EUROPEAN SPACE AGENCY
DIRECTORATE OF TECHNICAL & OPERATIONAL SUPPORT
MISSION OPERATIONS DEPARTMENT

INTEGRAL
Mission Report

INT-MOC-SYS-RP-1001-OPS-OF

No. 229
Week 06

12.02.07

Routine Phase

Prepared by: M. Walker (OPS-OFO)

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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 03.02.07 until 09.02.07 (both dates inclusive) and covers the revolutions 527 and 528.

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 raster dithers of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7) and SN1006/Cen X-4 (RA 15:00:26.27, DEC -36:47:29.6), GX 339-4, and a hexagonal dither of 4U 0142+61 (RA 01:46:22.44, DEC +61:45:03.2), the latter two were both Targets of Opportunity.

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.

2 slews were missed during the observation period due to problem on TM link with REDU.

The fuel consumption over the period between 03/02/2007 and 08/02/2007 was 0.1103 Kg. The remaining propellant is in the order of 148.2920 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.

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

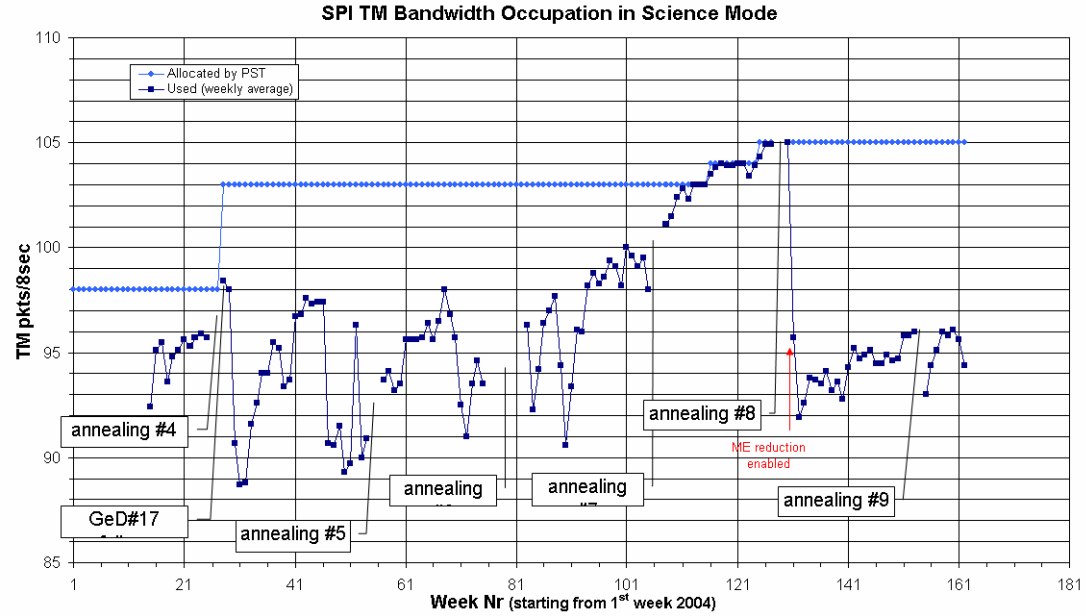
3.2.1 SPI

Following the 9th annealing, which ended on 22nd December, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution and is therefore operating at a lower HV setting of 3.5kV (instead of 4kV). The energy resolution of GeD#4 was recovered with this annealing. Detector #2 is failed since 06.12.2003 and detector #17 since 17.07.2004.

The Stirling compressors are working nominally, maintaining the Germanium detectors at 80 +/-1K. The stroke of all four compressors was 39 until 03.02.2007 at 13:16Z, when the stroke of all four compressors was increased to 40.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth in the science observation windows was 105 packets/cycle and the average telemetry occupation when the allocation was 105 packets/cycle was 94.4 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.

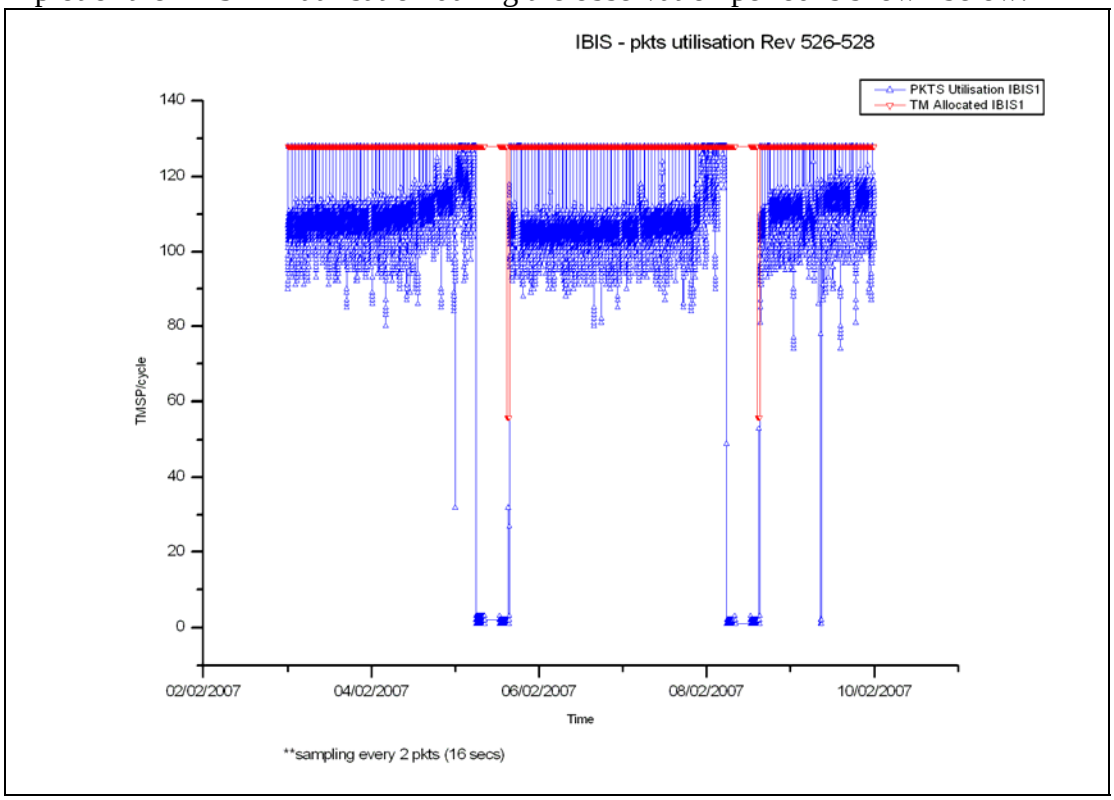
3.2.2 IBIS

The overall status of the unit is nominal.

On 02/02/2007, PICSIT PDM#6 reported a Latch-up notification. The recovery was performed successfully following the FDIR action.

During the reporting period, the PST allocation to IBIS was 128 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period (when IBIS was in Science mode) was 109.59 TMPS/cycle, down 3.2 on last week.

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



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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

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

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

3.2.4 OMC

The status of OMC is nominal.

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

During this reporting period, 142 of the 146 planned science pointings for OMC were executed nominally, one was delayed, and one was lost.

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

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity
The observation period was characterised by low solar activity.

Two sunspots were present on the surface of the sun this week: 940 and 941. They were both large, but neither of them posed a threat of strong 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. One pointing was lost, and another delayed by problems with the line to Redu. The overall performance was well over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was excellent this week, with no problems reported. The overall performance was nearly 100%.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There were, however, 3 occasions of data drops from Redu, one caused the total loss, and another a partial loss of a pointing. Also the link to ISDC and to DSS-24 also briefly dropped, without impact. The overall performance was well over the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs are available up to revolution 536. Observations have been planned and files sent up to revolution 534, but TOO observations in revolutions 528, 529, 530 and 531 have led to repeated re-planning activities, the last on Friday, 9 Feb for revolutions 529ff.

TSF's up to revolution 531 have been received, but for 529ff the planning has changed.

2. Observation status

ECS files have been received up to revolution 521 and processed up to 519.

3. ISOC Science Data Archive

A new version of INVITE has been released. Work is ongoing to include the results of the 3rd ISGRI catalogue.

4. ISOC system

Version 14.3 has been successfully tested and released. PGT has been tested by users, mostly successful with some small issues related to firewalls.

4.3.2 ISDC

Status of ISDC observation processing on 12/02/2007:

- Latest Standard Analysis completed: observation 04200730006 (Galactic disk latitude scans, Revolution 516) on 07/02/2007.

- Latest products archived: observation 04200730006 (Galactic disk latitude scans, Revolution 516) on 07/02/2007.

- Latest observation products sent to the observer: observation 04200730006 (Galactic disk latitude scans, Revolution 516) on 08/02/2007.

5 Special Events

6 Anomalies

The following problems that impacted operations were reported:

- On DoY 037 at 02:53z a hit on the line with Redu caused a 2 minute TM drop. This forced the suspension of the Timeline. A recovery was performed, and the Timeline rejoined at 03:20. The impact was the loss of pointing 05270014.
- On DoY 040, at 03:29, a hit on the line with Redu caused a 5 minute TM drop. The Timeline was suspended, and a recovery performed. The OMC imaging commands were sent manually at 04:02 and the Timeline rejoined at 04:13. The impact was a 28 minute delay in the start of pointing 05280015, which reduced the duration of the pointing from a scheduled 3572 to 2008 seconds.

The following anomaly report was entered into the ARTS system this week:

AR id	Date Created	Subject	Segment	Status
INT_SC-175	09/02/2007	IBIS: PICsIT PDM6 Latch-up Mode.	Payload	Open
INT_SC-176	09/02/2007	SPI GeD # 12 Degradation	Payload	Open

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 527

The observations in revolution 527 began with a raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), for ~2.1hours. This was followed by a raster dither of SN1006/Cen X-4 (RA 15:00:26.27, DEC -36:47:29.6), for ~55.2 hours, which lasted until the end of the revolution.

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

Revolution 528

The observations in revolution 528 began with a raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), for ~2.1hours. This was followed by a Target of Opportunity, namely a hexagonal dither of 4U 0142+61 (RA 01:46:22.44, DEC +61:45:03.2), for ~54.6 hours, which lasted until the end of the revolution.

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

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2007-01-22T09:26:13.000Z     148.6488    F   Automatic TM processing.
2007-01-22T13:15:00.000Z     148.6277    F   After thruster torque
                                             calibration
2007-01-22T14:16:13.000Z     148.6052    F   Automatic TM processing.
2007-01-23T00:23:43.000Z     148.5834    F   Automatic TM processing.
2007-01-24T14:10:51.000Z     148.5718    F   Automatic TM processing.
2007-01-25T23:49:34.000Z     148.5444    F   Automatic TM processing.
2007-01-27T13:59:07.000Z     148.5361    F   Automatic TM processing.
2007-01-28T23:57:51.000Z     148.4635    F   Automatic TM processing.
2007-01-30T13:48:11.000Z     148.4569    F   Automatic TM processing.
2007-01-31T23:46:54.000Z     148.4369    F   Automatic TM processing.
2007-02-02T18:00:43.000Z     148.4023    F   Automatic TM processing.
2007-02-05T13:22:50.000Z     148.3891    F   Automatic TM processing.
2007-02-05T17:48:59.000Z     148.3516    F   Automatic TM processing.
2007-02-08T13:11:38.000Z     148.3380    F   Automatic TM processing.
2007-02-08T17:37:54.000Z     148.2920    F   Automatic TM processing.

This report was generated  Fri Feb 9 08:00:35 GMT 2007
```

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, 03/02/2007 –09/02/2007

AOCS operations were executed from the Automatic Timeline.

During this period, 59 Open Loop Slews, 95 Closed Loop Slews and 4 Momentum Biases were executed.

2 slews (CSL, OSL) were missed from the TL during the observation period due to problem on the TM link with the REDU station.

The OTF was not reached during PID 05280028 due to lost of guide star.

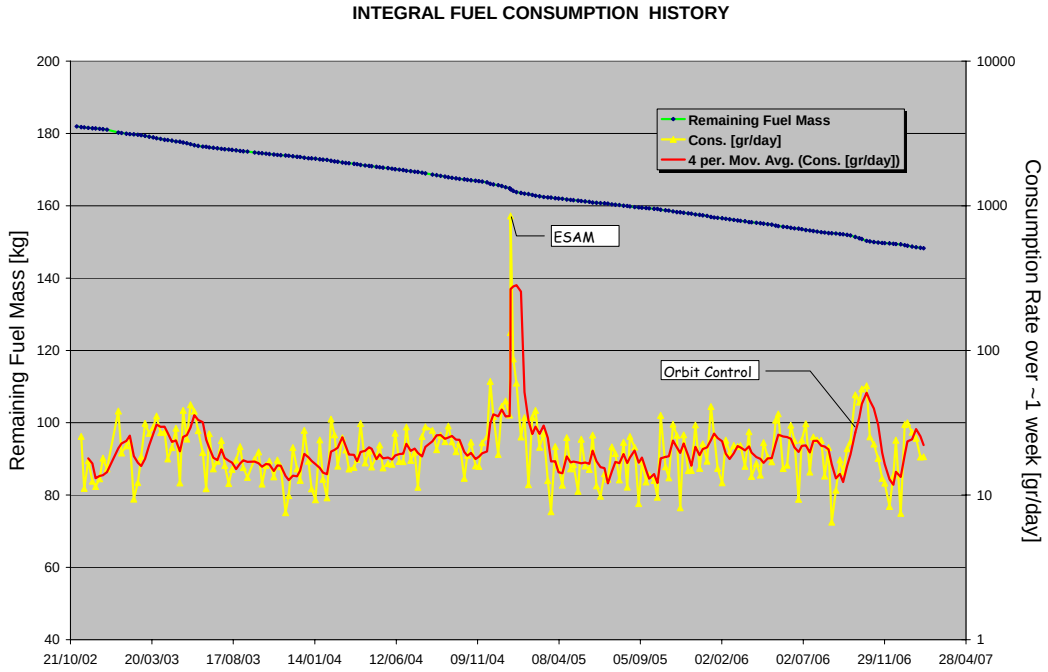
This is equivalent to a ~1% of the total number of slews (154)

Orbit Control

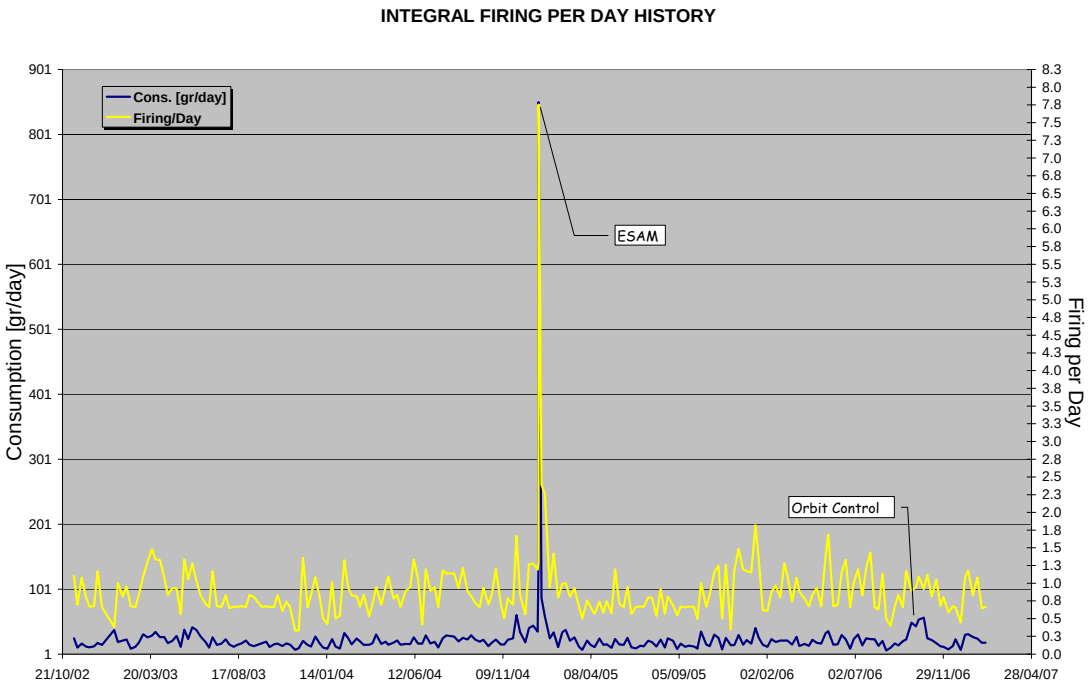
No update

Fuel consumption

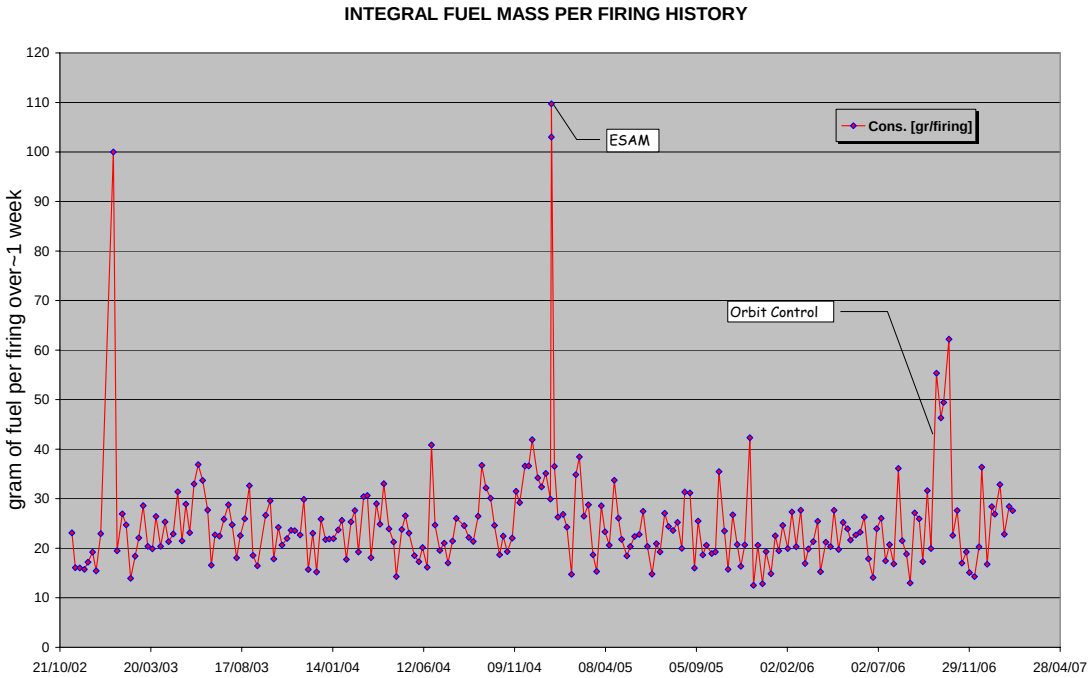
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 08/02/2007 is reported in the plot below.



The firing per day over the period between 01/11/2002 and 08/02/2007 is reported in the plot below.

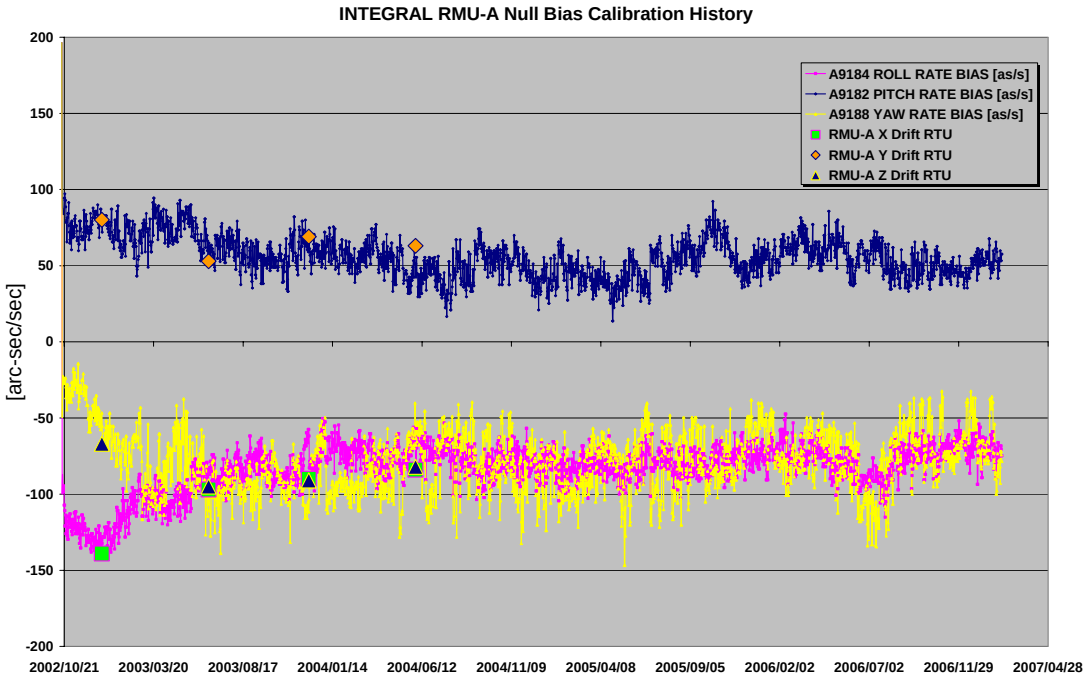


The fuel per firing over the period between 01/11/2002 and 08/02/2007 is reported in the plot below.

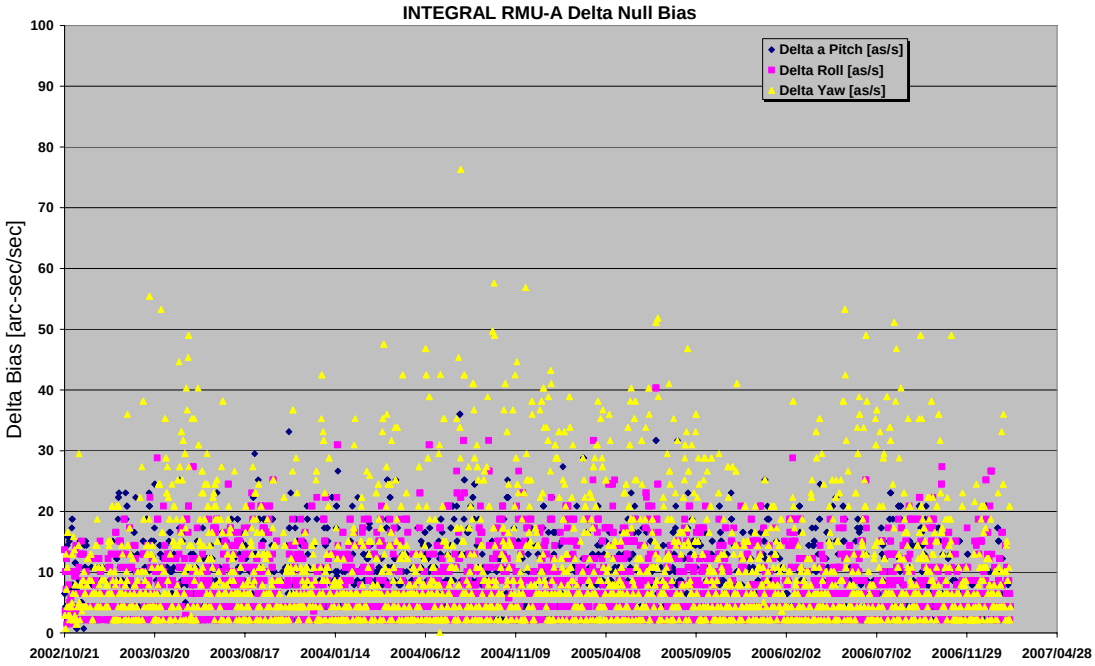


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 09/02/2007 is reported in the plot below.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 09/02/2007 is reported in the plot below



03/02/2007 (Day of Year 034, Revolution 526)

Nothing to report.

04/02/2007 (Day of Year 035, Revolution 526)

Nothing to report.

05/02/2007 (Day of Year 036, Revolution 526-527)

Nothing to report.

06/02/2007 (Day of Year 037, Revolution 527)

Problem on links to REDU: at 02:53z due to a problem on the TM link to REDU, the slew ID 05270014 failed release.

A manual recovery was then performed from attitude of PID 05270013 to the attitude of PID 05270014. The next slew ID 05270015 was manually updated in TL and the AOCS enabled in TL at 03:20z.

The following slew was not executed from TL: 05270014(OSL).

07/02/2007 (Day of Year 038, Revolution 527)

Nothing to report.

08/02/2007 (Day of Year 039, Revolution 527-528)

Nothing to report.

09/02/2007 (Day of Year 040, Revolution 528)

Problem on links to REDU: at 03:29z due to a problem on the TM link to REDU, the slew ID 05280015 failed release.

A manual recovery was then performed from attitude of PID 05280014 to the attitude of PID 05280015. The next slew ID 05280016 was manually updated in TL and the AOCS enabled in TL at 04:13z.

The following slew was not executed from TL: 05280015(CSL).

ACC bad TC sequence: at 03:33z during the recovery for PID 05280015, the following OEM APID 640 << ACC BAD TC SEQUENCE>> was reported. At the same time the counter for on-board recoverable errors (TM A5008-A5009) increased by 1 unit.

During the recovery of PID 05280015, the AOCS TC A3831 was uplinked in error (instead of the expected link test TC D3831) and this unexpected command, out of any sequence logic, caused the generation of the OEM and the increasing of the on-board recoverable error counter.

The TC A3831 is a report TC used by sequence AEOTA (setting the AMD on-times) dumping in specific the pending on-time for Wheel 1 on the RCS-A.

No effect was reported in TL.

STR SEU threshold exceeded: at 17:31:13z, the guide star was lost. As automatic reaction the ACC switched ON the IMU 1 and an automatic mapping was commanded.

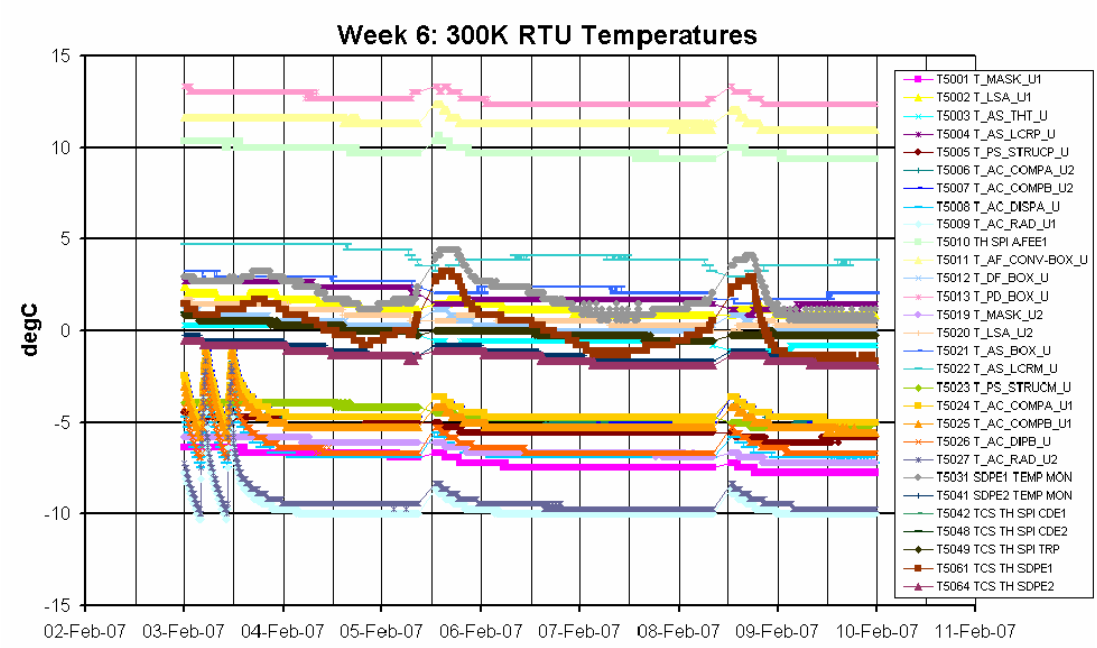
At moment of the event, the guide star was Mi 8.2 at CCD location [-15161, 2272].
A new guide star was picked after the automatic mapping, Mi 8.35 at CCD location [4143, 11].

The reason of the lost of guide star is likely due to the presence of a dim companion (Mi 10.2) at ~30 arcsec from the guide star. The STR could not determine the baricentre of the system and this caused the lost of guide star.

No impact on TL reported, except the OTF not reached during PID 05280028.

8.3.2 SPI Operations

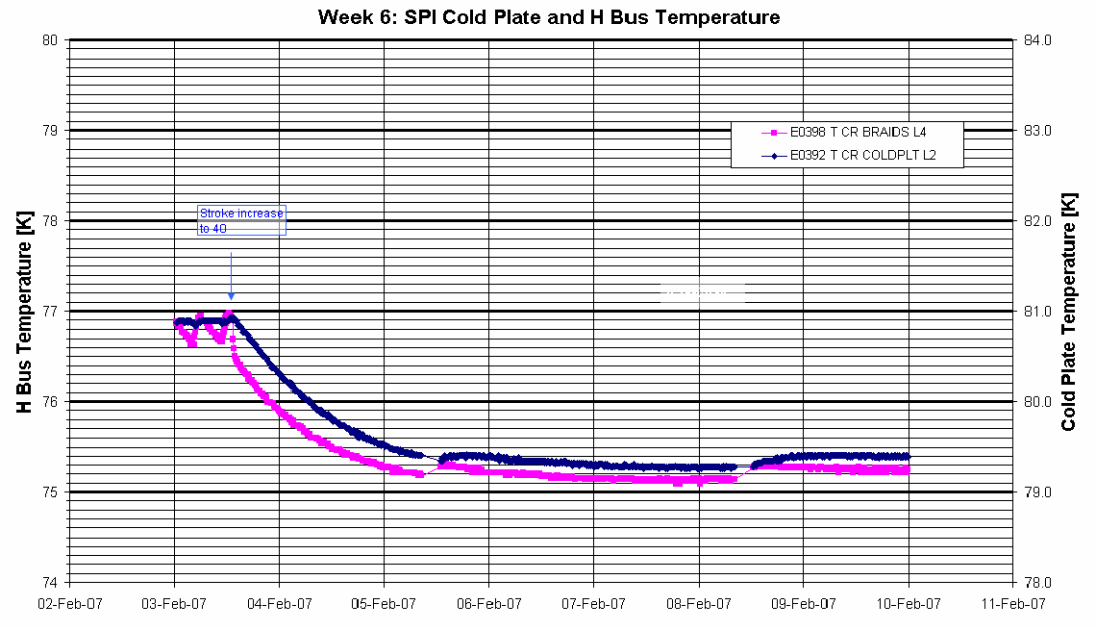
Unit Temperatures: All the equipment temperatures are inside the operational limits. The following plot shows their evolution during the reporting period:



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

The stroke of all four compressors was 39 until 03-02-2007 at 13:16Z, when the stroke of all four compressors was increased to 40 after the cold plate temperature, TM parameter E0392, reached 80.9K.

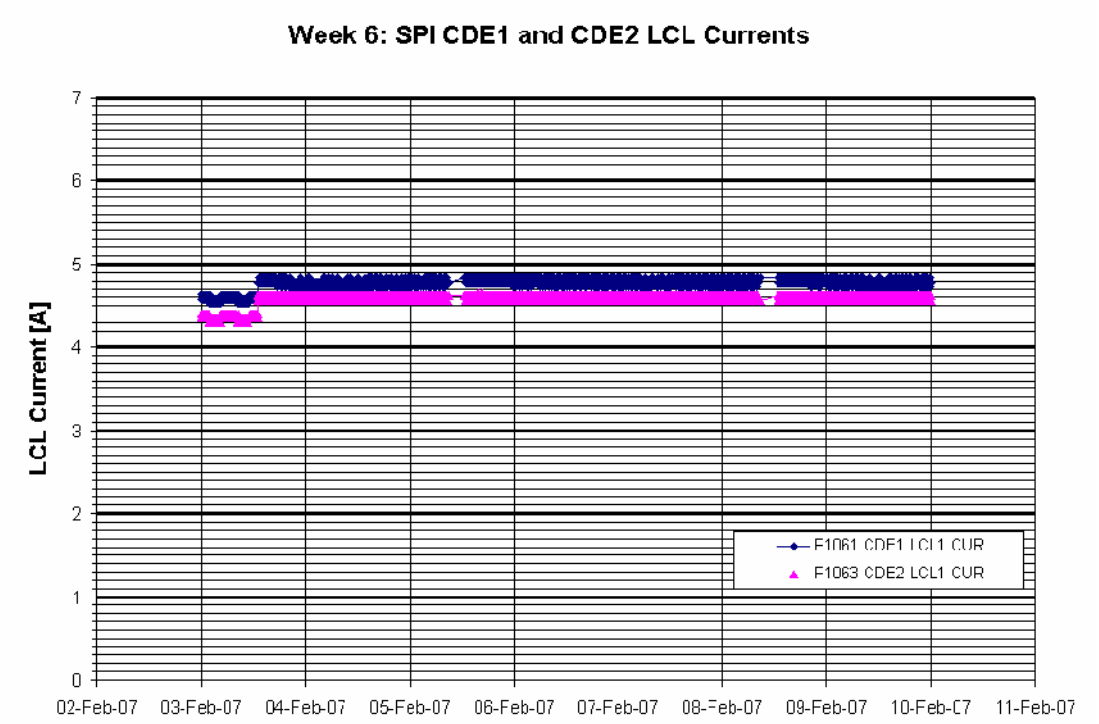
The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period. Note that with a compressor stroke of 40 the radiator compensation heater no longer cycles (is permanently off) as expected.



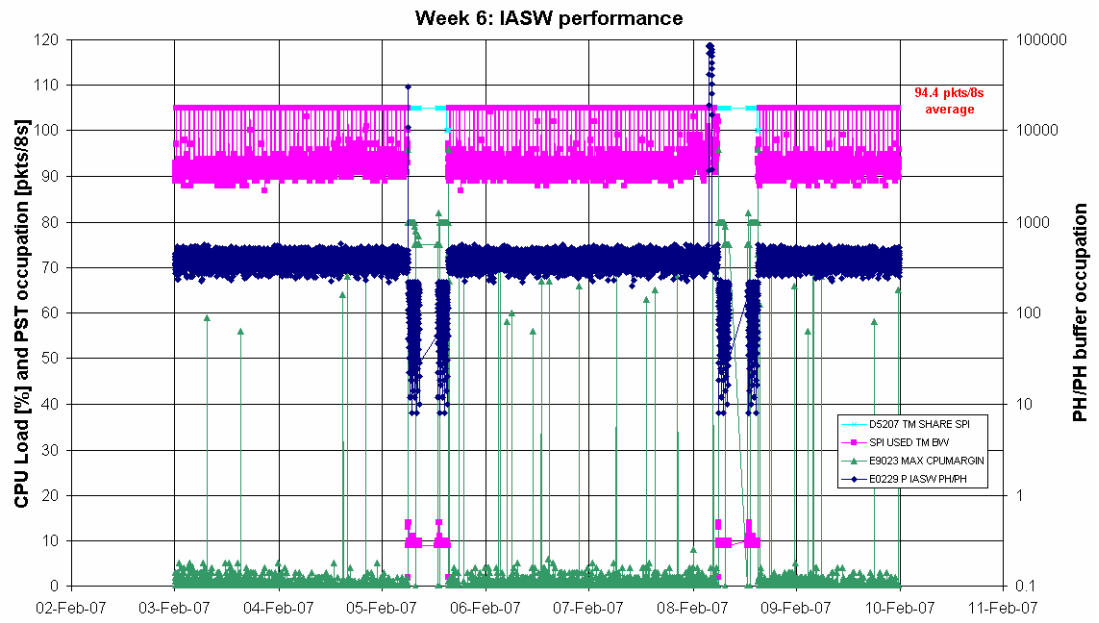
The average LCL currents of the CDEs over the week were:

- Average CDE1 LCL Current = 4.77A
- Average CDE2 LCL Current = 4.57A

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

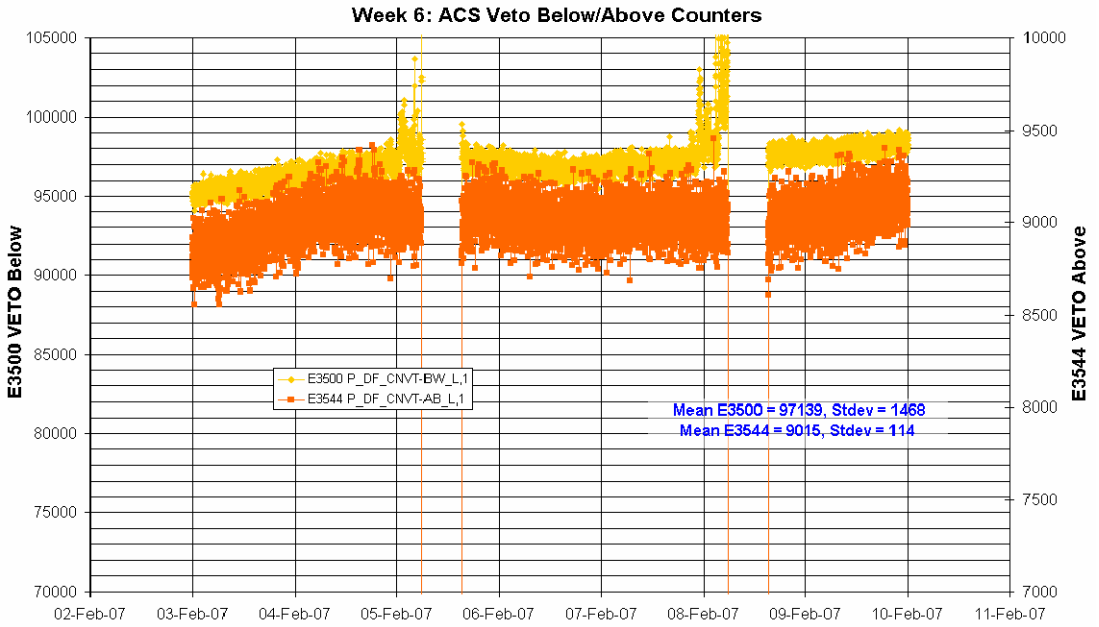


DPE & IASW: The DPE health and IASW performance is nominal. The current IASW version installed is 432. The average TM bandwidth occupation of SPI was 94.4 packets/cycle over the science window, when the TM allocation was 105 packets/cycle. The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



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

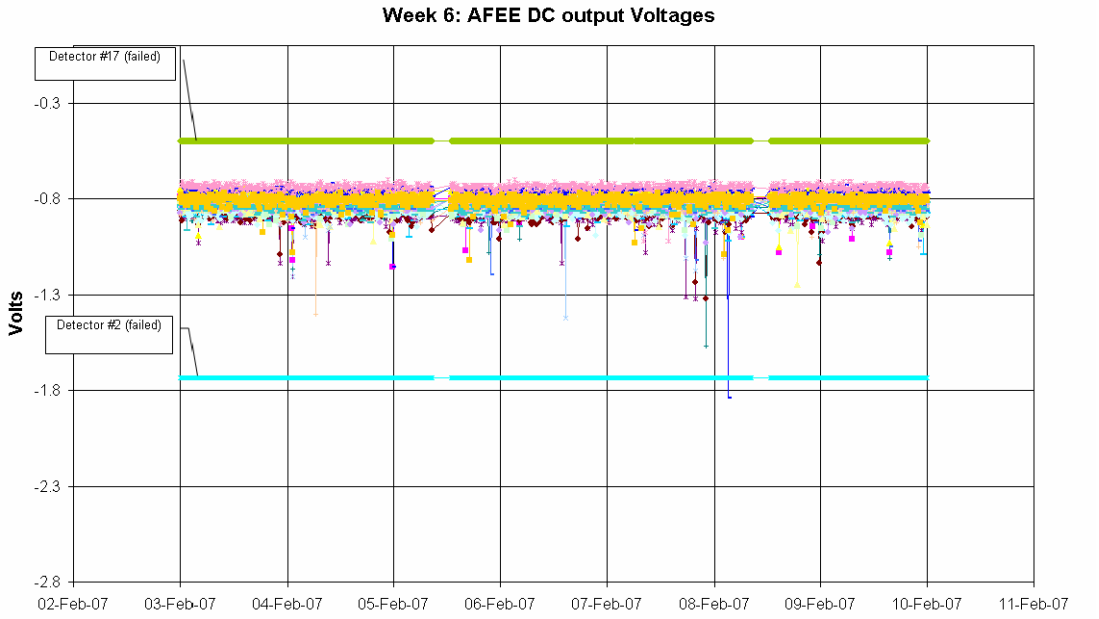
The following plot shows the ACS overall count rate evolution during the reporting period:



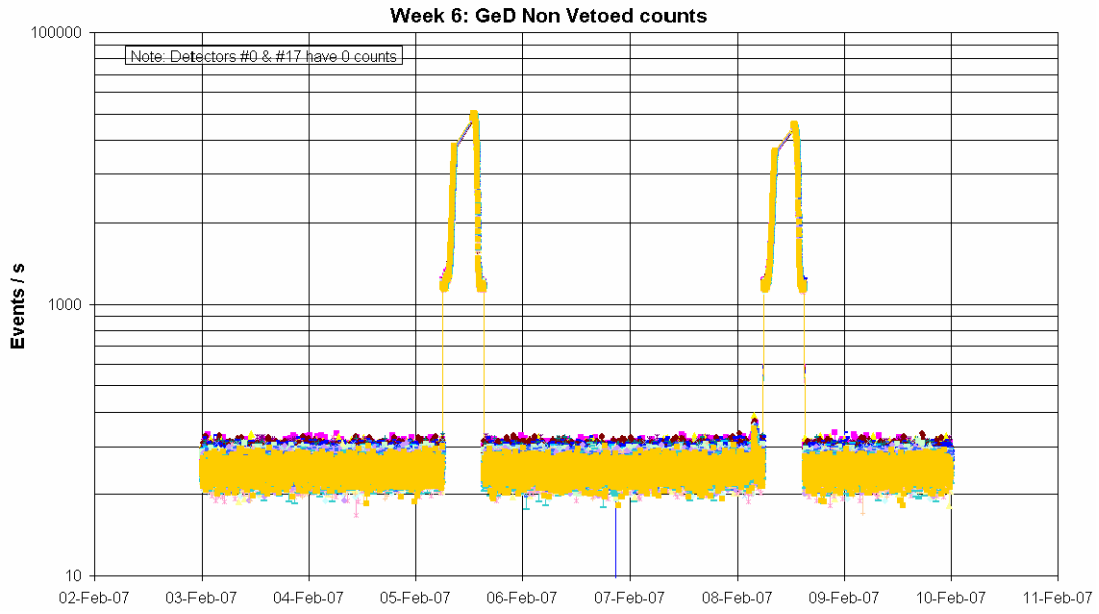
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution. The energy resolution of GeD#4 was recovered with the last annealing.

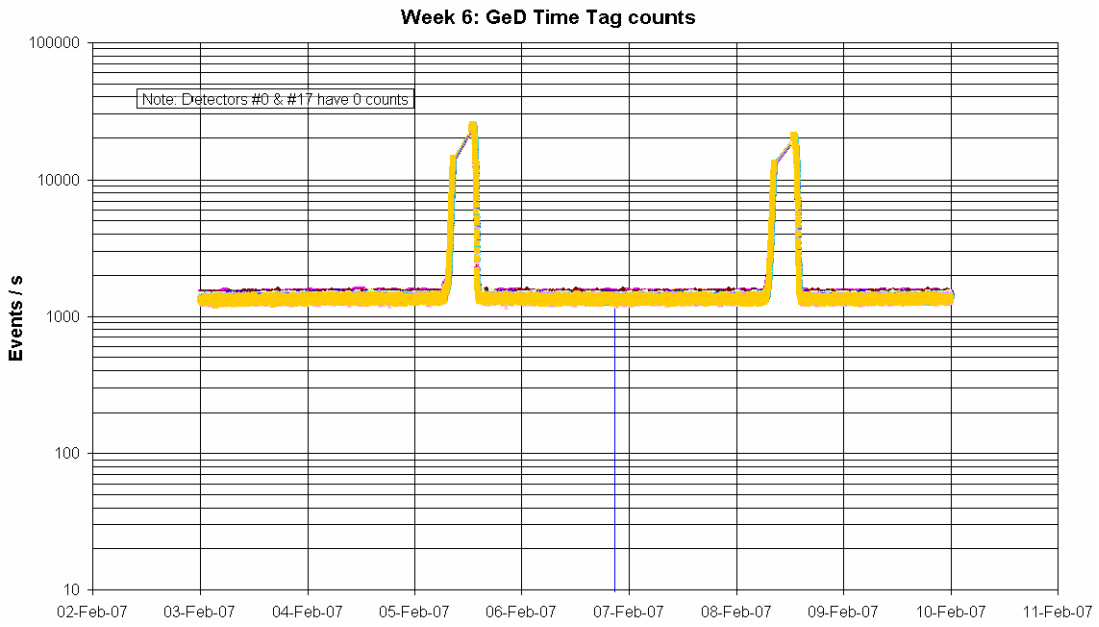
The GeD#12 HV remained at 3.5kV throughout the reporting period.

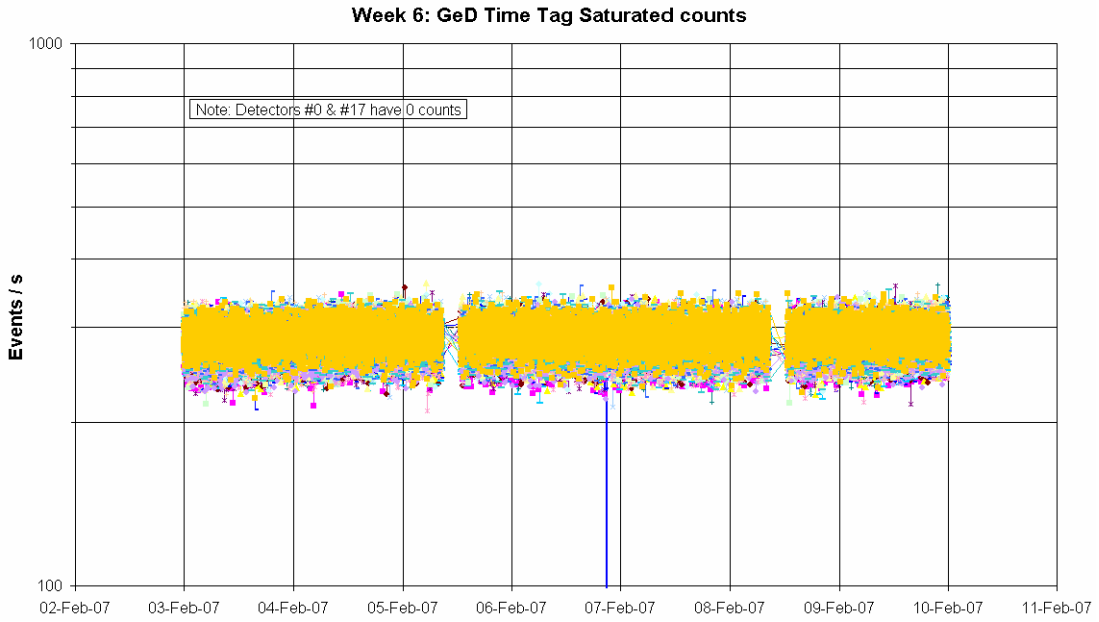
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004.



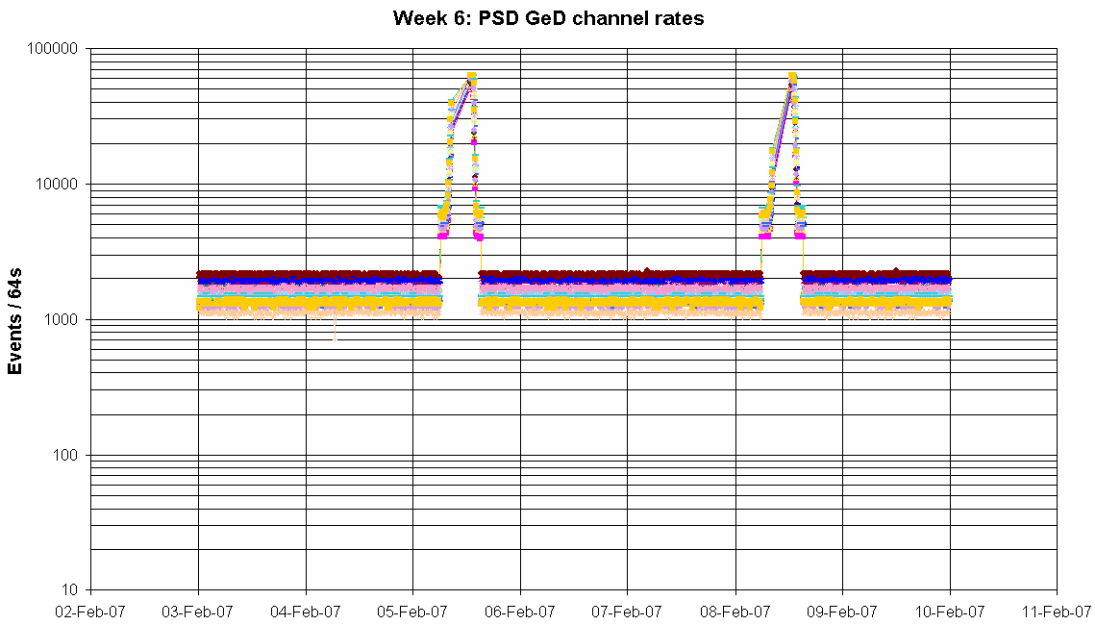
DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.







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



Event Log:

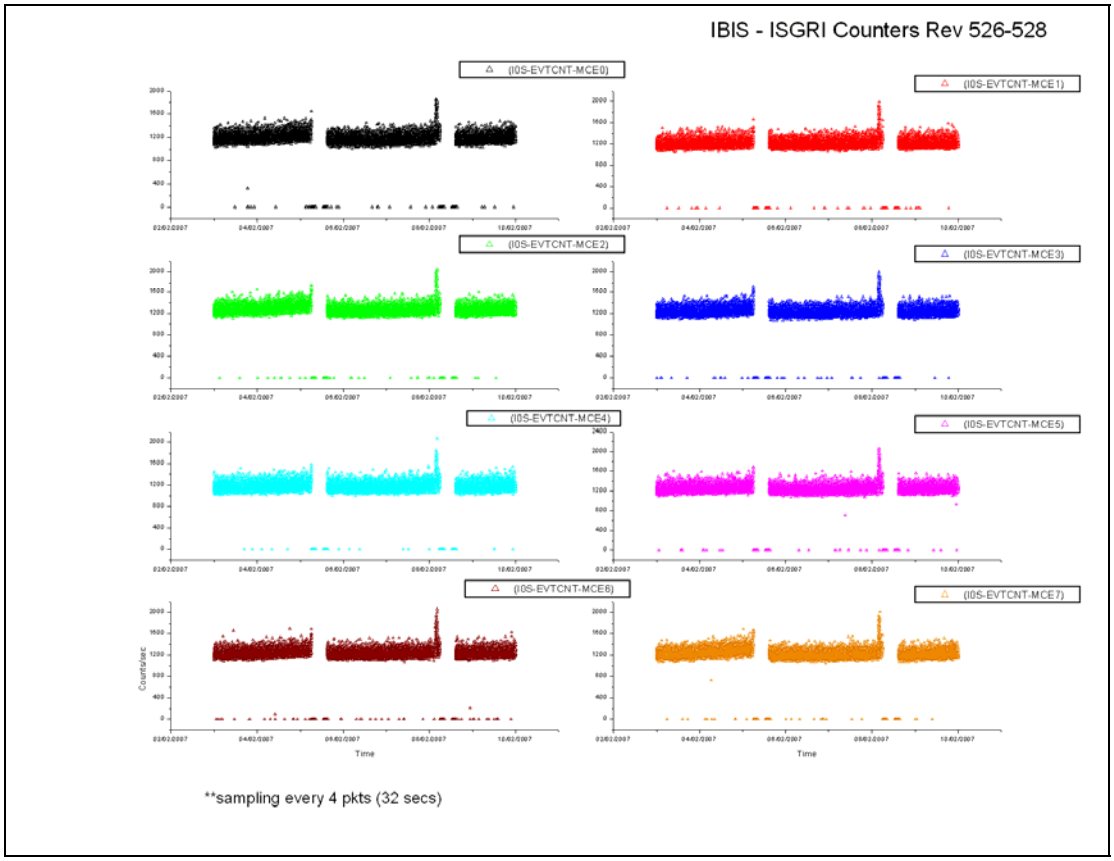
The following non-nominal events occurred on SPI during the reporting period:

- On 2007-02-05 at 05:57:55Z the TM parameter E3500 P_DF_CNVT-BW_L went OOL High. This was a few minutes before radiation belt entry of revolution 526 and therefore no action was taken.
- On 2007-02-05 at 08:37:42Z TM parameter E4009 S DF HSLERR L went OOL for 1 TM cycle, indicating errors on the HSL. This was just before LOS of revolution 526.
- On 2007-02-07 at 08:32:19Z one occurrence of OEM 1024 ID 229 EXCEPTION SPI1 PARTIAL FLAG OVERFLOW was received. This was during PID 05270043.
- On 2007-02-08 between 03:44:28Z and 03:50:52Z the TM parameter E3500 P_DF_CNVT-BW_L went OOL High. At 05:43:16Z it went OOL High again. This was a few minutes before radiation belt entry of revolution 527 and therefore no action was taken.
- On 2007-02-08 at 03:52:24Z the TM parameter E3825 U PD 5V+ANL L went OOL Low (value = 4.802V). This is the PSD +5V analogue voltage. It returned within limits when the next packet was received (after 64secs).
- TM parameter E2116 T AS PSAC L2 (Plastic Scintillator temperature) went OOL Low several times during the week. No action was taken as this is a known and recurring problem due to this thermistor being unreliable. The limit conditions for this parameter will be updated in the next IODB release.

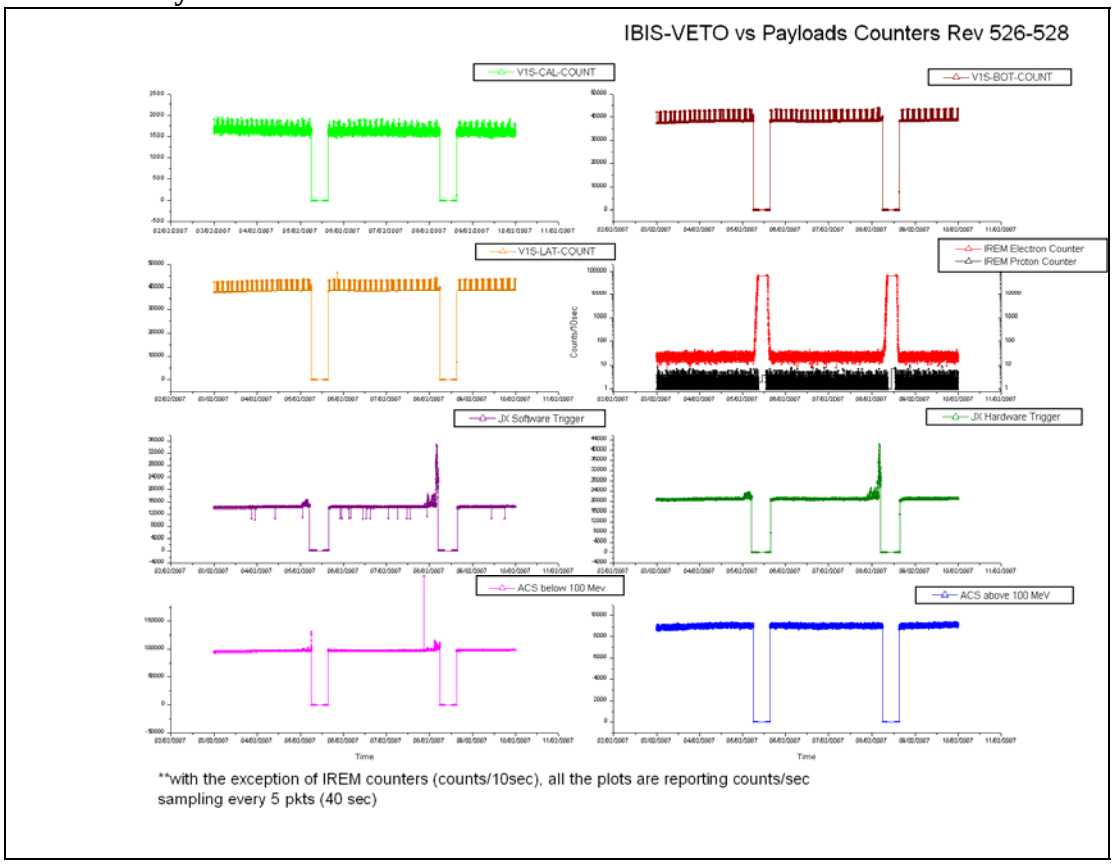
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

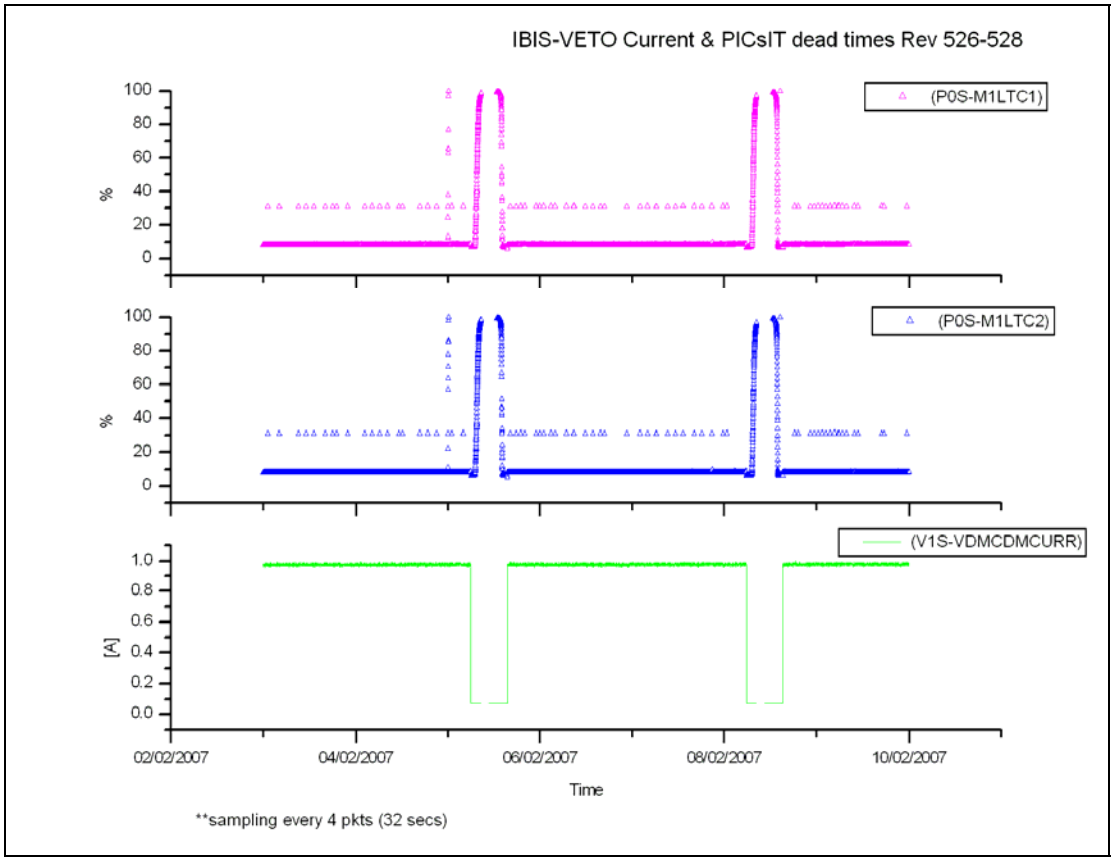


VETO vs Payloads Counters:

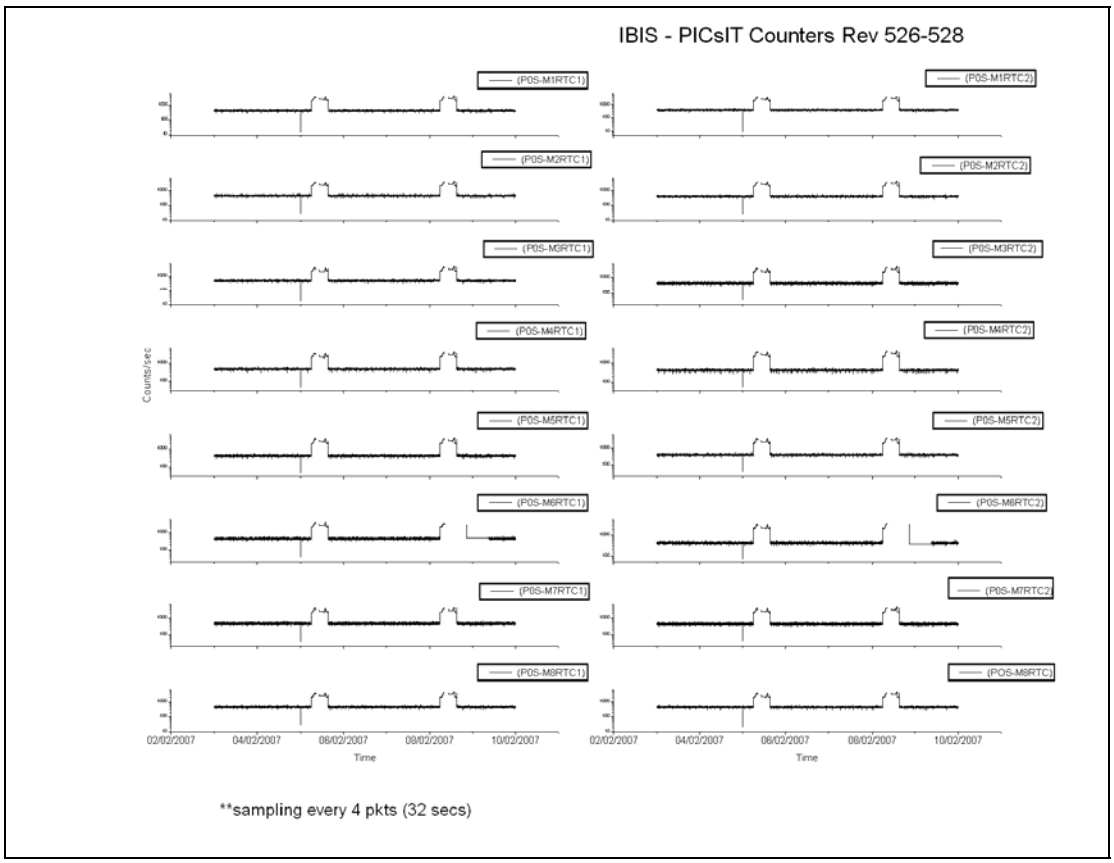


The week was characterised by low radiation.

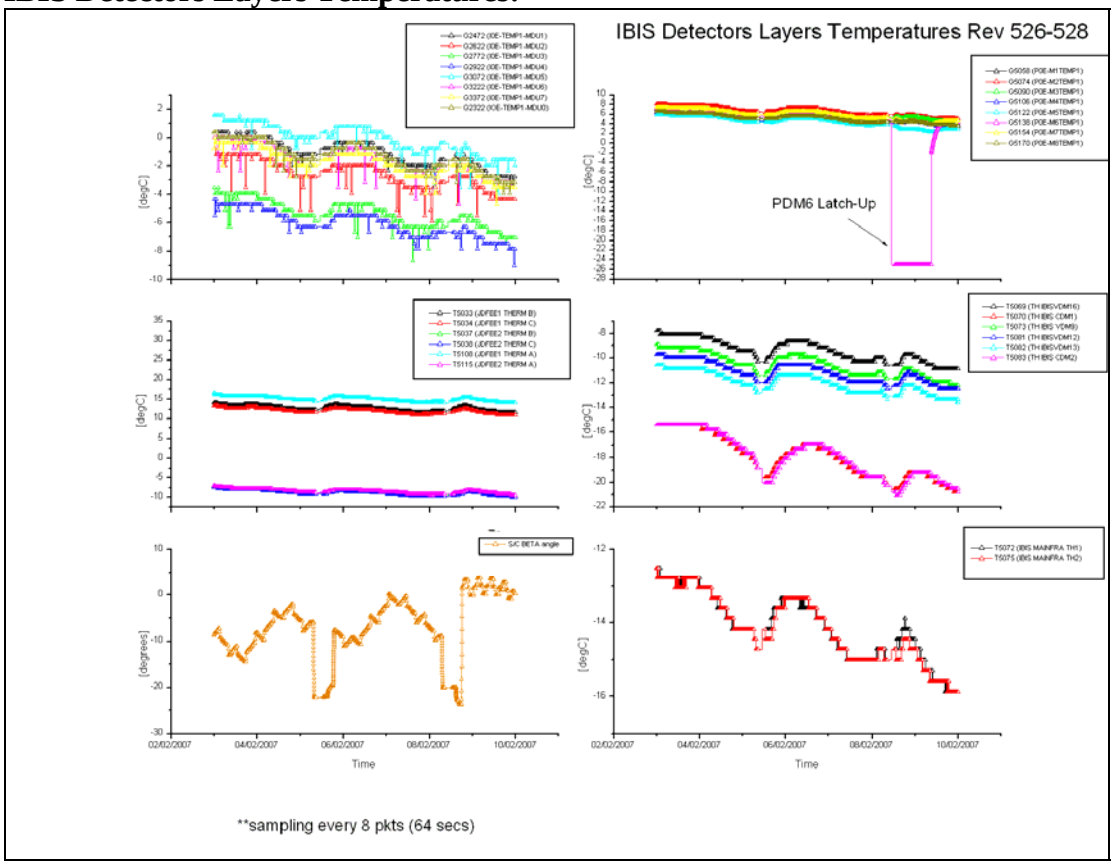
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report:

The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), families G5002 (P0S-Mi_RTC1) and G5003 (P0S-Mi_RTC2), families G2014 (I0E-OVFWPXADD-Mi) were reported at Radiation Belts passage.

DoY 2007.036 (05/02/2007):

At 00:03Z several parameters from TM families G5068 (P0S-MiF1ERRF) and G5072 (P0S-MiF2ERRF) were reported failing Status Consistency Check.
At 00:07Z, several parameters from G5002 (P0S-Mi RTC1) and G5003 (P0S-Mi RTC2) were reported OOL LOW-LOW (value =0 cnt/s).
At 00:10Z the On Event Message APID 1280, ID 132, class 0, "IBIS1 IASW HEPI RESYNCHRONIZED" was reported.
The coincidence of these 3 events is reporting a HEPI resynchronisation and according to FDIR no action is required.

DoY 2007.039 (08/02/2007): IBIS PICsIT PDM #6 Latch-Up mode (INT_SC-175)

On 08/02/2007 at 12:37Z (AOS of revolution 528), TM parameter G5042 (P0E-PDM6STB) was reported failing the Status Consistency Check with the value OFF. All other PDM were working nominally, and PICsIT was in Nominal mode.

It seemed that PDM #6 was switched OFF (Latch-Up) during the perigee outage. Therefore the OEM <<APID 1280, class 1, id 170, IBIS1 PICSIT LATCHED UP MODULE NOTIFICATION>> was not received on ground.

The reason for this change of status remains unknown at the time being.
The radiation background was important as the spacecraft was in the radiation belts.

Following the action in FDIR, the recovery consisted in switching OFF PDM #6, then switching it ON and enabling it.

1. On 09/02/2007 at 08:47Z IBIS was set in Stand-By mode with TC G0125.
2. At 08:51Z, PDM #6 was switched OFF with FCP_IBIS1_0325.
3. At 08:55Z, PDM #6 was switched ON with FCP_IBIS1_0108.
4. At 08:59Z, PDM #6 was enabled with FCP_IBIS1_0223 using the dynamic TC GU0512 as advised in steps 3. PDM #6, like all the others, showed nominal TM (temperatures, voltages and counters).
5. As the recovery was successful, IBIS was set back in Scientific Standard mode at 09:01Z.

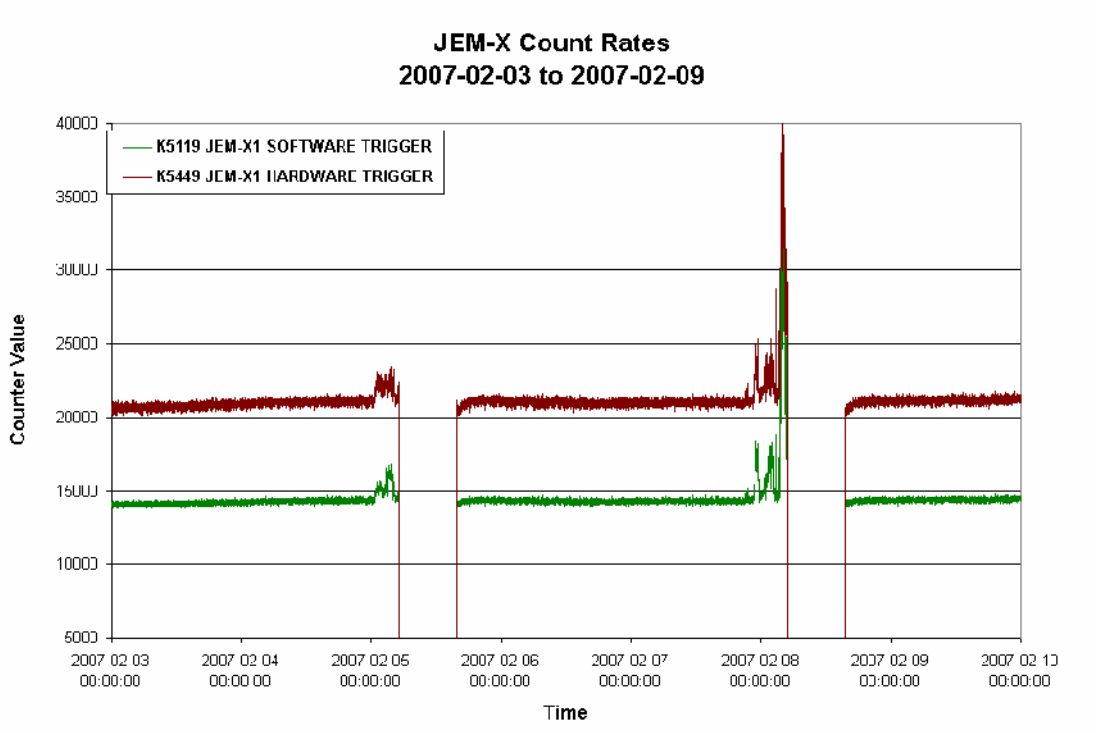
The impact on the science was: Pointings 05280001 to 05280020 were performed without PDM#6.

8.3.4 JEM-X Operations

JEM-X Count Rates

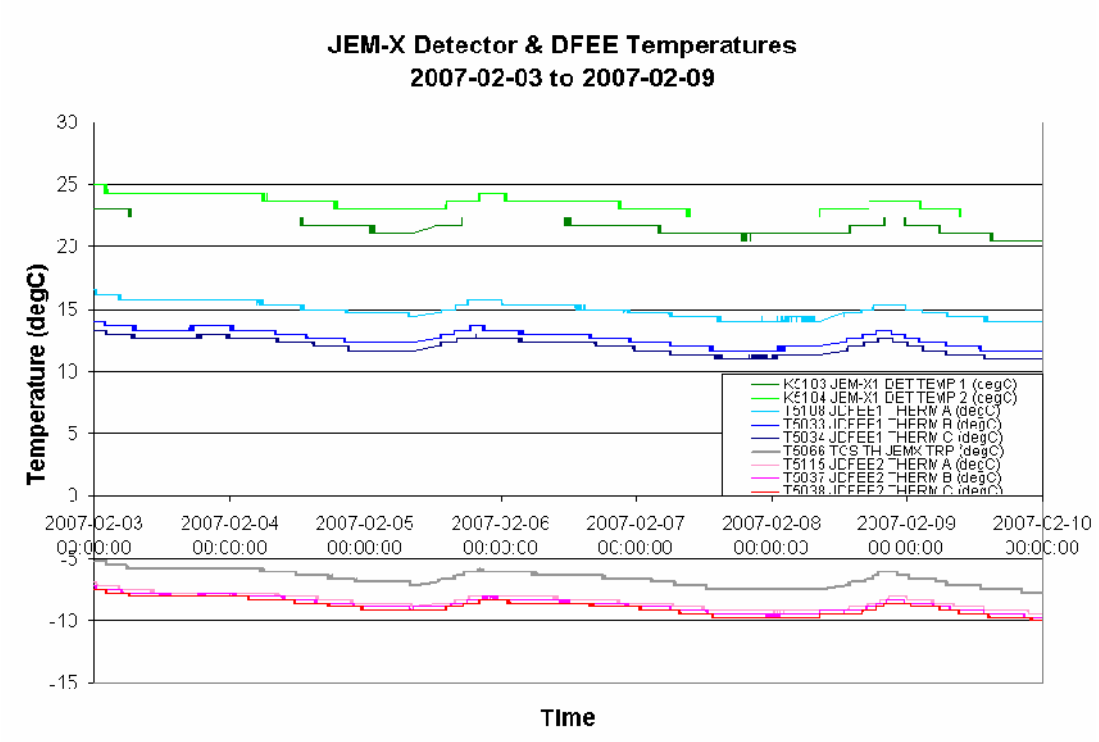
JEM-X count rates over the reporting period are displayed in the following graph[1].

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



JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph[2].



[2] Data sampled (1 frame in 8)

JEM-X Daily Report

2007-02-03 (DOY 034, Rev 526) to 2007-02-07 (DOY 038, Rev 527)

JEM-X1 operations executed nominally.

2007-02-08 (DOY 039, Rev 527-528)

At 03:38:39Z TM parameter K5449 HARDWARE TRIGGER started toggling OOL High. Between 03:41:27Z and 03:42:39Z K5136 BUFFER LOSS also went OOL High and at 04:07:51Z K5119 SOFTWARE TRIGGER went OOL High, returning within limits at 04:08:07Z. K5449 HARDWARE TRIGGER continued to toggle OOL High until JEM-X1 was commanded to Safe mode by the Timeline at 04:51:53Z, as planned before radiation belt entry.

JEM-X1 operations continued nominally.

2007-02-09 (DOY 040, Rev 528)

JEM-X1 operations executed nominally.

8.3.5 OMC Operations

2007-02-03 (DoY 034, Rev 526) to 2007-02-05 (DoY 036, Rev 527)

Nothing to Report

2007-02-06 (DoY 037, Rev 527)

At 02:53, a hit on the line with Redu, caused a 2 minute TM drop. This caused the loss of pointing 05270014. It was at this time the following commands were rejected:

```
2007.037.02.56.28.008   2007.037.02.56.36.197   1792   RealTime   131     TC REJECT
REJECTED TC1                                             0       0    65535   PR    N
E   E
2007.037.02.56.34.008   2007.037.02.56.44.260   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.

2007-02-07 (DoY 038, Rev 527) to 2007-02-08 (DoY 039, Rev 528)

Nothing to Report

2007-02-09 (DoY 040, Rev 528)

At 03:29, another hit on the line with Redu, caused a 5 minute TM drop. A recovery was performed, and the OMC commands were manually sent at 04:02:09. The impact was a 28 minute delay in the start of pointing 05280015, which reduced the duration of the pointing from a scheduled 3572 to 2008 seconds. It was at this time the following commands were rejected:

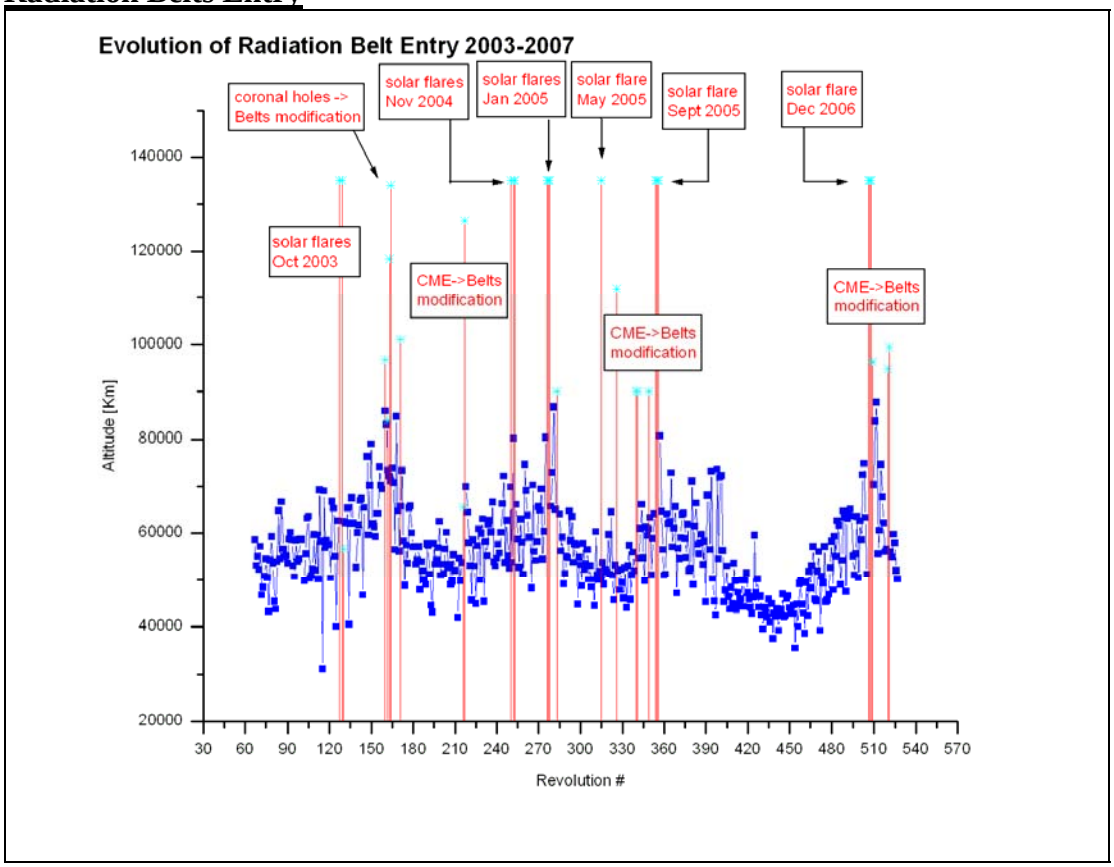
```
2007.040.03.34.20.906   2007.040.03.34.28.276   1792   RealTime   131     TC REJECT
REJECTED TC1                                              0       0    65535   PR    N
E   E
2007.040.03.34.27.156    2007.040.03.34.34.560    1792    RealTime    131      TC REJECT
REJECTED TC1
```

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

On DoY 036 at 05:59:13 and DoY 039 at 05:47:13 OMC went to SAFE mode nominally, at the radiation belt entry time as set in the Broadcast Packet.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

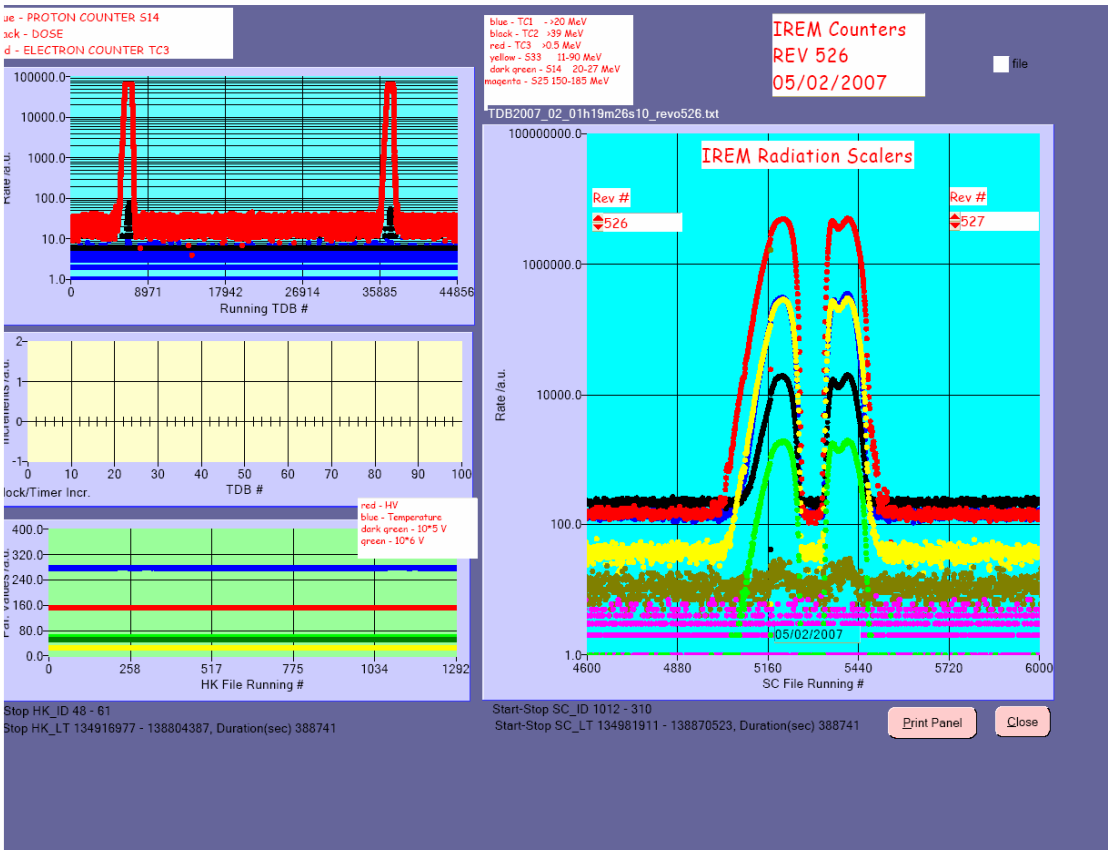
Nothing to report

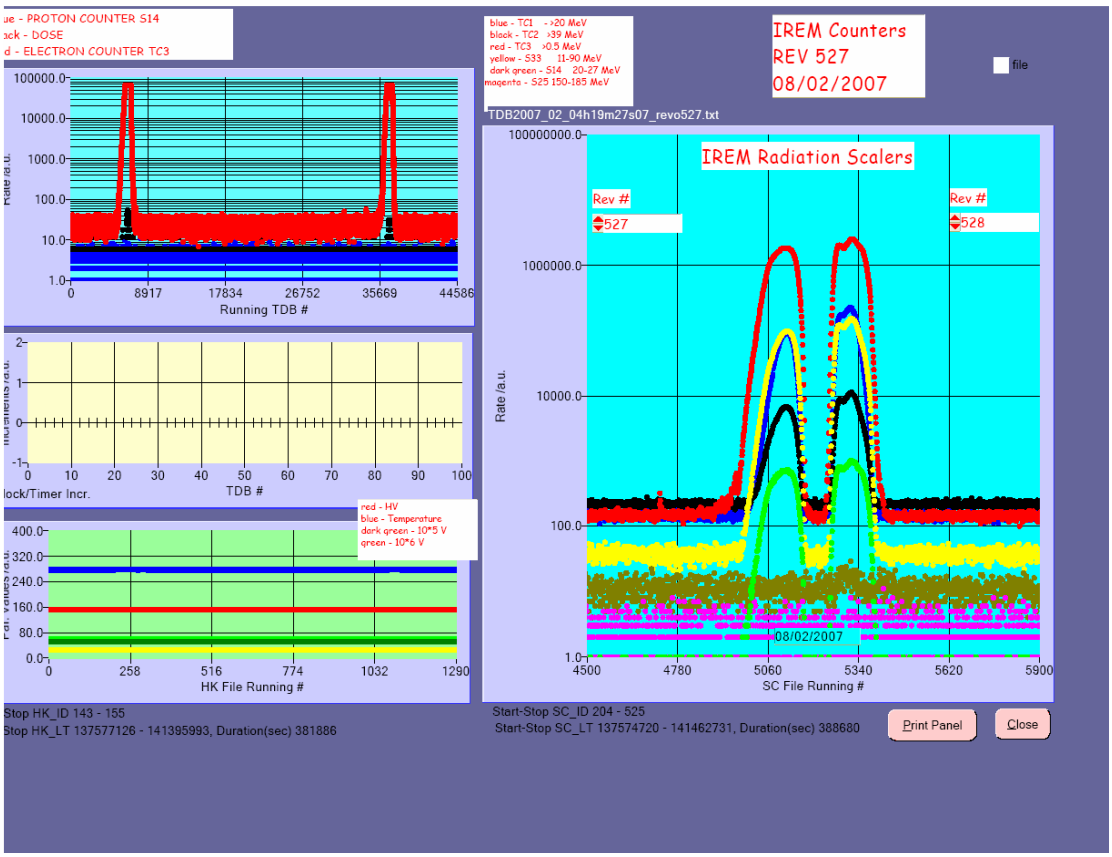
Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
526	RAD_ENTR R 2007-02-05T05:59:11Z	05-02-2007 06:33:35	52031.2	2007-02-05 06:58:38	47539
527	RAD_EXIT R 2007-02-05T15:16:02Z	05-02-2007 15:04:39	43308.0	2007-02-05 14:48:38	41260
527	RAD_ENTR R 2007-02-08T05:47:12Z	08-02-2007 06:29:36	50175.0	2007-02-08 06:46:54	47781
528	RAD_EXIT R 2007-02-08T15:04:12Z	08-02-2007 14:22:48	<<41950.3	2007-02-08 14:36:54	41004

Reference
Very small error vs reference (less than 10 minutes)
Small error vs reference (between 10 and 30 minutes)
Large error vs reference (more than 30 minutes)
Radiation Spike

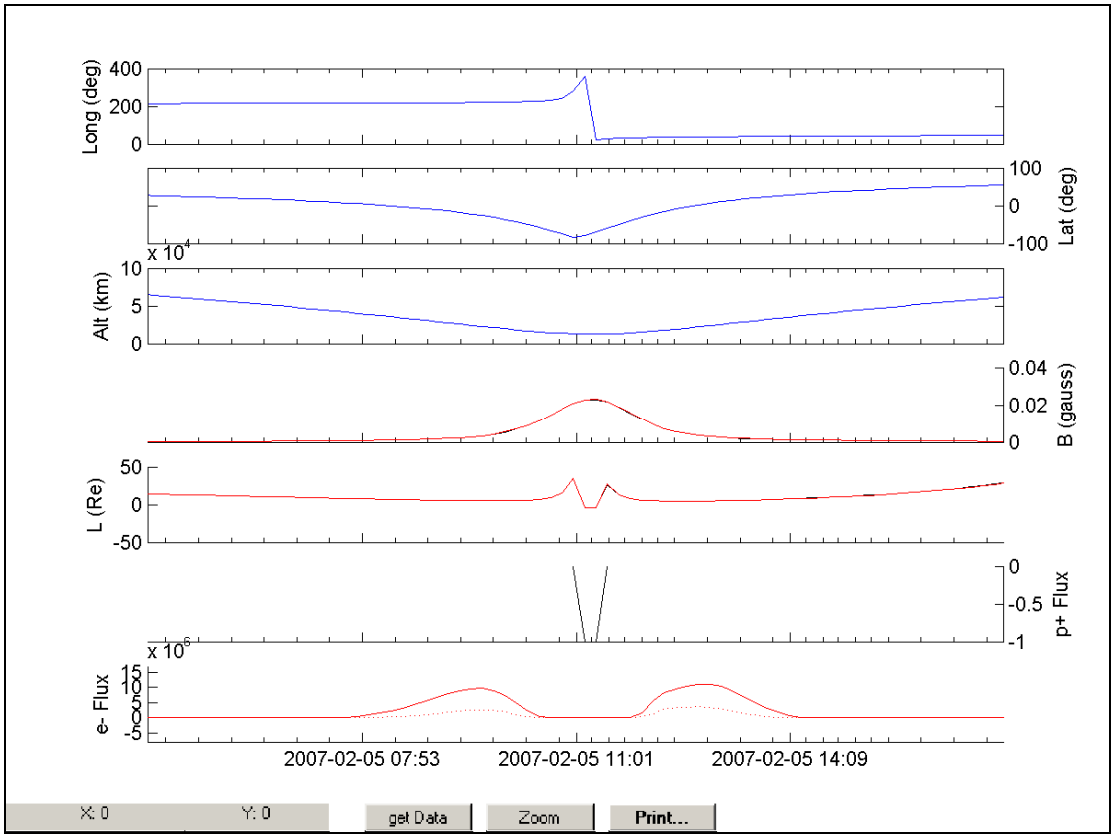
IREM radiation counters:



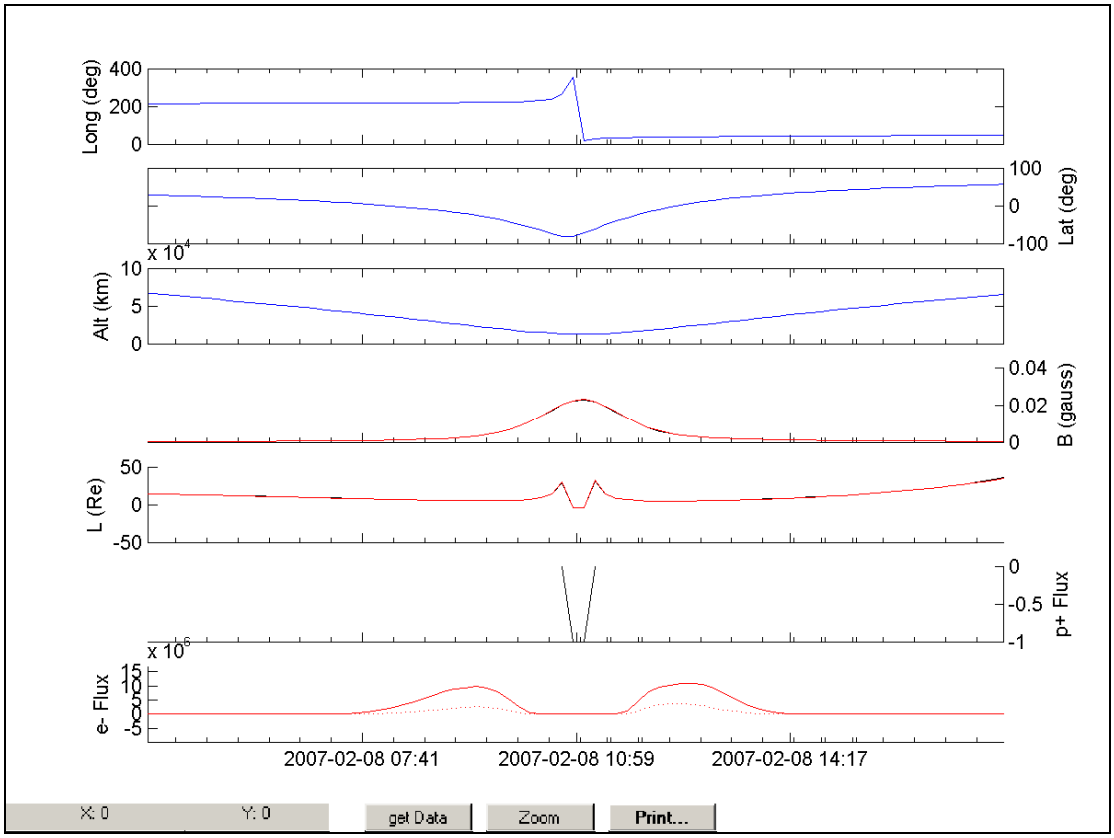


IREM Predicted Radiation Belt Passages

Rev 526



Rev 527



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

No plot is available this week. But the background was essentially low.