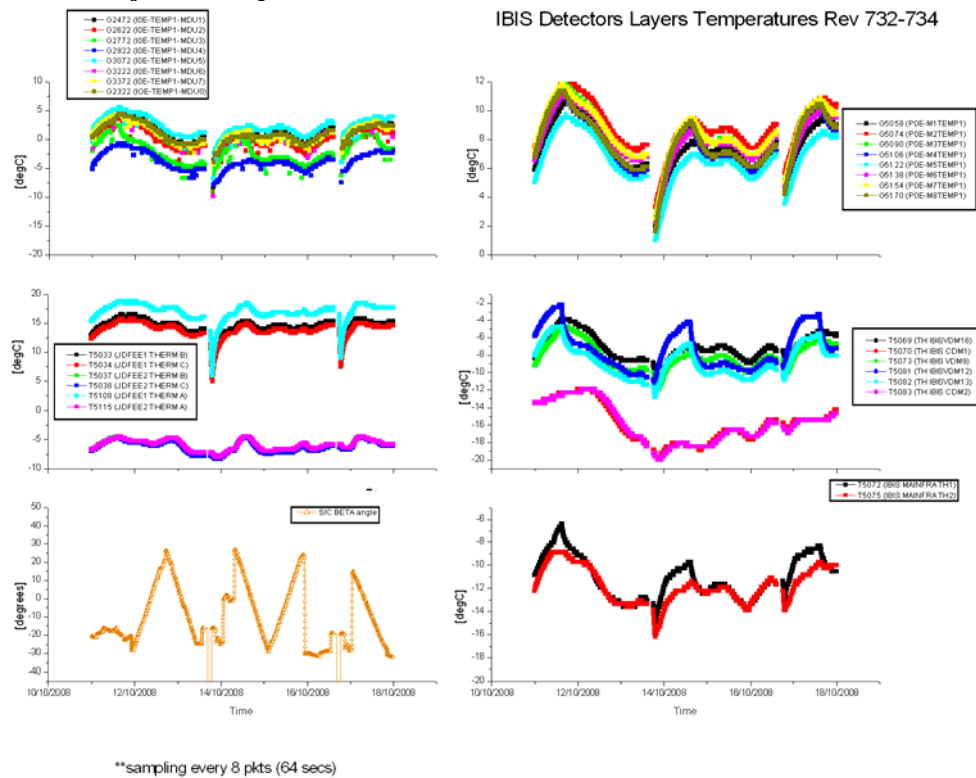
VETO Current:



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.

In addition, from 2008-10-13 at 20:42:32Z until the end of the week (2008-10-17 at 18:58:40Z) TM parameter G2070 toggled OOL several times, indicating an overflow of the noisy pixel address buffer in MCE5.

2008-10-11 (DOY 285, Rev 732) to 2008-10-12 (DOY 286, Rev 732)

IBIS operations executed nominally.

2008-10-13 (DOY 287, Rev 732-733)

At 04:58Z, following a ground station handover, TM parameter X7500 went OOL, indicating a problem with the histogram process. The recovery procedure to force the histogram accumulation and download process to resume was started by executing FCP_IBIS1_0312 at 05:10:51Z however the TC G0129 to return IBIS to Science Standard mode was omitted. Once this was noticed, the recovery procedure (FCP_IBIS1_0312 followed by TC G0129) was repeated several times (at 08:00:31Z, 08:31:44Z, 08:47:56Z and 09:18:20Z), until the histogram process resumed after the start of PID 07320095 at 10:08Z.

Due to slightly high radiation before the expected radiation belt entry at 11:13Z, TM parameters G6062, G6063 and GU6062 (VETO bottom and lateral counters) toggled

OOL High from 10:26:16Z until radiation belt entry. In addition, from 10:42:08Z TM parameter G8080 (Valid event rate on HBRA) and the TM parameter family G2013 (Number of events triggering the MCEi per second) started toggling OOL High until radiation belt entry.

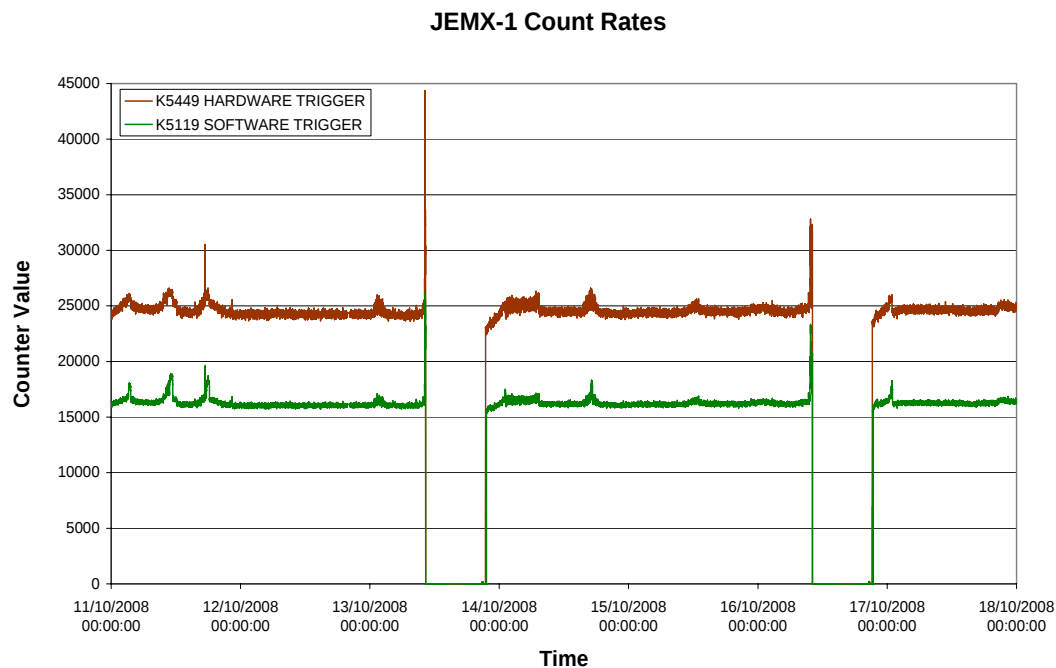
2008-10-14 (DOY 288, Rev 733) to 2008-10-17 (DOY 291, Rev 734)

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.



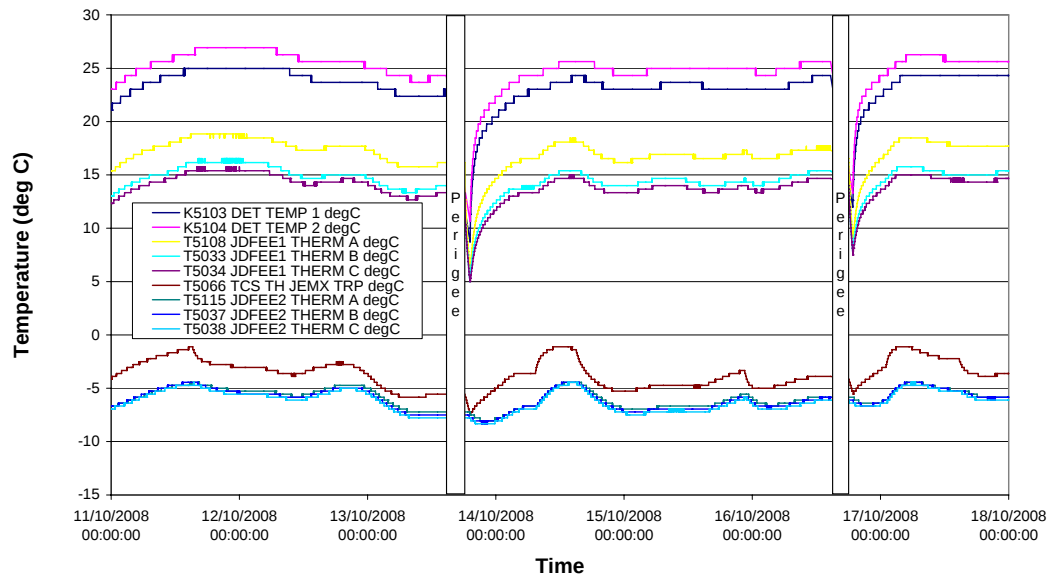
JEM-X Temperatures

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)

JEMX Detector & DFEE Temperatures



JEM-X Daily Report

2008-10-11 (DoY 285, Rev 732)

At 17:25:30, parameter K5449 briefly went outside soft limits. No action was taken, and there was no impact.

2008-10-12 (DoY 286, Rev 733)

JEM-X 1 operations executed nominally.

2008-10-13 (DoY 287, Rev 733)

At 10:11:30, 10:12:26, 10:16:37 & 10:20:05, parameter K5449 briefly went outside soft limits, while at 10:12:35, 10:13:06 & 10:13:48, parameter K5136 briefly went outside soft limits. From 19:09:26 to 19:09:47, parameter KD5380D was showing a False state. No action was taken on any of the above events, and there was no impact.

2008-10-14 (DoY 288, Rev 733)

At the indicated times, the following anomalous OEMs were received.

Time	Source	Message	Class	ID	Task ID	Address	RealTime	PR	N
2008.288.03.38.49.111	2008.288.03.38.50.039	1536	RealTime	5			0	0	65535
JEM-X1 CSSW INT ER EXCEPTIO									
E E									
FIX6 0									
K9079 MESS CLASS 2									
K9080 MESS ID 5									
K9074 TASK ID 16 12									
K9067 LOGICAL ADDRESS 4989									
2008.288.03.38.49.111	2008.288.03.38.50.047	1536	RealTime	5			0	0	65535
JEM-X1 CSSW INT ER EXCEPTIO									
E E									
FIX6 0									
K9079 MESS CLASS 2									
K9080 MESS ID 5									
K9074 TASK ID 16 12									
K9067 LOGICAL ADDRESS 4989									
2008.288.03.38.49.111	2008.288.03.38.50.048	1536	RealTime	5			0	0	65535
JEM-X1 CSSW INT ER EXCEPTIO									
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							
2008.288.03.38.49.111	2008.288.03.38.50.049	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							
2008.288.03.38.49.111	2008.288.03.38.50.050	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							
2008.288.03.38.49.111	2008.288.03.38.50.050	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							
2008.288.03.38.49.111	2008.288.03.38.50.051	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							

No action was taken, and there was no impact.

2008-10-15 (DoY 289, Rev 733)

JEM-X 1 operations executed nominally.

2008-10-16 (DoY 290, Rev 733-734)

At 09:41:38, 09:44:35 & 10:04:10, parameter K5449 briefly went outside soft limits. From 18:49:03 to 18:49:22, parameter KD5380D was showing a False state. No action was taken, and there was no impact.

2008-10-17 (DoY 291, Rev 734)

JEM-X 1 operations executed nominally.

8.3.5 OMC Operations

2008-10-11 (DoY 285, Rev 732)

Nothing to report.

2008-10-12 (DoY 286, Rev 732)

At 19:50, a drop in TM from DSS-27 forced a suspension of the Timeline. The links were recovered at 20:18, and a recovery performed. At 20:54, the Timeline was recovered. The impact was the loss of pointings 07320071 & 07320072.

2008-10-13 (DoY 287, Rev 732) to 2008-10-14 (DoY 288, Rev 733)

Nothing to report.

2008-10-15 (DoY 289, Rev 733)

At 20:33, a drop in TM from DSS-27 interrupted the slew commanding. A recovery was subsequently performed, and the Timeline recovered at 21:16. The impact was the loss of pointing 07330083. It was at this time that the following pair of commands was rejected:

```
2008.289.20.51.49.194  2008.289.20.51.56.350  1792  RealTime  131  TC REJECT
REJECTED TC1          0          0  65535  PR    N
E    E
2008.289.20.51.55.444  2008.289.20.52.04.289  1792  RealTime  131  TC REJECT
REJECTED TC1          0          0  65535  PR    N
E    E
```

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for that pointing.

2008-10-16 (DoY 290, Rev 733) to 2008-10-17 (DoY 291, Rev 734)

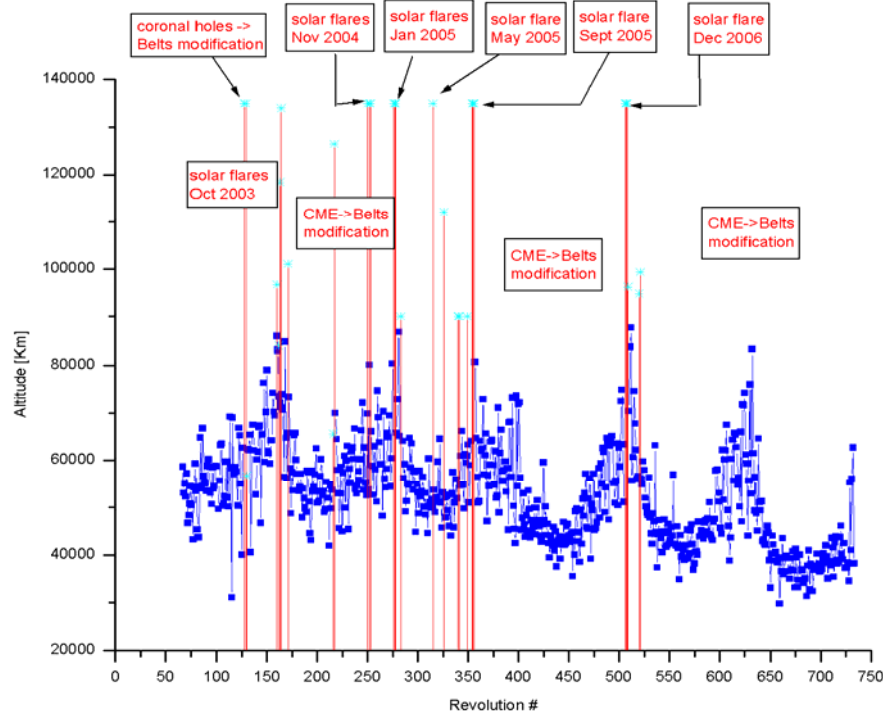
Nothing to report.

On DoY 287 at 11:13:54 and DoY 290 at 11:00:02 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 2008.271 (27/09/2008):

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]
732	RAD_ENTR R 2008-10-13T11:13:48Z	13/10/2008 10:26:49	62728.2	13-Oct-2008 13:32:02	37672.74
733	RAD_EXIT R 2008-10-13T21:05:57Z	13/10/2008 20:00:01	41772.7	13-Oct-2008 20:32:02	45678.25
733	RAD_ENTR R 2008-10-16T11:00:00Z	16/10/2008 13:01:37	38208.3	16-Oct-2008 12:59:01	38075.71
734	RAD_EXIT R 2008-10-16T20:51:37Z	16/10/2008 19:23:53	38596.3	16-Oct-2008 20:09:01	46898.64

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)

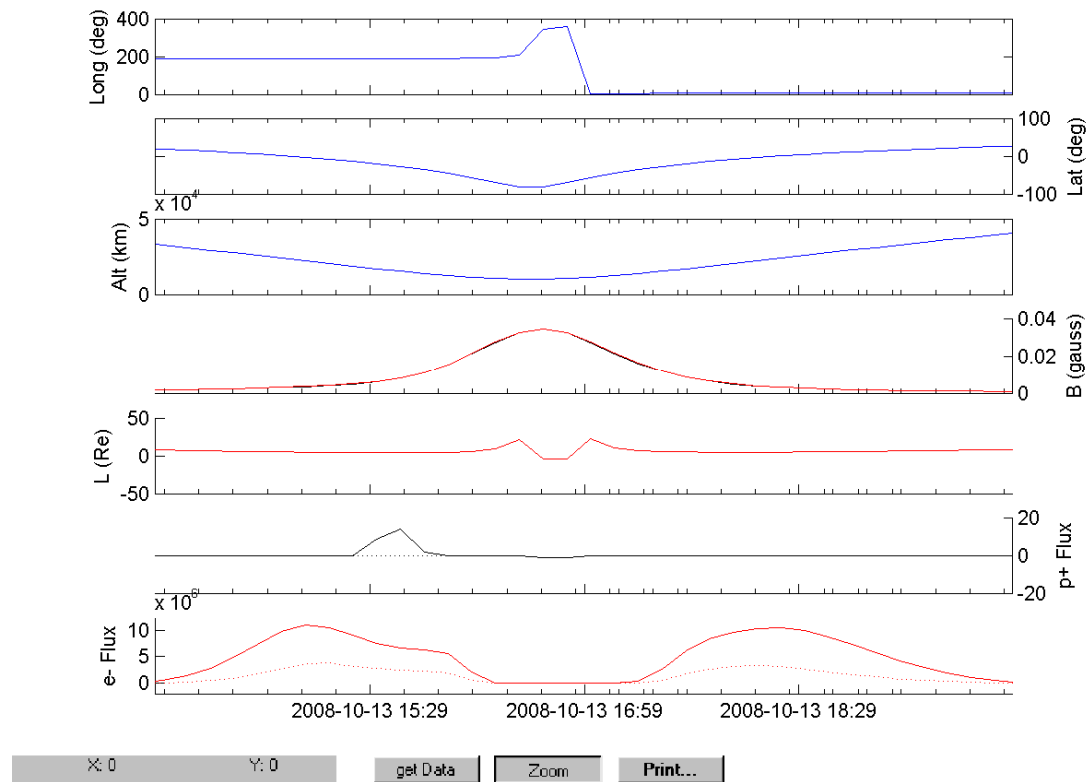
Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

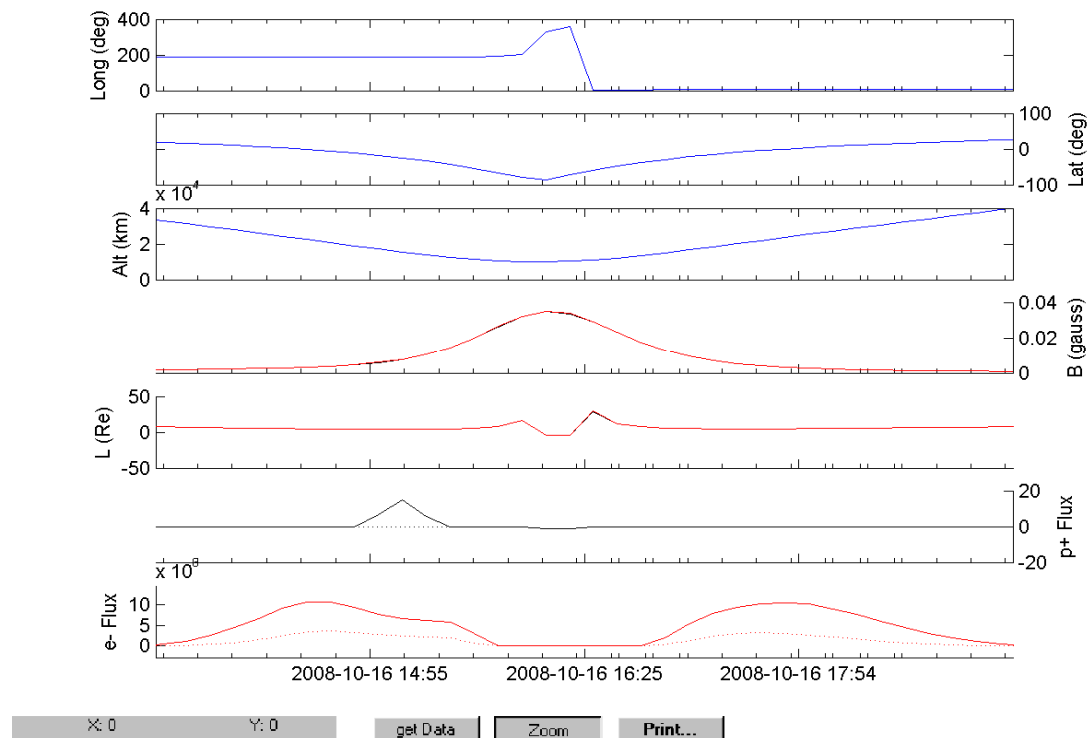
The IREM radiation counter plots are not available this week.

IREM Predicted Radiation Belt Passages

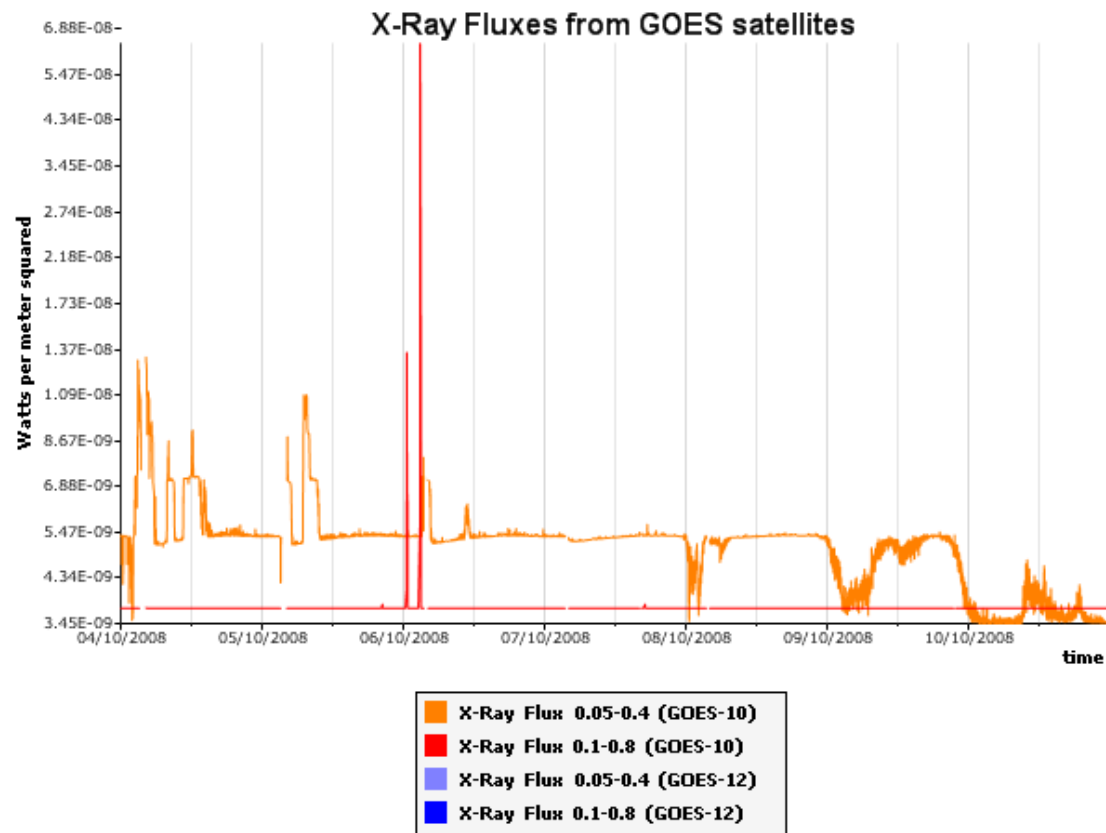
Rev 732



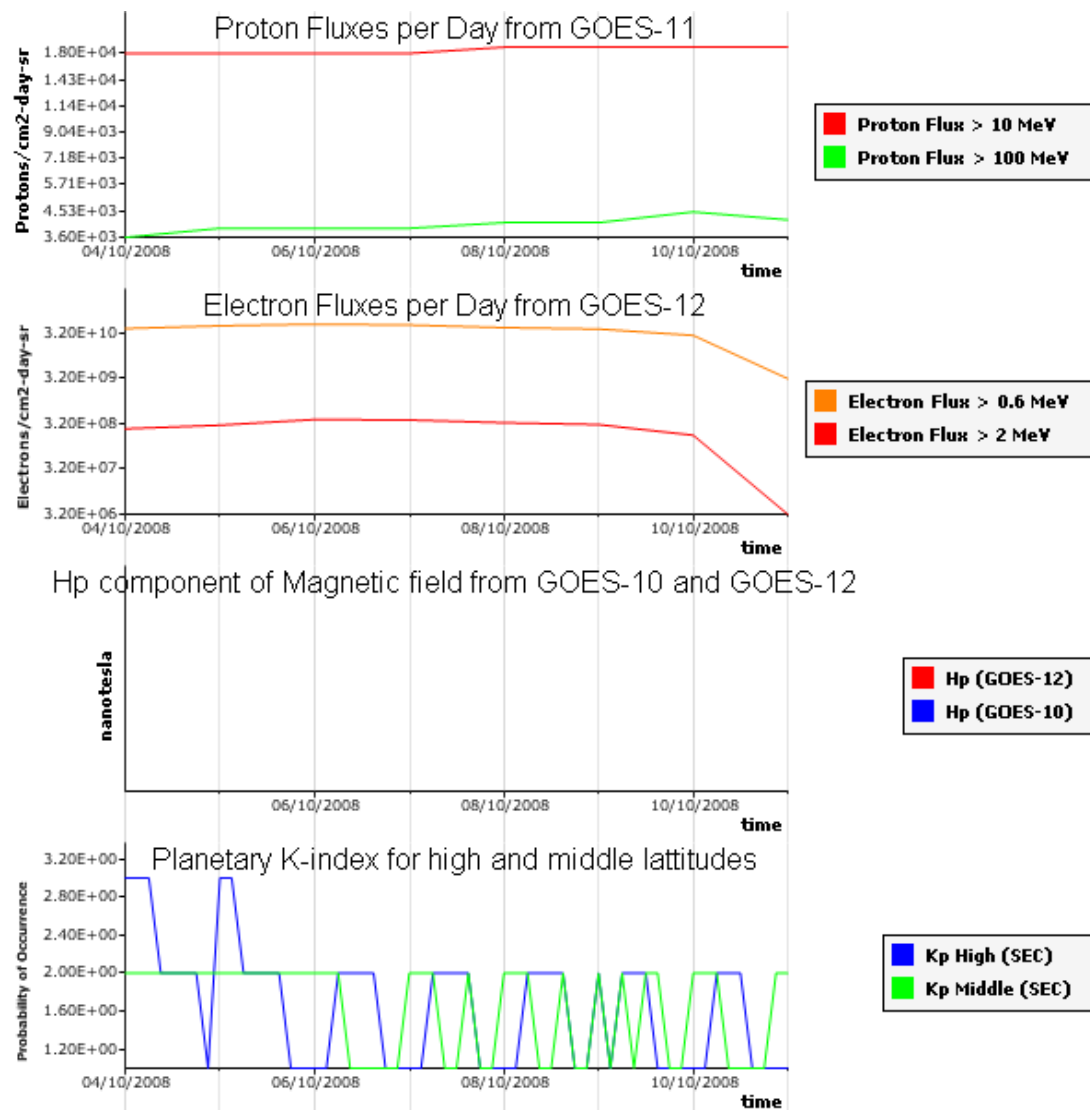
Rev 733



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.