

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 225
Week 02
15.01.07
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 06.01.07 until 12.01.07 (both dates inclusive) and covers the revolutions 517, 518 and 519.

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 3 raster dithers of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), 2 raster dithers of the Galactic Plane Region 2 (RA 14:08:36.11, DEC -61:30:20.6), 2 Galactic disk scans, at attitudes (RA 14:36:33.60, DEC -58:04:48.0), (RA 14:25:45.60, DEC -58:39:00.0), a hexagonal dither of the object GX 301-2 (RA 12:26:37.60, DEC -62:46:14.0), and another hexagonal dither of the object 4U 1254-690 (RA 12:57:37.20, DEC -69:17:21.0).

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.

Two slews were missed during the observation period, due to problems on the links with REDU station and star (planned) not found during search\track process.

The fuel consumption over the period between 06/01/2007 and 10/01/2007 was 0.1613 Kg. The remaining propellant is in the order of 148.9570 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

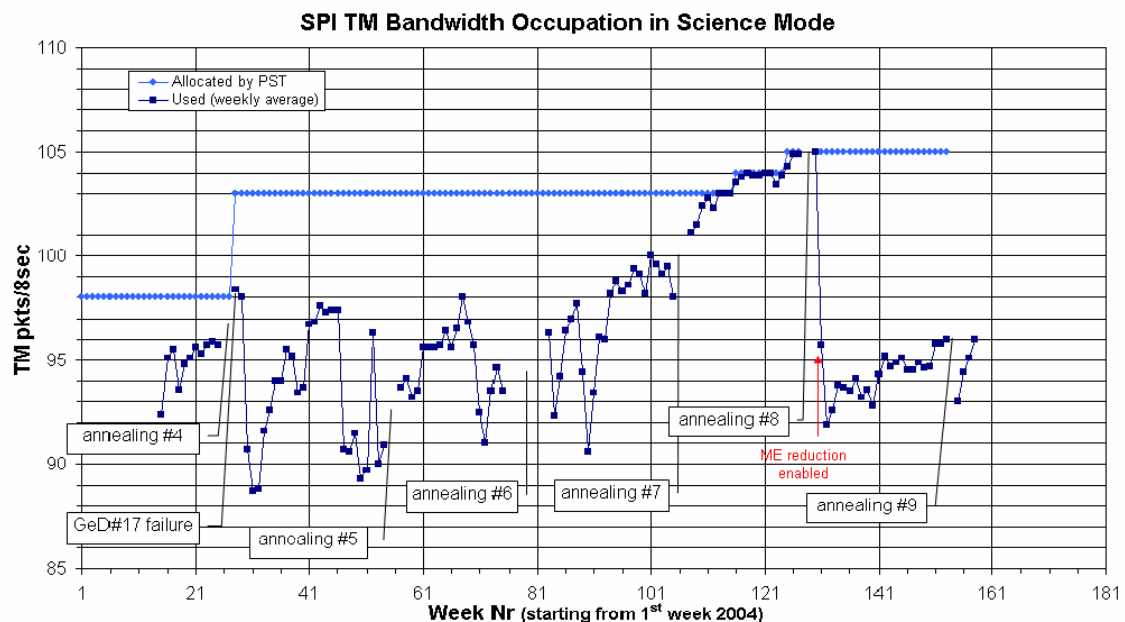
3.2.1 SPI

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.

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 96 packets/cycle.

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



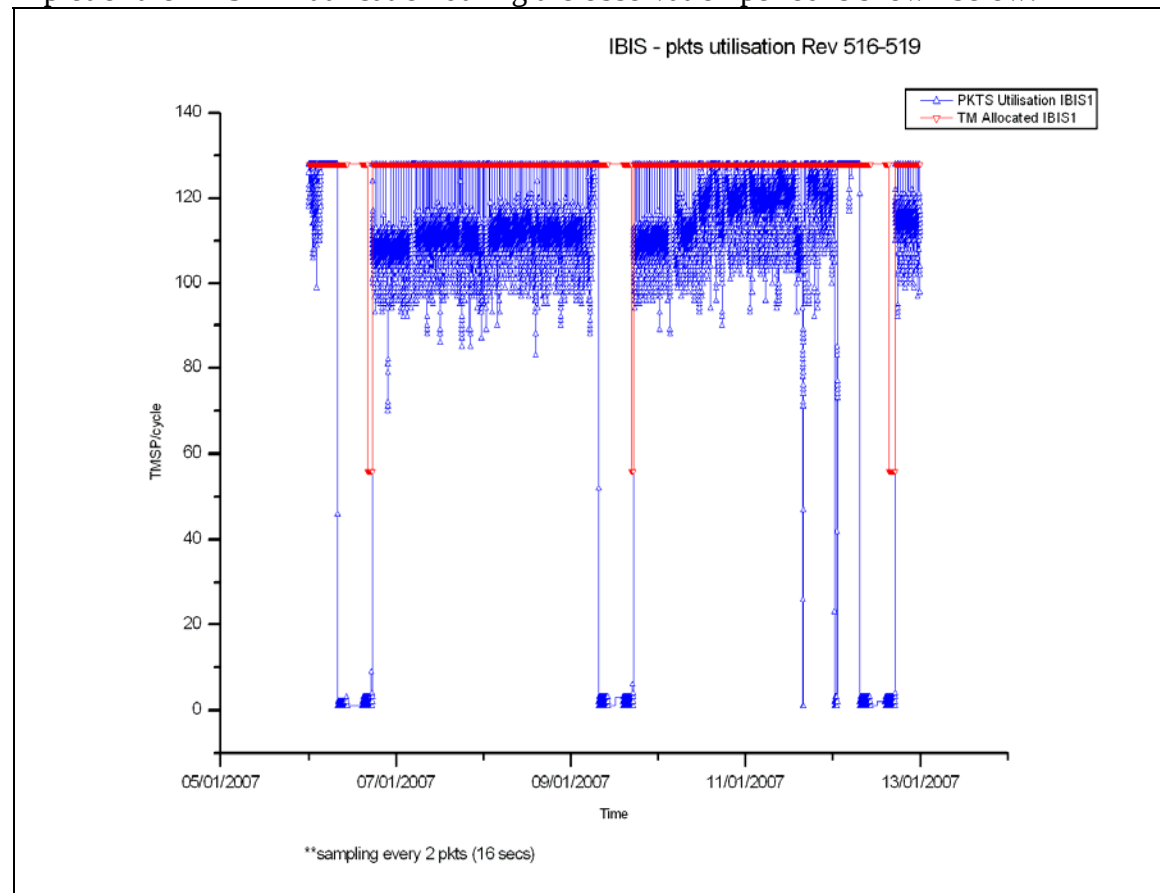
Note: Some more information concerning the SPI operations is provided in the Appendix.

3.2.2 IBIS

The overall status of the unit is nominal.

During the reporting period, the PST allocation to IBIS was 128 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period (when IBIS was in Science mode) was 115.33 TMPS/cycle, up 4.22 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, 167 of the 171 planned science pointings for OMC were executed nominally, 1 was interrupted and 3 were 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.

A large sunspot 930, growing sunspot 933, tiny sunspots 934 and 937 were present on the surface of the sun during the observation period. None 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 very good this week. Only 1 slew lost due to ground problems. The overall performance was well over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was excellent this week. The overall performance was nearly 100%.

4.2 Ground Stations & Network

The performance of the ground stations and Network was very good this week. There were, however, a couple of occasions of small TM drops from Redu, one of which caused the loss of a pointing. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs were received up to revolution 525, but due to uncertainties about Goldstone availability (see below), observations have only been planned up to 521

TSF's up to revolution 520 have been received.

2. Observation status

Received and processed ECS up to revolution 509.

135 ks of extra time were granted for proposal 0420003, (PI Beckmann, target MCG - 05-23-016), as result of time lost to solar flares.

3. ISOC Science Data Archive

Version 2.6 including INVITE is in use. Some problems have been found for large datasets, an update is in preparation with no release date set.

4. ISOC system

Version 14.0 with many fixes and improvements was successfully installed on 8 January. Versions 14.1 and 14.2 have been scoped and 14.1 will be ready for testing soon.

5. Problems

Uncertainties in the availability of Goldstone led to repeated deliveries of PSFs forcing re-planning on short notice of revolutions 520 and 521 and a delay of further planning.

4.3.2 ISDC

Status of ISDC observation processing on 15/01/2007:

- Latest Standard Analysis completed: observation 04200030001 (MCG -05-23-016, Revolution 508) on 12/01/2007.
- Latest products archived: observation 04200030001 (MCG -05-23-016, Revolution 508) on 12/01/2007.
- Latest observation products sent to the observer: observation 04200320001 (EXO 0748-676, Revolution 509) on 12/01/2007.

5 Special Events

6 Anomalies

The following problems that impacted operations were reported:

- On DoY 009, at 03:59, a hit on the line from Redu caused the loss of the slew to attitude 05170090.

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

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AR id	Date Created	Subject	Segment	Status
INT_SC-174	17/01/2007	IREM Anomaly: Reset of IREM_CSCI S/W #43, 12/01/2007	Payload	Open

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 517

The observations in revolution 517 began with a raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), lasting ~10.3 hours. It continued with a Galactic disk latitude scan, at attitude (RA 14:36:33.60, DEC -58:04:48.0), lasting ~17.1 hours. Finally a raster dither of the Galactic Plane Region 2 (RA 14:08:36.11, DEC -61:30:20.6), lasting ~28.0 hours, was performed until the end of the revolution.

Revolution 518

The observations in revolution 518 began with a raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), lasting ~9.6 hours. It continued with a raster dither of the Galactic Plane Region 2 (RA 14:08:36.11, DEC -61:30:20.6), lasting ~4.8 hours. Finally a hexagonal dither of the object GX 301-2 (RA 12:26:37.60, DEC -62:46:14.0), lasting ~40.7 hours was performed until the end of the revolution.

Revolution 519

The observations in revolution 519 began with a raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), lasting ~11.7 hours. It continued with a Galactic disk latitude scan, at attitude (RA 14:25:45.60, DEC -58:39:00.0), lasting 17.1 hours. Finally a hexagonal dither of the object 4U 1254-690 (RA 12:57:37.20, DEC -69:17:21.0), lasting ~27.8 hours was performed until the end of the revolution.

Throughout this observation, 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

2006-12-28T16:02:21.000Z	149.3455	F	Automatic TM processing.
2006-12-29T16:40:48.000Z	149.2801	F	Automatic TM processing.
2006-12-30T01:44:01.000Z	149.2732	F	Automatic TM processing.
2006-12-31T19:43:33.000Z	149.2620	F	Automatic TM processing.
2007-01-01T15:42:39.000Z	149.2160	F	Automatic TM processing.
2007-01-02T01:23:20.000Z	149.2070	F	Automatic TM processing.
2007-01-03T15:36:20.000Z	149.1790	F	Automatic TM processing.
2007-01-04T15:34:39.000Z	149.1339	F	Automatic TM processing.
2007-01-05T01:16:56.000Z	149.1183	F	Automatic TM processing.
2007-01-06T10:08:27.000Z	149.0762	F	Automatic TM processing.
2007-01-06T15:22:04.000Z	149.0598	F	Automatic TM processing.
2007-01-07T04:27:25.000Z	149.0138	F	Automatic TM processing.
2007-01-08T00:58:47.000Z	148.9922	F	Automatic TM processing.
2007-01-09T15:10:20.000Z	148.9843	F	Automatic TM processing.
2007-01-10T03:31:58.000Z	148.9570	F	Automatic TM processing.

This report was generated Fri Jan 12 08:00:32 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, 06/01/2007 –12/01/2007

AOCS operations were executed from the Automatic Timeline.

During this period, 84 Open Loop Slews, 109 Closed Loop Slews and 7 Momentum Biases were executed.

2 slews (1 OSL, 1 CSL) were missed from the TL during the observation period due to problem on the links with REDU station and the planned star not found during the search\track process for slew ID 05170040.

The OTF was not reached during PID 05180054, due to lost of guide star.

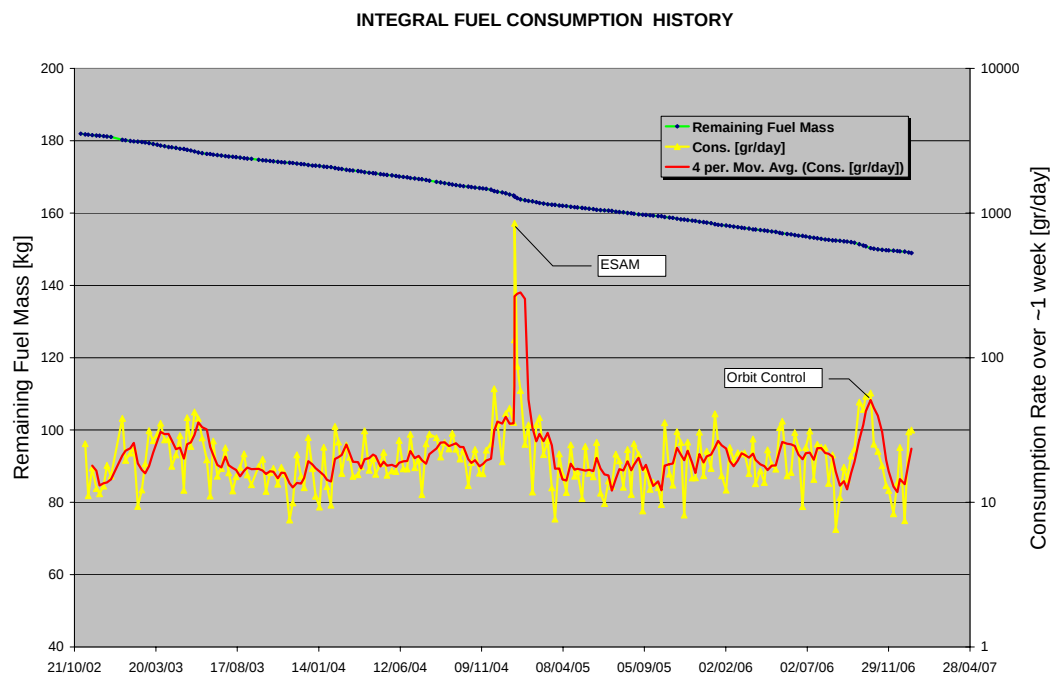
This is equivalent to a ~ 1 % of the total number of slews (194)

Orbit Control

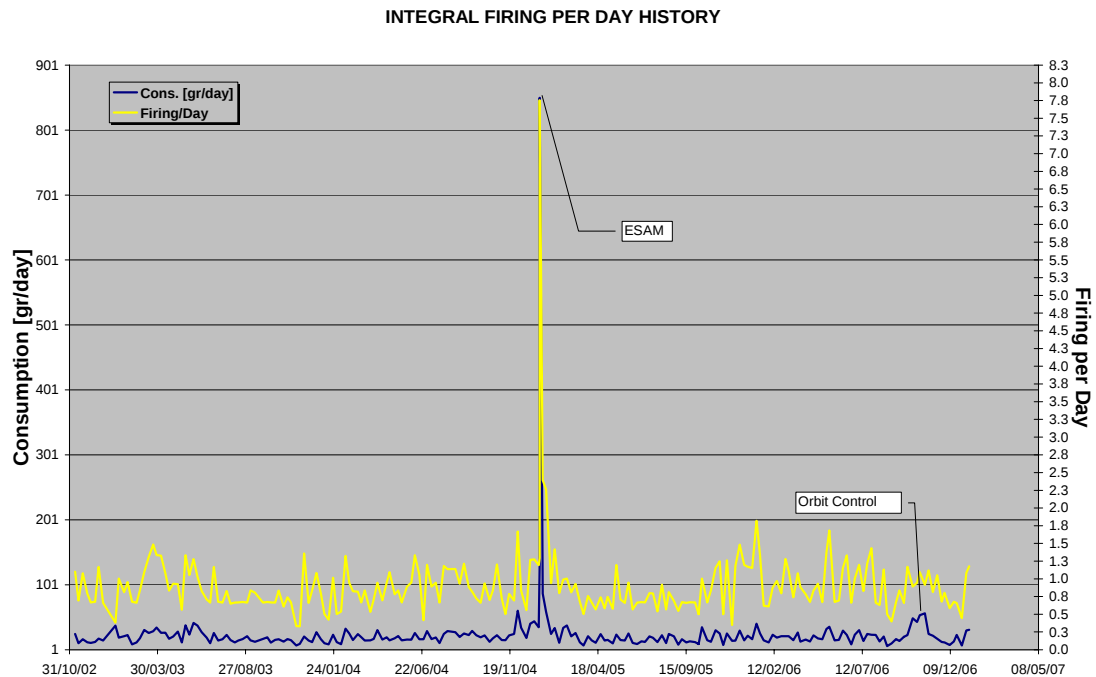
No update.

Fuel consumption

The fuel consumption (total, grams/day) over the period between 01/11/2002 and 10/01/2007 is reported in the plot below.

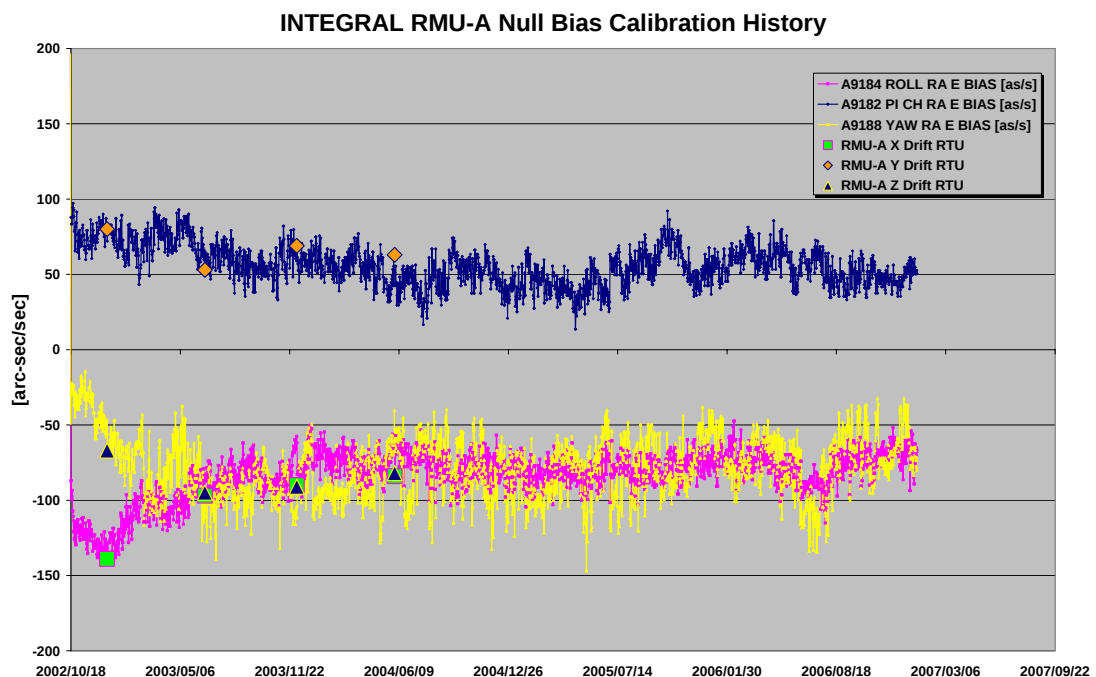


The firing\day over the period between 01/11/2002 and 10/01/2007 is reported in the plot below.

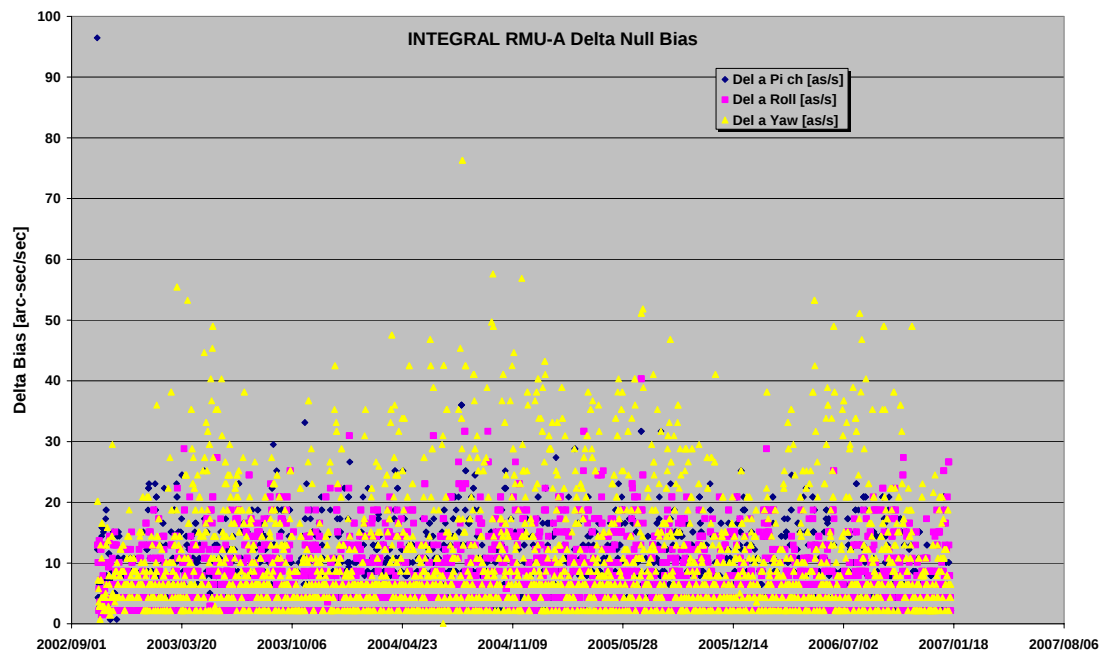


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 12/01/2007 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 12/01/2007 is reported in the plot below



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06/01/07 (Day of Year 006, Revolution 516-517)

Nothing to report

07/01/07 (Day of Year 007, Revolution 517)

Guide star not found, problem on Search\Track process: at 17:25z the planned guide star, GSC 9034 2416, was not found at expected CCD location [-17794, -14241], during the search\track process. This caused slew ID 05170040 to fail release due to static PTV.

A manual recovery was then performed from attitude of PID 05170039 to the attitude of PID 05170041. The next slew ID 05170042 was manually update in TL and the AOCS s/s enabled in TL at 18:07z.

The reason of the failing of the search\track process is likely the presence of a dim companion at CCD location [-18032, -14490] very close to the selected guide star.

The following slew was not executed form TL: 05170040(CSL).

08/01/2007 (Day of Year 008, Revolution 517)

Nothing to report

09/01/2007 (Day of Year 009, Revolution 517-518)

Problem on links to REDU station: at 03:59z due to a problem on the links with REDU station, the slew ID 05170090 failed release and the AOCS s/s disabled.

A manual recovery was then performed from attitude of PID 05170089 to the attitude of PID 05170090 (perigee passage attitude) and the AOCS enabled in TL for the end of revolution (LOS at 10:24z).

The following slew was not executed form TL: 05170090(OSL).

10/01/2007 (Day of Year 010, Revolution 518)

Nothing to report.

11/01/2007 (Day of Year 011, Revolution 518)

Lost of guide star at the end of close loop slew: at 16:31:16z after the execution of slew ID 05180054, the guide star was lost during the pointing stabilization phase (manoeuvre time still running). As automatic reaction the ACC switched ON the IMU 1 and an automatic mapping was commanded.

The guide star was Mi 6.4 at CCD location [5295, 6211]. The new guide star picked after automatic mapping was Mi 8.3 at CCD location [3227, -2912].

A manual recovery was performed and the next slew ID 05180055 was manually updated in TL.

The reason for the loss of the guide star is likely to be the presence of a dim companion (not in star catalogue) ~50 arcsec away apart.

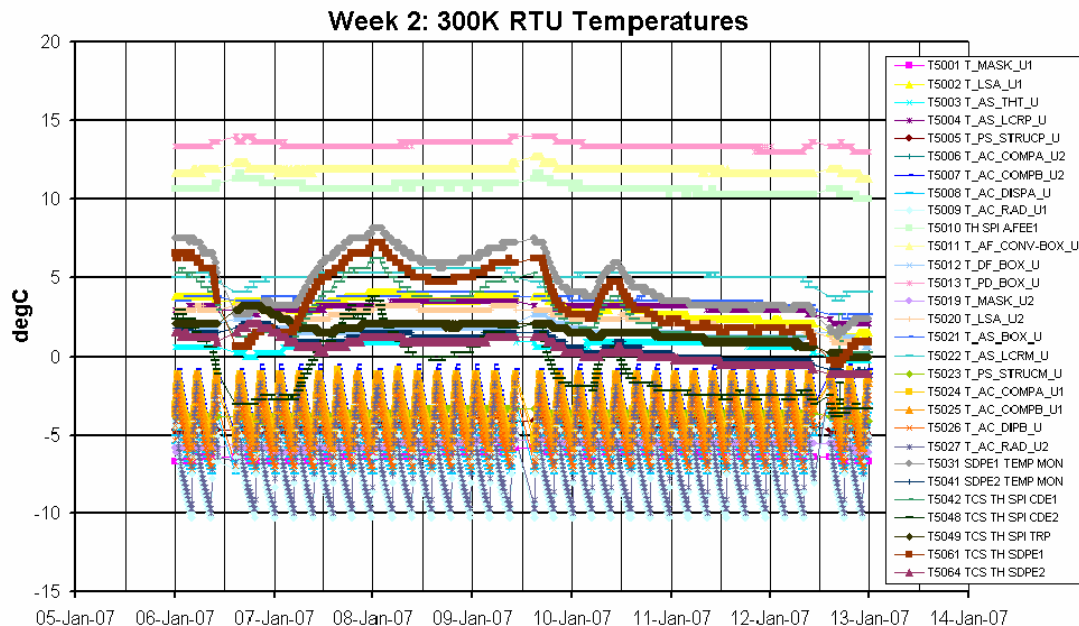
No impact on TL reported except the OTF was not reached during PID 05180054.

12/01/2007 (Day of Year 012, Revolution 518-519)

Nothing to report.

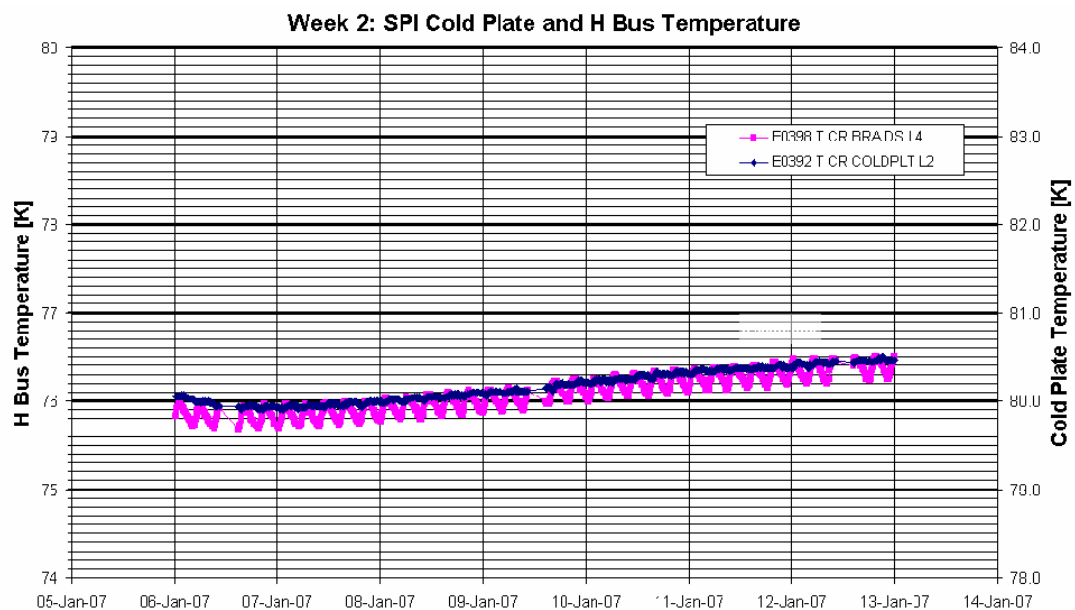
8.3.2 SPI Operations

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 to 80K +/-1K.

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

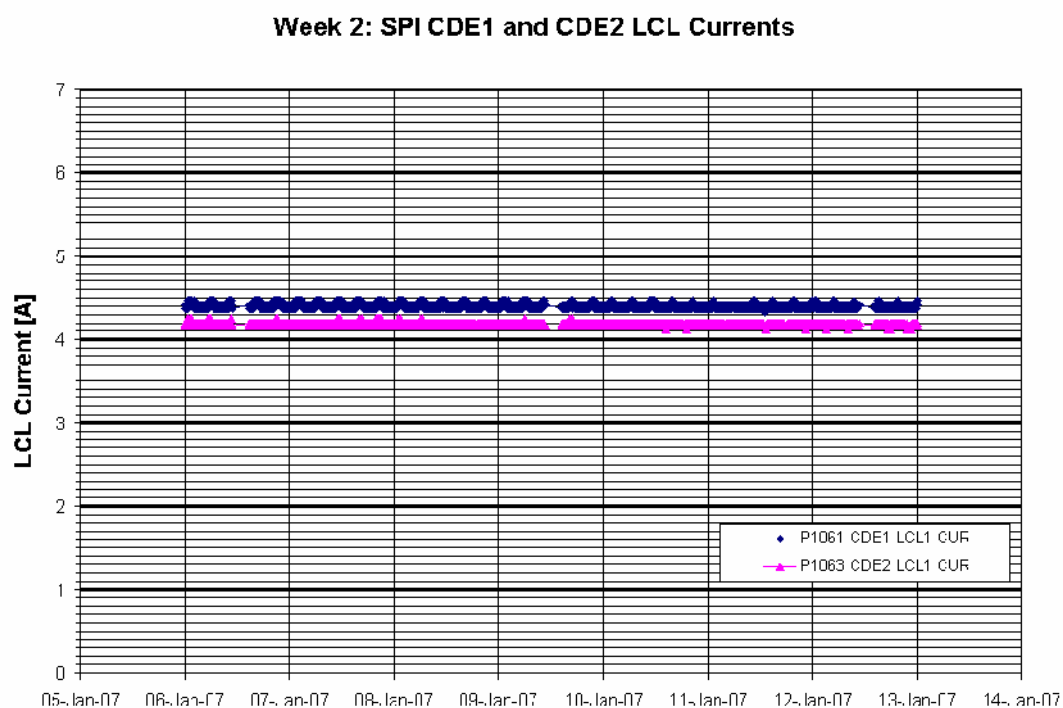


The stroke of all four compressors was set at 38 throughout the week.

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

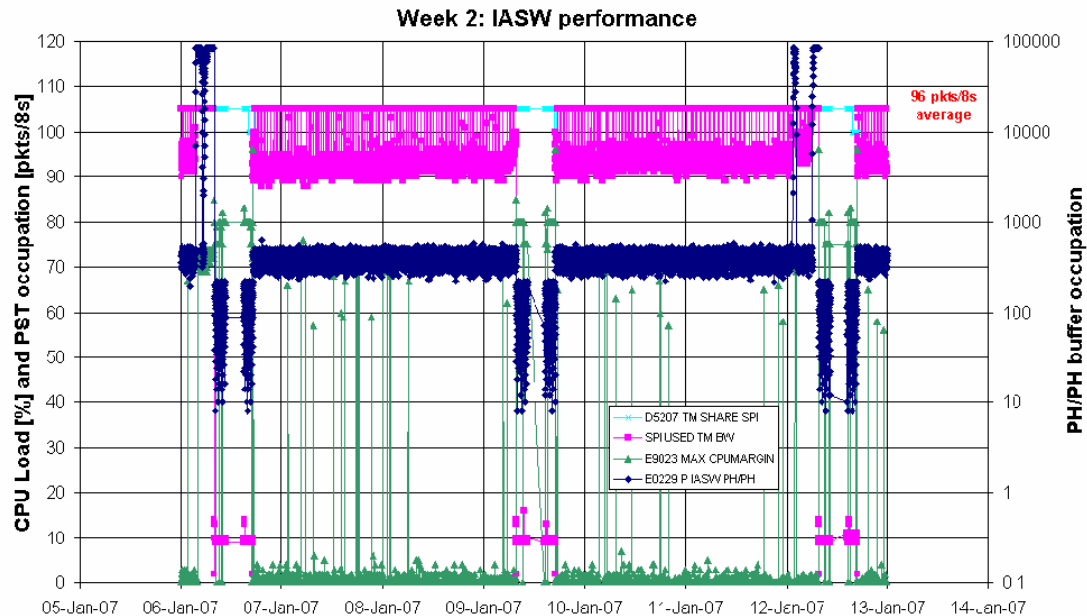
- Average CDE1 LCL Current = 4.41A
- Average CDE2 LCL Current = 4.18A

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



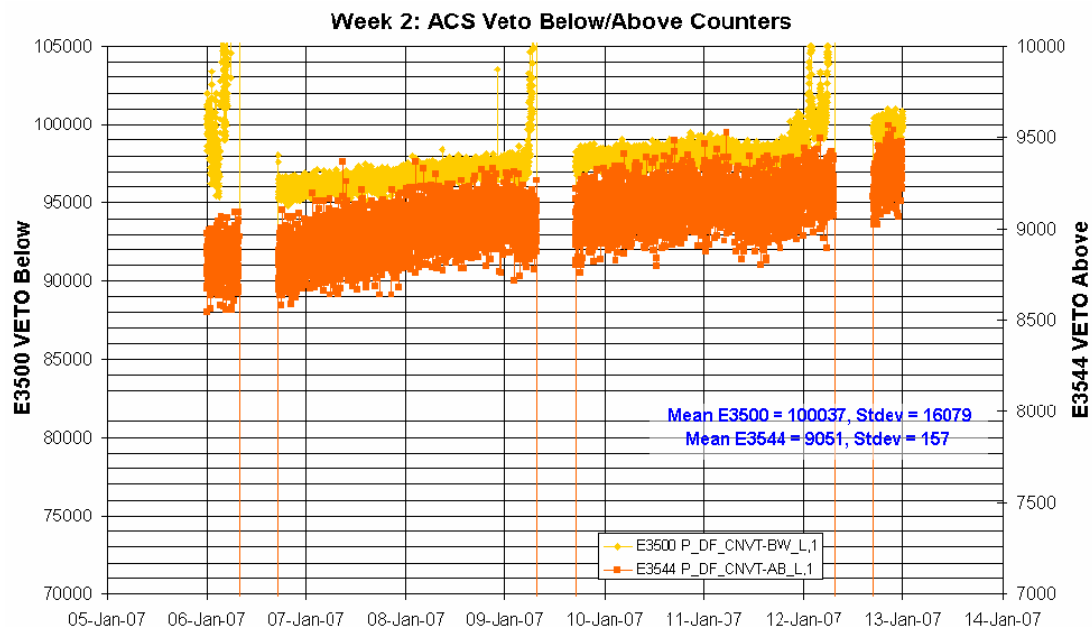
DPE & IASW: The DPE health and IASW performance is nominal. The current IASW version installed is 432. The average TM bandwidth occupation of SPI was 96 packets/cycle over the science window, when the TM allocation was 105

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).

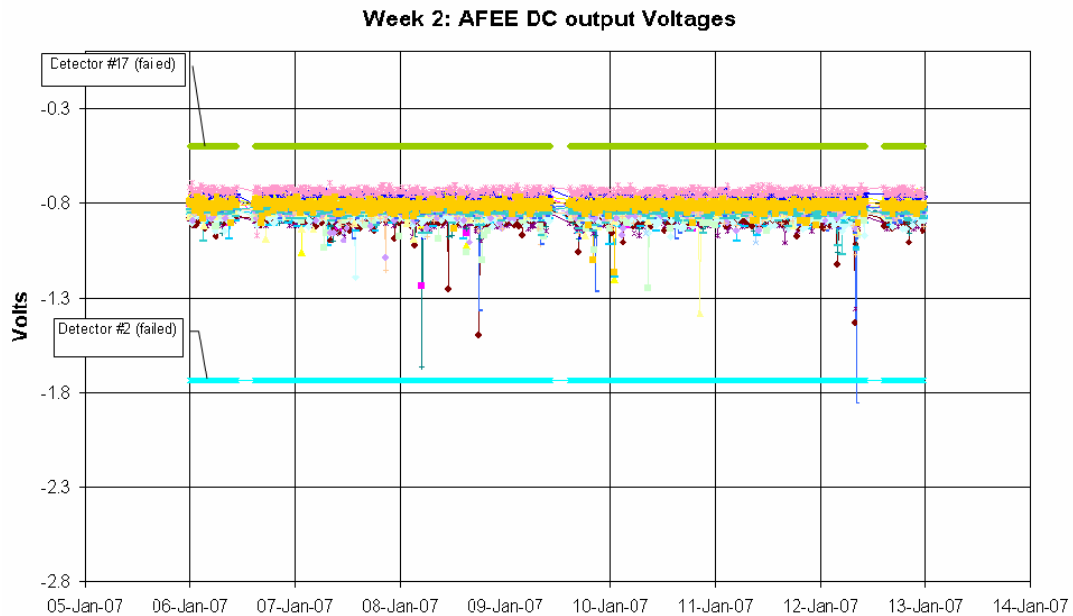
The following plot shows the ACS overall count rate evolution during the reporting period:



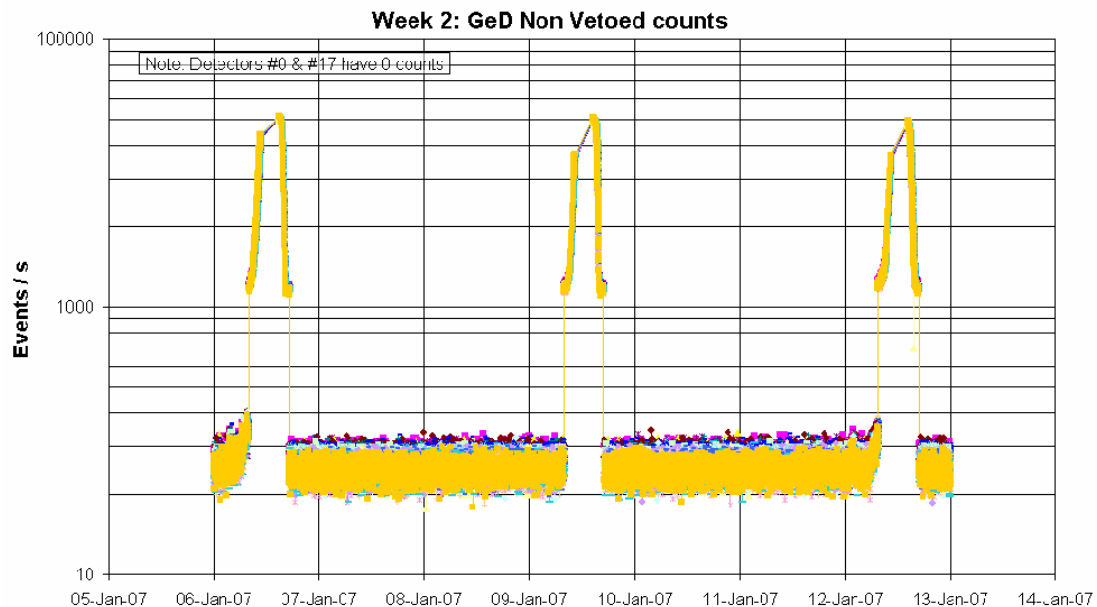
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution. The energy resolution of GeD#4 was recovered with the last annealing.

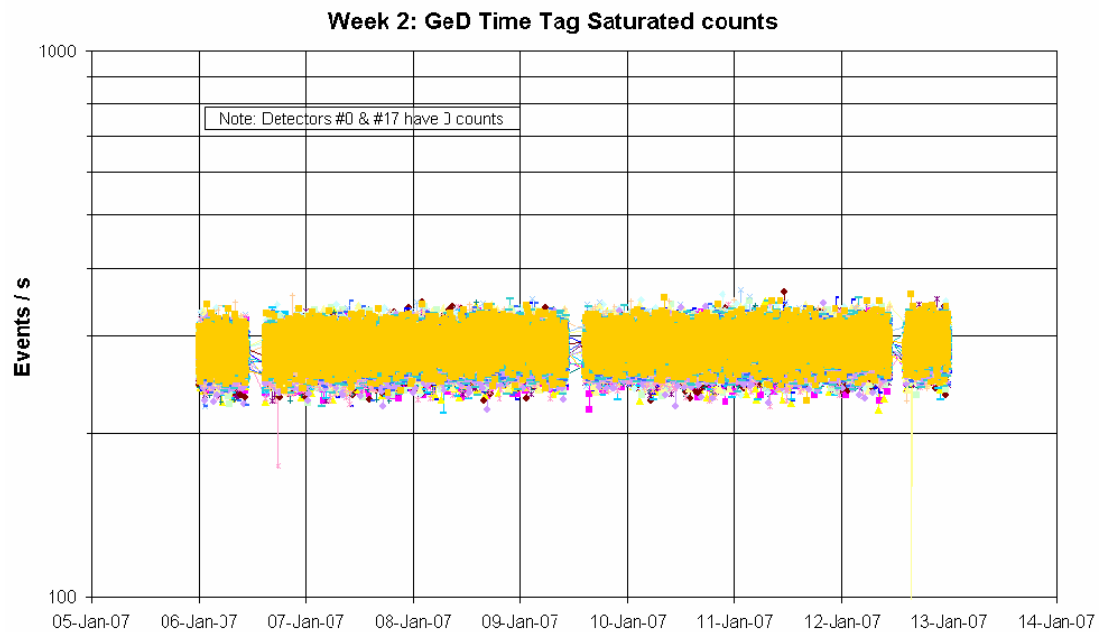
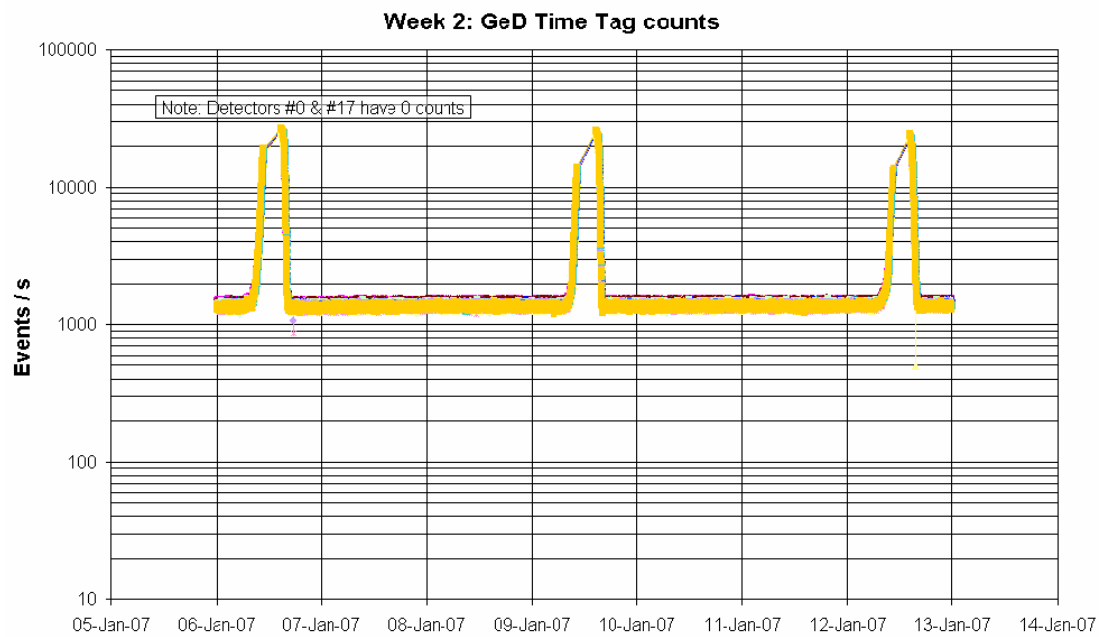
The GeD#12 HV remained at 3.5kV throughout the reporting period.

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

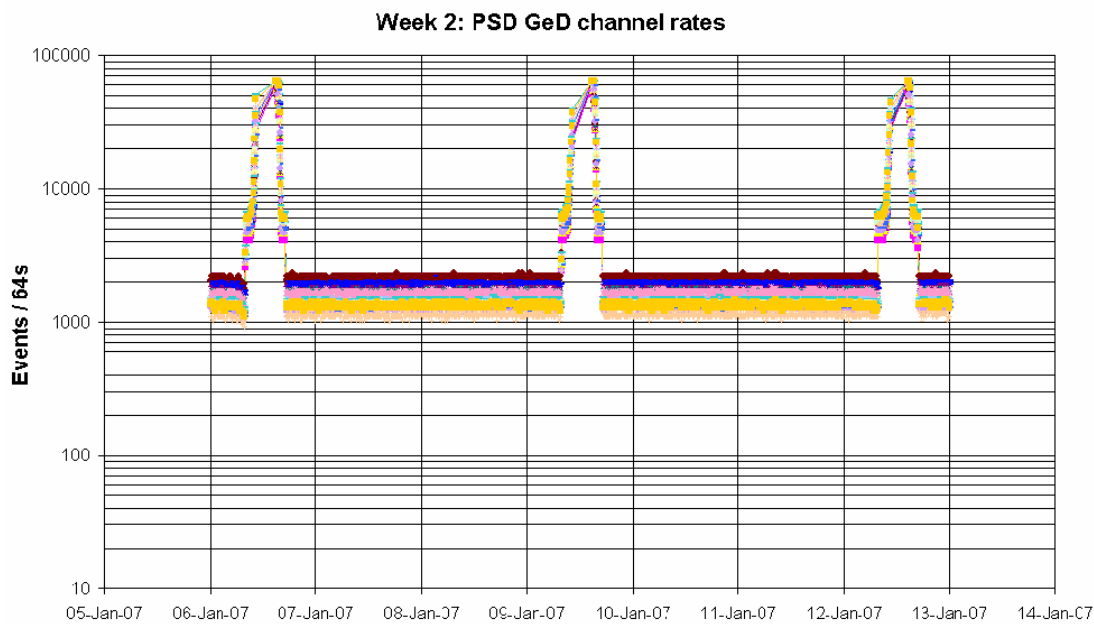


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.





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



Event Log:

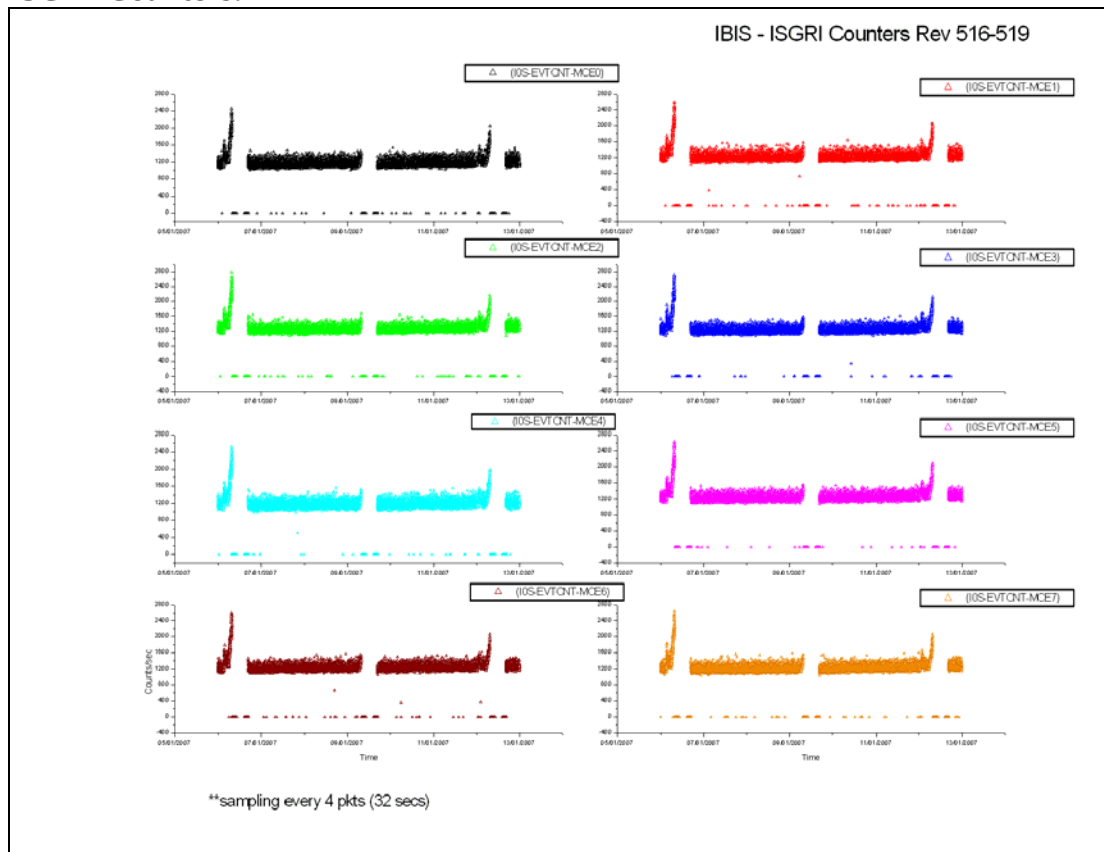
The following non-nominal events occurred on SPI during the reporting period:

- On 2007-01-06 at 03:30:50Z the TM parameter E3500 P_DF_CNVT-BW_L starting going OOL High. This was ~4.5 hours before radiation belt entry of revolution 516. No action was taken.
- On 2007-01-06 at 10:23:21Z OEM APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the LOS_CHK window of revolution 516, when the SPI1 DPE time verification TC was sent. This OEM is sometimes received when this TC is sent and no action was taken.
- On 2007-01-06 at 14:51:57Z TM parameter E4009 S DF HSLERR L went OOL, indicating errors on the HSL, and returned within limits at 14:52:13Z. This was just after AOS of revolution 517.
- On 2007-01-09 at 06:43:14Z the TM parameter E3500 P_DF_CNVT-BW_L starting going OOL High. This was ~1 hour before radiation belt entry of revolution 517 and therefore no action was taken.
- On 2007-01-12 at 01:35:30Z the TM parameter E3500 P_DF_CNVT-BW_L went OOL High, returning within limits at 01:52:42Z. It started toggling OOL High again at 05:57:06Z. This was ~1.5 hours before radiation belt entry of revolution 518 and therefore no action was taken.
- 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.

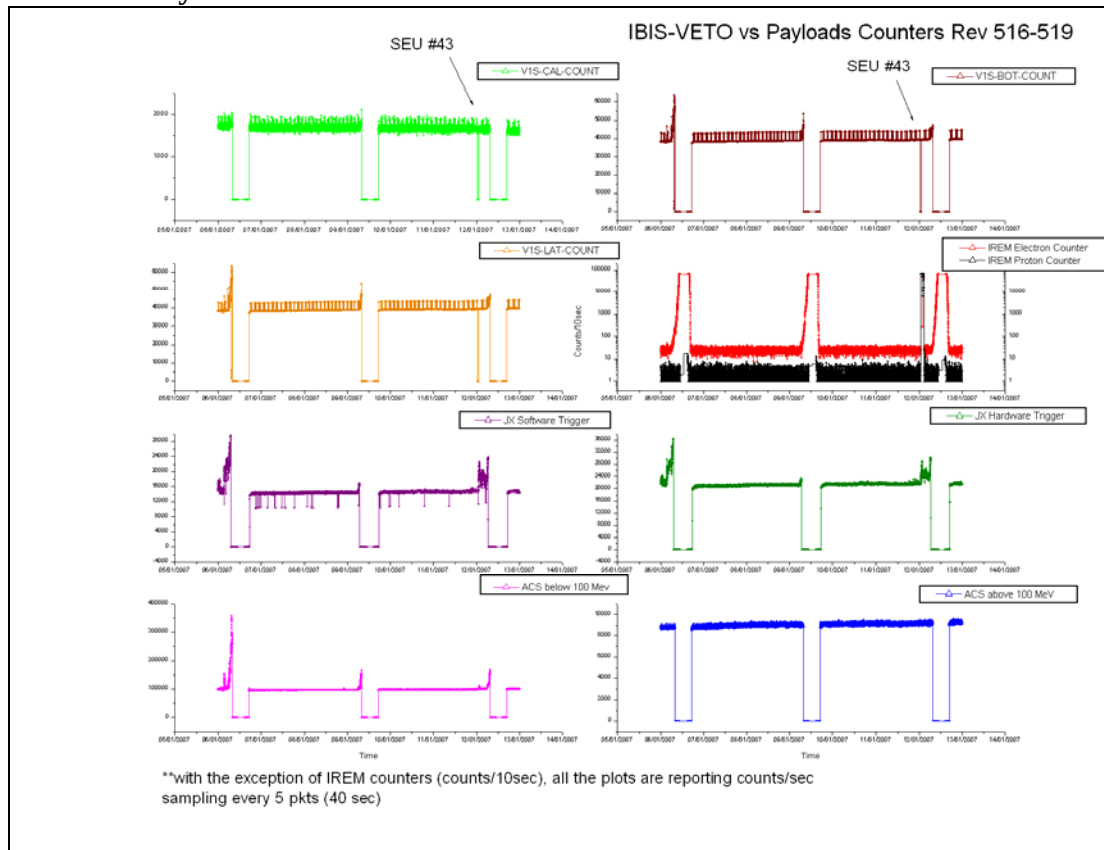
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

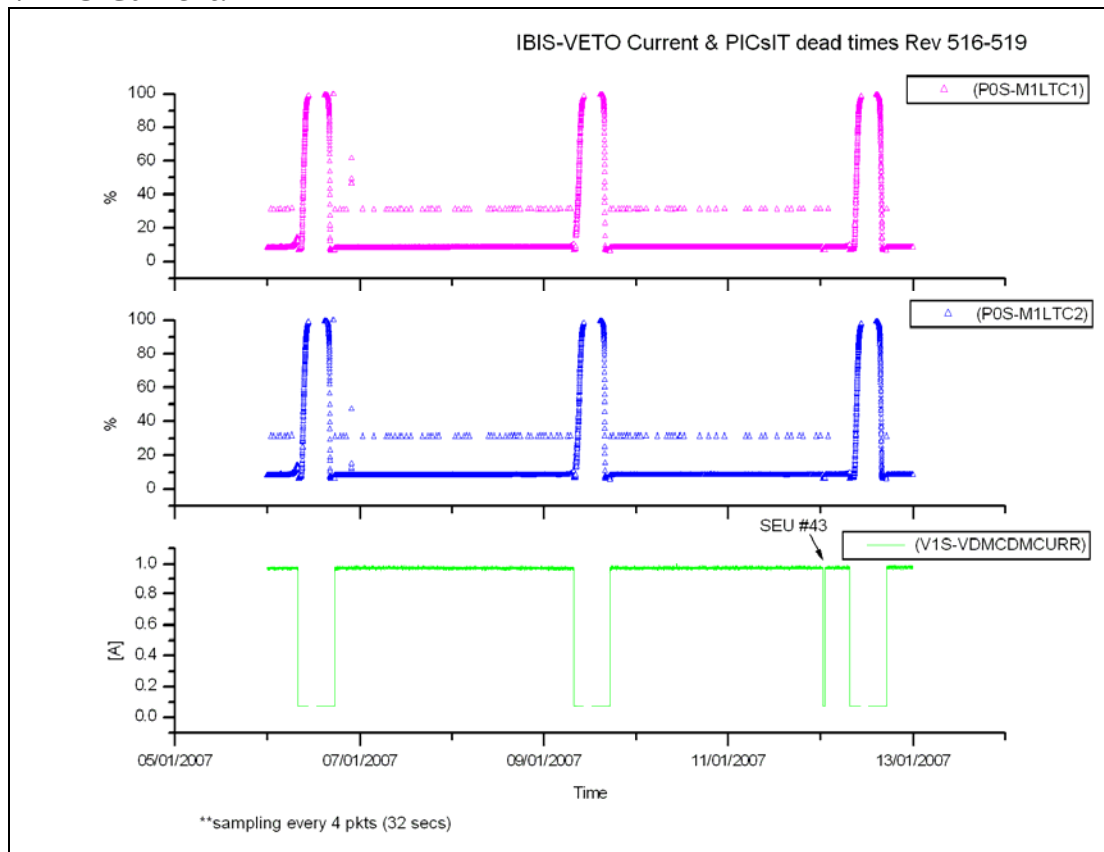


VETO vs Payloads Counters:

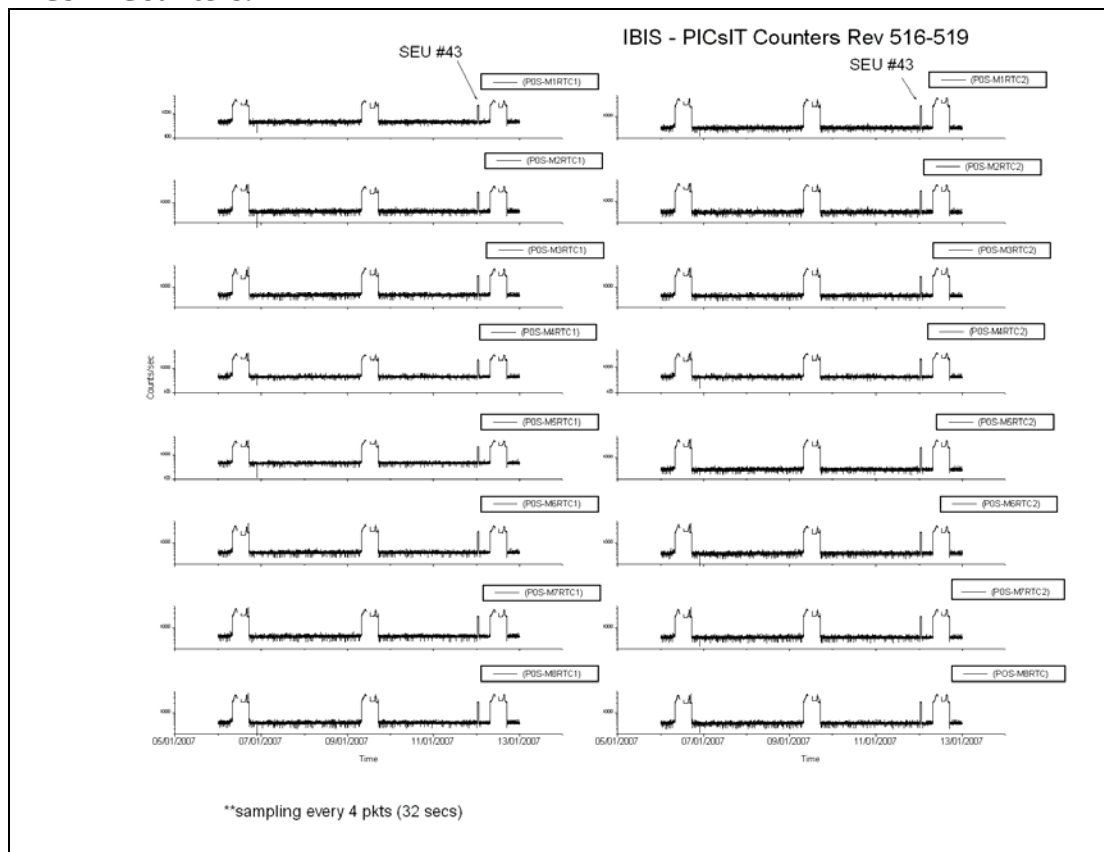


The week was characterised by low radiation.

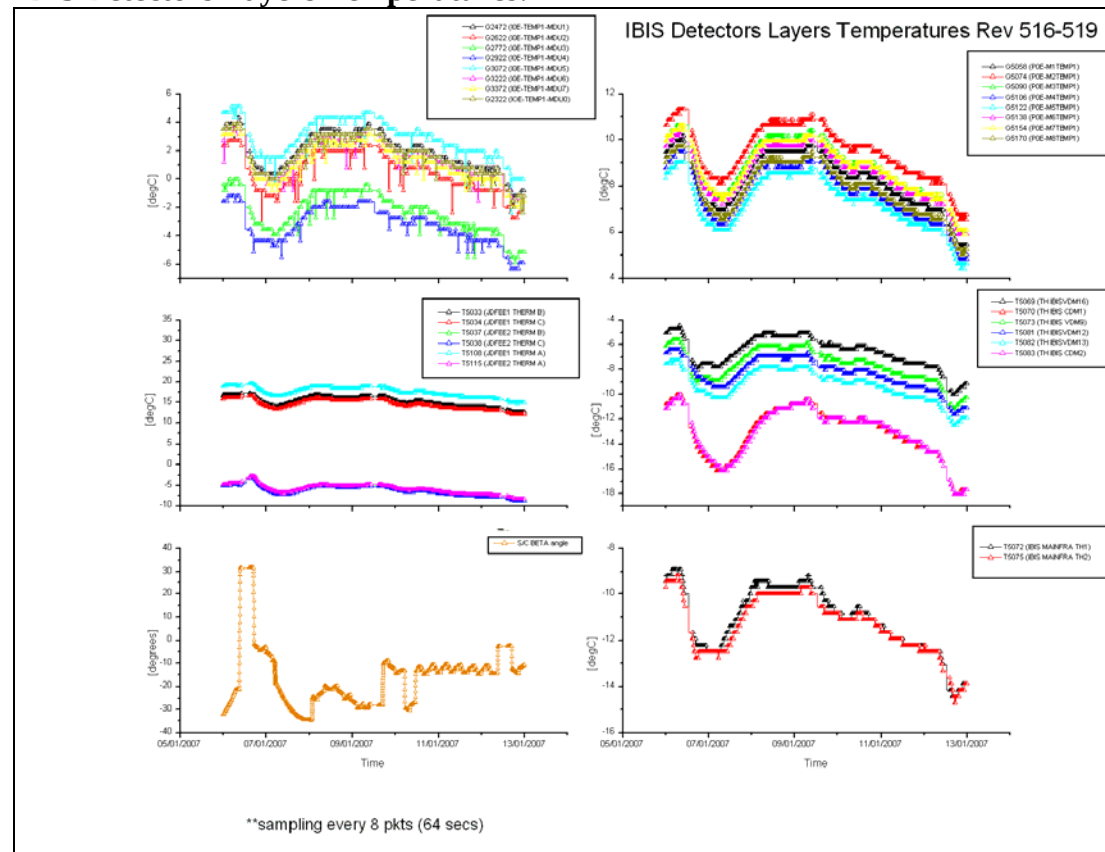
VETO Current:



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 2007.011 (11/01/2007):

At 14:29Z user defined parameter X7500 (IBIS HIST DWN LD) was reported OOL for several cycles and the histograms had stopped to cycle between buffers in term of integration and downlink.

At the start of the next pointing (05180053) at 15:28Z as the anomaly was not fixed, it was decided, on SOE guidance, to follow the FDIR reaction and execute procedure FCP_IBIS1_0312 (IBIS READ ALL REMAINING HISTOGRAMS).

The first step of this procedure put IBIS in Stand-By at 15:52Z. At 16:04Z (once buffers were cleared) IBIS was sent back into scientific standard mode via TC G0129. This recovery seemed successful. However the loss of Guide Star by the star trackers at the beginning of pointing 0054 (16:31Z) let the AOCS system in a mode not recognised by IBIS as pointing (TM parameter G8520 =SLEW). At the start of the next pointing (0055) at 17:31Z, histograms started accumulating again.

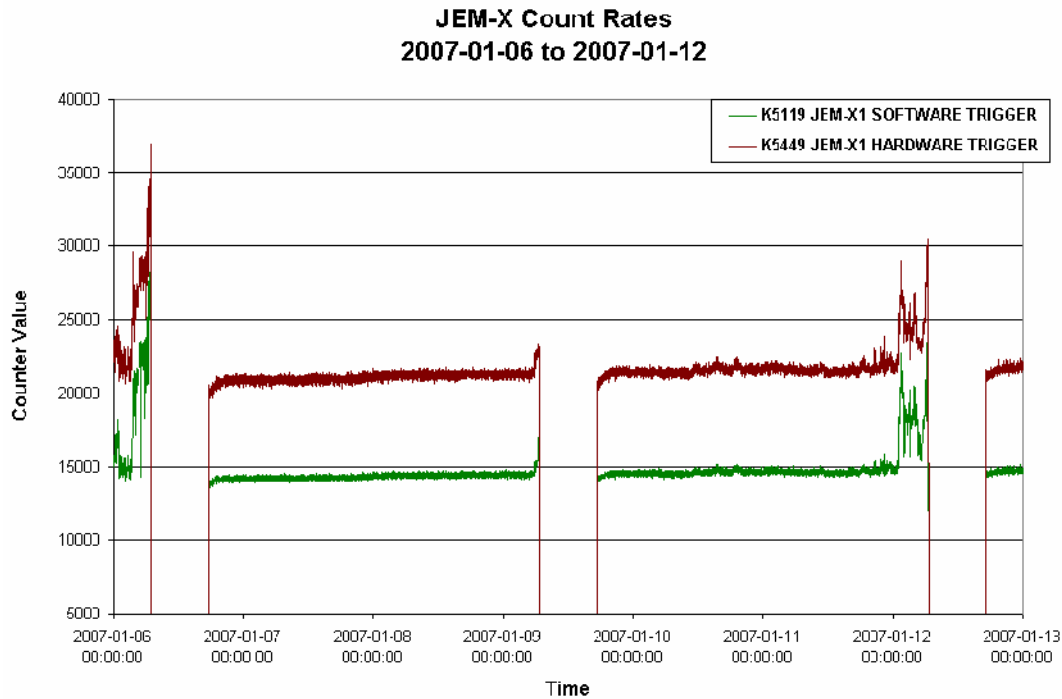
DoY 2007.012 (12/01/2007):

At 00:39Z, IBIS went to Stand-By mode as automatic reaction to the IREM SEU #43. The unit was fully recovered by the operator at 01:26Z.

8.3.4 JEM-X Operations

JEM-X Count Rates

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

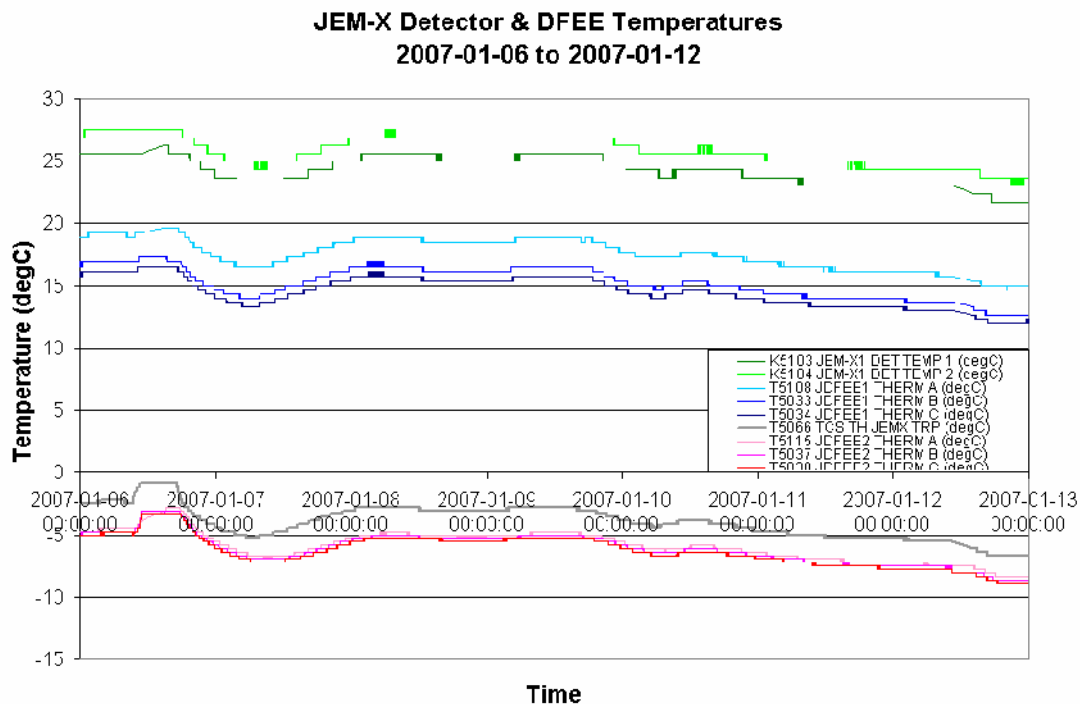


JEM-X Temperatures

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

2007-01-06 (DOY 006, Rev 516-517)

Due to high background radiation conditions, at 04:37:57Z the TM parameter K5136 BUFFER LOSS started toggling OOL High and at 06:20:05Z K5449 HARDWARE TRIGGER also started toggling OOL High. The situation remained as such until JEM-X1 was commanded to Safe mode by the ED KESAFE02 in the Timeline at 07:02:10Z.

JEM-X1 operations continued nominally.

2007-01-07 (DOY 007, Rev 517) to 2007-01-11 (DOY 011, Rev 518)

JEM-X operations executed nominally.

2007-01-12 (DOY 012, Rev 518-519)

At 00:39Z an IREM SW reset (see INT_SC-174) caused the IREM RMC parameters K5315-K5317 to go OOL high (value = 65535). This did not affect JEM-X1 as the JEM-X reactions to IREM are disabled.

Due to high background radiation conditions, at 06:19:42Z the TM parameter K5449 HARDWARE TRIGGER started toggling OOL High. The situation remained as such until JEM-X1 was commanded to Safe mode by the ED KESAFE02 in the Timeline at 06:36:46Z.

JEM-X1 operations continued nominally.

8.3.5 OMC Operations

2007-01-06 (DoY 006, Rev 516)

Nothing to Report.

2007-01-07 (DoY 007, Rev 517)

At 17:25, a problem with the AOCS caused the Guide Star Commands to fail release. This led to the loss of pointing 05170040. It was at this time the following commands were rejected:

2007.007.17.28.15.166	2007.007.17.28.25.329	1792	RealTime	131	TC REJECT	
REJECTED TC1			0	0	65535 PR	N
E E						
2007.007.17.28.21.166	2007.007.17.28.25.343	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.

2007-01-08 (DoY 008, Rev 517)

Nothing to Report

2007-01-09 (DoY 009, Rev 517-518)

At 03:59, hits on the line with Redu led to the loss of pointing 05170090. It was at this time the following commands were rejected:

2007.009.04.02.38.926	2007.009.04.02.49.396	1792	RealTime	131	TC REJECT	
REJECTED TC1			0	0	65535 PR	N
E E						
2007.009.04.02.44.864	2007.009.04.02.49.404	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.

2007-01-10 (DoY 010, Rev 518) to 2007-01-11 (DoY 011, Rev 518)

Nothing to Report

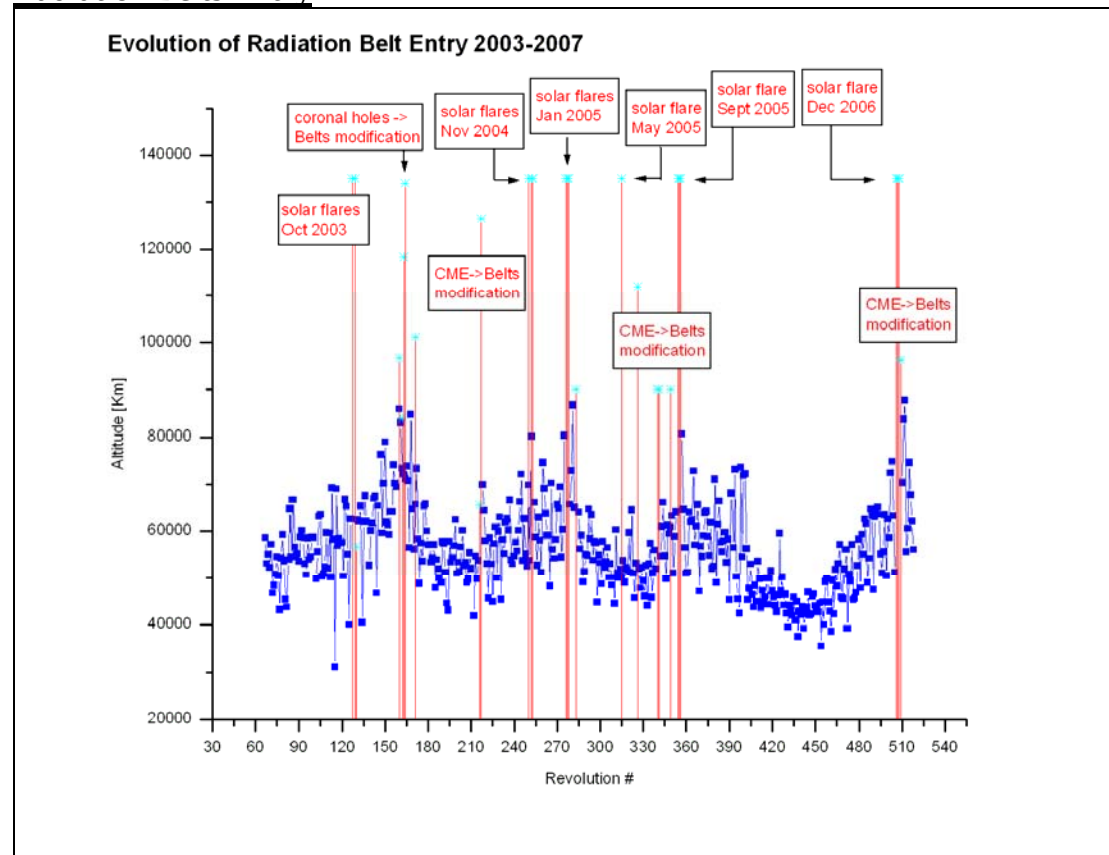
2007-01-12 (DoY 012, Rev 518-519)

At 00:39:20, an IREM SEU (#43) forced the unit to SAFE mode. A recovery was promptly executed, and the unit returned to Stand-by at 01:00:24, and returned to Normal mode at 02:05:59 according to the Timeline. The impact was the truncation after 2161 from a scheduled 3572 seconds of pointing 05180061, and the loss of pointing 05180062.

On DoY 006 at 07:57:35, DoY 009 at 07:44:56 and DoY 012 at 07:32:16 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

On 2007/01/12 at 00:39Z, a local reset of the IREM CSCI S/W (SEU #43) occurred as previously the status of the unit, before the anomalies, was nominal, here is a summary:

- 1) The temperatures were nominal
- 2) The LCL current was nominal
- 3) The last HK before the anomaly showed HV, 5V and 6V voltages inside limits
- 4) The anomaly occurred at 2007.012.00.39.00Z at 98329.0km. The unit had performed an automatic transition to Standard Mode (ie. no block counter increasing, all the TM words= FFFF hex); just before the anomaly, radiation counters reported nominal values considering the position of the S/C along the orbit
- 5) The recovery of the unit started at 00:39Z using procedure CRP_SYS_2570. The first dump of the status word after the anomaly showed a value of BCC0 HEX = 48320 DEC = 1011110011000000, i.e the Checksum Failure flag shows YES. The unit was still reporting the status as if it was in Integral mode with counting ON, accumulation ON and checksum failure flag ON. This value of the status word is assumed to be an old one written by the S/W at the moment of the anomaly.
- 6) A dump of all the registers gave a status word BC80 HEX = 48256 DEC = 1011110010000000, ie. the unit was still reporting the status as if it was in Integral

mode but the Checksum Failure flag was this time OFF and the checksum counter in the register number 3 incremented by 1 unit.

7) The patch was performed successfully with the correct re-starting of the S/W following procedure FCP_RM_0081. The operation was completed at 03:11Z.

The IREM automatic transition to Standard Mode affected the instruments by forcing them to automatically enter Safe configuration, except for SPI and JEM-X whose automatisms are disabled according to the PIs request.

The recovery of the payload was performed with OMC re-enabled at 01:00Z and IBIS re-enabled at 01:26Z.

The cause of these S/W resets is still under investigation, but it is apparently due to the unit's memory device that is sensitive to radiation.

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]
516	RAD_ENTR R 2007-01-06T07:57:34Z	2007-01-06 06:24:54	67737.0	2007-01-06 08:50:34	48632
517	RAD_EXIT R 2007-01-06T17:15:22Z	2007-01-06 16:25:42	37458.3	2007-01-06 16:50:34	41529
517	RAD_ENTR R 2007-01-09T07:44:52Z	2007-01-09 06:56:06	62169.9	2007-01-09 08:38:20	48638
518	RAD_EXIT R 2007-01-09T17:02:47Z	2007-01-09 16:04:22	<<42471.1	2007-01-09 16:38:20	41493
518	RAD_ENTR R 2007-01-12T07:32:11Z	2007-01-12 09:32:06	98329.0	2007-01-12 08:28:20	48316
519	RAD_EXIT R 2007-01-12T16:49:59Z	2007-01-12 16:12:14	39327.4	2007-01-12 16:28:20	41849

Reference

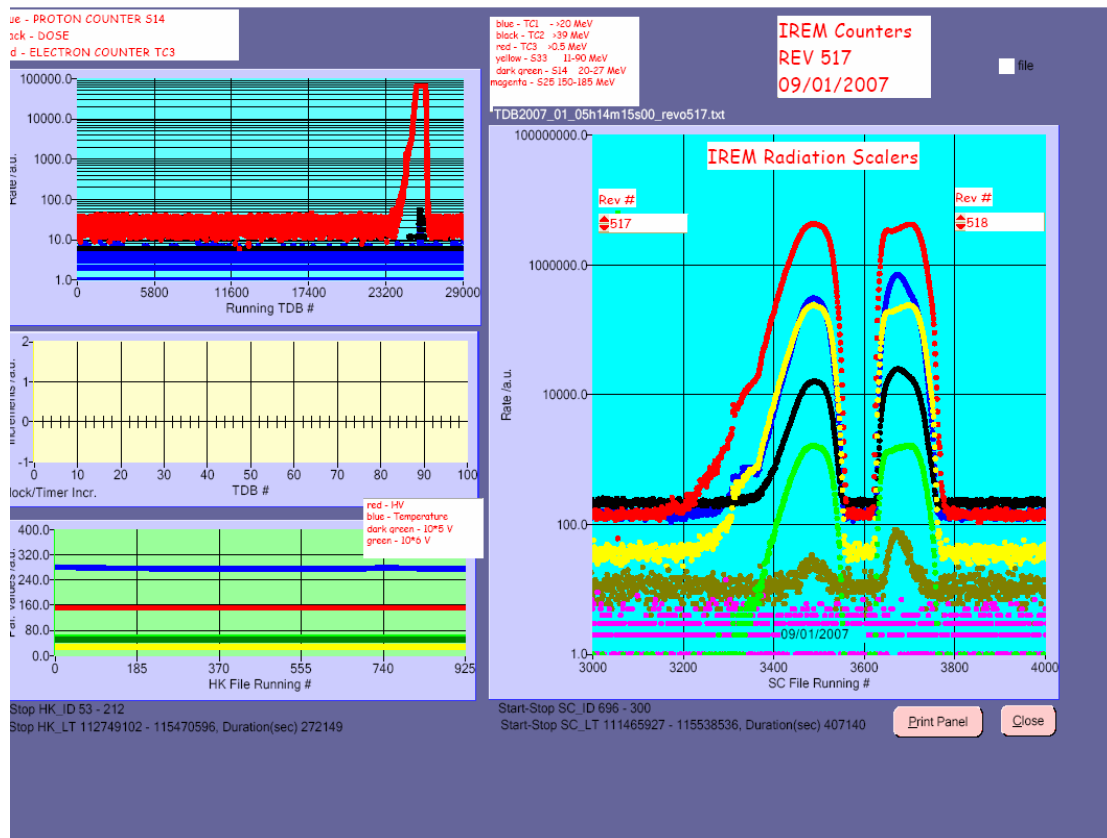
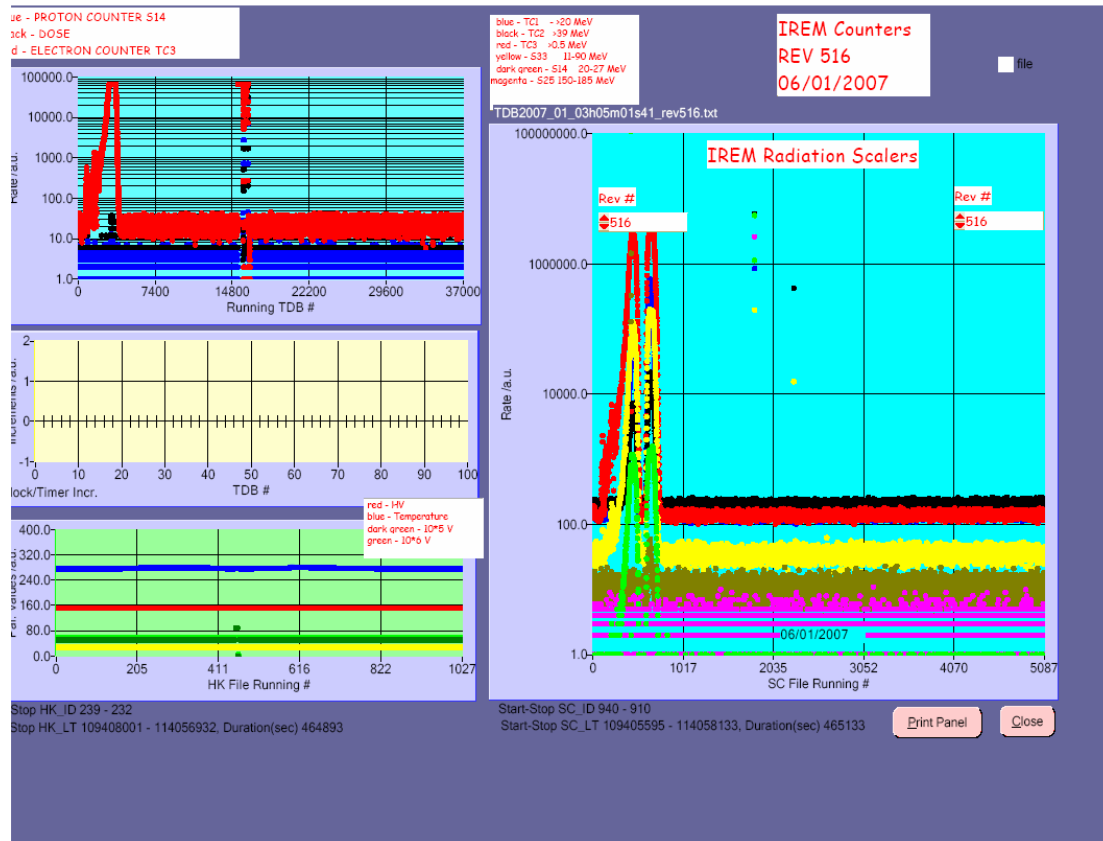
Very small error vs reference (less than 10 minutes)

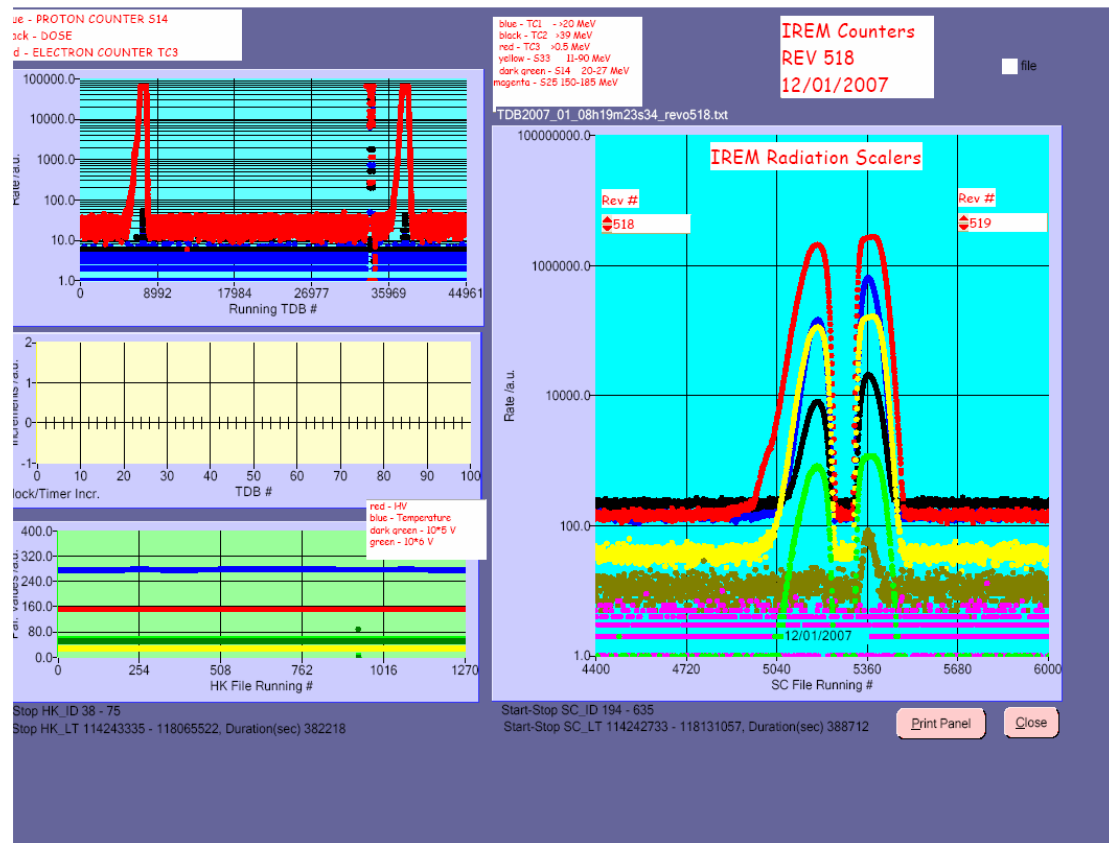
Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

Radiation Spike

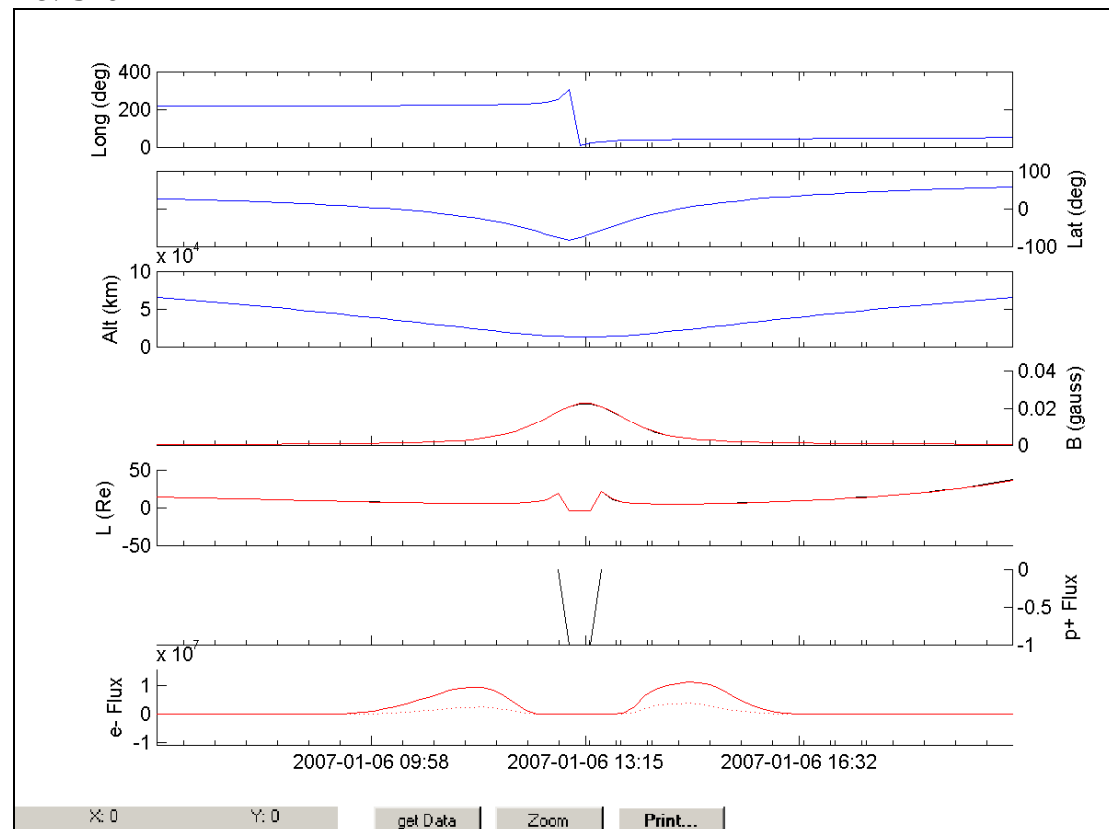
IREM radiation counters:



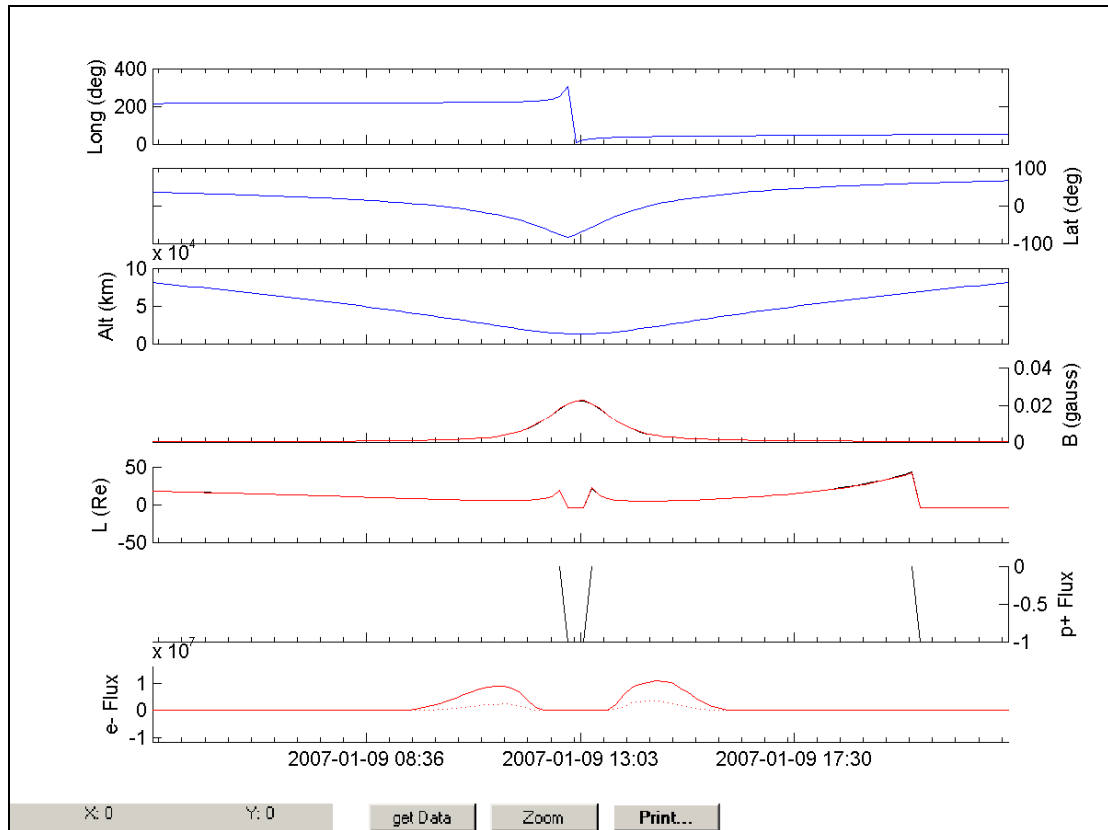


IREM Predicted Radiation Belt Passages

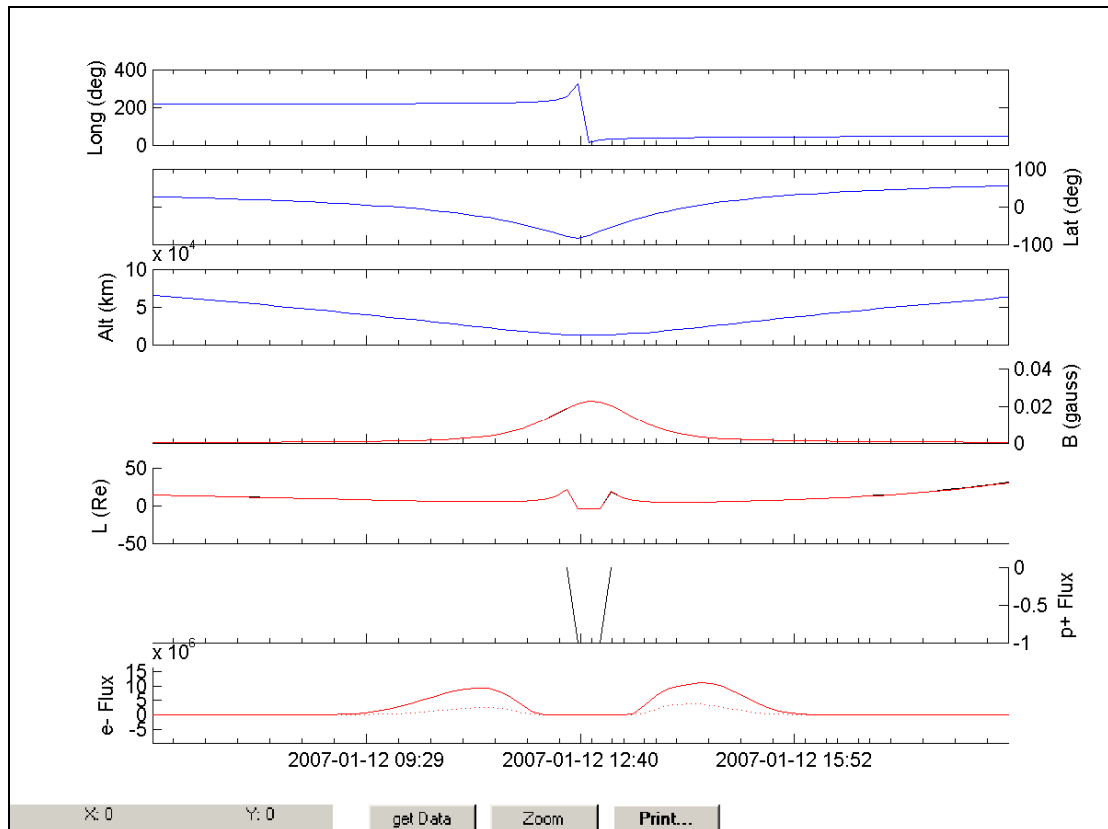
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Rev 518



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Date : 15/01/07

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

No plots are provided this week as several gaps were present. The radiation (X-ray, electron and proton flux) was low.