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

INTEGRAL
Mission Report

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

No.322
Week 47

24.11.08

Routine Phase

Prepared by: F.Schmidt (OPS-OAI) and INTEGRAL FCT

LIST OF CONTENTS

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1 General

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

It addresses the activities from 15.11.08 until 21.11.08 (both dates inclusive) and covers the revolutions 744 and 745.

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 the Cygnus Region (RA 20:35:53.00, DEC +40:39:49.0) and a hexagonal dither of the Galaxy Cluster 47 Tuc and Small Cloud of Magellan SMC (RA 00:53:55.20, DEC -72:26:42.0).

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.

Seven slews were missed from TL, during the observation period, due to problem on IMCS and due to loss of guide star.

The fuel consumption over the period between 15/11/2008 and 21/11/2008 was 0.1586 Kg. The remaining propellant is in the order of 137.4839 Kg.

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

3.1.2 Power

All the other units of EPS are working nominally; available power from the arrays is of the order of 2100W.

3.1.3 Thermal

The thermal control of the satellite is working well. The temperatures are currently all within the specified operational limits.

3.1.4 OBDH

The OBDH subsystem is working flawlessly. No on-board communications problem has been identified.

The PST was over-subscribed by 3 packets, which were allocated to SPI during the Instrument window for the entire reporting period.

3.1.5 RFS

The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

3.2 Payload

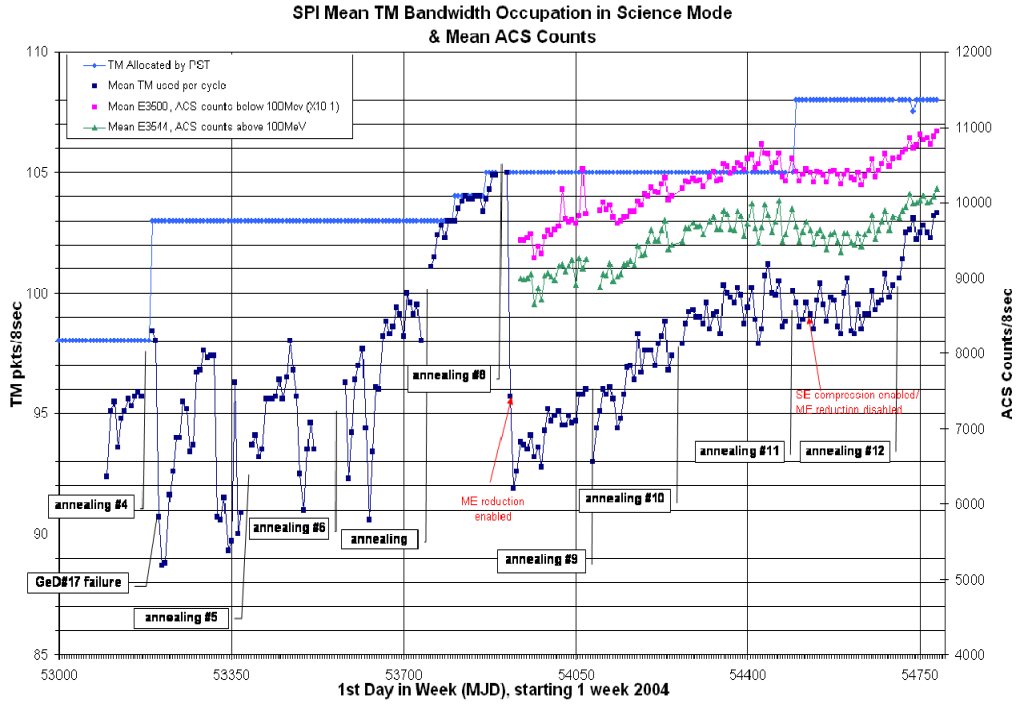
3.2.1 SPI

Following the 12th annealing, ended on 04/09/2008 at 23:50Z, the overall status of the gamma-ray spectrometer is nominal, except for detector #2 (failed since 06/12/2003) and detector #17 (failed since 17/07/2004). The energy resolution of the previously degraded GeD#12 has improved following this annealing and the bias of this detector is now set to 4kV as for the other detectors.

The Stirling compressors are working nominally. The Germanium detectors temperature was kept in the range 80K+/-1K throughout the week.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth in the science observation windows was 108 packets/cycle and the average telemetry occupation was 103.3 packets/cycle.

The following plot shows the evolution of the assigned and the average occupation of the SPI TM bandwidth along with the mean ACS count rate evolution (since July 2006). As can be seen, there is a strong correlation between the evolution of the background as measured by the ACS and the overall TM bandwidth usage.



Note: Some more information concerning the SPI operations is provided in the Appendix 8.3.2.

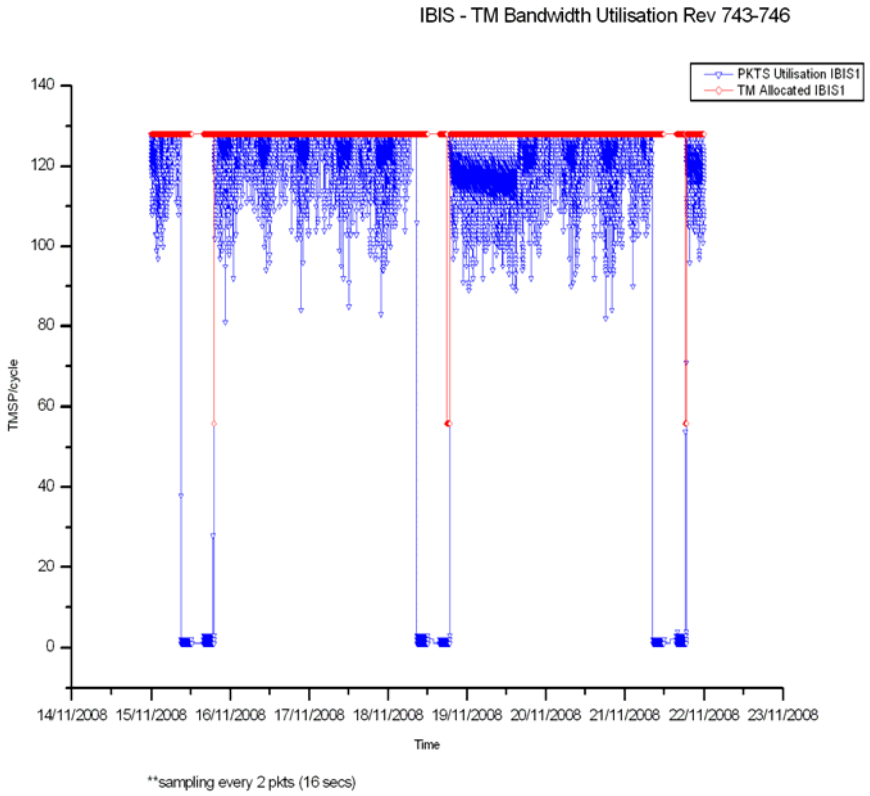
3.2.2 IBIS

The overall status of the unit is nominal.

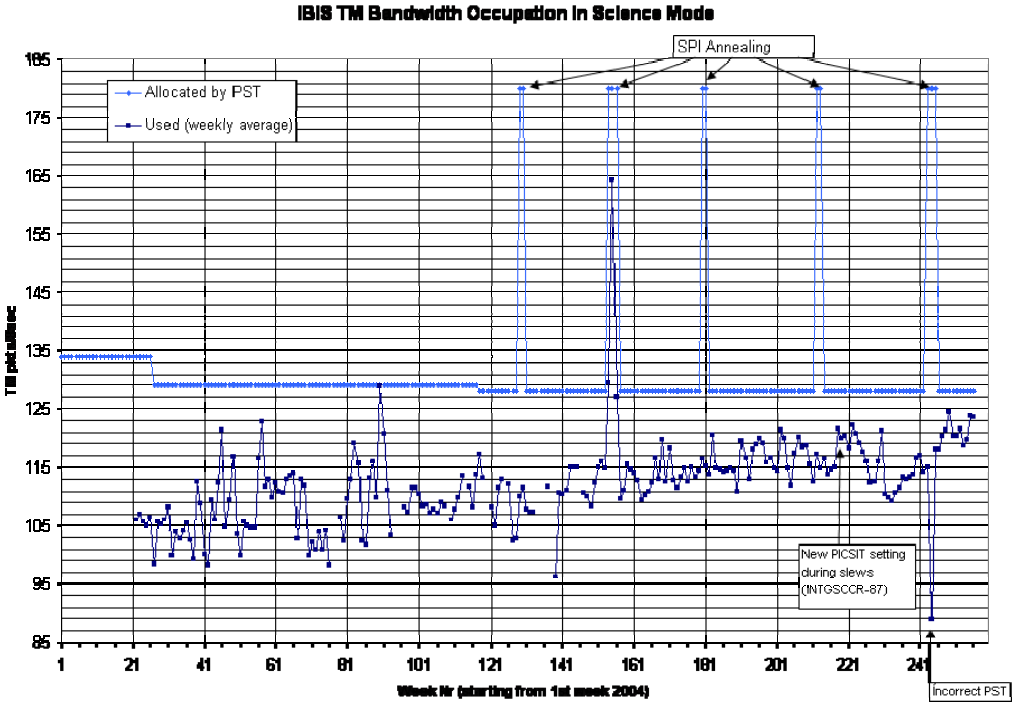
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 128 packets/cycle
- IBIS mean bandwidth utilisation in science mode:123.52 packets/cycle (down 0.34 on previous week)
- Percentage of TM cycles in which full bandwidth was used: 49.05%

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



A plot of the IBIS weekly bandwidth utilisation since 2004 is shown below:



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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

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

Note: Some more information concerning the JEM-X operations is provided in the Appendix Section 8.3.4.

3.2.4 OMC

The status of OMC is nominal.

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

During this reporting period, 202 of the 208 planned science pointings were executed nominally, 6 were lost.

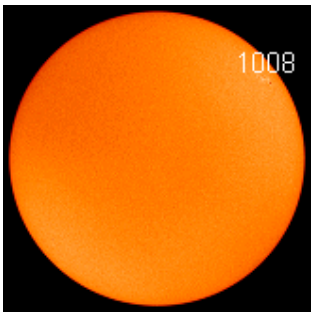
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. A small sun spot, #1008 was visible at the start of the week, but had disappeared by the 18th. The risk of solar flares was very low.



Reference: www.spaceweather.com
Note: Some more information concerning the IREM operations is provided in the Appendix Section 8.3.6.

4 Ground Facilities

The Operational ground facilities performance was good this week. No pointing was lost due to ground problems. The overall performance though was above the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. Seven pointings were lost to MOC related issues. More information is given in section 6.

4.2 Ground Stations & Network

- 2008-11-20 07:31:00 (325)
  Antenna from Goldstone lost. AOS of TM from DSS27 was established at 07:39. The TC link was established at 07:43. After that at 07:56 there was a loss of TM link from Goldstone for about 10 sec. The commanding was not affected.

- 2008-11-20 16:30:00 (325)
  The testing of the T1 line to JPL was successful.

- 2008-11-21 01:47:00 (326)
  No contact with Goldstone on voice loop. Therefore the G/S H/O had to be delayed. 2 minutes later the TM and TC links were established. The Voice contact was established with Goldstone at 01:56.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 751 to 753. Observations have been approved and planning files sent for revolutions 747 to 753.

New TSFs have been received for revolutions 746 and 747.

2. Observation status

A new ECS file has been received for revolution 735.

3. ISOC Science Data Archive

Updated ingest software has been installed.

4. ISOC system

Delta-tests and final updates have been ongoing for PGT and ISOC system V20. The final release is scheduled for 24 November.

5. Problems

No new problems.

4.3.2 ISDC

Status of ISDC observation processing on 24/11/2008:

- Latest Standard Analysis completed: observation 06200590017 (Galactic disk scan, Revolution 735) on 24/11/2008.

- Latest products archived: observation 06200590017 (Galactic disk scan, Revolutions 735) on 24/11/2008.

- Latest observation products sent to the observer: observation 05297000004 (Perseus OB2 Cloud, Revolutions 706-710) on 13/09/2008.

5 Special Events

6 Anomalies

The following problem was reported this week that impacted operations:

2008-11-17 03:57:00 (322)
Error Message received: [CMDHveri] Can not connect to TM RT cache. Verifier was restarted without effect. At 04:16 the Spacon swapped from Prime to Backup IMCS and requested CCC to restart IMCA. After that the Spacon could not perform normal

TL operations from the B-Chain. At 06:20 the operations were transferred back to the A-Chain. The following slews were not executed in TL: 07440057, 58, 59, 60 and 61.

To summarise: IMCA was lost following Verifier problems, IMCB also experienced commanding problems and the result was that 5 slews were lost. The FCT will consider periodic (weekly) exercise of B-chain to ensure hot standby.

Due to loss of the guide star the pointings 07440034 (DoY321) and 07440082 (DoY322) were not executed from the TL.

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

AR id	Date Created	Subject	Segment	Status
INT-3041	2008-11-17	IMCA - CMDHVerifier crash (DOY 322)	IMCS	Pending
INT-3042	2008-11-20	DSS27 - Antenna problem - reboot required (DOY 325)	NASA Station	Pending
INT-3043	2008-11-21	REDU - TM playbacks not working properly	NCTRS	

7 Future Milestones

- MCS version E3.2 is available on the C-chain for testing, it will be installed on the B-chain on 3/12/2008 and the A-chain on 9/12/2008.
- REDU Sis (Service Instances) expiry date will be extended on TMTCS and NCTRS.
- New database IODB_3.1_058 available on C-chain for checking.
- Playback from REDU TMTCS2 is working only intermittently.
- Thrusters calibration is planned for 10/12/2008.
- QoS (Quality of Service) on T1 line to JPL to be defined for Integral.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 744

The observations in revolution 744 consisted entirely of a raster dither of the Cygnus Region (RA 20:35:53.00, DEC +40:39:49.0) lasting ~56.7 hours.

Revolution 745

The observations in revolution 745 began with a hexagonal dither of the Galaxy Cluster 47 Tuc and Small Cloud of Magellan SMC (RA 00:53:55.20, DEC -72:26:42.0), lasting ~20.3 hours. They continued with a raster dither of the Cygnus Region (RA 20:35:53.00, DEC +40:39:49.0) lasting ~35.5 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 108; JEM-X1 8; JEM-X2 0; OMC 5.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2008-10-30T03:38:56.000Z     137.8052    F   Automatic TM processing.
2008-10-31T17:35:24.000Z     137.7942    F   Automatic TM processing.
2008-11-02T02:58:40.000Z     137.7738    F   Automatic TM processing.
2008-11-03T17:23:08.000Z     137.7612    F   Automatic TM processing.
2008-11-05T02:44:56.000Z     137.7177    F   Automatic TM processing.
2008-11-06T17:13:16.000Z     137.7047    F   Automatic TM processing.
2008-11-08T02:26:15.000Z     137.6969    F   Automatic TM processing.
2008-11-09T17:03:00.000Z     137.6951    F   Automatic TM processing.
2008-11-11T02:15:36.000Z     137.6714    F   Automatic TM processing.
2008-11-12T16:48:36.000Z     137.6677    F   Automatic TM processing.
2008-11-14T02:18:40.000Z     137.6425    F   Automatic TM processing.
2008-11-15T16:32:52.000Z     137.6314    F   Automatic TM processing.
2008-11-17T01:51:44.000Z     137.5623    F   Automatic TM processing.
2008-11-18T16:21:00.000Z     137.5540    F   Automatic TM processing.
2008-11-19T16:01:27.000Z     137.5064    F   Automatic TM processing.

This report was generated  Fri Nov 21 08:00:29 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, 15/11/2008 – 21/11/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 128 Open Loop Slews, 84 Closed Loop Slews and 6 Momentum Biases were executed (as reported by ACC OEM).

7 slews (OSL) were missed from TL, during the observation period, due to a problem on the TM RT cache task of IMCS and due to loss of guide star.

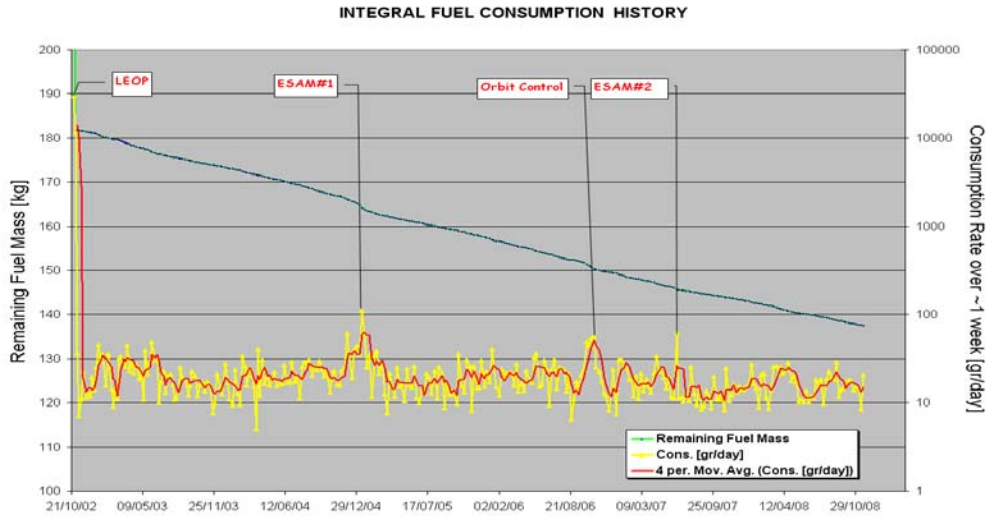
This is equivalent to ~ 3.2 % of the total number of slews planned (216).

Orbit Control

No update

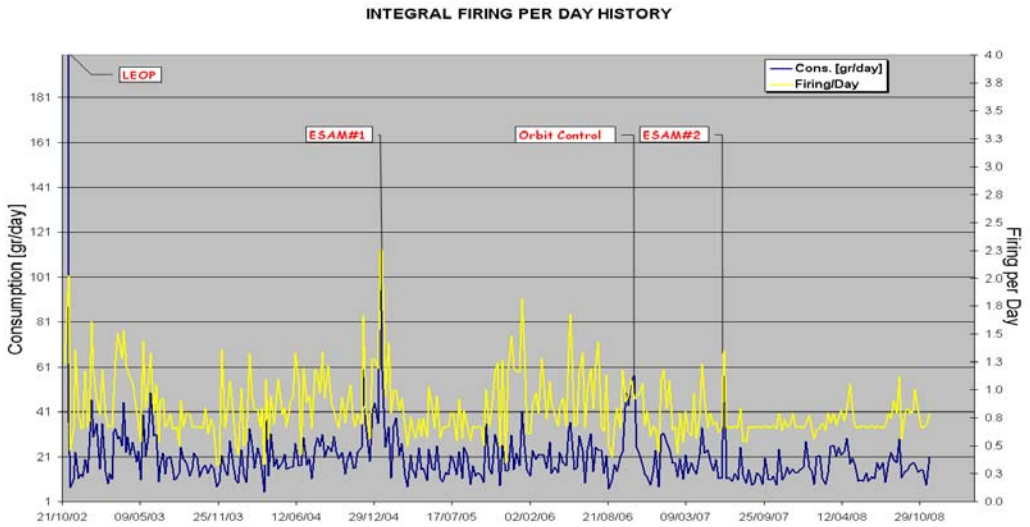
Fuel consumption

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



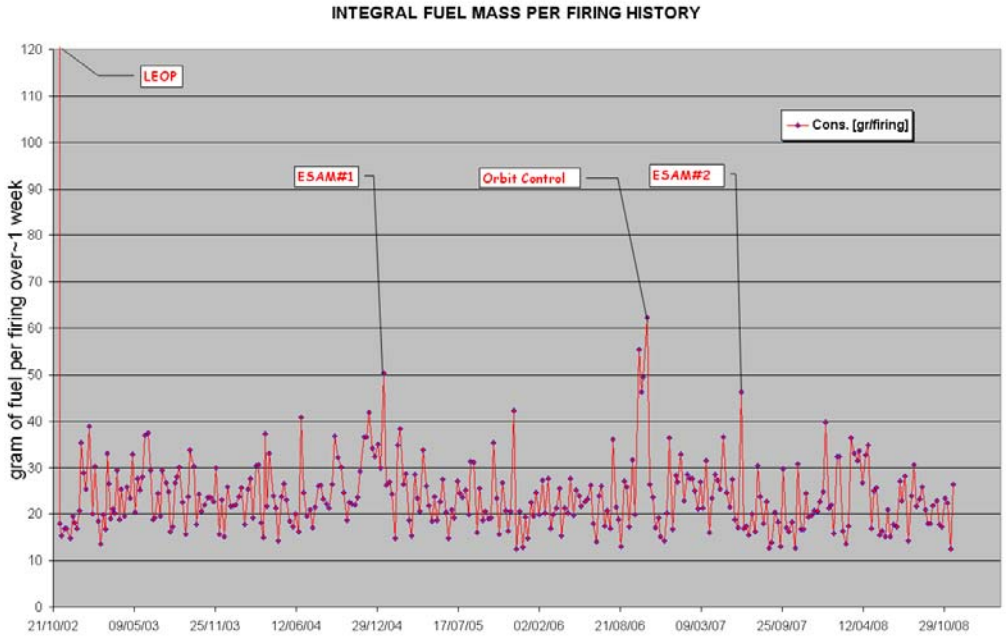
The above plot considers the ESAM fuel consumption spread over period of ~1 week.

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



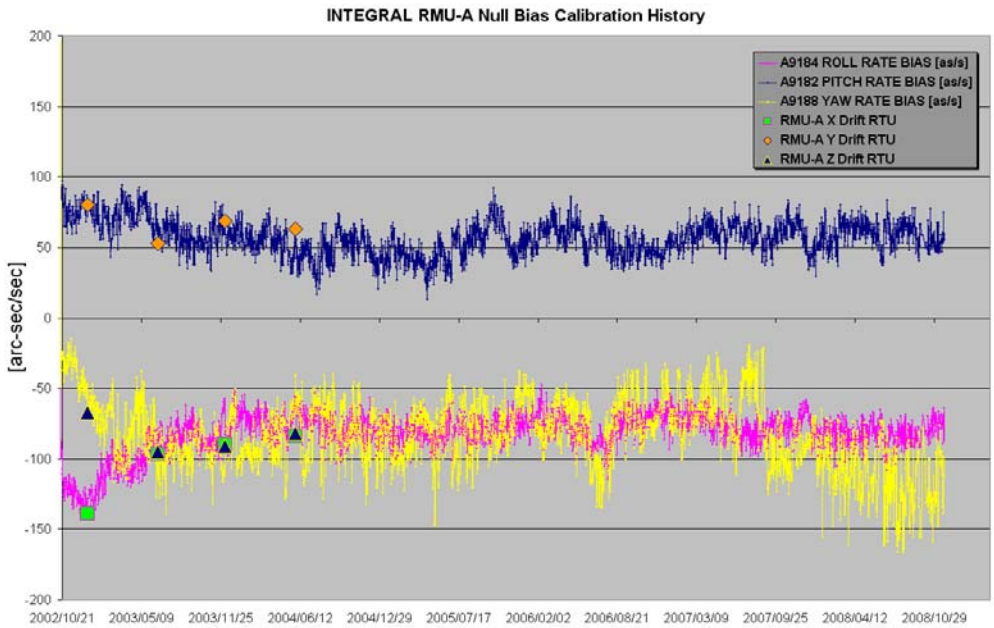
The above plot considers the ESAM fuel consumption spread over period of ~1 week.

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

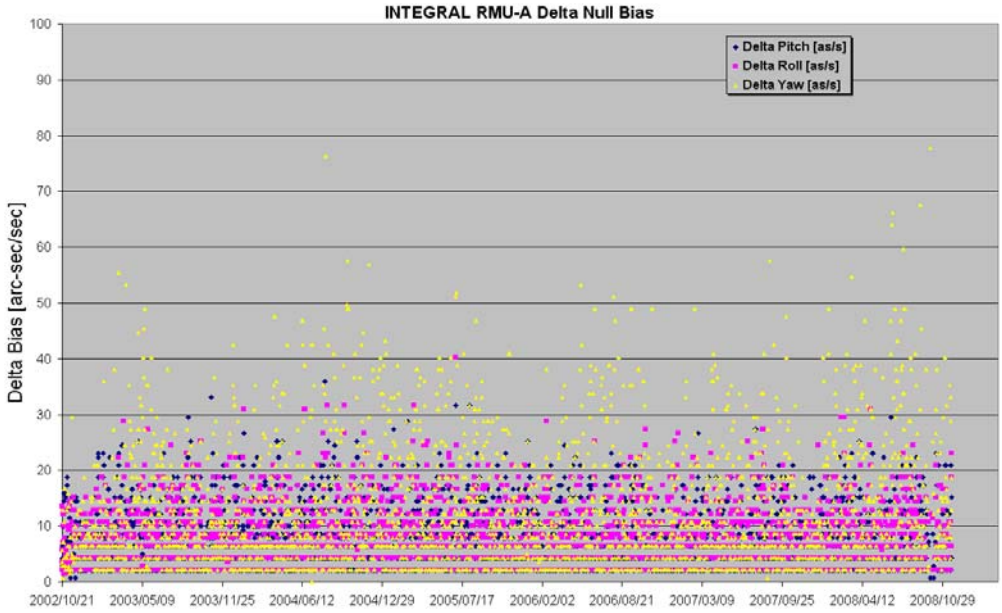


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 21/11/2008 is reported in the plot below.
The evolution of the drift on yaw channel is under constant monitoring but the values are still well within the specs. At moment the current constraints (for drift update generation) on the FDS have been relaxed to cope with the current situation.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over period between 01/11/2002 and 21/11/2008 is reported in the plot below.



15/11/2008 (Day of Year 320, Revolution 743-744)

Nothing to report.

16/11/2008 (Day of Year 321, Revolution 744)

Loss of guide star: at 13:41z a loss of the current guide star occurred. As foreseen by the IPS logic, the IMU1 went on until a new guide star picked.

The AOCS s/s was disabled at 13:42z

The operator performed a manual recovery from the attitude of PID 07440033 to the attitude of PID 07440034 and the next slew was manually updated in TL.

The AOCS s/s was disabled at 14:17z

The following slew was not executed in TL: 07440034 (OSL)

17/11/2008 (Day of Year 322, Revolution 744)

IMCS problem on TM RT cache task: at 03:57z a problem on the IMCS TM RT cache task occurred. This cause several s/s to fail TC release. The operations were moved to the B-Chain but this action was not successful: the B-chain reported problem. The operator then performed a switch back to the A-chain (rebooted successfully) and a recovery of the TL was initiated.

A manual recovery was performed from attitude of PID 07440056 to the attitude of PID 07440061 (by executing an OSL) and the next slew ID 07440062 was manually updated in TL.

The AOCS s/s was enabled in TL at 07:12z.

The following slews were not executed in TL: 07440057(OSL)-58(OSL)-59(OSL)-60(OSL)-61(OSL)

Loss of guide star: at 19:23z a loss of the current guide star occurred. As foreseen by the IPS logic, the IMU1 went on until a new guide star picked.

The AOCS s/s was disabled at 19:26z

The operator performed a manual recovery from the attitude of PID 07440081 to the attitude of PID 07440082 and the next slew was manually updated in TL.

The AOCS s/s was disabled at 20:03z

The following slew was not executed in TL: 07440082 (OSL)

18/11/2008 (Day of Year 323, Revolution 744-745)

Nothing to report.

19/11/2008 (Day of Year 324, Revolution 745)

Nothing to report.

20/11/2008 (Day of Year 325, Revolution 745)

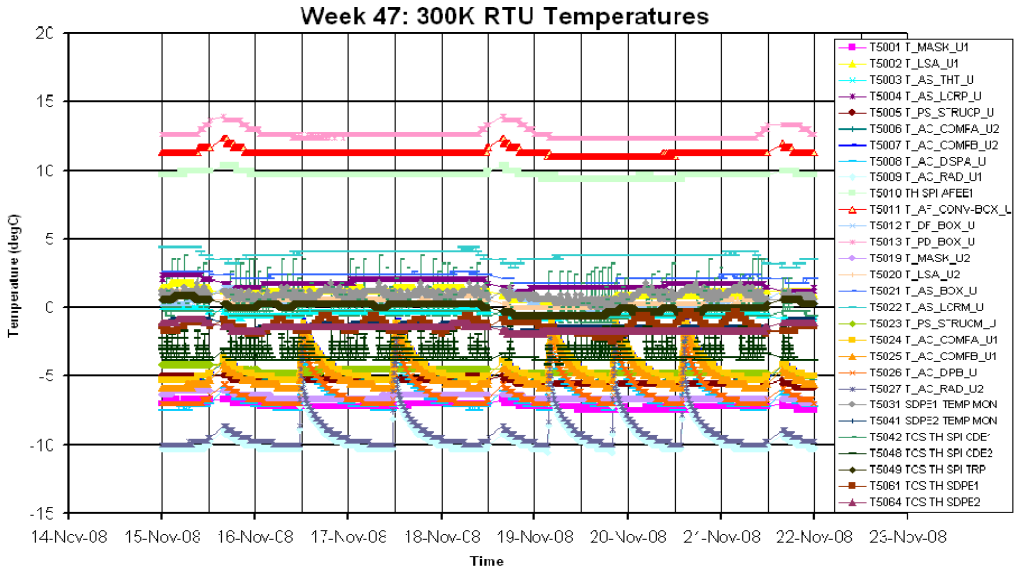
Nothing to report.

21/11/2008 (Day of Year 326, Revolution 745-746)

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.

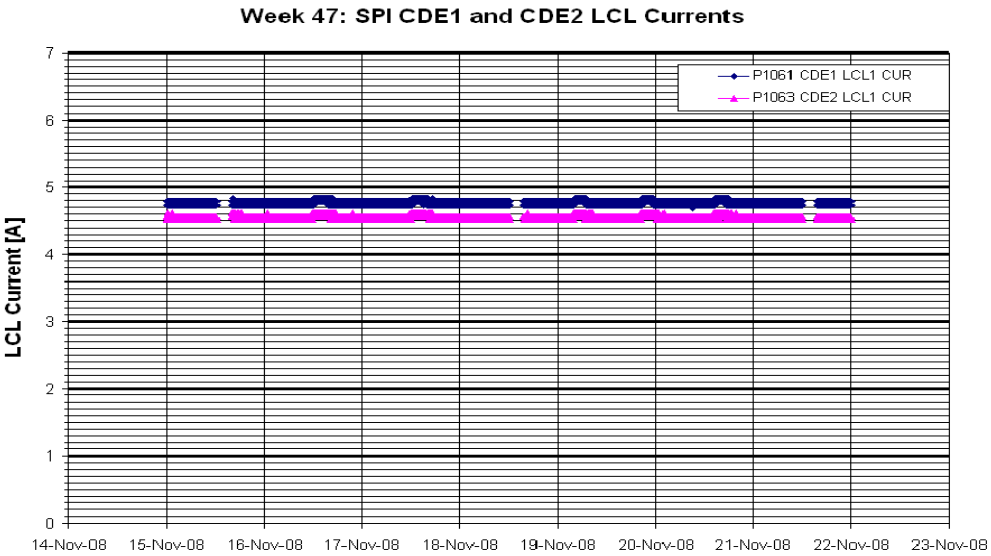


Stirling Compressors and Cryostat: The performance of the compressors is nominal.
The cold plate temperature was maintained in the range 80K +/-1K.

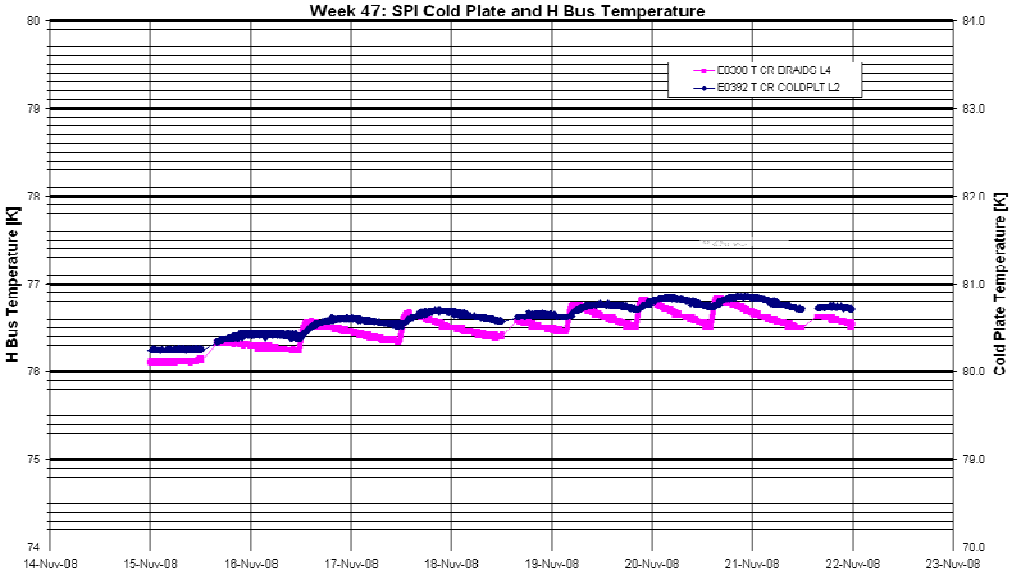
The stroke of all four compressors was set to 40 throughout the week and the average CDE LCL currents were as follows:

- CDE1 LCL Current = 4.76A
- CDE2 LCL Current = 4.55A

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



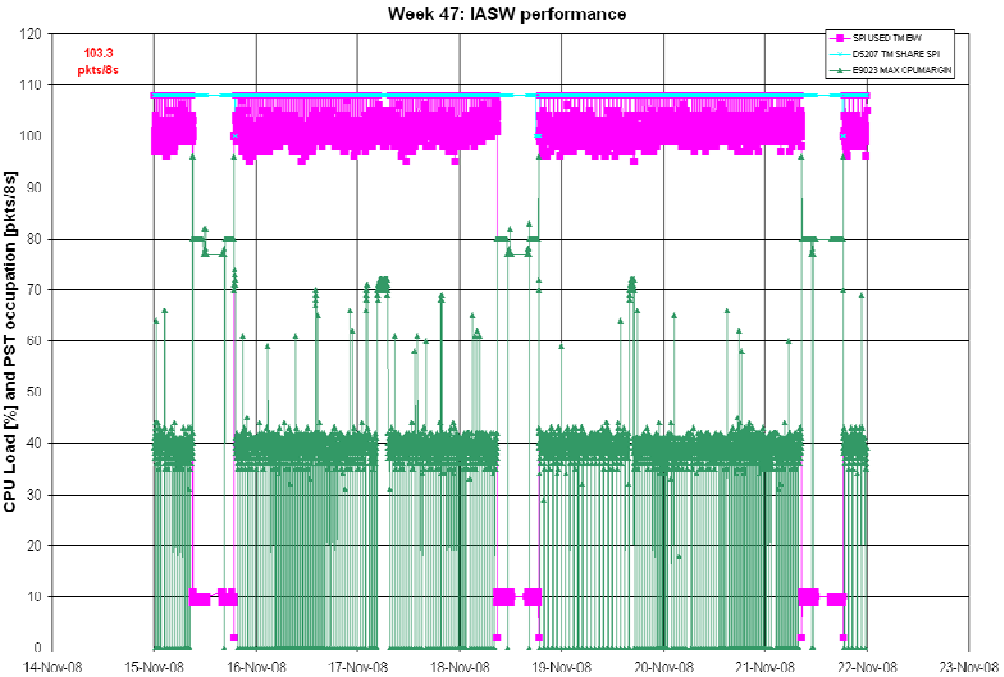
The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period.



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

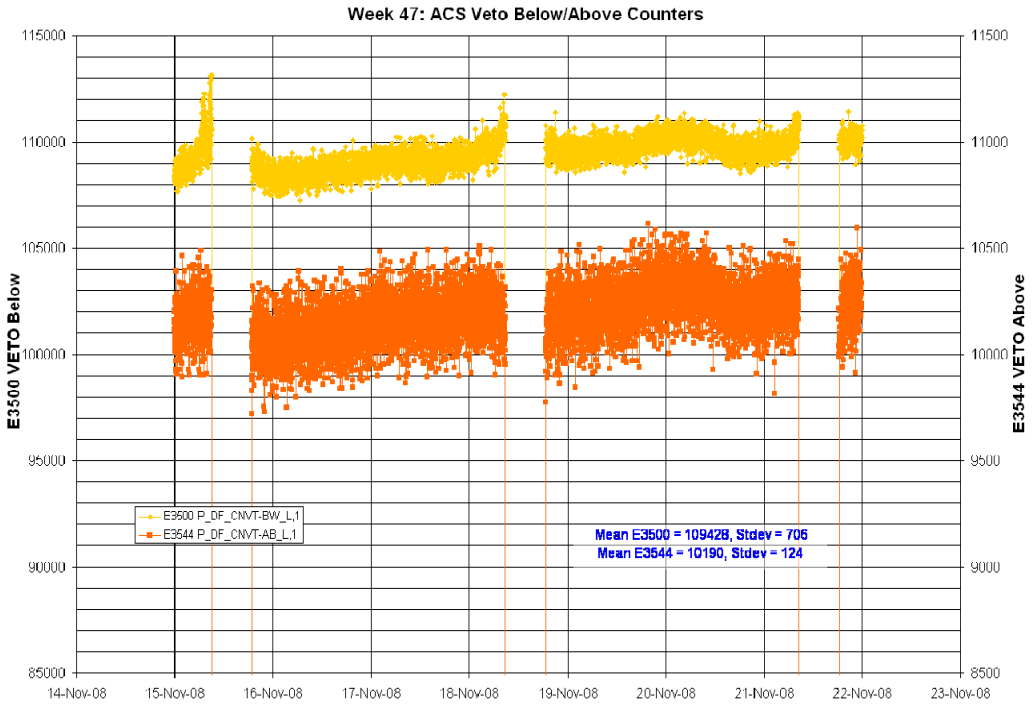
The IASW version installed is v4.3.4 with SE compression only enabled and the spectra scaling factor set to 8/19 SE. The average TM bandwidth occupation of SPI was 103.3 packets/cycle over the science window when the TM allocation was 108 packets/cycle.

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

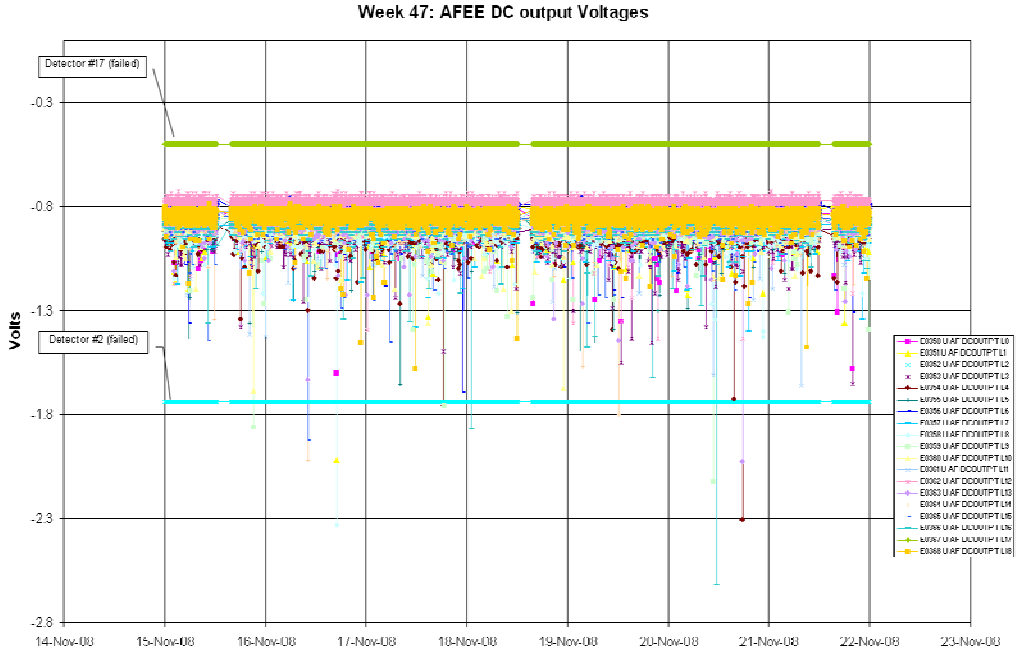


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

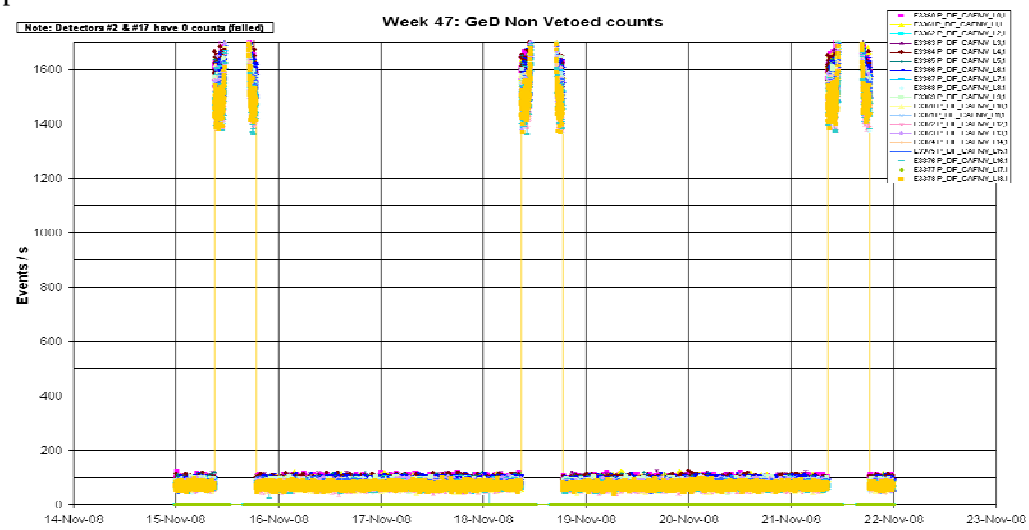
The following plot shows the ACS overall count rate evolution during the reporting period:

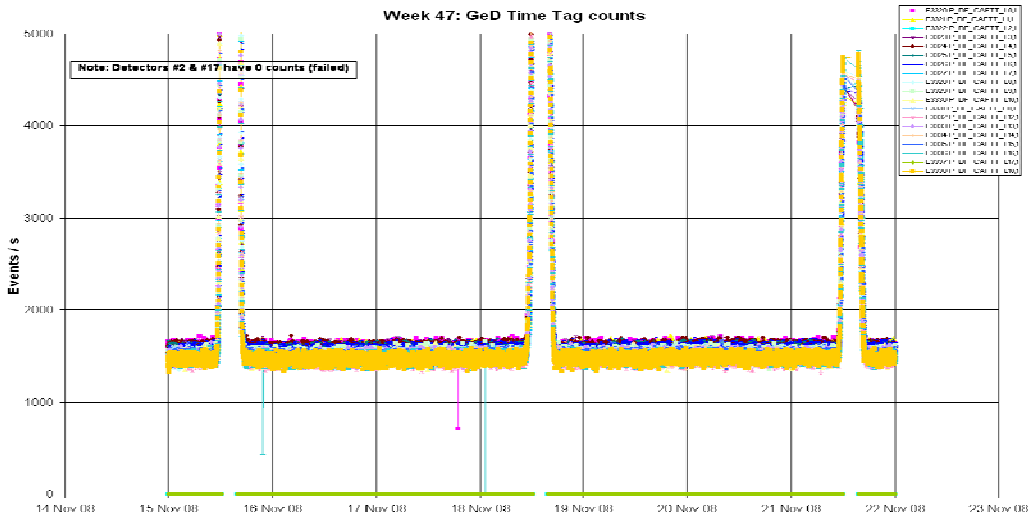


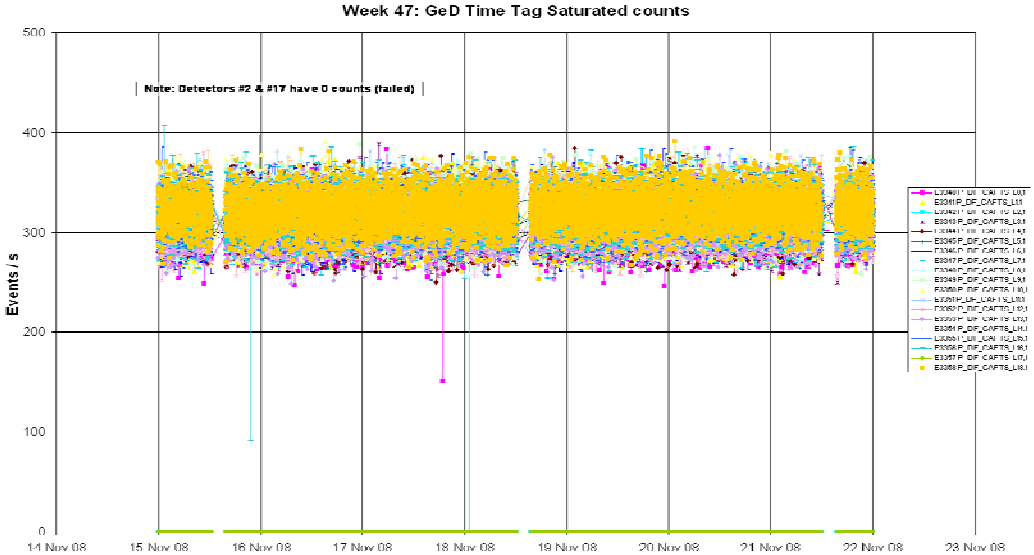
AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.



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.







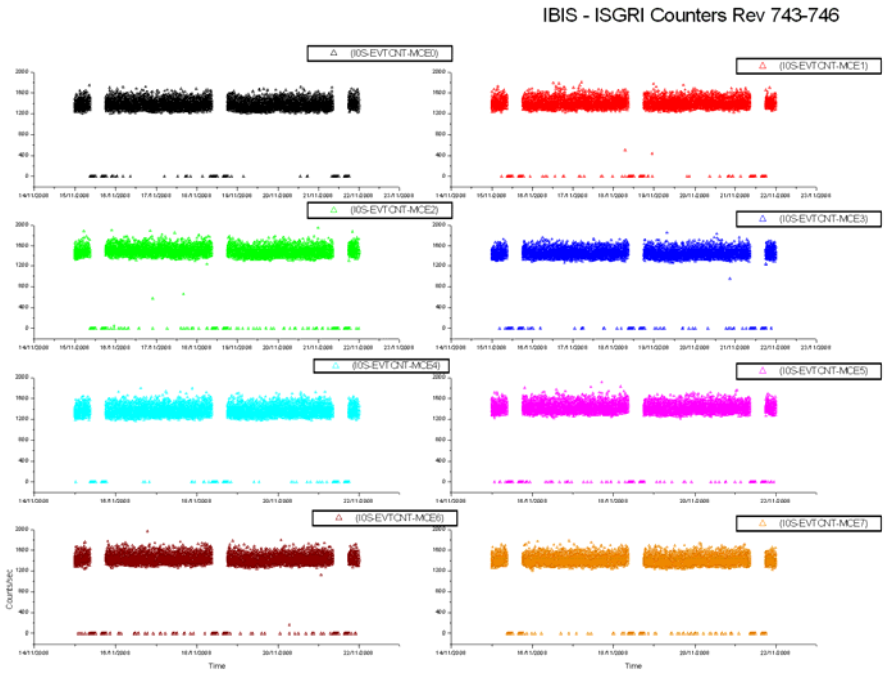
PSD: The health of the unit is nominal. The following plot shows the PSD channel rates during the reporting period.

Event Log:
No non-nominal events occurred during the reporting period.

8.3.3 IBIS Operations

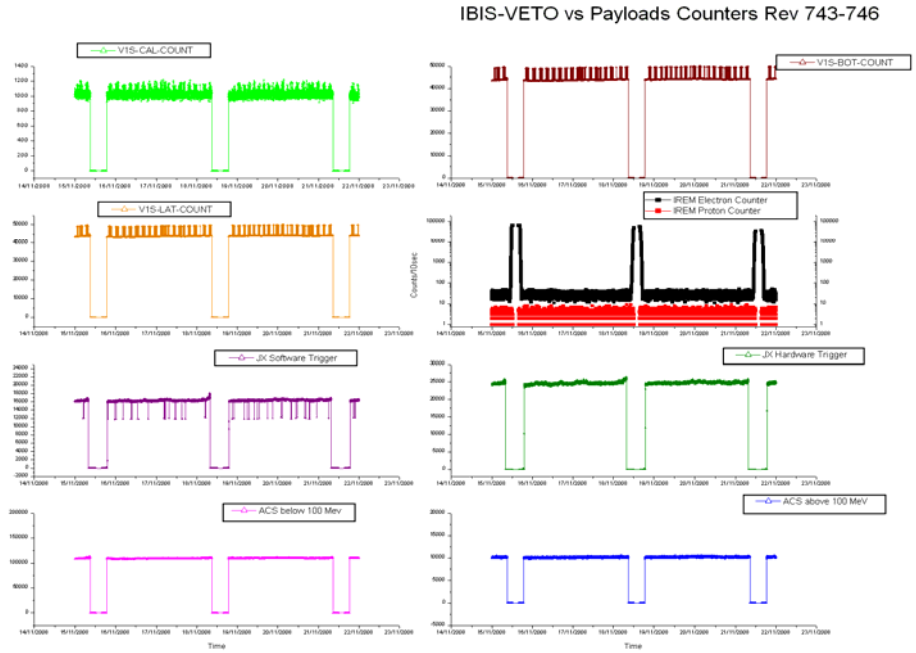
IBIS Event Counters Plots

ISGRI Counters:



**sampling every 4 pkts (32 secs)

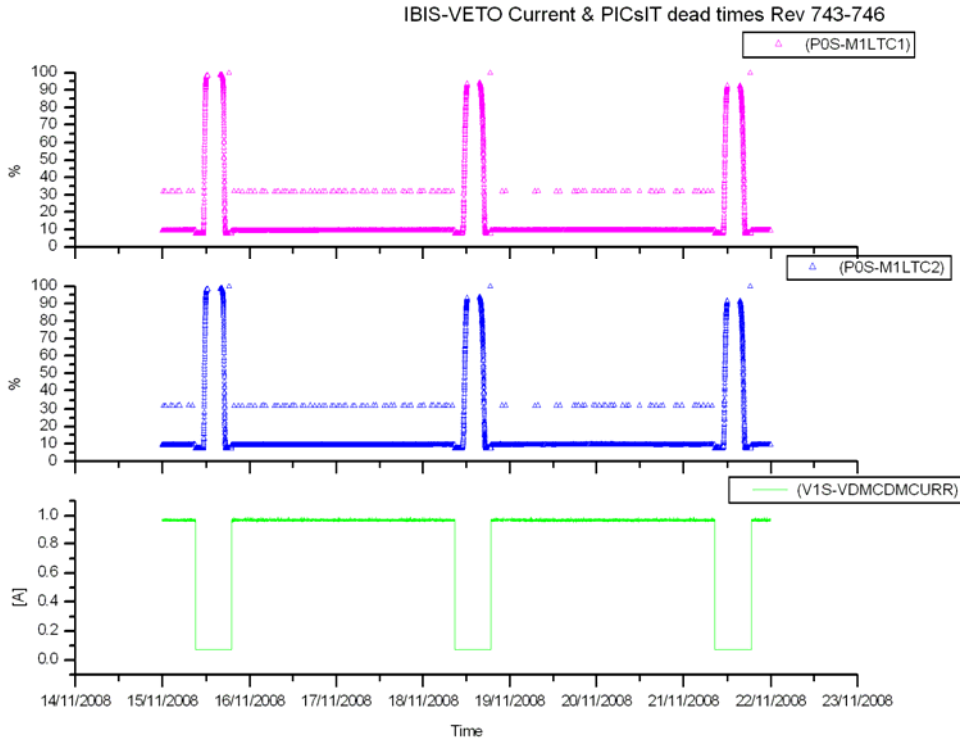
VETO vs Payload Counters:



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

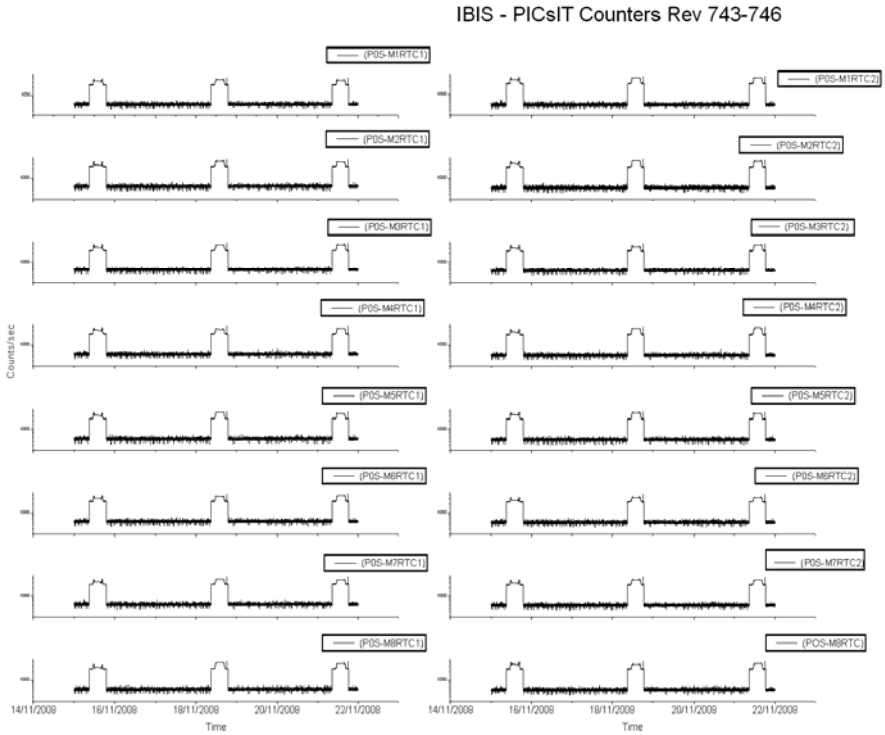
The week was characterised by low radiation as reported by the payload.

VETO Current:



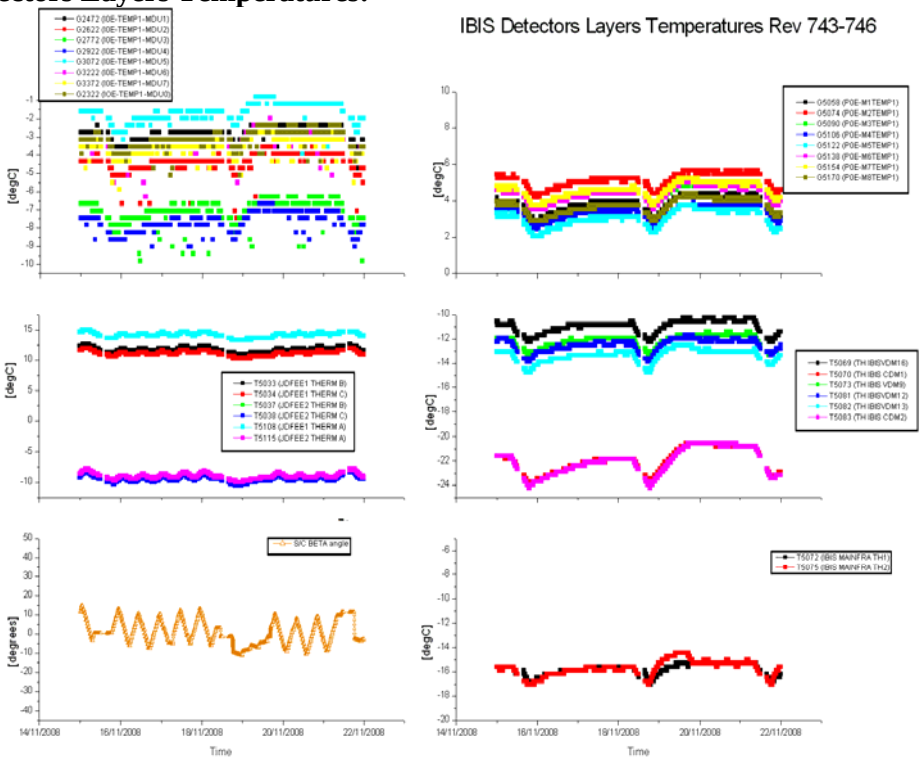
**sampling every 4 pkts (32 secs)

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.

2008-11-15 (DOY 320, Rev 743-744) to 2008-11-20 (DOY 325, Rev 745)

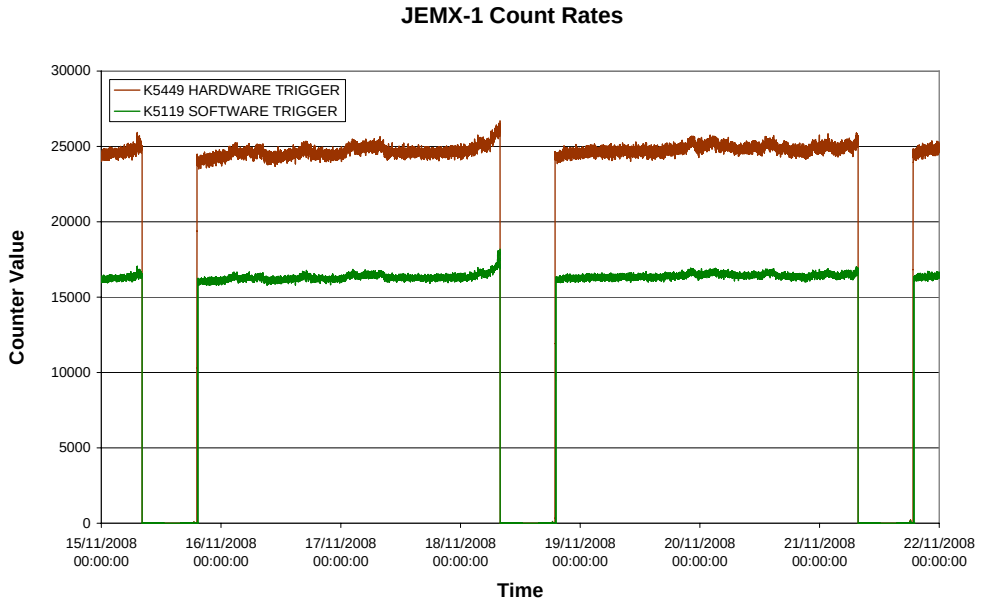
IBIS operations executed nominally.

2008-11-21 (DOY 326, Rev 745-746)

TM parameter G6061 (VETO Calibration Source counter) went briefly OOL Low several times from 18:56:34Z until 20:49:06Z. As in each case it returned within limits of its own accord, no action was taken. If these OOLs become more frequent, this may indicate that an adjustment of the limit is required to take into account the radioactive decay of the calibration source.

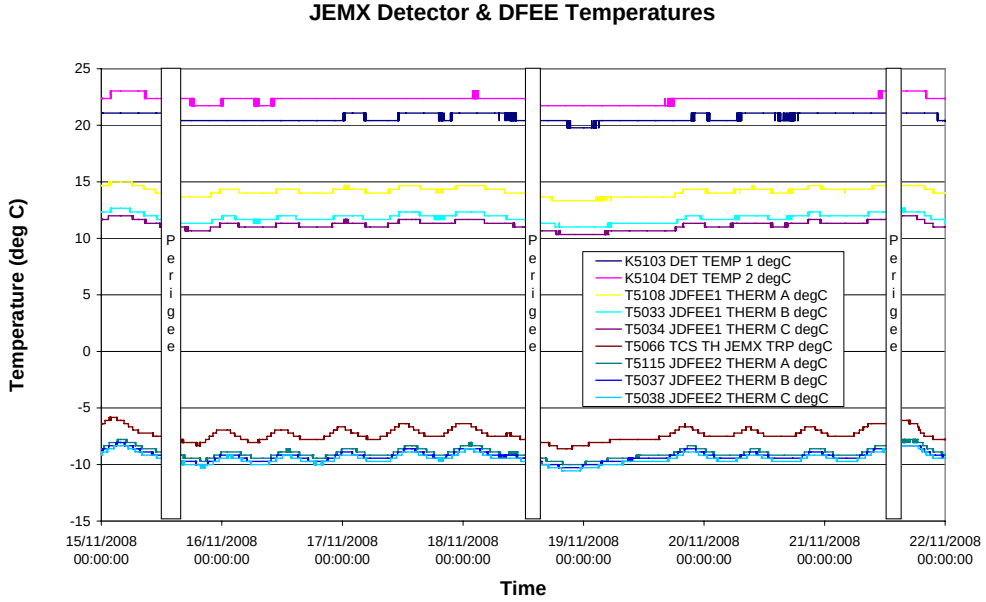
8.3.4 JEM-X Operations

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].



JEM-X Daily Report

[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)

2008-11-15 (DoY 320, Rev 743-744)

The following OEMs were received at the indicated times:

```
2008.320.19.22.02.822    2008.320.19.22.07.231    1536    RealTime    5          ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO                                0       0    65535   PR    N
E   E
    FIX6                                          0
    K9079          MESS CLASS                     2
    K9080          MESS ID                        5
    K9074          TASK ID 16                     12
    K9067          LOGICAL ADDRESS                4989
 2008.320.19.22.02.822    2008.320.19.22.07.246    1536    RealTime    5          ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO                                0       0    65535   PR    N
E   E
    FIX6                                          0
    K9079          MESS CLASS                     2
    K9080          MESS ID                        5
    K9074          TASK ID 16                     12
    K9067          LOGICAL ADDRESS                4989
2008.320.19.22.02.822    2008.320.19.22.07.271    1536    RealTime    5          ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO                                0       0    65535   PR    N
E   E
    FIX6                                          0
    K9079          MESS CLASS                     2
    K9080          MESS ID                        5
    K9074          TASK ID 16                     12
    K9067          LOGICAL ADDRESS                4989
2008.320.19.22.02.822    2008.320.19.22.07.272    1536    RealTime    5          ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO                                0       0    65535   PR    N
E   E
    FIX6                                          0
    K9079          MESS CLASS                     2
    K9080          MESS ID                        5
    K9074          TASK ID 16                     12
    K9067          LOGICAL ADDRESS                4989
2008.320.19.22.02.822    2008.320.19.22.07.273    1536    RealTime    5          ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO                                0       0    65535   PR    N
E   E
    FIX6                                          0
    K9079          MESS CLASS                     2
    K9080          MESS ID                        5
    K9074          TASK ID 16                     12
    K9067          LOGICAL ADDRESS                4989
2008.320.19.22.02.822    2008.320.19.22.07.274    1536    RealTime    5          ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO                                0       0    65535   PR    N
E   E
    FIX6                                          0
    K9079          MESS CLASS                     2
    K9080          MESS ID                        5
    K9074          TASK ID 16                     12
    K9067          LOGICAL ADDRESS                4989
2008.320.19.22.02.822    2008.320.19.22.07.275    1536    RealTime    5          ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO                                0       0    65535   PR    N
E   E
    FIX6                                          0
    K9079          MESS CLASS                     2
    K9080          MESS ID                        5
    K9074          TASK ID 16                     12
    K9067          LOGICAL ADDRESS                5336
```

No action was taken and there was no impact.

2008-11-16 (DoY 321, Rev 744) to 2008-11-21 (DoY 326, Rev 745-746)

JEM-X 1 operations executed nominally.

8.3.5 OMC Operations

2008-11-15 (DoY 320, Rev 743)

Nothing to report.

2008-11-16 (DoY 321, Rev 744)

At 13:41, an AOCS problem led to a suspension of the Timeline. A recovery was performed, and the Timeline restored at 14:17:01. The impact was the loss of pointing 07440033.

2008-11-17 (DoY 322, Rev 744)

At 03:57, a problem with the Command Verifier, forced an interruption of the Timeline. Repeated attempts at resolving the problem were unsuccessful, until a full restart of the a-chain recovered the situation. The Timeline was eventually restored at 07:12. The impact was the loss of pointings 07440057, 07440058, 07440059, 07440060 & 7440061. It was at around this time that the following pairs of commands were rejected:

```
2008.322.04.30.05.888   2008.322.05.36.15.582   1792   RealTime   131
TC REJECT   REJECTED TC1
0       0    65535   PR    N     E   E
2008.322.04.30.12.138   2008.322.05.36.17.383   1792   RealTime   131
TC REJECT   REJECTED TC1
0       0    65535   PR    N     E   E
2008.322.05.05.21.889   2008.322.05.41.34.765   1792   RealTime   131
TC REJECT   REJECTED TC1
0       0    65535   PR    N     E   E
2008.322.05.05.28.139   2008.322.05.41.35.747   1792   RealTime   131
TC REJECT   REJECTED TC1
0       0    65535   PR    N     E   E
2008.322.05.40.37.891   2008.322.05.46.52.309   1792   RealTime   131
TC REJECT   REJECTED TC1
0       0    65535   PR    N     E   E
2008.322.05.40.44.141   2008.322.05.46.54.086   1792   RealTime   131
TC REJECT   REJECTED TC1
0       0    65535   PR    N     E   E
2008.322.06.15.53.892   2008.322.06.16.40.091   1792   RealTime   131
TC REJECT   REJECTED TC1
0       0    65535   PR    N     E   E
2008.322.06.16.00.142   2008.322.06.16.41.129   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 pointings 07440057, 07440058, 07440059, 07440060.

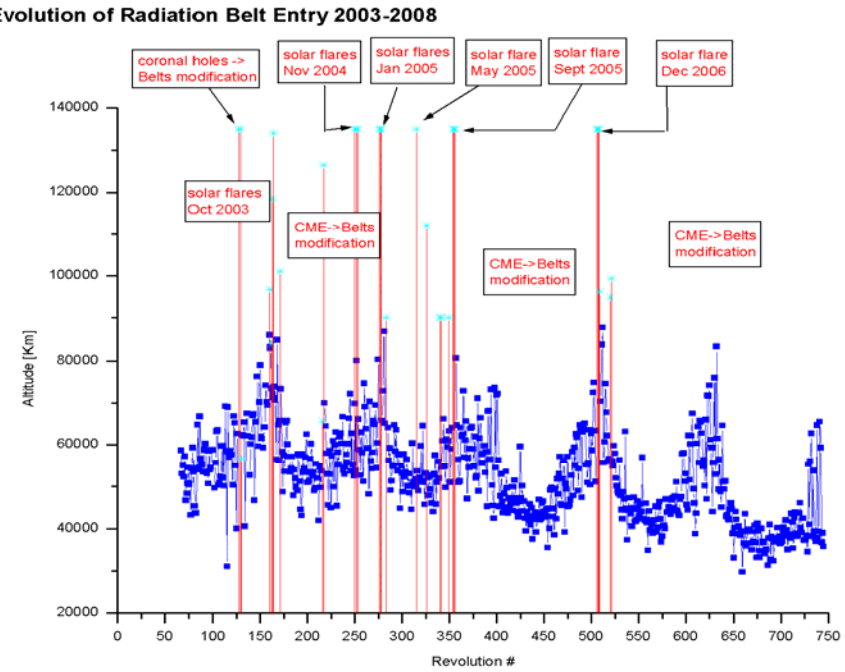
2008-11-18 (DoY 323, Rev 744) to 2008-11-21 (DoY 326, Rev 746)

Nothing to report.

On DoY 320 at 09:02:28, DoY 323 at 08:49:56 and DoY 326 at 08:37:08 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]
743	RAD_ENTR R 2008-11-15T09:02:25Z	15/11/2008 11:10:43	36767.5	15-Nov-2008 11:14:30	35903.14
744	RAD_EXIT R 2008-11-15T18:48:54Z	15/11/2008 17:34:19	>>33797.6	15-Nov-2008 18:04:30	46381.08
744	RAD_ENTR R 2008-11-18T08:49:49Z	18/11/2008 10:46:27	38983.1	18-Nov-2008 10:59:53	36308.47
745	RAD_EXIT R 2008-11-18T18:36:10Z	18/11/2008 17:19:07	>>33803.2	18-Nov-2008 17:49:53	46026.78
745	RAD_ENTR R 2008-11-21T08:37:00Z	21/11/2008 10:49:07	35789.3	21-Nov-2008 10:49:53	35832.05
746	RAD_EXIT R 2008-11-21T18:23:07Z	21/11/2008 17:00:35	>>33812.6	21-Nov-2008 17:39:53	46478.65

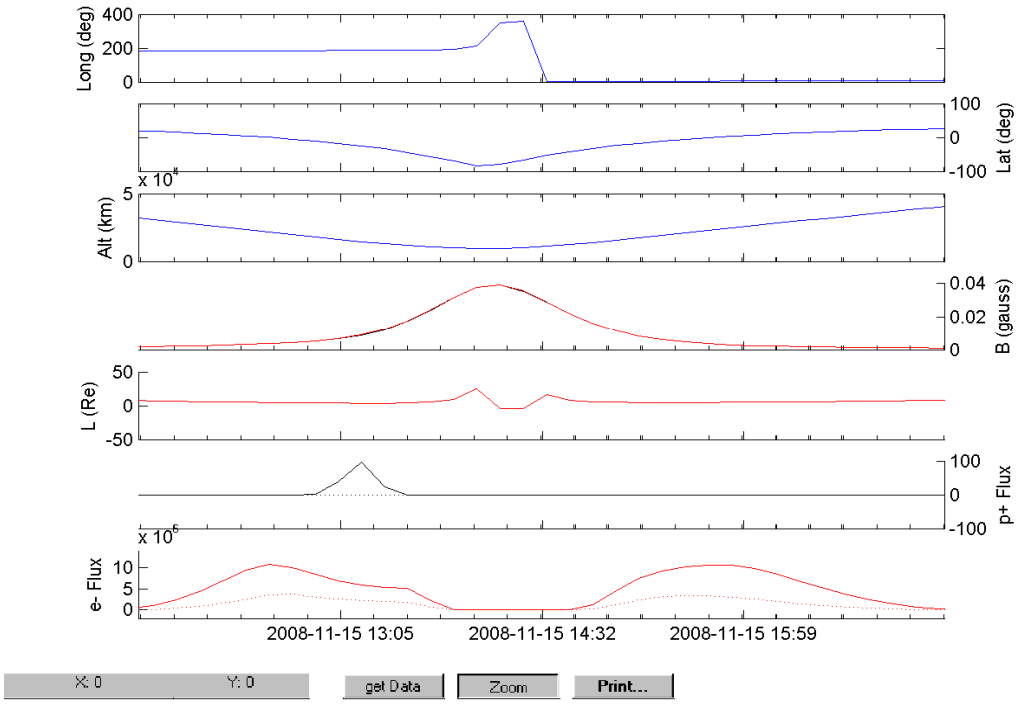
Reference
High radiation
Very small error vs reference (less than 10 minutes)
Small error vs reference (between 10 and 30 minutes)
Large error vs reference (more than 30 minutes)
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

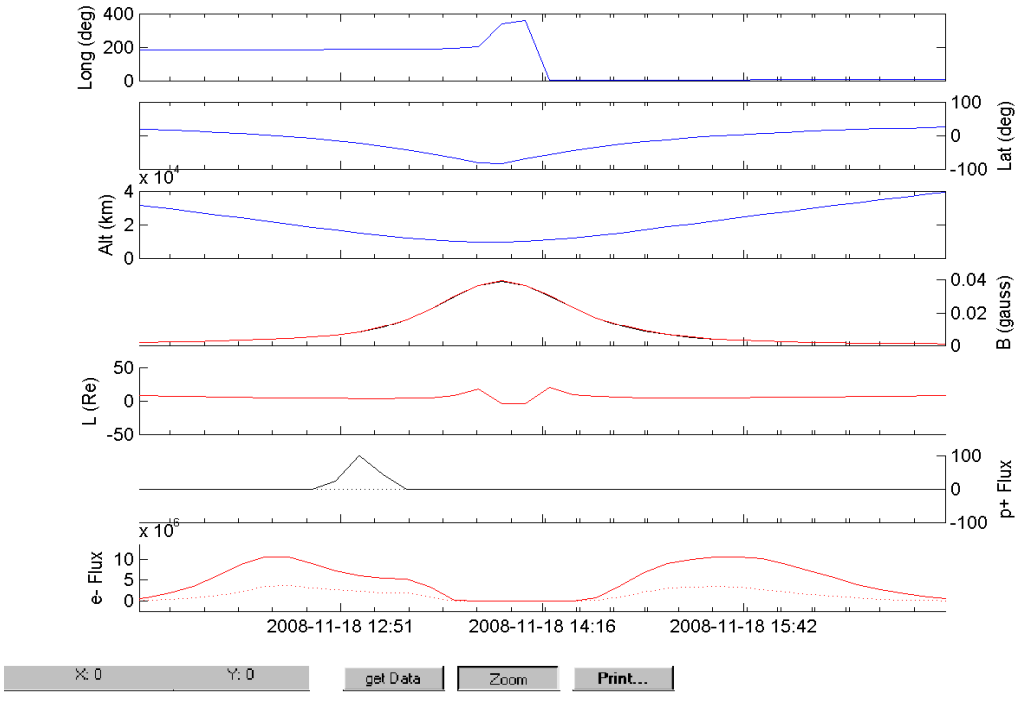
The IREM radiation counter plots are not available this week.

IREM Predicted Radiation Belt Passages

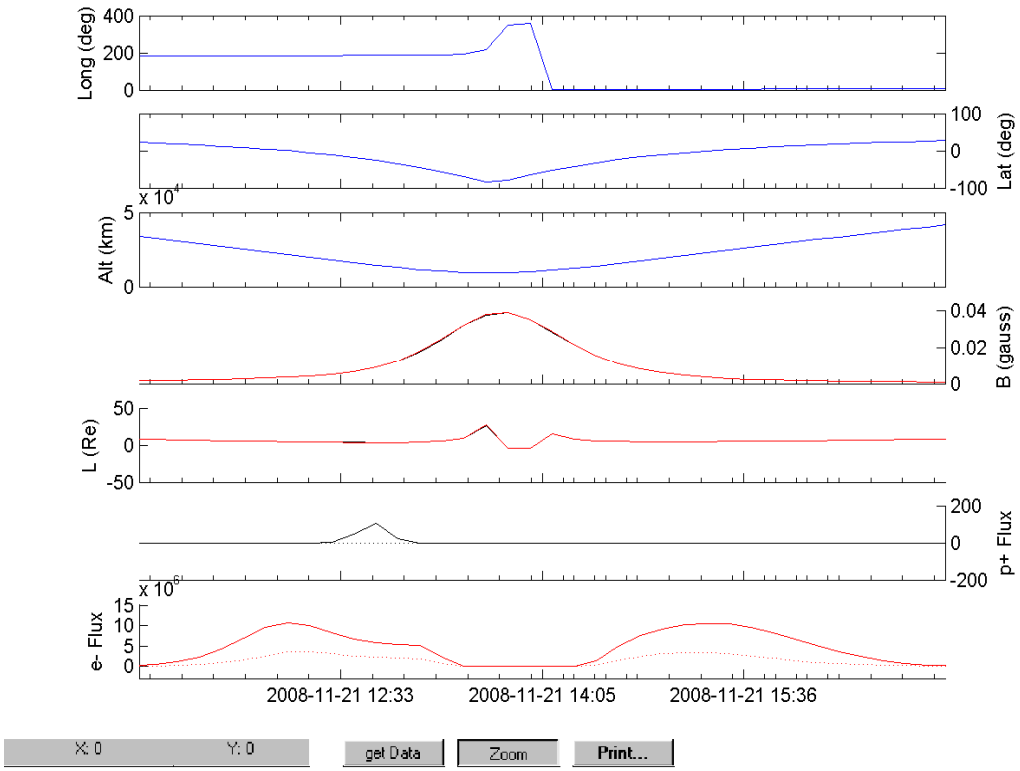
Rev 743



Rev 744

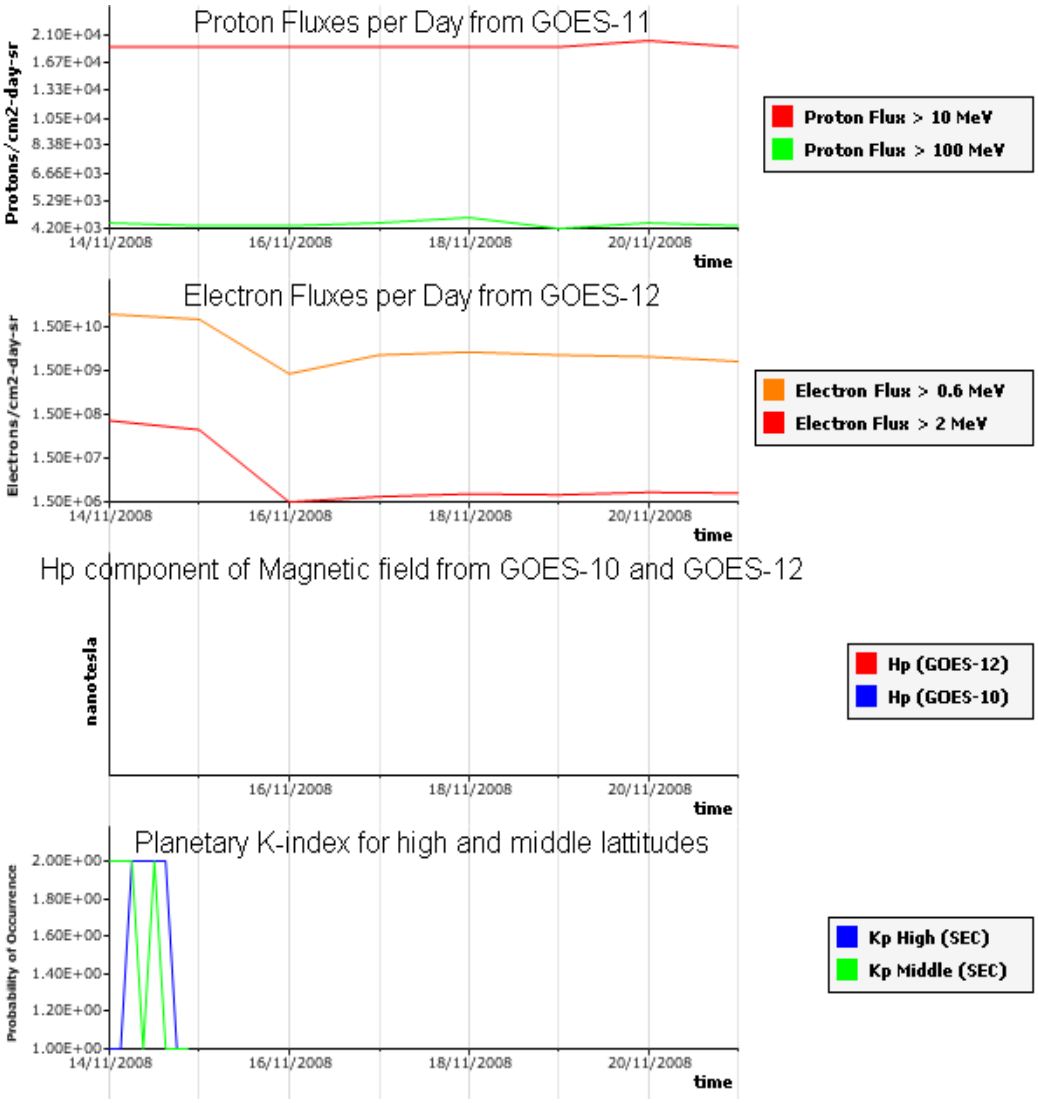


Rev 745


Long (deg)
400
200
0
100
0
-100
Lat (deg)
x 10^4
Alt (km)
5
0
0.04
0.02
0
B (gauss)
L (Re)
50
0
-50
200
0
-200
p+ Flux
x 10^6
e- Flux
15
10
5
0
2008-11-21 12:33
2008-11-21 14:05
2008-11-21 15:36
X: 0
Y: 0
get Data
Zoom
Print...

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

The system was down for most of the week, and only some data was available:



Proton and electron flux report low radiation background.
Hp component of the Geomagnetic Field is essentially parallel to the Earth's rotation axis. A drop near 0 nT is associated with a significant variation in the magnetic field.
Kp index is based on ground magnetometers. Kp >=5 features storm-level geomagnetic activity.