

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 340
Week 13
30.03.09
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 21.03.09 until 27.03.09 (both dates inclusive) and covers the revolutions 785, 786 and 787.

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 a hexagonal dither of GRS 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), a raster dither of the Galactic disk, $l=-25$ (RA 16:27:14.74, DEC -48:57:19.9), a staring OMC FF#33 calibration (RA 19:57:12.00, DEC -22:36:00.0), a hexagonal dither of the Galactic bulge region (RA 17:45:36.00, DEC -28:56:00.0), a raster dither of the Perseus Arm region (RA 04:46:58.46, DEC +45:14:46.4), a raster dither of the Galactic disk, $l=+25$ (RA 18:36:53.70, DEC -07:03:19.4) and a raster dither of Eta Carinae (RA 10:45:03.59, DEC -59:41:04.3).

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 summer 2009 eclipse passages were nominal from the AOCS point of view. In the same time frame were verified the AMD dead band value, the IMU timers, 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 from TL, during the observation period.

The fuel consumption over the period between 21/03/2009 and 27/03/2009 was 0.0906Kg. The remaining propellant is in the order of 135.1972 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

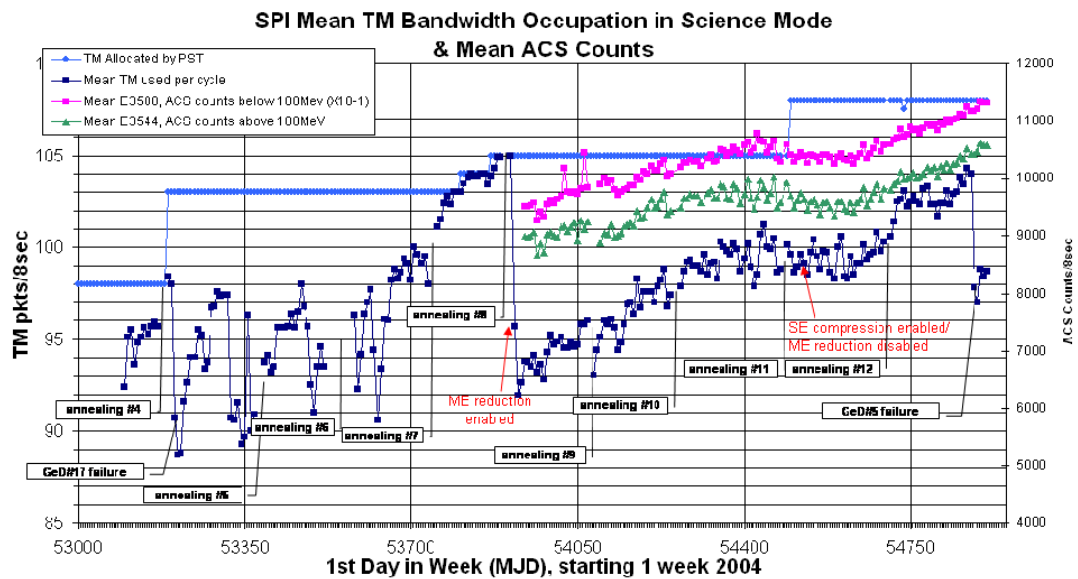
Following the 12th annealing, ended on 04/09/2008 at 23:50Z, the overall status of the gamma-ray spectrometer is nominal, except for detector #2 (failed since 06/12/2003); detector #17 (failed since 17/07/2004) and detector #5 (failed since 19/02/2009). The energy resolution of the previously degraded 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 except from 2009-03-22T10:35:07Z to 2009-03-22T14:28:22Z when it was 88 packets/cycle due to an OMC Flat Field Calibration. The average telemetry occupation when the allocation was 108 packets/cycle was 98.7 packets/cycle.

Eclipse operations for SPI were executed nominally throughout the week.

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.

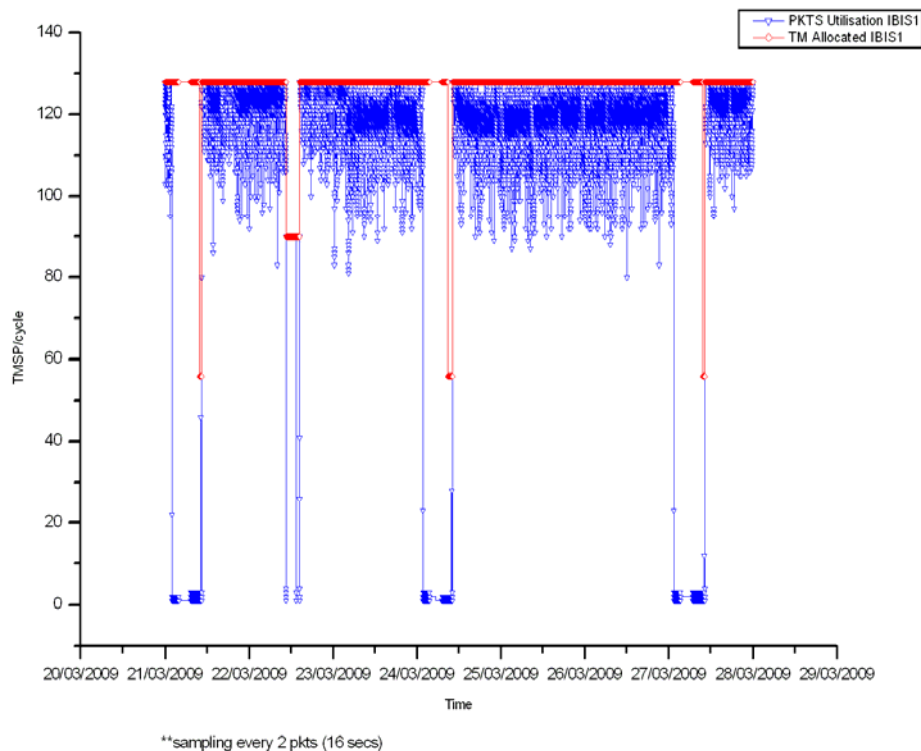
Eclipse operations for IBIS continued to be performed nominally during the reporting period.

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

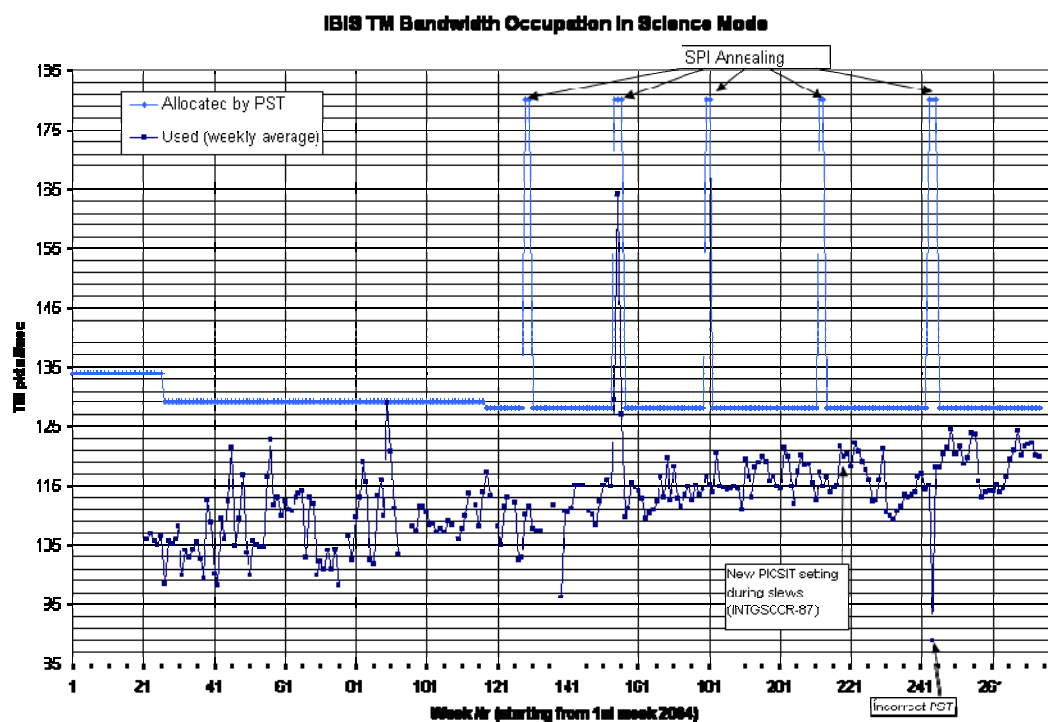
- PST allocation to IBIS above radiation belts: 128 packets/cycle except from 2009-03-22T10:35:07Z to 2009-03-22T14:28:22Z when it was 90 packets/cycle due to an OMC Flat Field Calibration
- IBIS mean bandwidth utilisation in science mode: 119.95 packets/cycle (down 0.2 on previous week)
- Percentage of TM cycles in which full bandwidth (128 packets/cycle) was used: 18.95%

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

IBIS - TM Bandwidth Utilisation Rev 785-788



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, except from 2009-03-22T10:35:50 to 2009-03-22T14:29:05 during the Flat-field calibration when it was 63 packets per cycle.

During this reporting period, 192 of the 193 planned science pointings were executed nominally, 1 was lost.

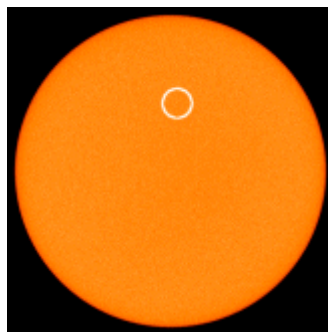
Note: Some more information concerning the OMC operations is provided in the Appendix.

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 tried to emerge on the 26th, but had disappeared by the following day. 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. The overall performance was over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. The update of one slew was not executed from the timeline on one occasion. The reason was that the FD ORATOS Job Scheduler was not running.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. On DoY 85 at 00:43z a drop in VC-0 & VC-7 TM from G/S DSS27 occurred for a few seconds. At 04:03z another drop in VC-0 & VC-7 TM occurred from G/S: DSS27 for about 6 minutes. This is related due to a JPL communication problem. DR No: N105240. On DoY 086 at 02:15z Redu's STC disconnected. It was reconnected one hour later and the ranging was restarted afterwards.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 791 and 792.

Observations have been replanned for revolutions 787 to 790, to resolve the problem of a long slew at the start of revolution 788. New observations have been planned for revolutions 791 and 792.

New TSFs have been received for revolutions 787 to 790.

2. Observation status

ECS files have been received up to revolution 778 and processed up to 776.

3. ISOC Science Data Archive

Ingestion is running, data up to revolution 775 has been ingested. An effort is ongoing to improve the documentation.

4. ISOC system

The interim version V21.1 has been successfully tested and will be installed next week. Work on V22 is ongoing.

5. Problems

No new problems.

4.3.2 ISDC

Status of ISDC observation processing on 27/03/2009:

- Latest Standard Analysis completed: observation 06200620004 (1E 1547.0-5408, Revolution 0768) on 27/03/2009.
- Latest products archived: observation 06200620004 (1E 1547.0-5408, Revolution 0768) on 09/03/2009.
- Latest observation products sent to the observer: observation 06200620004 (1E 1547.0-5408, Revolution 0768) on 09/03/2009.

5 Special Events

6 Anomalies

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

AR id	Date Created	Subject	Segment	Status
INT-3058	2009-03-26	DSS27 - COMMS problem (DOY 085)	NASA Station	Pending

7 Future Milestones

Eclipse season #14 finishes on 11/4/2009

From revolution 788 the CRIT_INST_ALT_ASC will be delayed by 30min. following the problem experienced last week during the instrument activation

Linux S2k beta delivery installed on imcf (Testing ongoing, Problem with Time correlation, appears to be a packetiser problem)

Installation and configuration of MUSTI

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 785

The observations in revolution 785 began with a hexagonal dither of GRS 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), lasting ~5.5 hours. They continued with a raster dither of the Galactic disk, $l=+25$ (RA 18:36:53.70, DEC -07:03:19.4), lasting ~12.5 hours. This was followed by 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 another raster dither of the Galactic disk, $l=-25$ (RA 16:27:14.74, DEC -48:57:19.9), lasting ~12.5 hours. They continued with a raster dither of Eta Carinae (RA 10:45:03.59, DEC -59:41:04.3), lasting ~21.3 hours, until the end of the revolution.

Revolution 786

The observations in revolution 786 began with a hexagonal dither of GRS 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), lasting ~5.5 hours. This was followed by 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 raster dither of the Galactic disk, $l=+25$ (RA 18:36:53.70, DEC -07:03:19.4), lasting ~12.5 hours. After that this was followed by a staring OMC FF#33 calibration (RA 19:57:12.00, DEC -22:36:00.0), lasting ~3.4 hours. This was followed by another raster dither of the Galactic disk, $l=-25$ (RA 16:27:14.74, DEC -48:57:19.9), lasting ~12.5 hours. They continued with a raster dither of Eta Carinae (RA 10:45:03.59, DEC -59:41:04.3), lasting ~18.5 hours, until the end of the revolution.

Revolution 787

The observation in revolution 787 was a raster dither of the Perseus Arm region (RA 04:46:58.46, DEC +45:14:46.4), lasting ~56.2 hours.

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, except from 2009-03-22T10:35:50Z to 2009-03-22T14:29:05Z, during the OMC Flat-Field calibration when it is IBIS 90; SPI 88; JEM-X1 8; JEM-X2 0; OMC 63.

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8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2009-03-04T19:14:13.000Z	135.6148	F	Automatic TM processing.
2009-03-06T08:59:37.000Z	135.6057	F	Automatic TM processing.
2009-03-07T16:32:52.000Z	135.5720	F	Automatic TM processing.
2009-03-09T09:03:29.000Z	135.5378	F	Automatic TM processing.
2009-03-10T04:46:35.000Z	135.4780	F	Automatic TM processing.
2009-03-12T09:19:21.000Z	135.4705	F	Automatic TM processing.
2009-03-13T18:04:28.000Z	135.4418	F	Automatic TM processing.
2009-03-15T09:05:28.000Z	135.4312	F	Automatic TM processing.
2009-03-16T17:52:12.000Z	135.3795	F	Automatic TM processing.
2009-03-18T08:57:52.000Z	135.3299	F	Automatic TM processing.
2009-03-19T17:49:32.000Z	135.2878	F	Automatic TM processing.
2009-03-21T08:45:05.000Z	135.2742	F	Automatic TM processing.
2009-03-22T18:19:09.000Z	135.2533	F	Automatic TM processing.
2009-03-24T08:28:25.000Z	135.2450	F	Automatic TM processing.
2009-03-25T17:08:28.000Z	135.2214	F	Automatic TM processing.

This report was generated Fri Mar 27 08:00:18 GMT 2009

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, 21/03/2009 – 27/03/2009

The AOCS operations were executed from the Automatic Timeline.

During this period, 142 Open Loop Slews, 71 Closed Loop Slews and 6 Momentum Biases were executed (as reported by ACC OEM).

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

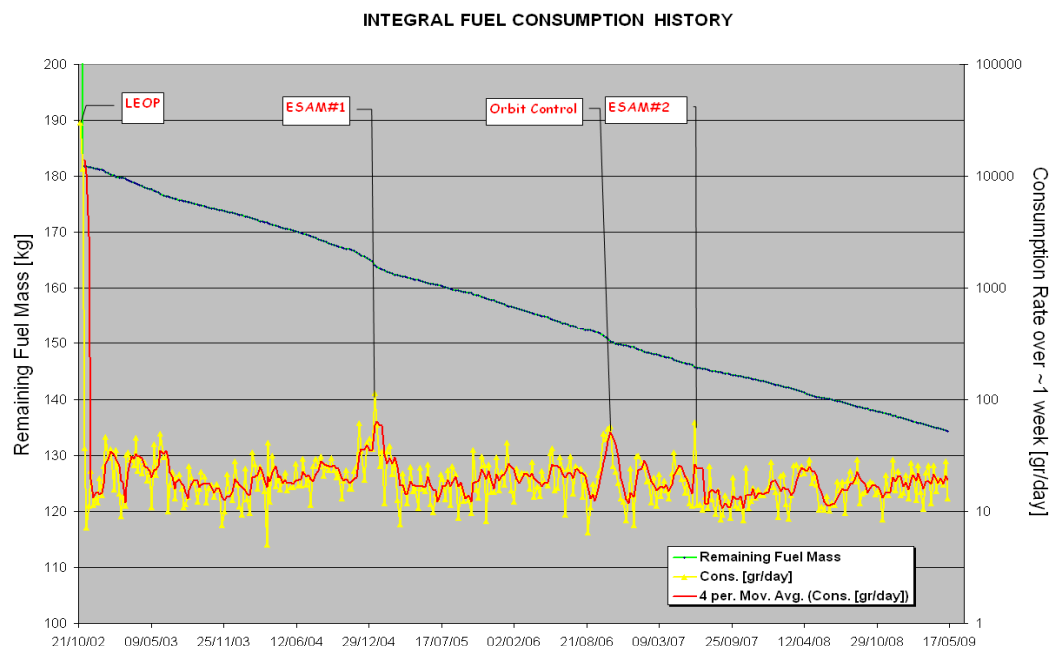
The OTF was not reached during part of PID 07870023.

Orbit Control

No update.

Fuel consumption

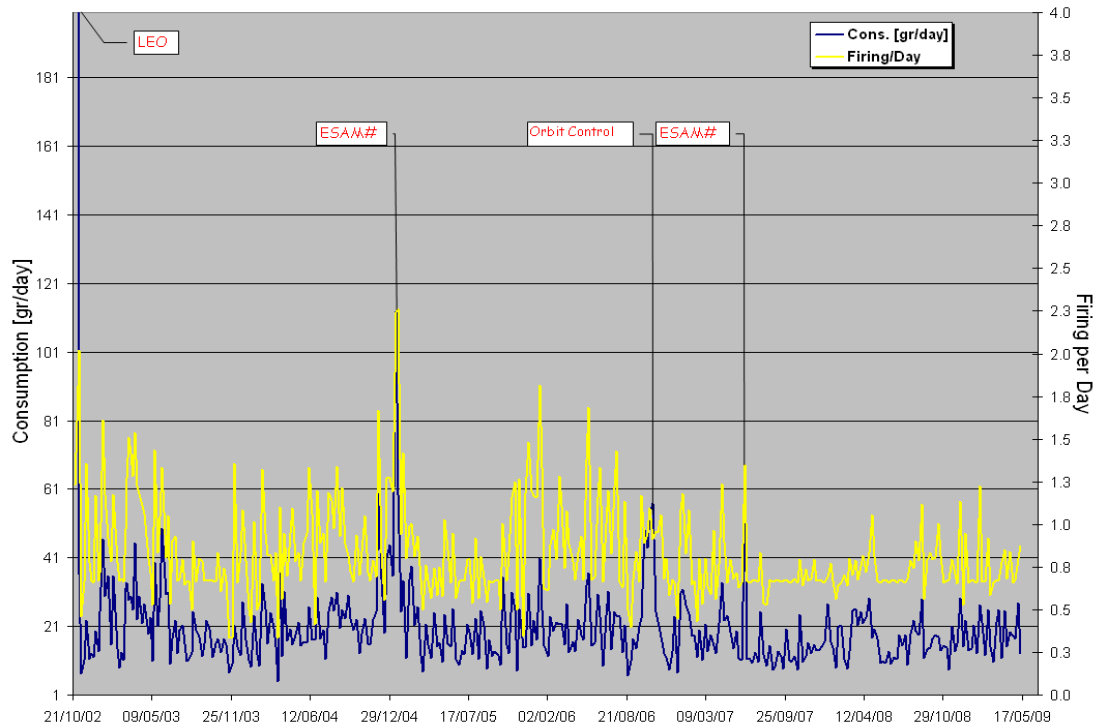
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 27/03/2009 is reported in the plot below.



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 27/03/2009 is reported in the plot below.

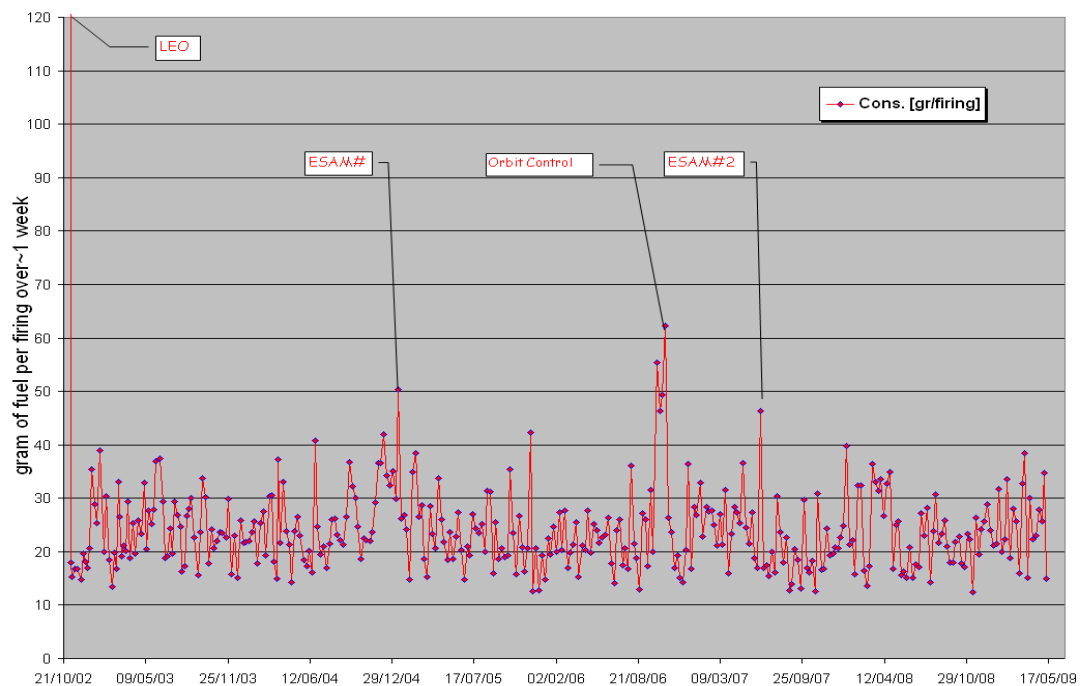
INTEGRAL FIRING PER DAY HISTORY



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 27/03/2009 is shown in the plot below.

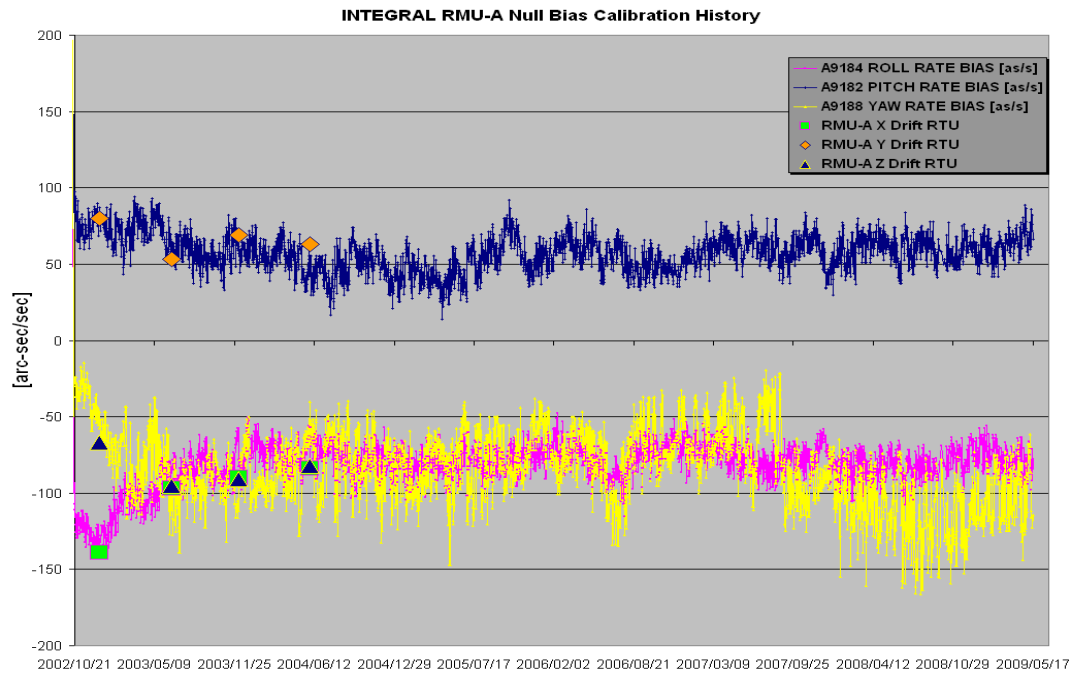
INTEGRAL FUEL MASS PER FIRING HISTORY



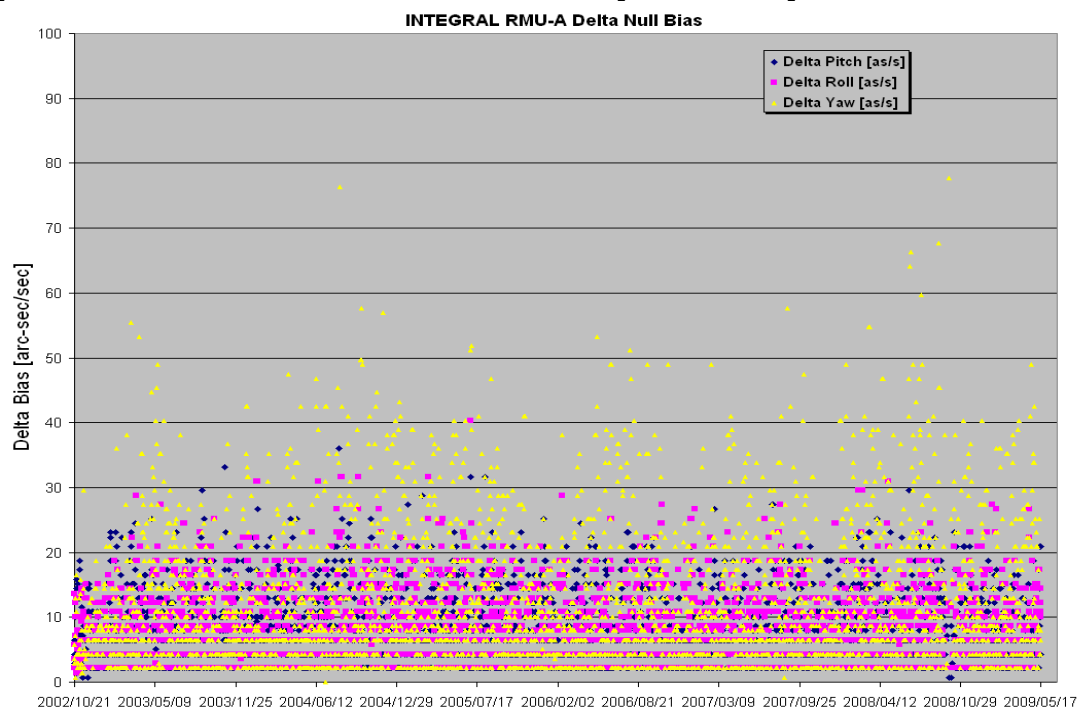
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 27/03/2009 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 27/03/2009 is reported in the plot below.



INPUT		AOCs ECLIPSE MONITORING				Revolution:	786
		Summer 2009				Date:	24/03/2009
						DoY:	83
Penumbra Start:	24/03/2009 03:32:36		LOS:	24/03/2009 03:43:00			
Penumbra End:	24/03/2009 04:25:40		AOS:	24/03/2009 07:05:00			
Umbra Start:	24/03/2009 03:33:46						
Umbra End:	24/03/2009 04:24:53						
Eclipse Duration:	0:53:04						
Eclipse Duration [sec]:	3184						
IMU Health Check Start	24/03/2009 00:19:00						
Eclipse Imminent Flag	24/03/2009 02:32:56						
ACC IMU Auto Cal Start	24/03/2009 02:47:22						
ACC IMU Auto Cal End	24/03/2009 03:07:22						
Sun out of FSS FoV	24/03/2009 03:33:34						
Sun back in FSS FoV	24/03/2009 04:25:00						
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	24/03/2009 03:15:05	-1051.00	24/03/2009 03:15:01	-1055.00	-1064		
FDE Eclipse Start	24/03/2009 03:24:14	-502.00			-404	176	
FCE Eclipse Start	24/03/2009 03:24:58	-458.00			-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	24/03/2009 04:29:42	242			360	176	
FDE Eclipse End	24/03/2009 04:29:42	242			360	176	
ACC Eclipse End	24/03/2009 04:35:32	592	24/03/2009 04:35:28	588.00	578		
IMU	Uplink	Execution	WRT Penumbra End [sec]				
IMU Auto Off Enable	21/03/2009 08:27:12	24/03/2009 04:37:22	702				
IMU On	24/03/2009 00:23:11	IMU H/C Noise Roll [as/s]	0.2016				
IMU Off	24/03/2009 04:37:22	IMU H/C Drift Roll [as/s]	0.2220				
IMU On Time	4:14:11	IMU Auto Cal Drift Roll [as/s]	0.2454				

Loss of guide star: at 22:44z a loss of the selected guide star occurred during PID 07870023.

As foreseen by the IPS logic, the event occurred in the first minute after the open loop slew end and the ACC did non switch ON the IMU 1, a new automatic mapping was commanded and a new guide star picked. The next slew 07870024 was manually updated in TL.

The OTF was not reached during PID 07870023.

25/03/2009 (Day of Year 084, Revolution 787)

Nothing to report.

26/03/2009 (Day of Year 085, Revolution 787)

Nothing to report.

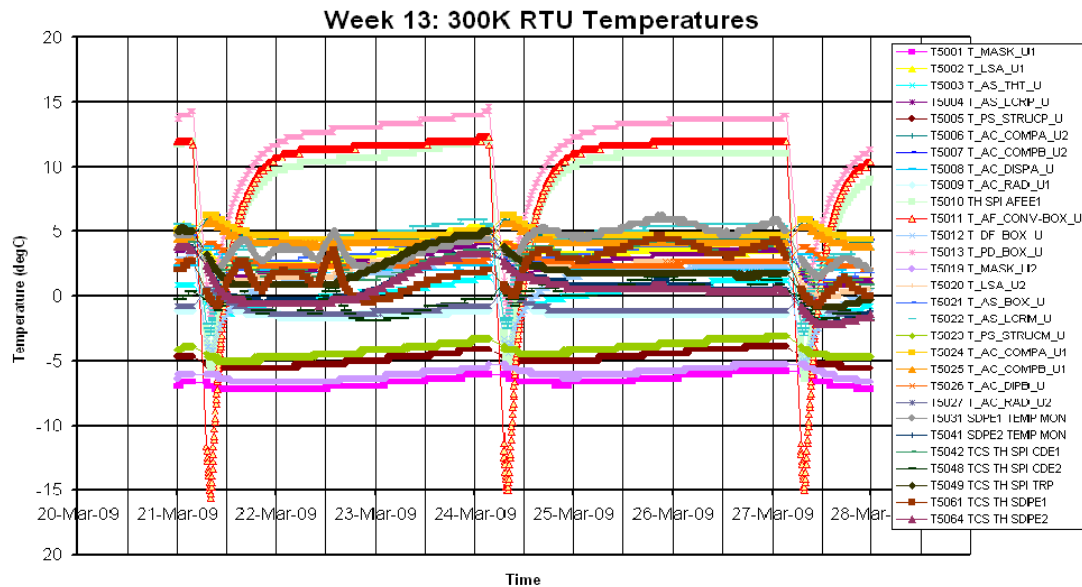
27/03/2009 (Day of Year 086, Revolution 787-788)

The <<Summer>> 2009 eclipse operations were nominal from the AOCS point of view. Hereafter is reported a summary of the eclipse passage during rev 787-788:

INPUT		AOCS ECLIPSE MONITORING				Revolution:	787
		Summer 2009				Date:	27/03/2009
						DoY:	86
Penumbra Start	27/03/2009 03:21:48	Penumbra Start:	27/03/2009 03:21:48	LOS:	27/03/2009 03:29:00		
Penumbra End	27/03/2009 04:13:55	Umbra Start:	27/03/2009 03:22:54	AOS:	27/03/2009 06:52:00		
Umbra Start	27/03/2009 03:22:54	Umbra End:	27/03/2009 04:13:09				
Umbra End	27/03/2009 04:13:09	Penumbra End:	27/03/2009 04:13:55				
		Eclipse Duration:	0:52:07				
ACC Sample Time	26/03/2009 14:07:19	Eclipse Duration [sec]:	3127				
FDE Sample Time	26/03/2009 14:07:19						
FCE Sample Time	26/03/2009 14:07:19	IMU Health Check Start	27/03/2009 00:22:00				
		Eclipse Imminent Flag	27/03/2009 02:22:08				
ACC Eclipse Counter	193726	ACC IMU AutoCal Start	27/03/2009 02:36:34				
ACC Eclipse Start	240335	ACC IMU AutoCal End	27/03/2009 02:56:34				
ACC Eclipse End	245104						
		Sun out of FSS FoV	27/03/2009 03:22:44				
FDE Eclipse Start	240754	Sun back in FSS FoV	27/03/2009 04:13:15				
FDE Left to Eclipse Start	47154						
FDE Eclipse Duration:	3884						
		Eclipse Timers					
			From Loaded Timers		Actual From Telemetry		
			Absolute	WRT Pen. Start [sec]	Absolute	WRT Pen. Start [sec]	UM [sec] LSB [sec]
FCE Eclipse Start	240798	ACC Eclipse Start	27/03/2009 03:04:08	-1060.00	27/03/2009 03:04:08	-1060.00	-1064 176
FCE Left to Eclipse Start	47198	FDE Eclipse Start	27/03/2009 03:13:13	-515.00			-404 176
FCE Eclipse Duration:	3840	FCE Eclipse Start	27/03/2009 03:13:57	-471.00			-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	27/03/2009 04:17:57	242			360 176
		FDE Eclipse End	27/03/2009 04:17:57	242			360 176
		ACC Eclipse End	27/03/2009 04:23:37	582	27/03/2009 04:23:37	582.00	578
		IMU	Uplink	Execution	WRT Penumbra End [sec]		
		IMU Auto Off Enable	24/03/2009 08:11:05	27/03/2009 04:25:51	716		
		IMU On	27/03/2009 00:22:55	IMU H/C Noise Roll [as/s]	0.1996		
		IMU Off	27/03/2009 04:25:51	IMU H/C Drift Roll [as/s]	0.2648		
		IMU On Time	4:02:56	IMU Auto Cal Drift Roll [as/s]	0.2984		

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.



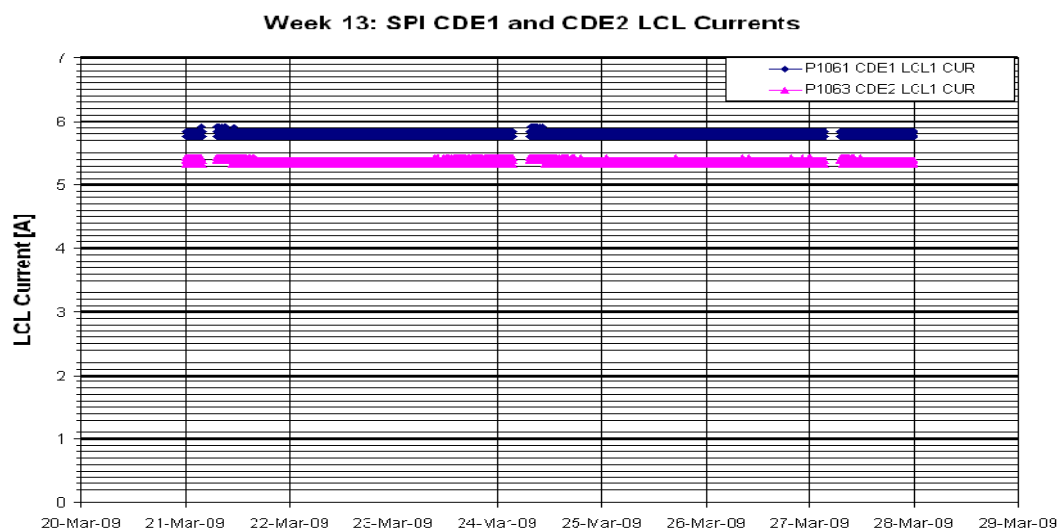
Stirling Compressors and Cryostat: The performance of the compressors is nominal.

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

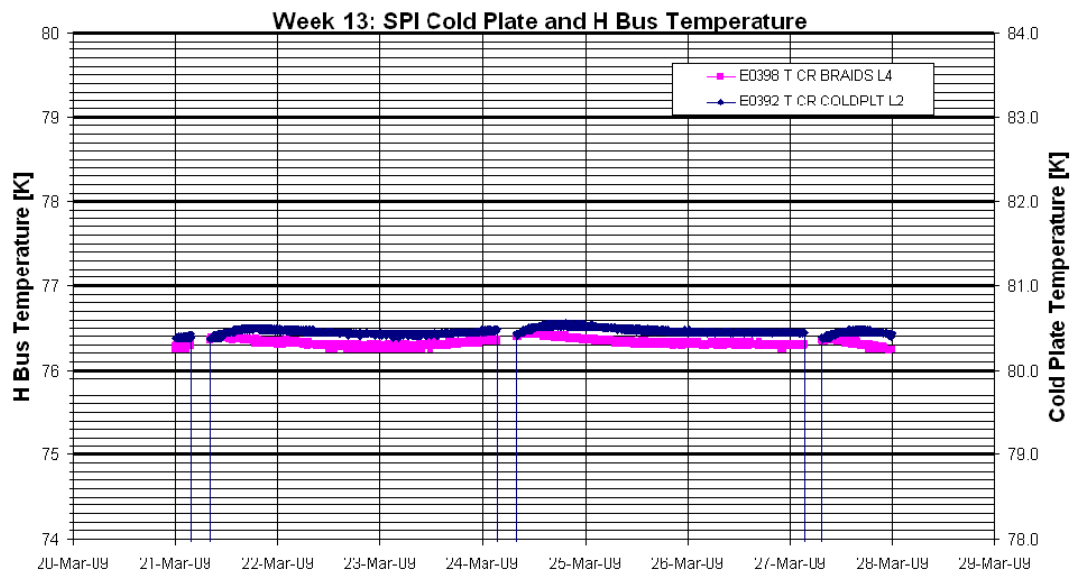
The stroke of all four compressors was set to 43 throughout the week and the average CDE LCL currents were as follows:

- CDE1 LCL Current = 5.80A
- CDE2 LCL Current = 5.37A

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.

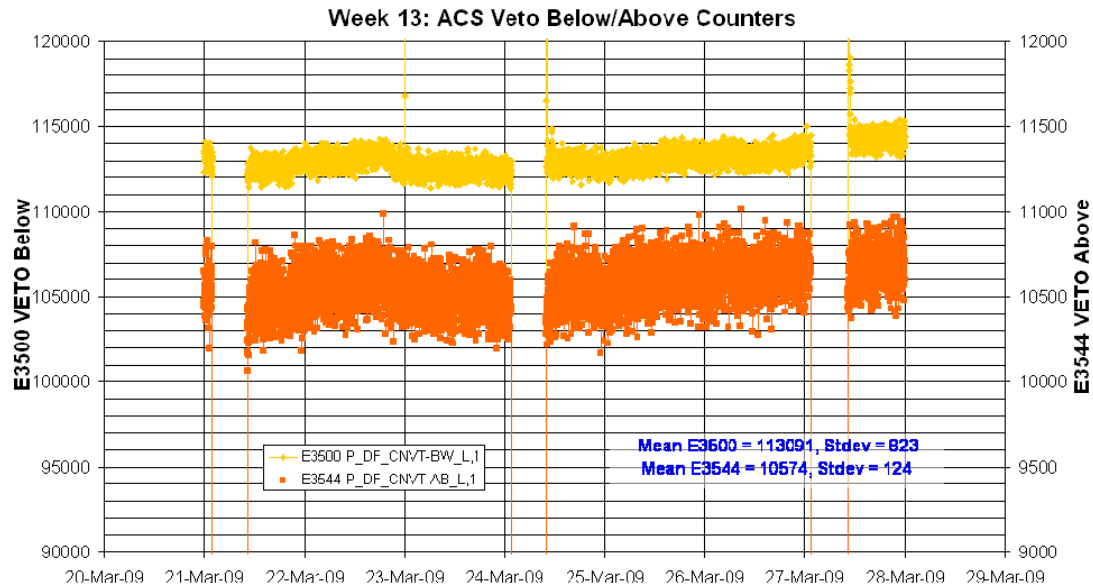
The IASW version installed is v4.3.4 with SE compression only enabled and the spectra scaling factor set to 8/19 SE. The average TM bandwidth occupation of SPI was 98.7 packets/cycle over the science window when the TM allocation was 108 packets/cycle.

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

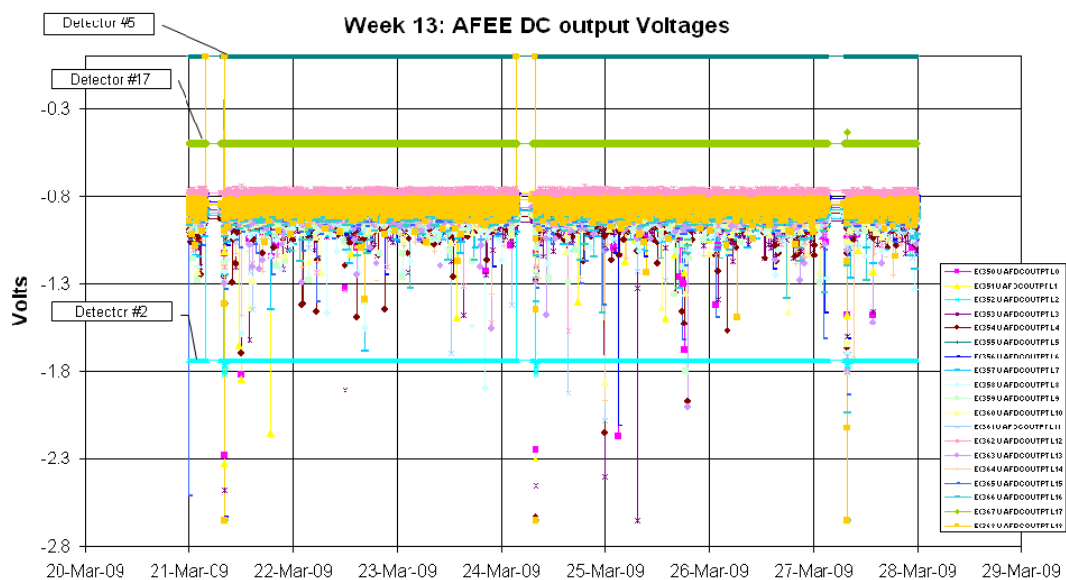


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

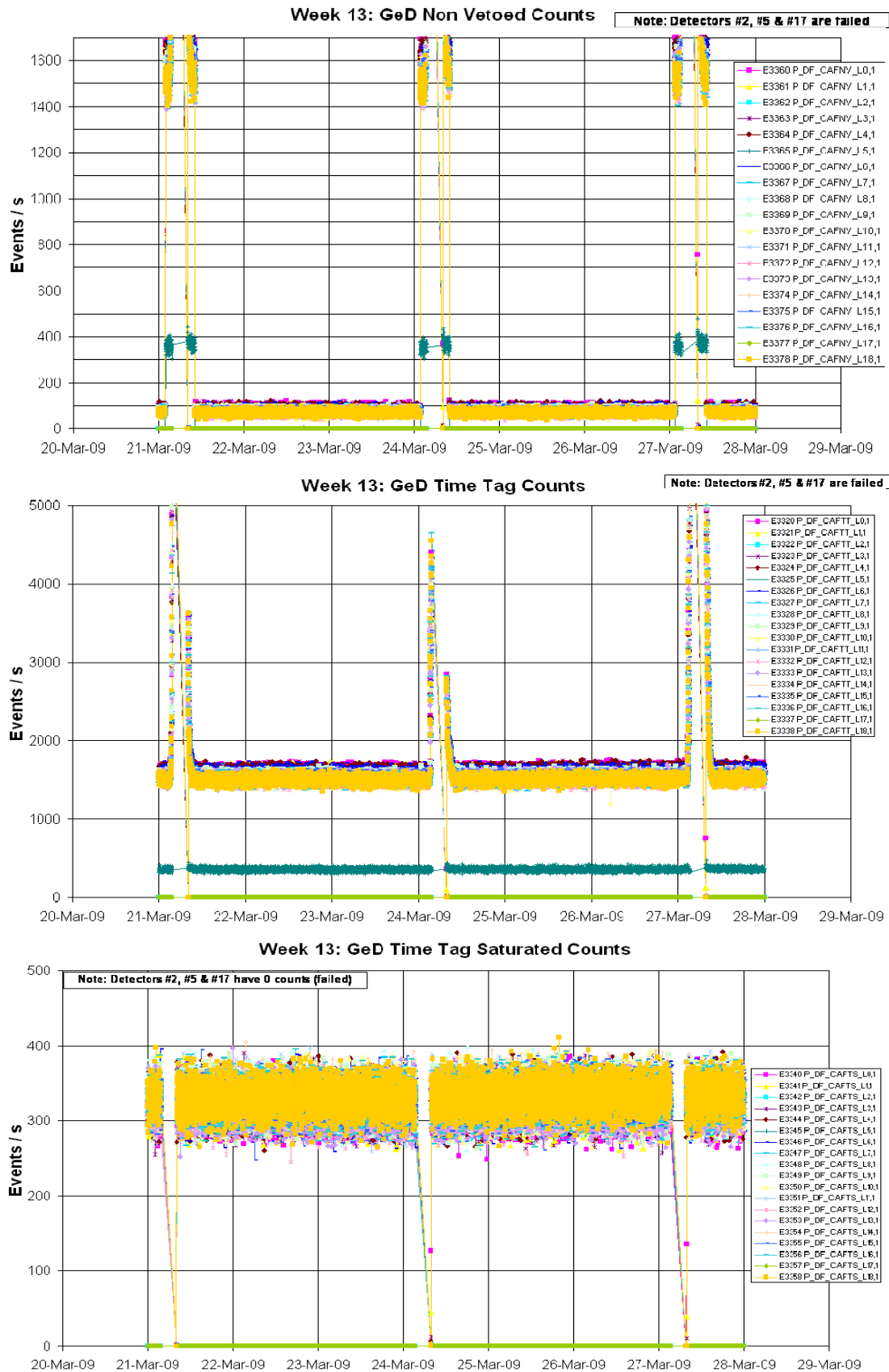
The following plot shows the ACS overall count rate evolution during the reporting period:



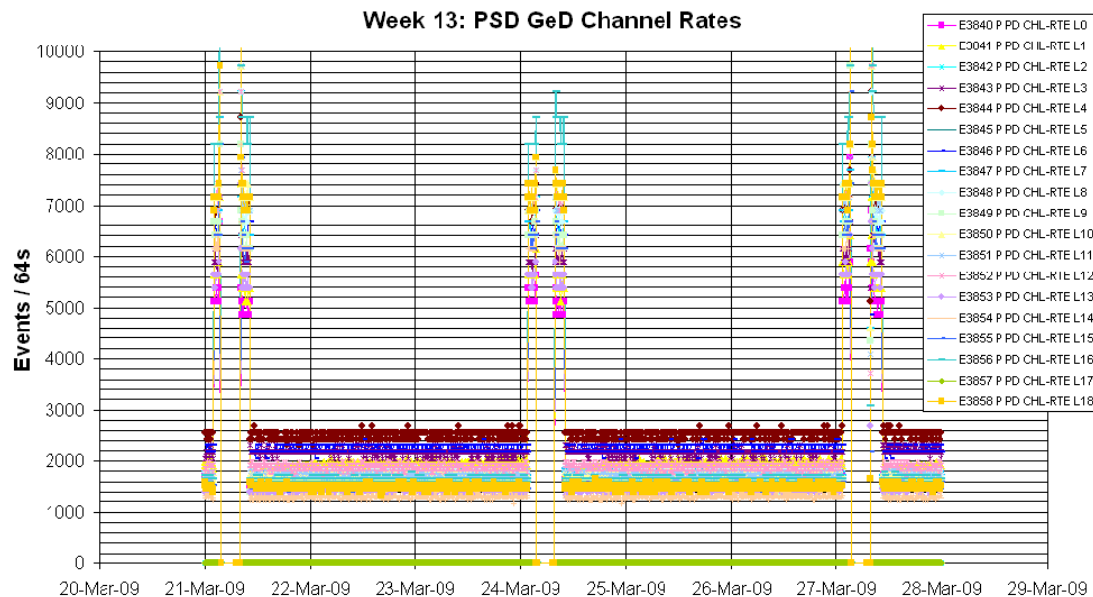
AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003; detector #17 is failed since 17/07/2004 and detector #5 is failed since 19/02/2009. The HV of the failed detectors are set to 0.5kV.



DFEE: The performance of the unit is nominal. The following plots show the Non Vetoes, 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. The failed detectors (GeD#2, GeD#5 and GeD#17) are disabled in the PSD.



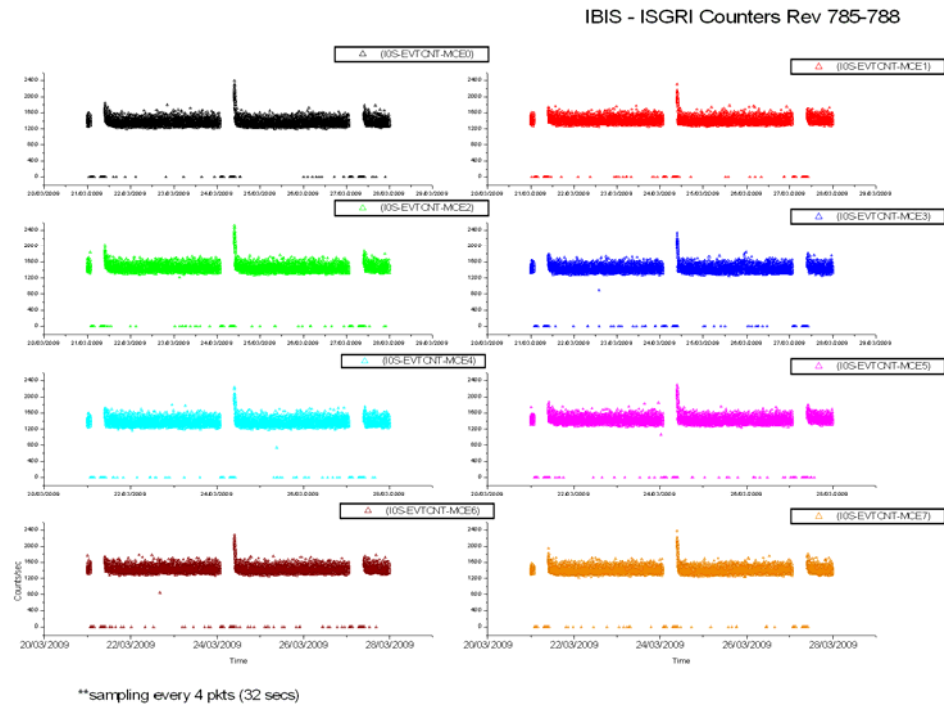
Event Log:

- On 2009-03-22 at 22:39:25Z four occurrences of OEM APID 1024 ID 229 EXCEPTION SPI1 PARTIAL FLAG OVERFLOW were received (parameter E9783 SUBBLOCK ID = SP3, SP15, SE and SP9) along with one OEM APID 1024 ID 243 EXCEPTION SPI1 SPECTRA BUILDING NOT COMPLETED (parameter E9780 DETECTOR ID = 12). As these OEMs stopped of their own accord, no action was taken.
- On 2009-03-22 at 23:10:45Z OEM APID 1024 ID 243 EXCEPTION SPI1 SPECTRA BUILDING NOT COMPLETED was received. As it was a single occurrence, no action was taken.
- On 2009-03-25 at 23:56:05Z TM parameter E2352 went OOL (value = PARAM > SPEC). This is the ACS FEE analogue status -5 V #2. It returned within limits on 2009-03-26 at 00:06:45Z and a report of the ACS HK data was then executed via FCP_SPI1_1831 at 00:07:54Z.
- Due to continuing high radiation after the expected radiation belt exit of revolutions 788, TM parameter E3500 (ACS CntVetoBelow) toggled OOL High on 2009-03-27 from 10:24:28Z to 10:48:52Z. As it returned within limits of its own accord, no action was taken.

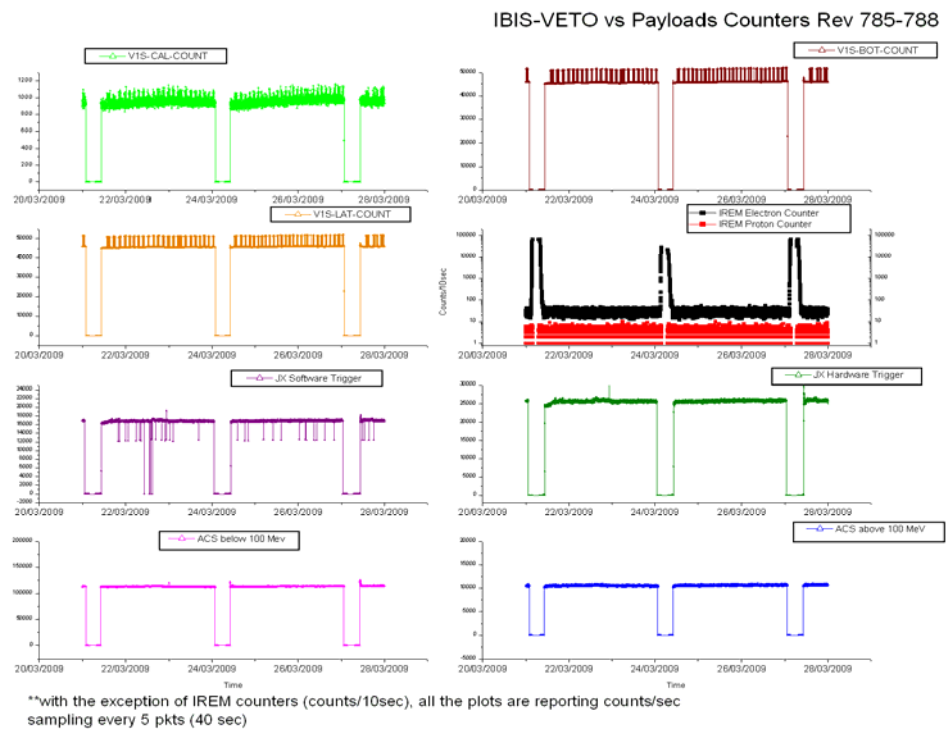
8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

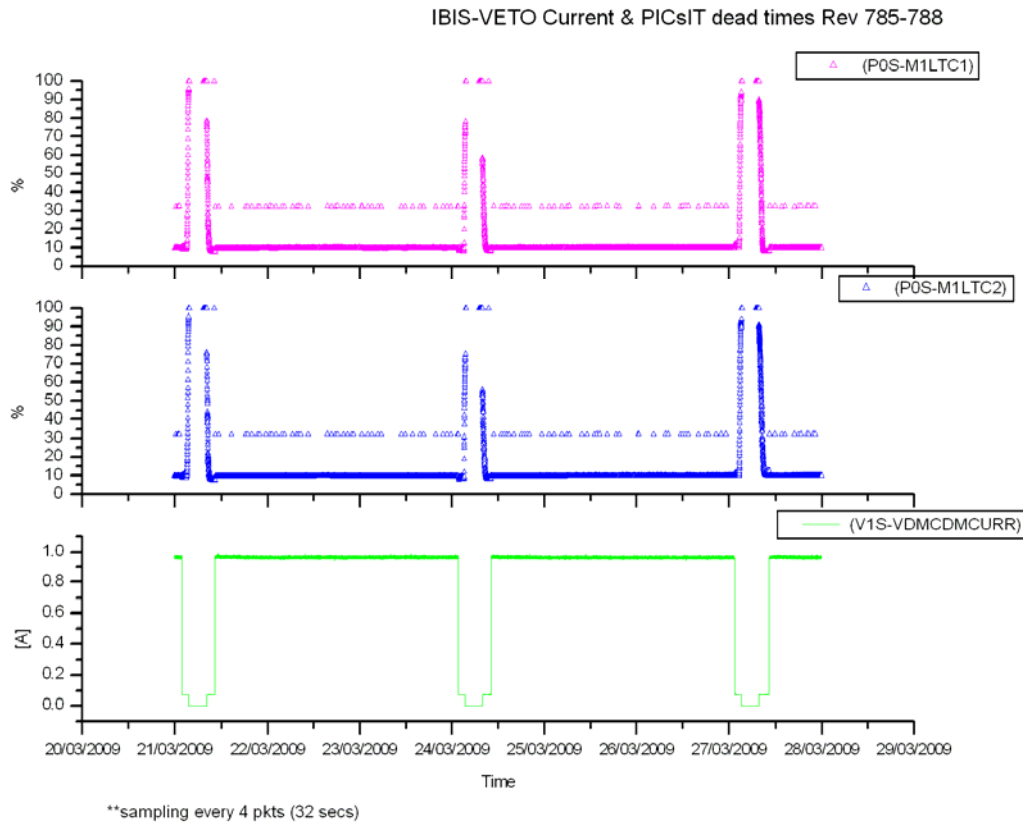


VETO vs Payload Counters:

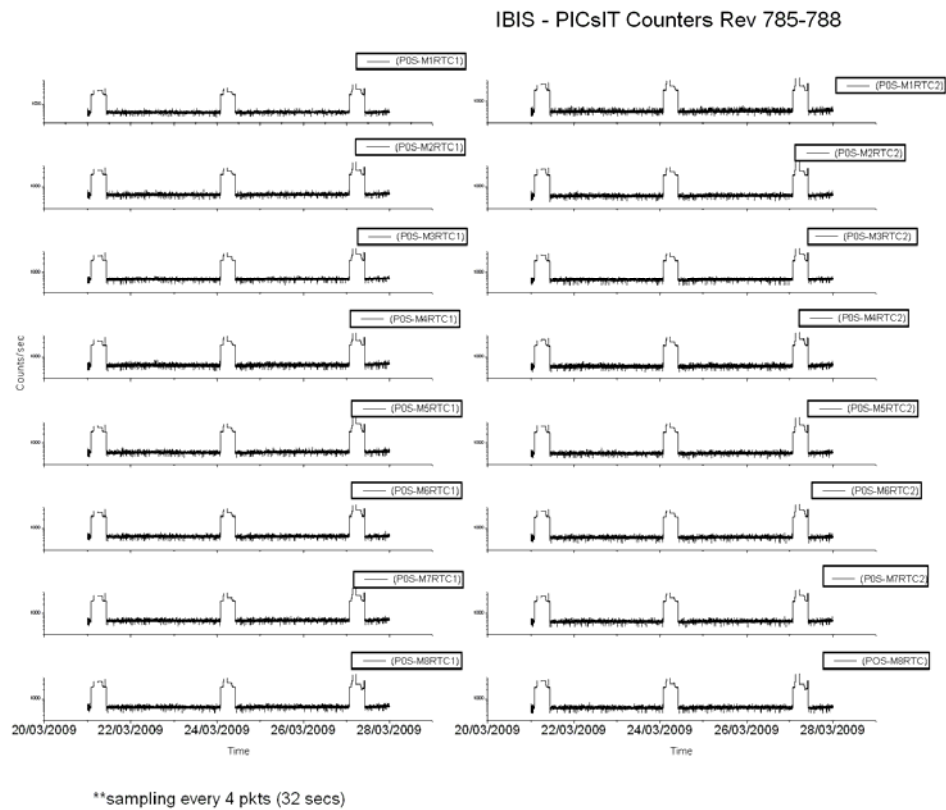


The background radiation level was low during the week.

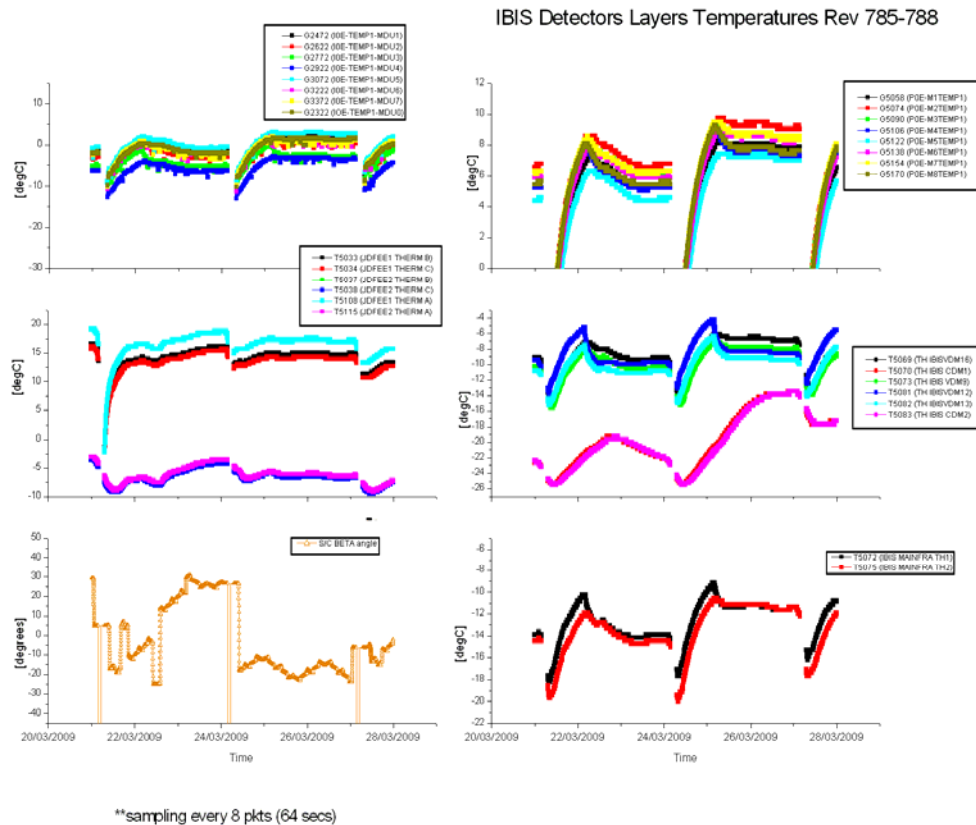
VETO Current:



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.

2009-03-21 (DOY 080, Rev 785-786) to 2009-03-23 (DOY 082, Rev 786)

IBIS operations executed nominally.

2009-03-24 (DOY 083, Rev 786-787)

During the execution of the ED GEISCL03 prior to radiation belt exit of revolution 786, the TM parameter family G2013 (number of events triggering the MCEi per second) went OOL Warning High starting at 09:38:07Z. As they had returned within limits by 09:50:47Z, no action was taken.

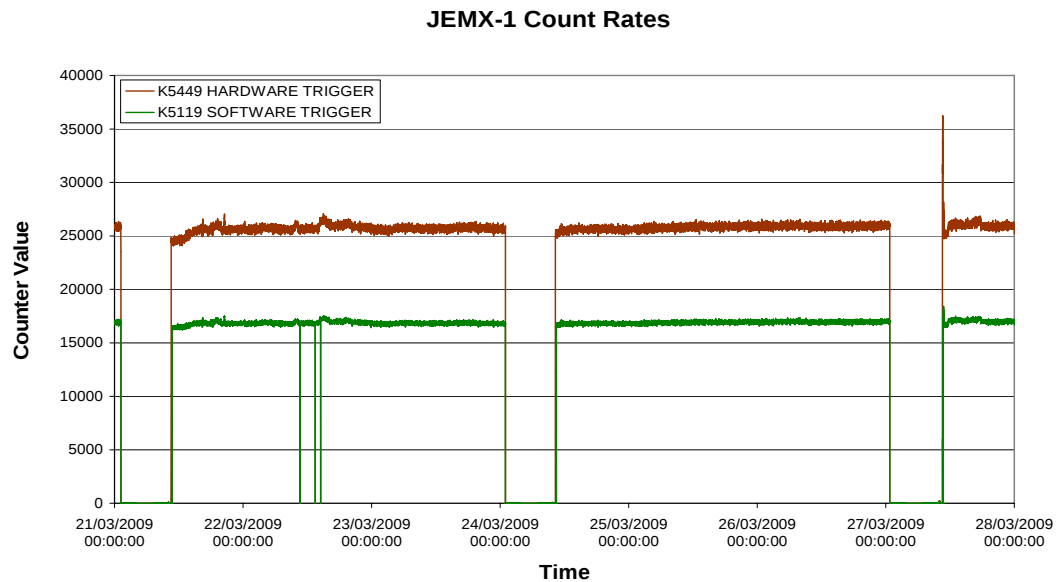
2009-03-25 (DOY 084, Rev 787) to 2009-03-27 (DOY 086, Rev 787-788)

IBIS operations executed nominally.

8.3.4 JEM-X Operations

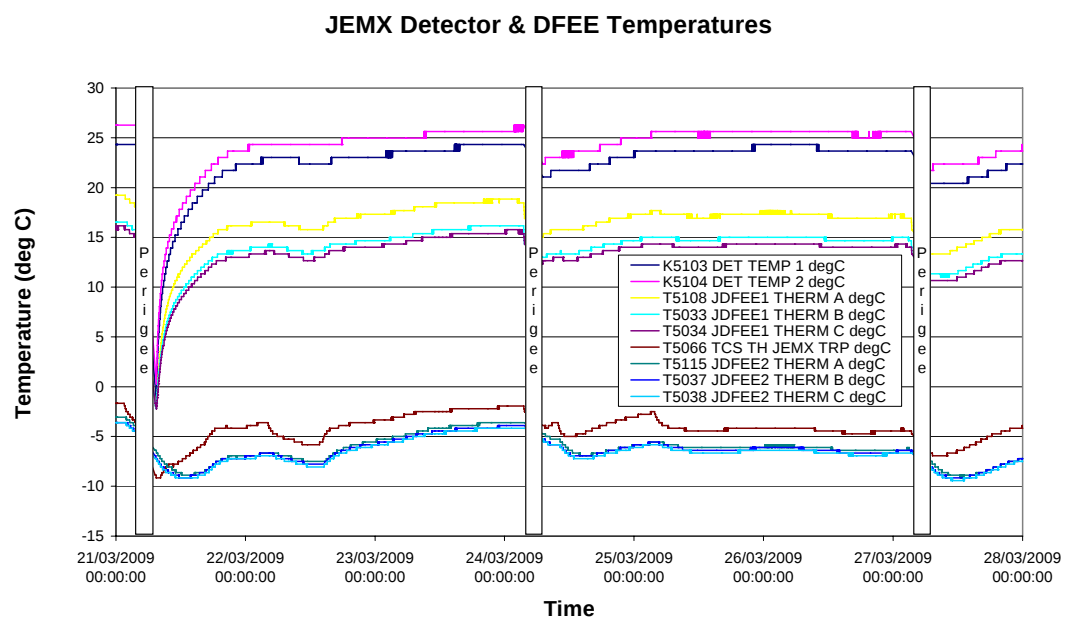
JEM-X Count Rates

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)

JEM-X Daily Report

2009-03-21 (DoY 080, Rev 785-786)

The Time-tagged ED KECLXT01, which switches the JEMX-1 DFEE on after eclipse was omitted. Immediately after AOS, when the JEMX-1 DFEE was observed to be off, the ED KECLEX01 was manually up-linked switching the unit back on.

At 07:30:26, TM parameter KD5380D, had an incorrect status for 24 seconds.

At 07:39:54, TM parameter K5317 exceeded hard limits.

From 08:27:56 to 09:32:46 there were repeated occasions of TM parameter K5102 exceeding soft limits.

No action was taken, and there was no impact.

2009-03-22 (DoY 081, Rev 786) to 2009-03-23 (DoY 082, Rev 786)

JEM-X 1 operations executed nominally.

2009-03-24 (DoY 083, Rev 786-787)

At 07:44:18, TM parameter K5317 exceeded hard limits.

No action was taken, and there was no impact.

2009-03-25 (DoY 084, Rev 787) to 2009-03-26 (DoY 085, Rev 787)

JEM-X 1 operations executed nominally.

2009-03-27 (DoY 086, Rev 787-788)

At 00:46:24, the TCs KU0014 & K0021 terminated with status unknown.

At 07:37:11, TM parameter K5317 exceeded hard limits.

At 09:59:55, the TC K0021 terminated with status Uncertain_failed.

At 10:34:58, TM parameter K5449 exceeded soft limits.

No action was taken, and there was no impact.

As for last week, the CRC was dumped once an orbit to verify the status of the on-board DFEE software. The results on each occasion were (All figures in hex):

Start Address	Length	CRC
B000	2000	F1B3
B000	1000	F074
C000	1000	CF9F

8.3.5 OMC Operations

2009-03-21 (DoY 080, Rev 785-786)

From 2009-03-22T10:35:22 to 2009-03-22T13:26:52, a Flat-Field calibration was performed. This was followed from 2009-03-22T13:27:22 to 2009-03-22T13:59:02 by a Dark Current calibration, both were performed nominally

2009-03-22 (DoY 081, Rev 786) to 2009-03-23 (DoY 082, Rev 786)

Nothing to report.

2009-03-24 (DoY 083, Rev 786-787)

At 22:44, a lost guide star led to an interruption of the Timeline. A recovery was performed, and the timeline rejoined at 22:59. The impact was the loss of pointing 07870023.

2009-03-25 (DoY 084, Rev 787) to 2009-03-27 (DoY 086, Rev 788)

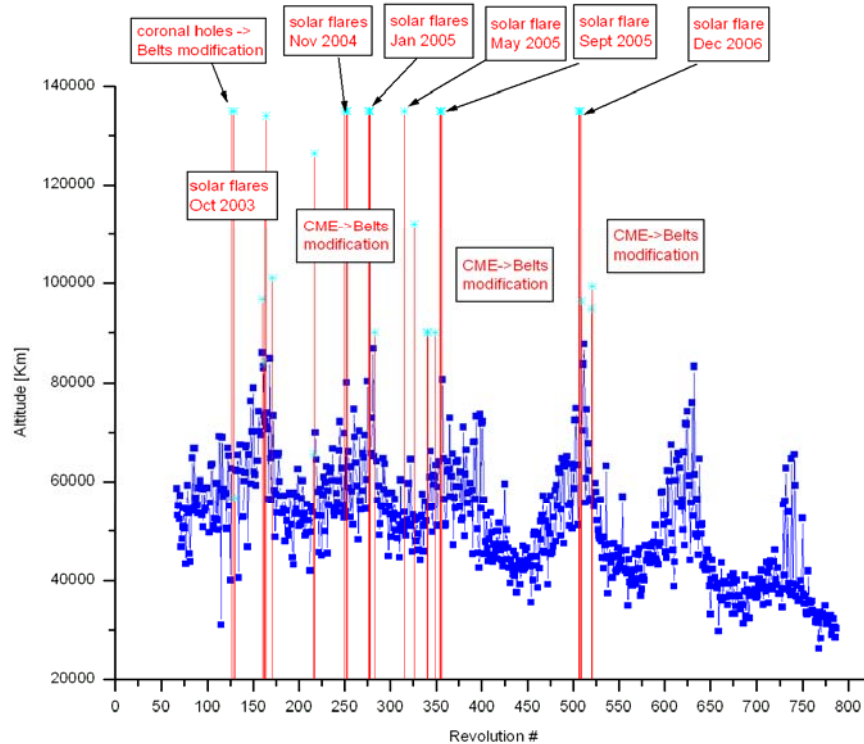
Nothing to report.

On DoY 080 at 01:56:41, DoY 083 at 01:44:34 and DoY 086 at 01:30:42 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

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]
785	RAD_ENTR R 2009-03-21T01:56:38Z	21/03/2009 03:07:13	30618.4	21-Mar-2009 02:46:09	34583.71
786	RAD_EXIT R 2009-03-21T10:09:38Z	21/03/2009 09:37:37	>>42429.0	21-Mar-2009 09:26:09	46665.72
786	RAD_ENTR R 2009-03-24T01:44:31Z	24/03/2009 03:08:33	28498.3	24-Mar-2009 02:39:06	33670.85
787	RAD_EXIT R 2009-03-24T09:57:53Z	24/03/2009 09:48:09	51567.6	24-Mar-2009 09:19:06	47384.45
787	RAD_ENTR R 2009-03-27T01:30:40Z	27/03/2009 02:45:13	30335.0	27-Mar-2009 02:19:06	34725.11
788	RAD_EXIT R 2009-03-27T09:44:09Z	27/03/2009 08:58:25	>>40777.6	27-Mar-2009 09:09:06	47972.68

Reference

High radiation

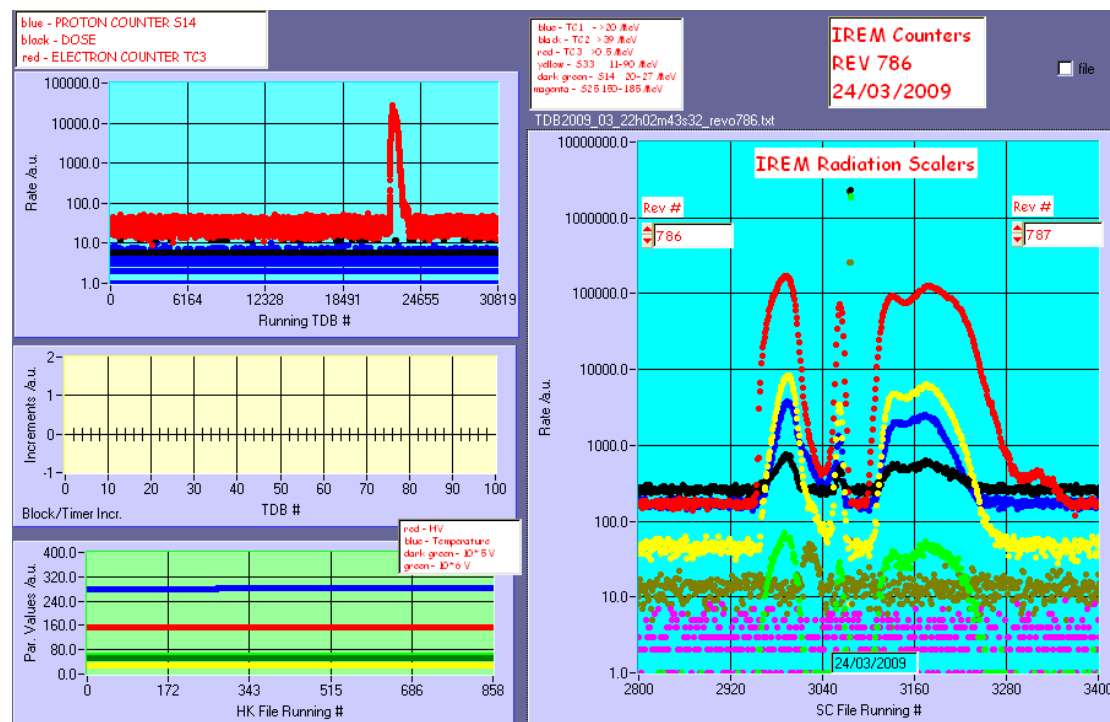
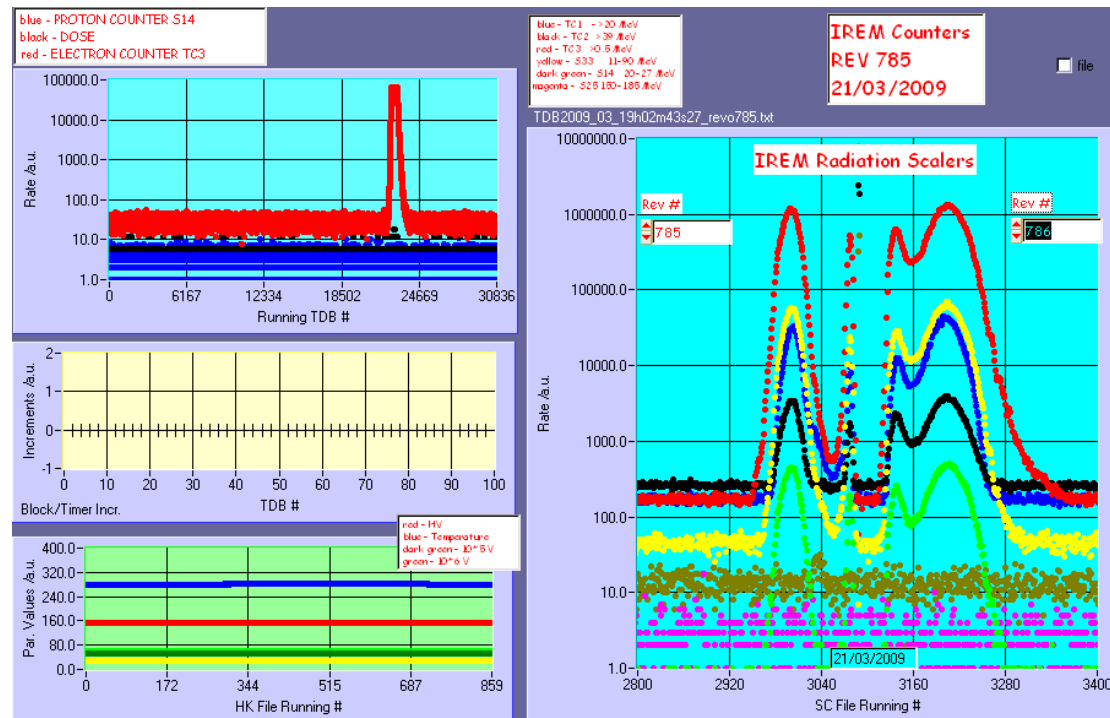
Very small error vs reference (less than 10 minutes)

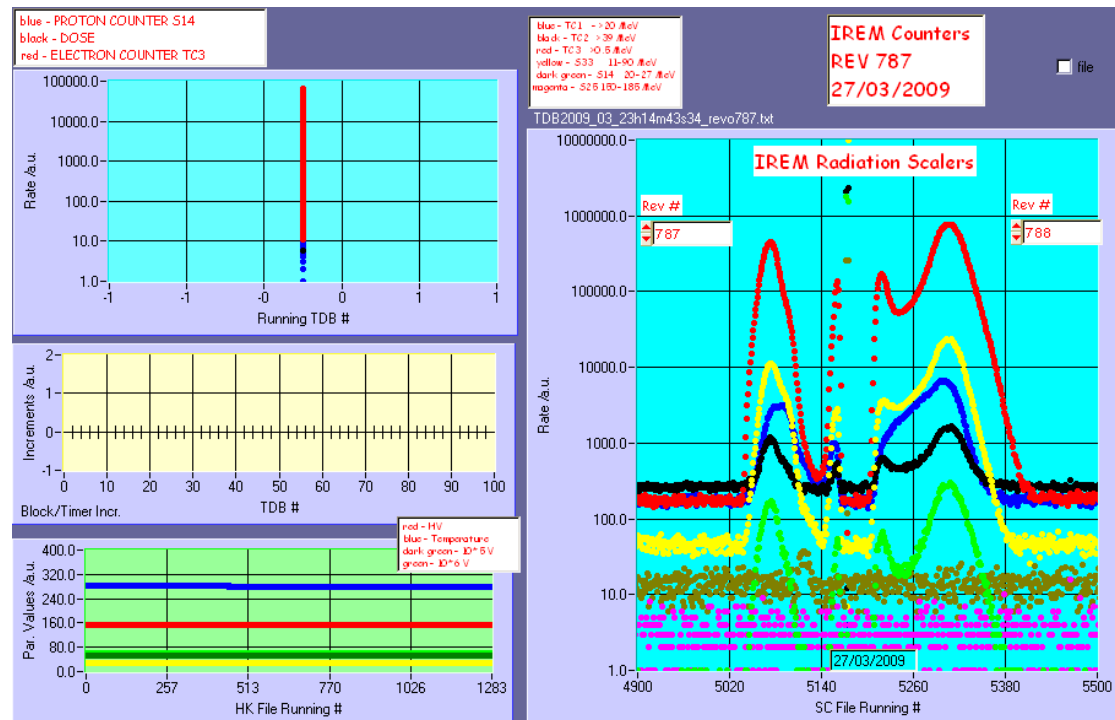
Small error vs reference (between 10 and 30 minutes)

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.

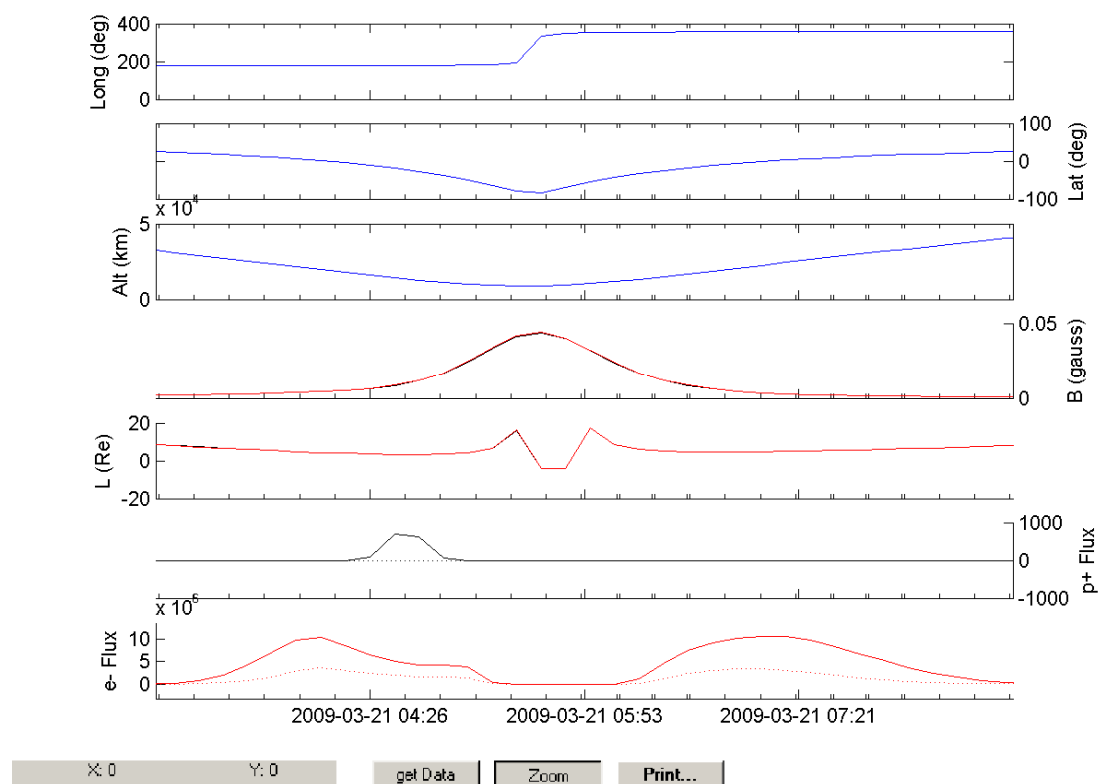
IREM radiation counters:



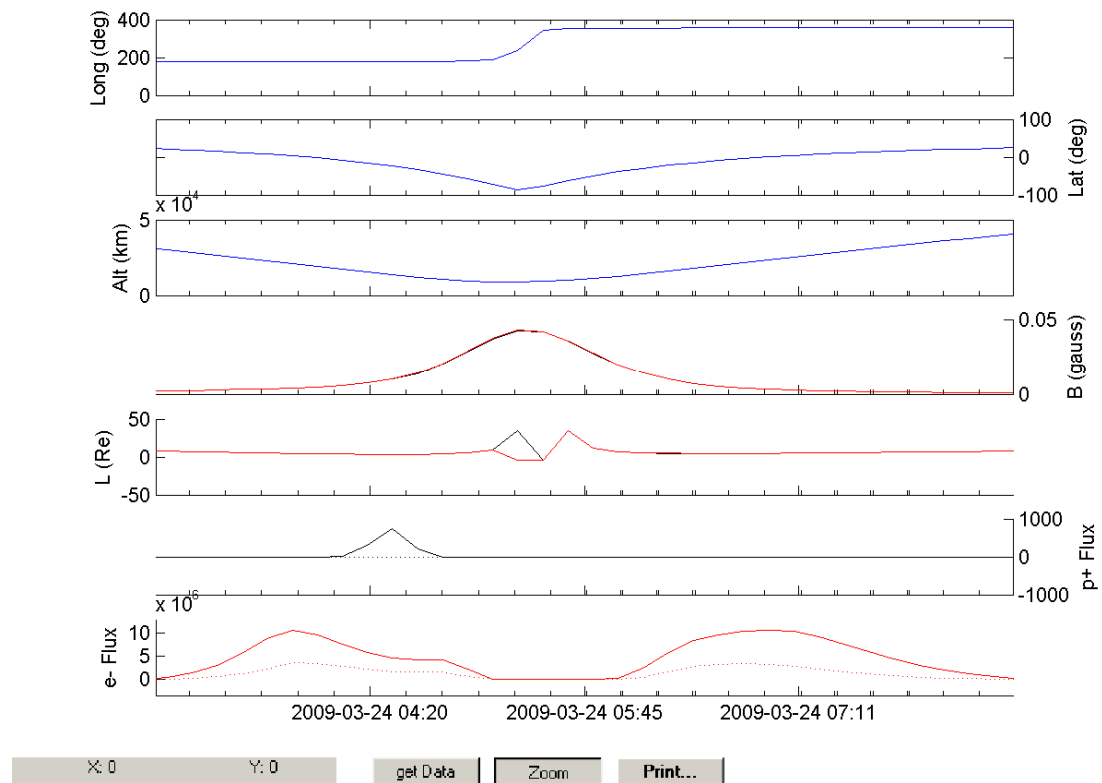


IREM Predicted Radiation Belt Passages

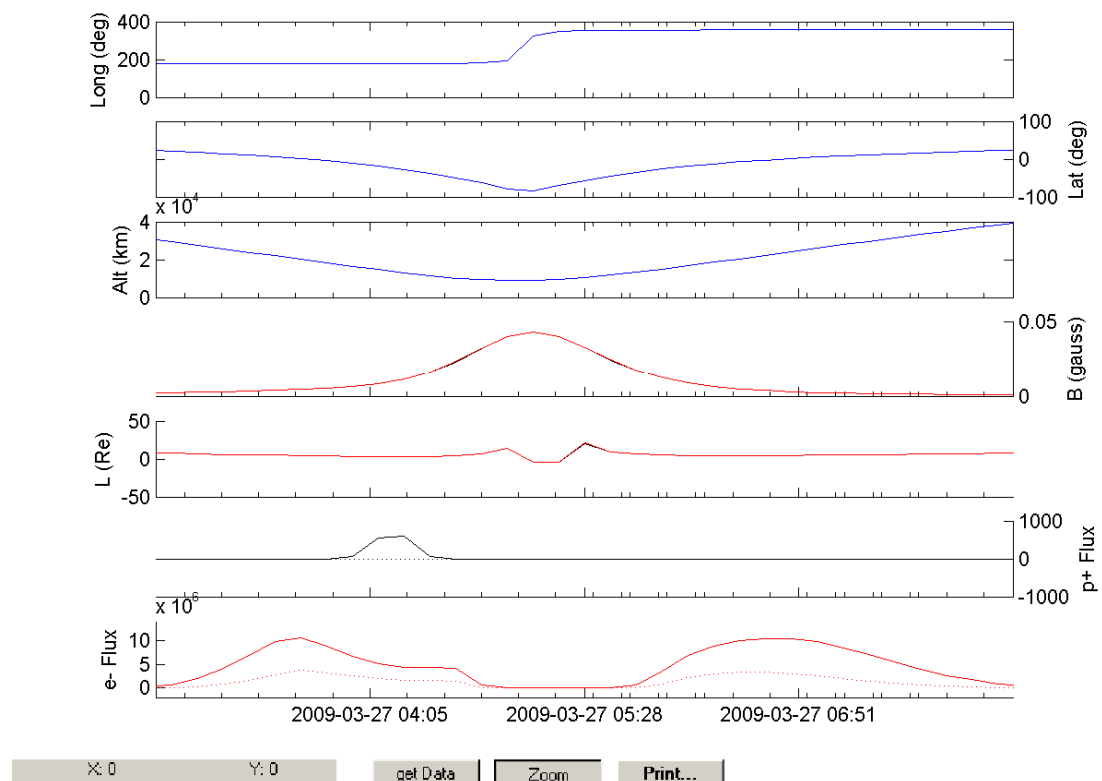
Rev 785



Rev 786



Rev 787



Radiation Assessment

Generated with SEIS Report and Analysis tool.

INTRODUCTION

This note summarises the space weather status over the observation period

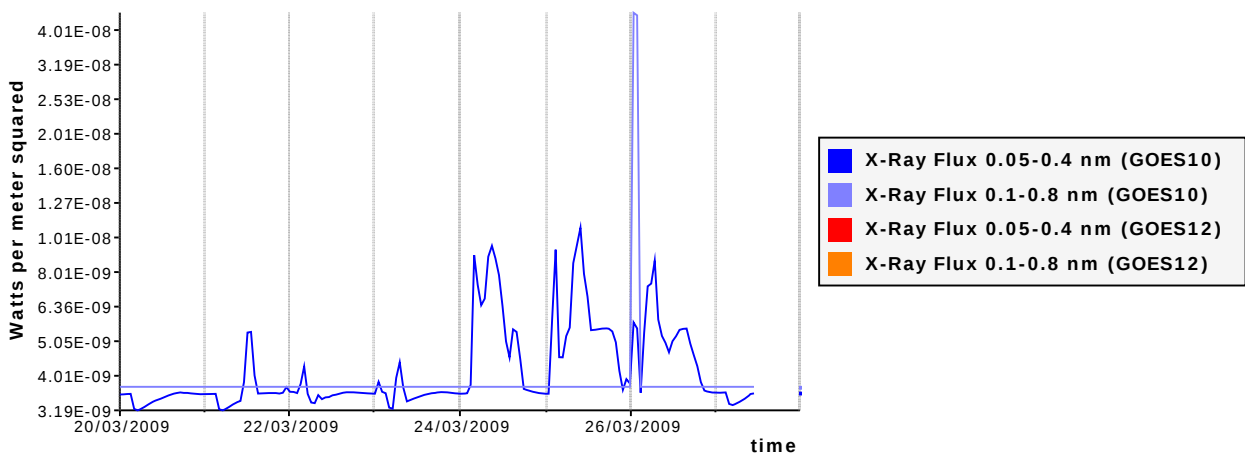
DAILY SUN

see in WR section 3.2.5

RADIATION FLUXES

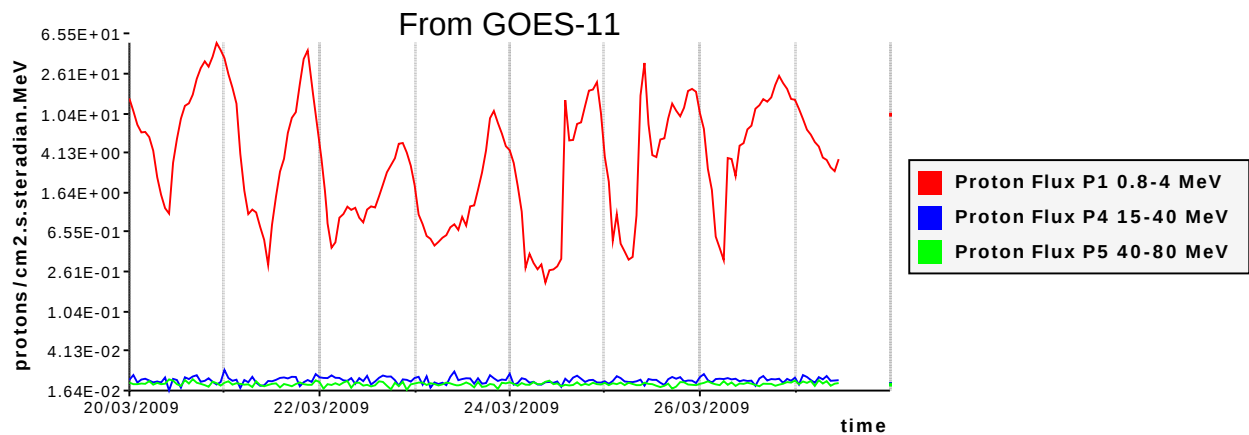
X-ray fluxes

X-ray fluxes for different energies are presented below as reported by GOES satellites. From $1\text{E-}5$ W/m^2 , they start featuring significant radiation activity corresponding to M-class solar flares from $1\text{E-}5$ to $1\text{E-}4$ W/m^2 , and to X-class solar flares from $1\text{E-}4$ and onwards.



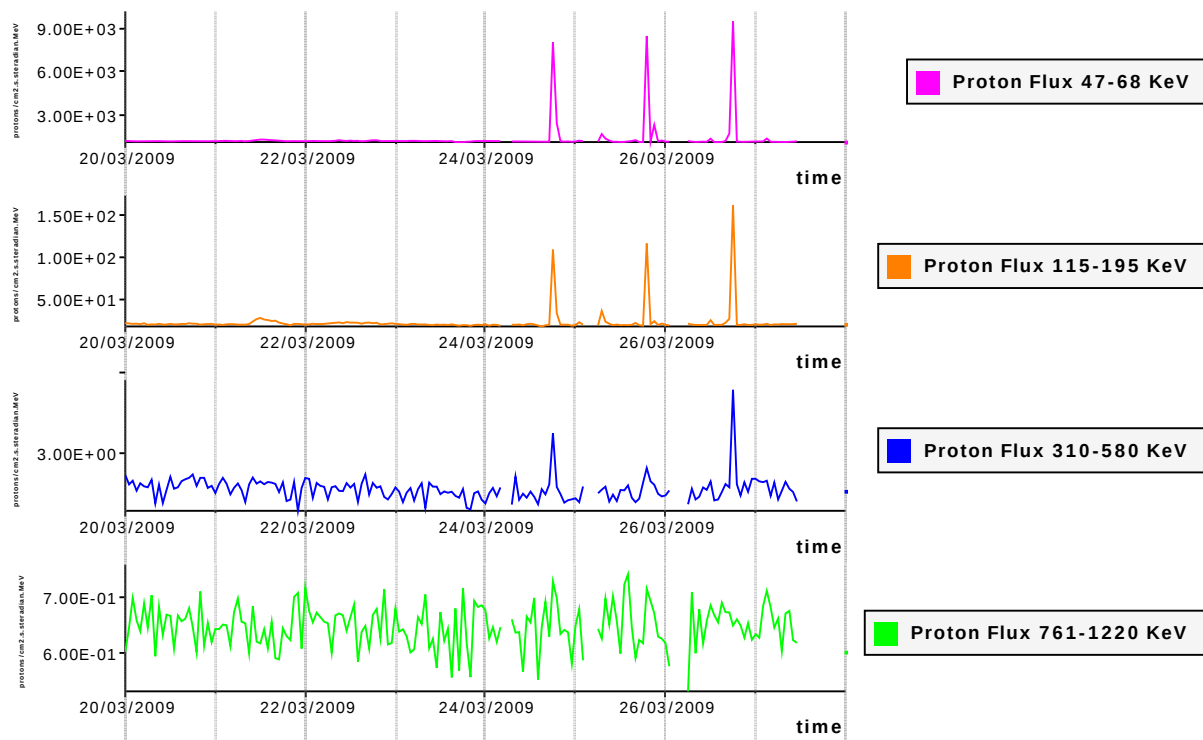
Proton fluxes (GOES-11)

Proton fluxes as measured by GOES satellites are presented in the following plot. Usually P1 oscillates between $1\text{E}+1$ and $1\text{E}+2$, while P2 and P3 evolve around $1\text{E-}2$.



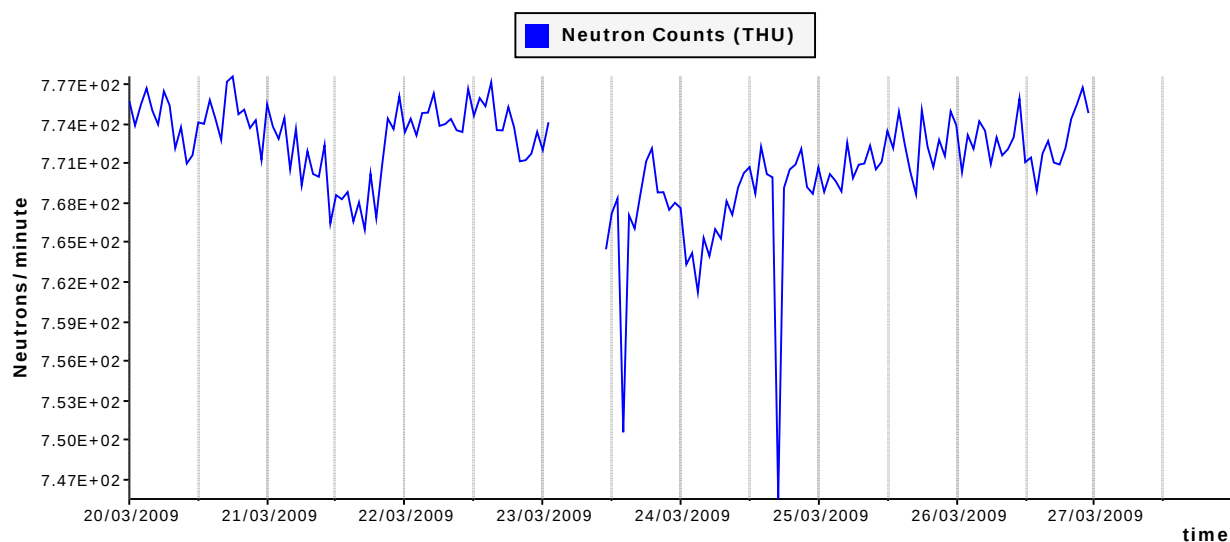
Proton fluxes (ACE)

Proton fluxes as measured by ACE satellite are presented in the following plot.



Neutron counts

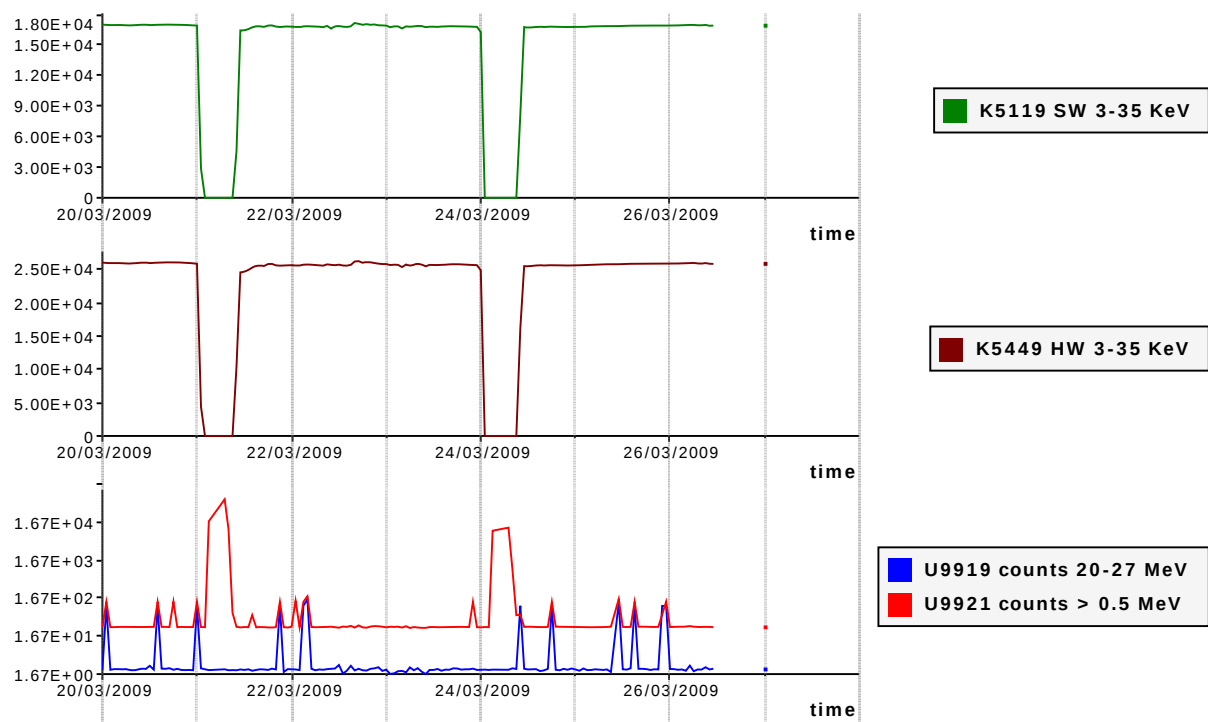
The neutron counts for the last 3 days are presented in the following plot. Nominally they remain stable around 7.2E+2.



IREM and JEM-X (INTEGRAL)

IREM proton and electron fluxes as well as JEM-X1 software and hardware triggers are presented in the following plots.

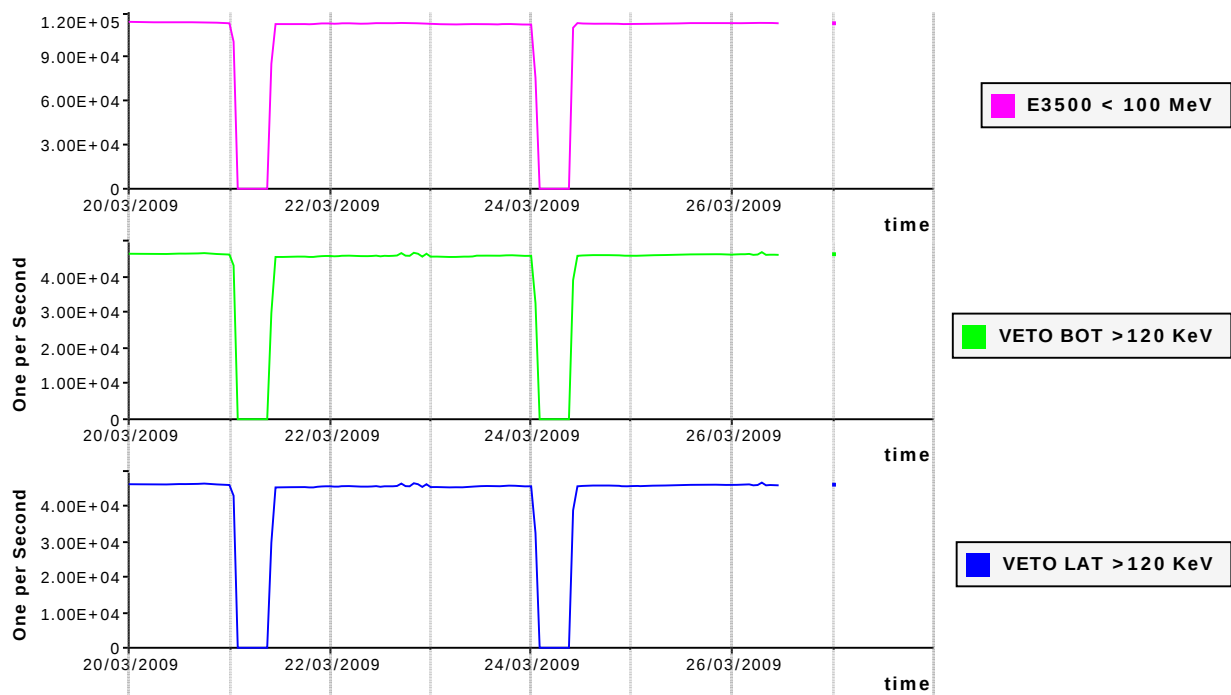
Nominal values are respectively about 1 and 18 for IREM counts, and, 13000 and 19000 for JEM-X ones.



SPI and IBIS (INTEGRAL)

SPI-ACS counters below 100MeV as well as IBIS-VETO bottom and lateral counters are presented in the following plots.

Nominal values are respectively about 90000 for SPI counts, and 36000 for IBIS ones.



SOLAR FLARES FORECAST

The probabilities of M and X-class solar flares during the last month are presented below. Chances of solar flare start to be meaningful from 15%.



