

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 309
Week 34
25.08.08
Routine Phase

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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 16.08.08 until 22.08.08 (both dates inclusive) and covers the revolutions 714 and 715.

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 16/08/2008 and 22/08/2008 was 0.1301 Kg. The remaining propellant is in the order of 138.9917 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.

Battery 1 reconditioning ongoing.

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 wrap around of the COBT occurred as expected on the 22/08/2008 at 01:24:34z.

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 11th annealing, which ended on 30th January, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which, although its energy resolution improved since the previous annealing, is still showing a slightly degraded energy resolution compared to the other detectors 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.

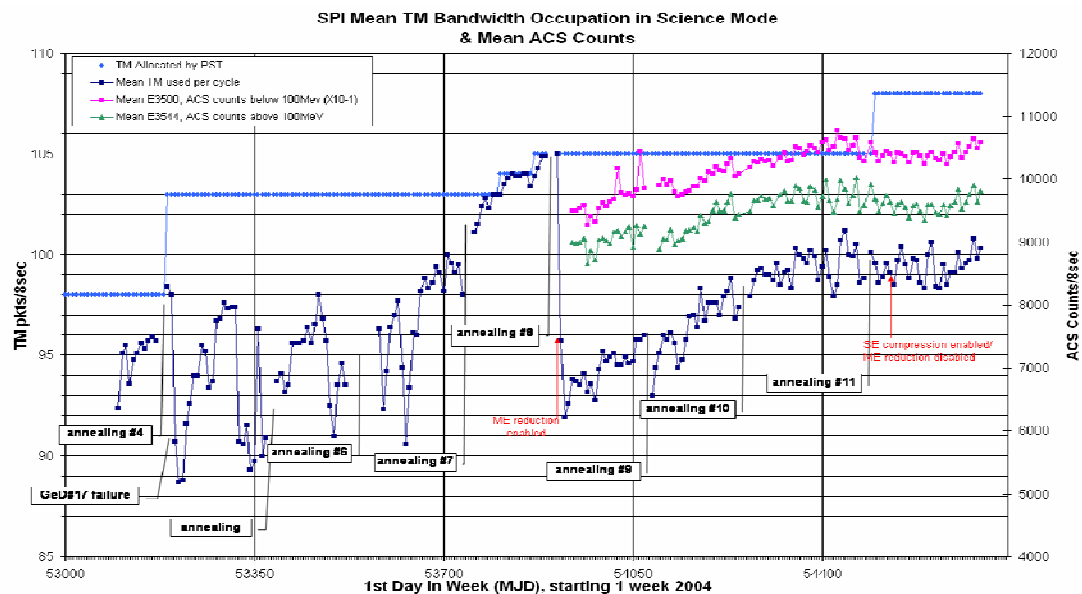
The 12th annealing started on 17/08/2008 at 15:15Z. This annealing is progressing nominally. The summary annealing timeline is included in the future activities section of this report. The following table reports the major events/steps performed so far (i.e. up to 22nd August) since the start of the annealing:

Date/Time	Activity
17/08/2008 15:15Z	Configure SPI for start of Annealing and stop SPI active cooling
17/08/2008 16:42Z	Annealing Heater Main ON
17/08/2008 18:42Z	Annealing Heater Redundant ON
19/08/2008 03:54Z	Cold plate temperature reached 373K (100degC)

The Stirling compressors are working nominally, maintaining the Germanium detectors at 80 +/-1K until the start of the 12th annealing on 17/08/2008.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled, until the start of annealing on 17/08/2008 at 15:15Z, when SPI was put in CONF mode. The assigned TM bandwidth in the science observation windows was 108 packets/cycle up to revolution 713 inclusive, with the average telemetry occupation being 100.3 packets/cycle. From revolution 714 onwards, the assigned TM bandwidth was 30 packets/cycle due to the annealing.

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.

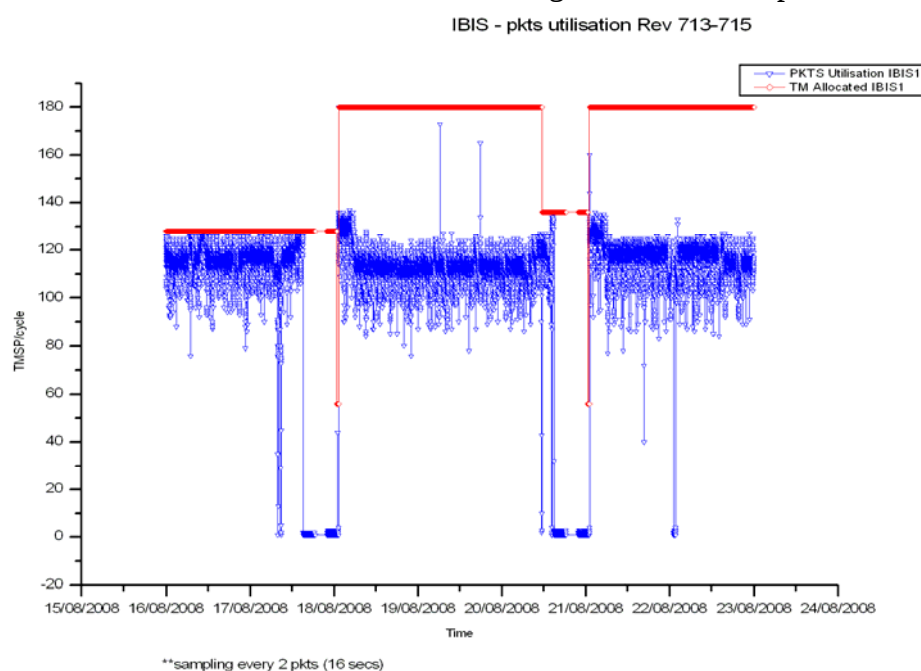
3.2.2 IBIS

The overall status of the unit is nominal.

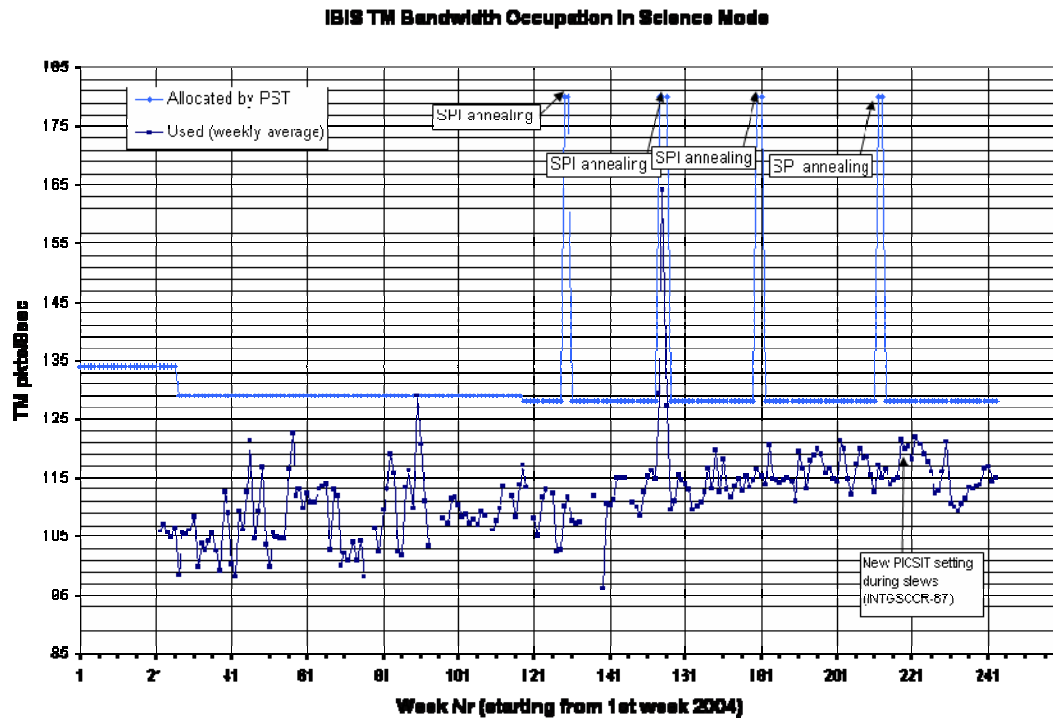
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 128 packets/cycle in rev 713; 180 packets/cycle in rev 714 onwards (except from 2008-08-20T11:29:16Z until the end of revolution 714 when it was 136 packets/cycle due to an OMC Flat Field Calibration).
- IBIS mean bandwidth utilisation in science mode: 115.04 packets/cycle (up 0.78 packets/cycle on last week)
- Percentage of TM cycles in which full bandwidth was used: 1.59%.

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.

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, all of the 165 planned science pointings were executed nominally.

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 new small sun-spot emerged on the 21st, but apart from that the sun was blank. 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 excellent this week. No slews were lost, the overall performance was nearly 100%.

4.1 Mission Operations Centre

The performance of the MOC was good this week. There was, however, one instance where the link to the TM RT Cache broke, which led to Command Verifier crashing. There was no impact.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There was only one link drop reported with Redu, without impact.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

A new PSF has been received for revolution 722.

Revolutions 717 to 721 have been planned. Revolutions 717 and 718 were re-planned to select a different target than PKS 0208-512 during SPI annealing. A new TOO request was received on Friday 22 August, but did not require immediate implementation.

New TSFs have been received for revolutions 715 to 717.

2. Observation status

No new ECS files were received. The last processed is for revolutions 704.

3. ISOC Science Data Archive

No news.

4. ISOC system

Work is continuing on ISOC system V19.4, to be released end of week 35.

5. Problems

None.

4.3.2 ISDC

Status of ISDC observation processing on 25/08/2008:

- Latest Standard Analysis completed: observation 05200080005 (Loop I-Loop IV Super, Revolution 691, 692 & 693) on 14/08/2008.
- Latest products archived: observation 05200480001 (XMM-LSS, Revolution 695, 696 & 697) on 15/08/2008.
- Latest observation products sent to the observer: observation 04200730061 (Galactic disk lat scans, Revolutions 703) on 13/08/2008.

5 Special Events

6 Anomalies

The following problem was reported this week that impacted operations.

- On DoY 233, at 11:29, the connection to the TM RT Cache dropped, this was followed a minute later by the Command Verifier crashing. The system was recovered at 12:05. There was no impact.

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

AR id	Date Created	Subject	Segment	Status
INT-3019	2008-08-20	SLE connections not working on new simulator software OD3_15	Simulator	Pending
INT-3021	2008-08-17	Problems encountered during JEMX-2 Switch-on.		Open
INT_SC-234	2008-08-29	IREM Anomaly: Reset of IREM_CSCI S/W #65, 17/08/2008	Payload	Pending

7 Future Milestones

- The 12th annealing operations started on 17th August 2008 at radiation belt entry of revolution 713. Below is the summary timeline of the planned annealing activities

12th SPI ANNEALING - revs 713-720									
ID	Task Name	Duration	Start	Resource Names	11 Aug '08	18 Aug '08	25 Aug '08	01 Sep '08	08 Sep
2	Start SPI Annealing - Warm-up Phase	36.5 hrs	17 Aug 15:10	PST[20 pkts]	Mo	Tu	We	Th	Fr
16	Annealing at 104degC	199 hrs	19 Aug 03:40	PST[20 pkts]	Sa	Su	Mo	Tu	We
28	Stop SPI Annealing - Passive Cooling Phase	64.02 hrs	27 Aug 10:40	PST[20 pkts]	Th	Fr	Sa	Su	Mo
32	ACS Calibration	61.83 hrs	27 Aug 10:40	PST[20 pkts]	Th	Fr	Sa	Su	Mo
44	Start Cryocoolers - Active Cooling Phase	140.5 hrs	30 Aug 02:41	PST[20 pkts]	Th	Fr	Sa	Su	Mo
56	Camera Switch on & Performance Tests	31.2 hrs?	03 Sep 07:11	PST[105 pkts]	Th	Fr	Sa	Su	Mo
76	Active Cooling Fine Tuning	67 hrs	04 Sep 23:11	PST[105 pkts]	Th	Fr	Sa	Su	Mo
79	Resume SPI POS Observations	62 hrs	05 Sep 00:10	PST[105 pkts]	Th	Fr	Sa	Su	Mo

- The next eclipse season will begin on the 22nd September during revolution 725.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 714

The observations in revolution 714 began with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. They continued with a raster dither of PKS 0208-512 (RA 02:10:46.20, DEC -51:01:01.9), lasting ~47.6 hours. Finally an OMC Flat-Field calibration was performed, which was a staring observation at attitude (RA 02:28:24.00, DEC +15:30:00.0), lasting ~3.4 hours, until the end of the revolution.

Revolution 715

The observations in revolution 715 began with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. They continued with a raster dither of X Per (RA 03:55:23.08, DEC +31:02:45.0), lasting ~28.0 hours. Finally a raster dither of the Galactic Plane Region 3 (RA 13:09:32.98, DEC -62:47:56.4), lasting ~20.2 hours, was performed, until the end of the revolution.

Throughout these observations, all instruments were in their nominal science modes, except SPI, which is undergoing annealing. The TM allocation was IBIS 180; SPI 30; JEM-X1 15; JEM-X2 15; OMC 9, except from 2008-08-20T11:29:59Z to the end of the revolution, during the Flat-Field calibration, when it was IBIS 136; SPI 20; JEM-X1 15; JEM-X2 15; OMC 63.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2008-08-04T00:40:13.000Z	139.3574	F	Automatic TM processing.
2008-08-05T17:06:09.000Z	139.3465	F	Automatic TM processing.
2008-08-06T21:22:36.000Z	139.3241	F	Automatic TM processing.
2008-08-08T16:55:54.000Z	139.3131	F	Automatic TM processing.
2008-08-08T23:18:18.000Z	139.2752	F	Automatic TM processing.
2008-08-10T09:18:06.000Z	139.2402	F	Automatic TM processing.
2008-08-11T23:06:58.000Z	139.1976	F	Automatic TM processing.
2008-08-12T21:48:20.000Z	139.1539	F	Automatic TM processing.
2008-08-14T22:55:37.000Z	139.1461	F	Automatic TM processing.
2008-08-15T16:35:23.000Z	139.1218	F	Automatic TM processing.
2008-08-17T22:42:01.000Z	139.1102	F	Automatic TM processing.
2008-08-18T05:08:50.000Z	139.0903	F	Automatic TM processing.
2008-08-20T10:37:03.000Z	139.0508	F	Automatic TM processing.
2008-08-20T22:30:49.000Z	139.0378	F	Automatic TM processing.
2008-08-21T04:57:29.000Z	139.0142	F	Automatic TM processing.

This report was generated Fri Aug 22 08:00:28 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, 16/08/2008 – 22/08/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 90 Open Loop Slews, 88 Closed Loop Slews and 6 Momentum Biases were executed (as reported by ACC).

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

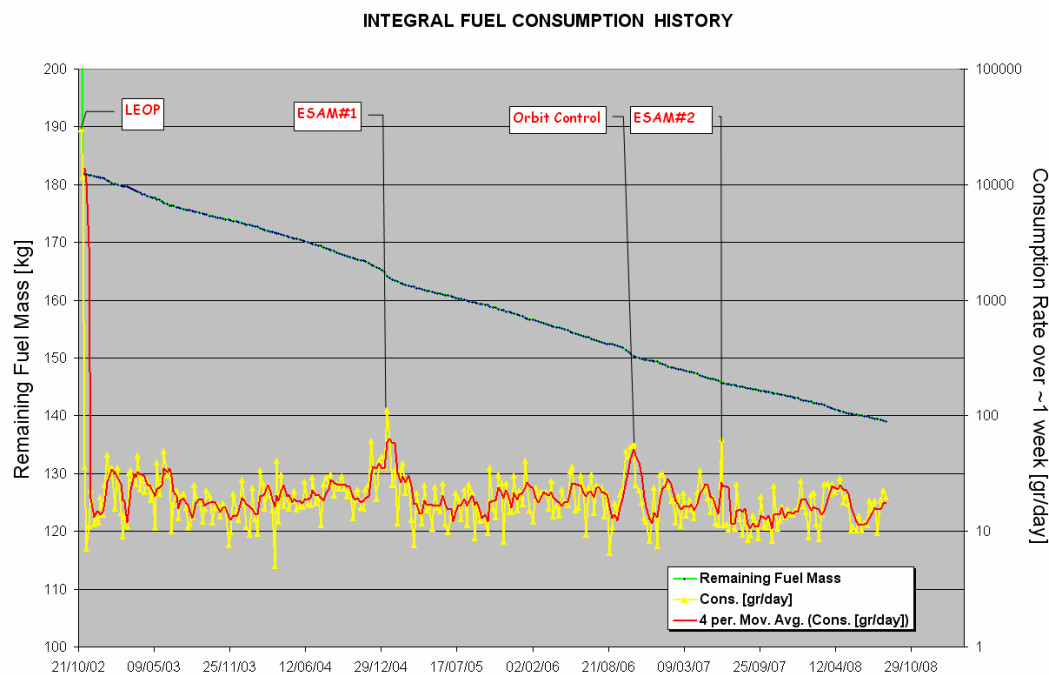
The OTF was not reached during PID 07130036 due to loss of guide star after an open loop slew.

Orbit Control

No update

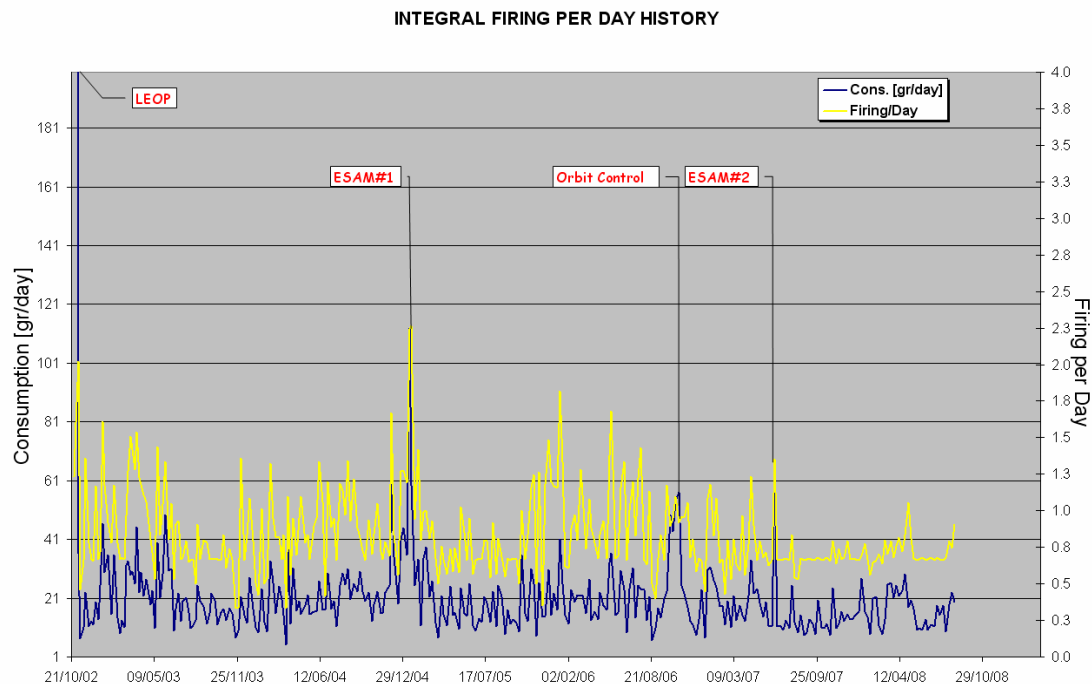
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 22/08/2008 is reported in the plot below.



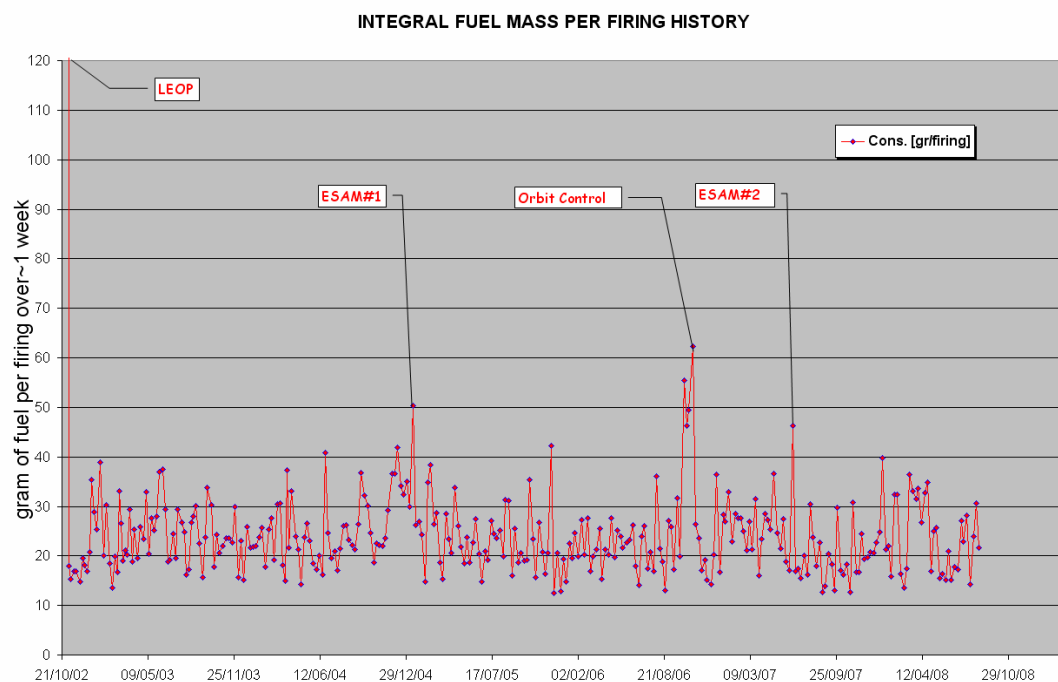
The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The firing per day over the period between 01/11/2002 and 22/08/2008 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 22/08/2008 is shown in the plot below.

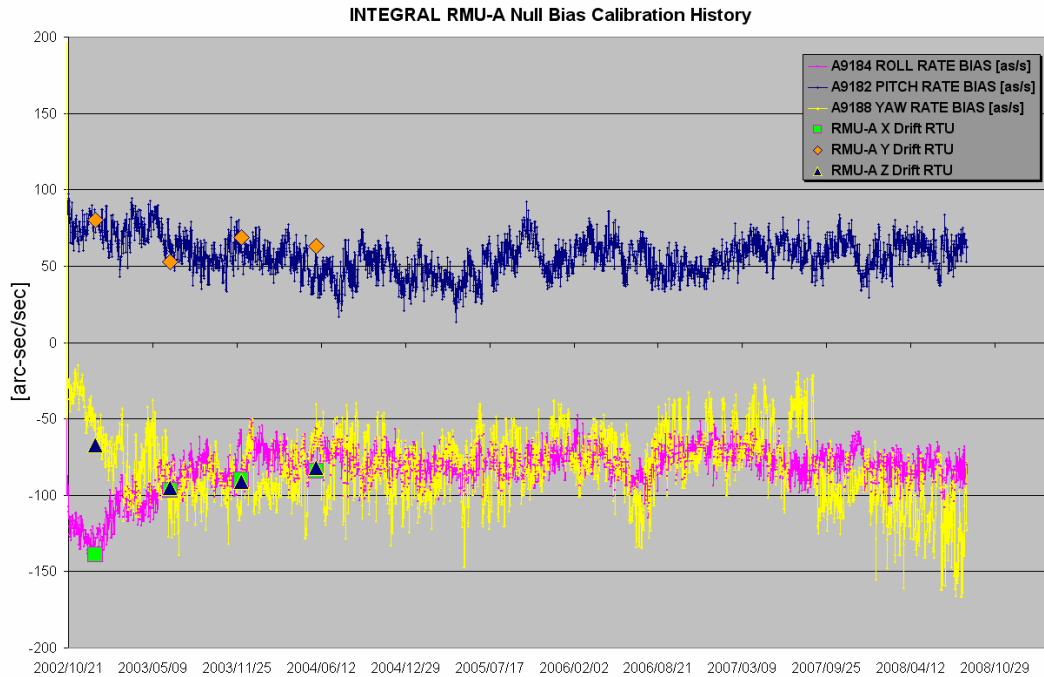


The RMU-A null bias calibration

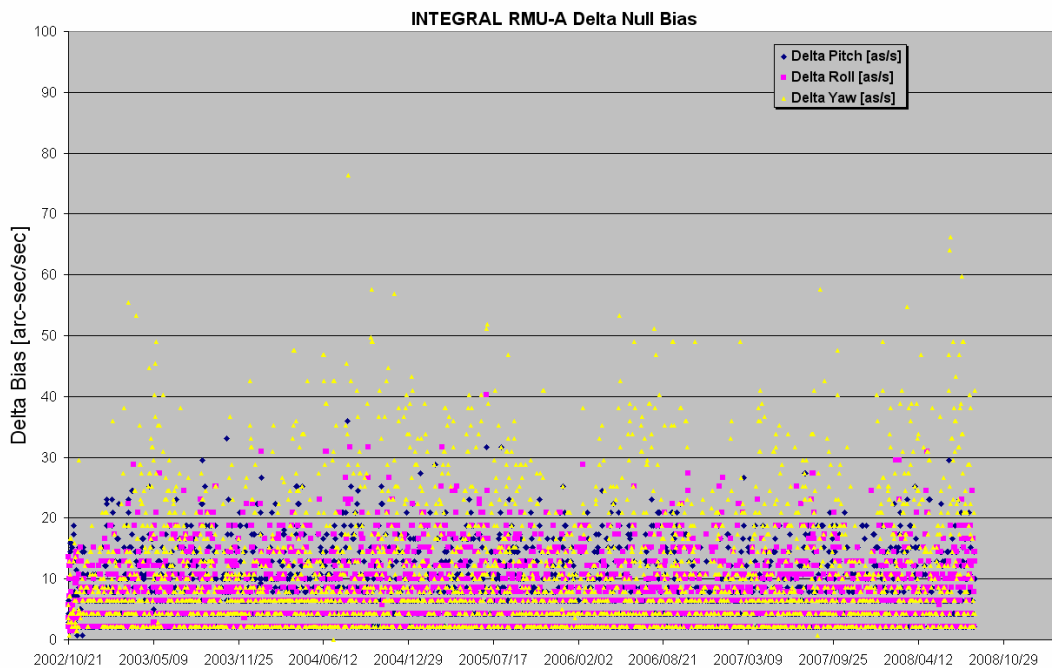
The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 22/08/2008 is reported in the plot below.

Problems have been reported during the last period on FDS when generating the drift update for the RMU-A Yaw channel: the limits set on FDS have been violated few times. 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 22/08/2008 is reported in the plot below.



16/08/2008 (Day of Year 229, Revolution 713)

Nothing to report.

17/08/2008 (Day of Year 230, Revolution 713)

Nothing to report.

18/08/2008 (Day of Year 231, Revolution 713-714)

Nothing to report.

19/08/2008 (Day of Year 232, Revolution 714)

Nothing to report.

20/08/2008 (Day of Year 233, Revolution 714)

Nothing to report.

21/08/2008 (Day of Year 234, Revolution 714-715)

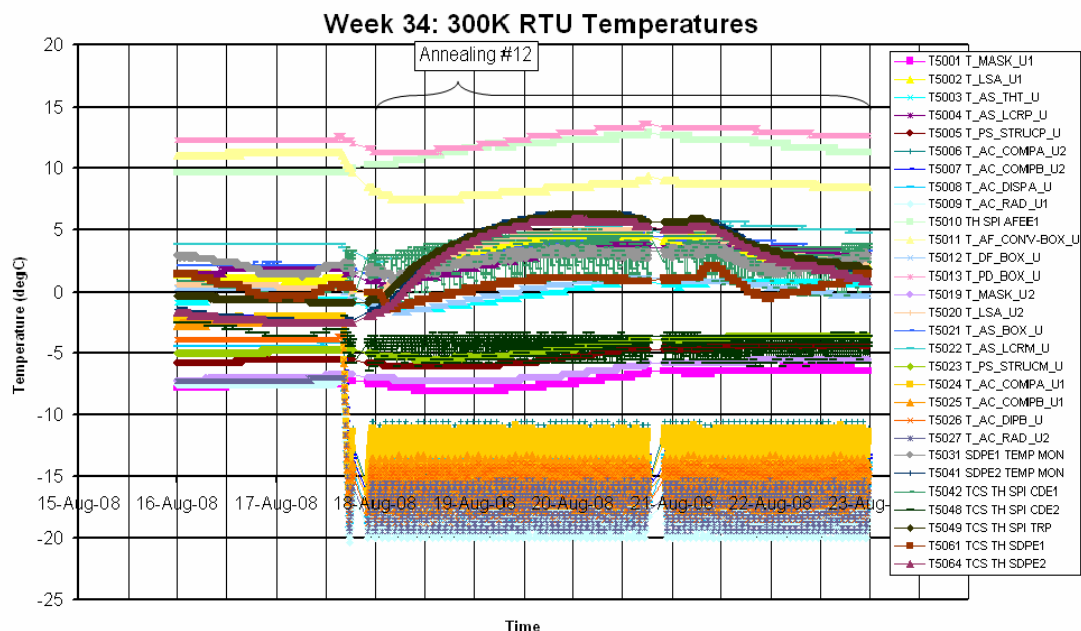
Nothing to report.

22/08/2008 (Day of Year 235, Revolution 715)

Nothing to report.

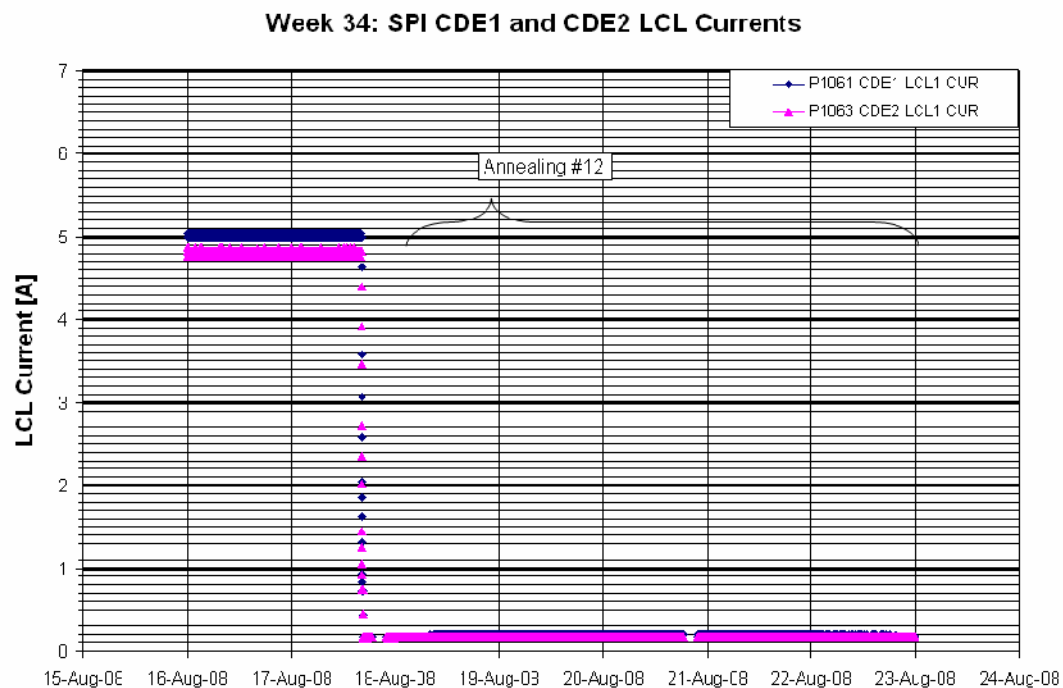
8.3.2 SPI Operations

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

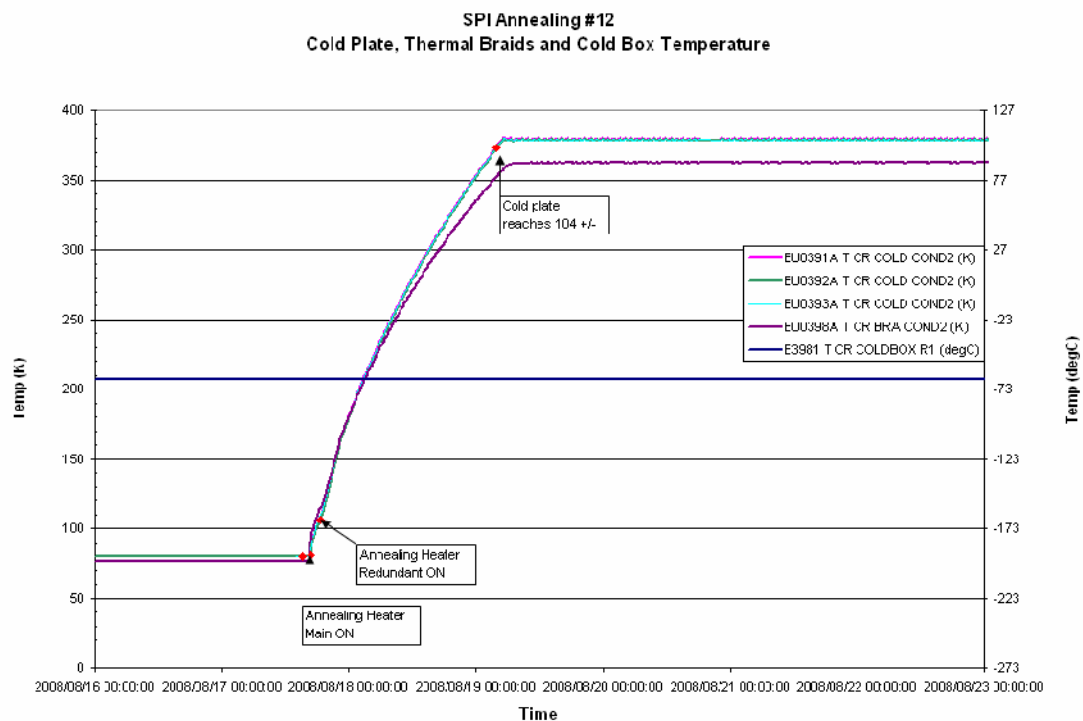


Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range 80K +/-1K and the stroke of all four compressors was set to 41 until 17/08/2008 at 16:15Z, when the active cooling was stopped for annealing.

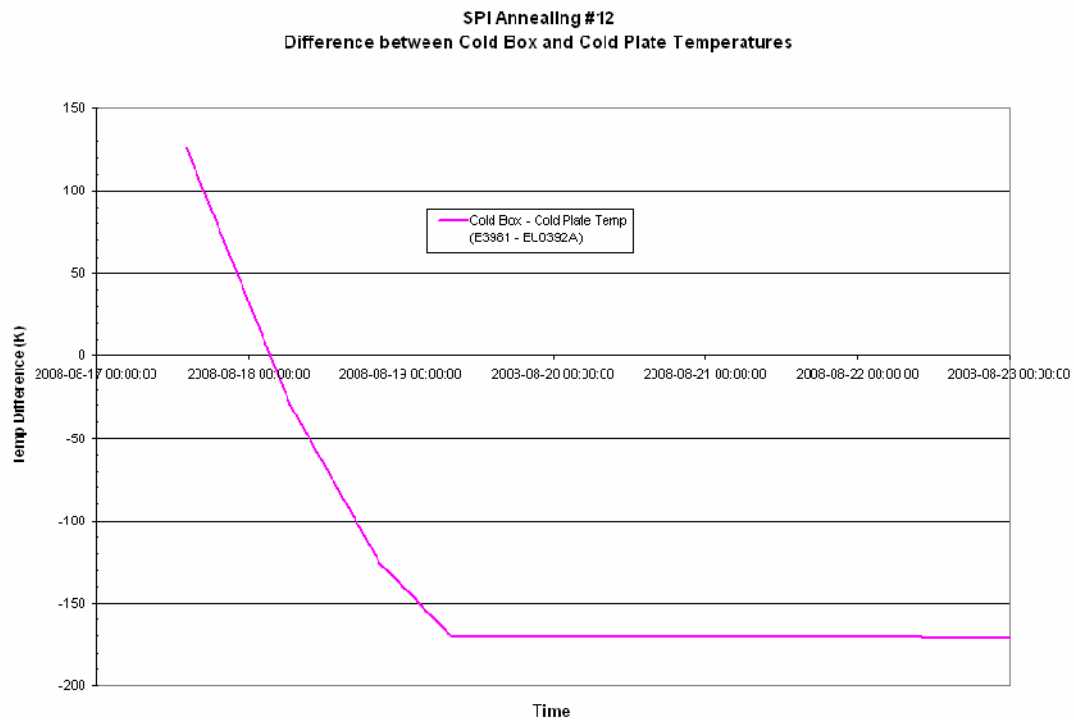
The following plot shows the evolution of the CDE LCL currents during the reporting period.



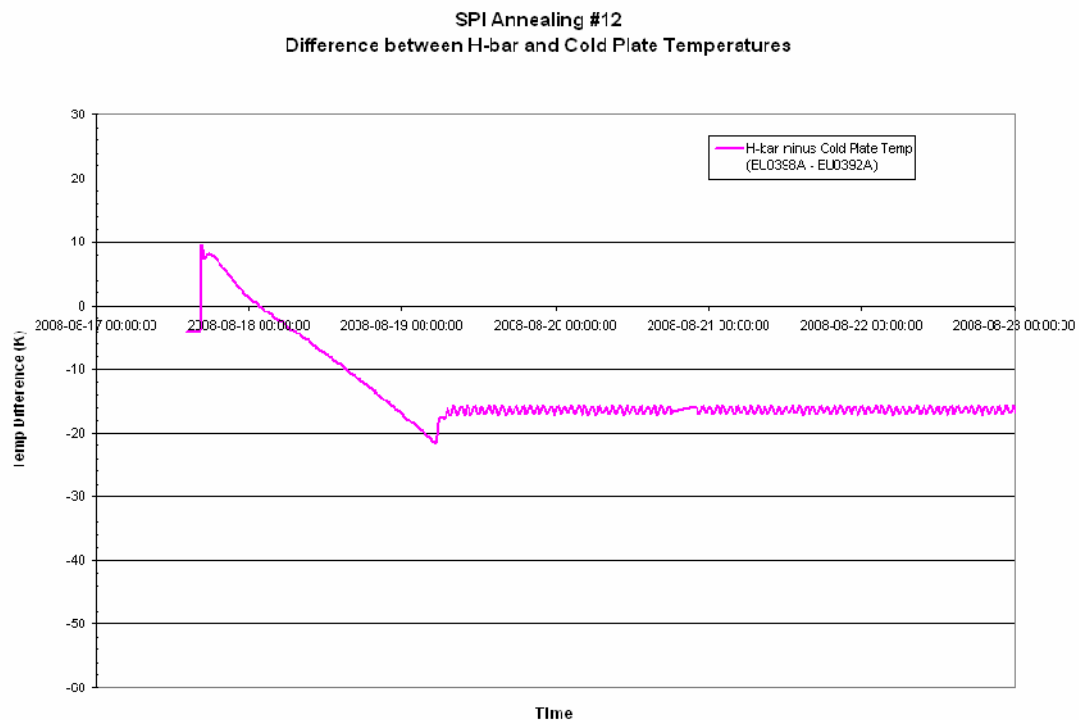
The following plot shows the evolution of the Cold Plate, Thermal Braids and Cold Box temperatures during the reporting period.



The following plot shows the difference between the Cold Box and Cold Plate temperatures since the start of annealing.



The following plot shows the difference between the H-bar and Cold Plate temperatures since the start of annealing.

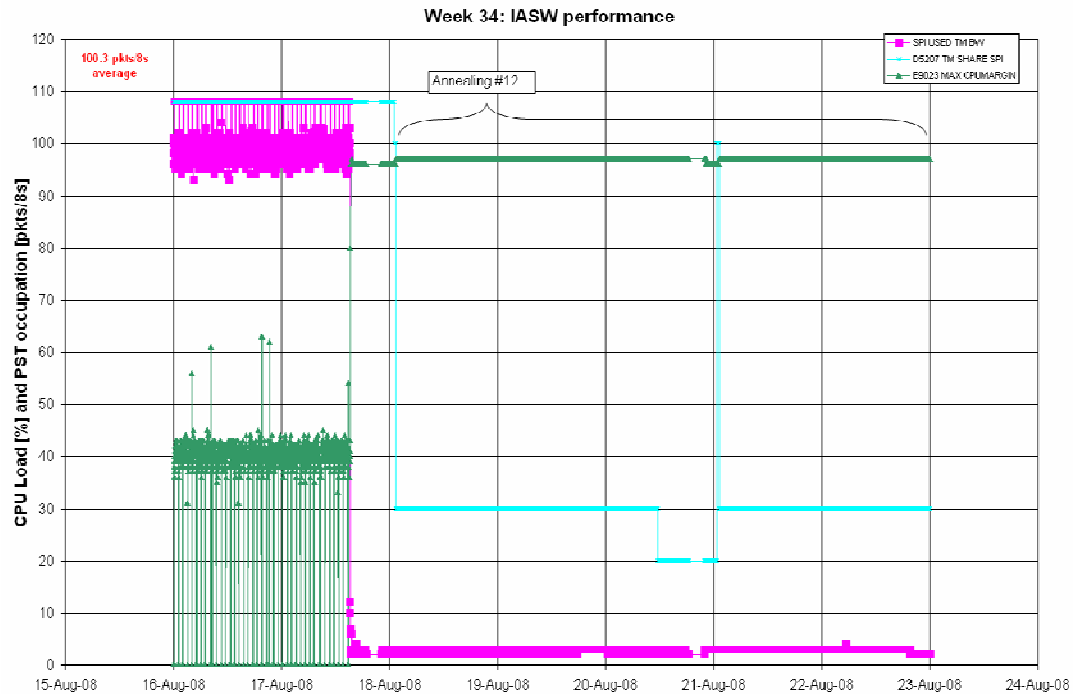


DPE & IASW: The DPE health and IASW performance is nominal.

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 100.3 packets/cycle over the science window when the TM allocation was 108 packets/cycle.

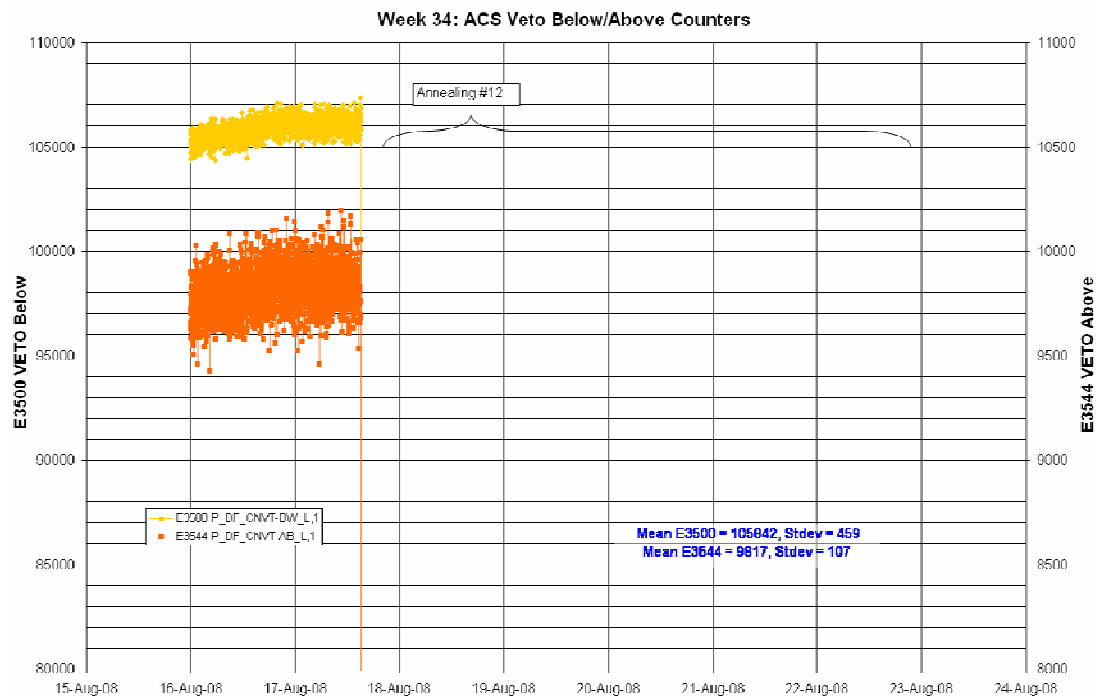
The following plot shows the IASW performance in terms of TM bandwidth occupation and DPE CPU load during the reporting period.



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).

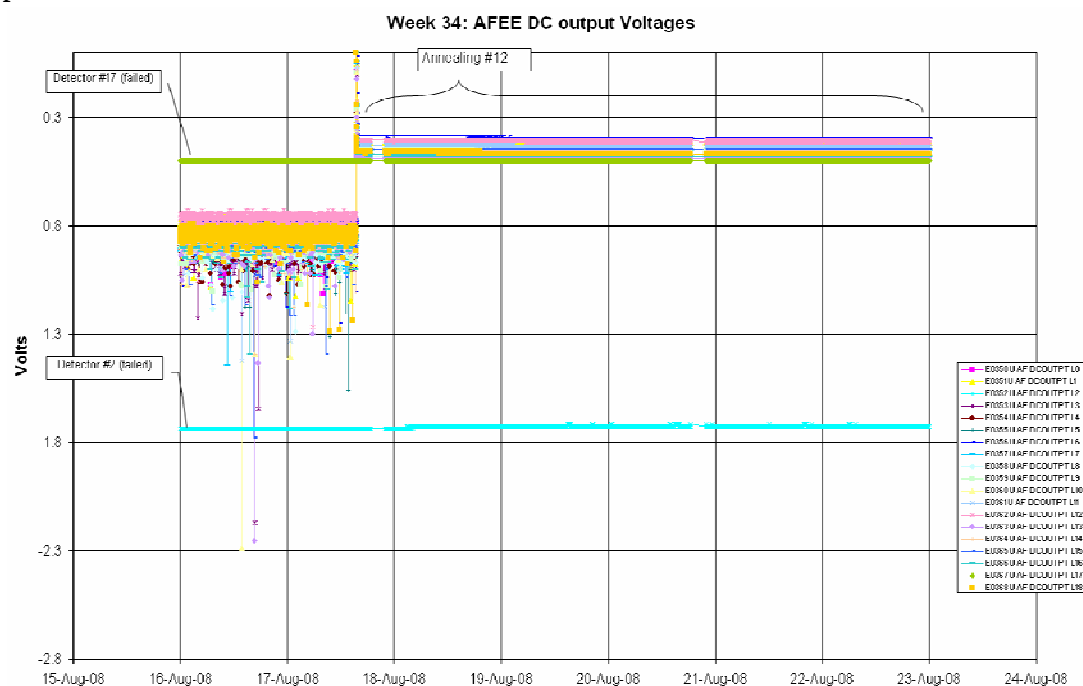
For the 12th annealing operations, started on 17th August 2008, the ACS High Voltages have been set to the minimum voltage (~980V) and the ACS is in CONF mode.

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



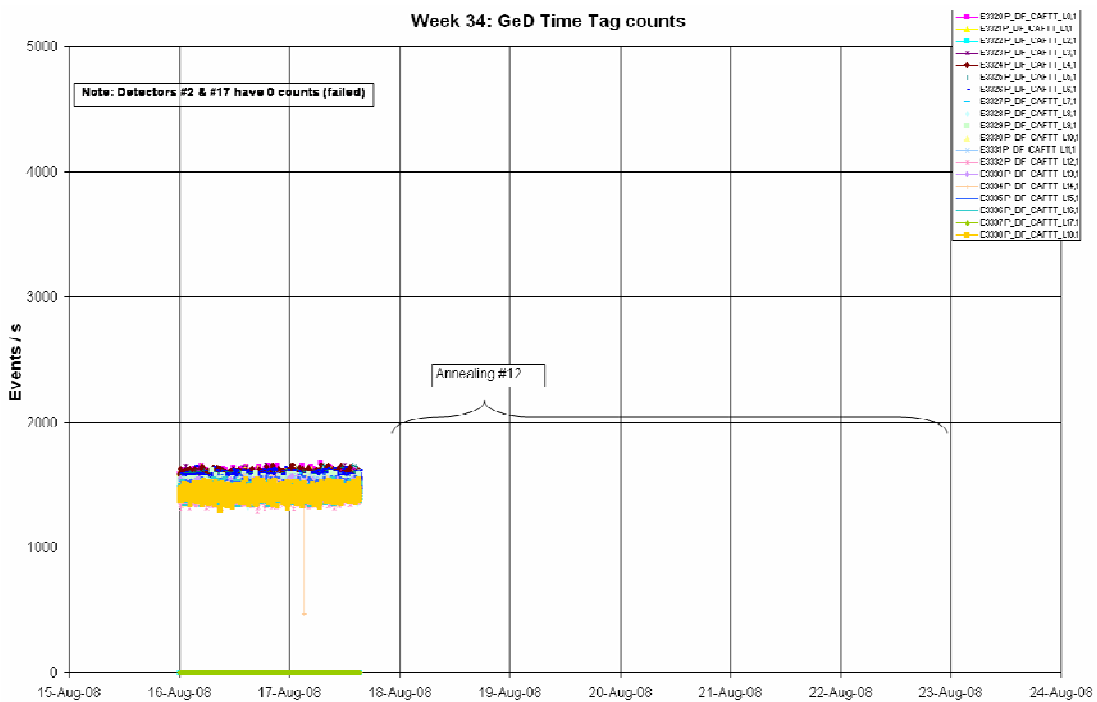
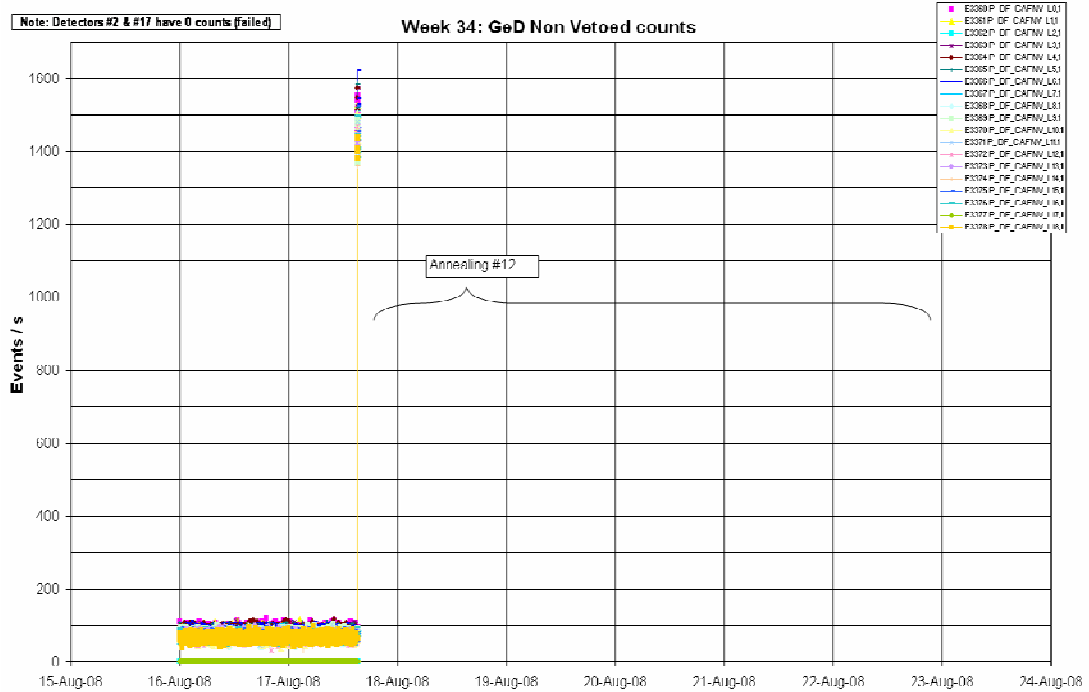
AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.

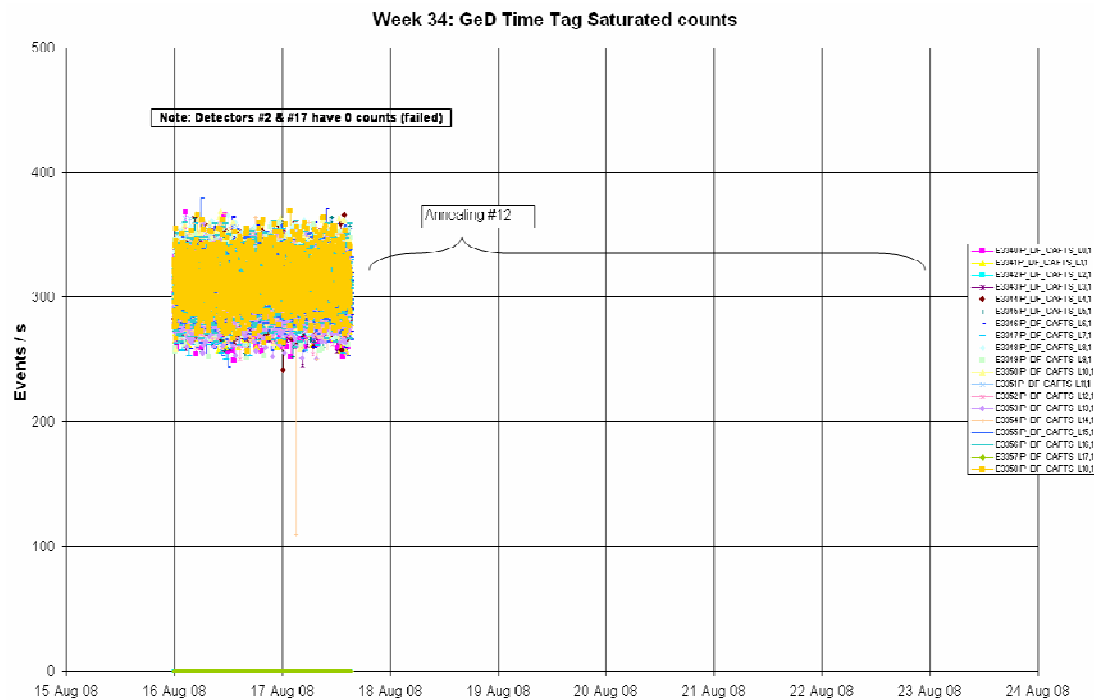
For the 12th annealing operations, started on 17th August 2008, all detector HVPSSs were switched off and only the LVPSSs are left on and the AFEE was put in CONF mode.



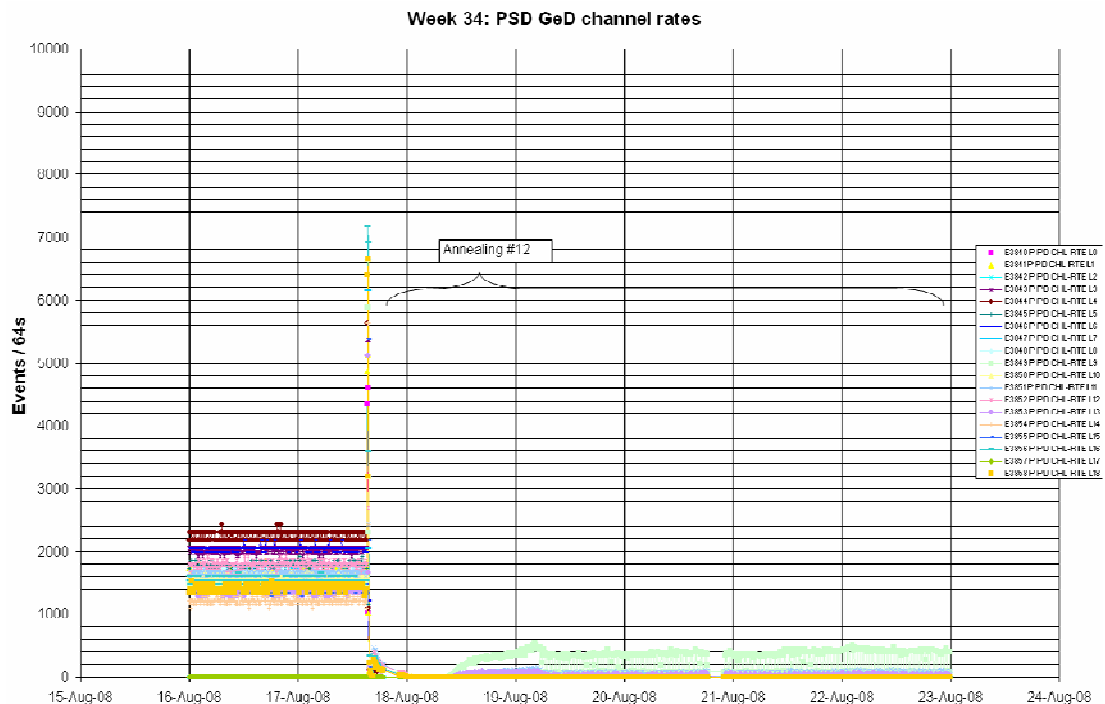
DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event count rates during the reporting period. For the 12th annealing operations, started on 17th August 2008, the DFEE was

put in CONF mode.





PSD: The health of the unit is nominal. The following plot shows the PSD channel rates during the reporting period. For the 12th annealing operations, started on 17th August 2008, the PSD was put in CONF mode.



Event Log:

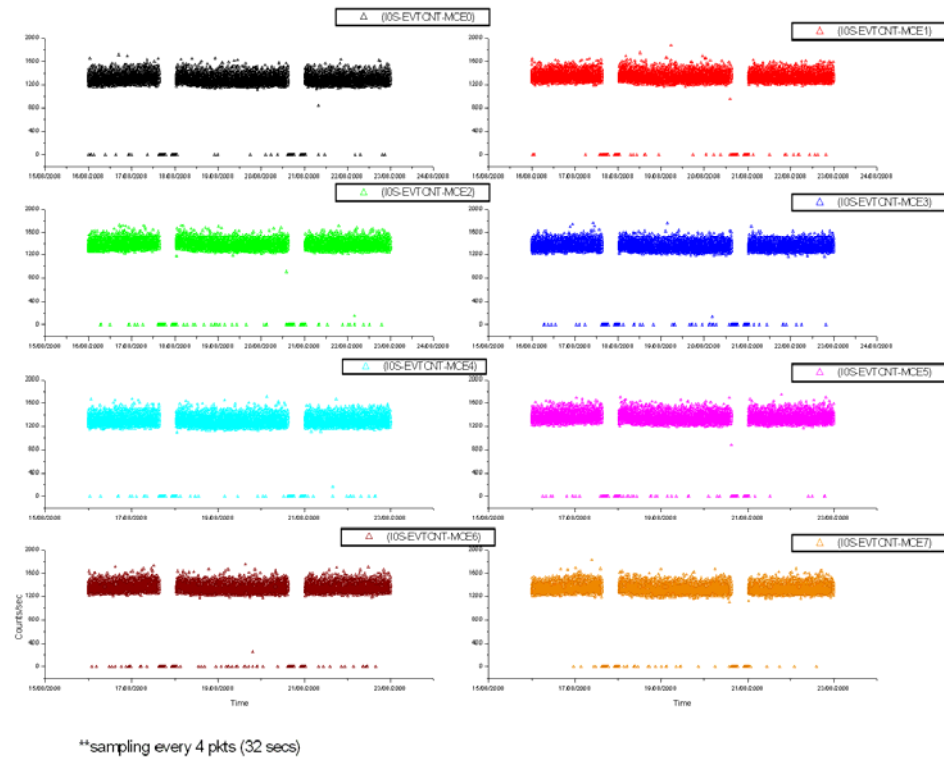
No non-nominal events occurred on SPI over the reporting period.

8.3.3 IBIS Operations

IBIS Event Counters Plots

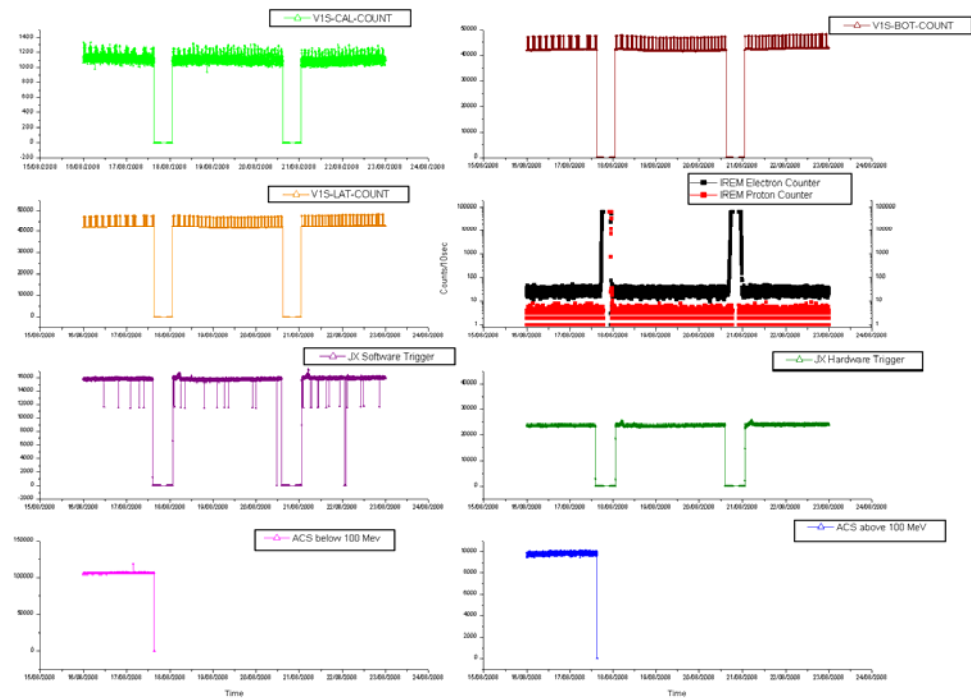
ISGRI Counters:

IBIS - ISGRI Counters Rev 713-715



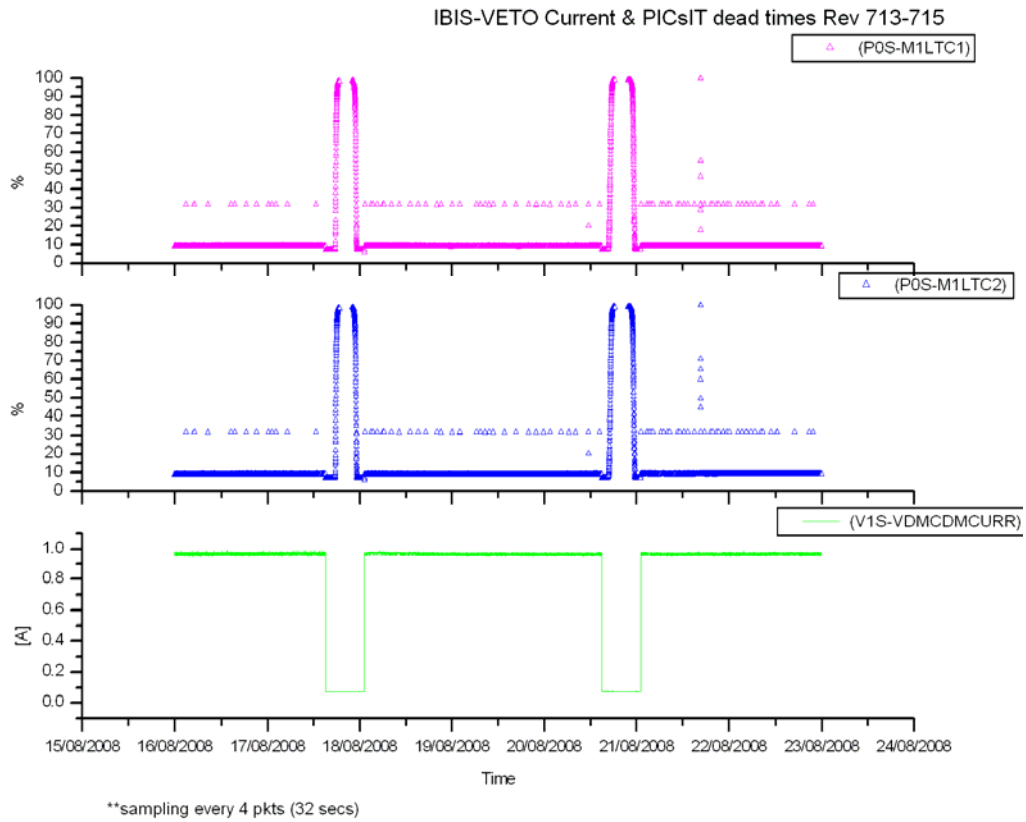
VETO vs Payload Counters:

IBIS-VETO vs Payloads Counters Rev 713-715

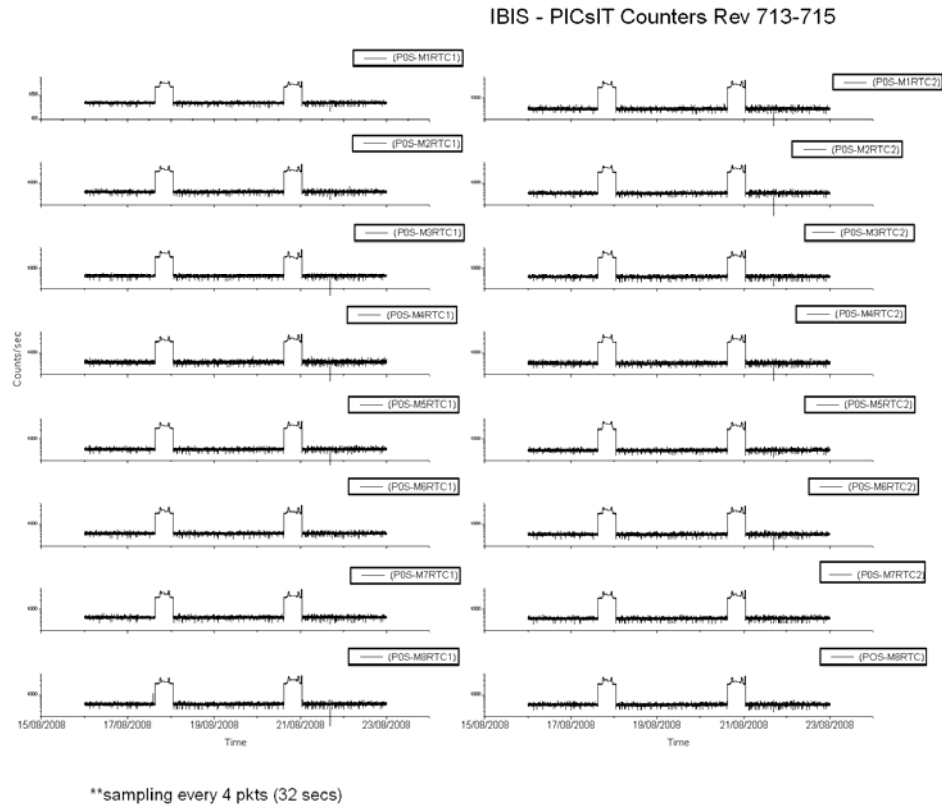


The week was characterised by low radiation as reported by the payload.

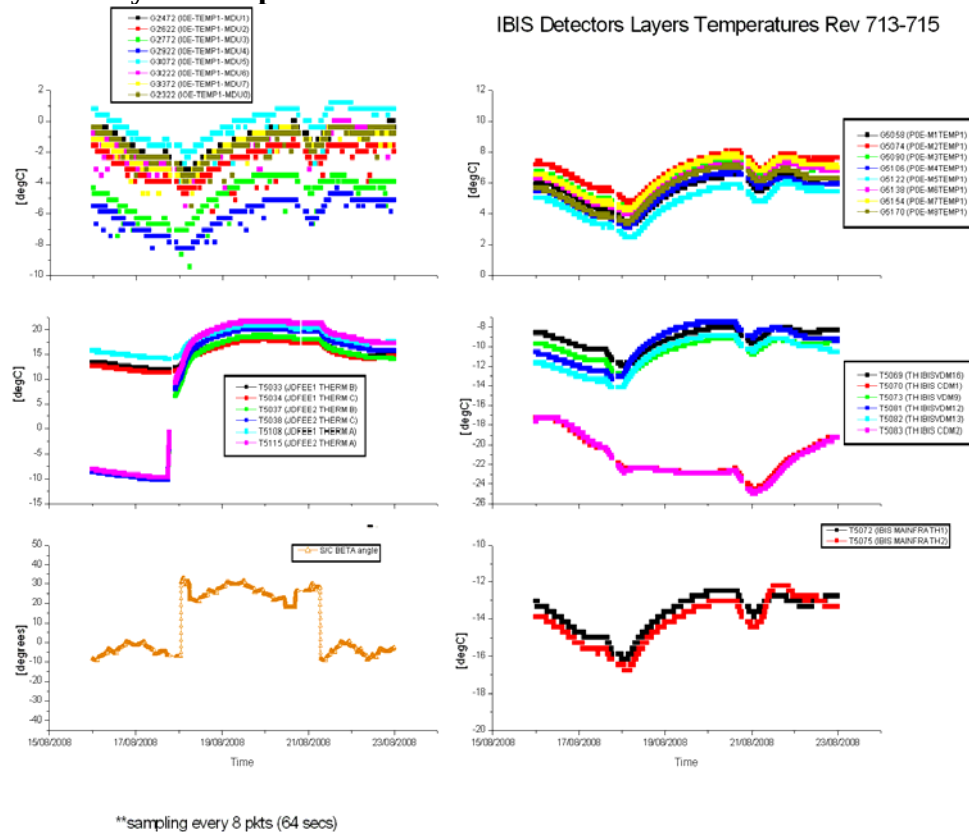
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



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.

2008-08-16 (DOY 229, Rev 713)

IBIS operations executed nominally.

2008-08-17 (DOY 230, Rev 713-714)

At 06:27:24Z TM parameter G2000 failed Status Consistency Check (Value: >1 NP DETECT), indicating an overflow of the noisy pixel address register in MCE0. As it returned within limits of its own accord at the next TM cycle, no action was taken.

At 07:40Z, following a ground station handover, TM parameter X7500 went OOL, indicating a problem with the histogram process. The following recovery procedure was then executed to force the histogram accumulation and download process to resume:

- 07:59:53Z FCP_IBIS1_0312

- 08:10:10Z TC G0129 uplinked to return IBIS to Science Standard mode.

After the start of the following pointing, at 08:39Z TM parameter X7500 went OOL again. The recovery procedure was then repeated as follows after which the histogram process resumed:

Doc. Title : INTEGRAL Mission Report #309
Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OAI
Date : 25/08/08

Issue : 1
Rev. : 0
Page : 24

- 08:48:42Z FCP_IBIS1_0312
- 08:57:11Z TC G0129 uplinked to return IBIS to Science Standard mode.
IBIS operations continued nominally.

2008-08-18 (DOY 231, Rev 714) to 2008-08-20 (DOY 233, Rev 714-715)

IBIS operations executed nominally.

2008-08-21 (DOY 234, Rev 715)

At 16:41:30Z the TM parameters families G5068 and G5072 failed status consistency check (value = TRUE). These are the PDM semi-module FIFO error flags. At 16:43:17Z the TM parameter families G5002 and G5003 for the PDM semi-module counters started going OOL Low. As these were followed at 16:46:45Z by OEM APID 1280 ID 132 EVENT IBIS1 IASW HEPI RESYNCHRONIZED, indicating that HEPI resynchronised autonomously, by which time all the above parameters had returned within limits, no action was taken.

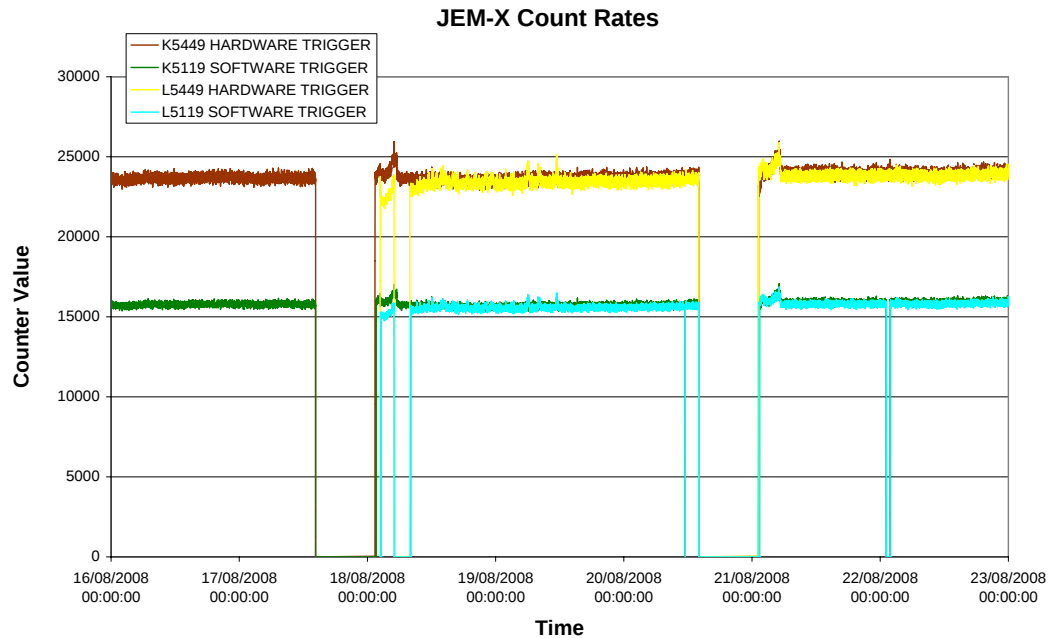
2008-08-22 (DOY 235, Rev 715)

Due to the upcoming wraparound of the DPE LOBT, IBIS was commanded to Standby Mode at 01:10:58Z via FCP_IBIS1_0313. It was commanded back to Science Standard Mode via the CCCF_ED GESTAN02 in the Timeline at 01:49:29Z.

8.3.4 JEM-X Operations

JEM-X Count Rates

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

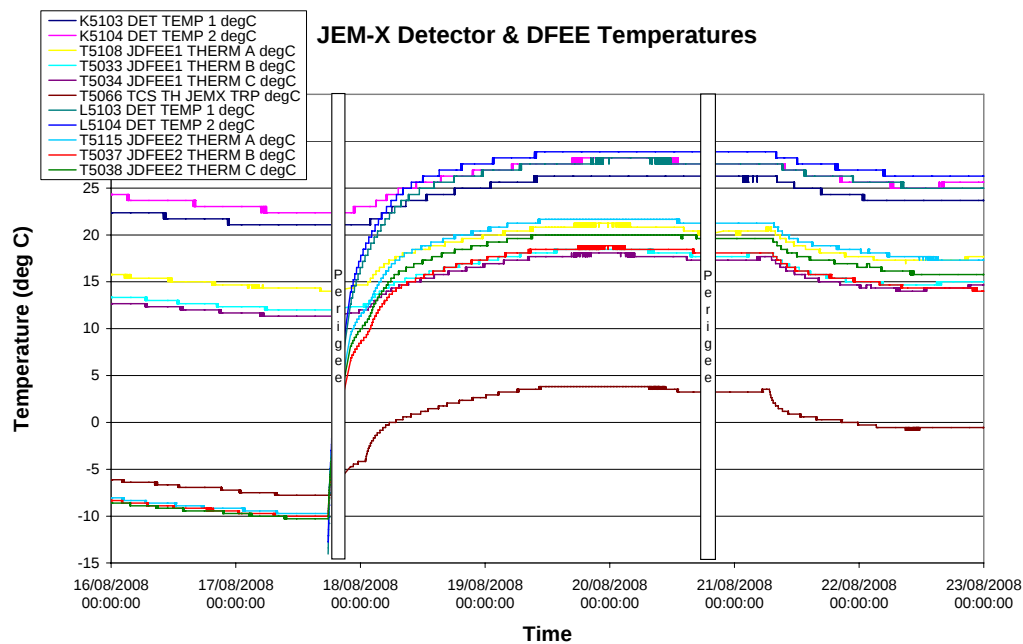


JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph².

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

² Data sampled (1 frame in 8)



JEM-X Daily Report

2008-08-16 (DoY 229, Rev 713)

JEM-X1 operations executed nominally.

2008-08-17 (DoY 230, Rev 713)

At 15:00 operations to re-activate JEMX-2 began. First, the ED DEBWHI00 to assign bandwidth to JEM-X2 was uplinked. This was followed by FCP_JEM2_0010 to activate the DPE & CSSW. Procedure FCP_JEM2_0011 was omitted, as the patch that it installs, is included in the previous procedure. The other procedures followed were FCP_JEM2_0015 JEMX2 IASW Activation, FCP_JEM2_0016 JEMX2 Enable BCP Distribution, FCP_JEM2_0017 JEMX IASW Extended TM Check, FCP_JEM2_0020 JEMX2 DFEE 1st Activation After DPE Switch, FCP_JEM2_0120 JEMX2 Set BCP Overrides, FCP_JEM2_0040 JEMX2 Transition To Safe, The activity was completed at 18:00, and the unit left in SAFE mode until the next revolution.

2008-08-18 (DoY 231, Rev 714)

At 01:35:31 TCs K0021 and KU0014 terminated with status Unknown. Later at 02:25:33, TC K0021 terminated with status Unknown_failed. No action was taken and there was no impact.

2008-08-19 (DoY 232, Rev 714)

JEM-X1 operations executed nominally.

2008-08-20 (DoY 233, Rev 714)

At 00:51 the TC L0005, part of the ED LEACAL01 failed release stopping the sequence. At 00:59, an attempt to manually send the sequence fails again at the same point. At 01:07, JEMX-2 is manually commanded to SAFE. At 01:34, a third attempt to uplink the ED is performed successfully, a possible reason being that the instrument was still warming up after the switch on the previous evening.

At 04:59:41, JEMX-2 switched to SAFE. An analysis revealed that the DFEE patch had been inadvertently omitted during the switch on. At 07:11, the patch was installed, and at 07:24, the linearisation table re-uplinked. The LEACAL01 and LEHVAC01 EDs were subsequently sent, and at 08:05:00, the unit was back in Data-Taking after the LEDATA02 ED was uplinked. The impact was the loss of 3 hours of science time.

At 11:29:56, TC KU0014 completed with status Affected. At 11:30:04, this changed to Unverified, and then Passed. At 11:39:18 a similar thing happened with TCs K0011, and KU0014. On each occasion, no action was taken and there was no impact.

2008-08-21 (DoY 234, Rev 715)

JEM-X1 operations executed nominally.

2008-08-22 (DoY 235, Rev 715)

From 13:35:26 to 13:35:34, parameter K5136 was briefly outside soft limits. No action was taken and there was no impact.

8.3.5 OMC Operations

2008-08-16 (DoY 229, Rev 713) to 2008-08-22 (DoY 235, Rev 715)

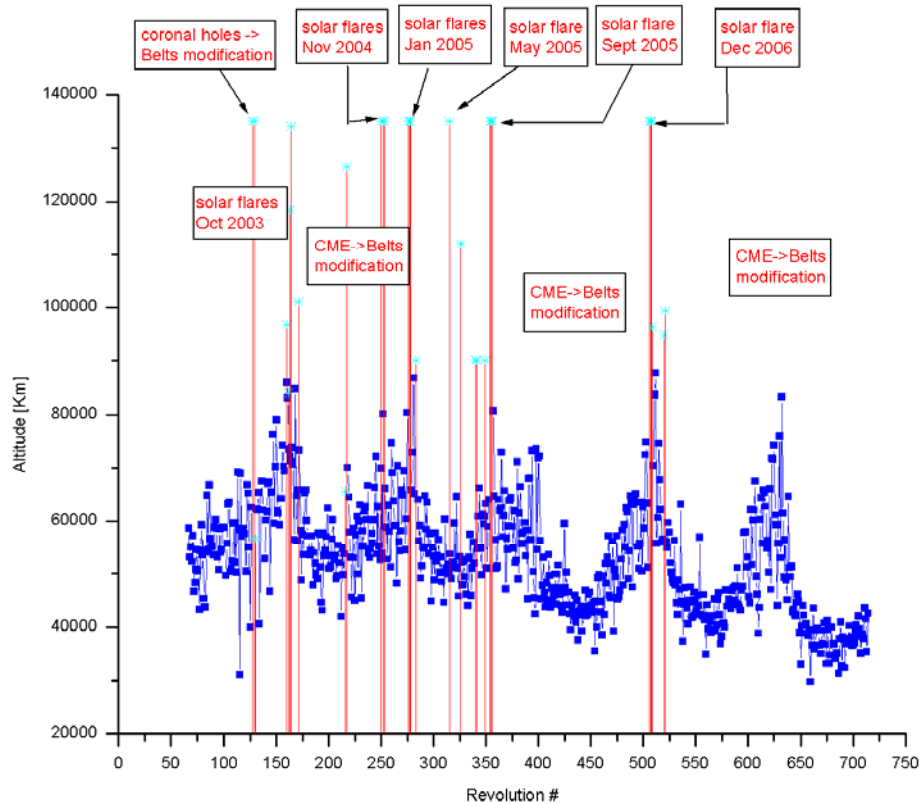
Nothing to report.

On DoY 230 at 15:10:07 and DoY 233 at 14:56:23 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

Evolution of Radiation Belt Entry 2003-2008



IREM daily report

DoY 2008.230 (17/08/2008):

At 22.03:57Z, at AOS, it was noticed that a local reset of the IREM CSCI S/W (SEU #65) had occurred. 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 between 2008.230.18.45:33Z (21079.1 km) and 2008.230.22.03.57 (24856.3 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 22:44Z using procedure CRP_SYS_2570. The first dump of the status word after the anomaly reported a value of 38C0 HEX = 14528 DEC = 0011100011000000, 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 23:56Z.

The IREM automatic transition to Standard Mode did not affected the instruments as they were in safe mode anyway due to the on-going radiation belt passage.

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]
713	RAD_ENTR R 2008-08-17T15:10:01Z	17/08/2008 17:26:30	35397.0	17-Aug-2008 17:05:29	38697.13
714	RAD_EXIT R 2008-08-18T01:03:23Z	N/A	N/A	18-Aug-2008 00:15:29	46099.43
714	RAD_ENTR R 2008-08-20T14:56:21Z	20/08/2008 16:28:14	42560.5	20-Aug-2008 16:47:53	39566.84
715	RAD_EXIT R 2008-08-21T00:50:24Z	20/08/2008 23:40:06	>>33527.7	21-Aug-2008 00:07:53	46727.55

Reference

High radiation

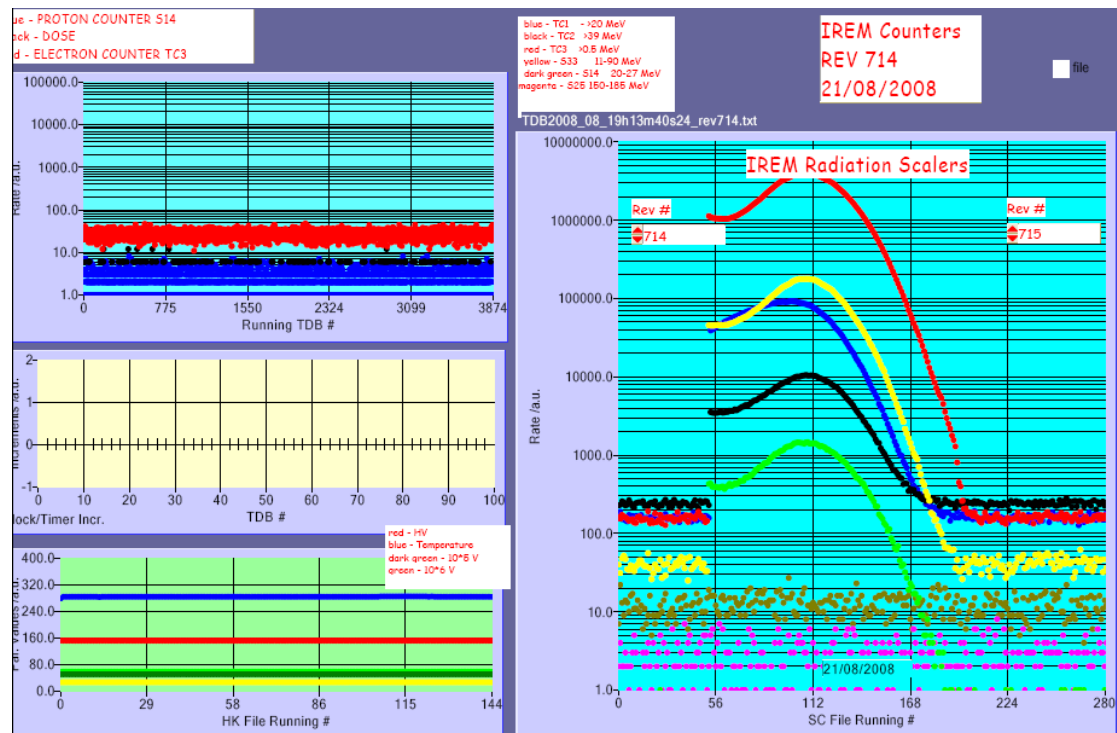
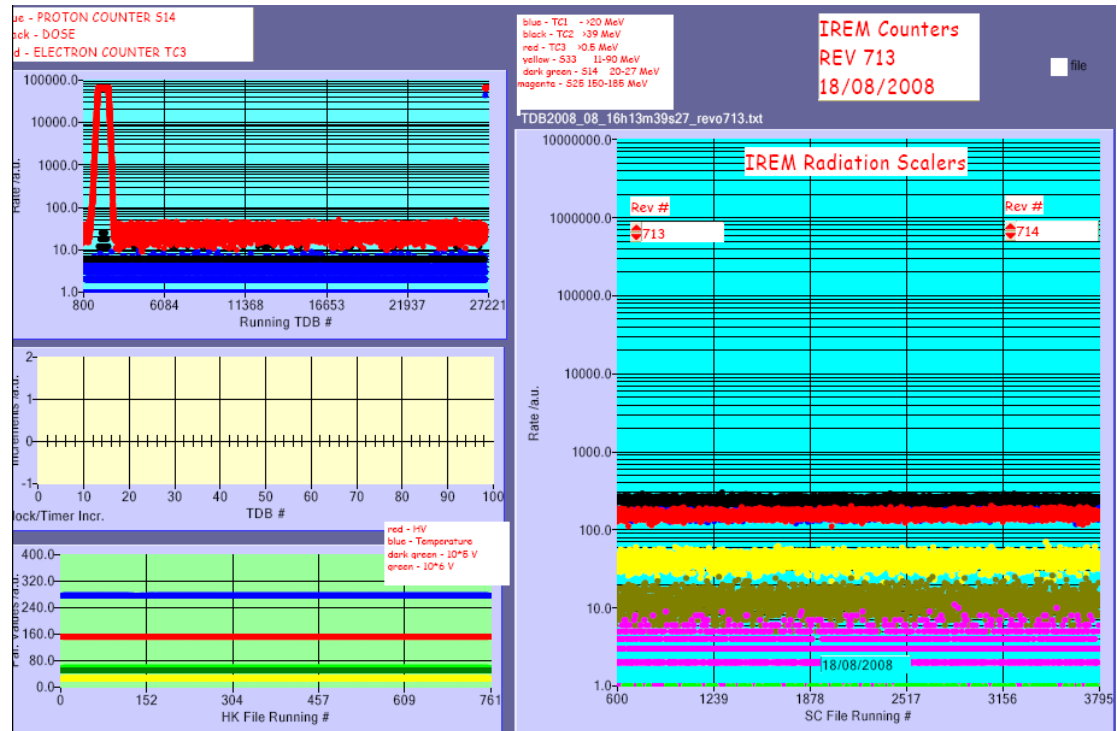
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

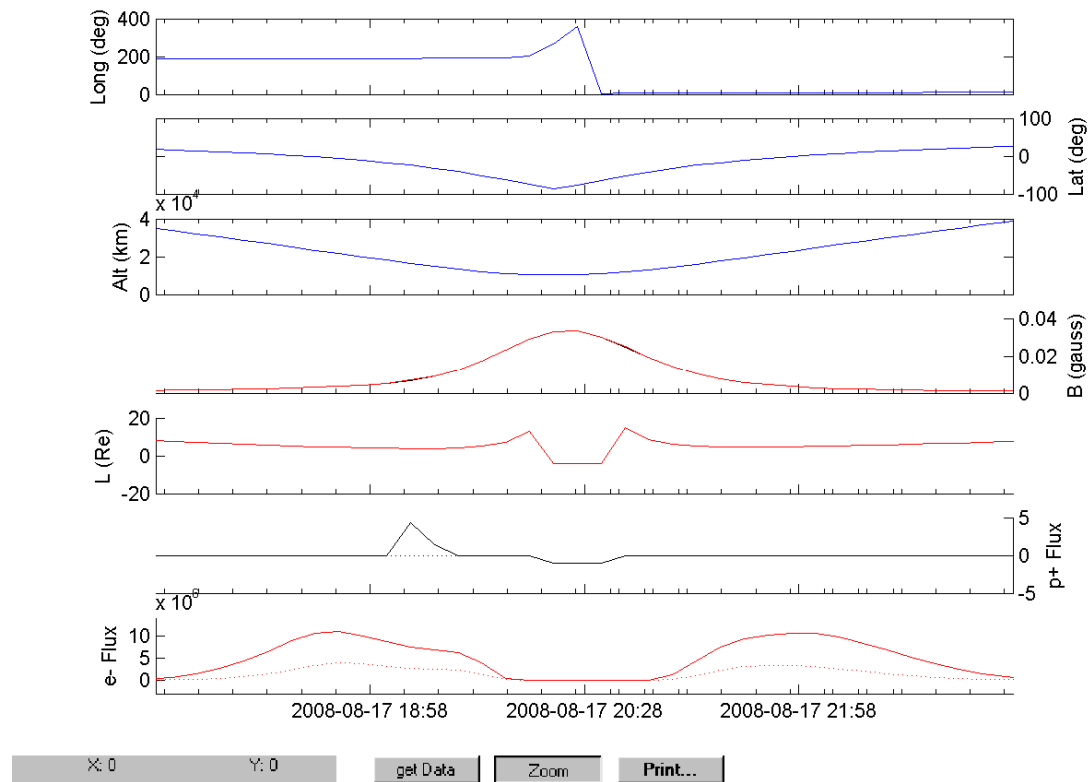
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

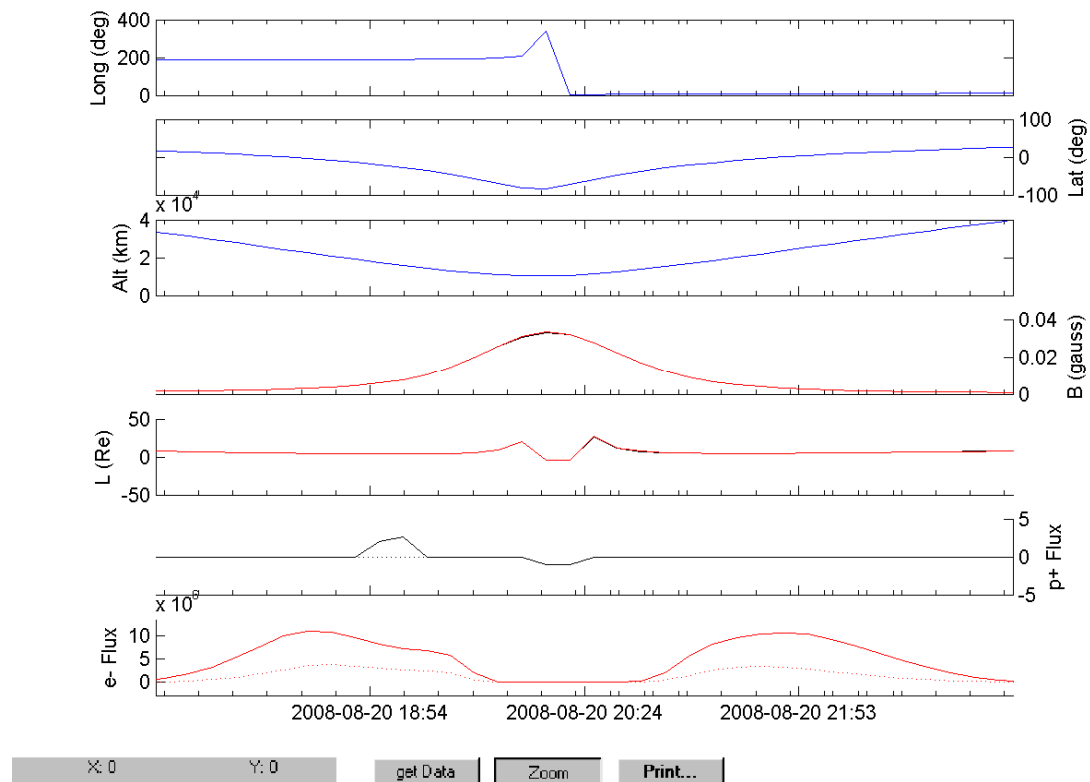


IREM Predicted Radiation Belt Passages

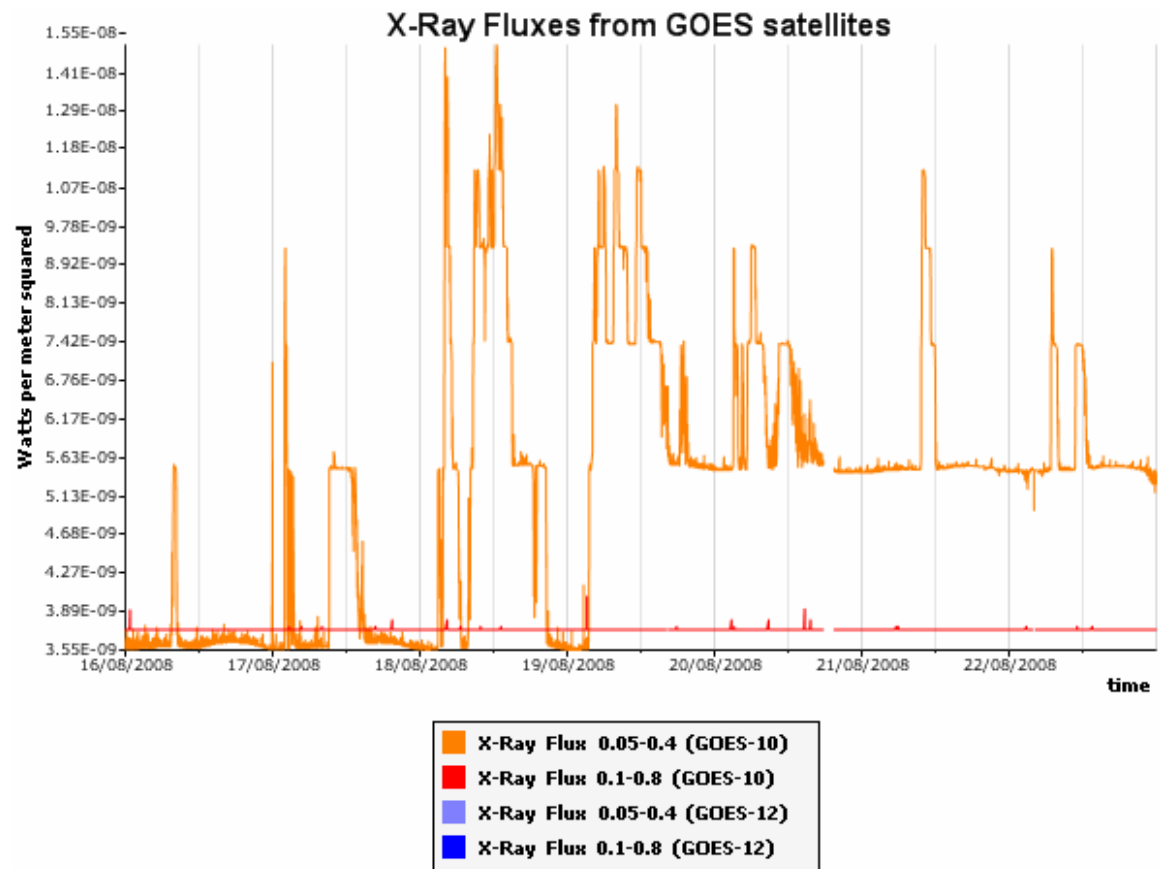
Rev 713



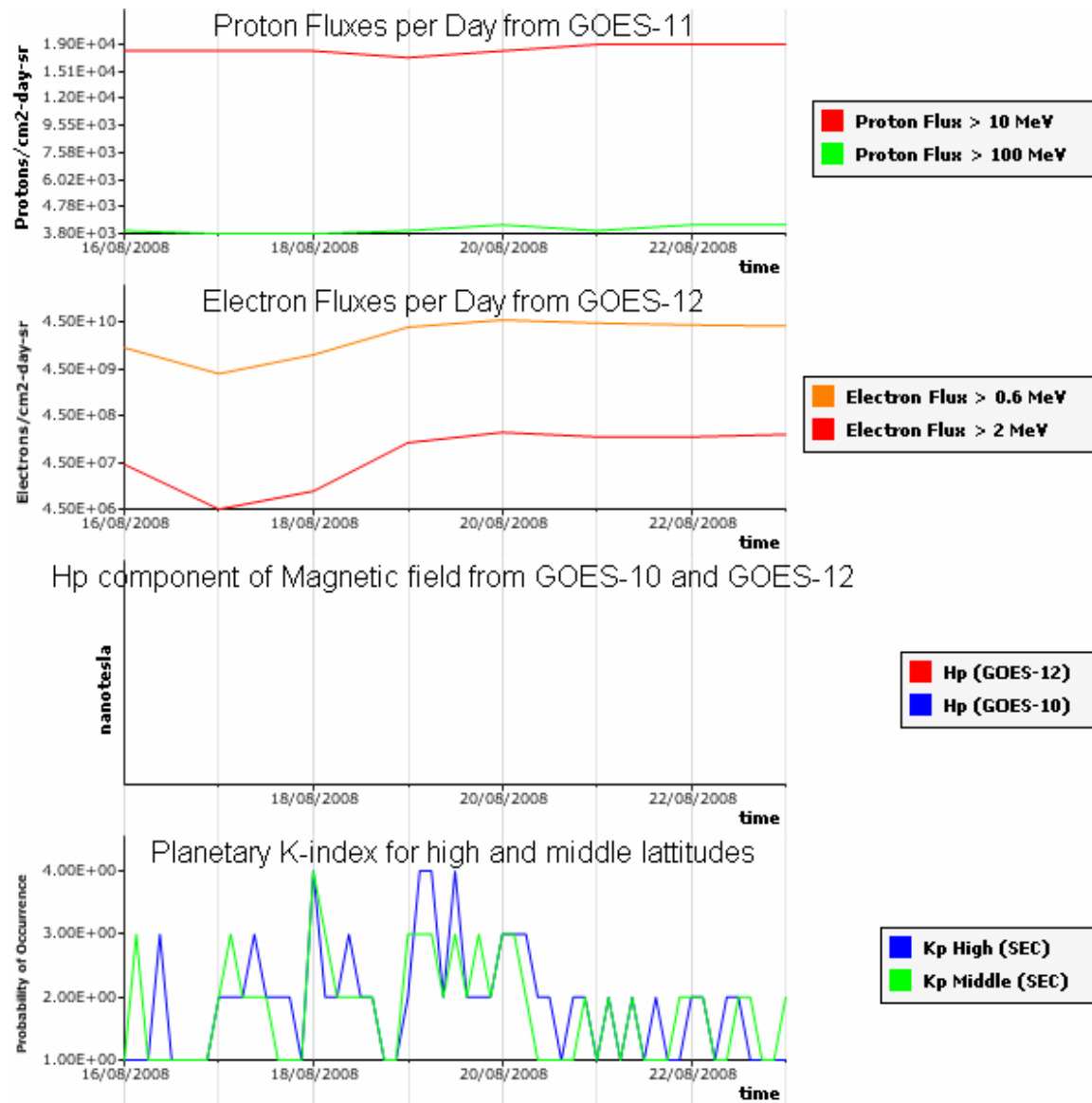
Rev 714



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.