

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 287
Week 12
25.03.08
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 15.03.08 until 21.03.08 (both dates inclusive) and covers the revolutions 662, 663 and 664.

2 Summary of Activities

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

The targets of these revolutions consisted of three hexagonal dithers of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), a raster dither of X Per (RA 03:55:23.08, DEC +31:02:45.0), a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), a raster dither of the Galactic Centre (RA 17:45:40.00, DEC -29:00:29.0), a hexagonal dither of 4U0115+63 (RA 01:18:31.90, DEC +63:44:24.0), and a raster dither of the mid-latitude 1 region (RA 18:36:17.05, DEC -60:24:50.7).

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.

Four slews were missed from TL, during the observation period, due to problems on FDS and Ground Stations (DSS-27, REDU).

The fuel consumption over the period between 14/03/2008 and 21/03/2008 was 0.1985 Kg. The remaining propellant is in the order of 141.6259 Kg.

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

3.1.2 Power

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

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 Allocation was over-subscribed by 3 packets to SPI for 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

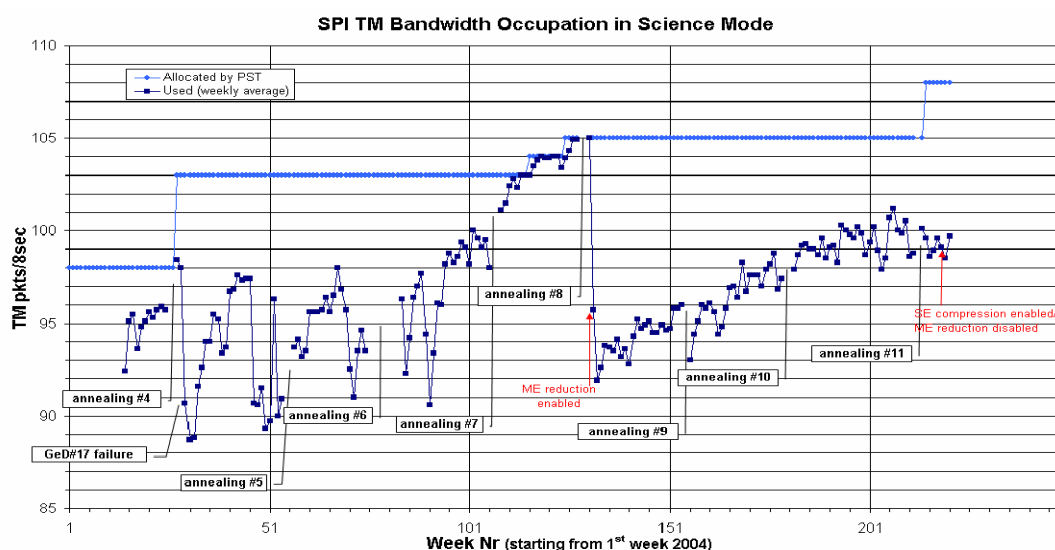
3.2.1 SPI

Following the 11th annealing, which ended on 30th January, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which, although its energy resolution improved since the previous annealing, is still showing a slightly degraded energy resolution compared to the other detectors and is therefore operating at a lower HV setting of 3.5kV (instead of 4kV). Detector #2 is failed since 06.12.2003 and detector #17 since 17.07.2004.

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

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth in the science observation windows was 105 packets/cycle however the over-allocated PST with 108 packets/cycle for SPI was loaded. The average telemetry occupation in the science window was 99.7 packets/cycle.

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



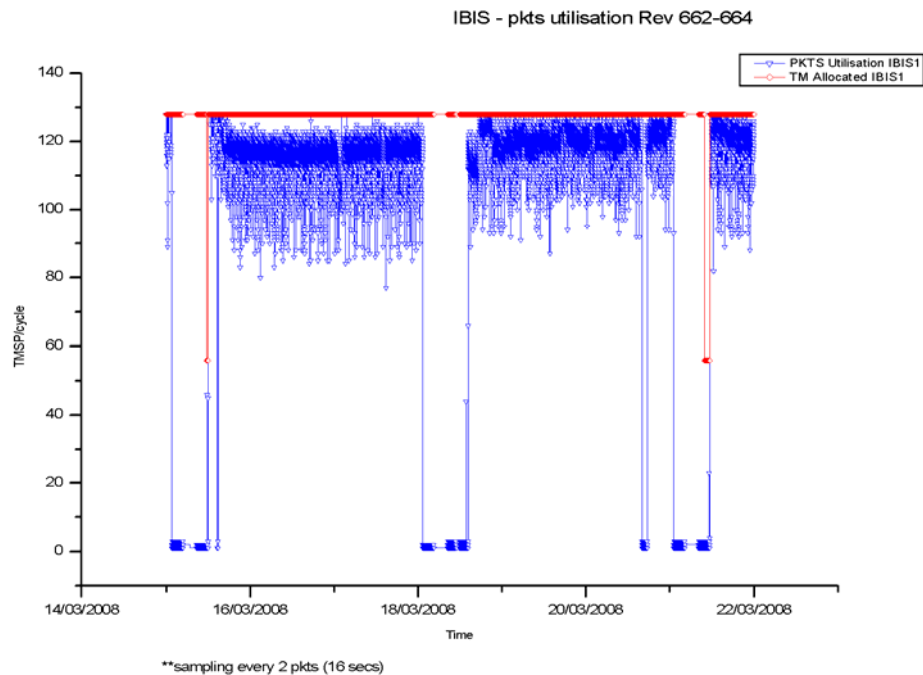
Note: Some more information concerning the SPI operations is provided in the Appendix.

3.2.2 IBIS

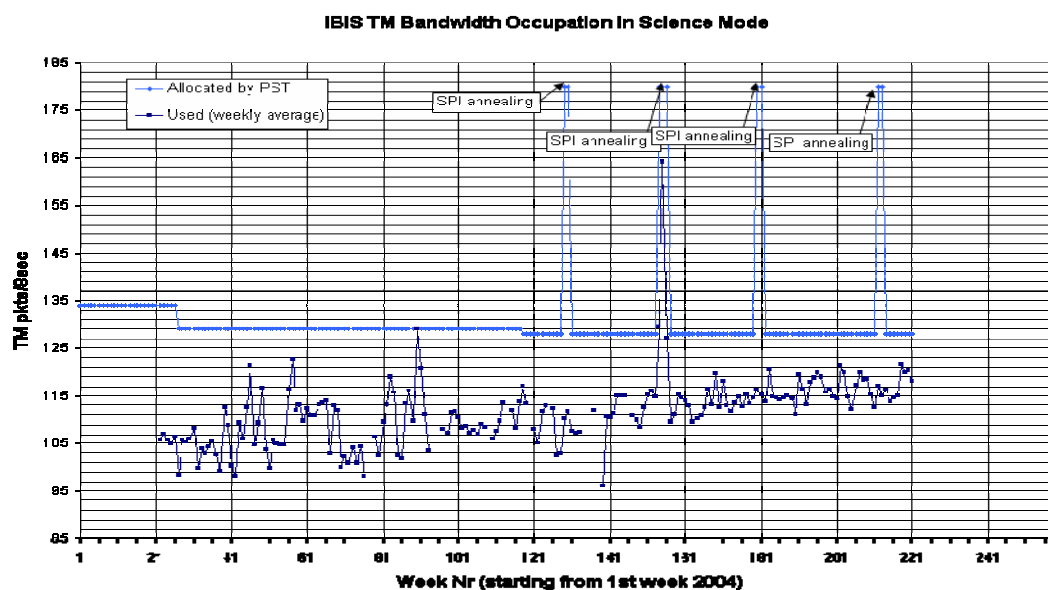
The overall status of the unit is nominal.

During the reporting period, the PST allocation to IBIS above the radiation belts was 128 packets/cycle and the IBIS mean bandwidth utilisation during the observation period (when IBIS was in Science mode) was 118.31 packets/cycle, down 1.96 on last week.

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



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.

3.2.4 OMC

The status of OMC is nominal.

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

During this reporting period, 185 of the 188 planned science pointings were executed nominally, 3 were lost.

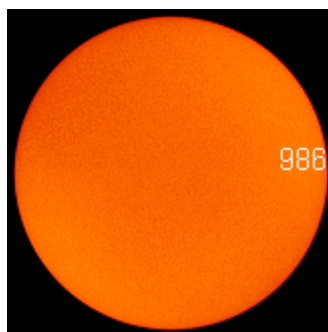
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. A new sun spot (#986) emerged on the 15th March, and had disappeared over the Sun's western limb by the 19th. For the remainder of the week, the sun was blank. There was no threat of solar flares.



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. 3 pointings were lost to ground problems. The overall performance was well over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. There was one occasion where the TPF update failed to arrive in time, which led to the loss of a pointing.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There was, however, one occasion where the links to Redu were lost for over an hour, leading to a lengthy manual recovery, and the loss of a pointing, another occasion of 18 bad frames, and another occasion of a link drop from DSS27, which led to the loss of a pointing..

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 670 and 671.

Observations have been planned up to revolution 668.

Due to a TOO on the transient X-ray pulsar 4U 0115+63 revolution 664 has been re-planned and further planning halted until a clearer view exists if and how further observations within this TOO may be done. It is probable that revolution 667 and following have to be re-planned as well.

New TSFs have been received for revolutions 663 to 666.

2. Observation status

New ECSs have been received for revolutions 656 to 658 but not yet processed.

3. ISOC Science Data Archive

A discussion has begun on how to make Key Programme data which are not yet public accessible to local data right owners from the ISDA.

4. ISOC system

Work is ongoing on V19.0.

5. Problems

The Web application showing the planning status is frequently very slow or hanging. An investigation is ongoing.

4.3.2 ISDC

Status of ISDC observation processing on 25/03/2008:

- Latest Standard Analysis completed: observation 05200010013 (Galactic Bulge region, Revolutions 655) on 17/03/2008.

- Latest products archived: observation 05200010013 (Galactic Bulge region, Revolutions 655) on 18/03/2008.

- Latest observation products sent to the observer: observation 05200540004 (SN 2008S, Revolution 652-653) on 18/03/2008.

5 Special Events

6 Anomalies

The following problems were reported this week that impacted operations.

- On DoY 077, at 03:00, the DSS-27 antenna stopped tracking, forcing the suspension of the Timeline. Data was flowing again by 03:22, and a manual recovery was performed. The Timeline was rejoined at 03:55. The impact was the loss of pointing 06620073.
- At 10:38, a problem on the attitude determination process on the FDS caused the update for slew 06620087 to fail. A manual recovery was performed, and the Timeline rejoined at 11:08. The impact was the loss of pointing 06620087.
- On DoY 078, from 10:54 to 11:56, all links with Redu dropped. A lengthy manual recovery was performed, and the Timeline rejoined at 14:58.

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

7 Future Milestones

The following activities are foreseen in the next few weeks.

- The next Crab calibration will take place from during revolution 665 and 666.
- The Spring eclipse season starts on the 30th March 2008, at the end of revolution 666, and continues until the last eclipse on 26th April.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 662

The observations in revolution 662 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 raster dither of X Per (RA 03:55:23.08, DEC +31:02:45.0), lasting ~50.5 hours, until the end of the revolution.

Revolution 663

The observations in revolution 663 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 hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. Finally, a raster dither of the Galactic Centre (RA 17:45:40.00, DEC -29:00:29.0), lasting ~47.6 hours, was performed, until the end of the revolution.

Revolution 664

The observations in revolution 664 began with a Target of Opportunity, a hexagonal dither of 4U0115+63 (RA 01:18:31.90, DEC +63:44:24.0), lasting ~27.8 hours. They continued with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. Finally, a raster dither of the mid-latitude 1 region (RA 18:36:17.05, DEC -60:24:50.7), lasting ~22.8 hours, was performed, 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

2008-03-01T19:58:42.000Z	142.0799	F	Automatic TM processing.
2008-03-03T10:14:30.000Z	142.0758	F	Automatic TM processing.
2008-03-04T19:55:22.000Z	142.0530	F	Automatic TM processing.
2008-03-06T10:00:46.000Z	142.0425	F	Automatic TM processing.
2008-03-06T16:48:30.000Z	142.0065	F	Automatic TM processing.
2008-03-09T02:26:21.000Z	141.9295	F	Automatic TM processing.
2008-03-09T09:49:57.000Z	141.9267	F	Automatic TM processing.
2008-03-10T19:31:29.000Z	141.8568	F	Automatic TM processing.
2008-03-12T09:37:33.000Z	141.8451	F	Automatic TM processing.
2008-03-13T18:59:45.000Z	141.8244	F	Automatic TM processing.
2008-03-15T09:20:21.000Z	141.8082	F	Automatic TM processing.
2008-03-15T15:50:38.000Z	141.7553	F	Automatic TM processing.
2008-03-16T18:36:57.000Z	141.7058	F	Automatic TM processing.
2008-03-18T09:08:05.000Z	141.6880	F	Automatic TM processing.
2008-03-19T18:32:25.000Z	141.6682	F	Automatic TM processing.

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, 15/03/2008 – 21/03/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 104 Open Loop Slews, 97 Closed Loop Slews and 6 Momentum Biases were executed (as reported by ACC).

4 slews were missed from TL, during the observation period due to problem on FDS and on lost of TC/TM links at DSS-27 and REDU stations.

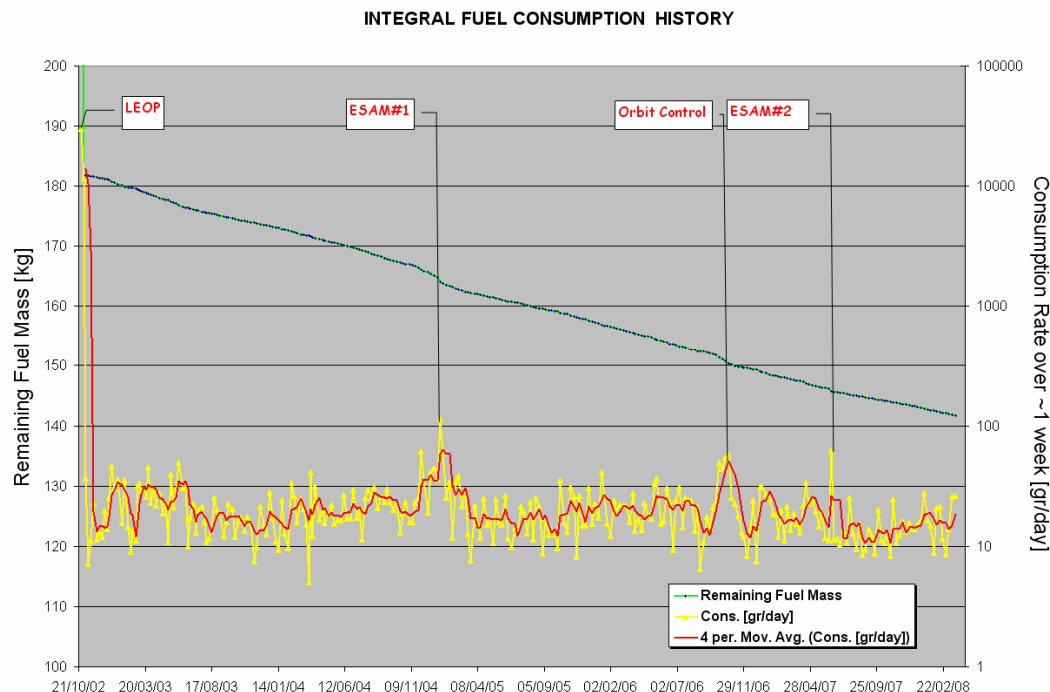
This is equivalent to $\sim 1.9\%$ of the total number of slews planned (202).

Orbit Control

No update

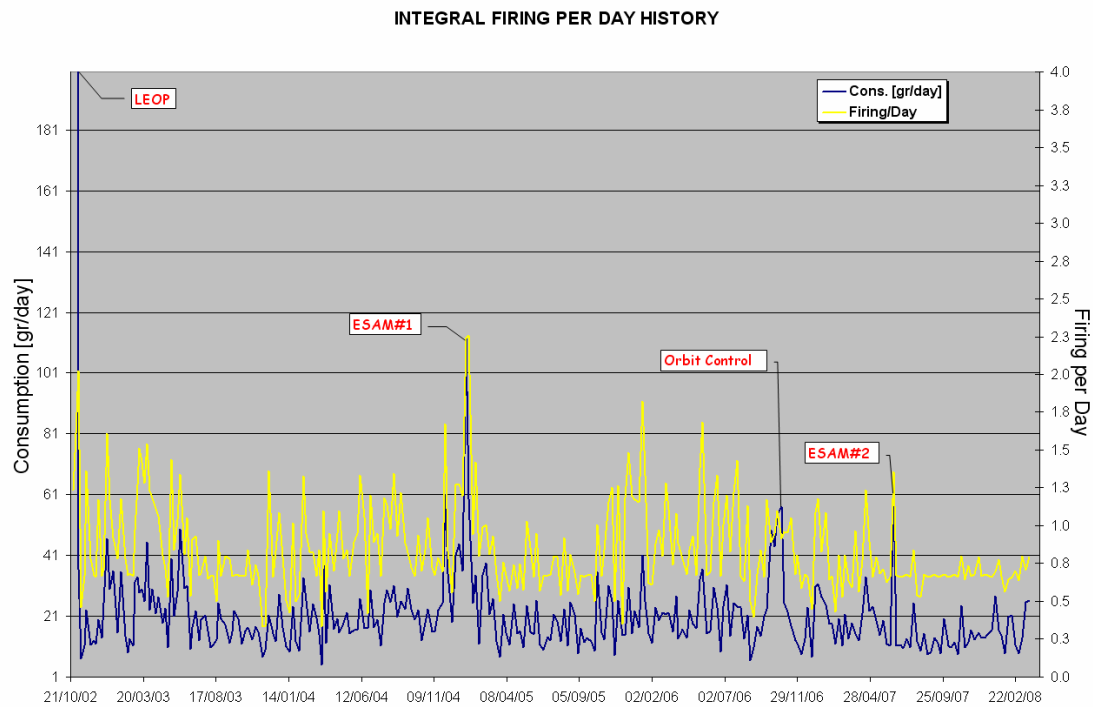
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 21/03/2008 is reported in the plot below.



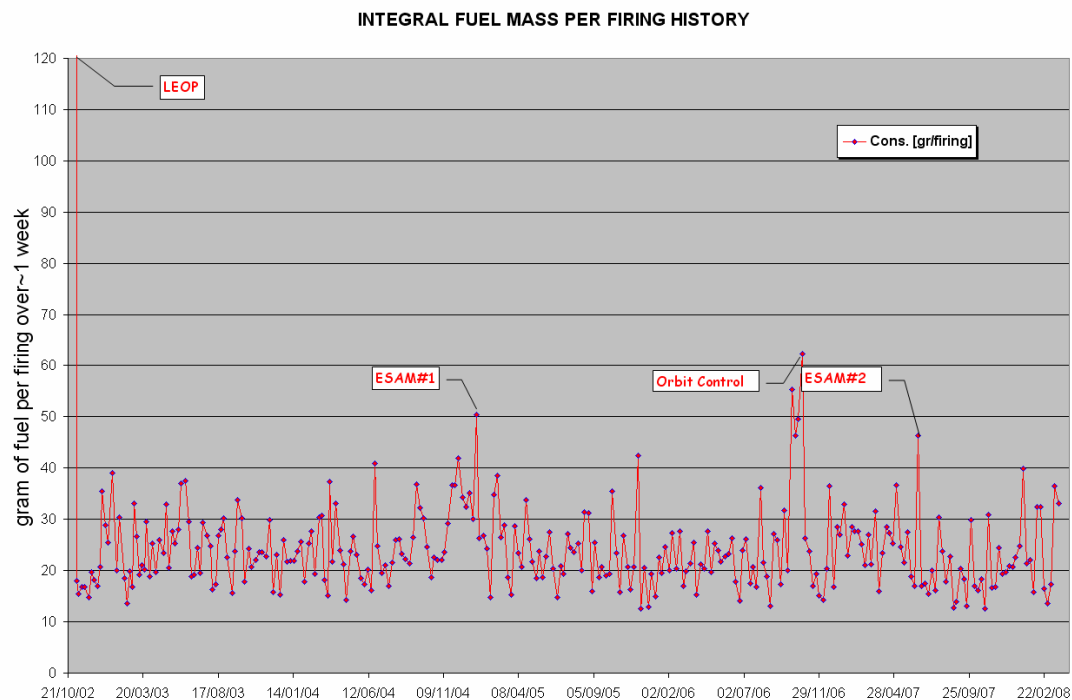
The above plot considers the ESAM fuel consumption spread over period of ~ 1 week.

The firing per day over the period between 01/11/2002 and 21/03/2008 is reported in the plot below.



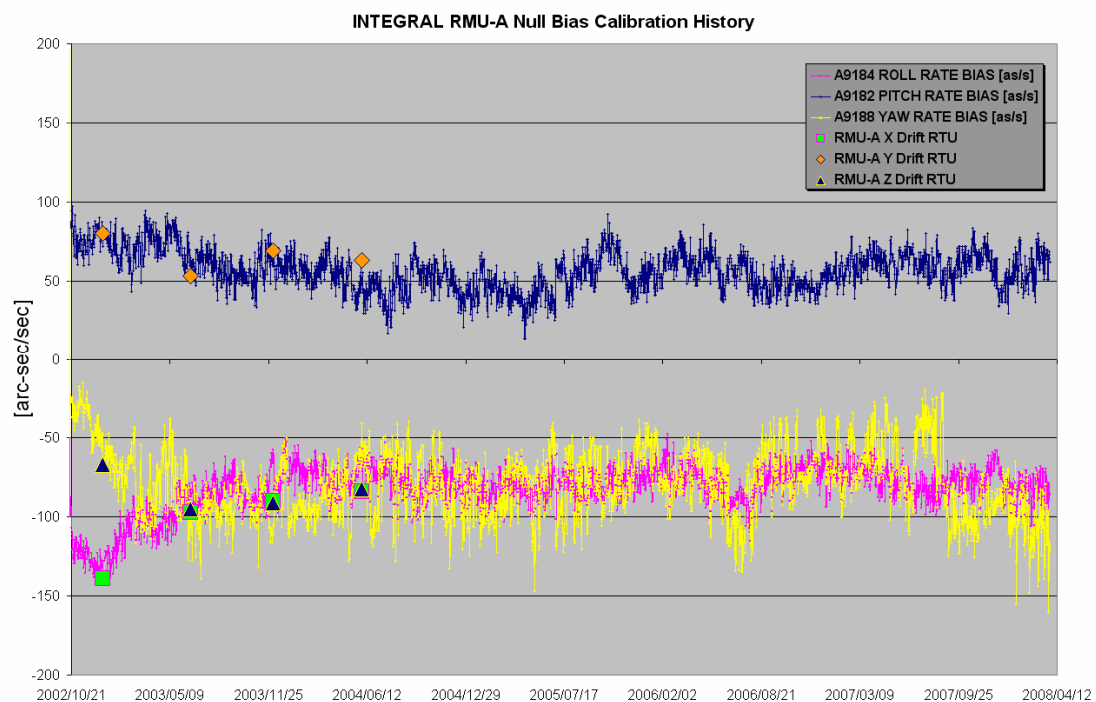
The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The fuel per firing over the period between 01/11/2002 and 21/03/2008 is shown in the plot below.



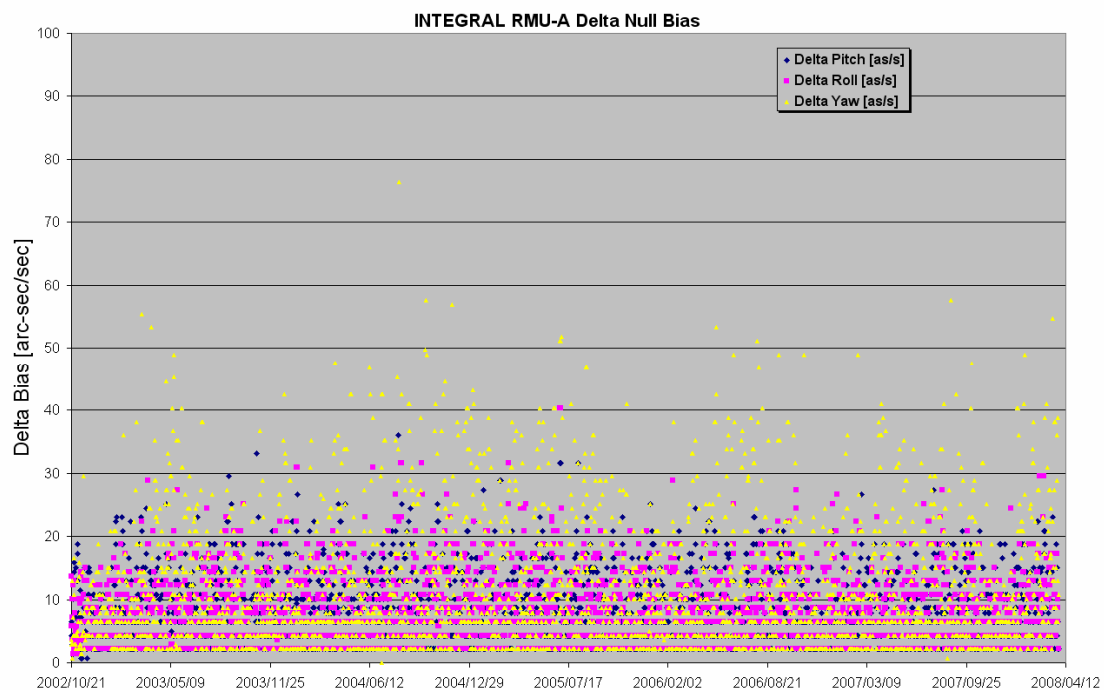
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 28/03/2008 is reported in the plot below.



Problems have been reported during the last period on FDS when generating the drift update for the RMU-A Yaw channel: the limits set on FDS have been violated few times. 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 28/03/2008 is reported in the plot below.



15/03/2008 (Day of Year 075, Revolution 661-662)

Doc. Title : INTEGRAL Mission Report #287
Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OAI
Date : 25/03/08

Issue : 1
Rev. : 0
Page : 13

Nothing to report.

16/03/2008 (Day of Year 076, Revolution 662)

Nothing to report.

17/03/2008 (Day of Year 077, Revolution 662)

Problem on DSS station: at 03:00z a problem on the TC/TM links with DSS-27 station caused the slew 06620073 to fail release.

A manual recovery was performed from attitude of PID 06620072 to the attitude of PID 06620073. The slew ID 06620074 was manually updated in TL.

At 03:55z the AOCS s/s was enabled in TL.

The following slew was missed in TL: 06620073 (OSL)

Problem on FDS: at 10:38z a problem on the attitude determination process on the FDS caused the update for slew ID 06620087 to fail update.

A manual recovery was performed from the attitude of PID 06620086 to the attitude of PID 06620087. The slew ID 06620088 was updated in TL at 11:08z.
The AOCS s/s was enabled in TL at 11:08z.

The following slew was missed in TL: 06620087(OSL)

18/03/2008 (Day of Year 078, Revolution 662-663)

Problem on REDU station: at 10:54z a problem on the TC/TM links with REDU station caused the slew 06630001 to fail release.

A manual recovery was performed from last attitude of rev 662 to the attitude of PID 06630002. The slew ID 06630003 was manually updated in TL.

At 12:42z the AOCS s/s was enabled in TL.

The following slews were missed in TL: 06630001(CSL)-06630002(CSL)

19/03/2008 (Day of Year 079, Revolution 663)

Nothing to report.

20/03/2008 (Day of Year 080, Revolution 663)

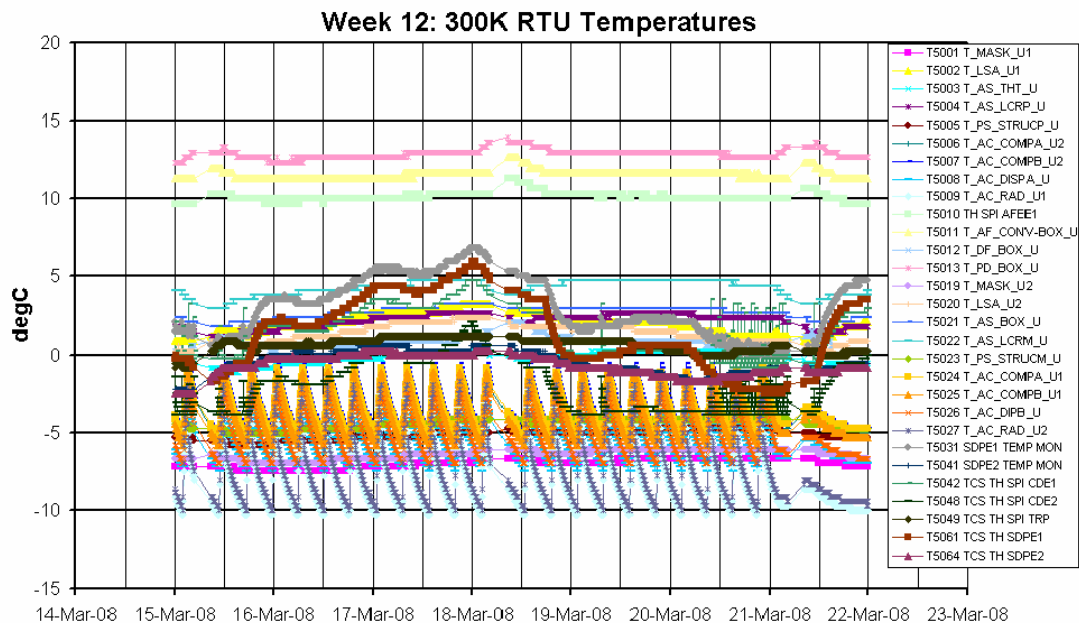
Nothing to report.

21/03/2008 (Day of Year 081, Revolution 663-664)

Nothing to report.

8.3.2 SPI Operations

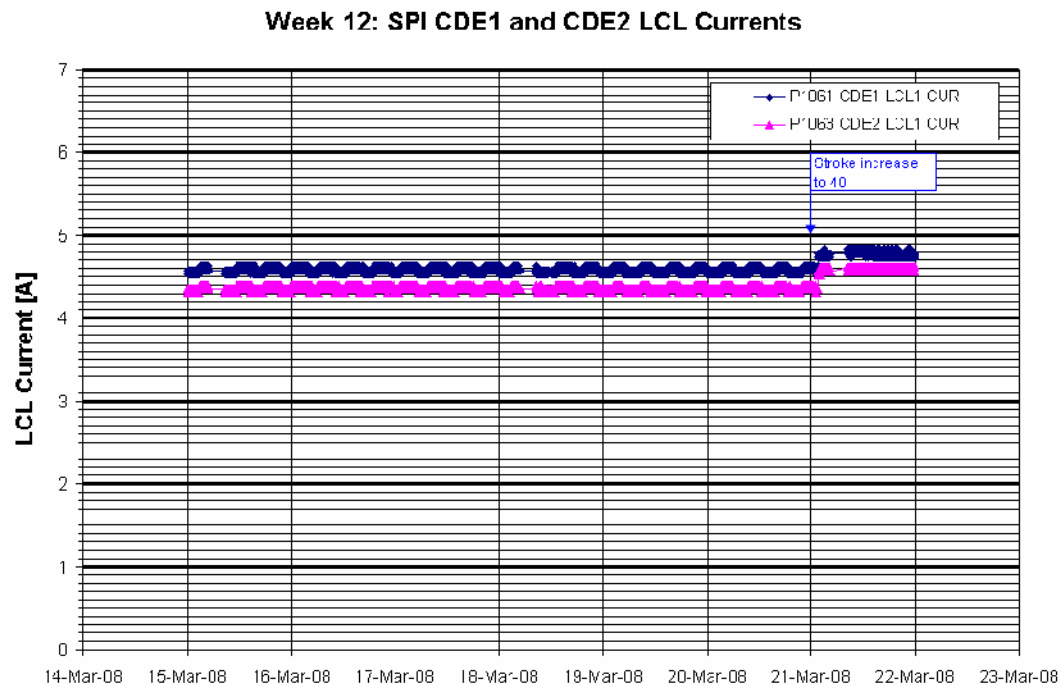
Unit Temperatures: All the equipment temperatures are inside the operational limits. The following plot shows their evolution during the reporting period.



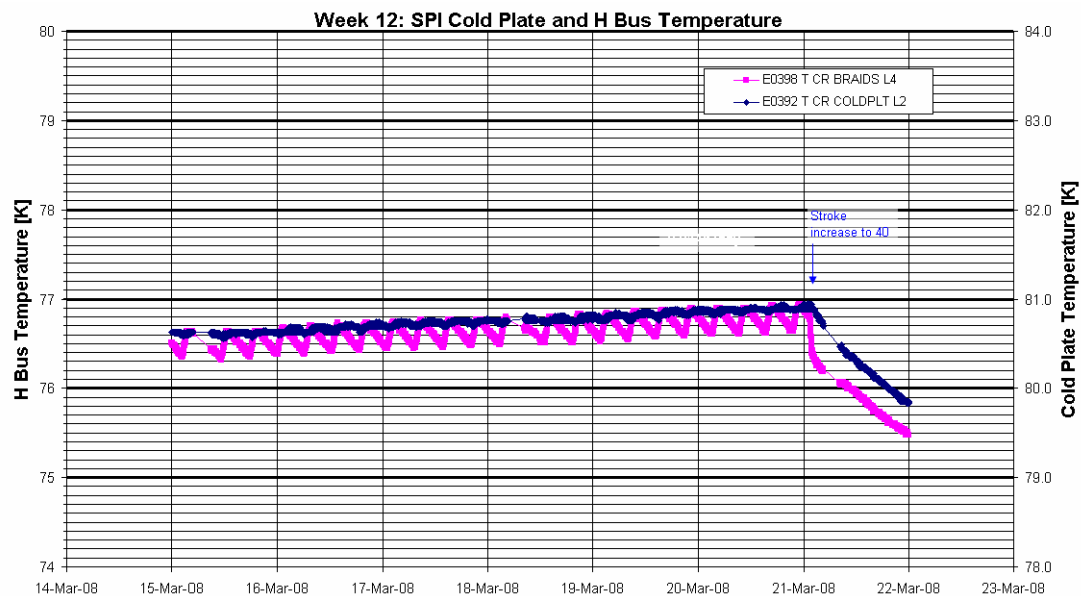
Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range 80K +/-1K.

The stroke of all four compressors was set to 39 until 2008-03-21 at 01:38Z, when it was increased to 40 as the cold plate temperature (TM parameter E0392) had reached 80.9K.

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.



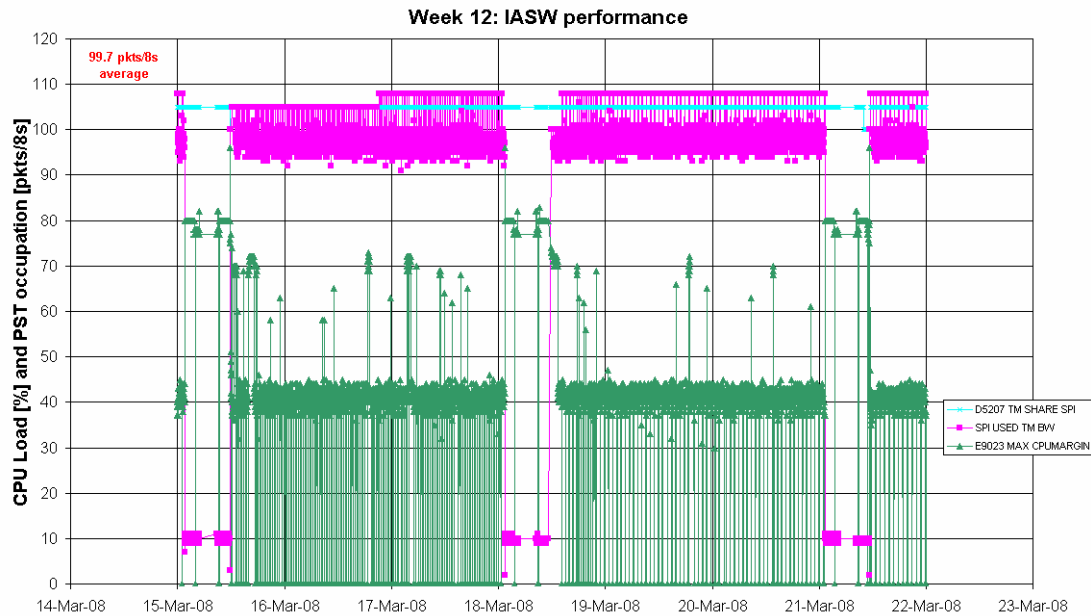
DPE & IASW: The DPE health and IASW performance is nominal.

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 99.7 packets/cycle over the science window. The TM allocation in the science window was 105 packets/cycle, however the over-allocated PST with 108 packets/cycle for SPI was used most of the time (see plot below). Note that the Broadcast Packet TM allocation was not updated.

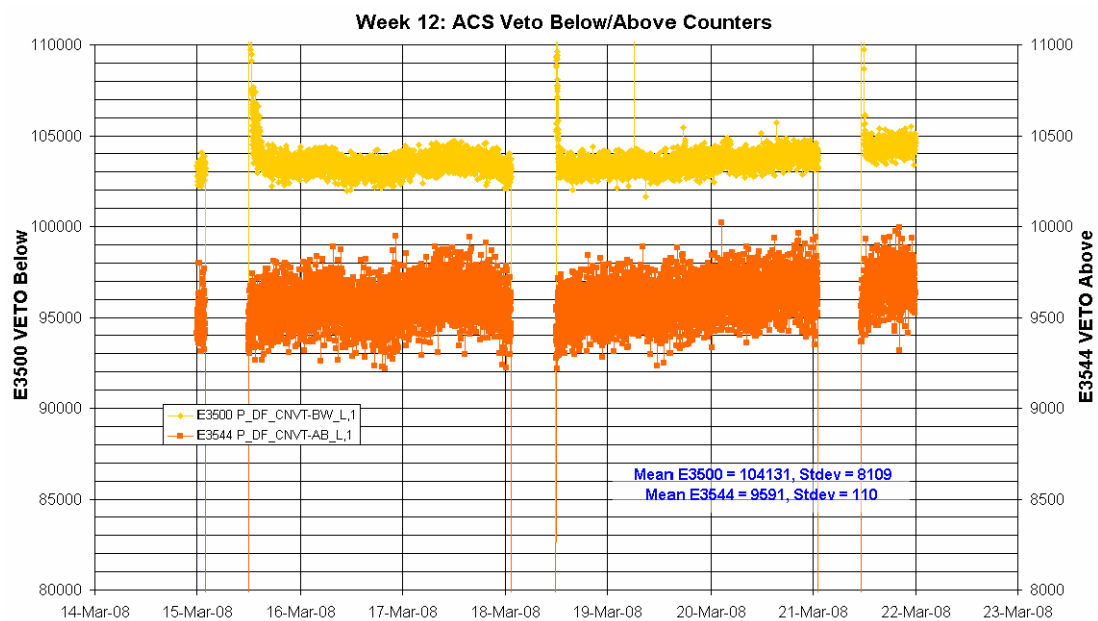
This did not cause any problems and SPI used the additional TM bandwidth during spectra transmission.

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

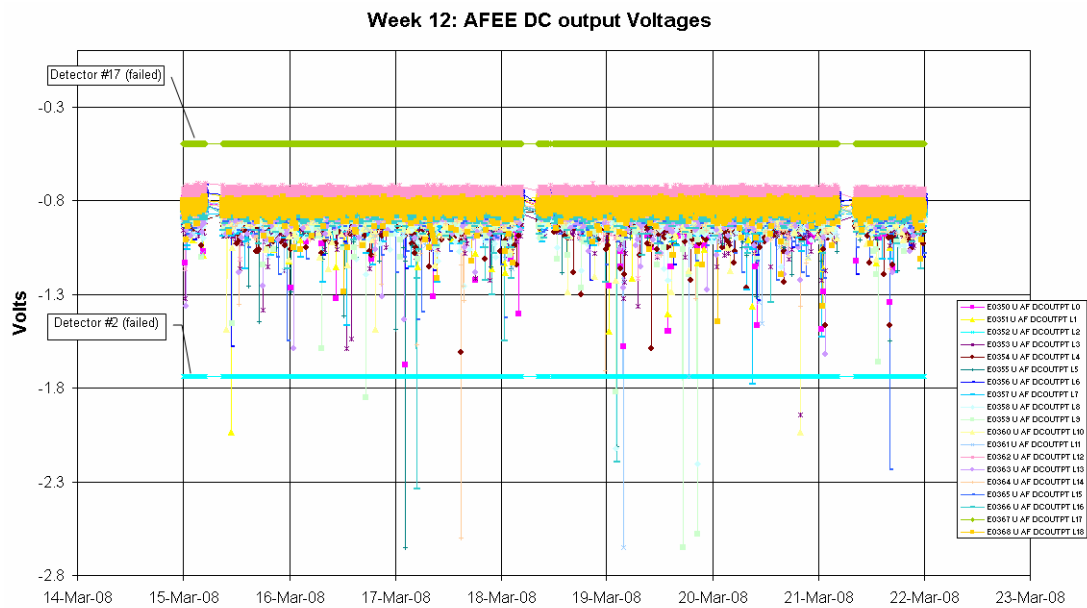


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

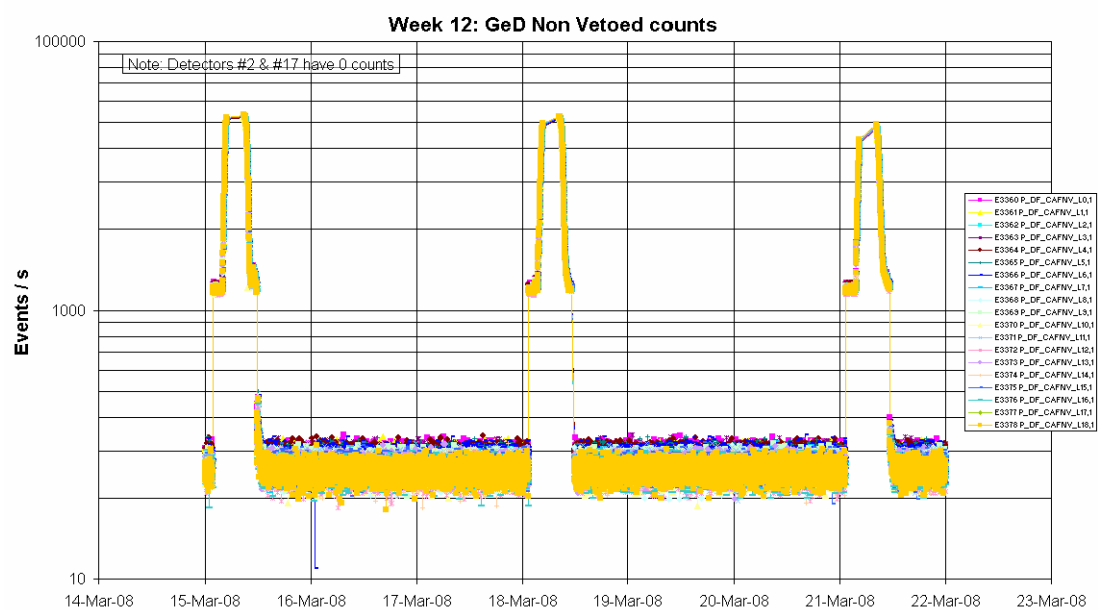
The following plot shows the ACS overall count rate evolution during the reporting period:

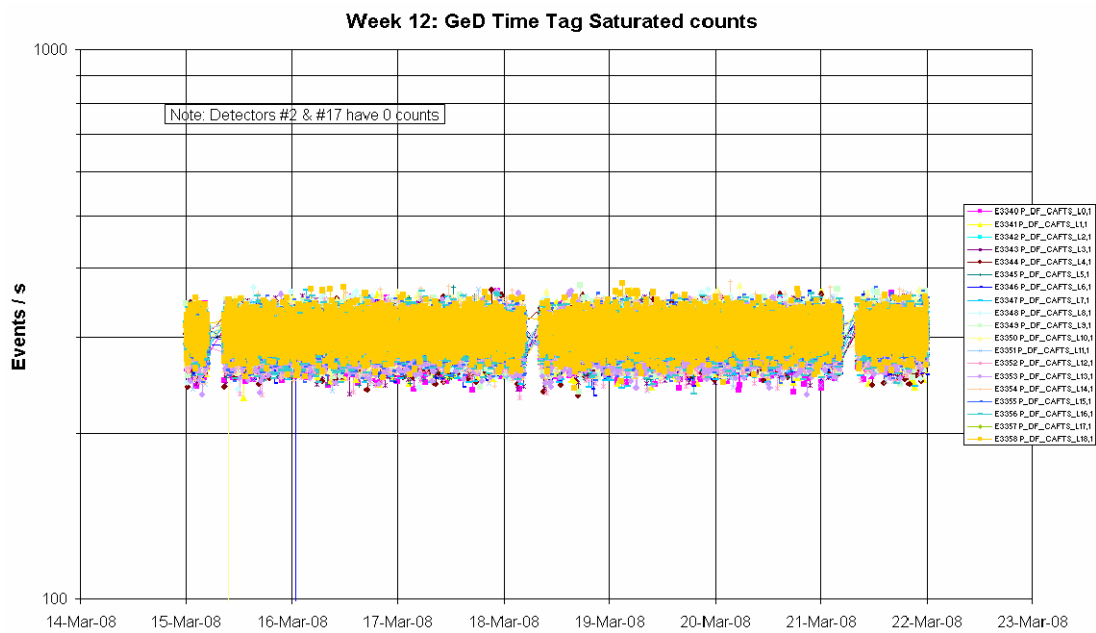
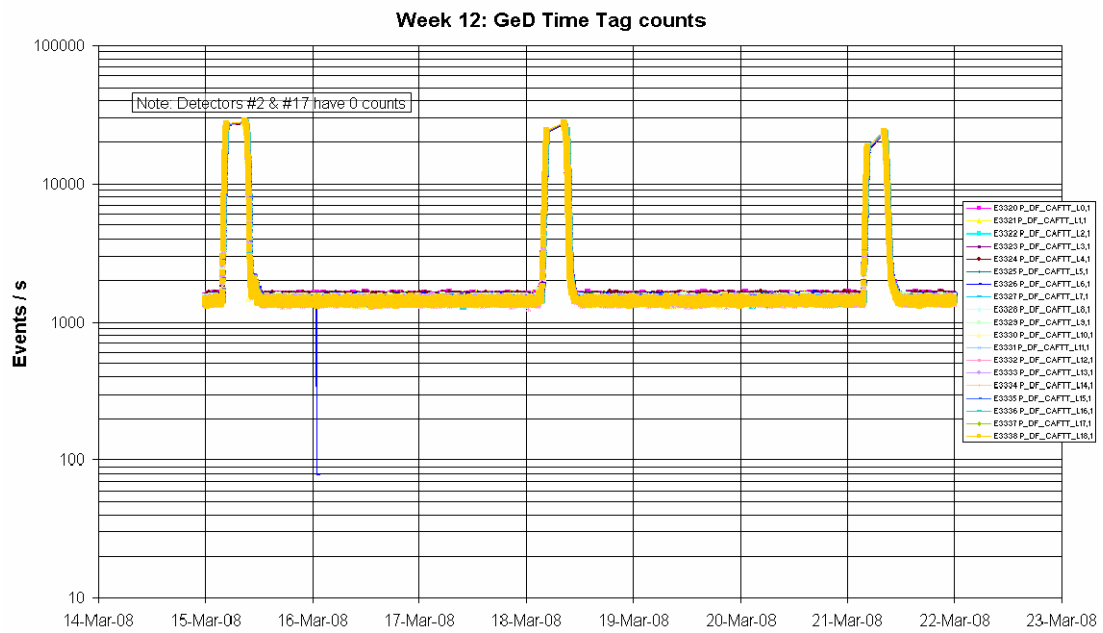


AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.

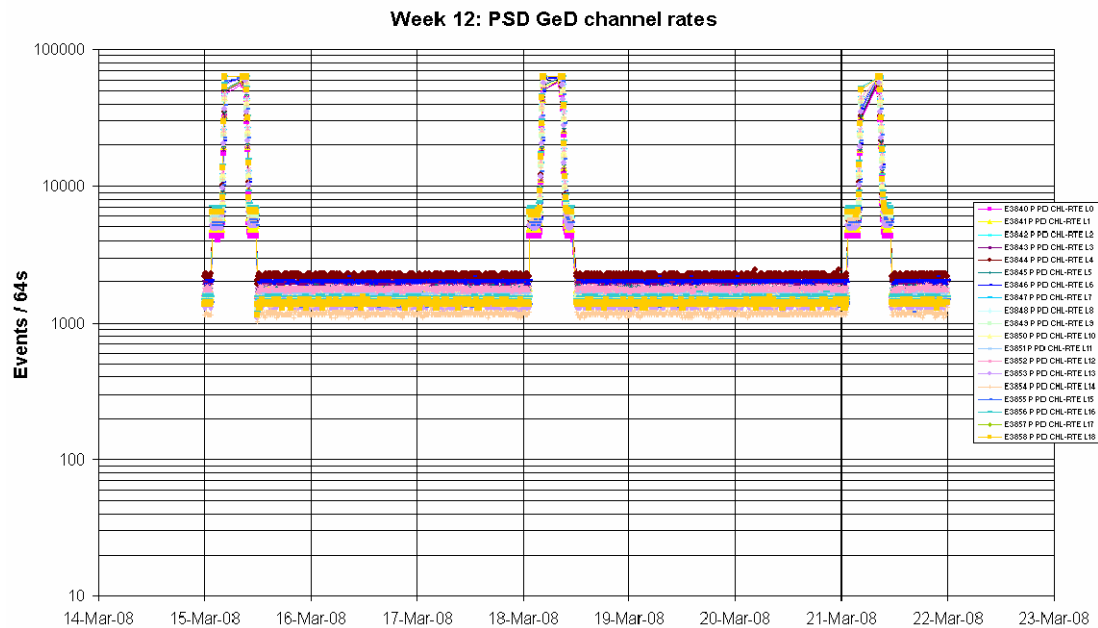


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event count rates during the reporting period.





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



Event Log:

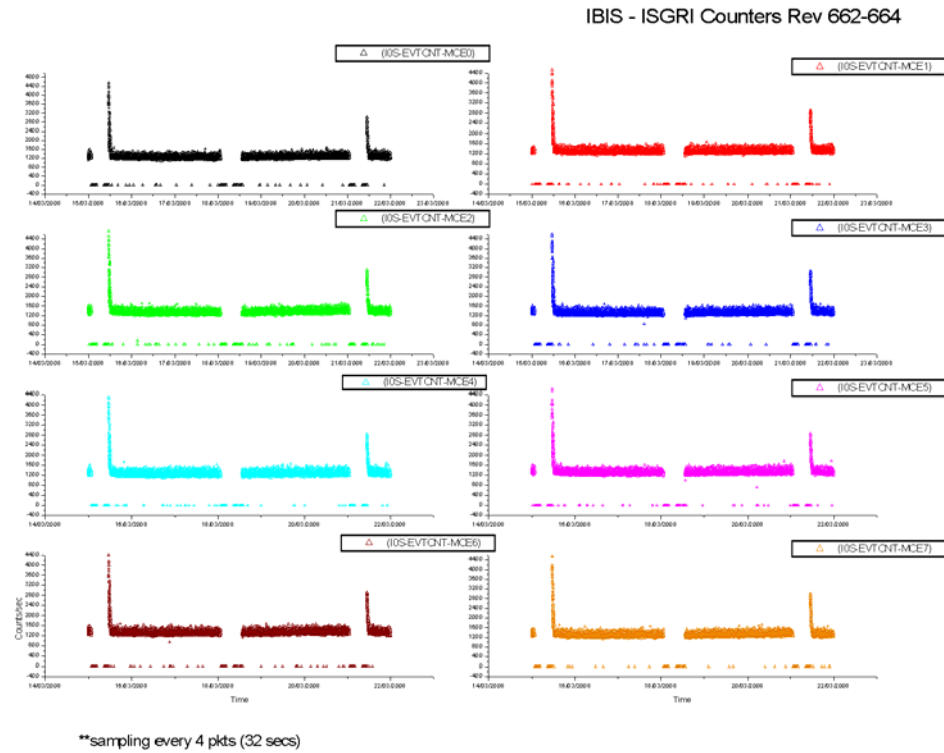
The following non-nominal events occurred on SPI over the reporting period:

- On 2008-03-15 at 11:53:05Z, due to continuing high radiation after the expected radiation belt exit of revolution 662, the TM parameter E3500 (ACS CntVetoBelow) went OOL High. As it returned within limits at 12:19:45Z, no action was taken.
- On 2008-03-21 at 11:25:29Z, due to continuing high radiation after the expected radiation belt exit of revolution 664, the TM parameter E3500 (ACS CntVetoBelow) went OOL High. As it returned within limits at 11:49:05Z, no action was taken.
- The TM parameter E2115 for the Plastic Scintillator temperature toggled OOL Warning Low several times throughout the week. The lower soft limits will be modified from -15degC to -17degC in the next IODB release.

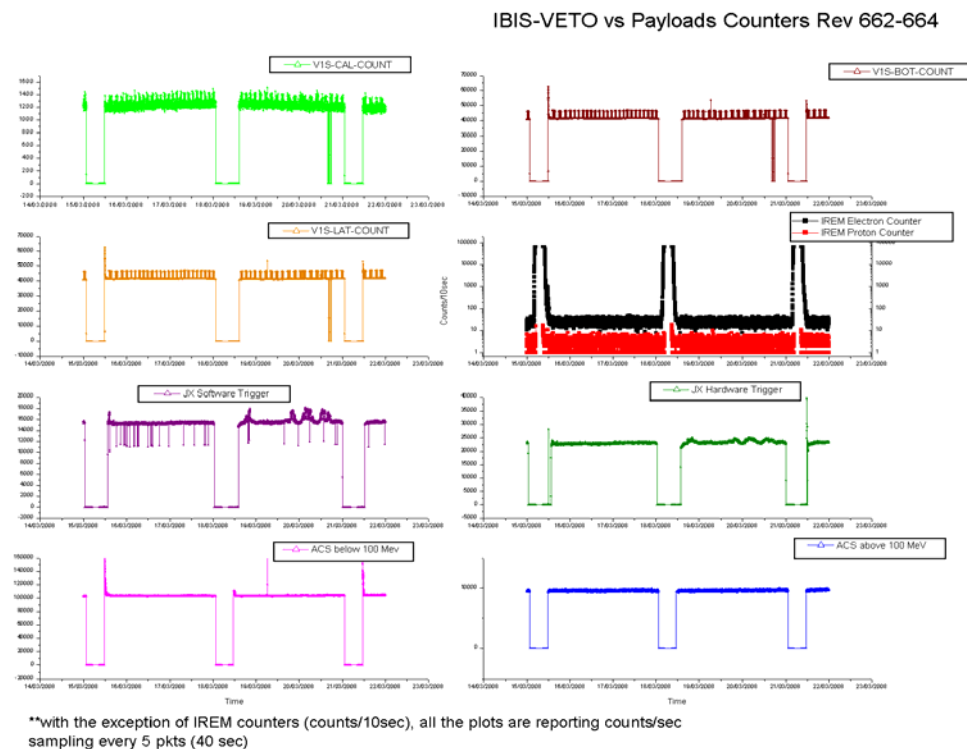
8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:



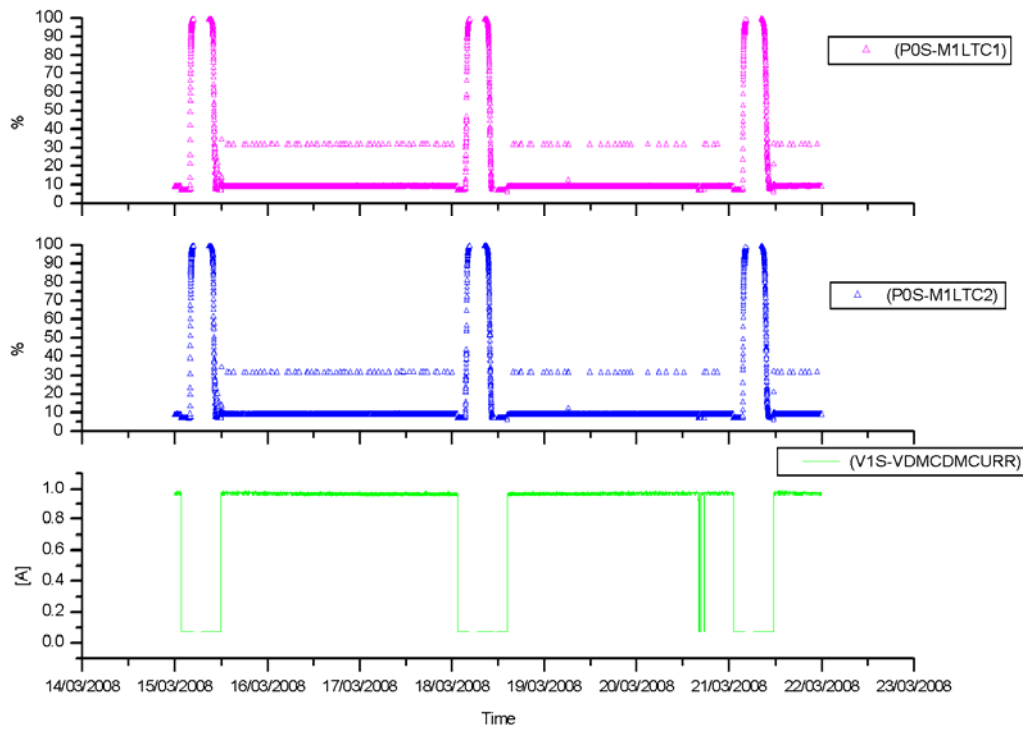
VETO vs Payload Counters:



The week was characterised by high radiation after the expected radiation belt exit of revolutions 662 and 664 as reported by the payload (SPI ACS and IBIS/ISGRI counters). (N.B. The spikes in the ACS below 100MeV counter were off the scale of the graph above.)

VETO Current:

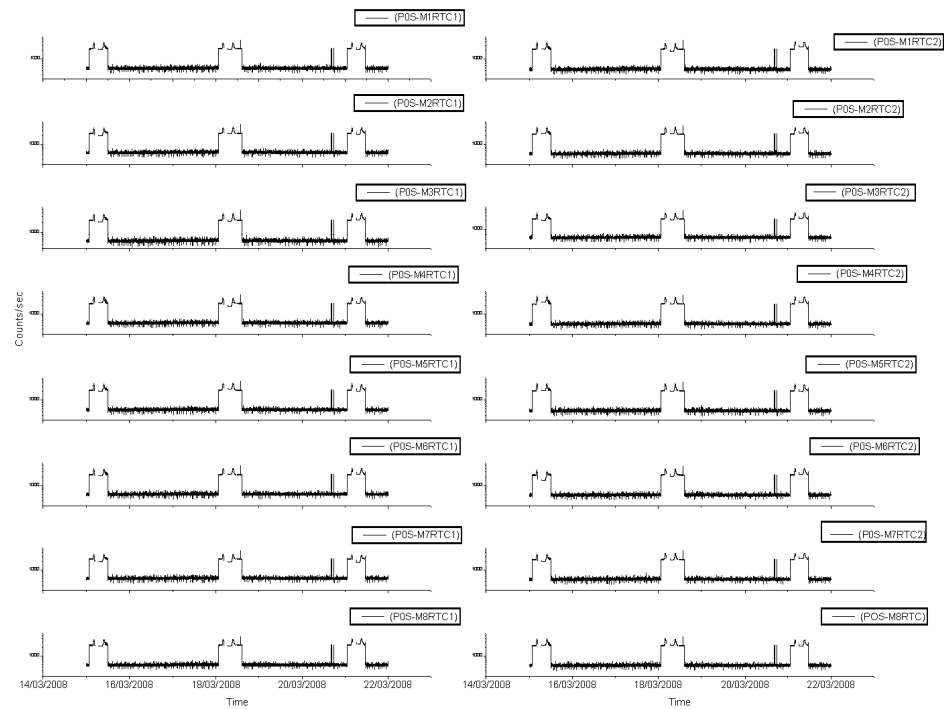
IBIS-VETO Current & PICsIT dead times Rev 662-664



**sampling every 4 pkts (32 secs)

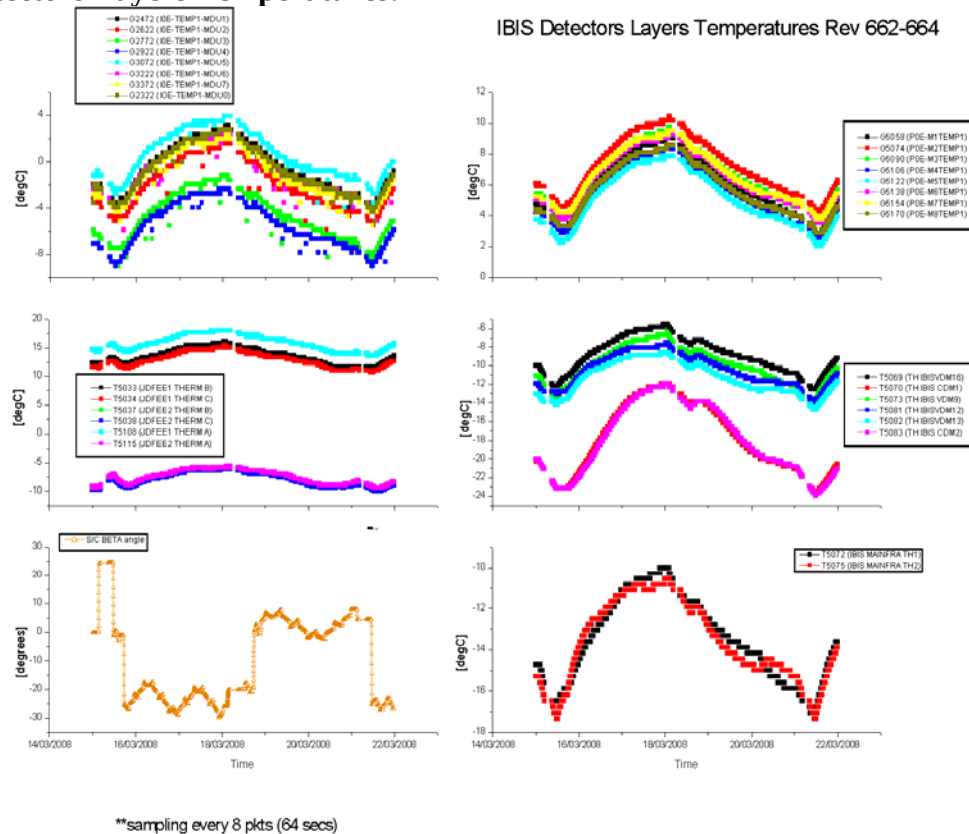
PICsIT Counters:

IBIS - PICsIT Counters Rev 662-664



**sampling every 4 pkts (32 secs)

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.

2008-03-15 (DOY 075, Rev 661-662)

Due to continuing high radiation after the expected radiation belt exit (at 11:44:29Z) of revolution 662, the following parameters toggled OOL:

- TM parameter family G2013 toggled OOL High from 11:24:52Z (during ED GEISCL03) to 12:08:04Z. These are the number of events triggering the MCEi per second.
- From 11:57:16Z to 12:05:16Z the VETO counters, TM parameters G6062 and G6063 toggled OOL High.

As these parameters all returned within limits of their own accord, no action was taken.

2008-03-16 (DOY 076, Rev 662) to 2008-03-17 (DOY 077, Rev 662)

IBIS operations executed nominally.

2008-03-18 (DOY 078, Rev 662-663)

At 09:51:46Z TM parameter G5079 went OOL High (value = 2.60509804V). This is the PDM2: +2.5 V. As it returned within limits at 09:52:17Z, no action was taken.

Due to loss of TM/TC links from the ground station, the commands in the Timeline to configure IBIS at the start of the revolution, from the ED GEISCL03 scheduled at 11:05:45Z onwards, failed. Once stable TM/TC links were regained, the EDs were re-uplinked manually as follows:

- 13:25:26Z ED GEISCL03
- 14:08:24Z ED GEBENT02
- 14:23:10Z ED GEBEXT01
- 14:26:32Z ED GESTAN02, to put IBIS in Science Standard mode with the planned observation parameters.

IBIS operations continued nominally.

2008-03-19 (DOY 079, Rev 663)

At 06:13:00Z the VETO counters, TM parameters G6062 and G6063, went OOL High. As they returned within limits at 06:13:40Z, no action was taken.

2008-03-20 (DOY 080, Rev 663)

At 15:57:11Z OEM APID 1280 ID 186 ANOMALY IBIS1 VETO PMTXX IS ON AND CORRESPONDING HV MONIT IS ABOUT ZERO began to be received (8 occurrences every TM cycle).

At the same time, the following TM parameters went OOL with value = 0 RAW:

- G6051 V1S-CDM01HV
- G6011 V1S-CDM1TEMP
- G6061 V1S-CAL-COUNT

This indicated an HV break-down of CDM#1.

In addition, the currents dropped down slightly due to the HV break-down of CDM#1:

G6012 (VETO current)= 1.59 A

G6013 (VETO VDM/CDM current)= 0.94 A

Before the anomaly the main VETO parameters reported nominal values and no particularly high radiation was reported at the time of the anomaly.

The anomaly was recovered as follows:

- 16:08:19Z FCP_IBIS1_0313 IBIS Transition to Standby
- 16:11:39Z FCP_IBIS1_0203 VETO to Standby
- 16:14:32Z FCP_IBIS1_0205 VETO to Maintenance
- During this time, an OOL on G6227 was observed and VETO was commanded back to Standby at 16:32:36Z. When it was understood that this OOL did not indicate a problem, considering the 'bad' telemetry which could be received from VETO during this time, it was commanded back to Maintenance at 16:48:28Z.
- 17:36:08Z FCP_IBIS1_0203 VETO to Standby

- 17:39:03Z FCP_IBIS1_0201 VETO to Nominal
- 17:40:05Z IASW to Science Standard (TC G0129)

IBIS operations continued nominally. This is recorded as INT_SC-221.

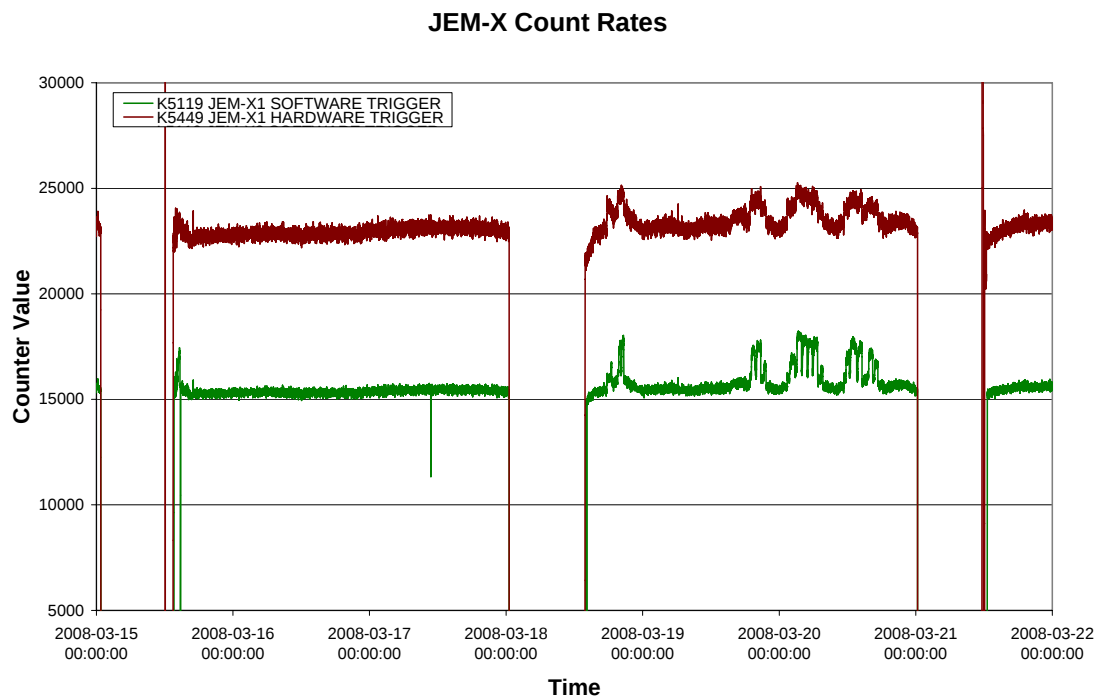
2008-03-21 (DOY 081, Rev 663-664)

At 10:57:16Z, during the execution of the ED GEISCL03 before radiation belt exit of revolution 664 (belt exit at 11:16:48Z), the TM parameter family G2013 (number of events triggering the MCEi per second) started toggling OOL warning High. As they had all returned within limits by 11:21:40Z, no action was taken.

8.3.4 JEM-X Operations

JEM-X Count Rates

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



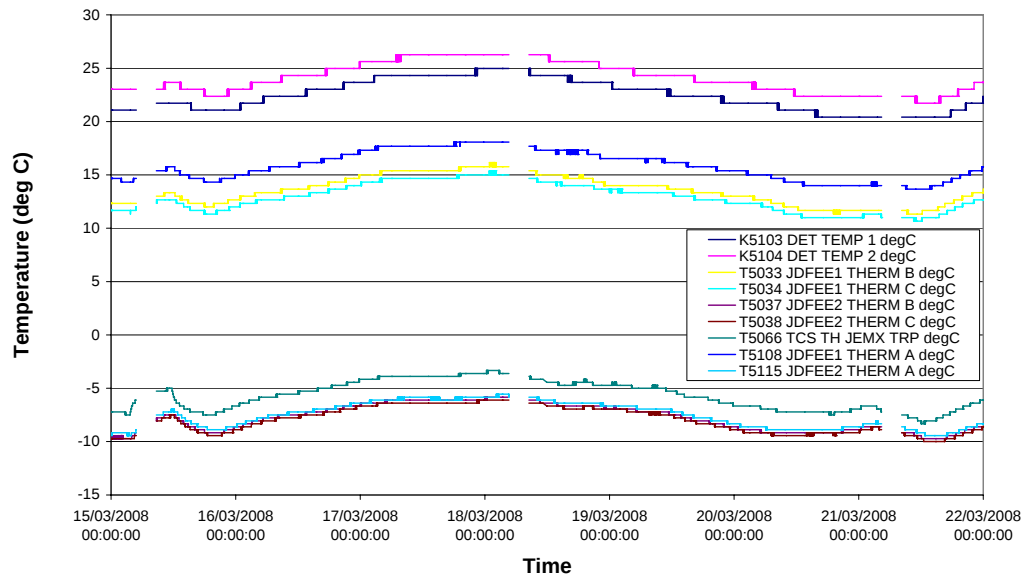
JEM-X Temperatures

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

2008-03-15 (DoY 075, Rev 661-662)

From 11:29:52 to 12:05:12, there were 10 occurrences of the parameter K5317 being outside hard limits. This was due to a high radiation background. At 12:08:37, the command K0013 (part of the ED KEHVAC01) was not released due to high radiation tripping the on-board hardware trigger and causing the command to fail its PTV. The procedures and times used in the recovery were:

13:11:56 FCP_JEM1_0040 (JEMX1 transition to SAFE)

13:21:08 FCP_JEM1_0041 (JEMX1 to SETUP)

13:23:52 FCP_JEM1_1010 (JEMX1 config. for science)

13:41:59 CCCF enabled

14:46:24, KEDATA02 sent from Timeline.

The impact was the loss of science data from 12:16 to 14:47.

2008-03-16 (DoY 076, Rev 662) to 2008-03-17 (DoY 077, Rev 662)

JEM-X1 operations executed nominally.

2008-03-18 (DoY 078, Rev 662-663)

From 10:54 to 11:56, all links with Redu dropped. The impact was that the KEACAL01 & KEHVAC01 EDs were missed and before they could be uplinked the KEDATA02 was missed as well. The recovery was performed manually, with KEACAL01 executed at 13:32, KEHVAC01 from 13:46 to 14:10, and the KEDATA02 at 14:11. The unit was enabled in the Timeline at 14:12. The impact was the loss of science data from 12:02 to 14:12.

2008-03-19 (DoY 079, Rev 663)

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Date : 25/03/08

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On this day, the following anomalous OEMs were received, at the indicated times:

2008.079.11.08.19.698	2008.079.11.08.26.400	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				
2008.079.11.08.19.698	2008.079.11.08.26.429	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 the messages did not reappear. There was no impact.

2008-03-20 (DoY 080, Rev 663)

JEM-X1 operations executed nominally.

2008-03-21 (DoY 081, Rev 663-664)

Between 11:39:03 and 11:43:43, there were a series of error and warning messages about parameters K5449, K9134 and KD5020D being outside either hard or soft limits. At 11:45:55, the KEHVAC01 ED failed due to the on-board hardware trigger causing the PTV for command K0009 to prevent uplink.

The procedures and times used in the recovery were:

11:51:15 FCP_JEM1_0040 (JEMX1 transition to SAFE)
11:55:56 FCP_JEM1_0041 (JEMX1 to SETUP)
11:58:38 FCP_JEM1_1010 (JEMX1 config. for science)
12:33:22 FCP_JEM1_0044 (JEMX1 DATA TAKING)

8.3.5 OMC Operations

2008-03-15 (DoY 075, Rev 662) to 2008-03-16 (DoY 076, Rev 662)

Nothing to Report.

2008-03-17 (DoY 077, Rev 662)

At 03:00, a problem with DSS27 forced the suspension of operations. A recovery was later performed, and the Timeline rejoined at 03:55. The impact was the loss of pointing 06620073. It was at this time the following OEMs were received:

2008.077.03.16.30.010	2008.077.03.16.42.735	1792	RealTime	131	TC REJECT			
REJECTED TC1			0	0	65535	PR	N	
E	E							
2008.077.03.16.35.322	2008.077.03.16.42.769	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.

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At 10:38, an FD problem prevented a slew being performed. A recovery was performed, and the Timeline rejoined at 11:08. The impact was the loss of pointing 06620087. It was at this time the following OEMs were received:

2008.077.10.45.54.213	2008.077.10.46.00.586	1792	RealTime	131	TC	REJECT		
REJECTED TC1			0	0	65535	PR	N	
E	E							
2008.077.10.46.00.338	2008.077.10.46.08.768	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.

2008-03-18 (DoY 078, Rev 663)

From 10:54 to 11:56, the links with Redu dropped, forcing a suspension of the Timeline. At 11:56, a recovery was commenced. At 11:41:04, the MEBEXT01 ED (Reset ROE) failed release and was later manually re-uplinked at 12:17. At 11:56, a recovery was commenced, with the Timeline rejoined at 12:42. The impact was the loss of pointing 06630001.

2008-03-19 (DoY 079, Rev 663) to 2008-03-21 (DoY 081, Rev 664)

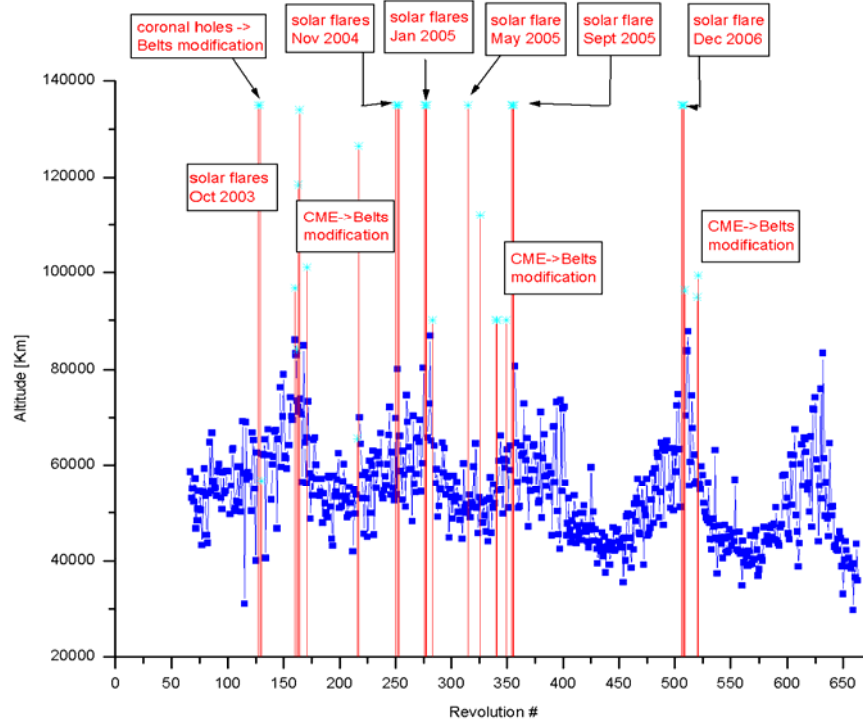
Nothing to Report.

On DoY 075 at 01:40:55, DoY 078 at 01:27:03 and DoY 081 at 01:12:39 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]
661	RAD_ENTR R 2008-03-15T01:40:49Z	15/03/2008 03:53:17	36561.5	15-Mar-2008 03:10:35	43030.04
662	RAD_EXIT R 2008-03-15T11:44:29Z	15/03/2008 12:05:10	55229.7	15-Mar-2008 10:50:35	45444.68
662	RAD_ENTR R 2008-03-18T01:26:58Z	18/03/2008 02:54:46	43516.4	18-Mar-2008 03:04:17	41830.26
663	RAD_EXIT R 2008-03-18T11:30:53Z	18/03/2008 10:39:42	>>33222.5	18-Mar-2008 10:34:17	45081.3
663	RAD_ENTR R 2008-03-21T01:12:33Z	21/03/2008 03:36:22	35885.0	21-Mar-2008 02:44:17	42565.76
664	RAD_EXIT R 2008-03-21T11:16:48Z	21/03/2008 11:18:54	53301.1	21-Mar-2008 10:24:17	45818.47

Reference

High radiation

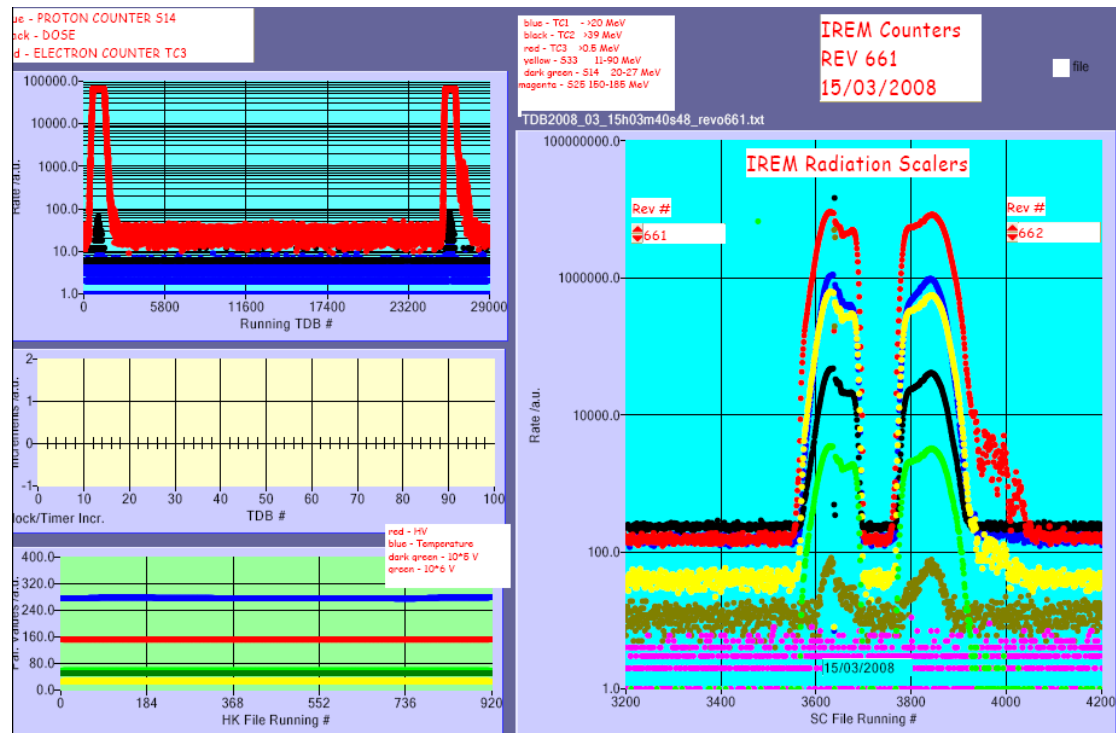
Very small error vs reference (less than 10 minutes)

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.

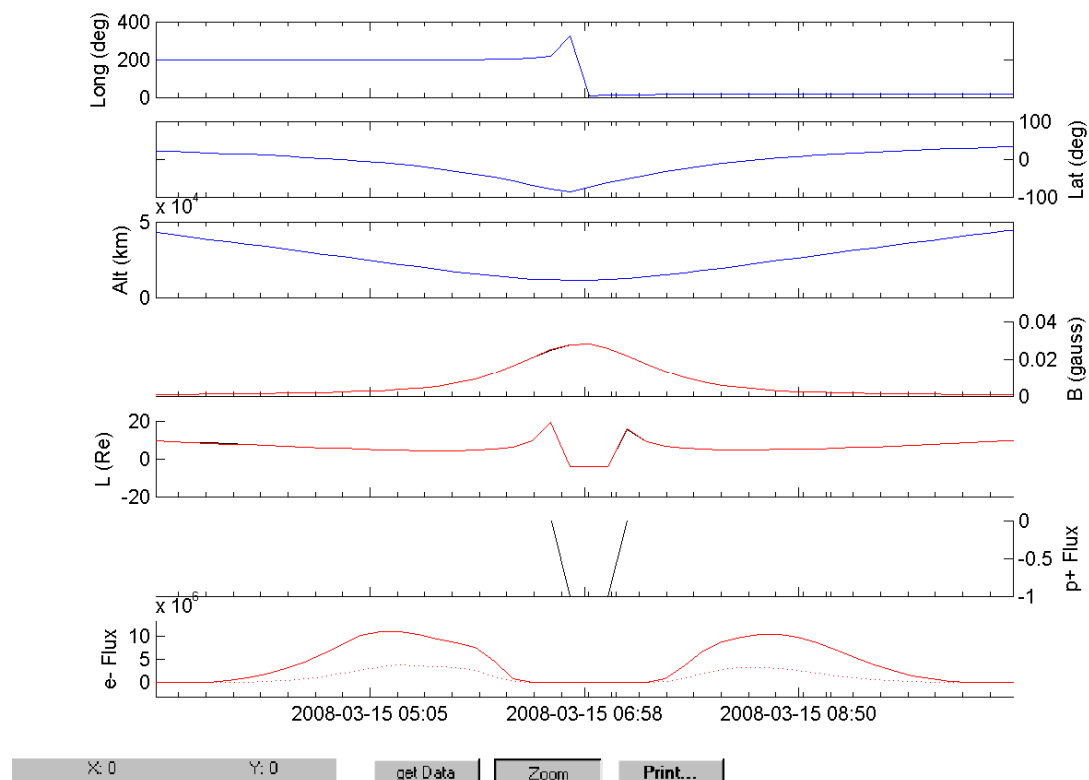
IREM radiation counters:



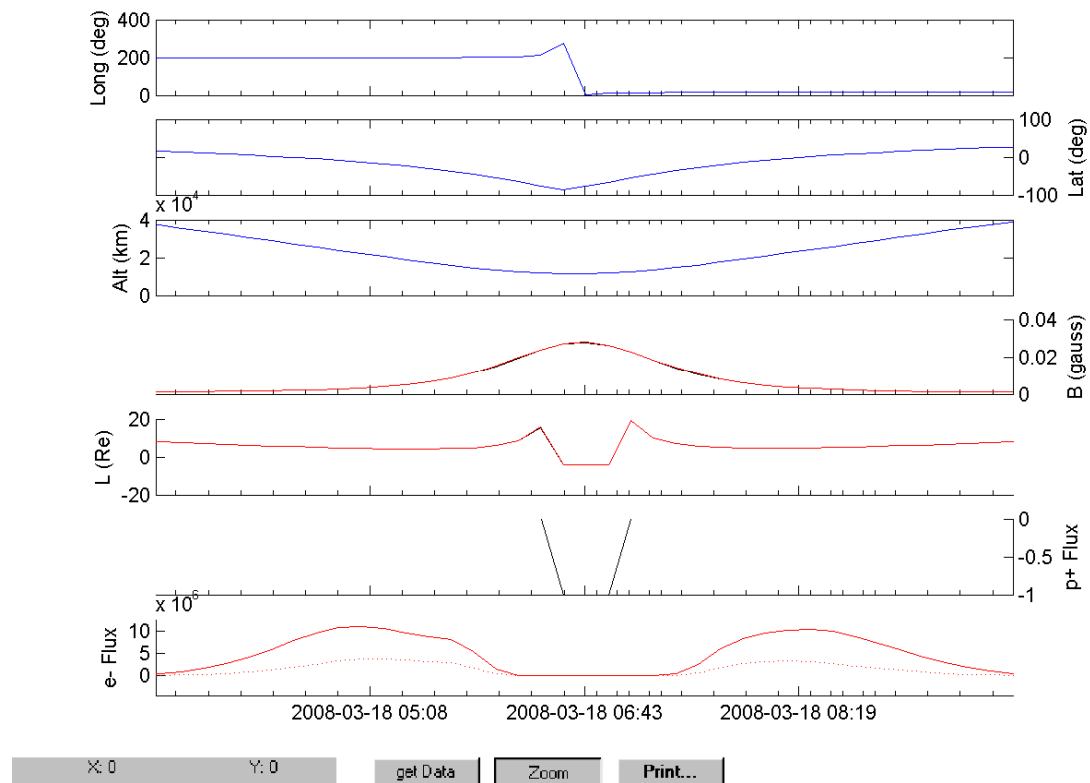
For revolutions 662 and 663, no data was collected.

IREM Predicted Radiation Belt Passages

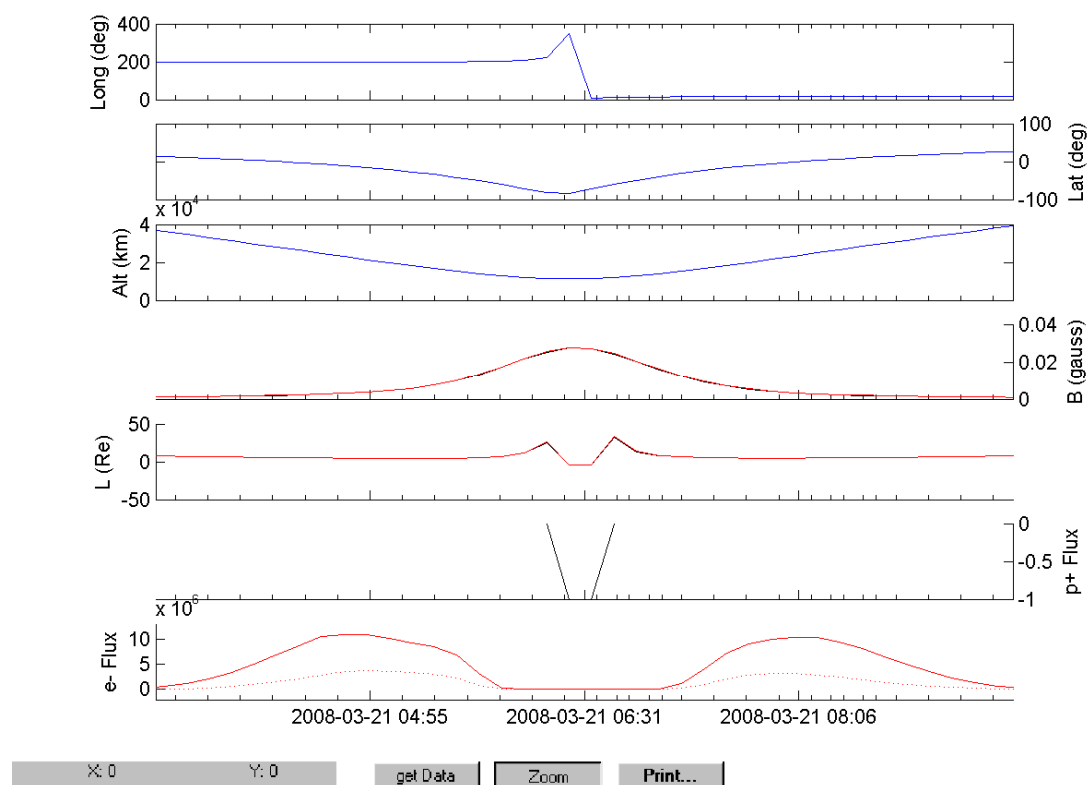
Rev 661



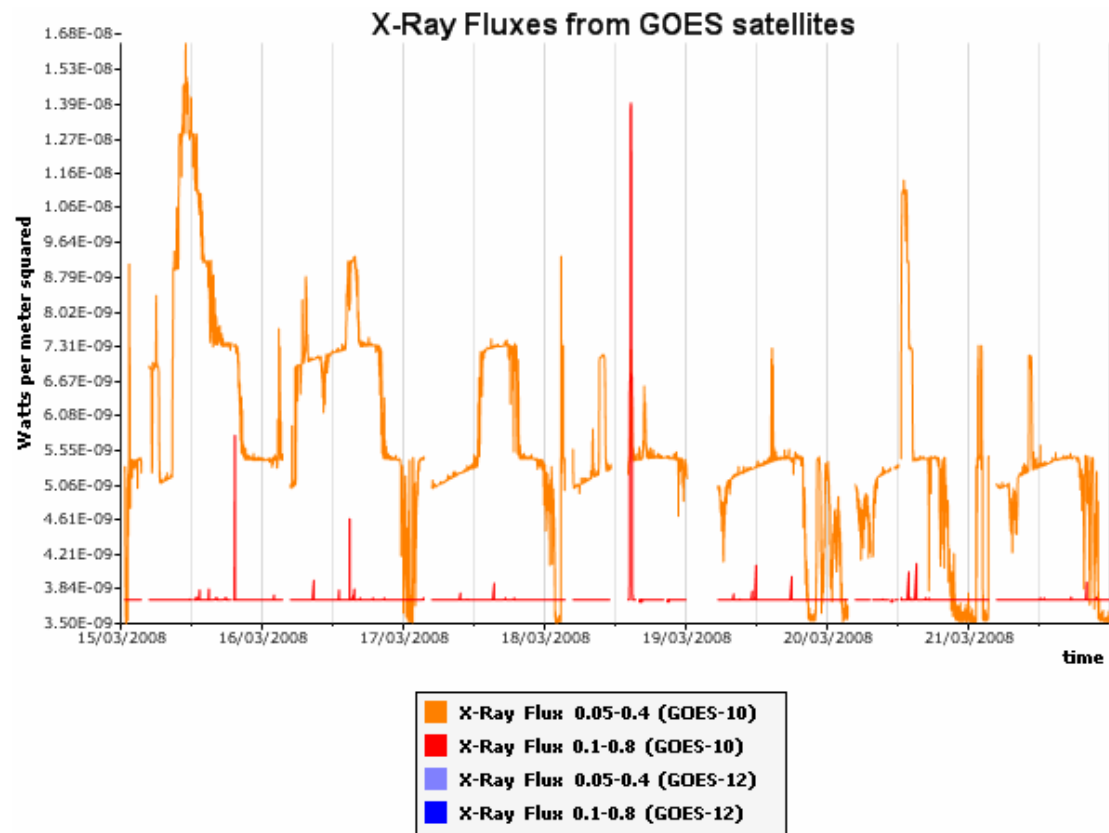
Rev 662



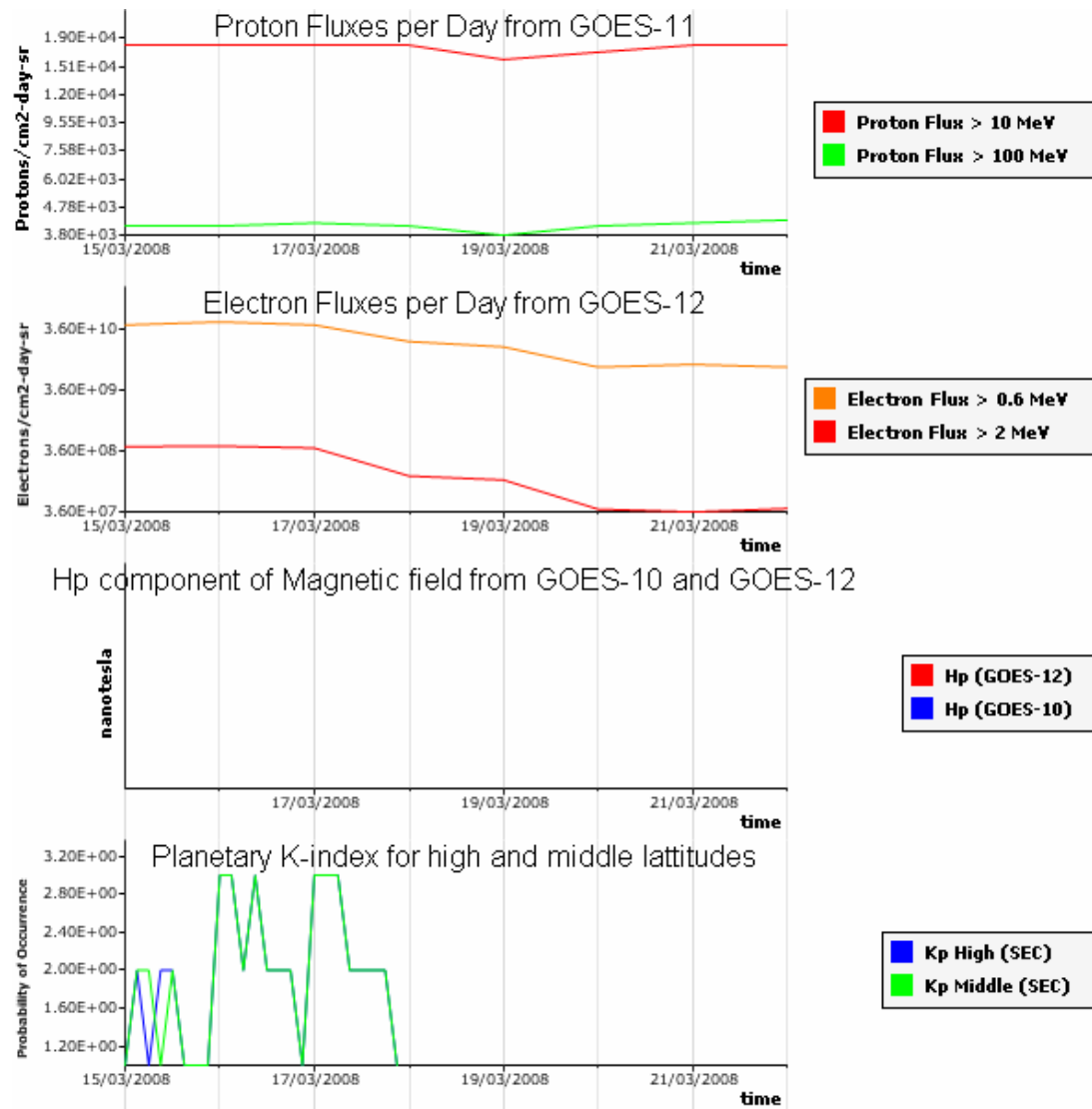
Rev 663



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.