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

INTEGRAL
Mission Report

INT-MOC-SYS-RP-1001-OPS-OAI

No. 277
Week 02

14.01.08

Routine Phase

Prepared by: M.J.H. Walker (OPS-OAI) and INTEGRAL FCT

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1 General

The Flight Control Team at MOC has compiled this report with some input provided by the Flight Dynamics Team, ISOC and ISDC.

It addresses the activities from 05.01.08 until 11.01.08 (both dates inclusive) and covers the revolutions 639 and 640.

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 two raster dithers of Loop I-Loop IV Super (RA 13:57:10.00, DEC +07:34:37.0), and two raster dithers of the Galactic Plane Region 3 (RA 13:09:32.98, DEC -62:47:56.4).

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.

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

The fuel consumption over the period between 04/01/2008 and 10/01/2008 was 0.1989 Kg. The remaining propellant is in the order of 142.8140 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

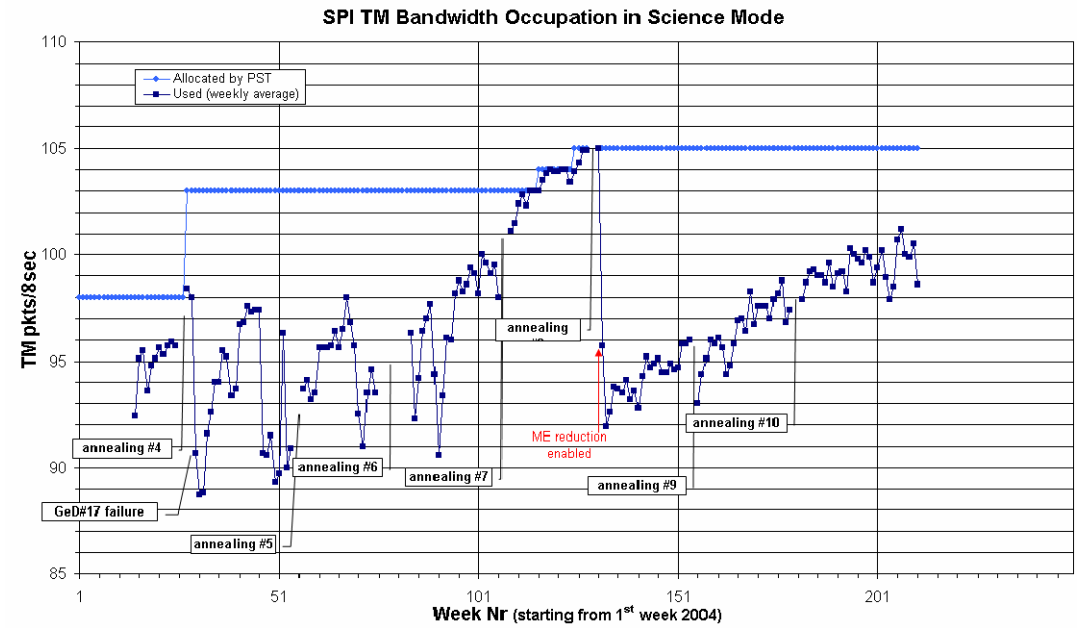
3.2.1 SPI

Following the 10th annealing, which ended on 17th June, 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). 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. The average telemetry occupation in the science windows was 98.6 packets/cycle.

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



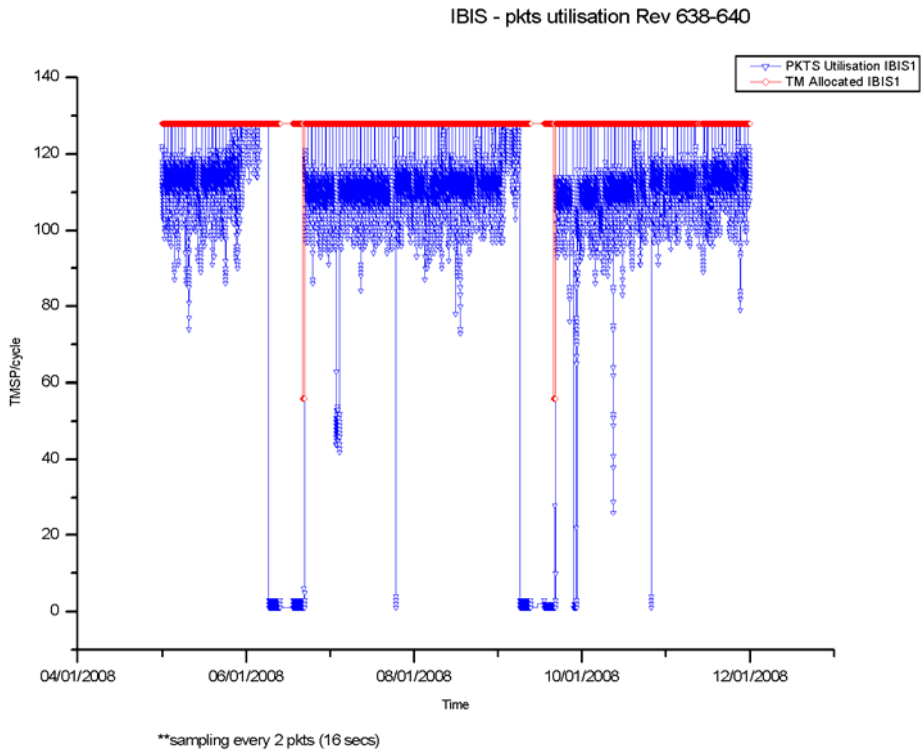
Note: Some more information concerning the SPI operations is provided in the Appendix.

3.2.2 IBIS

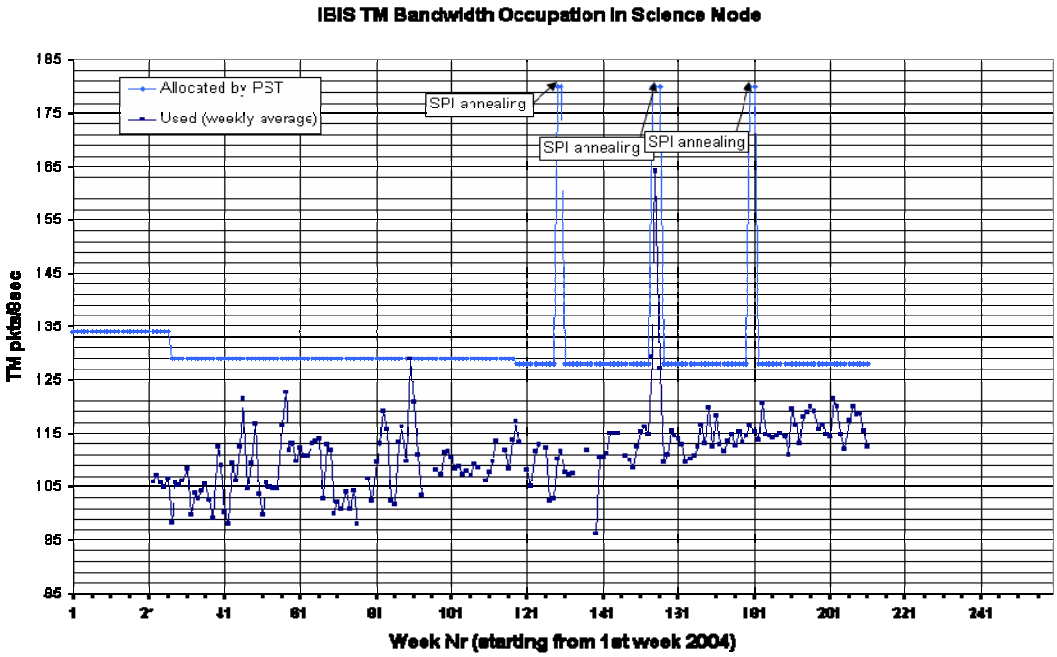
The overall status of the unit is nominal.

During the reporting period, the PST allocation to IBIS was 128 packets/cycle. The IBIS mean bandwidth utilisation during the observation period (when IBIS was in Science mode) was 112.50 packets/cycle, down 2.95 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, 137 of the 138 planned science pointings for OMC were executed nominally, 1 was interrupted by an IREM SEU.

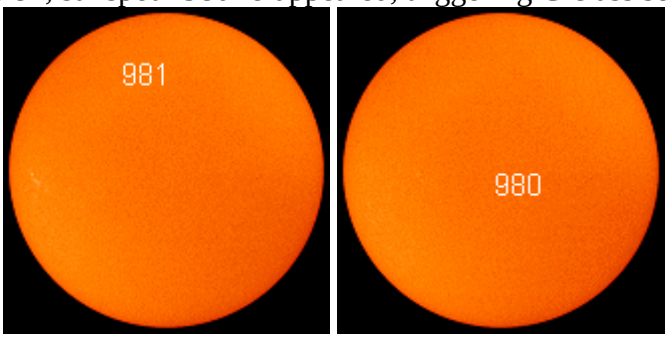
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. From the beginning of the week until 7th 1st January 2008, sun spot #981, the first of the next solar cycle was present. From the 8th, sunspot #980 re-appeared, triggering C-class 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. No pointings were lost. The overall performance was nearly 100%.

4.1 Mission Operations Centre

The performance of the MOC was excellent this week. However, there were 2 occasions of lost connections with the RT cache, and the Command Verifier crashed twice, on one occasion delaying the activation of JEMX by half an hour.

4.2 Ground Stations & Network

The performance of the ground stations and Network was very good this week. There was, however, 1 occasion of a TM drop from Redu, and 1 from DSS24, both without impact. There were 2 incidence where the link with ISDC dropped, also without impact.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 645-648.
The PSF for revolution 643 was updated in January to accommodate for one extra Goldstone pass.

Revolutions have been planned up to revolution 644, including a SAS calibration. Revolution 643 was re-planned because of the new PSF.

The TSFs for revolution 641 & 642 have been received.

The Long-Term Plan has been updated with the changes caused by the SPI annealing.

2. Observation status

New ECSs have been received and processed for Revolutions 621-628.

3. ISOC Science Data Archive

M. Cadolle Bel has begun as new Archive scientist, taking over from R. Williams.

4. ISOC system

Work is progressing on version 18.0 according to schedule.

5. Problems

None.

4.3.2 ISDC

Status of ISDC observation processing on 14/01/2008:

- Latest Standard Analysis completed: observation 05200180005 (Gamma Ray Source 1915+105, Revolution 621) on 06/01/2008.

- Latest products archived: observation 05200180005 (Gamma Ray Source 1915+105, Revolution 621) on 07/01/2008.

- Latest observation products sent to the observer: observation 05200180006 (Gamma Ray Source 1915+105, Revolution 623) on 07/01/2008.

5 Special Events

6 Anomalies

The following problem was reported that impacted operations:

- On DoY 009, at 16:39, the Command Verifier task within the imcs crashed. This prevented the completion of the KEHVAC01 ED. There was a string of failed commands at this time. A7 17:07, after the recovery, the above ED was manually uplinked, followed at 17:24 by KEDATA02. The Timeline for JEM-X was re-enabled at 17:26. The impact was a 30 minute delay in the activation of that instrument.
- At 21:45:30, an IREM SEU (#60) caused OMC and IBIS to switch to safe mode. For details see the appendix.

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

AR id	Date Created	Subject	Segment	Status
INT_SC-217	2008-01-17	IREM Anomaly: Reset of IREM_CSCI S/W #60, 09/01/2008	Payload	Pending

7 Future Milestones

The following activities are foreseen in the next few weeks.

- A SPI annealing activity is foreseen to be performed starting with revolution 641.
- A SAS calibration is planned for revolution 644.
- The next On-Board Clock wrap-around is expected during revolution 650.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 639

The observations in revolution 639 began with of a raster dither of Loop I-Loop IV Super (RA 13:57:10.00, DEC +07:34:37.0), lasting ~24.2 hours. They continued with a raster dither of the Galactic Plane Region 3 (RA 13:09:32.98, DEC -62:47:56.4) lasting ~31.9 hours, until the end of the revolution.

Revolution 640

The observations in revolution 640 began with of a raster dither of Loop I-Loop IV Super (RA 13:57:10.00, DEC +07:34:37.0), lasting ~24.2 hours. They continued with a raster dither of the Galactic Plane Region 3 (RA 13:09:32.98, DEC -62:47:56.4) lasting ~30.9 hours, until the end of the revolution.

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

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2007-12-21T01:11:56.000Z     143.2274    F   Automatic TM processing.
2007-12-22T15:08:40.000Z     143.2027    F   Automatic TM processing.
2007-12-24T00:43:32.000Z     143.1854    F   Automatic TM processing.
2007-12-25T14:56:56.000Z     143.1557    F   Automatic TM processing.
2007-12-27T00:43:48.000Z     143.1369    F   Automatic TM processing.
2007-12-28T14:44:00.000Z     143.1194    F   Automatic TM processing.
2007-12-30T00:19:08.000Z     143.0722    F   Automatic TM processing.
2007-12-31T14:31:45.000Z     143.0581    F   Automatic TM processing.
2008-01-02T00:20:21.000Z     143.0246    F   Automatic TM processing.
2008-01-03T14:17:29.000Z     143.0129    F   Automatic TM processing.
2008-01-04T19:19:24.000Z     142.9786    F   Automatic TM processing.
2008-01-06T14:09:05.000Z     142.9520    F   Automatic TM processing.
2008-01-07T17:56:12.000Z     142.9236    F   Automatic TM processing.
2008-01-09T13:57:44.000Z     142.9099    F   Automatic TM processing.
2008-01-10T19:08:44.000Z     142.8140    F   Automatic TM processing.

This report was generated  Fri Jan 11 08:00:22 GMT 2008
```

8.3 Detailed Satellite Information

This section contains some detailed information concerning the various subsystems of the satellite and instruments.

8.3.1 AOCS SUMMARY OPERATIONS REPORT, 05/01/2008 – 11/01/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 83 Open Loop Slews, 63 Closed Loop Slews and 4 Momentum Biases were executed.

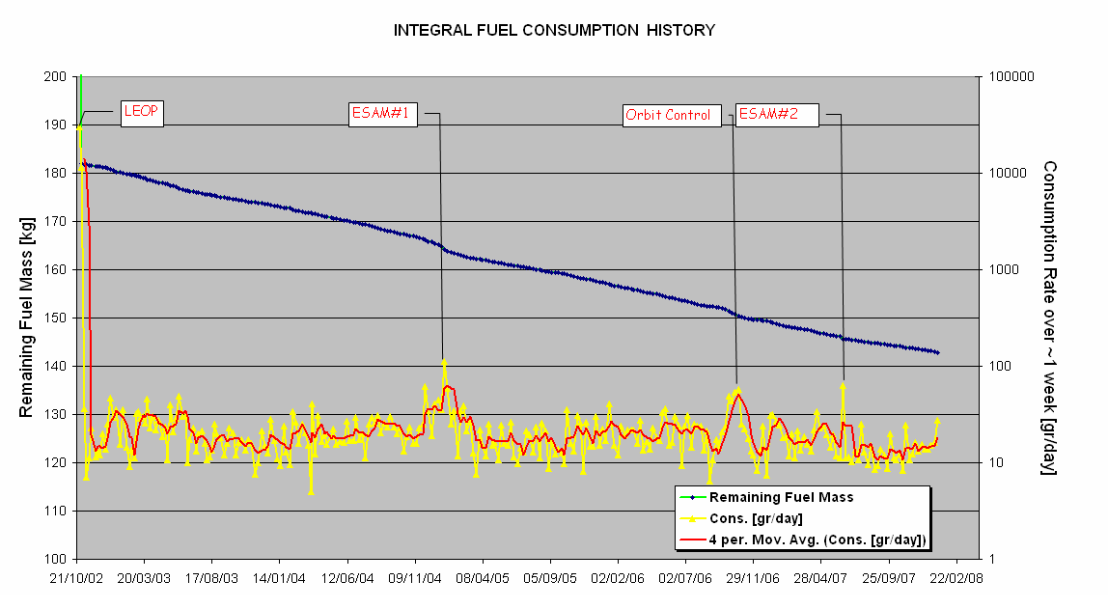
No slews were missed from TL, during the observation period.

Orbit Control

No update.

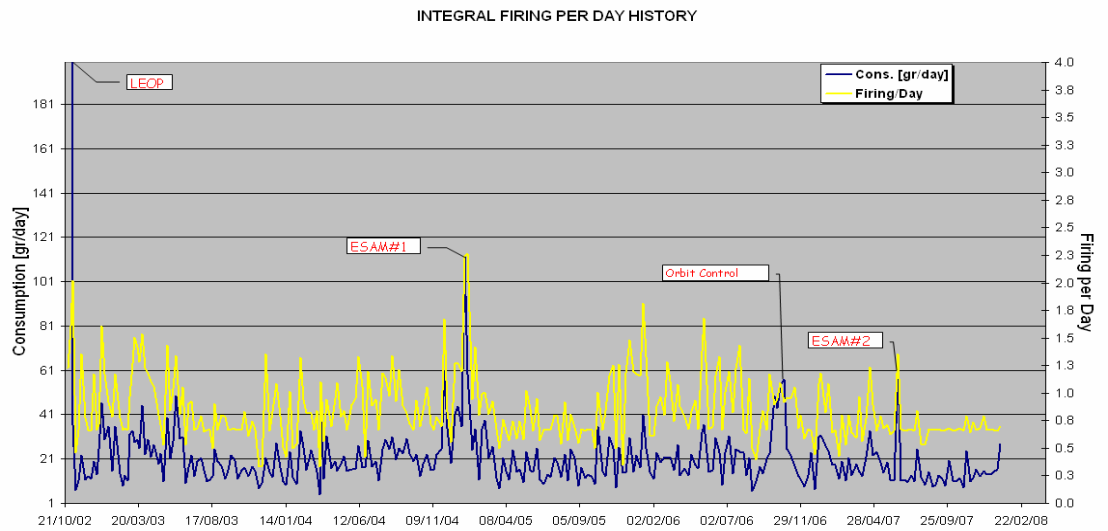
Fuel consumption

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



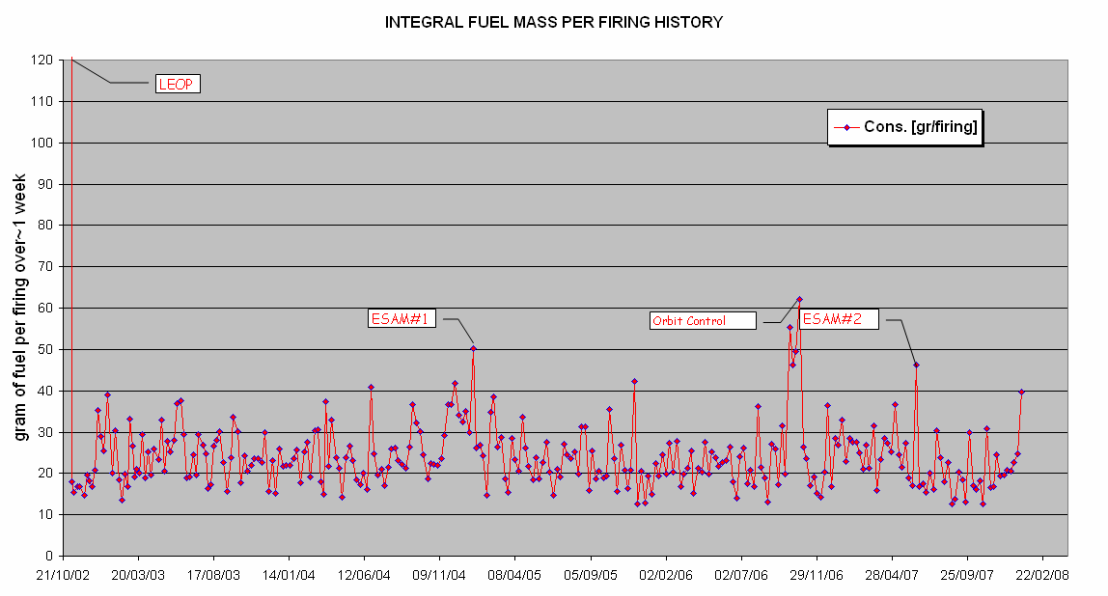
The plot above consider the ESAM fuel consumption spread over period of ~1 week.

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



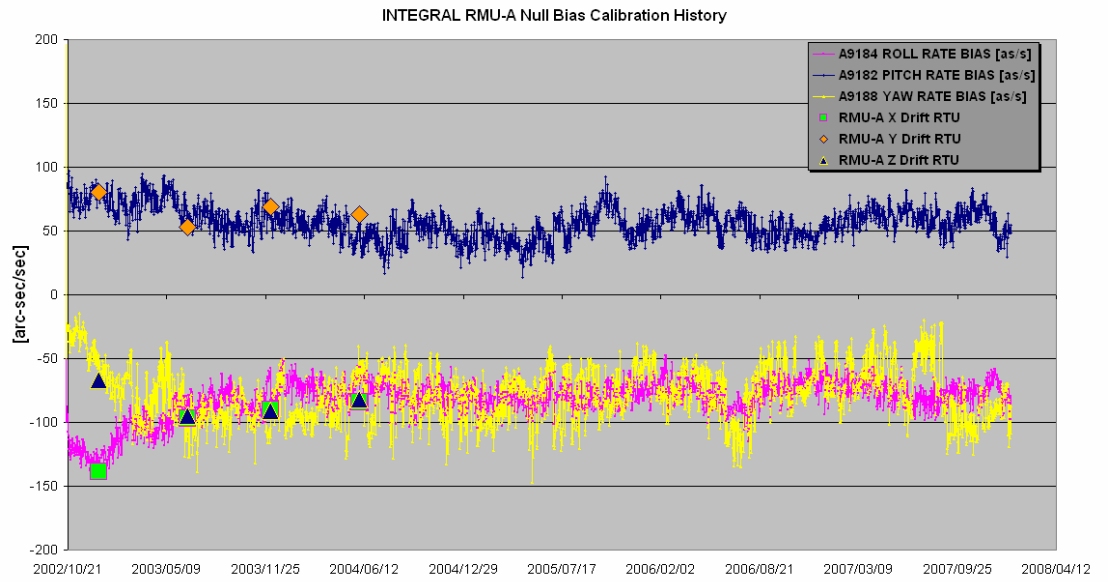
The plot above consider the ESAM fuel consumption spread over period of ~1 week.

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



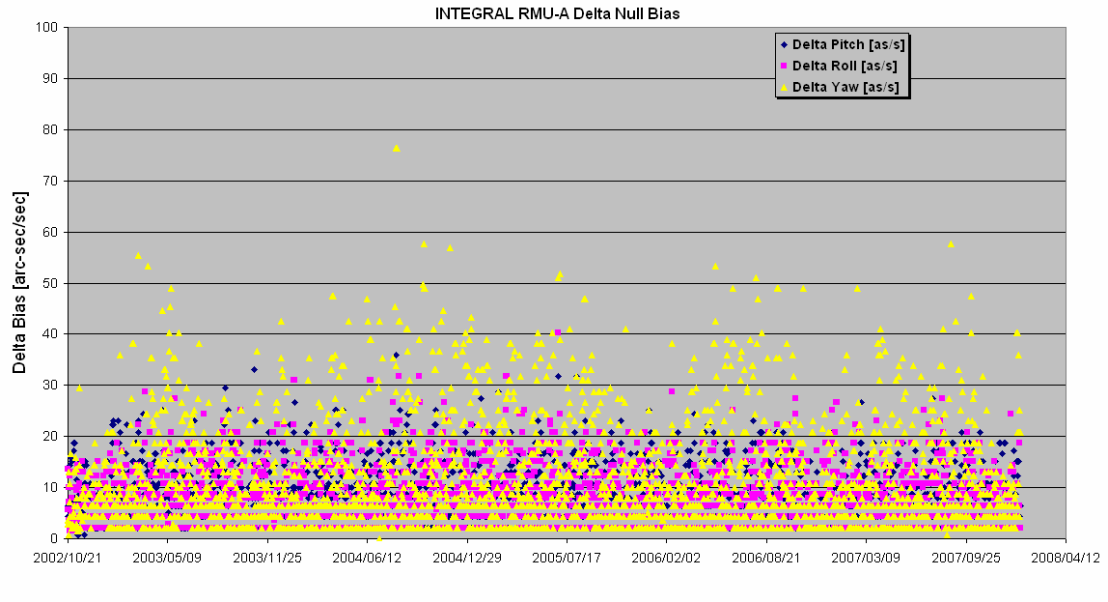
The RMU-A null bias calibration

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



The evolution of the drift on yaw channel is under constant monitoring.

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



05/01/2008 (Day of Year 005, Revolution 638)

Nothing to report.

06/01/2008 (Day of Year 006, Revolution 638-639)

Nothing to report.

07/01/2008 (Day of Year 007, Revolution 639)

Nothing to report.

08/01/2008 (Day of Year 008, Revolution 639)

Nothing to report.

09/01/2008 (Day of Year 009, Revolution 639-640)

Nothing to report.

10/01/2008 (Day of Year 010, Revolution 640)

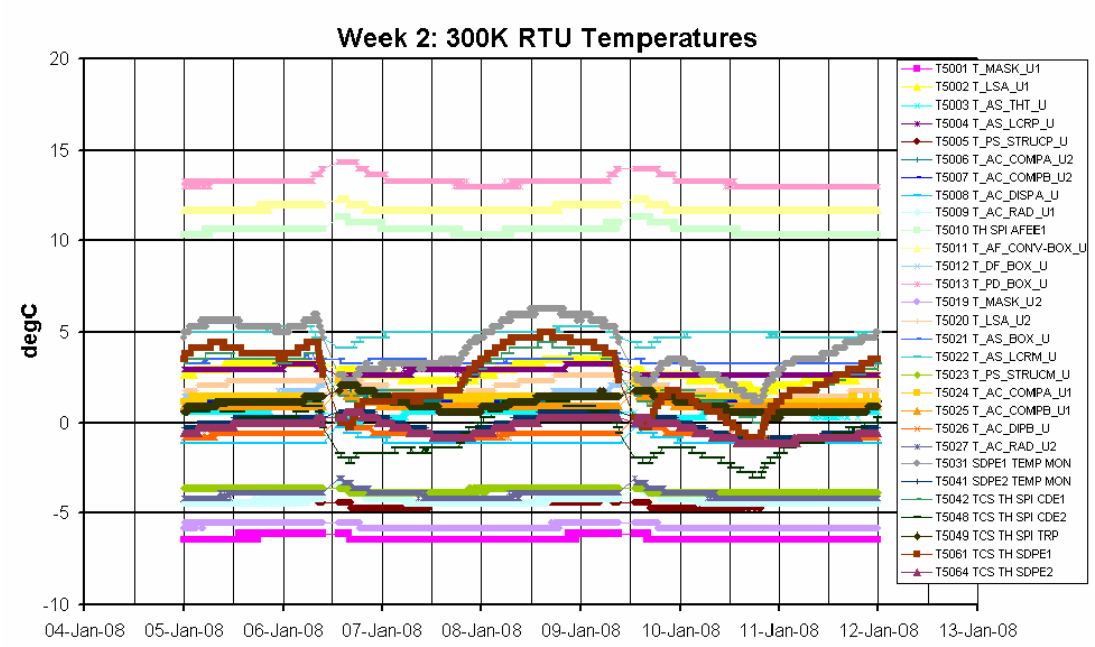
Nothing to report.

11/01/2008 (Day of Year 011, Revolution 640)

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.

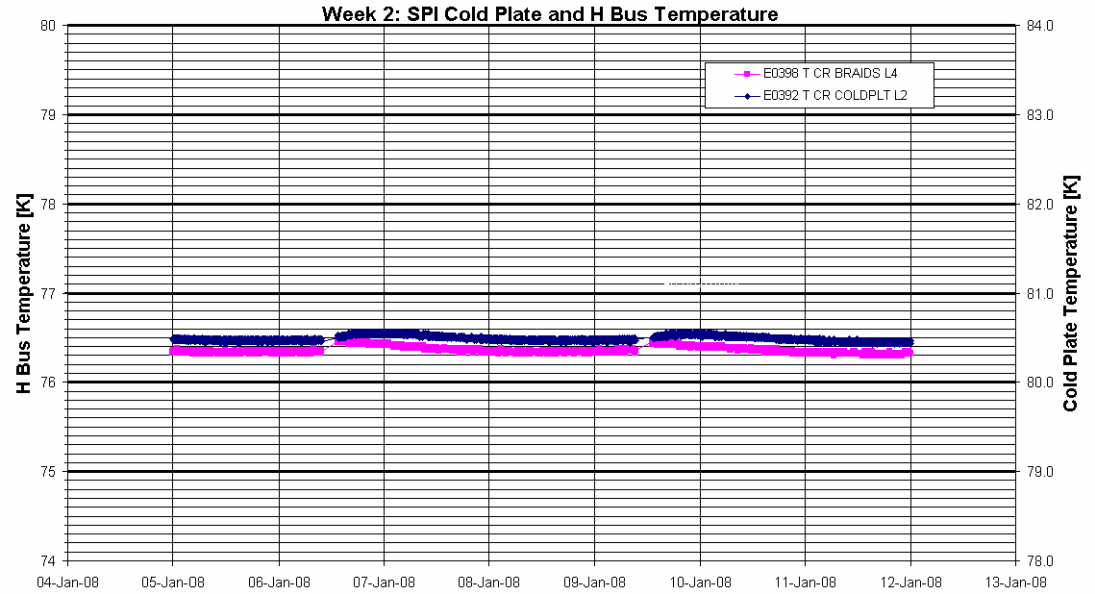


Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range 80K +/-1K.

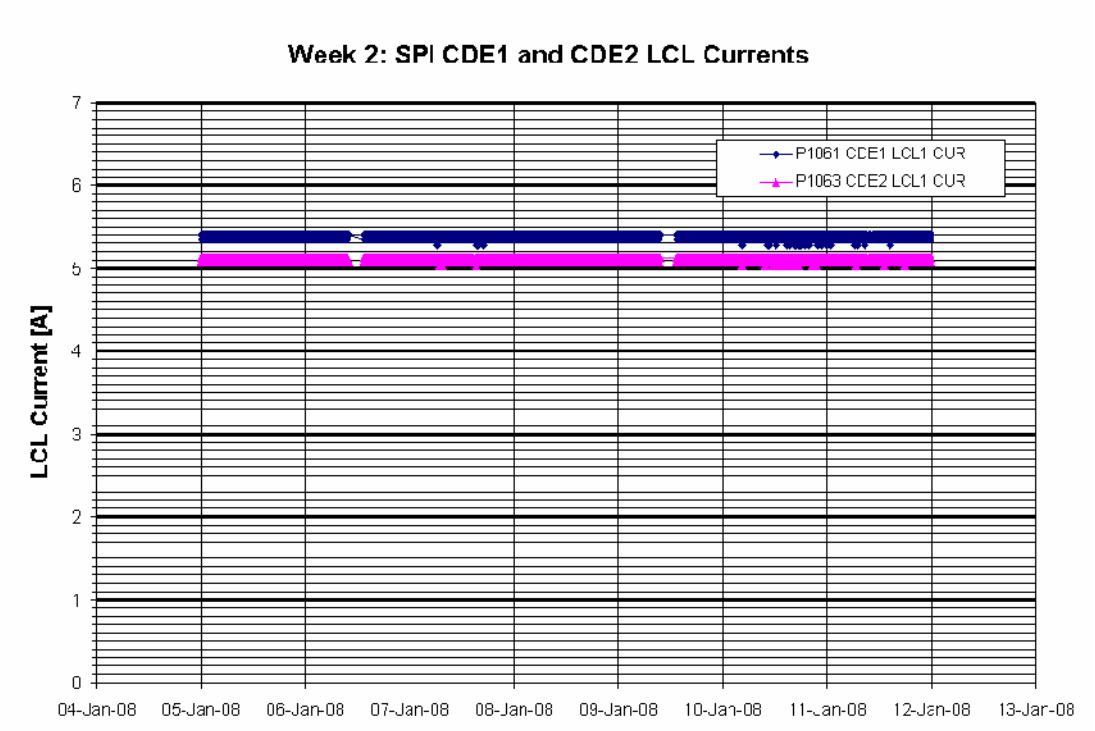
The stroke of all four compressors was set to 42 throughout the week. The average CDE LCL currents over the week were as follows:

- CDE1 LCL Current = 5.37A
- CDE2 LCL Current = 5.09A

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



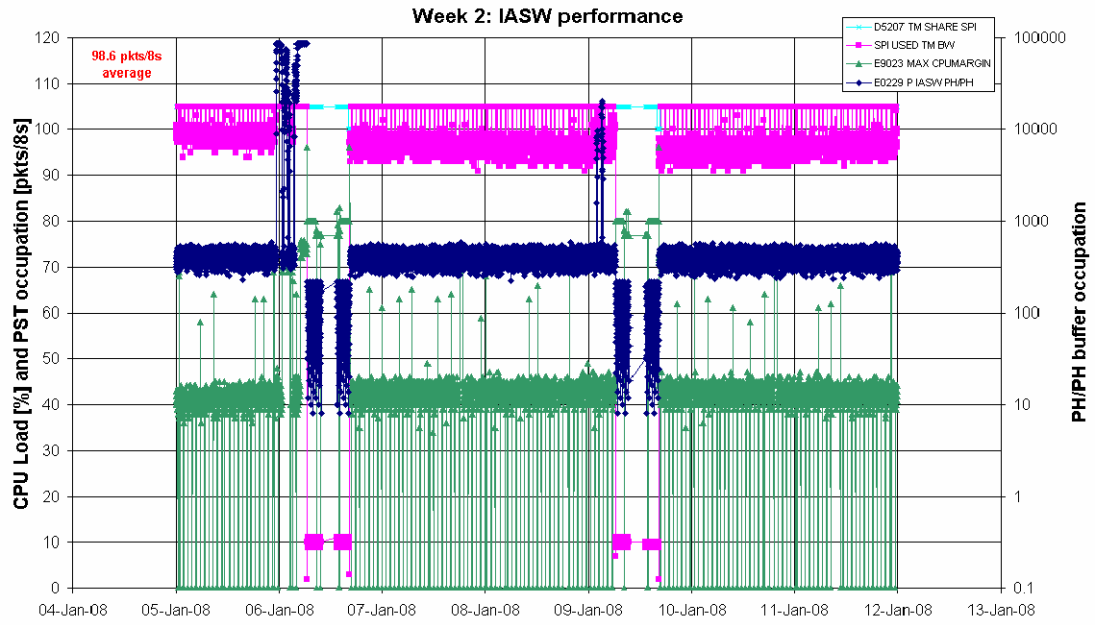
The following plot shows the evolution of the CDE LCL currents during the reporting period.



DPE & IASW: The DPE health and IASW performance is nominal. The IASW version installed is v433 patch #1 with the spectra scaling factor set to 8/19 SE.

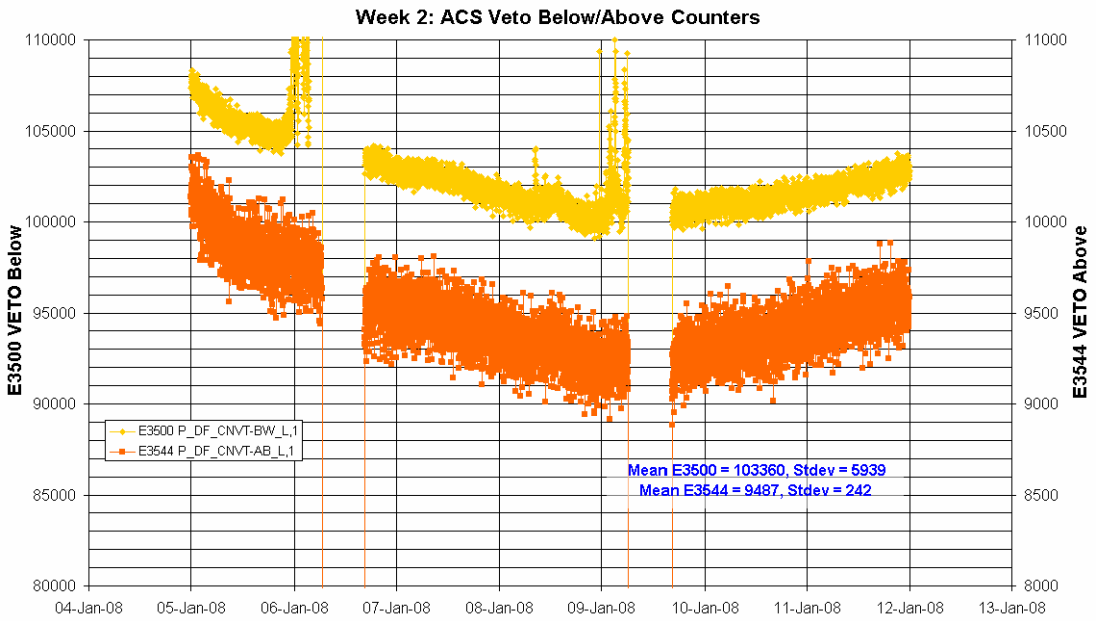
The average TM bandwidth occupation of SPI was 98.6 packets/cycle over the science window, when the TM allocation was 105 packets/cycle.

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



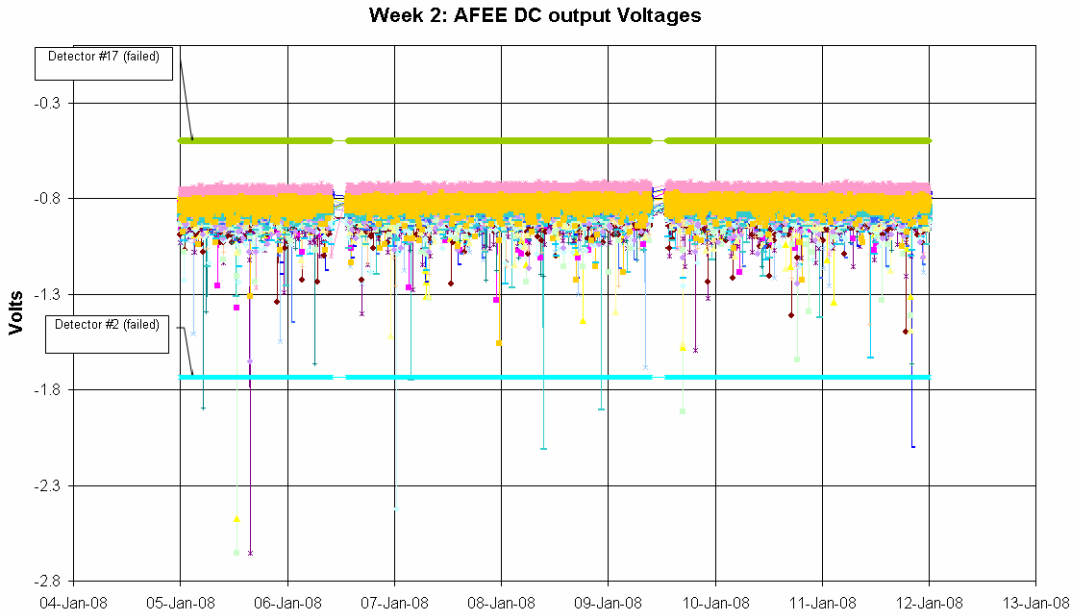
ACS: The performance of the ACS is nominal, except for FEE #81 which remains switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is still OFF due to the anomaly on 5/8/2003 (INT_SC-61).

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

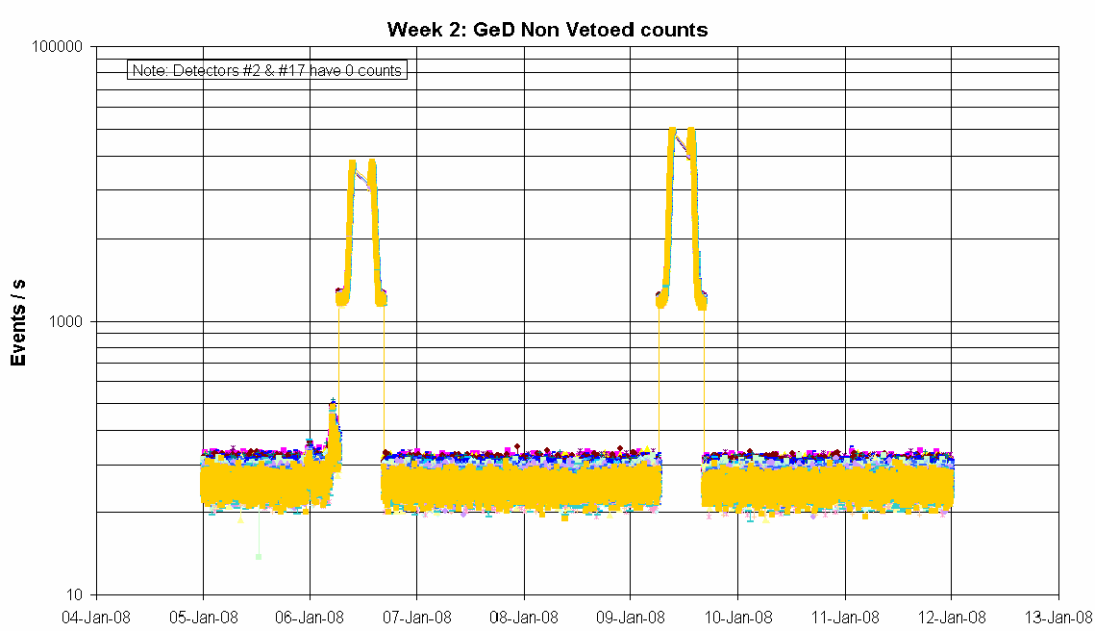


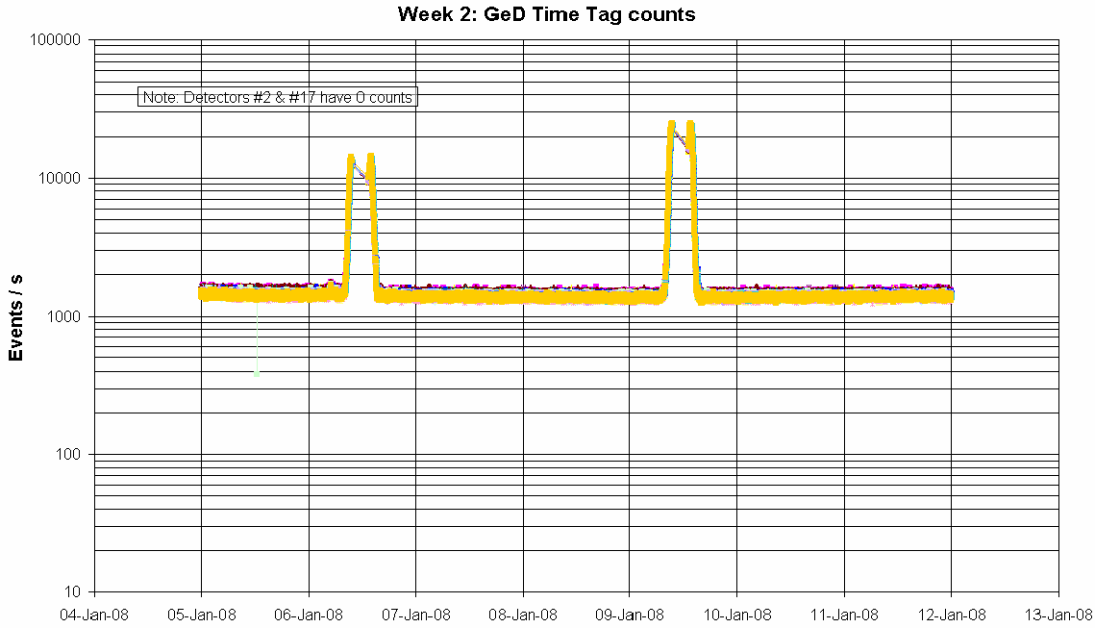
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution and is therefore operated at a lower HV setting of 3.5kV (instead of 4kV).

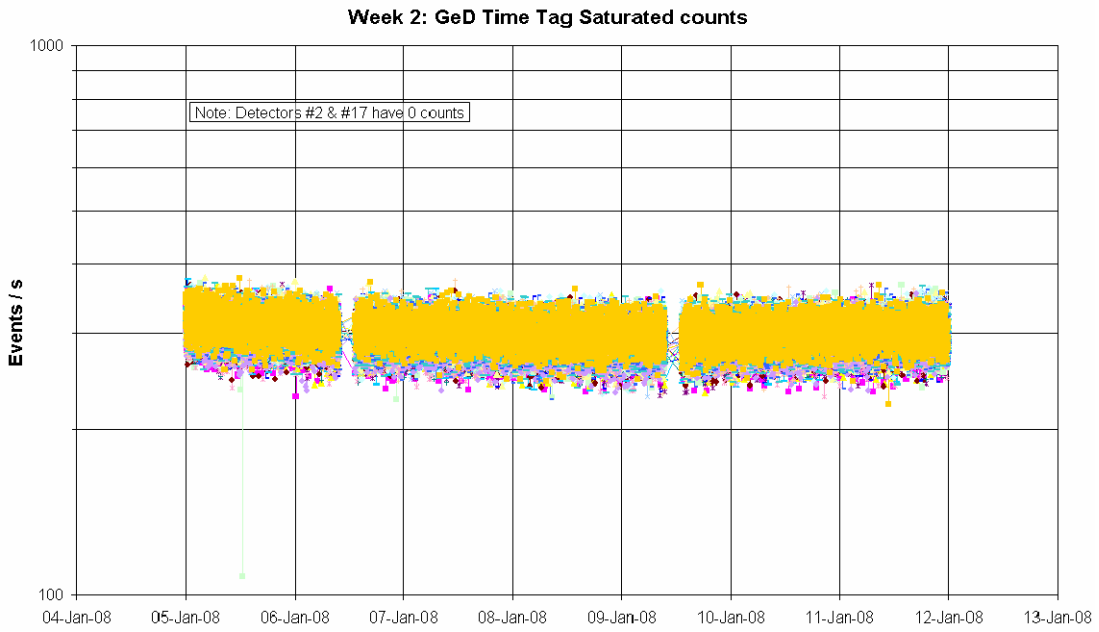
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.



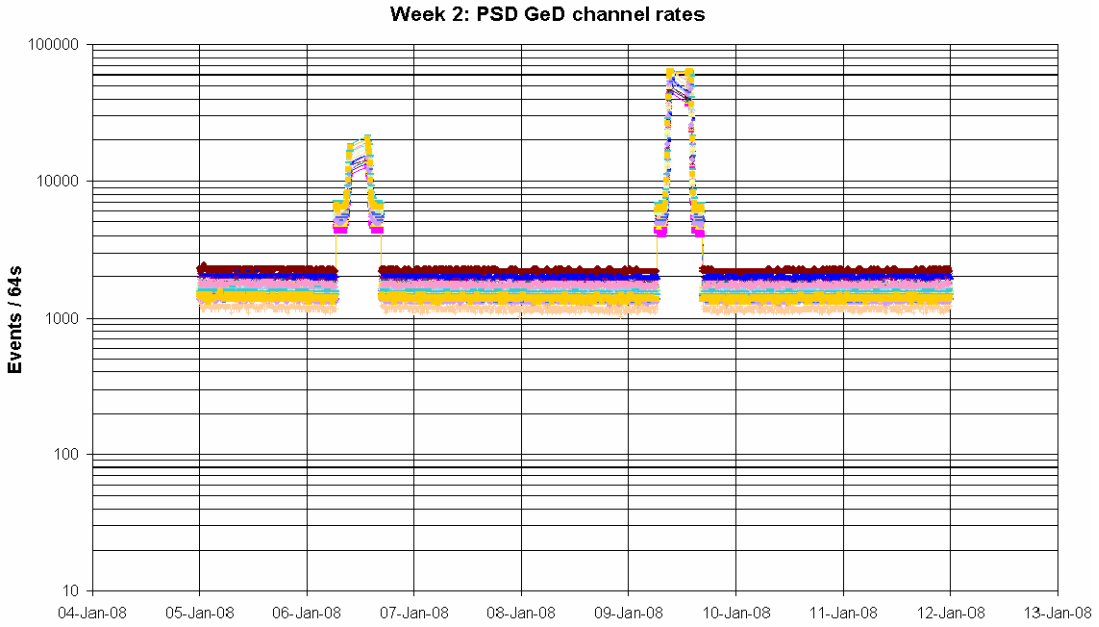
DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.


Week 2: GeD Non Vetoed counts
Note: Detectors #2 & #17 have 0 counts
Events / s
100000
1000
10
04-Jan-08
05-Jan-08
06-Jan-08
07-Jan-08
08-Jan-08
09-Jan-08
10-Jan-08
11-Jan-08
12-Jan-08
13-Jan-08


Week 2: GeD Time Tag counts
Note: Detectors #2 & #17 have 0 counts
Events / s
100000
10000
1000
100
10
04-Jan-08
05-Jan-08
06-Jan-08
07-Jan-08
08-Jan-08
09-Jan-08
10-Jan-08
11-Jan-08
12-Jan-08
13-Jan-08



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:

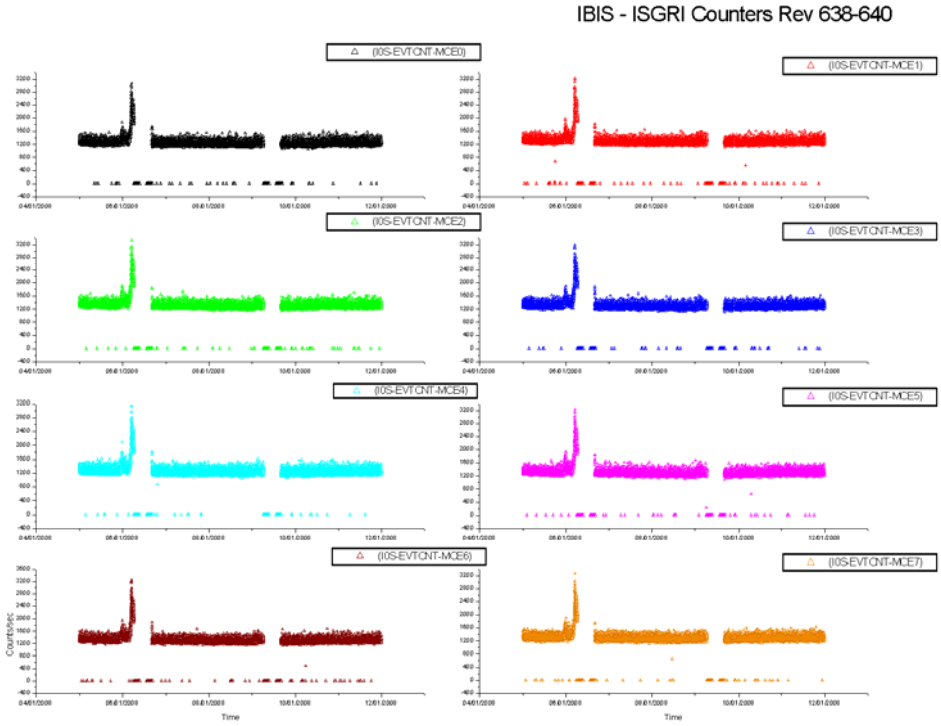
- 5 occurrences of OEM APID 1024 ID 243 EXCEPTION SPI1 SPECTRA BUILDING NOT COMPLETED were received during the week. As they were all single occurrences, no action was taken.
- Due to high background radiation conditions before the expected radiation belt entry of revolution 638, on 2008-01-05 at 23:41:41Z TM parameter E3500 went OOL High, toggling OOL until radiation belt entry, on 2008-01-06 at 06:29:55Z.
- On 2008-01-09 at 13:43:06Z OEM APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the

AOS_CHK window of revolution 640, when the time verification TC was sent. This OEM is sometimes received when this TC is sent and no action was taken.

8.3.3 IBIS Operations

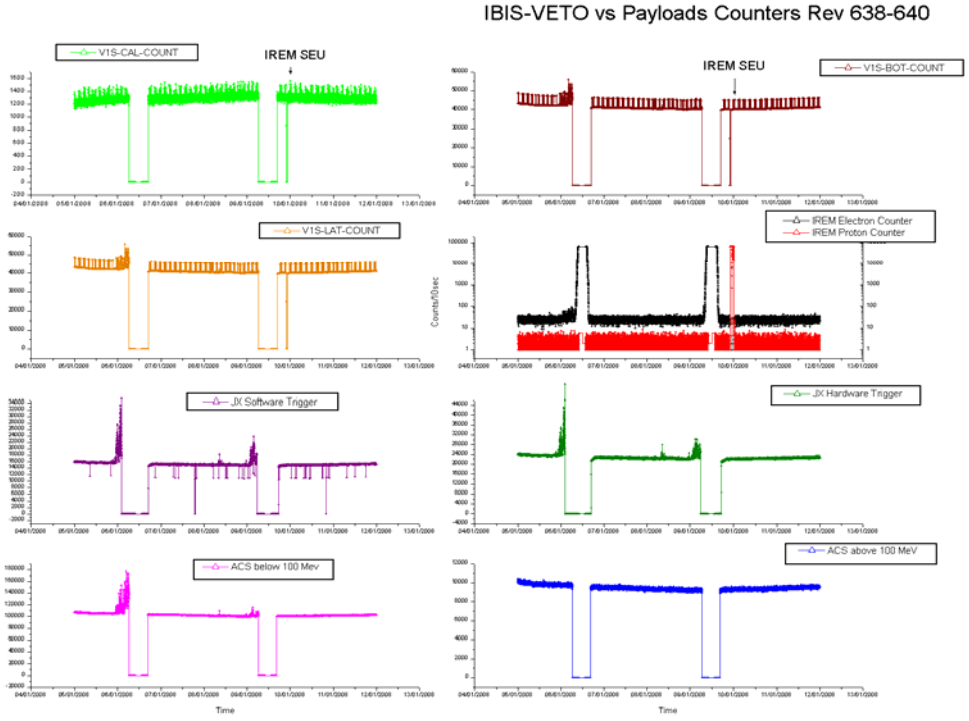
IBIS Event Counters Plots

ISGRI Counters:



**sampling every 4 pkts (32 secs)

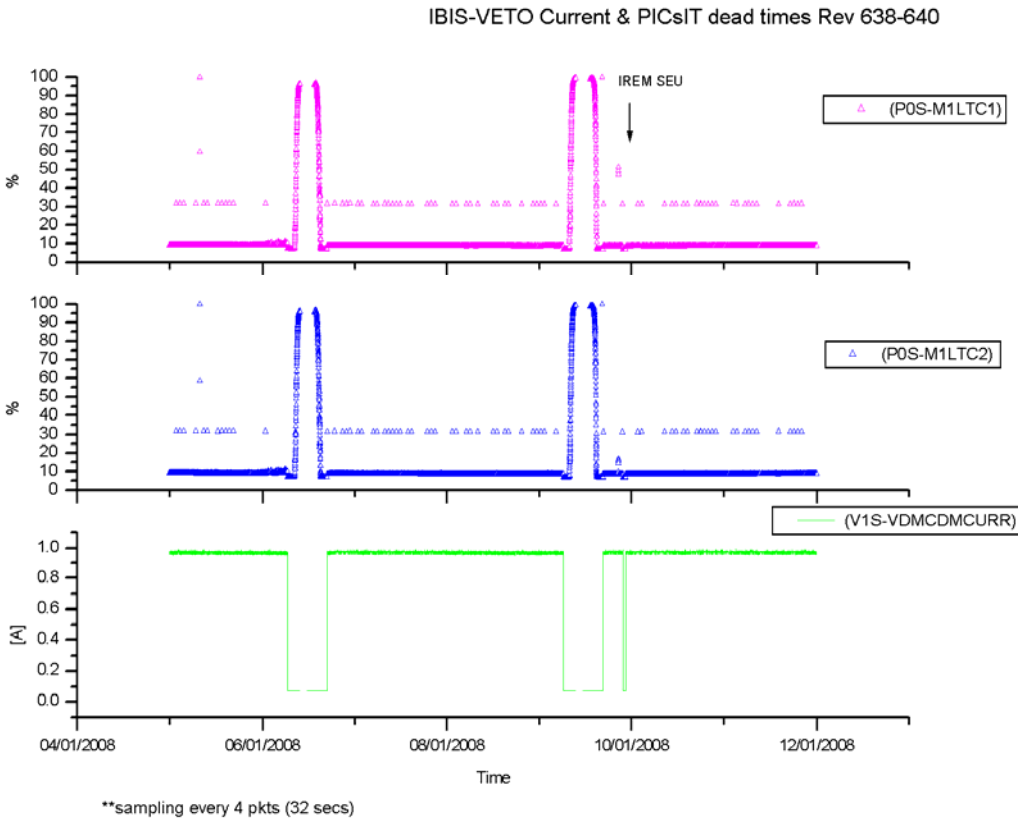
VETO vs Payloads Counters:



**with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec sampling every 5 pkts (40 sec)

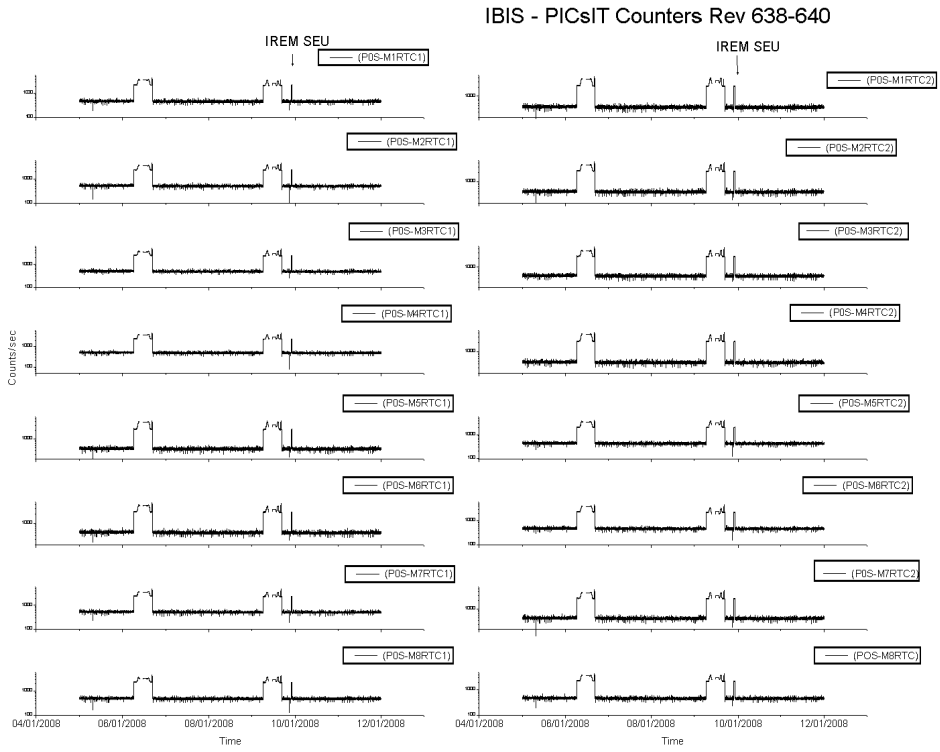
The week was characterised by high radiation before the expected radiation belt entry of revolution 638 as reported by the payload.

VETO Current:



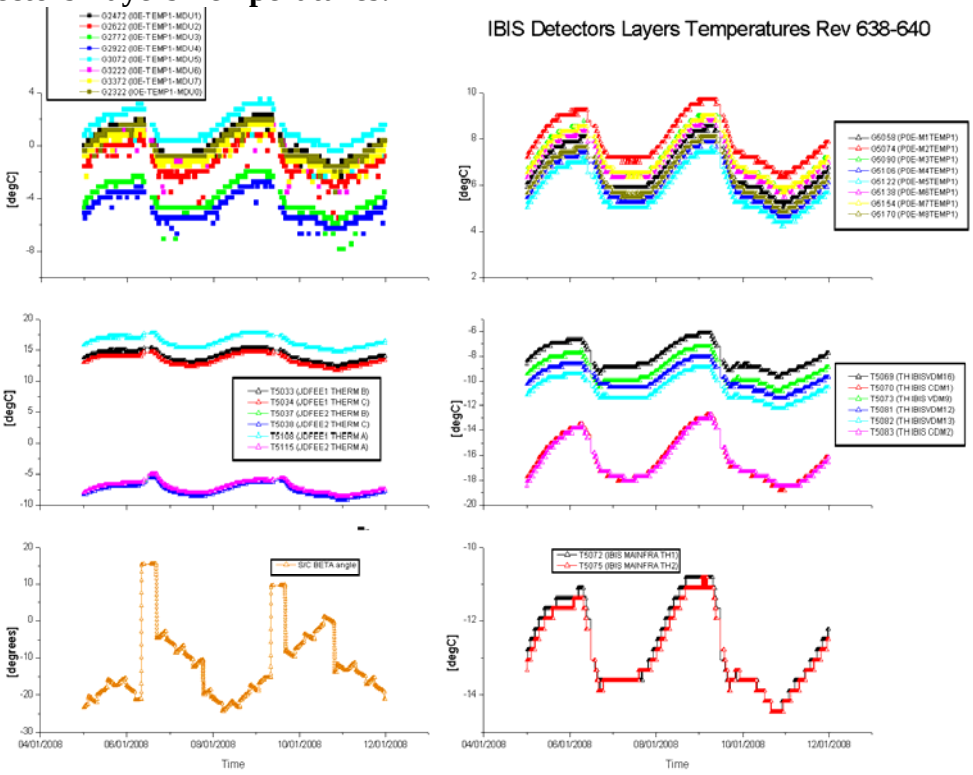
**sampling every 4 pkts (32 secs)

PICsIT Counters:



**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures:



**sampling every 8 pkts (64 secs)

IBIS daily report:

The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), G5002 (P0S-Mi_RTC1) and G5003 (P0S-Mi_RTC2) families and G2000 family (I0E-OVFWPXADD-Mi) were received during the radiation belt passages.

In addition, throughout the week, TM parameter G8080 went OOL Warning High several times. This is the Valid event rate on HBRA. As at each occurrence it remained OOL for only 1 TM cycle, no action was taken. This indicates an overflow in the counters and affects only the quality of the scientific data but not the safety of the instrument.

2008-01-05 (DOY 005, Rev 638)

At 07:41:34Z, the TM parameter families G5068 and G5072 failed Status Consistency Check (value = TRUE). These are the PDM semimodule FIFO error flags. At 07:41:52Z the TM parameters families G5002 and G5003 for the PDM semimodule counters also went OOL (value = 0). As these parameters had all returned within limits by 07:43:28Z, no action was taken.

2008-01-06 (DOY 006, Rev 638-639)

Due to the high background radiation, at 02:23:44Z, ~4 hours before the expected radiation belt entry of revolution 638, TM parameters G6062 and G6063 started toggling OOL High. These are the VETO bottom and lateral counters respectively. In addition, starting at 04:53:28Z the G2013 family (Number of events triggering the MCEi per second) also started toggling OOL High. These parameters continued to toggle OOL until radiation belt entry at 06:29:55Z.

2008-01-07 (DOY 007, Rev 639) to 2008-01-08 (DOY 008, Rev 639)

IBIS operations executed nominally.

2008-01-09 (DOY 009, Rev 639-640)

At 03:28:01Z TM parameter G2056 went OOL Status Consistency Check failed, indicating an overflow of the noisy pixel address buffer in MCE4. As it returned within limits at 03:28:09Z, no action was taken.

At 20:39:10Z, the TM parameter families G5068 and G5072 failed Status Consistency Check (value = TRUE). These are the PDM semimodule FIFO error flags. As these parameters had all returned within limits by 20:40:46Z, no action was taken.

Due to an IREM SEU, IBIS transitioned autonomously to Safe configuration at 21:45:39Z It was recovered as follows:

- At 22:21:58Z FCP_IBIS1_0803 IBIS EXIT FROM SAFE MODE
- At 22:39:42Z ED GESTAN02 uplinked with the planned observation parameters and commanding to IBIS from the Timeline re-enabled.

IBIS operations continued nominally.

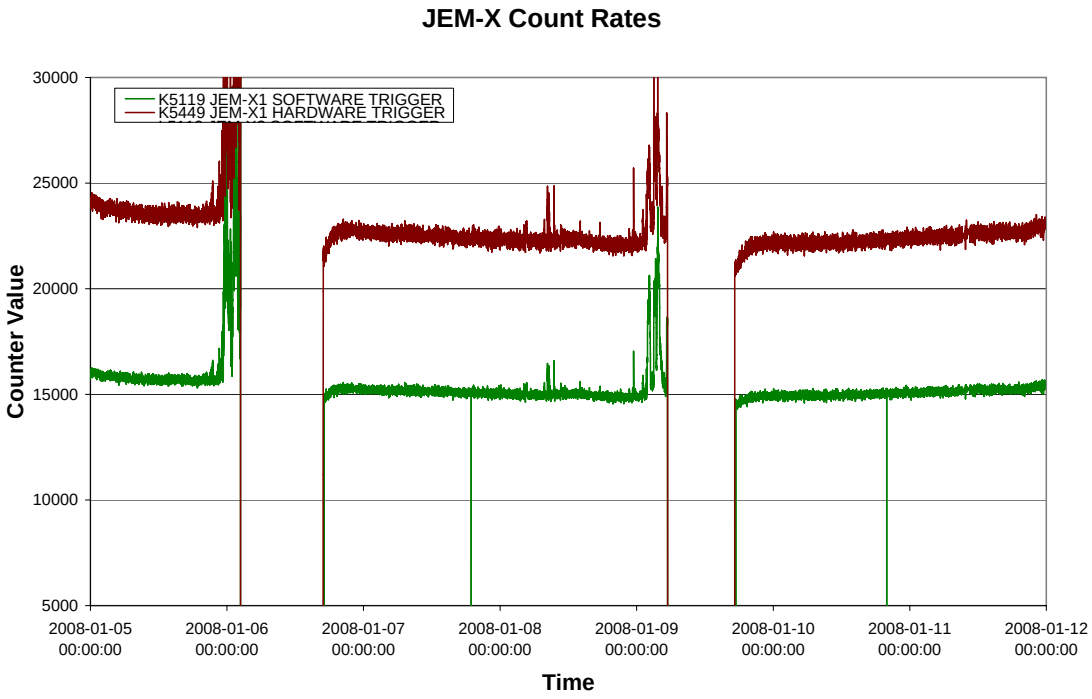
2008-01-10 (DOY 010, Rev 640) to 2008-01-11 (DOY 011, Rev 640)

IBIS operations executed nominally.

8.3.4 JEM-X Operations

JEM-X Count Rates

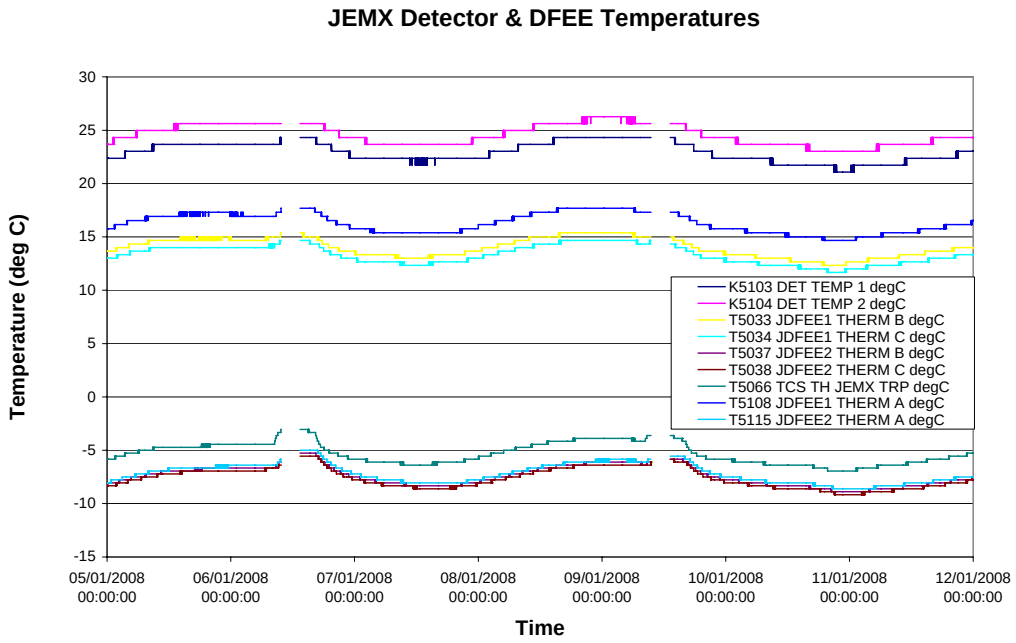
JEM-X count rates over the reporting period are displayed in the following graph[1].



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].

[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

2008-01-05 (DoY 005, Rev 638)

At 23:23:42, 23:33:17, 23:36:11, 23:37:48, 23:45:40 and 23:51:47 K5449 exceeded soft limits, and at 23:52:52, K5136 also exceeded its soft limit. No action was taken and there was no impact.

2008-01-06 (DoY 006, Rev 638-639)

Between 00:01:56 and 02:23:34, there was a string of warnings about K5449 exceeding its soft limit. At 02:23:34, K5119 exceeded soft limit, and at 02:23:40, it exceeded its hard limit. At the same time K9104 went out of soft limit, followed at 02:25:32, by KD5020D outside hard limit indicating the DFEE status had autonomously switched to SAFE. These events occurred in the build up to belt entry at the end of revolution 638, and are common.

2008-01-07 (DoY 007, Rev 639)

JEM-X1 operations executed nominally

2008-01-08 (DoY 008, Rev 639)

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

```
2008.008.12.33.19.986   2008.008.12.33.26.444   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
```

```
2008.008.12.33.19.986   2008.008.12.33.26.471   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.

2008-01-09 (DoY 009, Rev 639-640)

At 03:01:40, K5449 exceeded soft limit. No action was taken and there was no impact.

At 16:39, the Command Verifier task within the imcs crashed. This prevented the completion of the KEHVAC01 ED. There was a string of failed commands at this time. A7 17:07, after the recovery, the above ED was manually uplinked, followed at 17:24 by KEDATA02. The Timeline for JEM-X was re-enabled at 17:26. The impact was a half hour delay in the activation of JEM-X

At 21:46:12 JEMX parameters K5315, K5316 & K5317 went Out-of-Limits due to an IREM SEU (#60). There was no impact as the reaction has been disabled.

2008-01-10 (DoY 010, Rev 640)

At 20:01:23 The following TCs from the KEDATA02 ED terminated with acceptance and execution unknown: K0011, K0021, KU0014, K0009. The commands were manually checked against TM, and no further action was taken. There was no impact.

2008-01-11 (DoY 011, Rev 640)

JEM-X1 operations executed nominally

8.3.5 OMC Operations

2008-01-05 (DoY 005, Rev 638) to 2008-01-08 (DoY 008, Rev 639)

Nothing to Report.

2008-01-09 (DoY 009, Rev 639-640)

At 21:43:31, OMC was sent to SAFE mode by an IREM SEU (#60). A recovery was performed, and the instrument returned to Stand-by at 22:16:03. The impact was pointing 06400007 was cut short after 289 from a planned 3479 seconds.

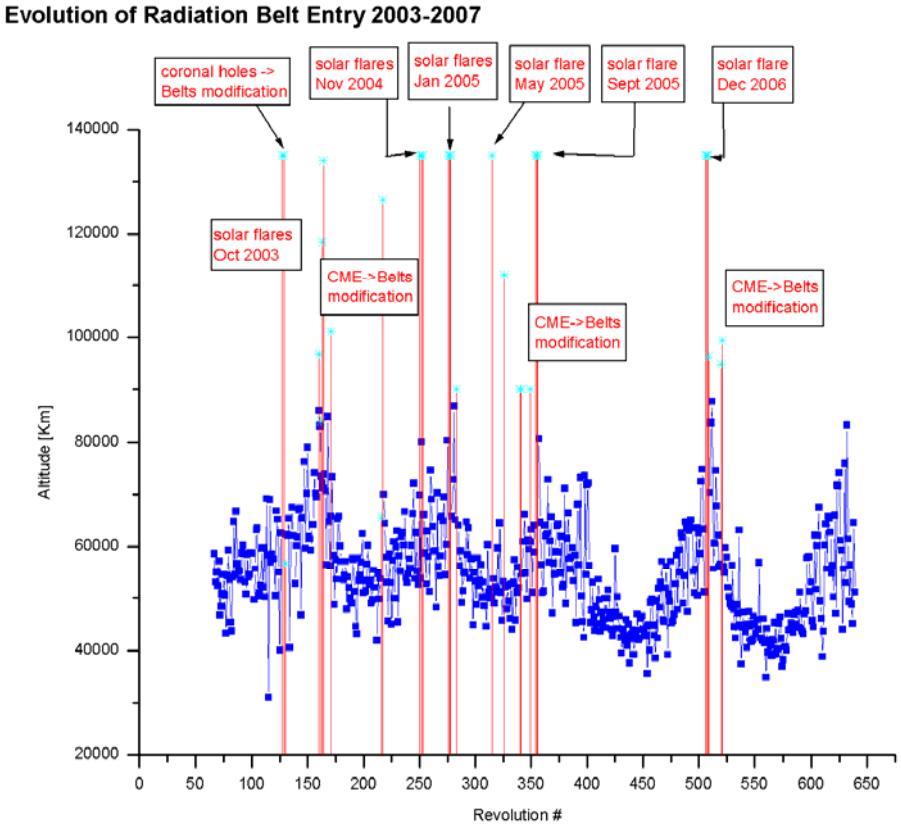
2008-01-10 (DoY 010, Rev 640) to 2008-01-11 (DoY 011, Rev 640)

Nothing to Report.

On DoY 006 at 06:30:03, DoY 009 at 06:20:03 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

DoY 2008.009 (09/01/2008):

At 21.45.30Z, a local reset of the IREM CSCI S/W (SEU #60) was observed. The status of the unit, before the local reset of the IREM CSCI S/W, 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 2008.009.21.45:30Z at 89704 km. 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 21:58Z using procedure CRP_SYS_2570. The first dump of the status word after the anomaly reported a value of BCC0 HEX = 48320 DEC = 1011110011000000, i.e the Checksum Failure Flag ON. The unit was still reporting the status as if it was in Integral mode with counting ON and

accumulation 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) The patch was performed successfully with the correct re-starting of the S/W following procedure FCP_RM_0081. The operation was completed at 00:02Z.

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. OMC was recovered at 22:16:00Z and IBIS at 22:39:42Z.

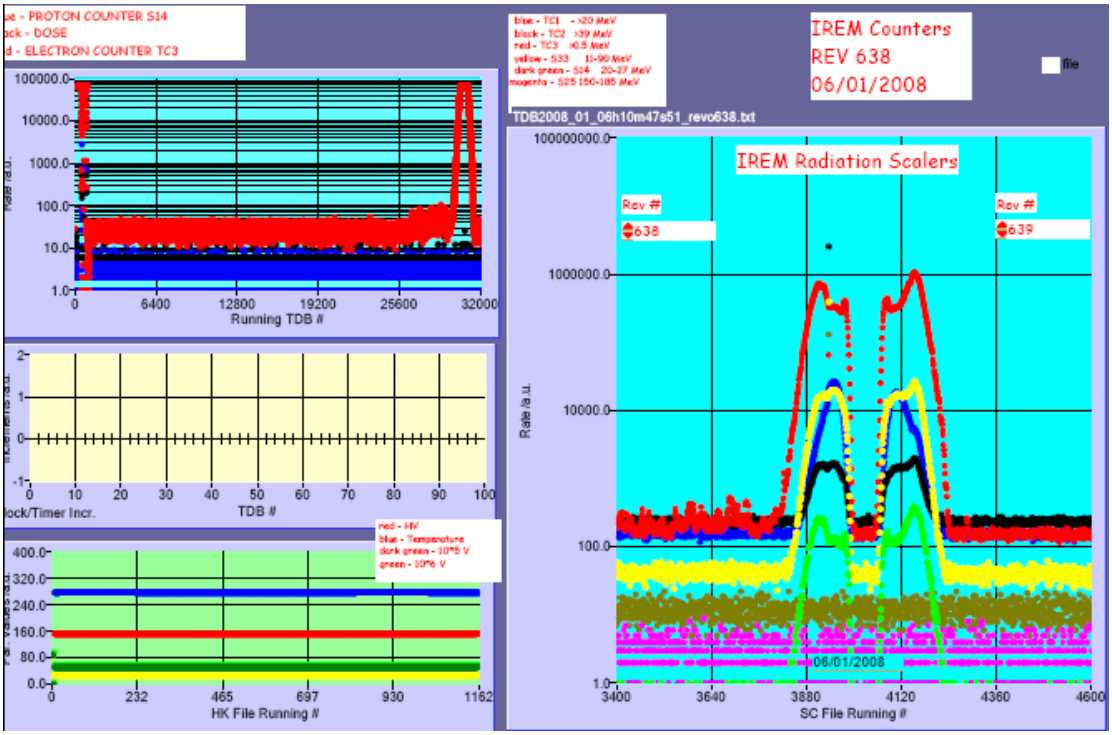
The cause of these S/W resets is apparently due to the unit's memory device that is sensitive to high energy radiation, as proved during test campaign on-ground.

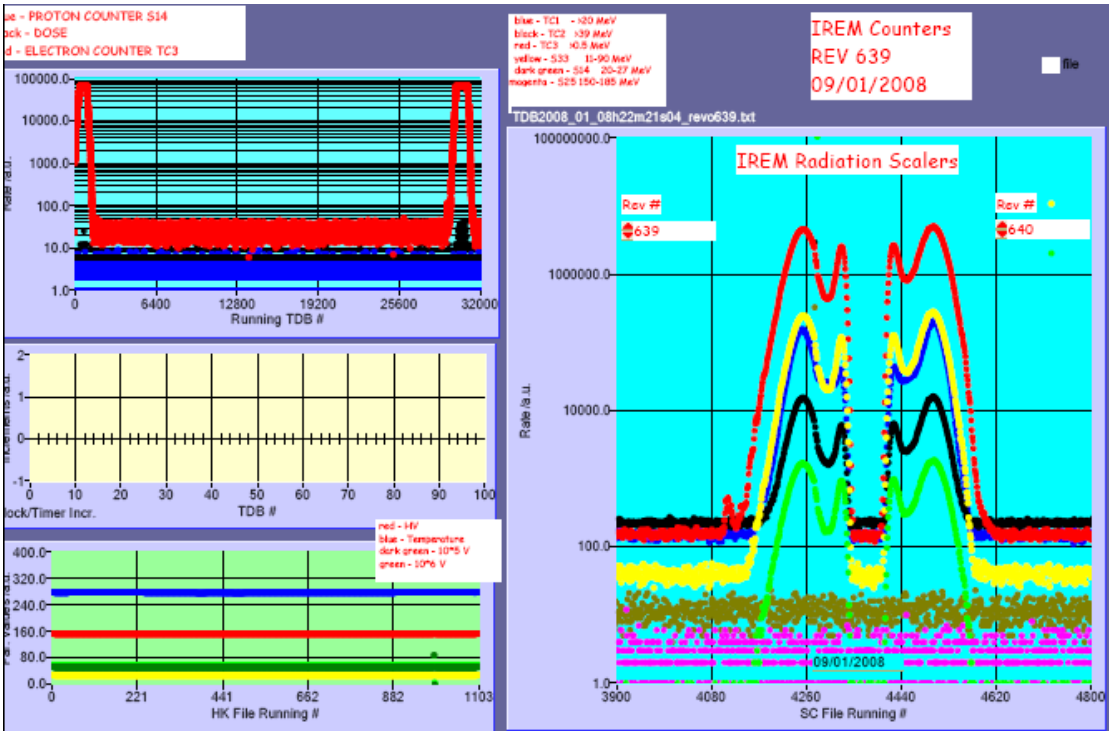
Electron Belts

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]
638	RAD_ENTR R 2008-01-06T06:29:55Z	06/01/2008 05:21:06 *	64631.4	06-Jan-2008 07:55:47	43484.99
639	RAD_EXIT R 2008-01-06T16:32:21Z	06/01/2008 15:14:34	>>33266.8	06-Jan-2008 15:35:47	45174.38
639	RAD_ENTR R 2008-01-09T06:20:01Z	09/01/2008 06:58:18	51145.4	09-Jan-2008 07:54:03	42218.14
640	RAD_EXIT R 2008-01-09T16:22:07Z	09/01/2008 15:15:38	>>33275.7	09-Jan-2008 15:24:03	44930.87

Reference
High radiation
Very small error vs reference (less than 10 minutes)
Small error vs reference (between 10 and 30 minutes)
Large error vs reference (more than 30 minutes)
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

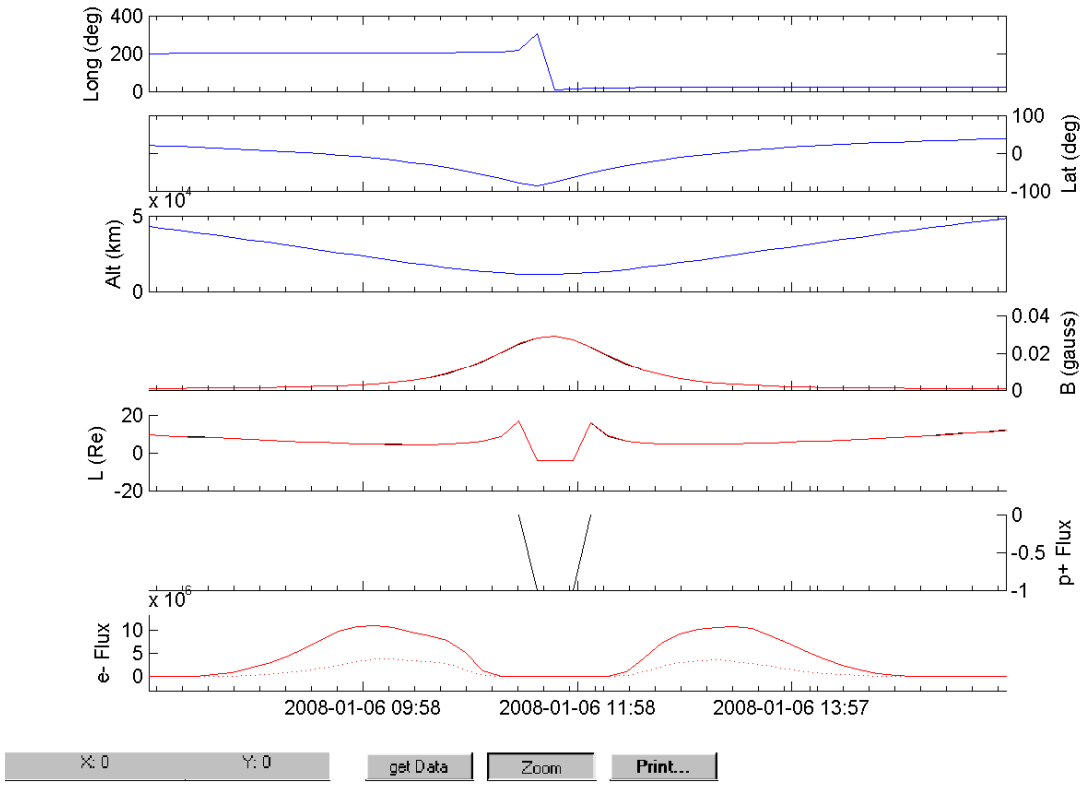
IREM radiation counters:



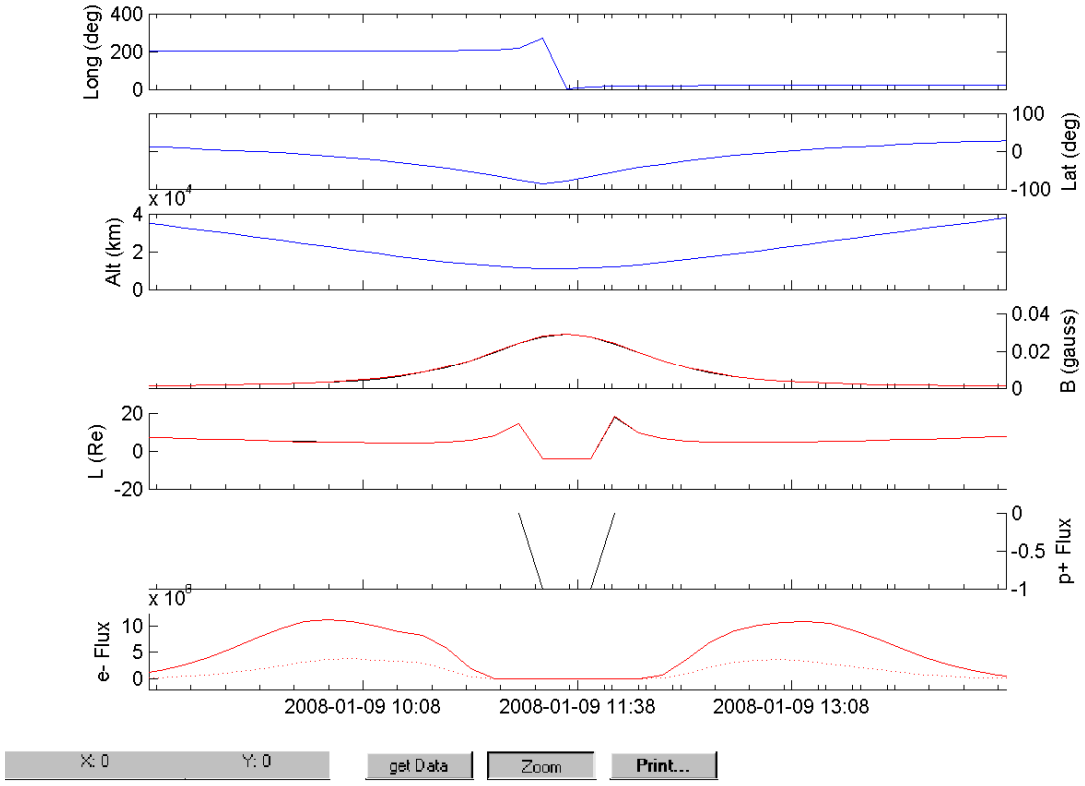


IREM Predicted Radiation Belt Passages

Rev 638



Rev 639



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

Due to a problem on the SEISOP server, no data are available this week. However, the week was very quiet and no radiation was reported.