

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 344
Week 17
27.04.09
Routine Phase

Prepared by: MJH. Walker (OPS-OAI) and INTEGRAL FCT

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1 General

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

It addresses the activities from 18.04.09 until 24.04.09 (both dates inclusive) and covers the revolutions 795, 796 and 797.

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 the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), a raster dither of the Galactic Centre (RA 17:45:40.03, DEC -29:00:28.1), a Galactic disk scan, two raster dithers of 47 Tuc and SMC (RA 00:53:55.20, DEC -72:26:42.0), two raster dithers of PKS B2149-307 (RA 21:51:55.52, DEC -30:27:53.7), a hexagonal dither of the Gamma Ray Source 1915+105 (RA 21:51:55.52, DEC -30:27:53.7) and a hexagonal dither of 4U 1907+09 (RA 19:09:37.90, DEC +09:49:49.0).

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.

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

The fuel consumption over the period between 18/04/2009 and 24/04/2009 was 0.1617 Kg. The remaining propellant is in the order of 134.6421 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

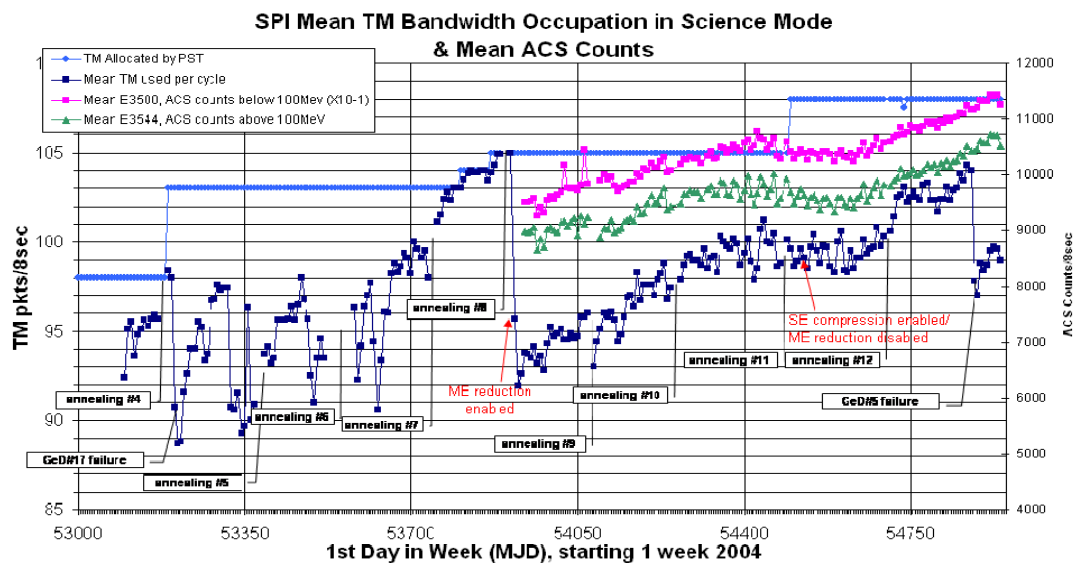
Following the 12th annealing, ended on 04/09/2008 at 23:50Z, the overall status of the gamma-ray spectrometer is nominal, except for detector #2 (failed since 06/12/2003); detector #17 (failed since 17/07/2004) and detector #5 (failed since 19/02/2009). The energy resolution of the previously degraded GeD#12 has improved following this annealing and the bias of this detector is now set to 4kV as for the other detectors. The 13th Annealing started on 19-04-2009 at 23:56Z. Operations for this annealing are progressing nominally. The main activities were as follows:

Date/Time	Activity
19/04/2009 23:56Z	Configure SPI for start of Annealing and stop SPI active cooling
20/04/2009 01:00Z	Annealing Heater Main ON
20/04/2009 03:00Z	Annealing Heater Redundant ON
20/04/2009 15:35Z	Heat Pipe Heater Main ON, All Antifreeze Heaters (1A; 2A; 1B; 2B) OFF
21/04/2009 03:35Z	Heat Pipe Heater Redundant ON
21/04/2009 12:00Z	Cold plate temperature reached 373K (100degC)

The Stirling compressors are working nominally. The Germanium detectors temperature was kept in the range 80K+/-1K until the start of annealing.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth during science observations was 108 packets/cycle and the average telemetry occupation was 99 packets/cycle. From revolution 796 onwards, SPI was in CONF mode with a TM allocation of 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 8.3.2.

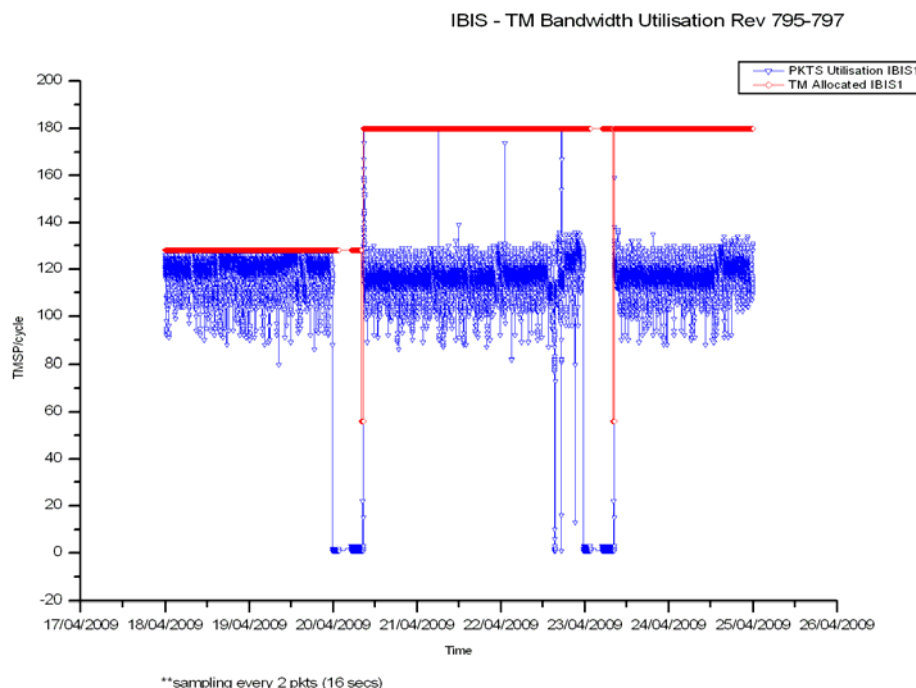
3.2.2 IBIS

The overall status of the unit is nominal.

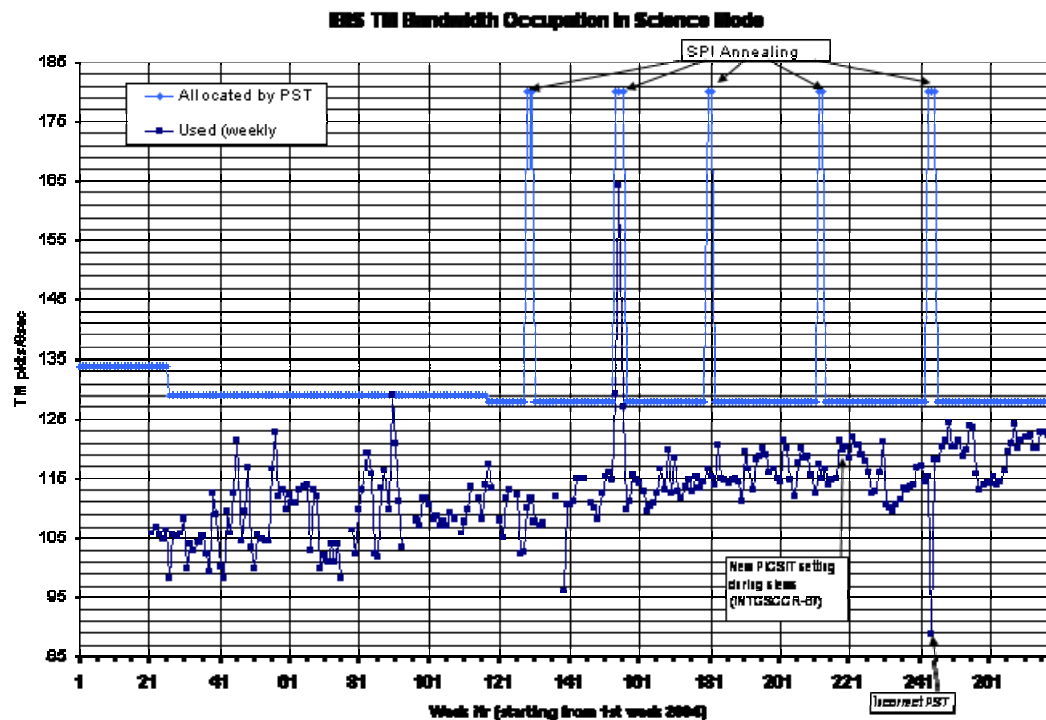
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 128 packets/cycle
- IBIS mean bandwidth utilisation in science mode: 117.62 packets/cycle (down 4.49 on previous week)
- Percentage of TM cycles for which bandwidth usage was ≥ 128 packets/cycle: 3.47%

The plot below shows the IBIS TM utilisation during the reporting 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 began the week operating in Data Taking mode with a TM allocation of 8 packets/cycle. From Revolution 796 onward, JEM-X2 was re-activated and then also operated in Data Taking mode, with the TM allocation set to 15 packets/cycle for both instruments.

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. At the beginning of the week, OMC was operated in Science Normal mode during science observations, with a TM allocation of 5 packets per cycle, during the SPI annealing from revolution 796 onward, the TM allocation was increased to 9 packets/cycle.

During this reporting period, all of the 167 planned science pointings were executed nominally.

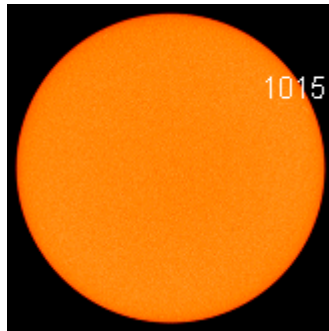
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. The sun was blank at the beginning of the week, late on the 21st April, a small new spot appeared, which then disappeared by the 23rd. 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. The overall performance was over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. No slews were missed from TL, during the observation period. During the reporting period one restart of the IFRD and ISDS tasks on the isdsb machine was required. The reason is not known.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. On DoY 108 18/04/2009 at 01:38z a G/S drop VC0/VC7 from REDU was reported, and on DoY 114 24/04/2009 at 01:08z bad frames from REDU were reported. There was no impact.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 801 to 804.

The PSFs for revolutions 799 and 800 have been updated.

The planning for revolutions 798 was updated to correct settings during the OMC FF observation while 799 had to be re-planned due to the new PSF. New observations have been planned for revolution 800.

New TSFs have been received for revolutions 797 and 798.

2. Observation status

ECS files have been received and processed up to revolution 787.

3. ISOC Science Data Archive

ISDA 2.9 has been released including an updated GINGEST and an improved support for heavy Grid processing.

4. ISOC system

Work on V22 is ongoing.

5. Problems

No new problems.

4.3.2 ISDC

Status of ISDC observation processing on 24/04/2009:

- Latest Standard Analysis completed: observation 06200220001 (Eta Carinae, Revolutions 781, 783 & 785) on 18/04/2009.
- Latest products archived: observation 06200220001 (Eta Carinae, Revolutions 781, 783 & 785) on 20/04/2009.
- Latest observation products sent to the observer: observation 06200220001 (Eta Carinae, Revolutions 781, 783 & 785) on 22/04/2009.

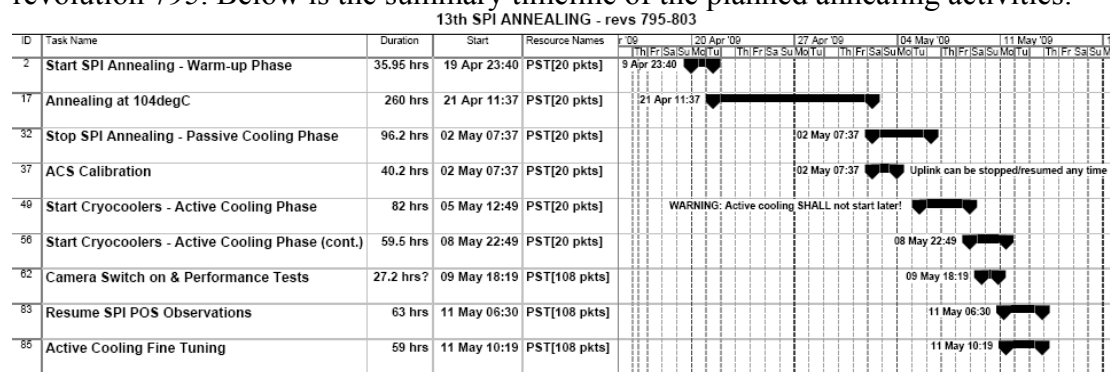
5 Special Events

6 Anomalies

No anomaly reports were entered into the ARTS system this week.

7 Future Milestones

The 13th annealing operations started on 19th April at radiation belt entry of revolution 795. Below is the summary timeline of the planned annealing activities:



8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 795

The observations in revolution 795 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 the Galactic Centre (RA 17:45:40.03, DEC -29:00:28.1), lasting ~18.4 hours, finally a Galactic disk scan was performed for ~33.7 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.

Revolution 796

The observations in revolution 796 began with a raster dither of 47 Tuc and SMC (RA 00:53:55.20, DEC -72:26:42.0), lasting ~35.8 hours. They continued with a raster dither of PKS B2149-307 (RA 21:51:55.52, DEC -30:27:53.7), lasting ~14.8 hours. This was followed by a hexagonal dither of the Gamma Ray Source 1915+105 (RA 21:51:55.52, DEC -30:27:53.7), lasting ~5.6 hours, until the end of the revolution.

Revolution 797

The observations in revolution 797 began with a raster dither of 47 Tuc and SMC (RA 00:53:55.20, DEC -72:26:42.0), lasting ~29.0 hours. This was followed by a hexagonal dither of 4U 1907+09 (RA 19:09:37.90, DEC +09:49:49.0), lasting ~25.0 hours. This was followed by a raster dither of PKS B2149-307 (RA 21:51:55.52, DEC -30:27:53.7), lasting ~2.8 hours, until the end of the revolution.

Throughout these observations in revolutions 796 & 797 all instruments were in their nominal science modes, except SPI, which was being annealed. The TM allocation was IBIS 180; SPI 30; JEM-X1 15; JEM-X2 15; OMC 9.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2009-04-03T16:35:24.000Z	135.0003	F	Automatic TM processing.
2009-04-05T07:36:32.000Z	134.9860	F	Automatic TM processing.
2009-04-06T16:27:24.000Z	134.9587	F	Automatic TM processing.
2009-04-08T07:21:05.000Z	134.9442	F	Automatic TM processing.
2009-04-09T16:28:44.000Z	134.9354	F	Automatic TM processing.
2009-04-11T06:54:49.000Z	134.9259	F	Automatic TM processing.
2009-04-11T16:09:54.000Z	134.8928	F	Automatic TM processing.
2009-04-14T01:46:16.000Z	134.8664	F	Automatic TM processing.
2009-04-14T06:13:28.000Z	134.8509	F	Automatic TM processing.
2009-04-15T15:30:20.000Z	134.8203	F	Automatic TM processing.

2009-04-17T06:03:04.000Z	134.8038	F	Automatic TM processing.
2009-04-18T08:04:35.000Z	134.7550	F	Automatic TM processing.
2009-04-20T05:53:04.000Z	134.7370	F	Automatic TM processing.
2009-04-21T15:14:04.000Z	134.7022	F	Automatic TM processing.
2009-04-23T05:40:48.000Z	134.6811	F	Automatic TM processing.

This report was generated Fri Apr 24 08:00:23 GMT 2009

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, 18/04/2009 – 24/04/2009

The AOCS operations were executed from the Automatic Timeline.

During this period, 94 Open Loop Slews, 86 Closed Loop Slews and 5 Momentum Biases were executed (as reported by ACC OEM).

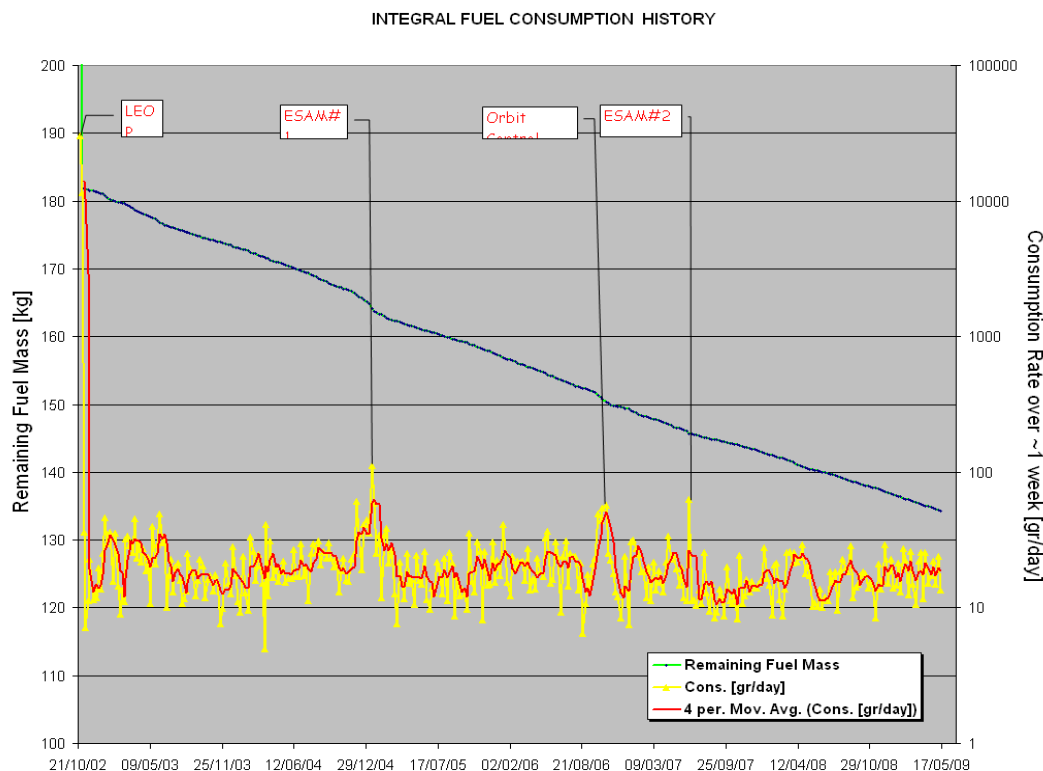
No slews were missed from TL, during the observation period.

Orbit Control

No update.

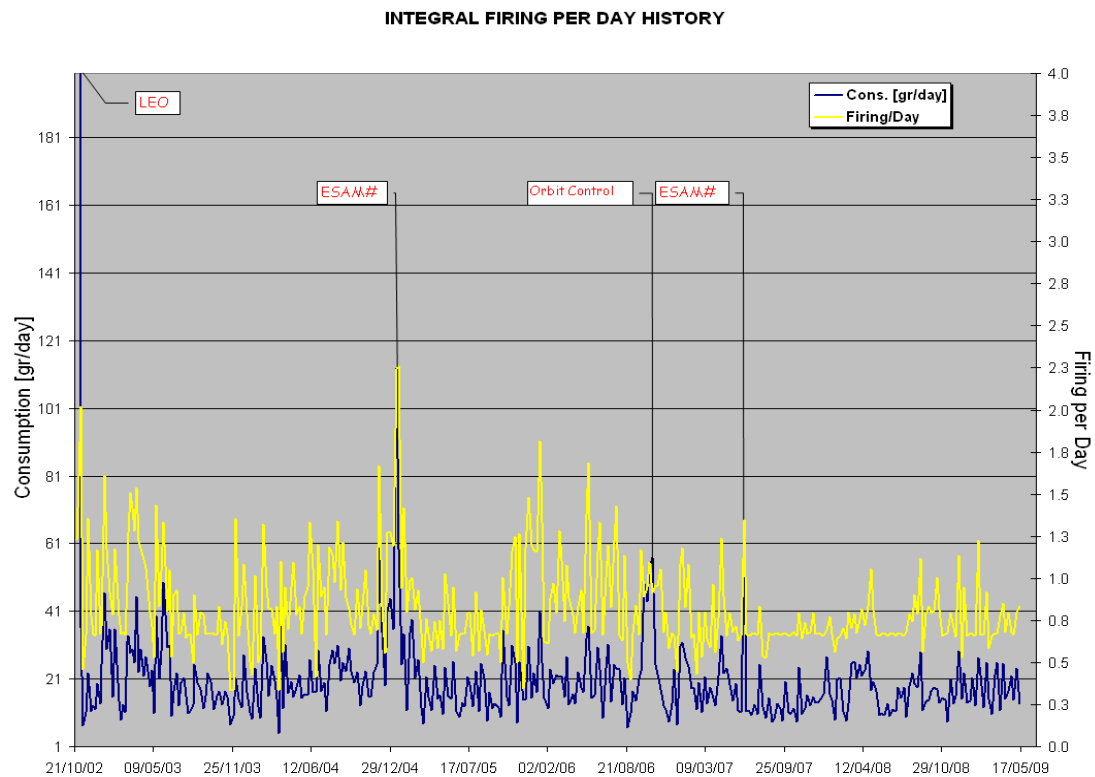
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 24/04/2009 is reported in the plot below.



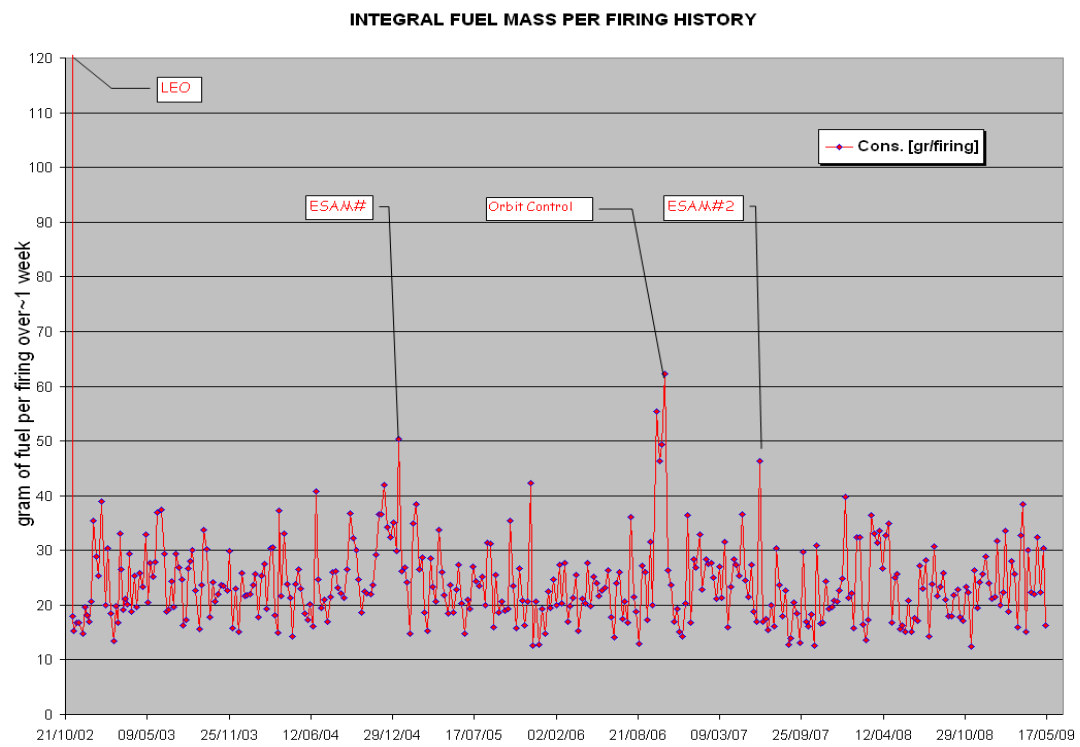
The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The firing per day over the period between 01/11/2002 and 24/04/2009 is reported in the plot below.



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

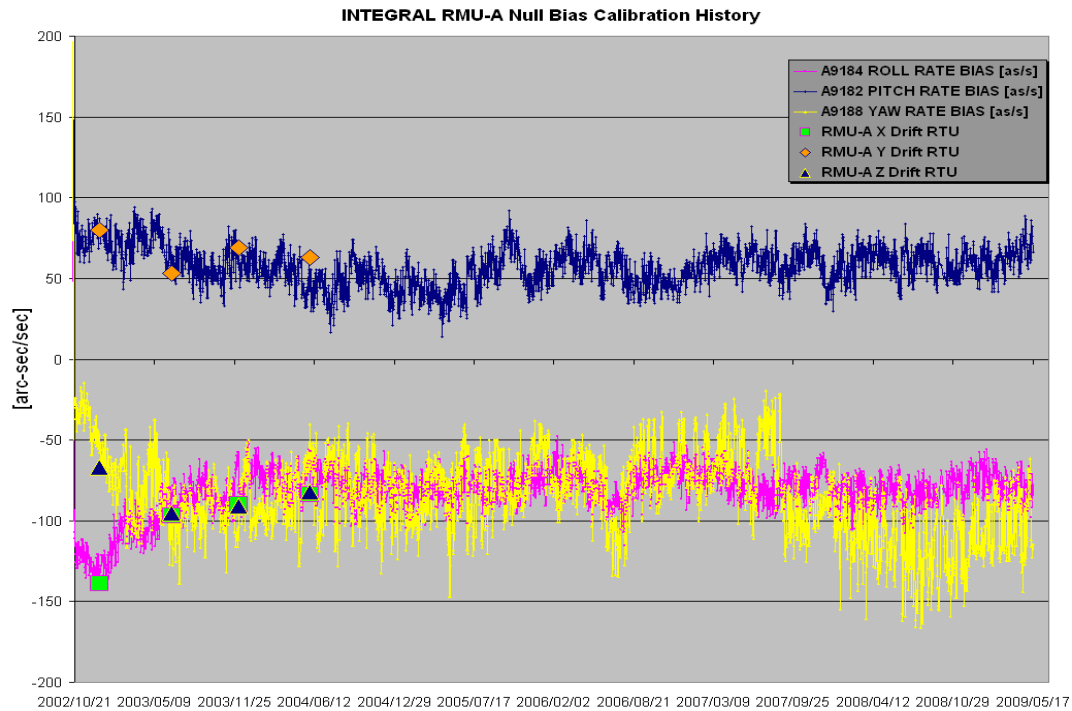
The fuel per firing over the period between 01/11/2002 and 24/04/2009 is shown in the plot below.



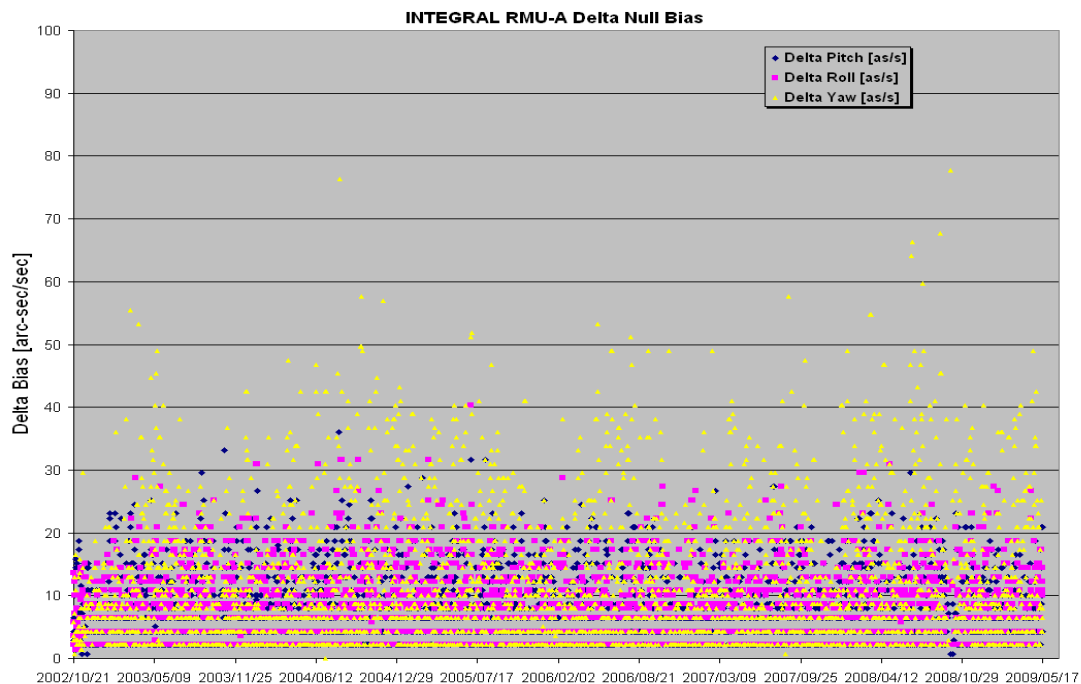
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 24/04/2009 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 24/04/2009 is reported in the plot below.



18/04/2009 (Day of Year 108, Revolution 795)

Nothing to report.

19/04/2009 (Day of Year 109, Revolution 795)

Nothing to report.

20/04/2009 (Day of Year 110, Revolution 795-796)

Nothing to report.

21/04/2009 (Day of Year 111, Revolution 796)

Nothing to report.

22/04/2009 (Day of Year 112, Revolution 796)

Nothing to report.

23/04/2009 (Day of Year 113, Revolution 796-797)

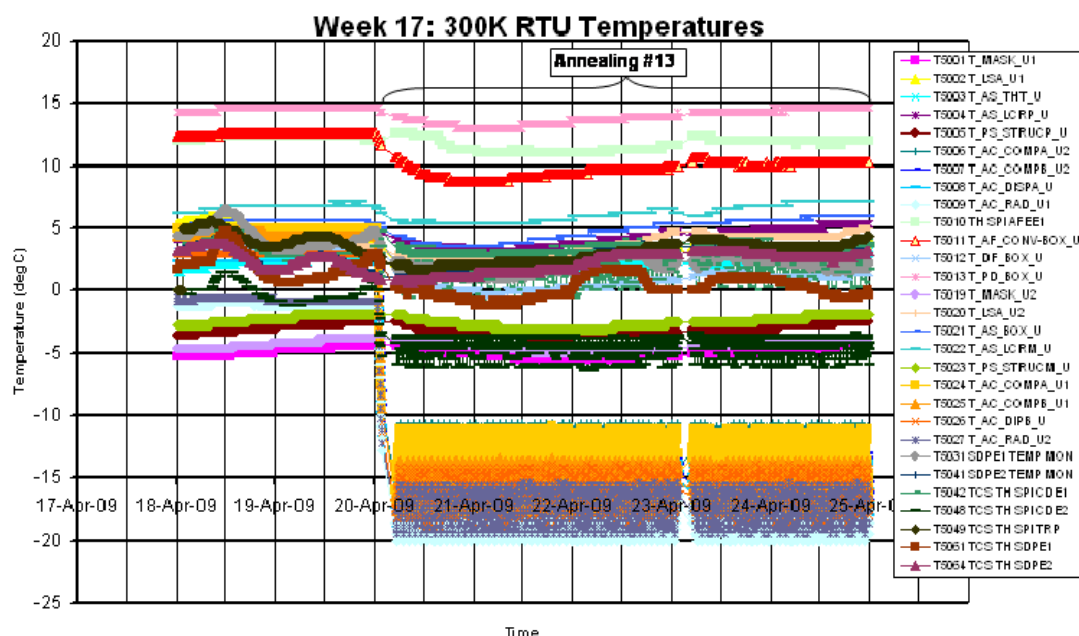
Nothing to report.

24/04/2009 (Day of Year 114, Revolution 797)

Nothing to report.

8.3.2 SPI Operations

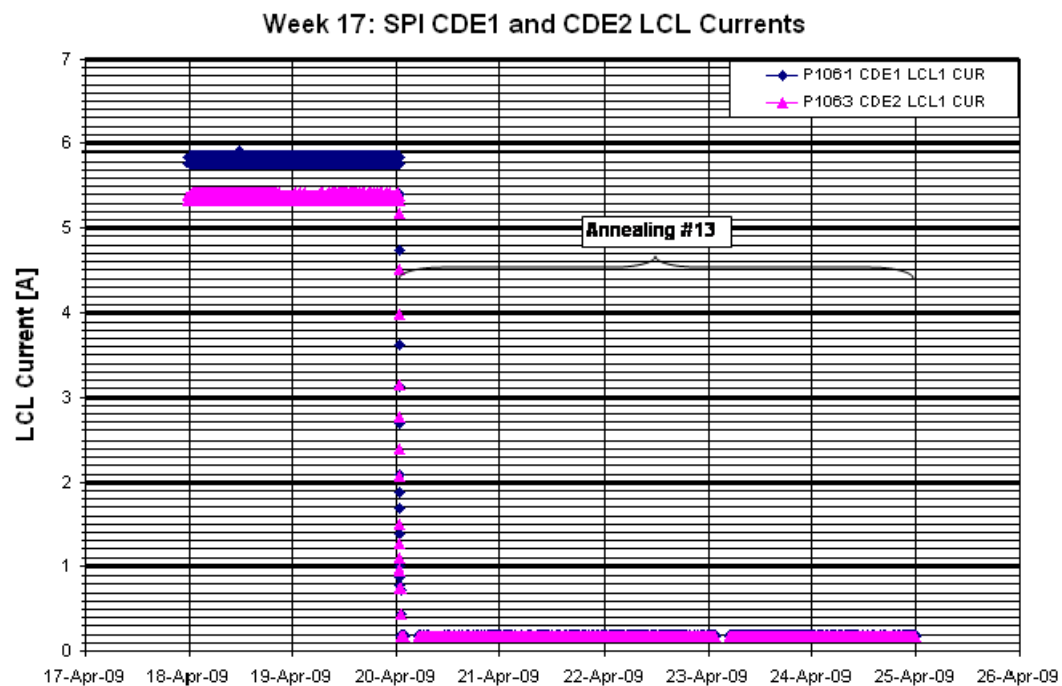
Unit Temperatures: All the equipment temperatures are inside the operational limits. The following plot shows their evolution during the reporting period.



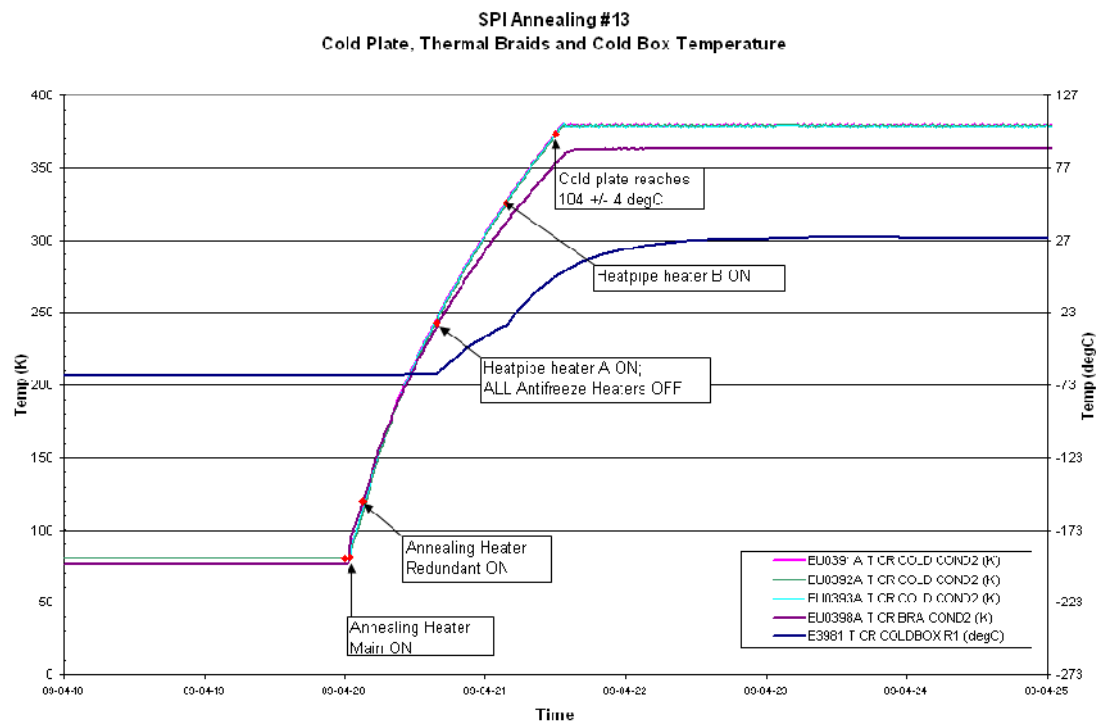
Stirling Compressors and Cryostat: The performance of the compressors is nominal.

The cold plate temperature was maintained in the range 80K +/-1K, with the stroke of all four compressors set to 43, until the start of annealing.

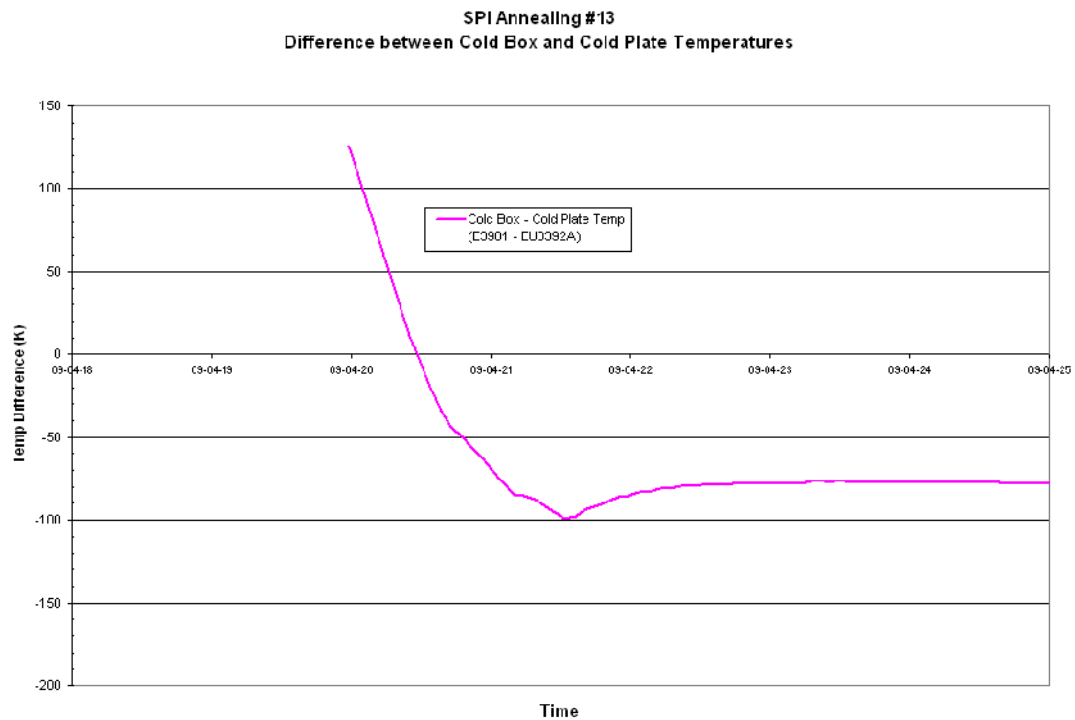
The following plot shows the evolution of the CDE LCL currents during the reporting period.



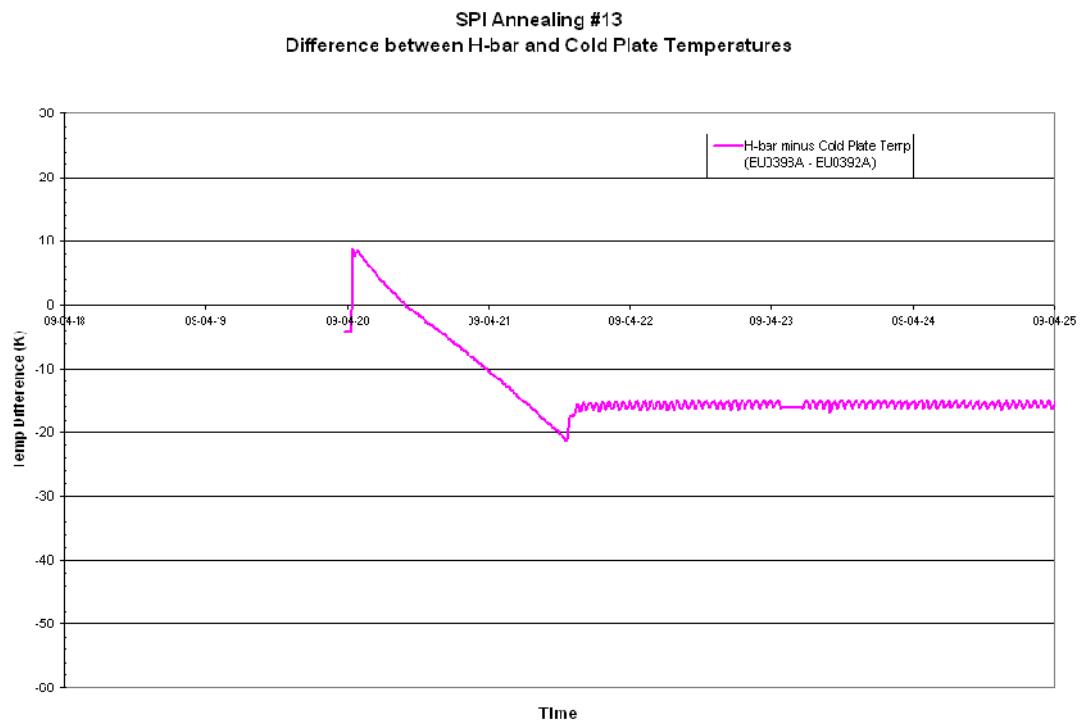
The following plot shows the evolution of the Cold Plate, thermal braids and Cold Box temperatures during the reporting period:



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:

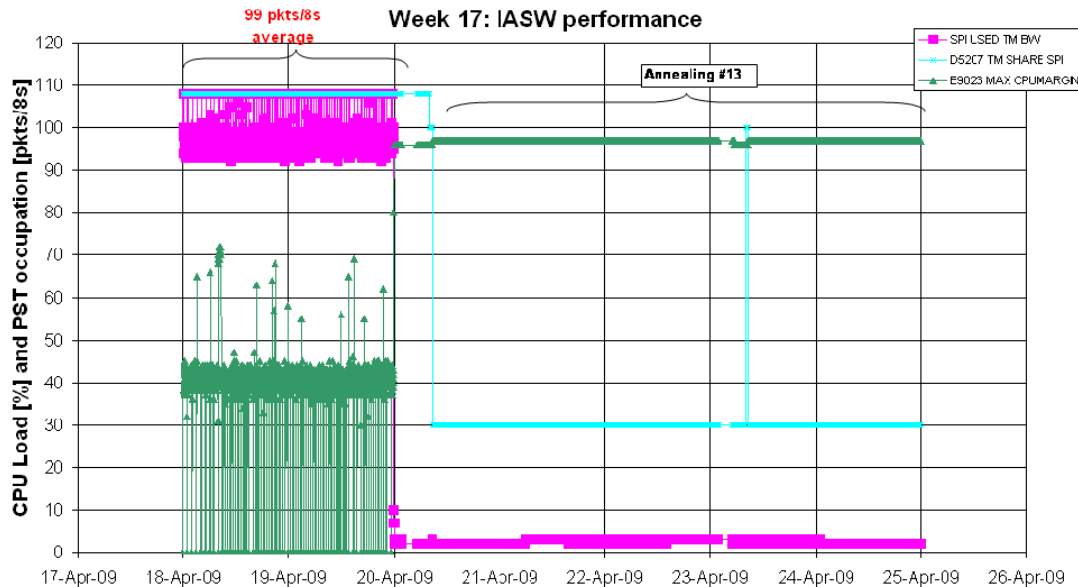


DPE & IASW: The DPE health and IASW performance are nominal.

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 99 packets/cycle during science observations when the TM allocation was 108

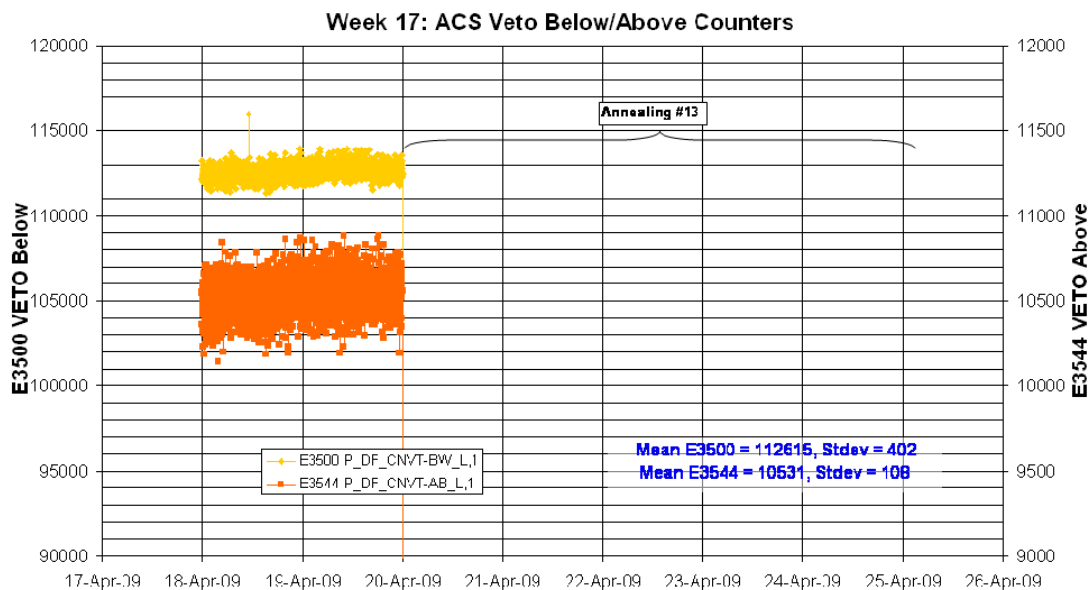
packets/cycle. From revolution 796 onwards, SPI was in CONF mode with a TM allocation of 30 packets/cycle due to the annealing.

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 13th annealing operations, started on 19/04/2009, the ACS High Voltages were set to the minimum voltage (~980V) and the ACS was in CONF mode.

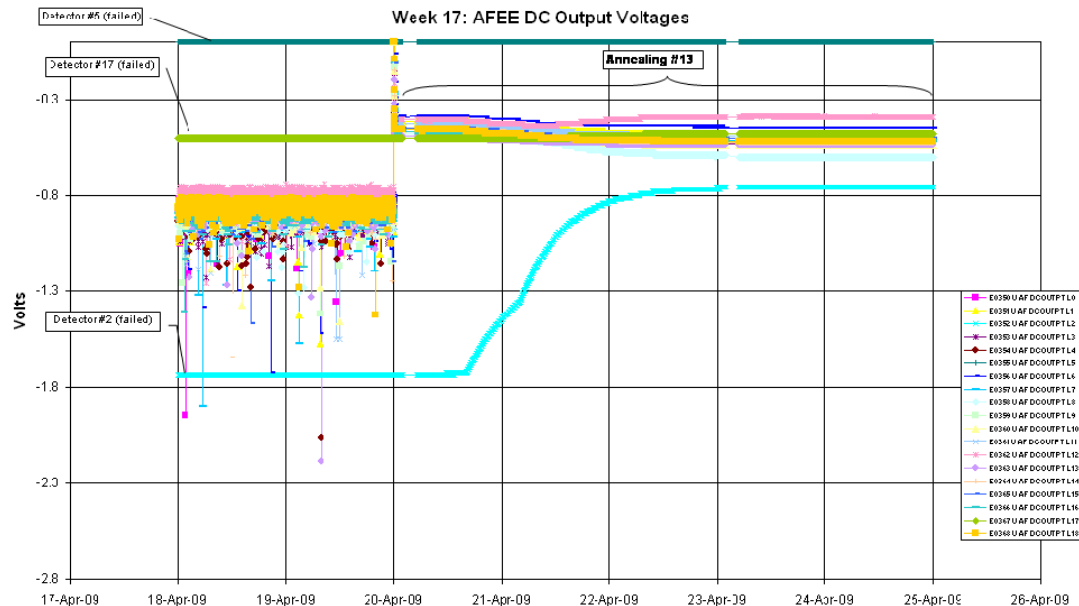
The following plot shows the ACS overall count rate evolution during the reporting period:



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

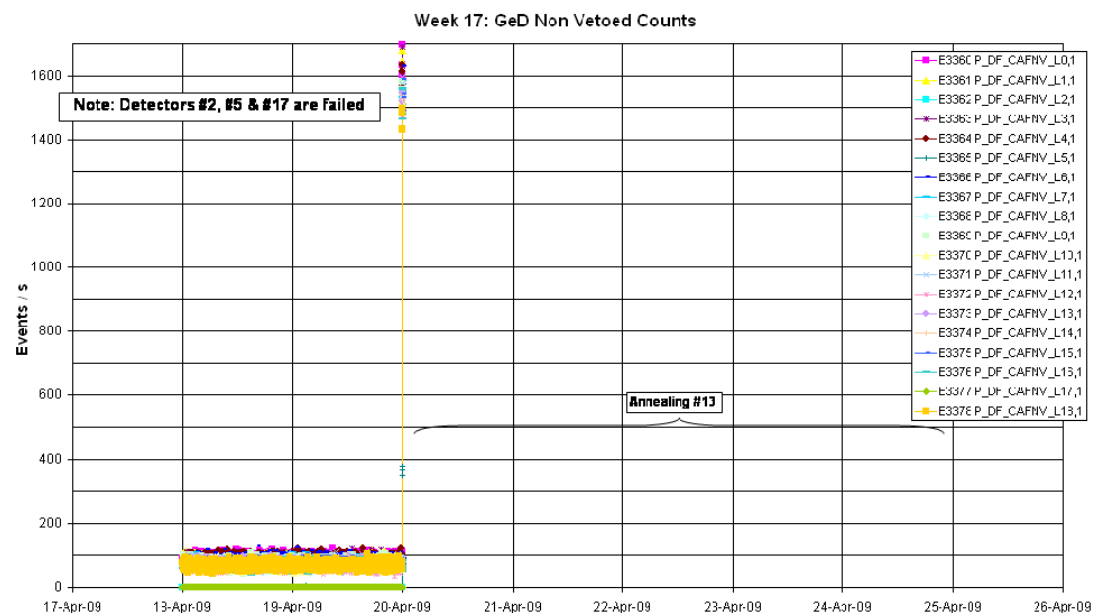
detector #5 is failed since 19/02/2009. The HV of the failed detectors are nominally set to 0.5kV.

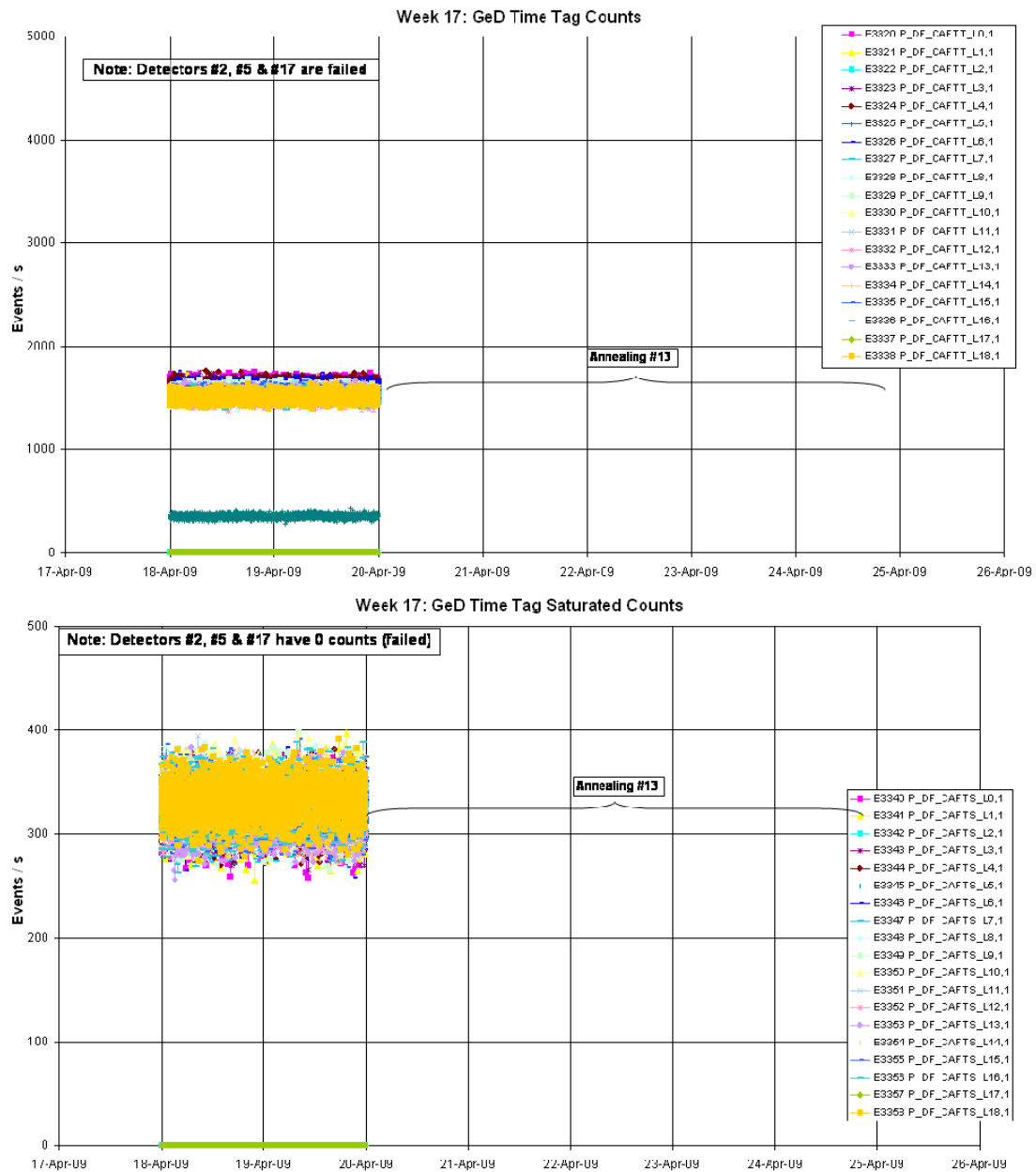
For the 13th annealing operations, started on 19/04/2009, all detector HVPSs were switched off and only the LVPSs are left on and the AFEE was in CONF mode.



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.

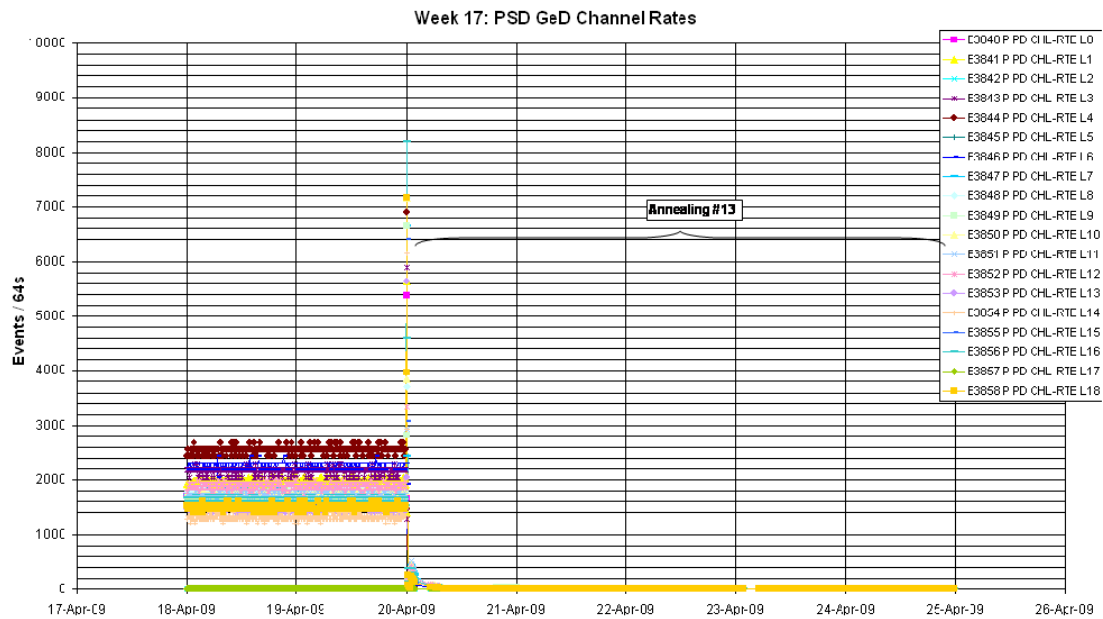
For the 13th annealing operations, started on 19/04/2009, the DFEE was in CONF mode.





PSD: The health of the unit is nominal. The following plot shows the PSD channel rates during the reporting period. The failed detectors (GeD#2, GeD#5 and GeD#17) are disabled in the PSD.

For the 13th annealing operations, started on 19/04/2009, the PSD was in CONF mode.



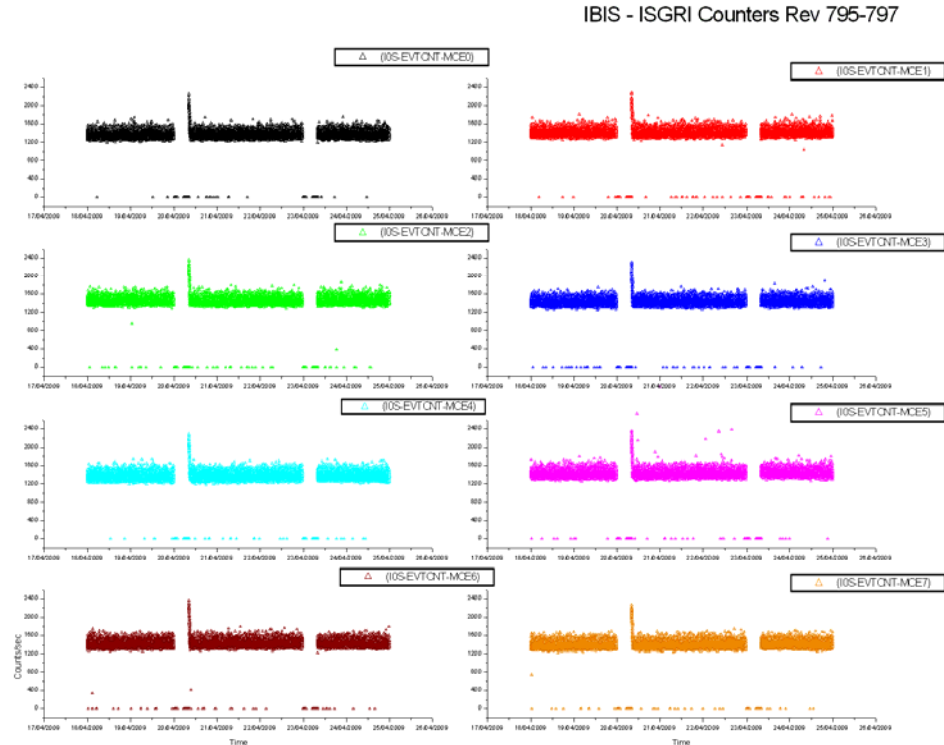
Event Log:

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

8.3.3 IBIS Operations

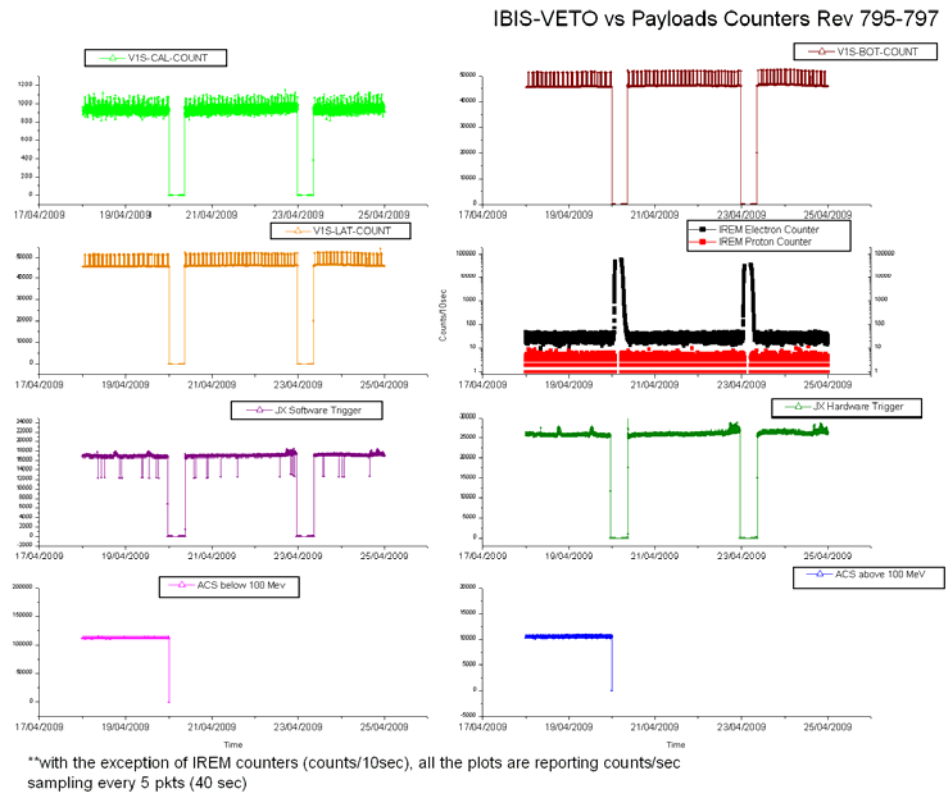
IBIS Event Counters Plots

ISGRI Counters:



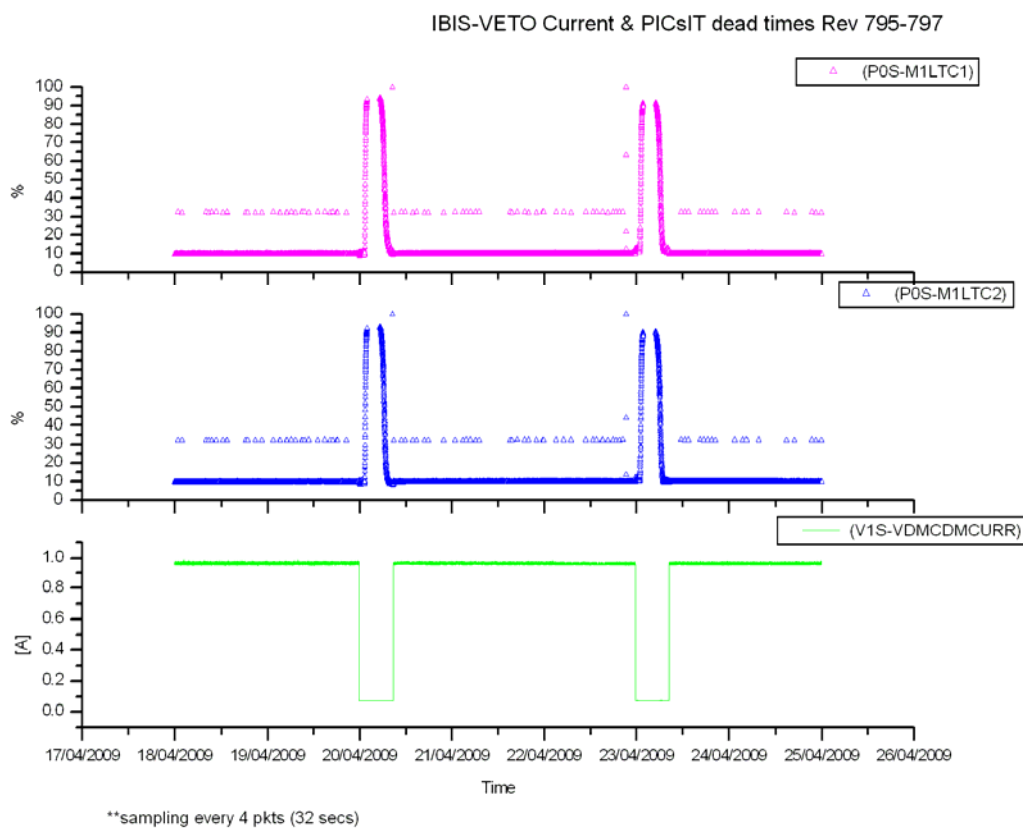
**sampling every 4 pkts (32 secs)

VETO vs Payload Counters:



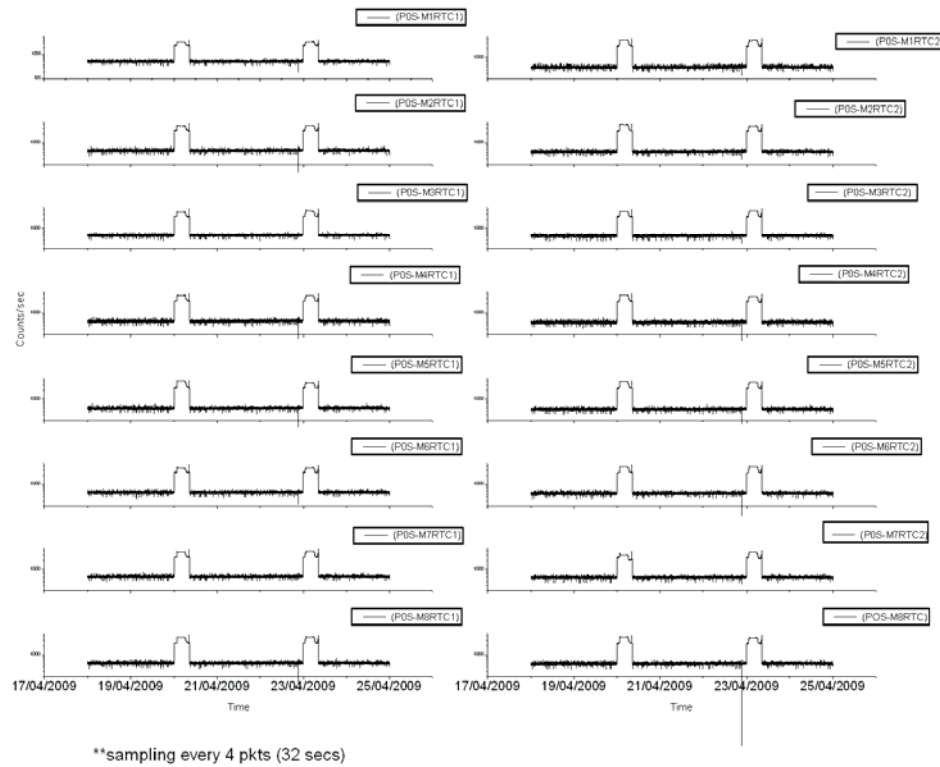
The background radiation level was low during the week.

VETO Current:



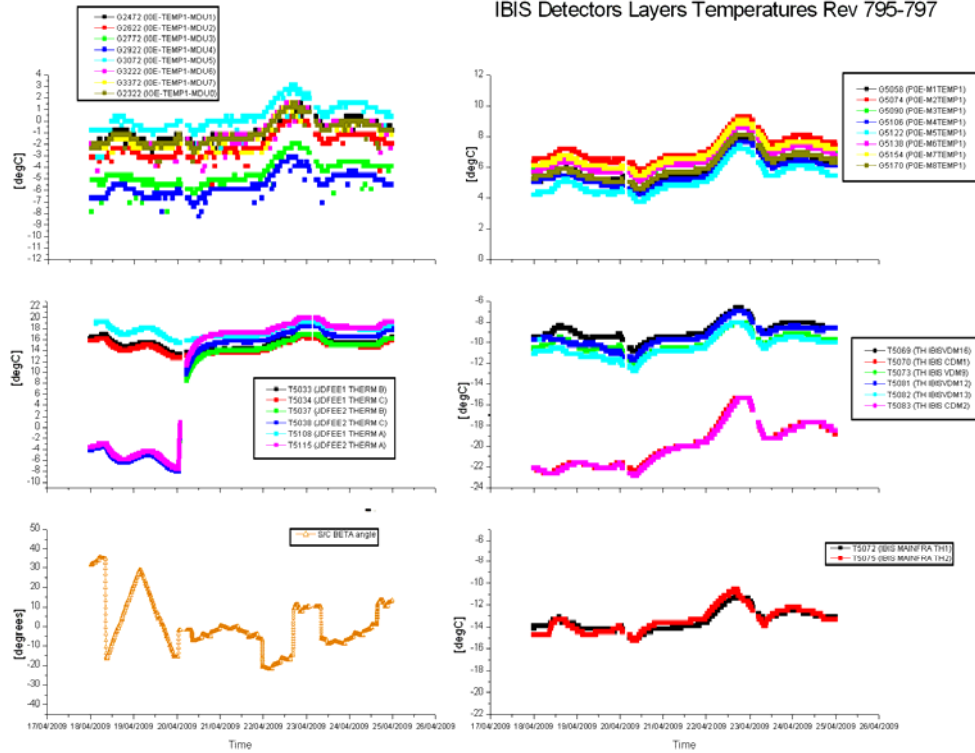
PICsIT Counters:

IBIS - PICsIT Counters Rev 795-797



IBIS Detectors Layers Temperatures:

IBIS Detectors Layers Temperatures Rev 795-797



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.

TM parameter G6061 went OOL Warning Low several times during the week. This is the VETO calibration counter. As in each case it returned within limits of its own accord at the next TM cycle, no action was taken.

2009-04-18 (DOY 108, Rev 795) to 2009-04-19 (DOY 109, Rev 795)

IBIS operations executed nominally.

2009-04-20 (DOY 110, Rev 795-796)

During the execution of the ED GEISCL03 prior to radiation belt exit of revolution 796, the TM parameter family G2013 (number of events triggering the MCEi per second) went briefly OOL Warning High. As they returned within limits of their own accord, no action was taken.

At 11:44:41Z TM parameter G2070 went OOL, indicating an overflow of the noisy pixel address buffer in MCE5. As it returned within limits of its own accord at 11:44:57Z, no action was taken.

2009-04-21 (DOY 111, Rev 796)

At 12:02:41Z TM parameter G2070 went OOL, indicating an overflow of the noisy pixel address buffer in MCE5. As it returned within limits of its own accord at 12:02:57Z, no action was taken.

2009-04-22 (DOY 112, Rev 796)

At 14:17Z, 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:

- 15:21:29Z FCP_IBIS1_0312

- 15:43:13Z TC G0129 uplinked to return IBIS to Science Standard mode.

X7500 remained OOL following the recovery however it had returned within limits by the start of the next pointing at 16:54Z. Nevertheless, the recovery procedure was executed again as follows:

- 17:23:51Z FCP_IBIS1_0312

- 17:25:08Z TC G0129 uplinked to return IBIS to Science Standard mode.

IBIS operations continued nominally.

At 21:17:26Z the TM parameters families G5068 and G5072 failed status consistency check (value = TRUE). These are the PDM semi-module FIFO error flags. At 21:17:53Z the TM parameter families G5002 and G5003 for the PDM semi-module counters started going OOL Low. As these were followed at 21:21:29Z 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.

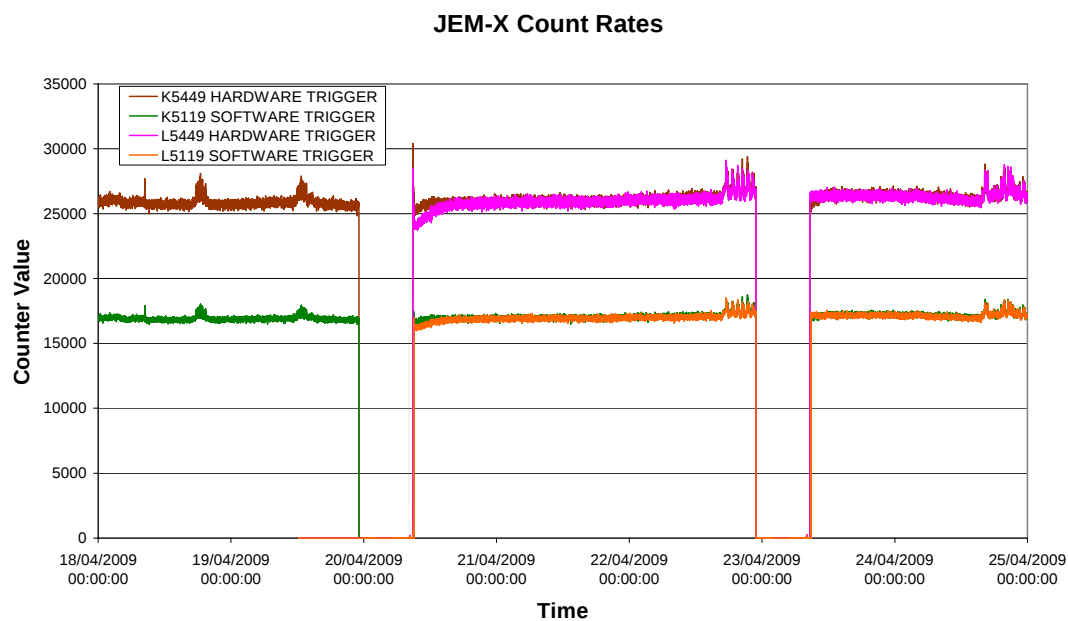
2009-04-23 (DOY 113, Rev 796-797) to 2009-04-24 (DOY 114, Rev 797)

IBIS operations executed nominally.

8.3.4 JEM-X Operations

JEM-X Count Rates

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



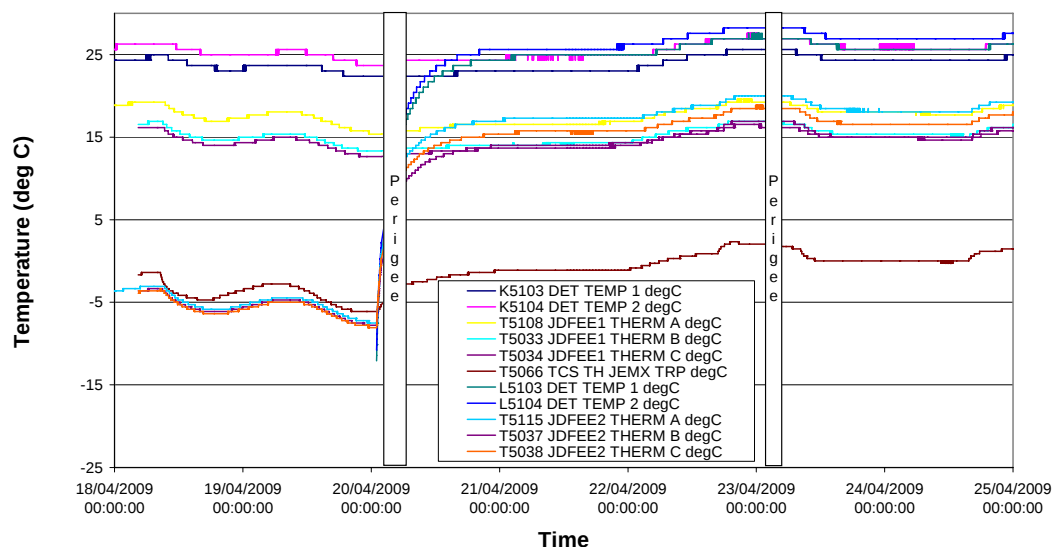
JEM-X Temperatures

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 Detector & DFEE Temperatures



JEM-X Daily Report

2009-04-18 (DoY 108, Rev 795)

JEM-X 1 operations executed nominally.

2009-04-19 (DoY 109, Rev 795)

At 23:51, operations began to activate JEMX-2 prior to the crab calibration.

First, the ED DEBWHI00 to assign bandwidth to JEM-X2 was uplinked

2009-04-20 (DoY 110, Rev 795-796)

The Re-activation of JEMX-2 continued with the following procedures:

FCP_JEM2_0010 JEMX2 DPE AND CSSW ACTIVATION
 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_0060 JEMX2 UPDATE ENERGY LINEARISATION TABLE
 FCP_JEM2_0040 JEMX2 TRANSITION TO SAFE

The operations were completed by 01:30.

The rest of the activation was executed from the Timeline, with both units entering Data-taking at the nominal time.

There was a string of JEMX-2 out of limits associated with the switch-on, but these were normal, and disappeared after the unit had warmed up.

2009-04-21 (DoY 111, Rev 796)

JEM-X 1 operations executed nominally.

2009-04-22 (DoY 112, Rev 796)

At 11:46:41 TC K0008 completed briefly with status 'Superceded' before being 'Passed'

2009-04-23 (DoY 113, Rev 796-697)

JEM-X 1 operations executed nominally.

2009-04-24 (DoY 114, Rev 697)

JEM-X 1 operations executed nominally.

8.3.5 OMC Operations

2009-04-18 (DoY 108, Rev 795) to 2009-04-24 (DoY 114, Rev 797)

Nothing to report.

During the week, there were 3 occurrences (on DoY 110 at 10:51:07, DoY 111 at 11:11:10 & DoY 111 at 20:01:36) of the OEM pair:

RealTime	5	ANOMALY	OMC CSSW INT ER	0	0	65535	PR	N	E	E
RealTime	7	EXCEPTION	OMC CONSTRAINT D	0	0	65535	PR	N	E	E

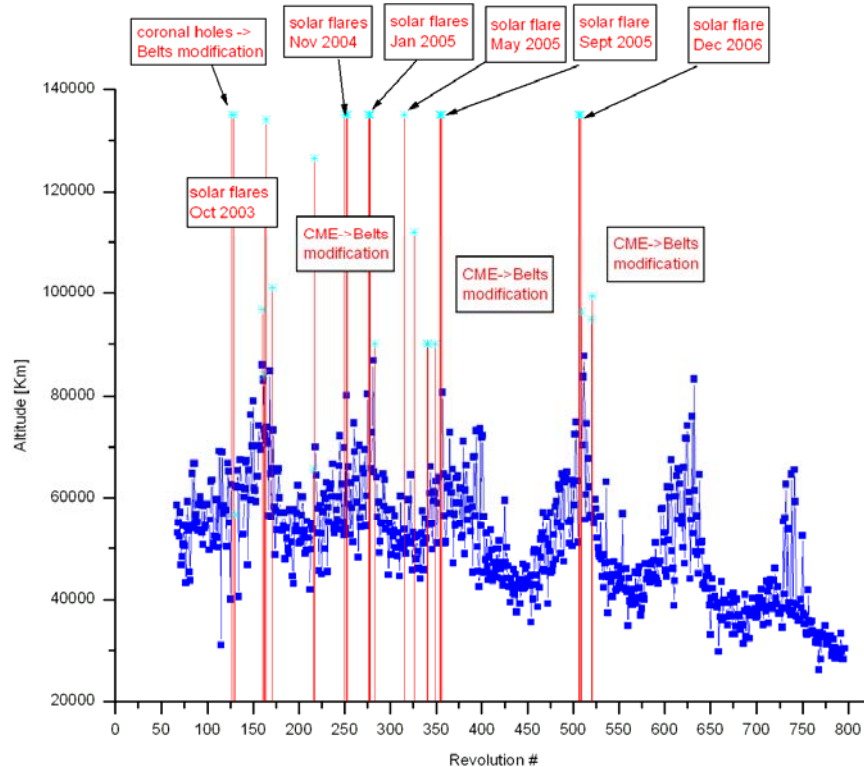
These occur, when OMC is pointing at a crowded area of the sky, and are harmless.

On DoY 109 at 23:53:07 and DoY 112 at 23:39:48 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

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]
795	RAD_ENTR R 2009-04-19T23:53:00Z	20/04/2009 01:18:26	28316.7	20-Apr-2009 00:47:56	33276.64
796	RAD_EXIT R 2009-04-20T08:31:28Z	20/04/2009 08:24:26	55936.6	20-Apr-2009 07:17:56	46566.65
796	RAD_ENTR R 2009-04-22T23:39:40Z	23/04/2009 00:53:30	30444.2	23-Apr-2009 00:32:33	33791.45
797	RAD_EXIT R 2009-04-23T08:18:09Z	23/04/2009 07:00:34	>>34187.8	23-Apr-2009 07:12:33	47665.17

Reference

High radiation

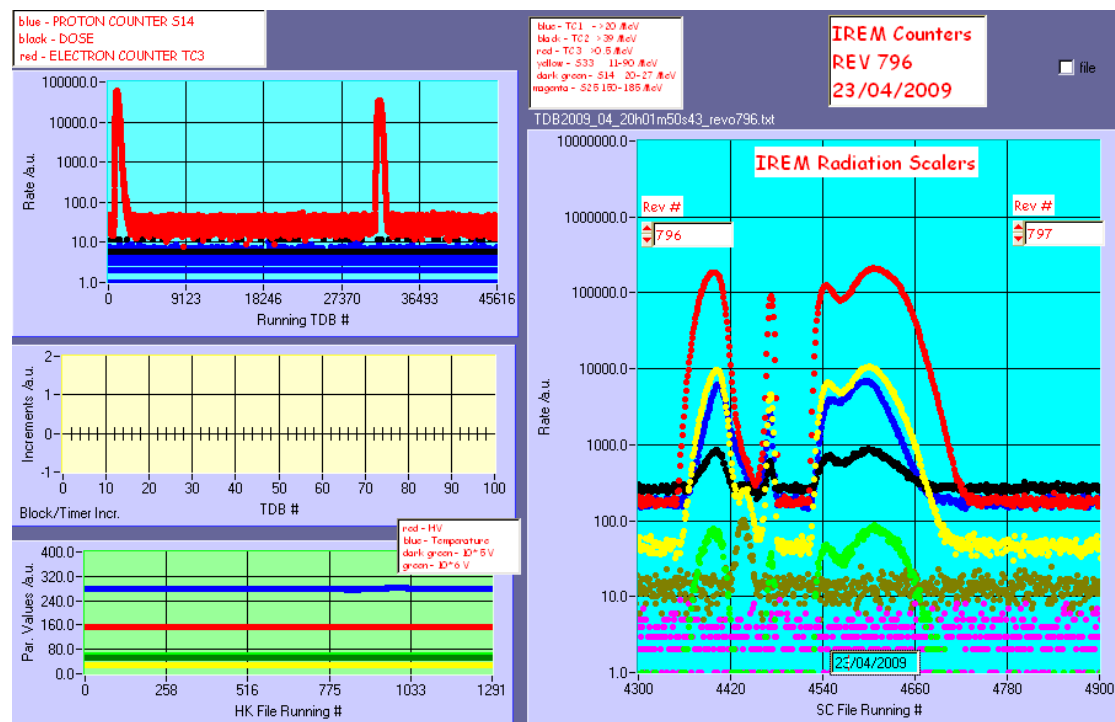
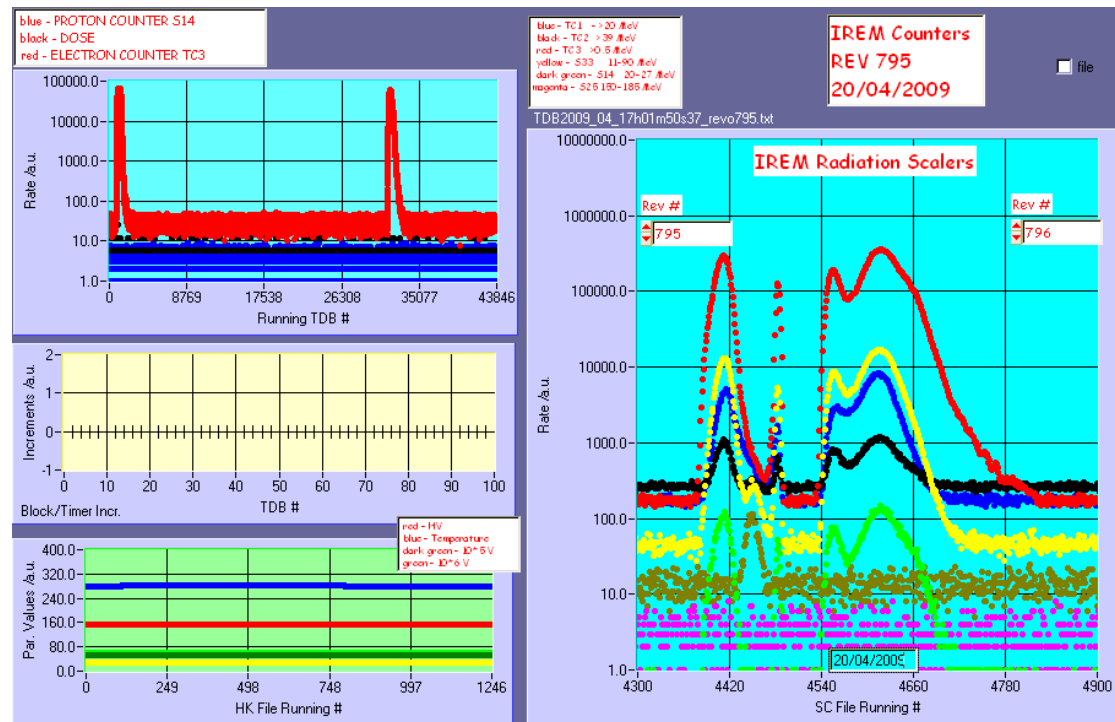
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

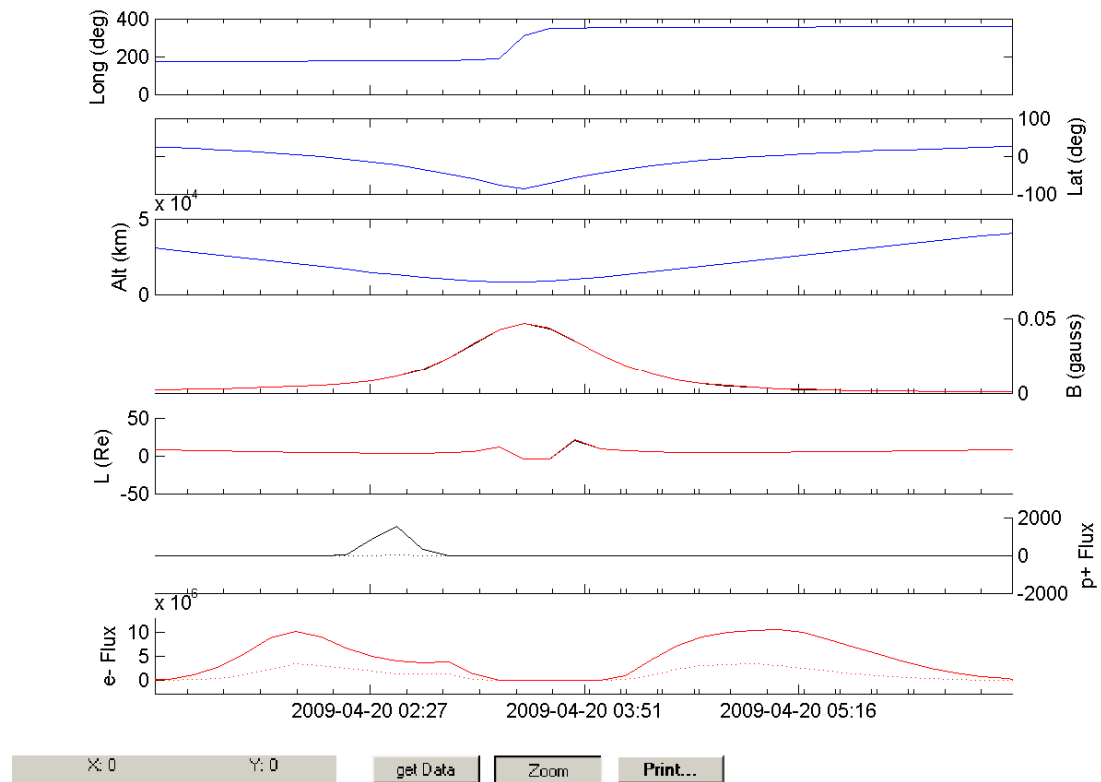
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

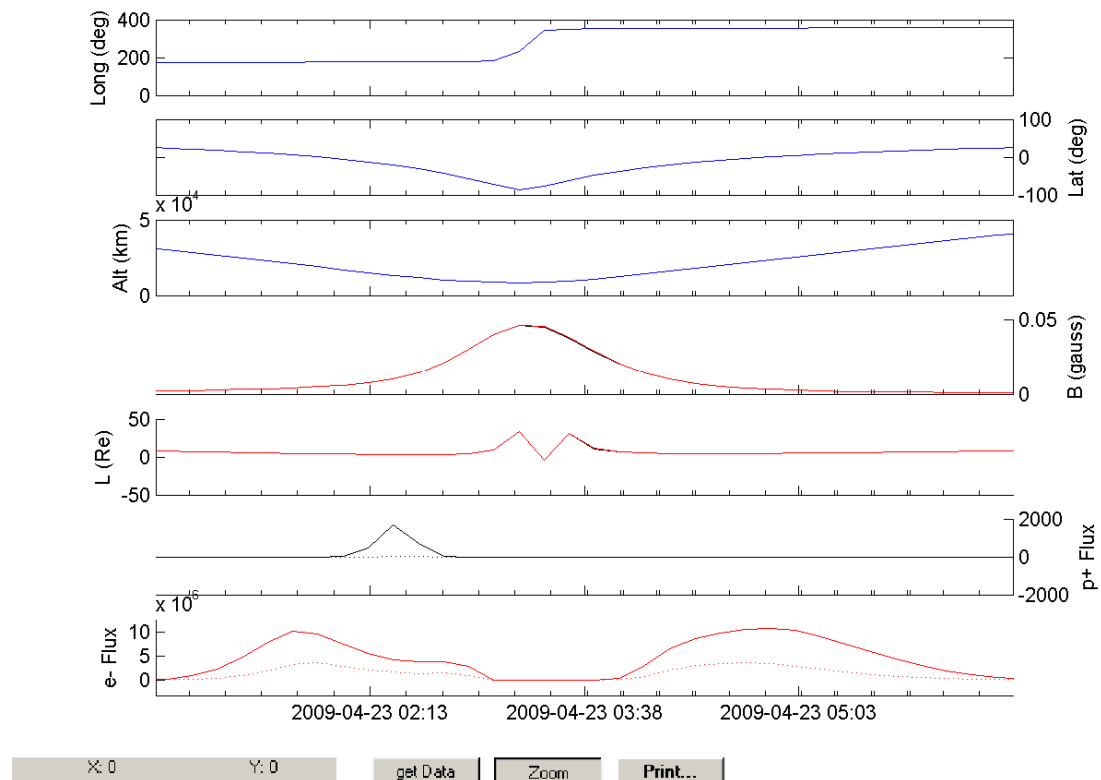


IREM Predicted Radiation Belt Passages

Rev 795



Rev 796



Radiation Assessment

Generated with SEIS Report and Analysis tool.

INTRODUCTION

This note summarises the space weather status over the observation period

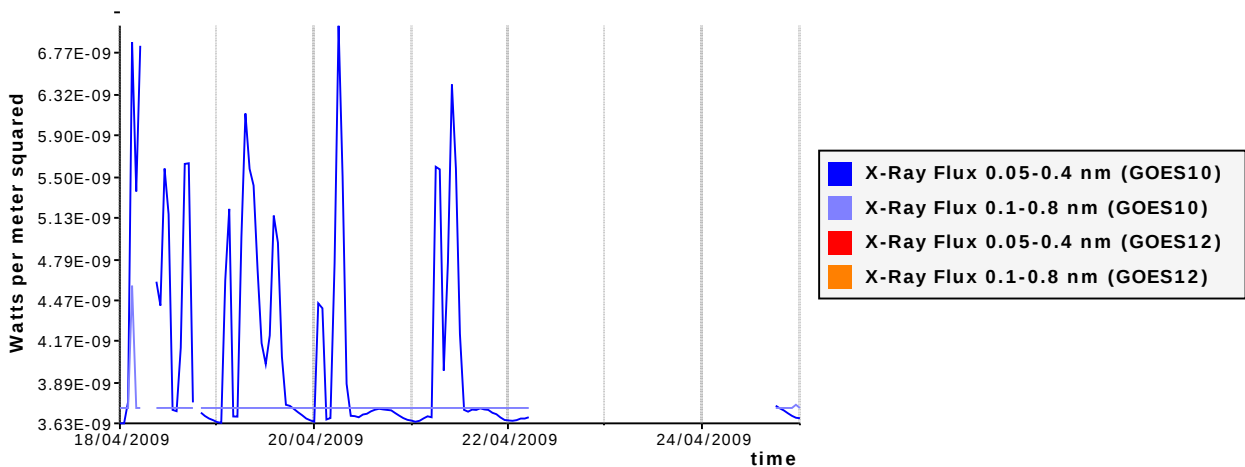
DAILY SUN

see in WR section 3.2.5

RADIATION FLUXES

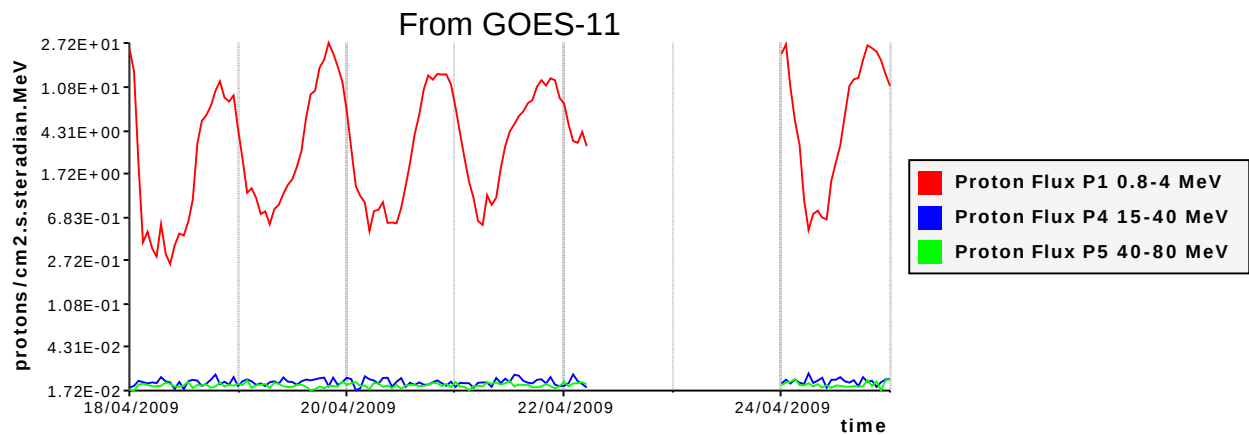
X-ray fluxes

X-ray fluxes for different energies are presented below as reported by GOES satellites. From $1\text{E-}5$ W/m^2 , they start featuring significant radiation activity corresponding to M-class solar flares from $1\text{E-}5$ to $1\text{E-}4$ W/m^2 , and to X-class solar flares from $1\text{E-}4$ and onwards.



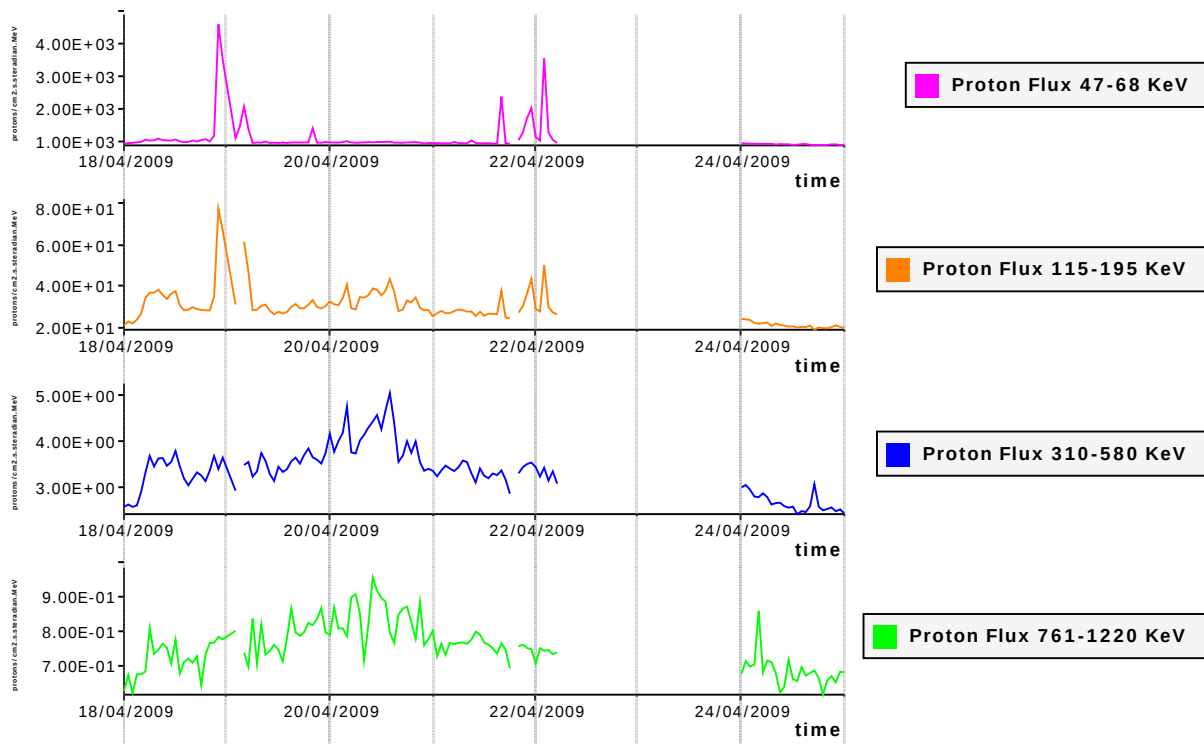
Proton fluxes (GOES-11)

Proton fluxes as measured by GOES satellites are presented in the following plot. Usually P1 oscillates between $1\text{E}+1$ and $1\text{E}+2$, while P2 and P3 evolve around $1\text{E-}2$.



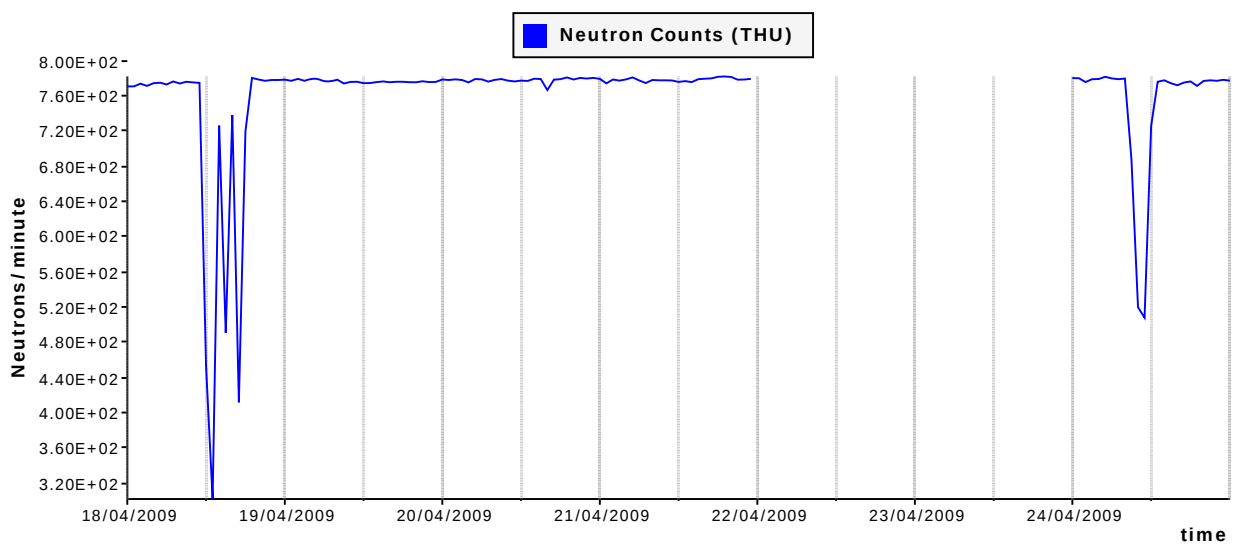
Proton fluxes (ACE)

Proton fluxes as measured by ACE satellite are presented in the following plot.



Neutron counts

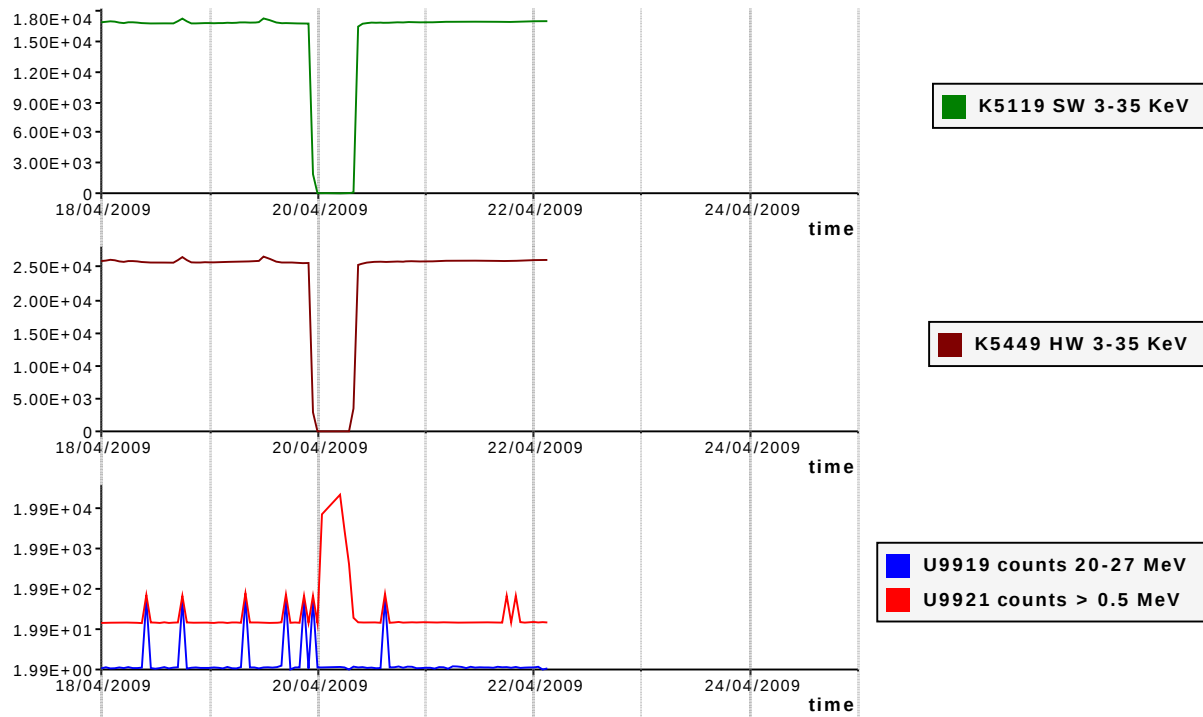
The neutron counts for the last 3 days are presented in the following plot. Nominally they remain stable around 7.2E+2.



IREM and JEM-X (INTEGRAL)

IREM proton and electron fluxes as well as JEM-X1 software and hardware triggers are presented in the following plots.

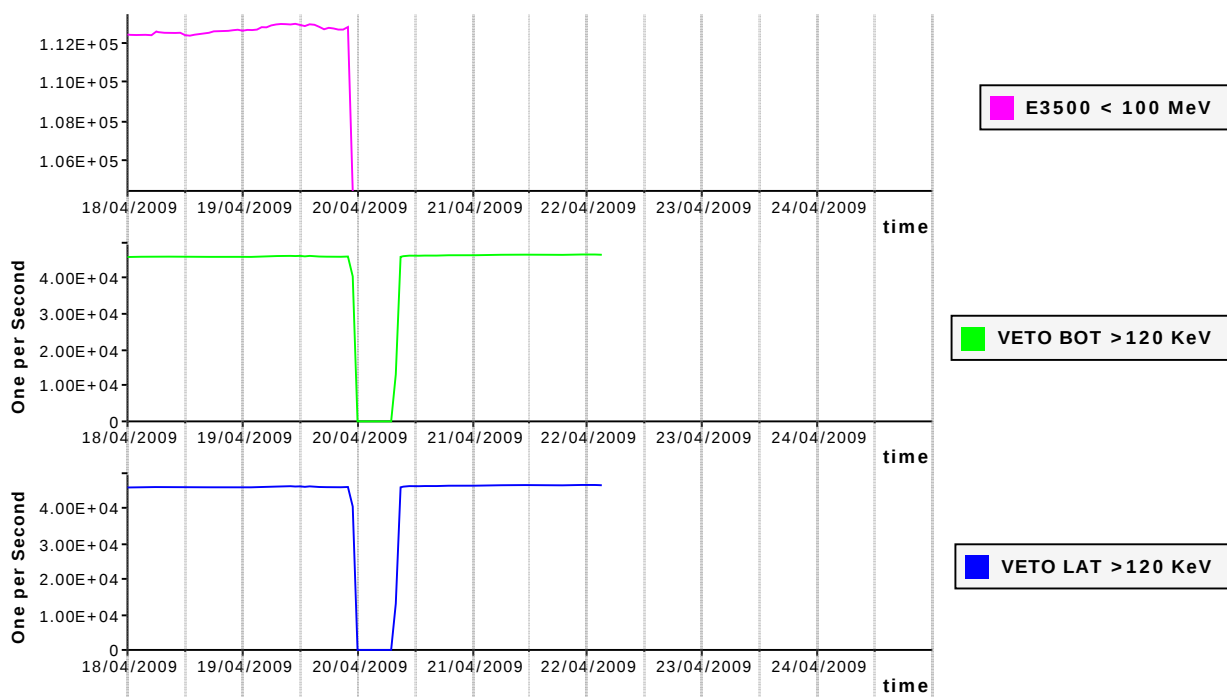
Nominal values are respectively about 1 and 18 for IREM counts, and, 13000 and 19000 for JEM-X ones.



SPI and IBIS (INTEGRAL)

SPI-ACS counters below 100MeV as well as IBIS-VETO bottom and lateral counters are presented in the following plots.

Nominal values are respectively about 90000 for SPI counts, and 36000 for IBIS ones.



SOLAR FLARES FORECAST

The probabilities of M and X-class solar flares during the last month are presented below. Chances of solar flare start to be meaningful from 15%.

