

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 205
Week 34
28.08.06
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 19.08.06 until 25.08.06 (both dates inclusive) and covers the revolutions 470, 471 and 472.

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 a hexagonal dither of Gal. Bulge region (RA 17:45:36.00, DEC -28:56:00.0), a Hexagonal dither of 2030+375 (RA 20:32:15.30, DEC +37:38:15.0), which was a Target of Opportunity, a raster dither of the Mid-latitude North region (RA 16:18:13.65, DEC -14:13:46.6), a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0) and a raster dither of the Galactic Centre (RA 17:45:40.00, DEC -29:00:28.0).

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.

16 slews were missed during the observation period due to several problems on IMCS and DSS27 station

The fuel consumption over the period between 18/08/2006 and 23/08/2006 was 0.0389 Kg. The remaining propellant is in the order of 152.4171 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

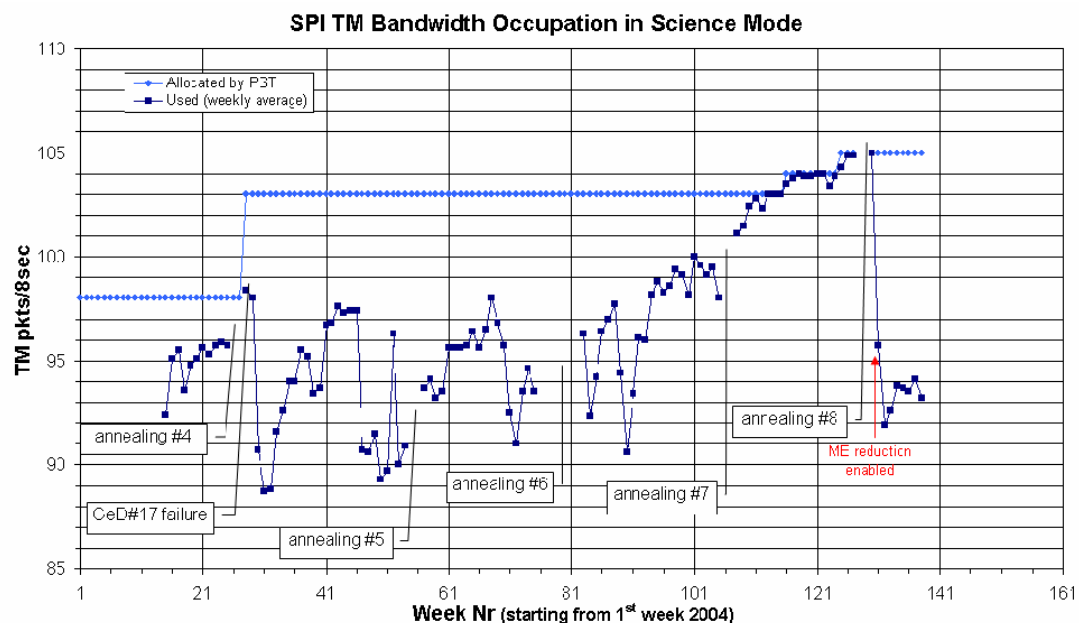
3.2.1 SPI

Following the 8th annealing, which ended on 26th June, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detectors #4 and #12 which are showing a slightly degraded energy resolution. The energy resolution of GeD#15 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 82 +/-1K. The compressor stroke was increased from 38 to 39 on 2006-08-24 at 15:19Z.

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 pkts/cycle, except during revolution 471 in which the TM allocation in the PST was 100 pkts/cycle (see AR INT-2872). The average telemetry occupation in the science window was 93.2 packets/cycle.

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



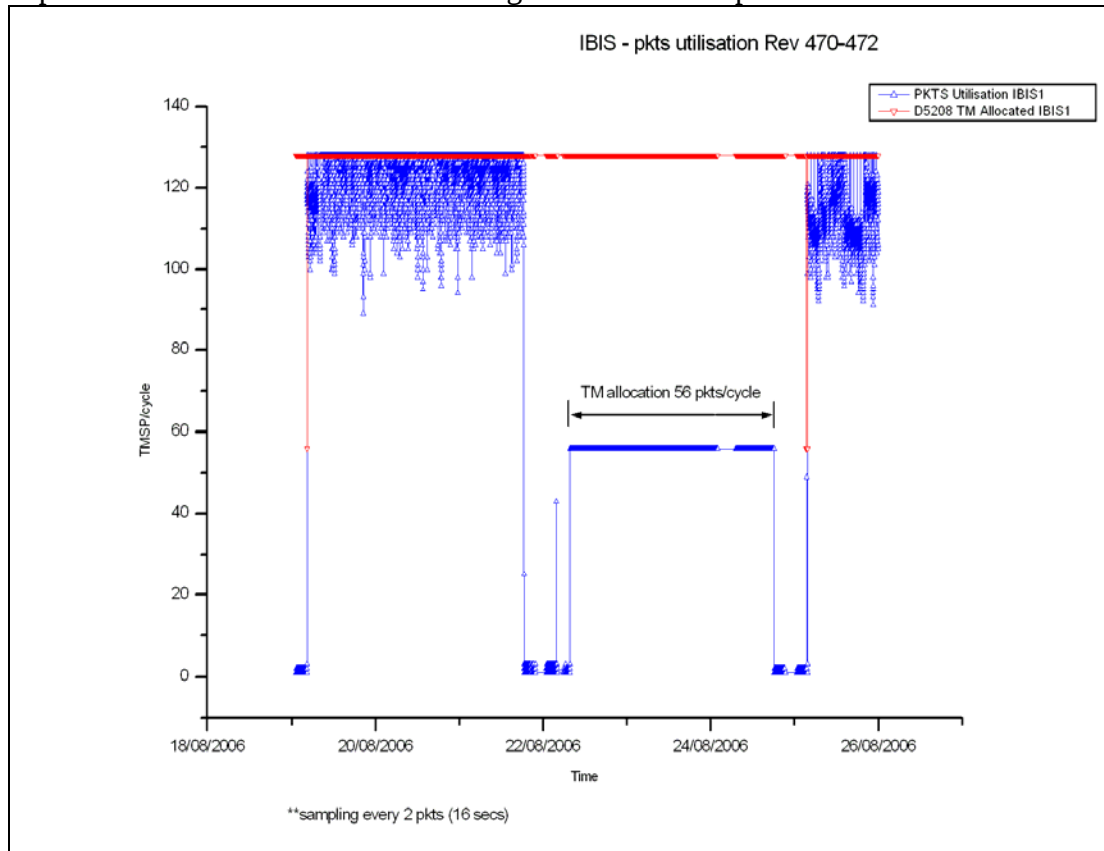
Note: Some more information concerning the SPI operations is provided in the Appendix.

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 except in revolution 471 where it was 56 TMPS/cycle due to a wrong TM allocation setting (cf. Anomaly Report INT-2872). The IBIS mean bandwidth utilisation during the observation period was 96.23 TMPS/cycle, down 14.21 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, except during revolution 471 in which the TM allocation in the PST was 9 packets/cycle (see AR INT-2872). JEM-X2 was dormant (DPE OFF) with no TM slots allocated.

Due to high count rates during the galactic Mid-latitude North observation, several OOLs were received on the TM parameters K5136 BUFFER LOSS; K5449 HARDWARE TRIGGER and K5119 SOFTWARE TRIGGER during the week. In addition JEM-X1 made an autonomous transitions to Safe mode on 2006-08-25 at

11:07Z. It was recovered back to Data Taking at 11:48Z and from this time onwards the Software Trigger limit was set to 55000 counts/8secs.

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, 133 of the 148 planned science pointings for OMC were executed nominally, 15 were lost.

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

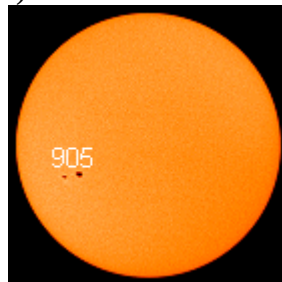
3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity.

From 19/08/2006 to 21/08/2006, sunspot 904 disappeared from the Sun, posing no threat of strong solar flares. On 22/08/2006 sunspot 905 appeared. It started posing threat for M-class solar flares on 23/08/2006 until the end of the observation period (cf. picture of sun on 25/08/2006).



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 poor this week, with 16 pointings were lost to ground problems. The overall performance was below the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was poor this week, 9 pointings was lost due to a problem with the NCTRS. A knock-on effect of this problem, was that the PST was

not reset, which severely degraded the science TM. There were also minor incidents where the TC History crashed, the manual stack froze, the connection to the MISCdynamic server dropped. The overall performance was below the 95% requirement.

4.2 Ground Stations & Network

The performance of the ground stations and Network was also poor this week. 7 pointings were lost when a DSS-27 pass was lost. There were, however, a few occasions of bad frames and brief link drops with Redu and DSS-27, and errors sending data to the isds, but these had no impact. The overall performance was below the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs have been received up to revolution 476. For all these revolutions the short-term planning has been done and the approved planning sent to MOC.

2. Observation status

ECS have been received and processed up to revolution 460.

3. ISOC science data archive

Work is ongoing on the ISDA Visualisation Tool.

4. ISOC system

Continuing to work on version 13, expected to be released in about 2 weeks.

5. AO-4

Most tasks are finished, the "latitude scan" observations (PI: Sunayev) still needs to be set up and amalgamated, one observation foreseen in 2007 is to be done.

6 Extra AO for AO-5 Key programme

No news.

7. Problems

Nothing to report.

4.3.2 ISDC

Status of ISDC observation processing on 28/08/2006:

- Latest Standard Analysis completed: observation 03201080014 (Field_14, Revolution 453, 455 & 459) on 28/08/2006.

- Latest products archived: observation 03201100004 (XMM LSS, Revolution 456-457) on 15/08/2006.

- Latest observation products sent to the observer: observation 03201090063 (Galactic Bulge, Revolution 426) on 01/06/2006.

5 Special Events

6 Anomalies

The following problems that impacted operations were reported:

- On DoY 234 at 01.25z, shortly after the start of execution of TC Sequence EEORTM01, the Autostack failed to release some commands (about every 2nd TC). The Timeline was stopped, and various attempts were made to diagnose and correct the situation, (see anomaly report #2871). A recovery was finally completed at 08:41, the impact was the loss of pointings 04710001 through to 04710009.
- On DoY 234, at 04:09:31, due to an NCTRS anomaly (INT-2871, see above), the PSTREQ that was planned to be released, was missed from the timeline. Thus the TM Allocation remained at IBIS: 56, SPI: 100, JEMX-1: 9, JEMX-2: 9, OMC: 5 for the entire revolution. The impact was some loss of science data for IBIS. SPI, JEMX-1 & OMC were unaffected.
- On DoY 236, at 01:12, after the ground station handover from Vil2 to DSS-27, the TC link was not available. The link was switched back to Vil2, until End of Track at 02:06. After AOS Vil2 at 07:55, a recovery was performed, and the Timeline rejoined at 09:05. The impact was the loss of pointings 04710050 to 04710056 inclusive (7 pointings).

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

AR id	Date Created	Subject	Segment	Status
INT-2871	22/08/2006	NCTRS: Admin Messages Buffered.	NCTRS	Pending
INT-2872	22/08/2006	PAYLOAD: Wrong TM allocation	Payload	Open

7 Future Milestones

There are battery re-conditioning activities currently planned for mid-September, more details later.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 470

The observations in revolution 470 began with a hexagonal dither of Gal. Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. This was followed by a Target of Opportunity, which was a Hexagonal dither of 2030+375 (RA 20:32:15.30, DEC +37:38:15.0), lasting ~54.6 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.

Revolution 471

The observations in revolution 471 began with a hexagonal dither of Gal. Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. This was followed by a raster dither of the Mid-latitude North region (RA 16:18:13.65, DEC -14:13:46.6), lasting ~54.1 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 erroneously set to: IBIS 56; SPI 100; JEM-X1 9; JEM-X2 9; OMC 5.

Revolution 472

The observations in revolution 472 began with a raster dither of the Mid-latitude North region (RA 16:18:13.65, DEC -14:13:46.6), lasting ~15.5 hours. This was followed by a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. Finally a raster dither of the Galactic Centre (RA 17:45:40.00, DEC -29:00:28.0), lasting ~38.7 hours, was performed, until the end of the revolution.

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

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2006-08-05T13:52:36.000Z	152.6617	F	Automatic TM processing.
2006-08-07T02:55:36.000Z	152.6367	F	Automatic TM processing.
2006-08-09T20:01:12.000Z	152.6180	F	Automatic TM processing.
2006-08-10T11:24:18.000Z	152.6066	F	Automatic TM processing.
2006-08-11T13:25:32.000Z	152.5836	F	Automatic TM processing.
2006-08-12T21:56:56.000Z	152.5752	F	Automatic TM processing.
2006-08-13T02:28:32.000Z	152.5484	F	Automatic TM processing.
2006-08-13T11:50:25.000Z	152.5307	F	Automatic TM processing.

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2006-08-13T17:41:30.000Z	152.5093	F	Automatic TM processing.
2006-08-14T12:53:00.000Z	152.4909	F	Automatic TM processing.
2006-08-16T02:12:08.000Z	152.4724	F	Automatic TM processing.
2006-08-17T12:55:00.000Z	152.4560	F	Automatic TM processing.
2006-08-19T08:14:24.000Z	152.4392	F	Automatic TM processing.
2006-08-22T02:38:55.000Z	152.4350	F	Automatic TM processing.
2006-08-23T12:21:39.000Z	152.4171	F	Automatic TM processing.

This report was generated Fri Aug 25 08:00:36 GMT 2006

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, 19/08/2006 – 25/08/2006

AOCS operations were executed from the Automatic Timeline.

During this period, 75 Open Loop Slews, 68 Closed Loop Slews and 3 Momentum Biases were executed.

16 slews (10 OSL, 6 CSL) were missed during the observation period due to several problems on IMCS (Command Releaser Task) and DSS27 (TC link and tracking) station.

This is equivalent to ~10 % of the total number of slews planned (156).

Orbit Control

The attached plot shows the apogee longitude of Integral as a function of the orbit number. From the approximation of the apogee longitudes with a parable the average semi-major axis increase due to momentum dumping manoeuvres is estimated to have been 586 m per orbital revolution.

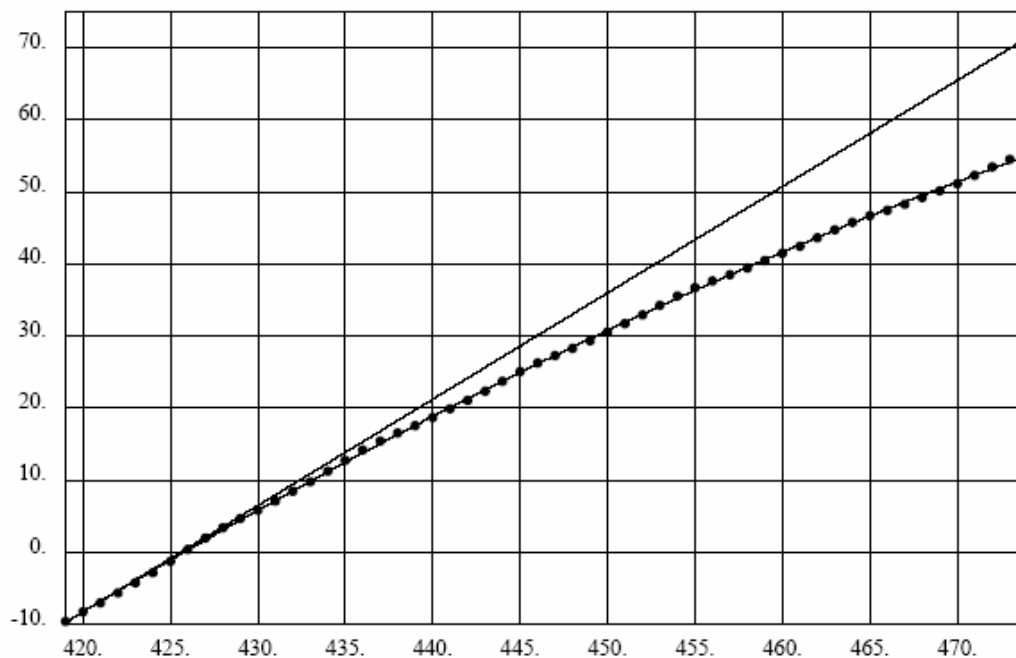
Rev AOS REDU - 45000 km altitude
(Crit.Instr.Alt.Asc.)

463 174 minutes
474 165 minutes

LOS REDU - 56000 km altitude
(Crit.Instr.Alt.Des.)

119 minutes
141 minutes

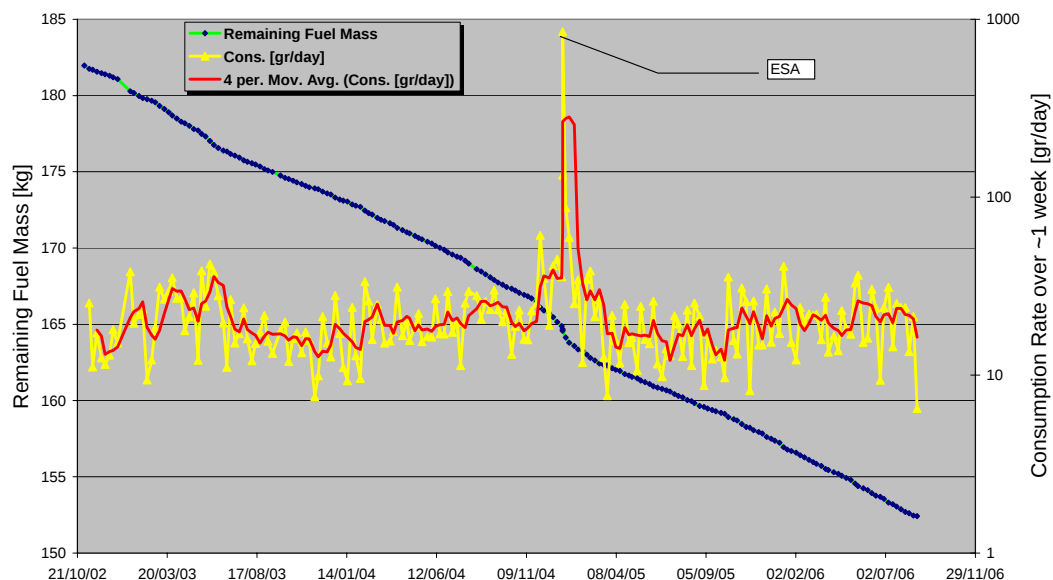
APOGEE LONGITUDES OF INTEGRAL 21.03.2006 - 01.09.2006
 LEAST SQUARES APPROXIMATION WITH PARABLE



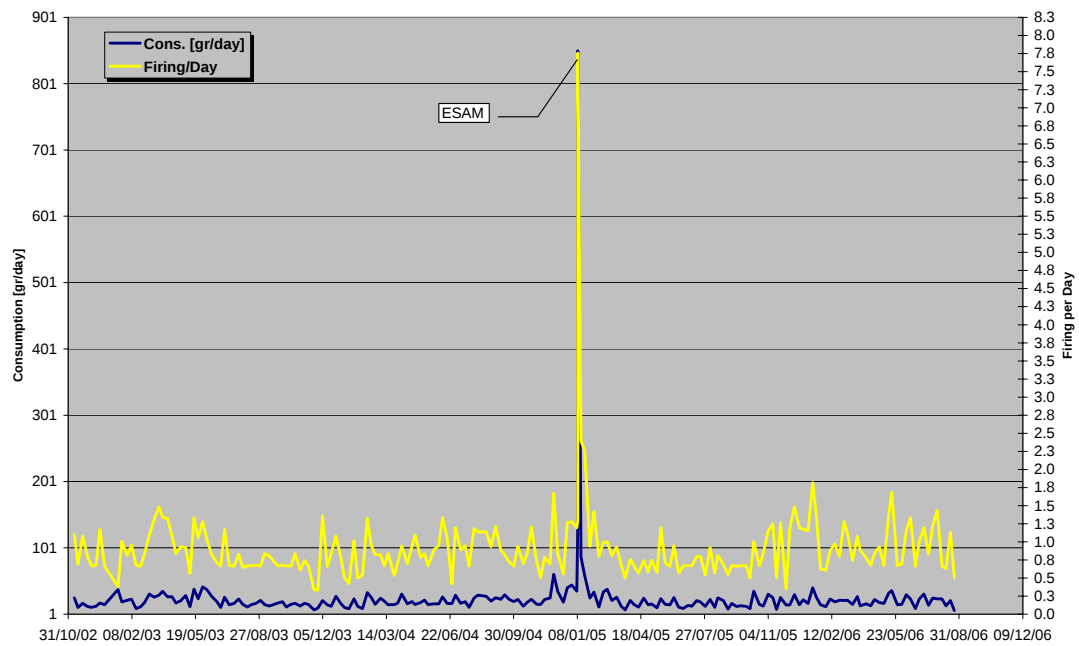
Fuel consumption

The fuel consumption (total, grams/day) over the period between 01/11/2002 and 23/08/2006 is reported in the plot below.

INTEGRAL FUEL CONSUMPTION HISTORY

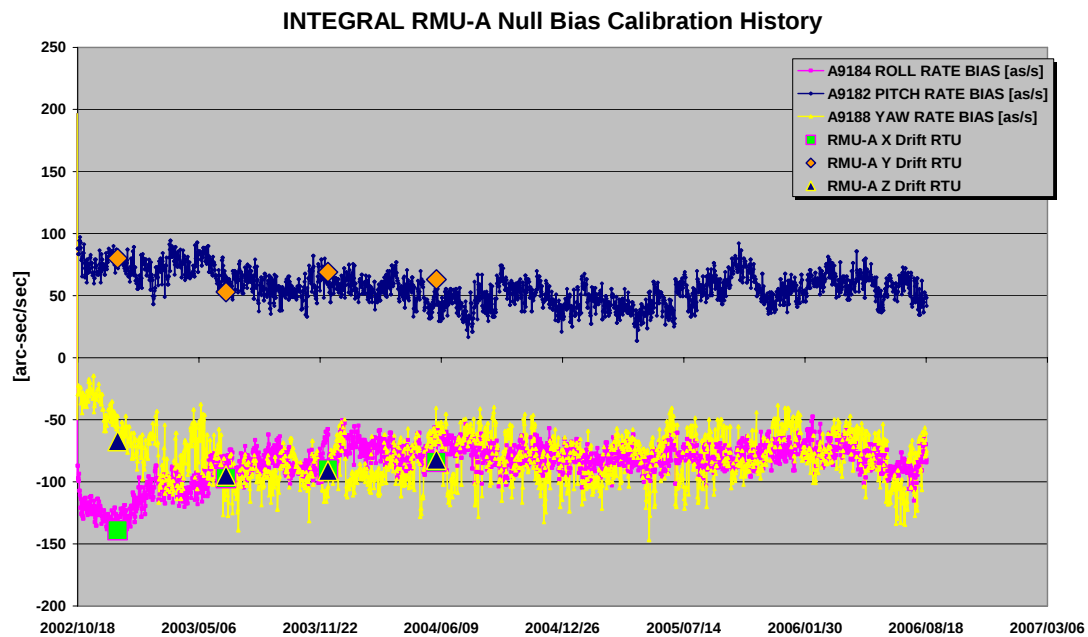


The firing\day over the period between 01/11/2002 and 23/08/2006 is reported in the plot below.

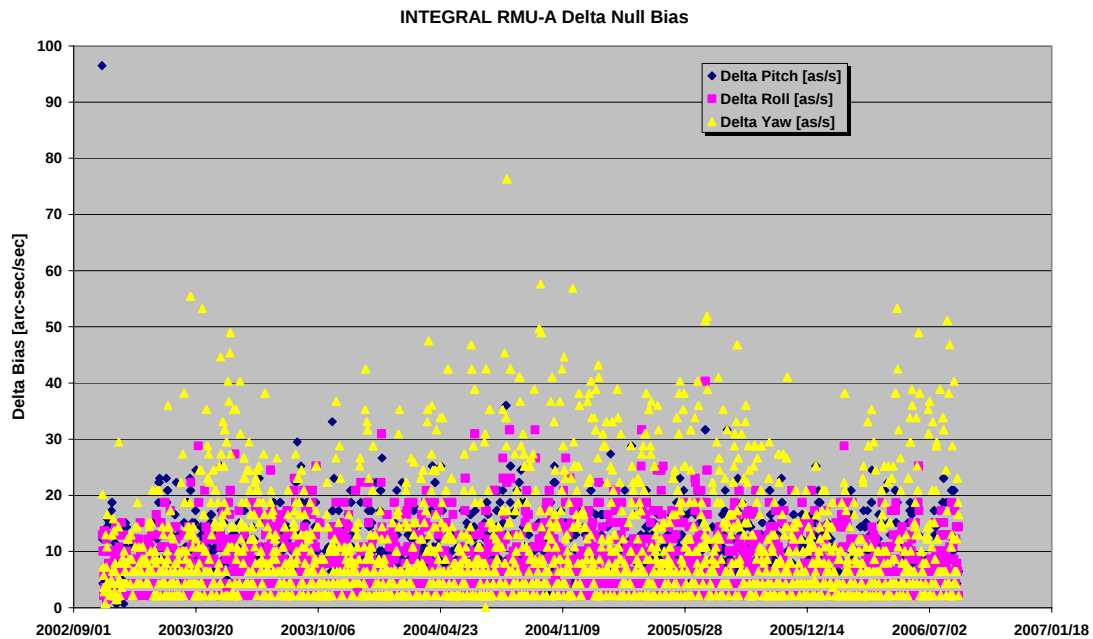


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 25/08/2006 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 25/08/2006 is reported in the plot below.



19/08/06 (Day of Year 231, Revolution 469-470)

Nothing to report.

20/08/06 (Day of Year 232, Revolution 470)

Nothing to report.

21/08/06 (Day of Year 233, Revolution 470)

Nothing to report.

22/08/06 (Day of Year 234, Revolution 470-471)

ACC STR threshold exceeded: at 01:23:33z the STR SEU threshold was exceeded, before the execution of last RWB of rev 470. The AOCS s/s was disabled at 01:24z to prevent the uplink of the bias commands being the current guide star not the expected one for the Bias execution.

The RWB was manually executed at 02:33 and the last slew of the revolution manually updated.

The AOCS s/s was re-enabled in TL at 03:16z.

No slews missed.

Problem on IMCS: at 03:54z due to a problem on the IMCS Command Releaser task, the TL was stopped at 04:00z and the IMCS-A chain and NCTRS-A chain was restarted. The sequences for slews ID 04710001-9 failed release.

A manual recovery was then started at 08:10z, from attitude of PID 04700065 (perigee attitude) to the attitude of PID 04710009. The next slew in TL (04710010) was manually updated at 08:41z.

The following slews were not executed from TL: ID 04710001(OSL)-2(OSL)-3(OSL)-4(OSL)-5(CSL)-6(OSL)-7(CSL)-8(OSL)-9(CSL).

23/08/06 (Day of Year 235, Revolution 471)

Nothing to report.

24/08/06 (Day of Year 236, Revolution 471)

Problem on TC link at DSS27 station: at 01:12z due to several problems on DSS27 station (problem to bring up the carrier and tracking the S/C), the AOCS s/s was disabled and the TL was stopped at 02:05z. The sequences for slews ID 04710050-56 failed release.

A manual recovery was then started at 08:14z, from attitude of PID 04710049 to the attitude of PID 04710056. The next slew in TL (04710057) was manually updated at 09:03z.

The AOCS s/s was re-enabled at 09:05z.

The following slews were not executed from TL: ID 04710050(CSL)-51(CSL)-52(OSL)-53(OSL)-54(CSL)-55(OSL)-56(OSL).

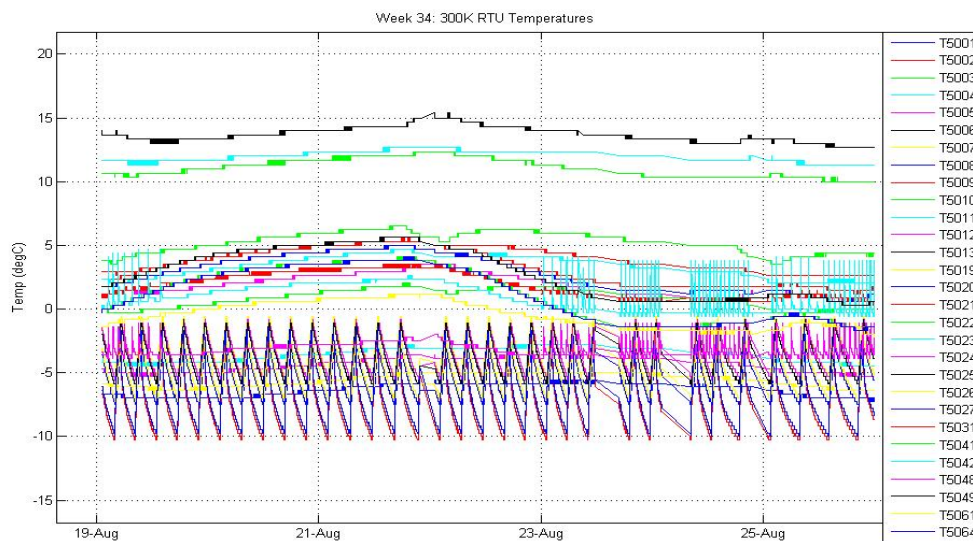
25/08/06 (Day of Year 237, Revolution 471-472)

Nothing to report.

8.3.2 SPI Operations

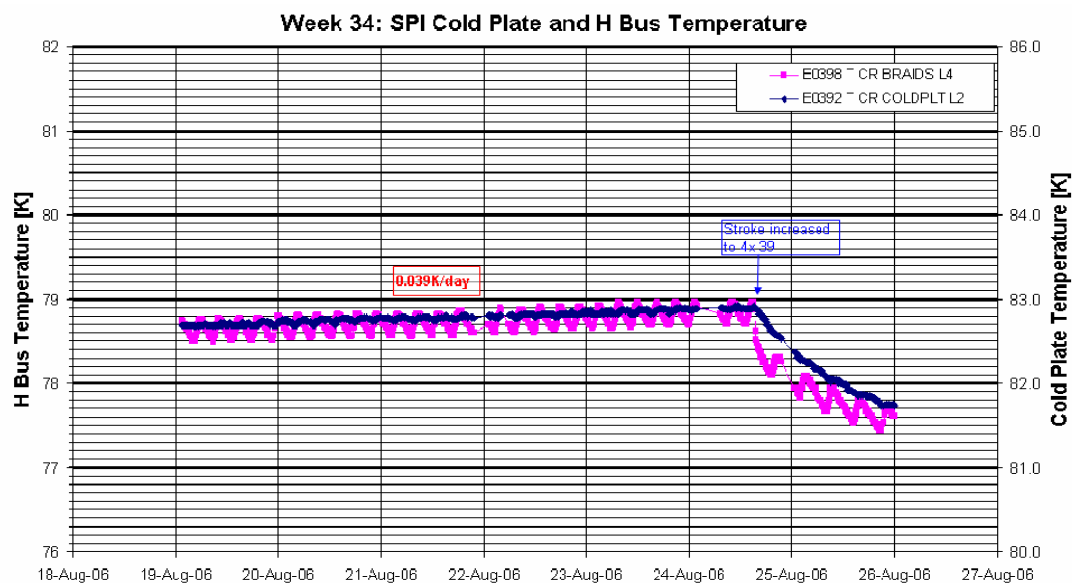
Unit Temperatures:

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 82K $\pm$ 1K with a positive of 0.039deg/day until 2006-08-24 at 15:19Z, when the stroke of all four compressors was increased from 38 to 39. At the time of the stroke increase, the cold plate temperature was 82.9K. The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period.



DPE & IASW:

The DPE health and IASW performance is nominal. The current IASW version installed is 432.

The average TM bandwidth occupation of SPI was 93.2 packets/cycle over the science window. The TM allocation in the science window was 105 packets/cycle, except during revolution 471, in which the TM allocation in the PST was 100 packets/cycle (see AR INT-2872).

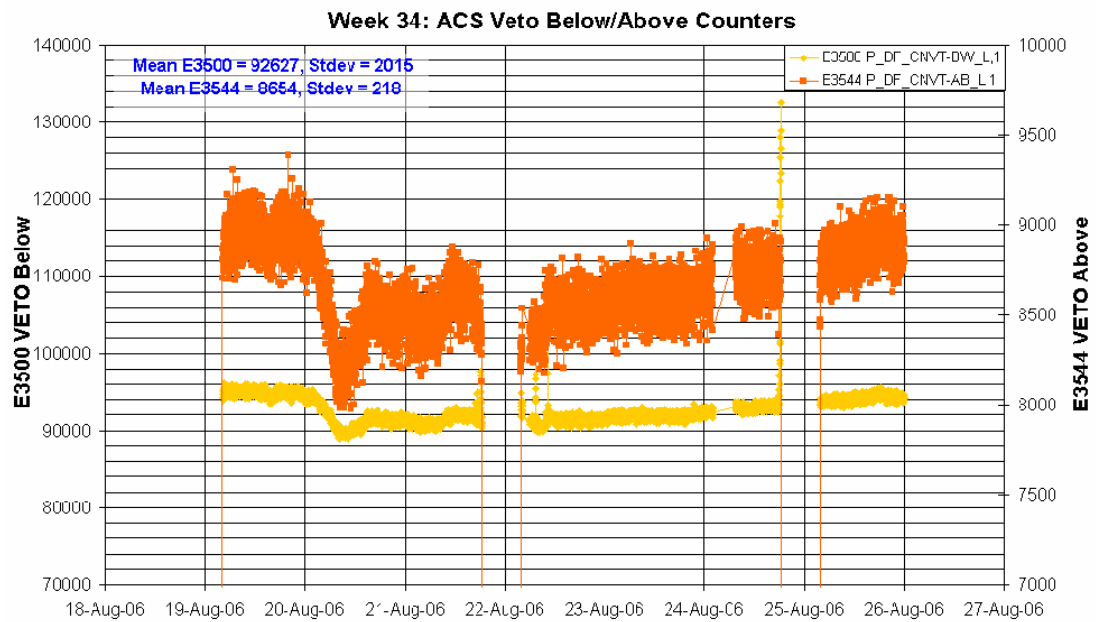
The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS:

The performance of the ACS is nominal.

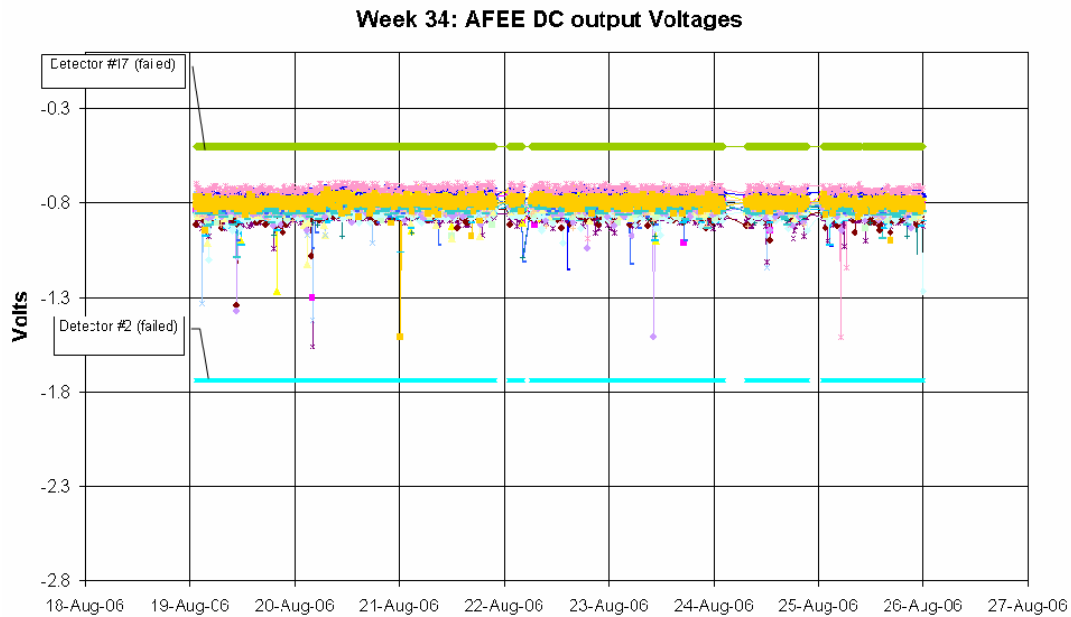
The following plot shows the ACS overall count rate evolution during the reporting period:



AFEE:

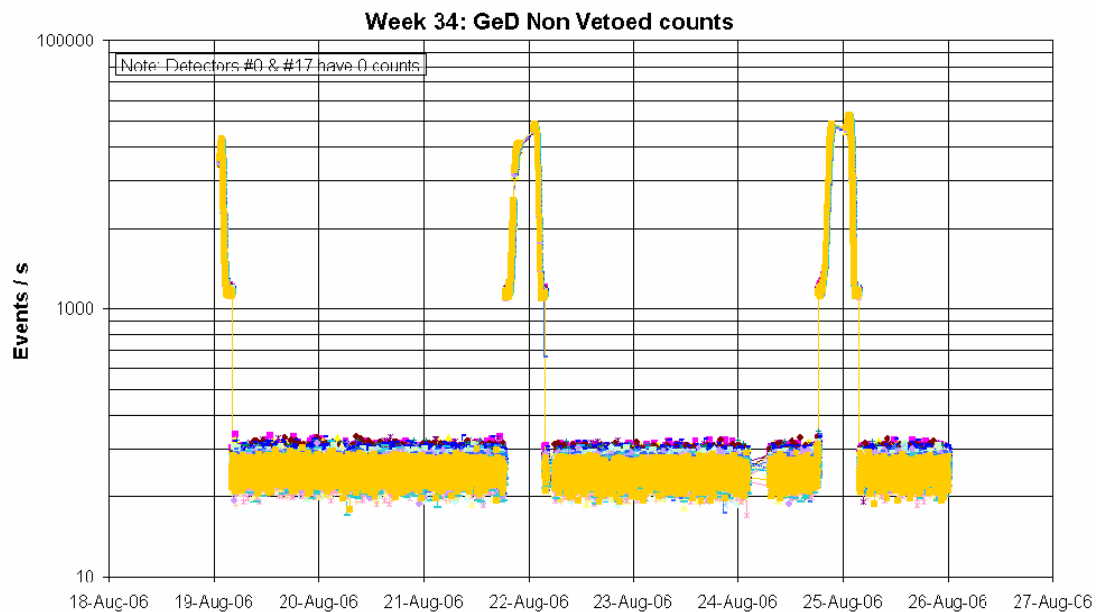
The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detectors #4 and #12 which are showing a slightly degraded energy resolution. The energy resolution of GeD#15 was recovered with the last annealing.

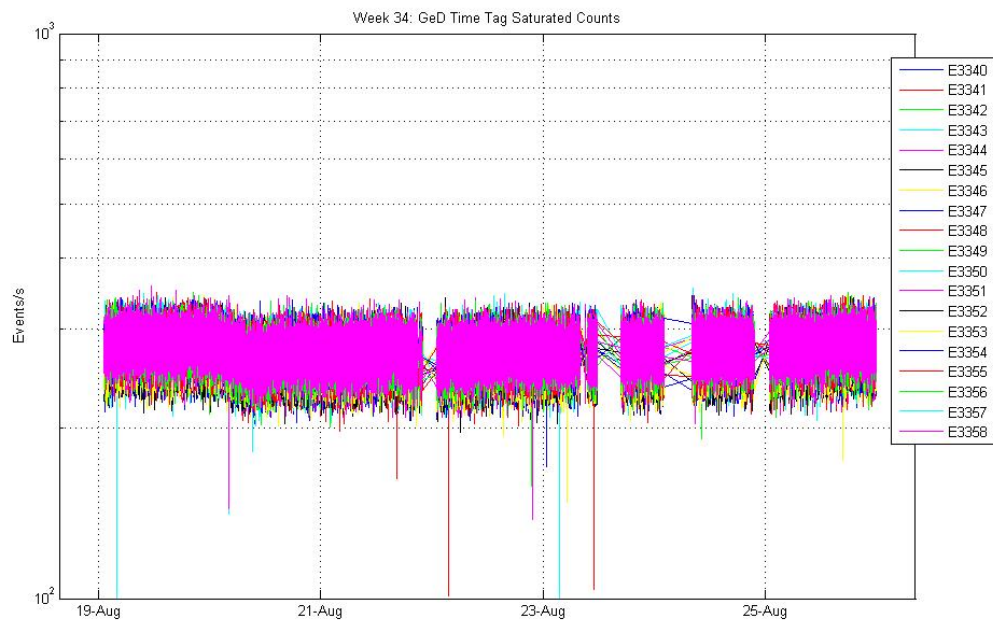
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004



DFEE:

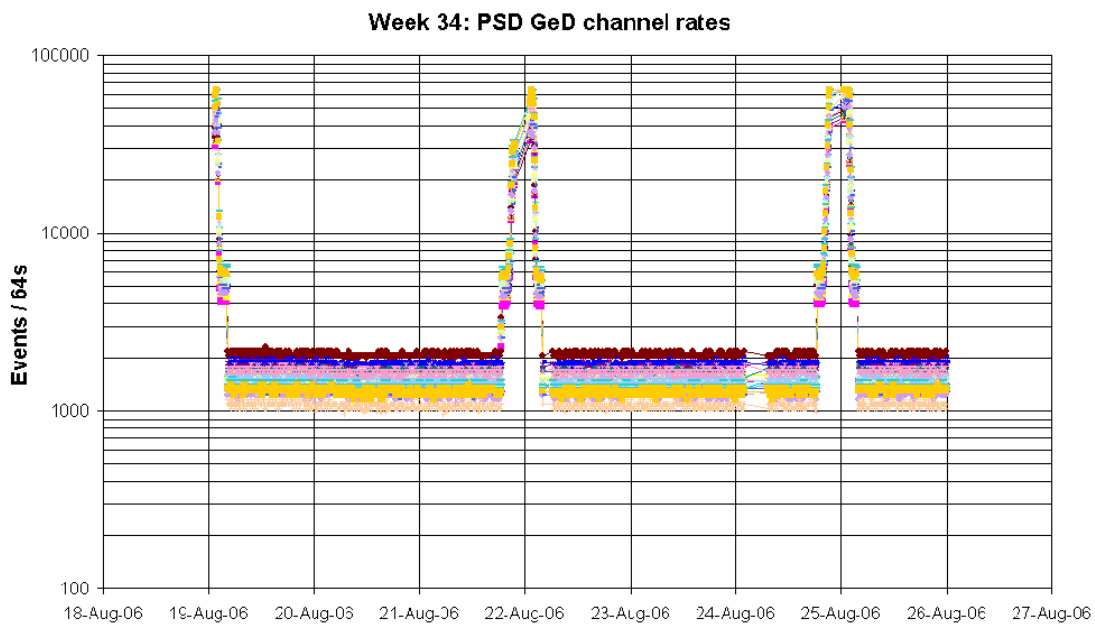
The performance of the unit is nominal. The following plots show the Non Vetoes, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.





PSD:

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



Event Log:

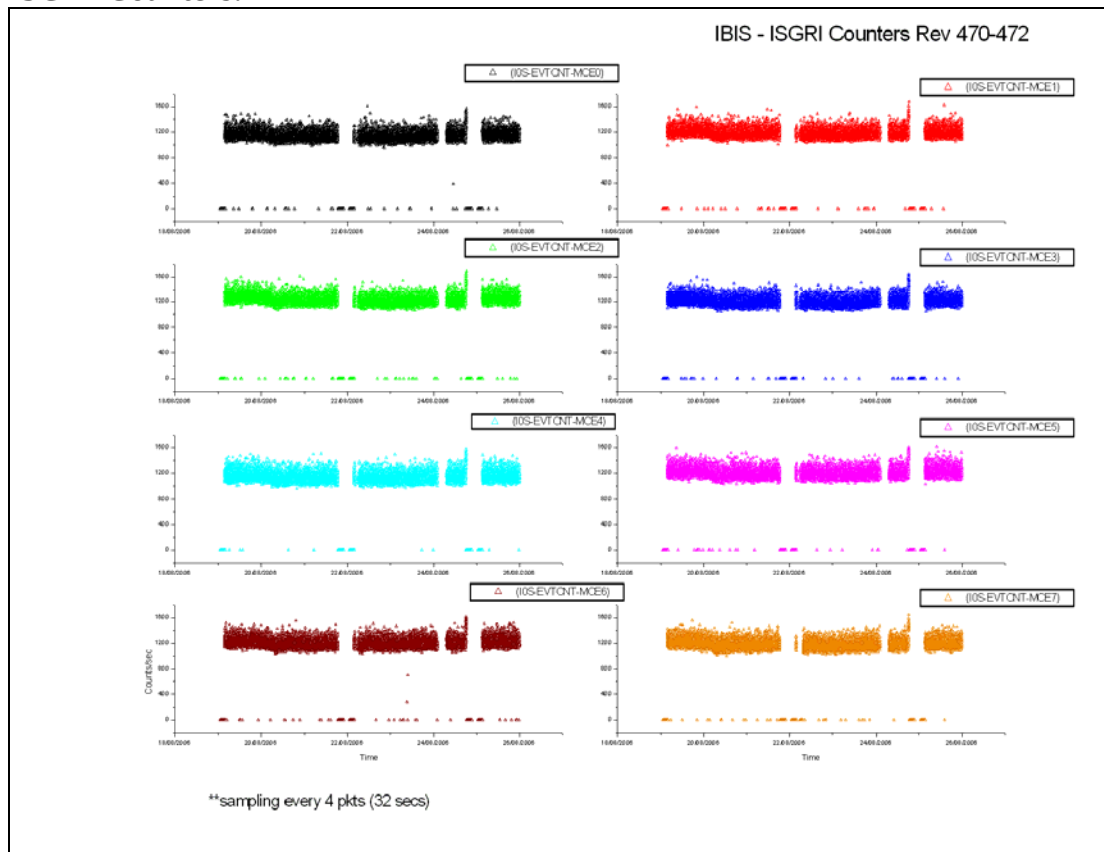
The following non-nominal OOLs and OEMs were received from SPI during the reporting period:

- On 2006-08-22 at 01:24:09Z OEM APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the AOS_CHK window of revolution 471, 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 2006-08-25 at 01:22:22Z TM parameter E4009 S DF HSLERR L went OOL High (value = 1), indicating that the number of erroneous HSL transfers in the previous second exceeded the threshold. It returned within limits at the next TM cycle.

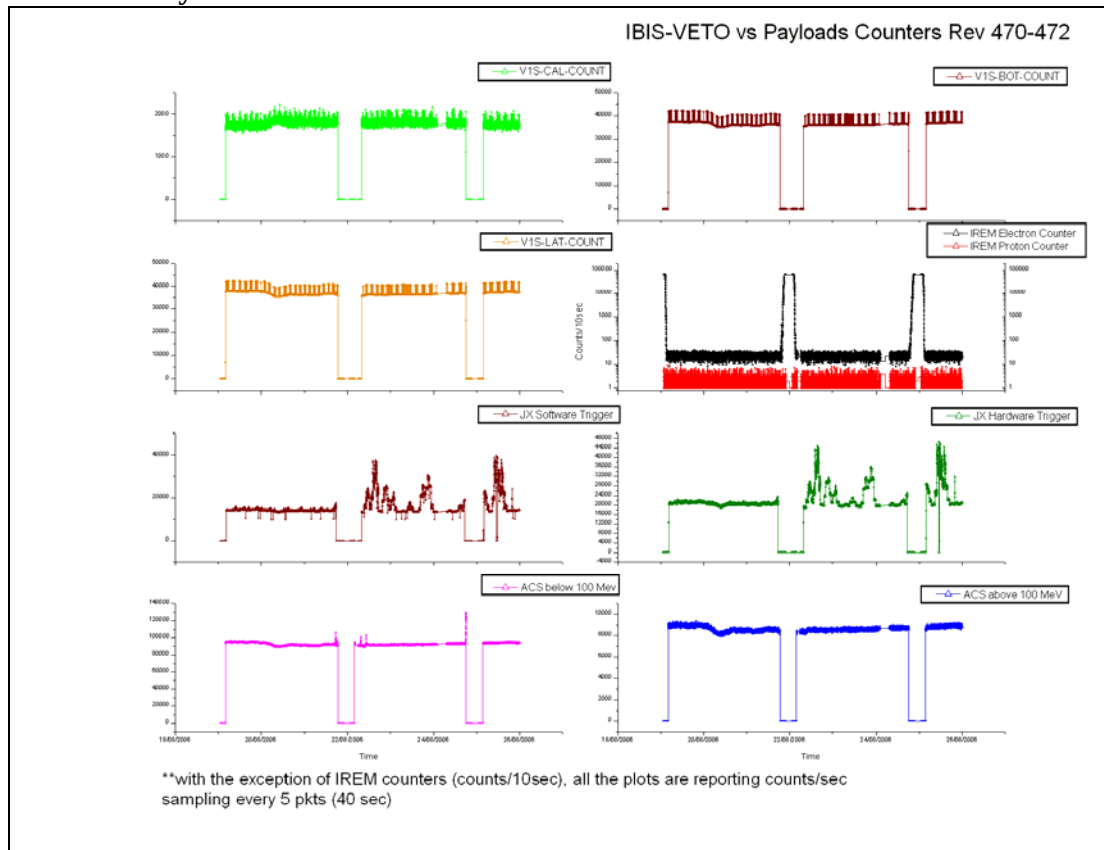
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

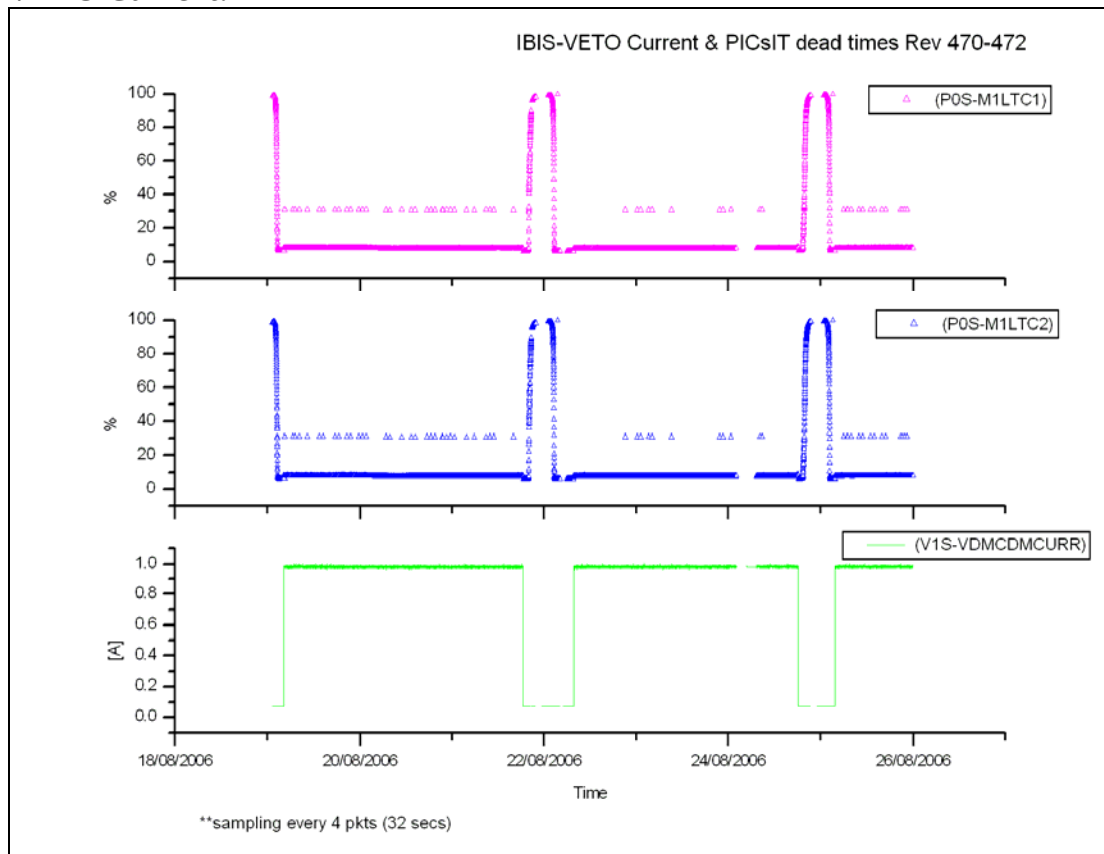


VETO vs Payloads Counters:

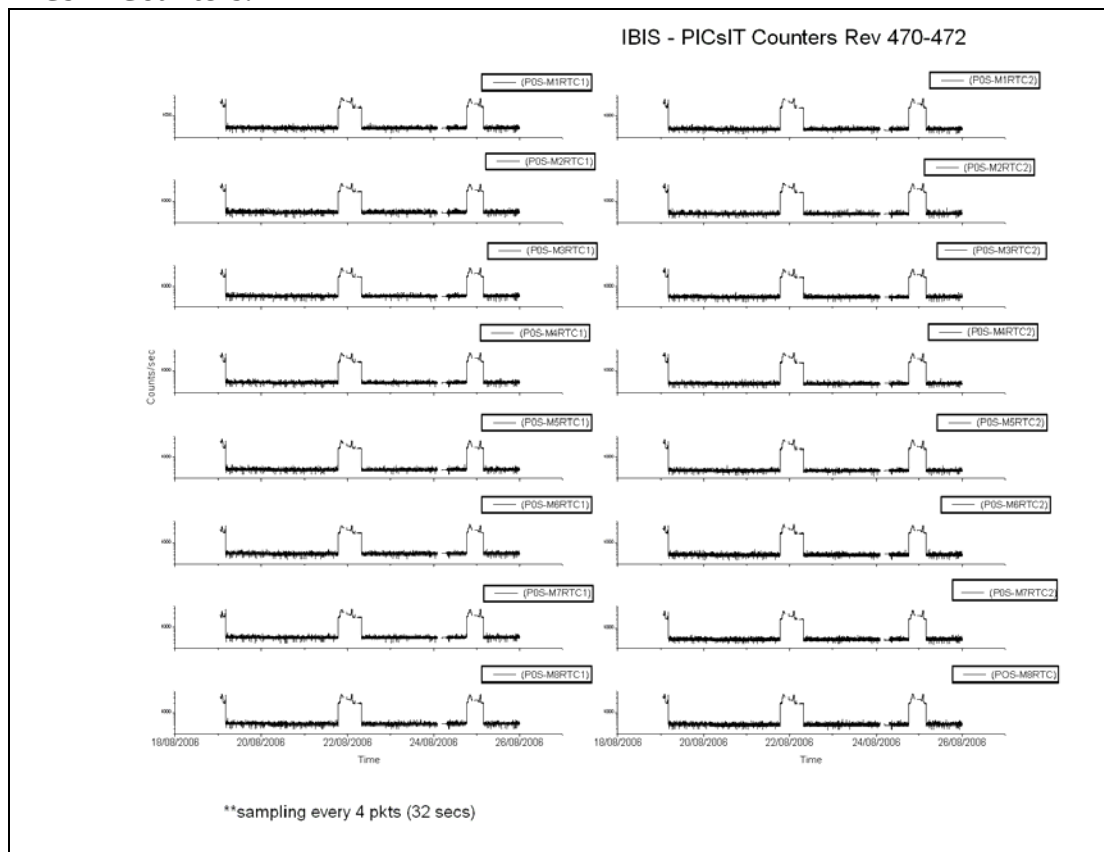


The week was characterised by low radiation.

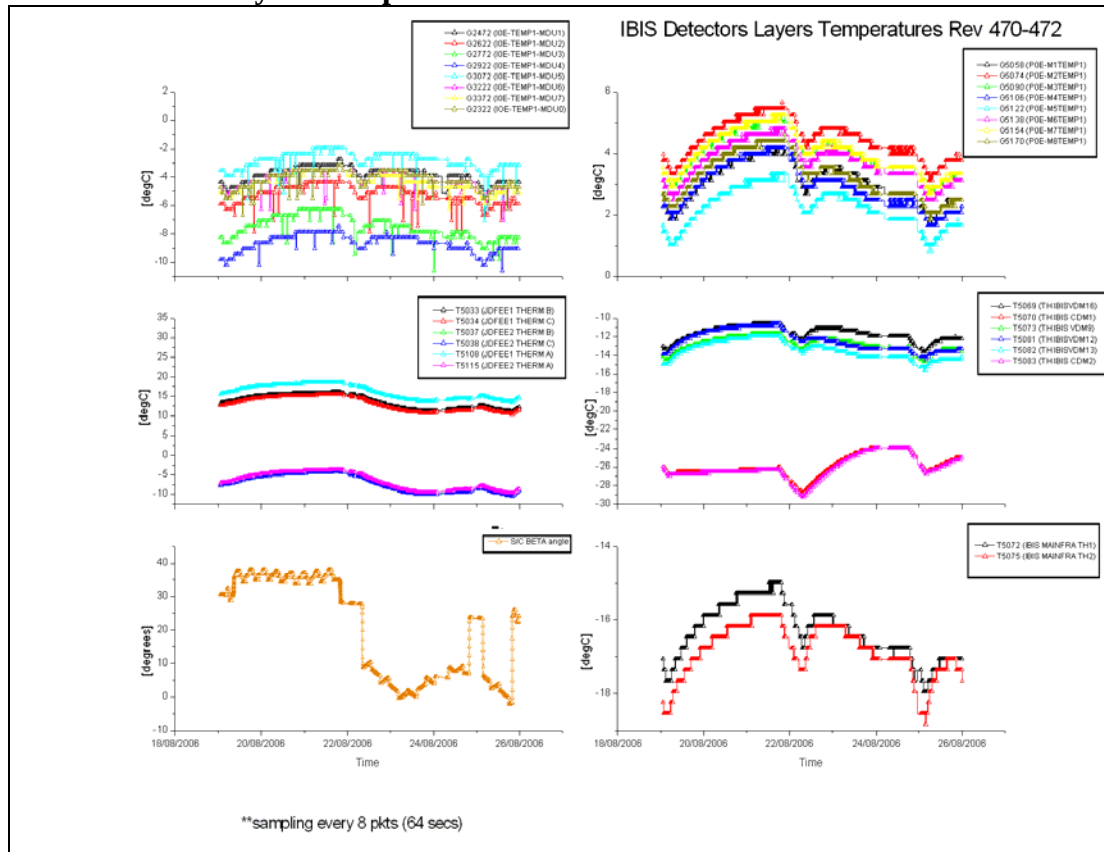
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report

DoY 231 (19/08/2006):

On DoY 230 (18/08/2006) at 18:52Z, TM parameter G8015 (S1E-A2 PMT V) was reported Out Of Limit high. It went back inside limit on DoY 231 at 04:23Z. As this happened inside the radiation belts (following VETO Stand-By mode), according to V-VLT-1 no action was taken.

During the Belts, several TM parameters from families G5002 (P0S-Mi RTC1) and G5003 (P0S-Mi RTC2) went OOL High and back. According to P-CNT-1, no action was taken.

At 04:00Z TM parameter G2098 (I0E-OVFWPXADD-M7) failed SCC and back. According to I-OVF-1, no action was taken.

DoY 233 (21/08/2006):

At 18:36Z, TM parameter G8015 (S1E-A2 PMT V) was reported Out Of Limit high. It went back inside limit on DoY 234 at 07:43Z. As this happened inside the radiation belts (following VETO Stand-By mode), according to V-VLT-1 no action was taken.

During the Belts, several TM parameters from families G5002 (P0S-Mi RTC1) and G5003 (P0S-Mi RTC2) went OOL High and back. According to P-CNT-1, no action was taken.

At 20:15Z, TM parameter G5079 (P0E-MiASICLINE) was reported OOL High. According to P-VLT-2, as this lasted only 1 cycle, no action was taken. However this is not the first time it happens and it may require more investigations.

DoY 234 (22/08/2006):

At 03:34Z TM parameter G2084 (I0E-OVFWPXADD-M6) failed SCC and back. According to I-OVF-1, no action was taken.

DoY 234 (22/08/2006): INT-2871

At 03:54Z, the last command of ED GEISCL03 (TC G0464: TC-I-M-NOM-7) failed release due to a NCTRS problem (cf. INT-2871). Then, some commands of ED GEBENT02 failed release as well. At 04:00Z the operator stopped the timeline. Consequently the IBIS activation was interrupted.

The system was back running at 06:34Z.

At 07:38Z, TC G0464 from ED GEISCL03 was resent manually to IBIS. The Time-Tag commands uplinked automatically from ED GEBENT02 at 03:59Z were deleted from the on-board buffer, and the complete ED was resent manually at 07:40Z.

At 07:43Z, ED GEBEXT01 was manually sent.

At 07:49Z, GESTAN02 was manually sent.

IBIS was running in Scientific Standard mode from 07:50Z.

DoY 234 (22/08/2006): INT-2872

During the problem with the NCTRS (cf. INT-2871), several commands were missed from the timeline, among which PSTREQ at 04:09Z. This was not recovered and therefore the IBIS1 TM allocation during the whole revolution 471 was: 56 TMPS/cycle.

This led to a saturation of TM as showed by “IBIS-TM utilisation” graph in section 3-2-2.

The TM allocation to IBIS was back to nominal after the execution of PSTREQ in next revolution on 25/08/2006 at 03:53:28Z.

To avoid similar problems in the future, MOC is working on definition of new parameters to monitor the TM utilisation and flag any anomaly in real time.

DoY 236 (24/08/2006): Antenna outage

Due to problem with the ground station DSS-27, a TM gap was reported from 24/08/2006 02:05Z to 07:58Z.

DoY 236 (24/08/2006):

At 18:20Z, TM parameter G8015 (S1E-A2 PMT V) was reported Out Of Limit high. It went back inside limit on DoY 237 at 03:51Z. As this happened inside the radiation belts (following VETO Stand-By mode), according to V-VLT-1 no action was taken.

During the Belts, several TM parameters from families G5002 (P0S-Mi RTC1) and G5003 (P0S-Mi RTC2) went OOL High and back. According to P-CNT-1, no action was taken.

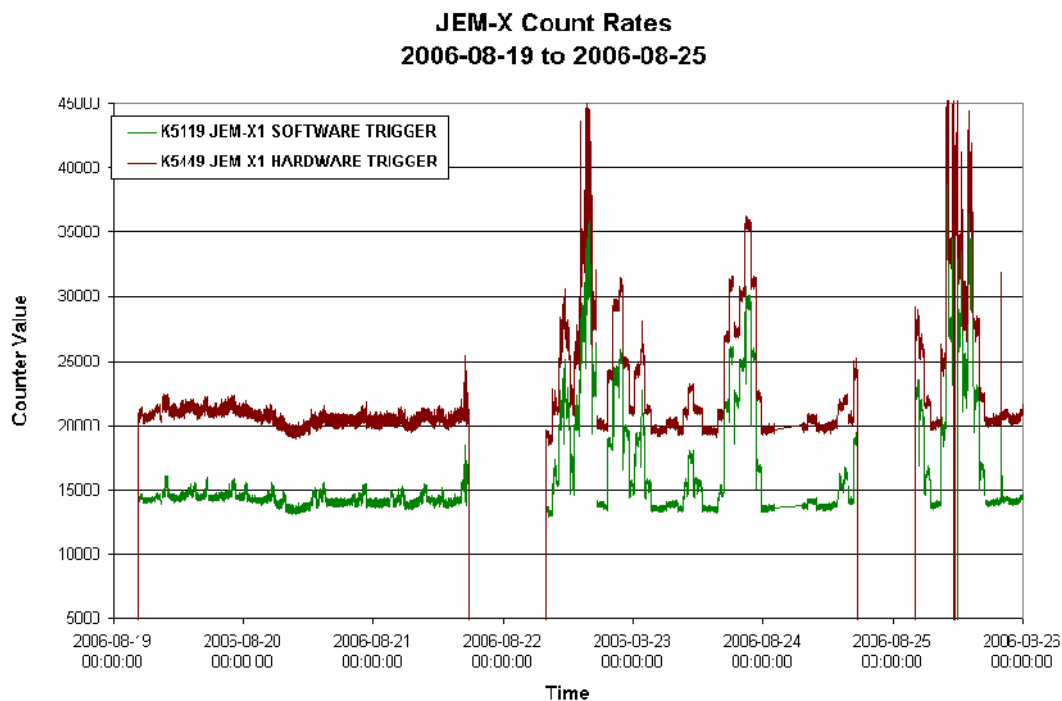
DoY 237 (25/08/2006):

The ISGRI Context Tables from revolution 471 were not available, therefore the tables from revolution 470 were uplinked by the operator.

8.3.4 JEM-X Operations

JEM-X Count Rates

JEM-X count rates over the reporting period are displayed in the following graph¹. Note that a smaller scale than normal has been used for this plot in order to display the very high count rates which were obtained during some of the pointings.

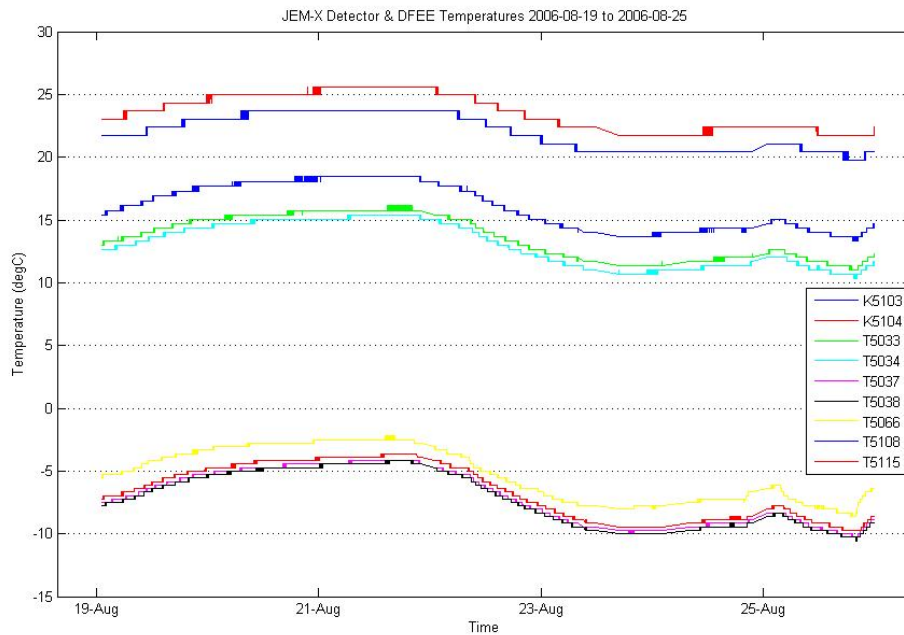


JEM-X Temperatures

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

2006-08-19 (DOY 231, Rev 469-470) to 2006-08-21 (DOY 233, Rev 470-471)

Nothing to report

2006-08-22 (DOY 234, Rev 471)

Due to high count rates from the observed source, the TM parameters K5136 BUFFER LOSS; K5449 HARDWARE TRIGGER and K5119 SOFTWARE TRIGGER toggled OOL High and back several times during this day.

2006-08-23 (DOY 235, Rev 471)

Due to high count rates from the observed source, the TM parameters K5136 BUFFER LOSS and K5449 HARDWARE TRIGGER toggled OOL High and back a occasionally during this day.

Due to problems with the control system (see AR INT-2871), the Timeline was stopped at 04:00Z and the ED KEHVAC01 was missed. Once the system was recovered, this ED was re-uplinked manually at 07:38:20Z. This put JEM-X1 in Data Taking at 07:53Z, about 3.5 hours later than planned.

2006-08-24 (DOY 236, Rev 471-472)

Nothing to report

2006-08-25 (DOY 237, Rev 472)

Due to high count rates from the observed source, the TM parameters K5136 BUFFER LOSS; K5449 HARDWARE TRIGGER and K5119 SOFTWARE TRIGGER toggled OOL High and back several times during this day.

During the execution of the JEM-X1 activation ED KEHVAC01 from the Timeline, after the TC K0013 STATE DIAGNOSTIC was uplinked at 04:02:28Z, OEM 189 JEM-X1 PROB DFEE 9 (Unexpected DFEE state reported in HK) was received, as the TM parameter K5462 DFEE STATE IASW was reporting state DATA DUMP while K5022 DFEE STATUS was SETUP. This was because the DFEE output FIFO buffer was over half full at the time of termination of the diagnostic data collection so the IASW did not recognise the autonomous transition of the DFEE back to SETUP. The situation rectified itself when the next TC of the ED, TC K0009 STATE SETUP, was sent at 04:07:28Z, after which both TM parameters K5462 and K5022 reported SETUP and OEM 254 ERROR OFF was received.

At 11:07:28Z, during pointing ID 04720009, TM parameter K5119 SOFTWARE TRIGGER exceeded the Safe threshold for JEM-X1 of 40000 counts/8sec, causing JEM-X1 to make an autonomous transition to Safe mode. Two occurrences of OEM 189 JEM-X1 PROB DFEE 9 (Unexpected DFEE state reported in housekeeping) were received at this time, as the TM parameter K5462 DFEE STATE IASW was reporting state Setup while K5022 DFEE STATUS was Safe. Commanding to JEM-X1 from the Timeline was disabled and at 11:09:45Z FCP_JEM1_0040 was executed to command JEM-X1 to Safe mode. K5462 DFEE STATE IASW then also went to Safe and OEM 254 ERROR OFF was received. JEM-X1 was then re-activated as follows:

- 11:16:34Z FCP_JEM1_0041 JEMX1 TRANSITION TO SETUP
- 11:17:29Z FCP_JEM1_1010 JEMX1 CONFIGURATION SETTING FOR SCIENCE OPS
- 11:47:42Z ED KEDATA02 sent, with the Software Trigger limit set to 55000.

Commanding to JEM-X1 from the Timeline was re-enabled and JEM-X1 operations continued with the Software Trigger limit remaining at 55000 counts/8secs for the rest of the revolution.

8.3.5 OMC Operations

2006-08-19 (DOY 231, Rev 470)

At 09:07:25, a Trigger command was sent by ISDC. This command was rejected, as the unit was in Stand-by mode at the time. There was no impact.

2006-08-20 (DOY 232, Rev 470) to 2006-08-21 (DOY 233, Rev 470)

Nothing to report

2006-08-22 (DOY 234, Rev 471)

At 01.25, an NCTRS problem caused the timeline to be stopped. A recovery was not achieved until 08:41, see section 6 for details. The impact was the loss of 8 pointings: 04710001 to 04710007 & 04710009.

2006-08-23 (DOY 235, Rev 471)

Nothing to report

2006-08-24 (DOY 236, Rev 471)

At 01:12, a problem with DSS-27 caused the loss of a pass. After AOS Vil2 at 07:55, a recovery was performed, and the Timeline rejoined at 09:05. The impact was the loss of pointings 04710050 to 04710056 inclusive (7 pointings).

It was at this time the following commands were rejected:

2006.236.08.47.40.090	2006.236.08.47.45.876	1792	RealTime	131	TC	REJECT
REJECTED TC1			0	0	65535	PR N
E E						
2006.236.08.47.33.965	2006.236.08.47.37.786	1792	RealTime	131	TC	REJECT
REJECTED TC1			0	0	65535	PR N
E E						

Which correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) for pointing 04610056.

The impact was the loss of pointings 04710050 to 04710056 inclusive (7 pointings)

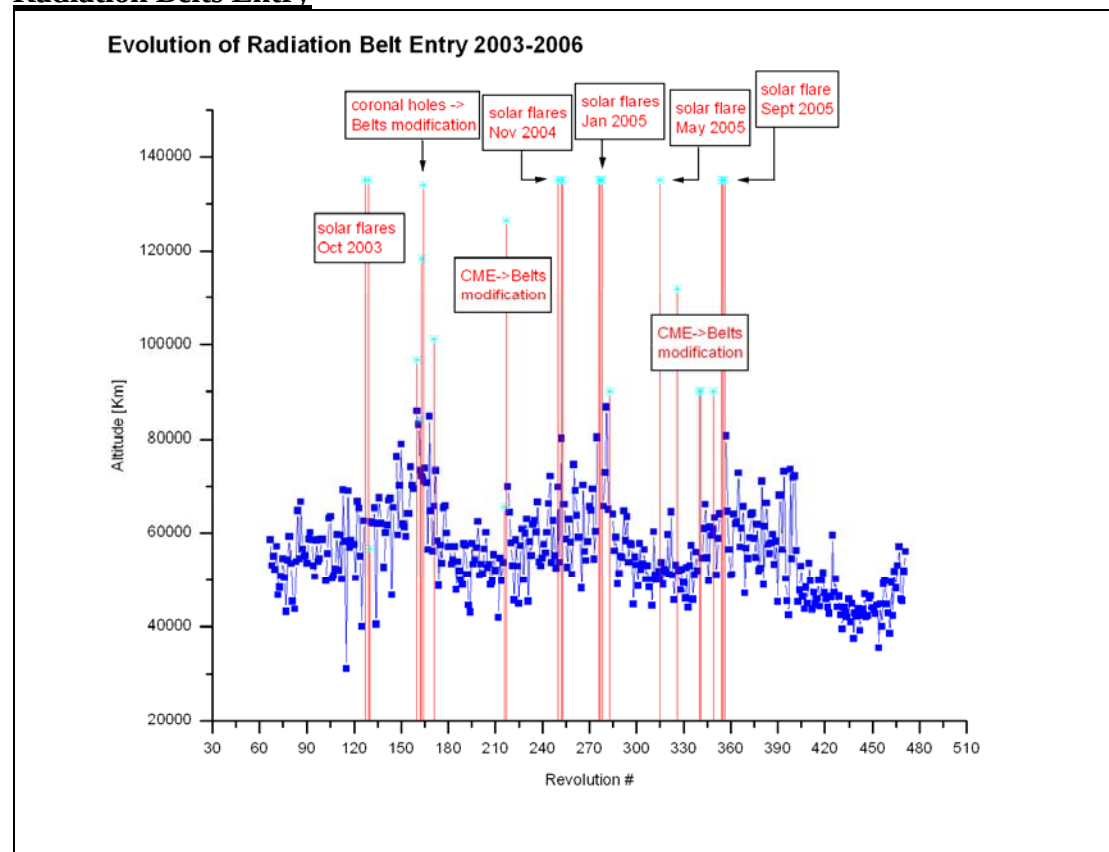
2006-08-25 (DOY 237, Rev 472)

Nothing to report

On DoY 233 at 18:36:00 and DoY 236 at 18:19:44 OMC was switched by the Timeline to SAFE mode, at the nominal time.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

DoY 2006.233 (21/08/2006):

At 21:29Z, TC U4921 (GND LINK OFF) from ED UEGROF01 was missed from the timeline due to problems with the ground station DSS27. It was manually uplinked at 21:40Z.

DoY 2006.234 (22/08/2006):

Due to NCTRS problems (see INT-2871), ED UEGRON01 was missed from the timeline and manually resent at 07:51Z.

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]
470	RAD_EXIT R 2006-08-19T04:10:21Z	2006-08-19 02:57:40	>>24933.9	2006-08-19 03:26:59	38594
470	RAD_ENTR R 2006-08-21T18:35:58Z	2006-08-21 19:04:31	51929.0	2006-08-21 19:30:16	48406
471	RAD_EXIT R 2006-08-22T03:54:16Z	2006-08-22 02:55:19	>>26535.6	2006-08-22 03:10:16	38703
471	RAD_ENTR R 2006-08-24T18:19:43Z	2006-08-24 18:23:51	<56068.9	2006-08-24 19:10:16	48826
472	RAD_EXIT R 2006-08-25T03:38:13Z	2006-08-25 02:37:11	>>26535.4	2006-08-25 03:00:16	39742

Reference

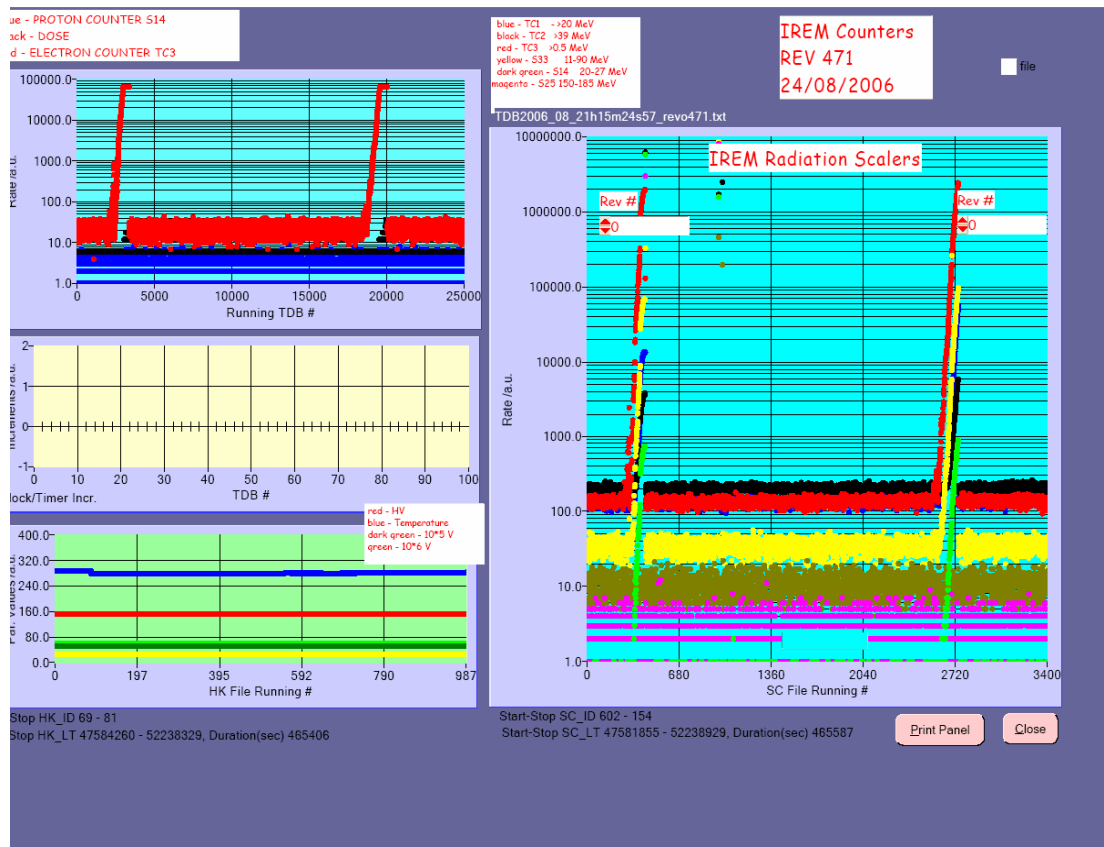
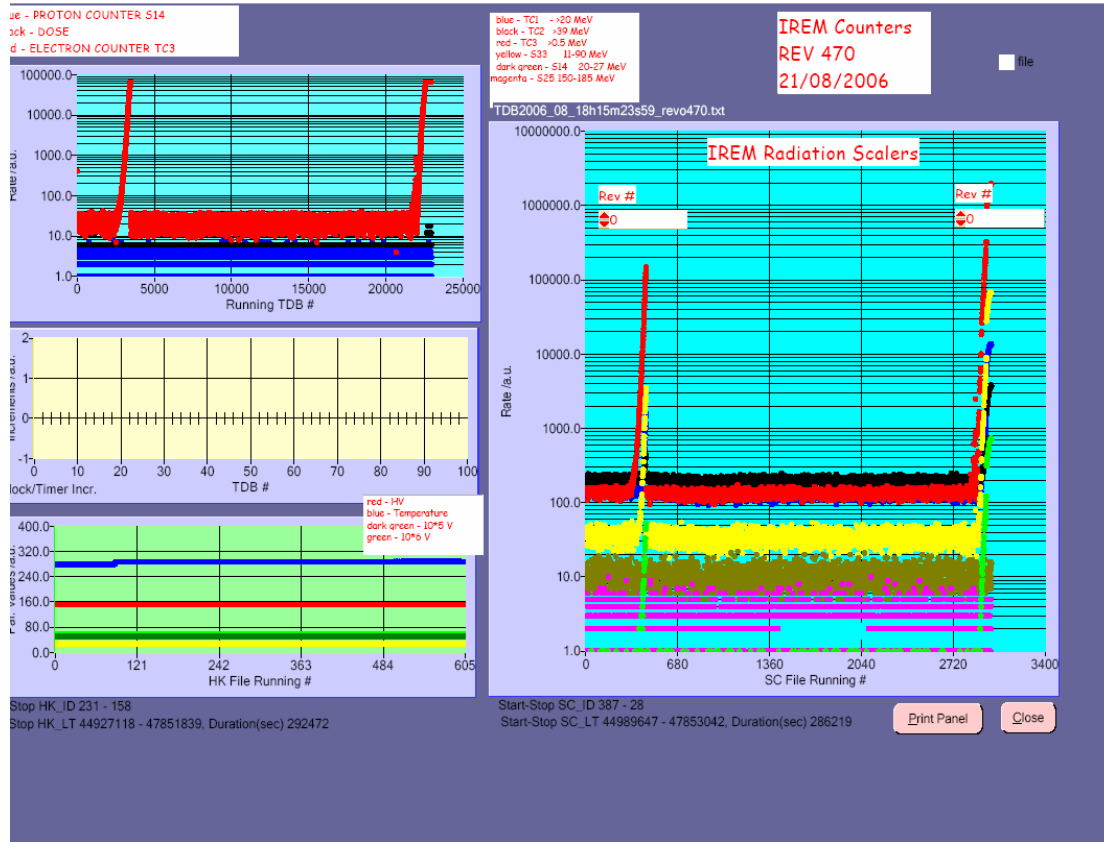
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

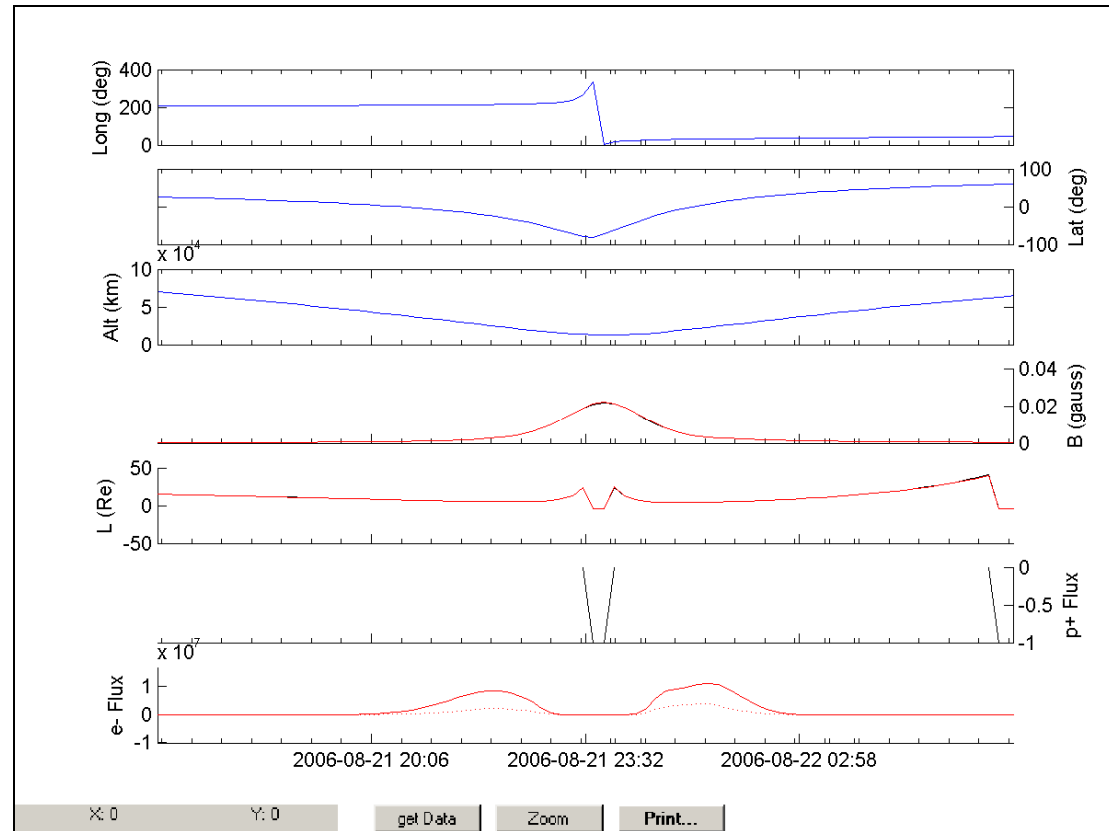
Radiation Spike

IREM radiation counters:

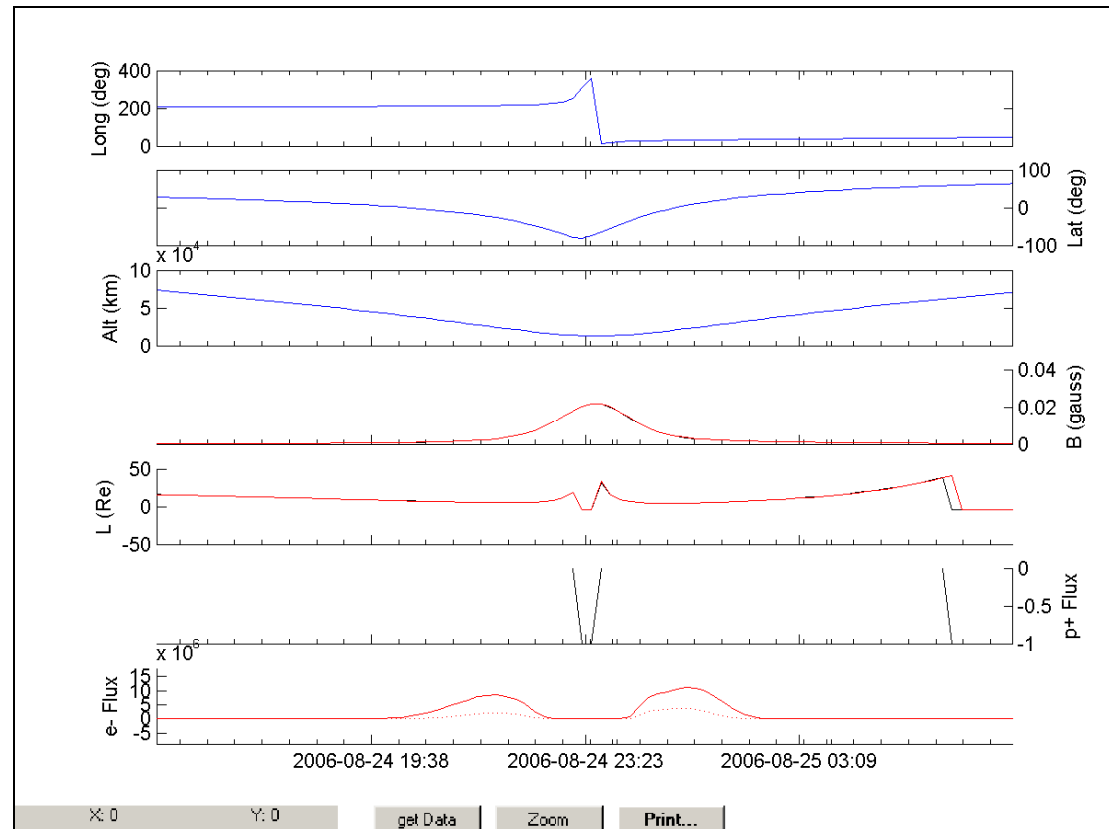


IREM Predicted Radiation Belt Passages:

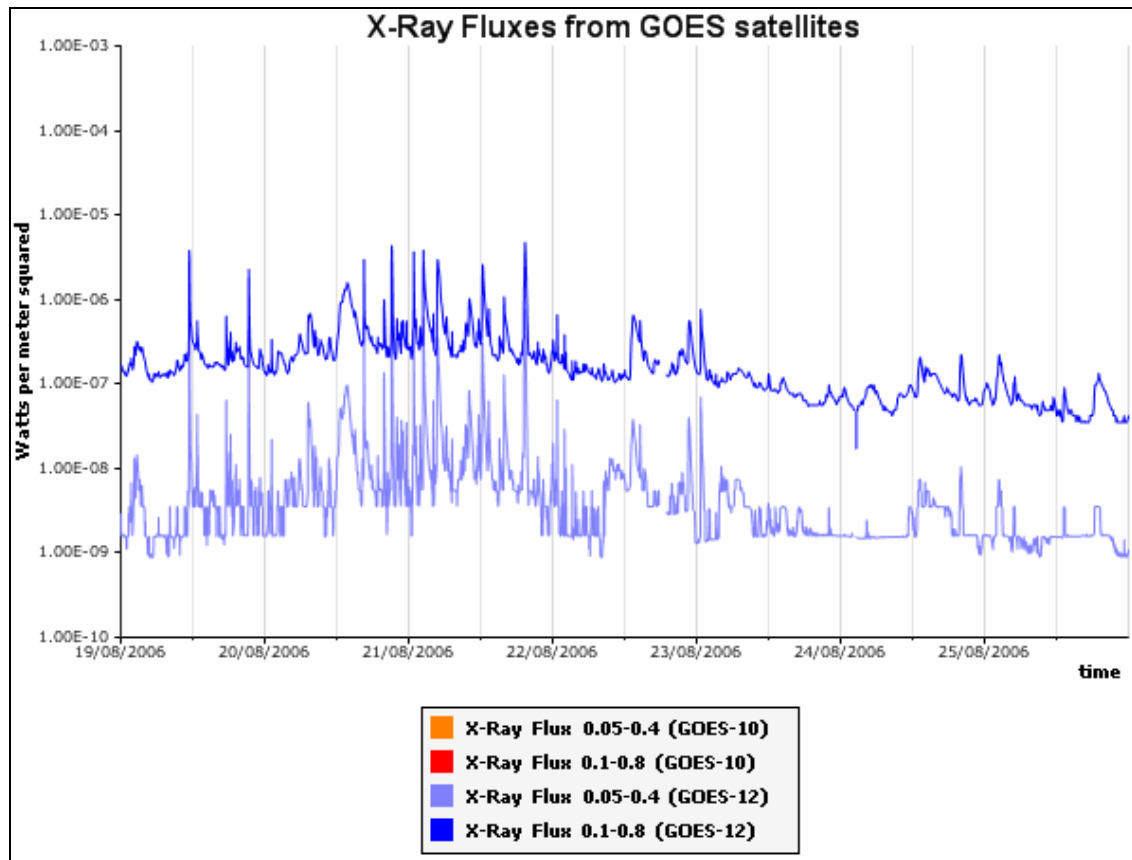
Rev 470



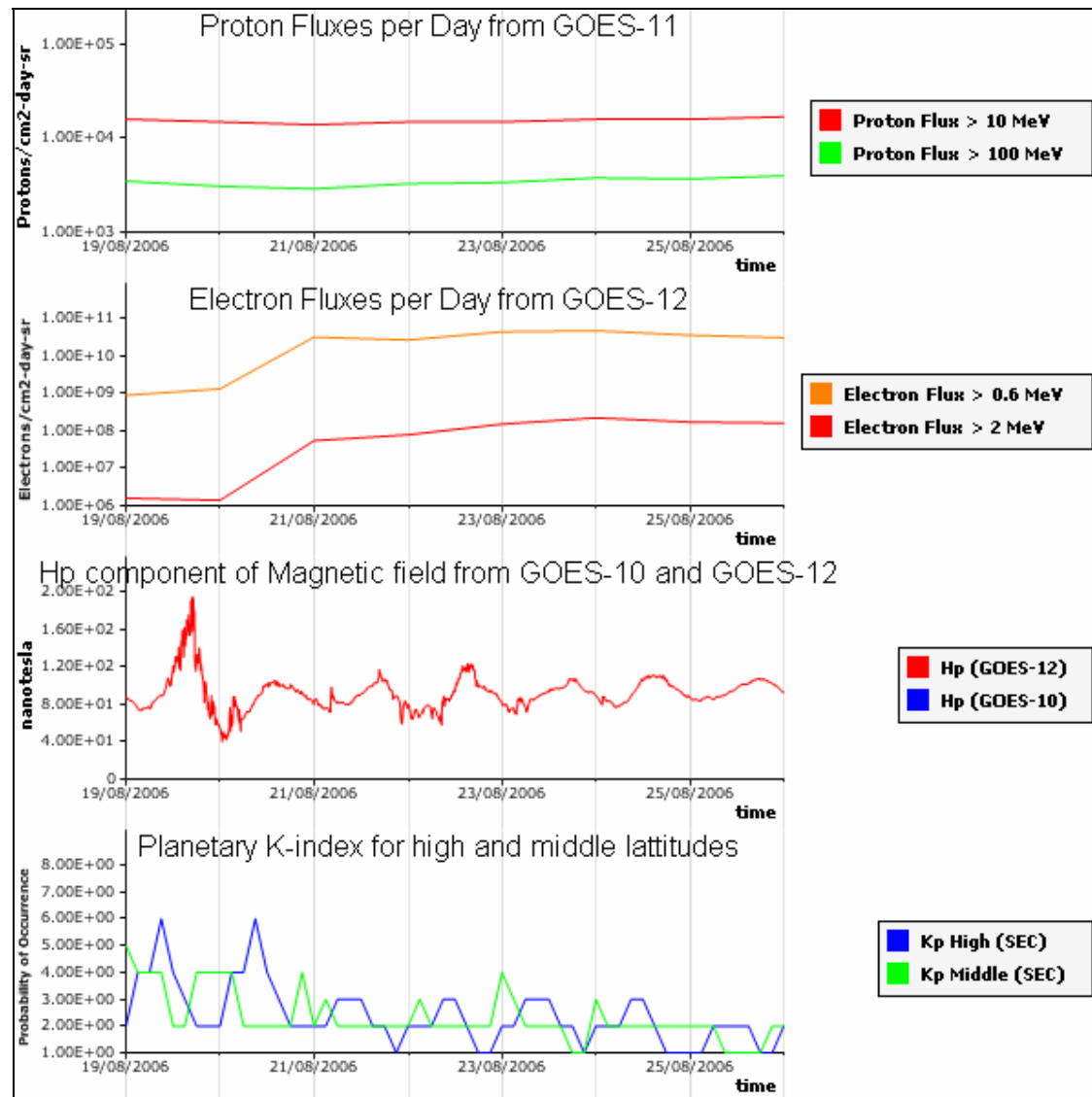
Rev 471



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



X-Ray fluxes start to be significant over 10^{-5}W/m^2 (corresponding to M-class flares). Above 10^{-4}W/m^2 , they correspond to strong X-class flares.



Proton and electron flux report low radiation background.

Hp component of the Geomagnetic Field is essentially parallel to the Earth's rotation axis. A drop near 0 nT is associated with a significant variation in the magnetic field.

Kp index is based on ground magnetometers. Kp ≥ 5 features storm-level geomagnetic activity.