

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 298
Week 23
09.06.08
Routine Phase

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

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1 General

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

It addresses the activities from 31.05.08 until 06.06.08 (both dates inclusive) and covers the revolutions 688 and 689.

2 Summary of Activities

The operations were performed according to the planning inputs from ISOC combined with some manual commanding by MOC.

The targets of these revolutions consisted of two raster dithers of the North Ecliptic Pole (RA 18:00:00.00, DEC +66:33:39.0).

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.

Four slews were missed from TL, during the observation period due to problem on search and track process (star in slot #2 not found) and problem at DSS-27 station.

The fuel consumption over the period between 30/05/2008 and 05/06/2008 was 0.0759 Kg. The remaining propellant is in the order of 140.1970 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.

From the EPS point of view the eclipse passage was entirely nominal.

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

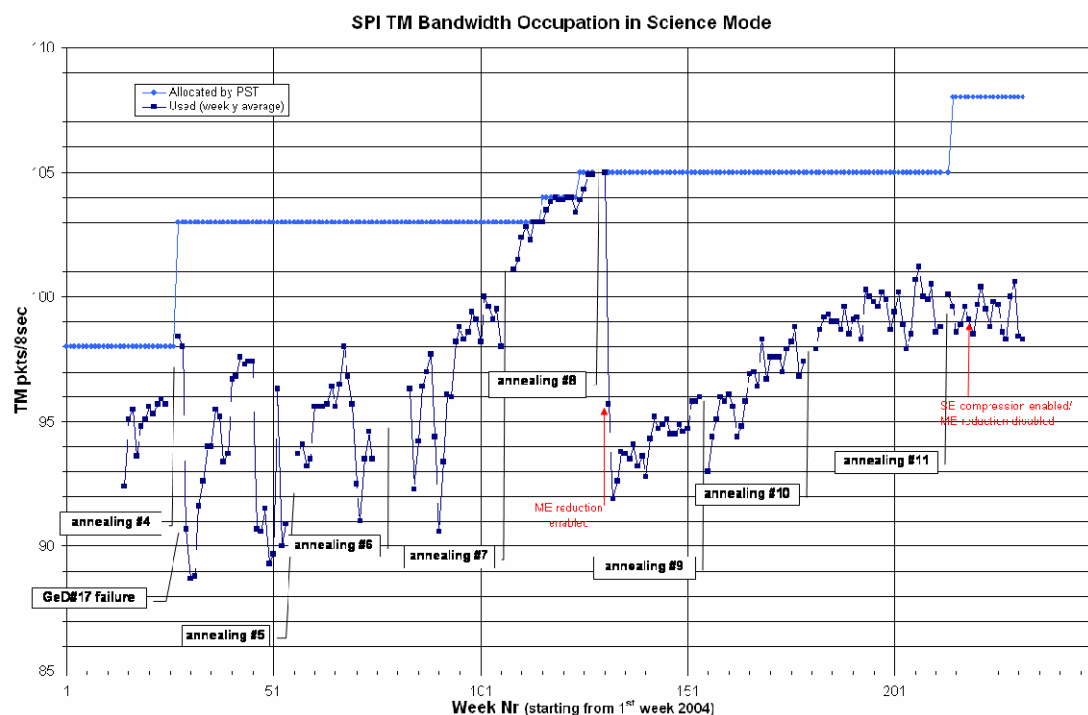
3.2.1 SPI

Following the 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 Stirling compressors are working nominally, maintaining the Germanium detectors at 80 +/-1K.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth in the science observation windows was 108 packets/cycle. The over-allocated PST with an additional 3 packets/cycle for SPI was used however the Broadcast Packet TM allocation was not updated. The average telemetry occupation in the science window was 98.3 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.

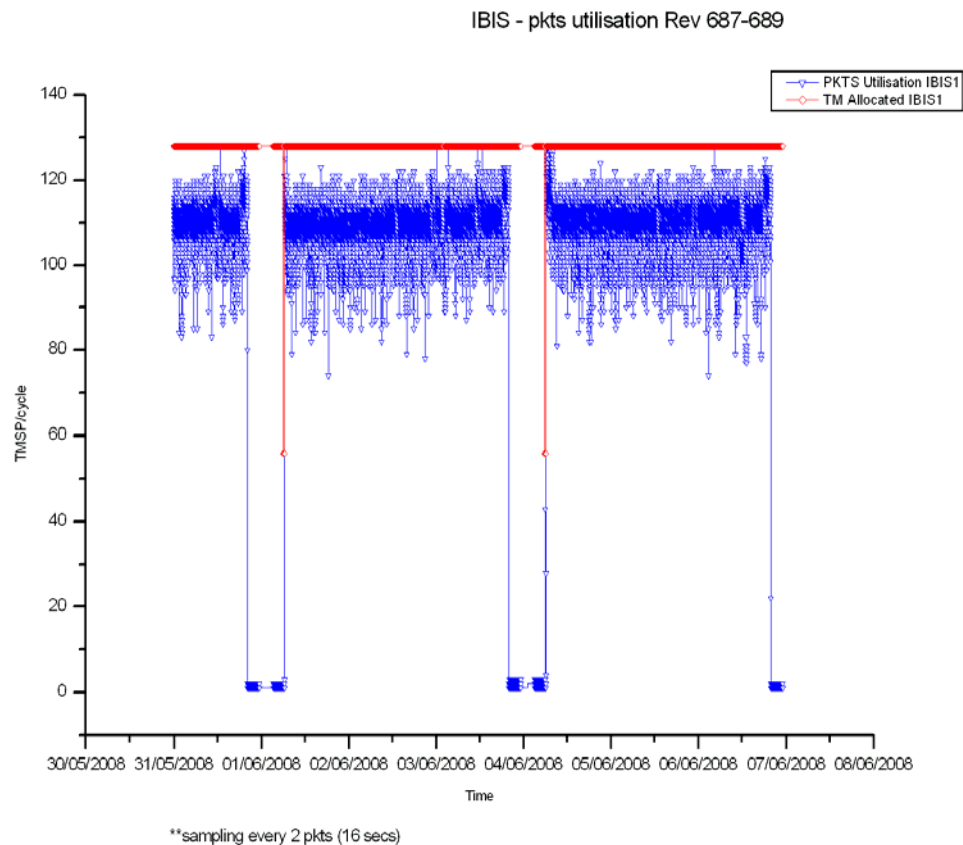
3.2.2 IBIS

The overall status of the unit is nominal.

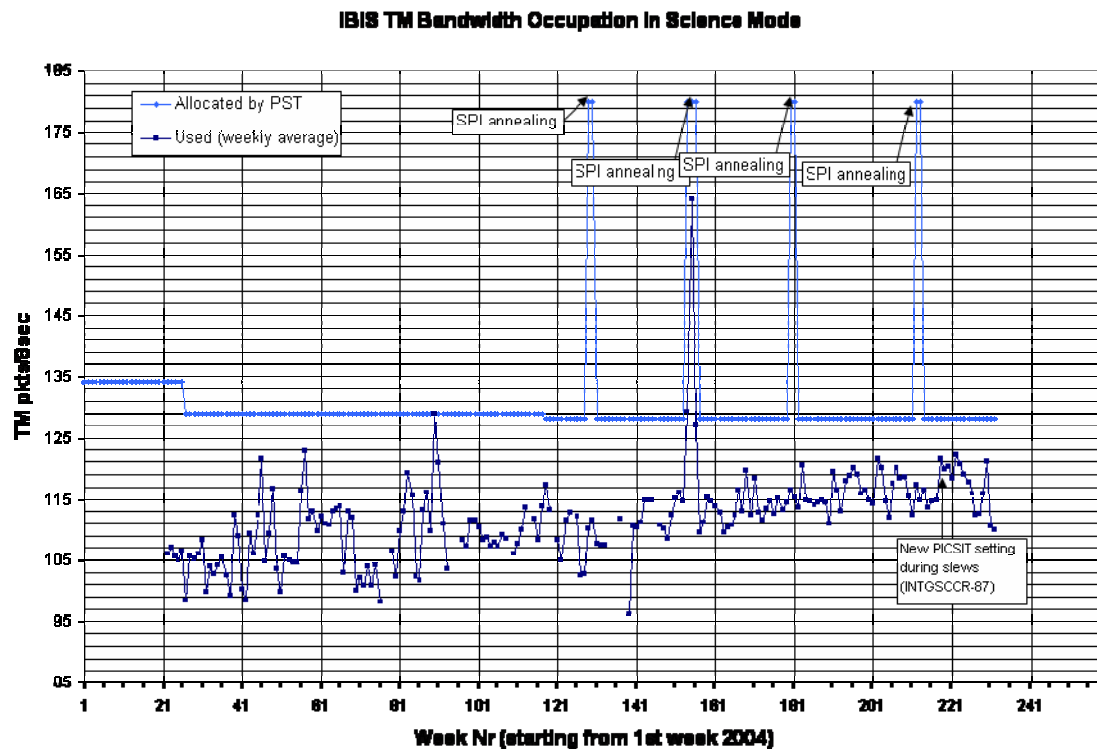
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 128 packets/cycle
- IBIS mean bandwidth utilisation in science mode: 109.9 packets/cycle (down 0.67 on last week)
- Percentage of TM cycles in which full bandwidth was used: 0.5%

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, 134 of the 138 planned science pointings were executed nominally, 1 pointing was shortened and 3 were lost.

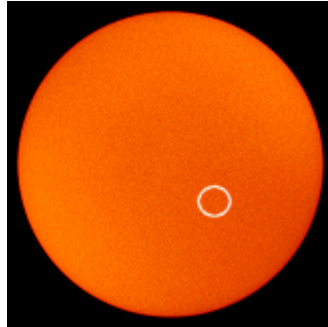
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. A tiny spot began to appear on the 5th, and was still just present a day later. 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 very good this week. 1 pointing was lost to ground problems. The overall performance was over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was very good this week. The HFA task crashed once, and the FD slew update failed to arrive on 1 occasion, there was no impact.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There was however 4 occasions where the TM dropped from Redu one of which was on the b-chain, one occasion where the links with DSS-27 dropped for over half an hour, which led to the loss of a pointing and the links to ISDC dropped three times.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 696 and 697.
No new observations have been planned.

New TSFs have been received for revolutions 690 to 692.

2. Observation status

A new ECS file has been received for revolution 680.

3. ISOC Science Data Archive

Nothing to report this week.

4. ISOC system

ISOC system V19.2 was installed on the operational system on 4 June.

5. Problems

None.

4.3.2 ISDC

Status of ISDC observation processing on 09/06/2008:

- Latest Standard Analysis completed: observation 05200680008 (4U0115+63, Revolutions 675 & 677) on 29/05/2008.
- Latest products archived: observation 05200680008 (4U0115+63, Revolutions 675 & 677) on 29/05/2008.
- Latest observation products sent to the observer: observation 05200680008 (4U0115+63, Revolutions 675 & 677) on 29/05/2008.

5 Special Events

6 Anomalies

The following problems were reported this week that impacted operations.

- On DoY 155 from 01:56:45 to 02:27:59, the links with DSS-27 were down. A recovery was performed, and the Timeline rejoined at 02:54:51. The impact was the loss of pointing 06880045. The corresponding DR# is G108648

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

AR id	Date Created	Subject	Segment	Status
INT-2997	2008-06-03	DSS-27 Antenna problems	NASA Station	Pending
INT-2998	2008-06-03	Frame ERT Incorrect		Pending
INT-3002	2008-05-25	FDS: Problem during Search/Track , star not found in slot #2	FDS	Pending

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 688

The observations in revolution 688 consisted entirely of a raster dither of the North Ecliptic Pole (RA 18:00:00.00, DEC +66:33:39.0), lasting ~58.0 hours.

Revolution 689

The observations in revolution 689 consisted entirely of a raster dither of the North Ecliptic Pole (RA 18:00:00.00, DEC +66:33:39.0), lasting ~57.0 hours.

Throughout these observations, all instruments were in their nominal science modes, except JEM-X2, which is switched off. The TM allocation was IBIS 128; SPI 108; JEM-X1 8; JEM-X2 0; OMC 5.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2008-05-14T05:11:29.000Z	140.4293	F	Automatic TM processing.
2008-05-15T14:18:52.000Z	140.4160	F	Automatic TM processing.
2008-05-17T04:50:57.000Z	140.4019	F	Automatic TM processing.
2008-05-18T14:05:32.000Z	140.3746	F	Automatic TM processing.
2008-05-20T04:39:12.000Z	140.3656	F	Automatic TM processing.
2008-05-21T14:05:32.000Z	140.3503	F	Automatic TM processing.
2008-05-23T04:28:08.000Z	140.3383	F	Automatic TM processing.
2008-05-24T14:17:39.000Z	140.3210	F	Automatic TM processing.
2008-05-26T05:41:52.000Z	140.3097	F	Automatic TM processing.
2008-05-27T13:54:11.000Z	140.2861	F	Automatic TM processing.
2008-05-29T04:07:12.000Z	140.2729	F	Automatic TM processing.
2008-05-30T13:42:28.000Z	140.2506	F	Automatic TM processing.
2008-06-01T03:53:52.000Z	140.2439	F	Automatic TM processing.
2008-06-02T13:32:27.000Z	140.2257	F	Automatic TM processing.
2008-06-05T13:17:55.000Z	140.2029	F	Automatic TM processing.

This report was generated Fri Jun 6 08:00:27 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, 31/05/2008 – 06/06/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 63 Open Loop Slews, 82 Closed Loop Slews and 4 Momentum Biases were executed (as reported by ACC).

4 slews (CSL) were missed from TL, during the observation period due to problem on search and track process (star in slot #2 not found) and antenna problem at DSS-27 station.

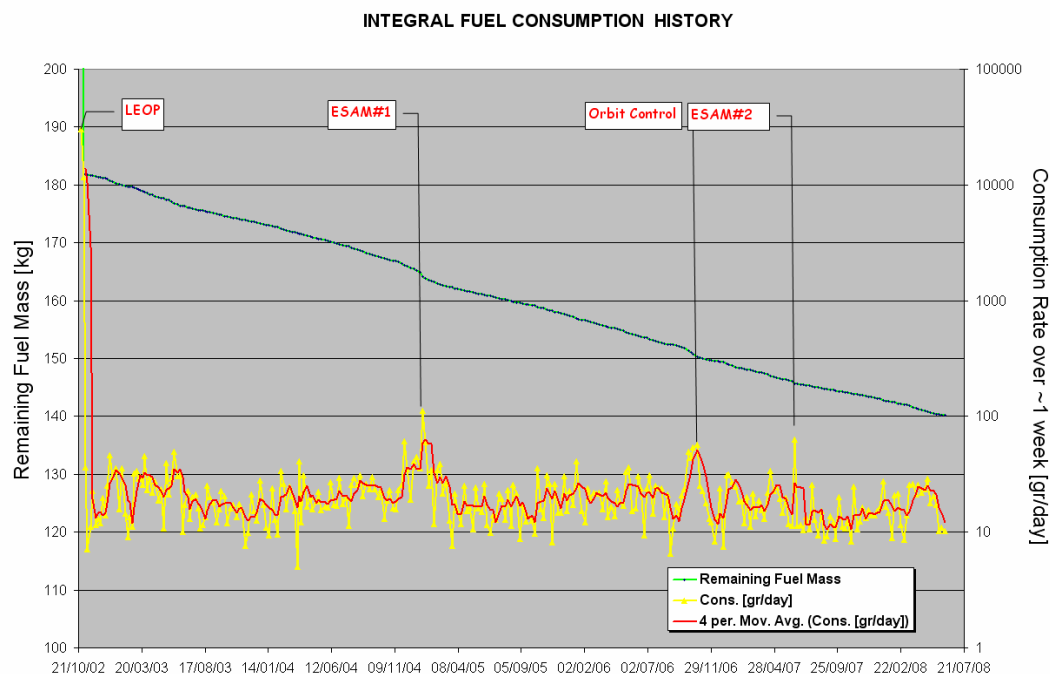
This is equivalent to $\sim 2.8\%$ of the total number of slews planned (146)

Orbit Control

No update

Fuel consumption

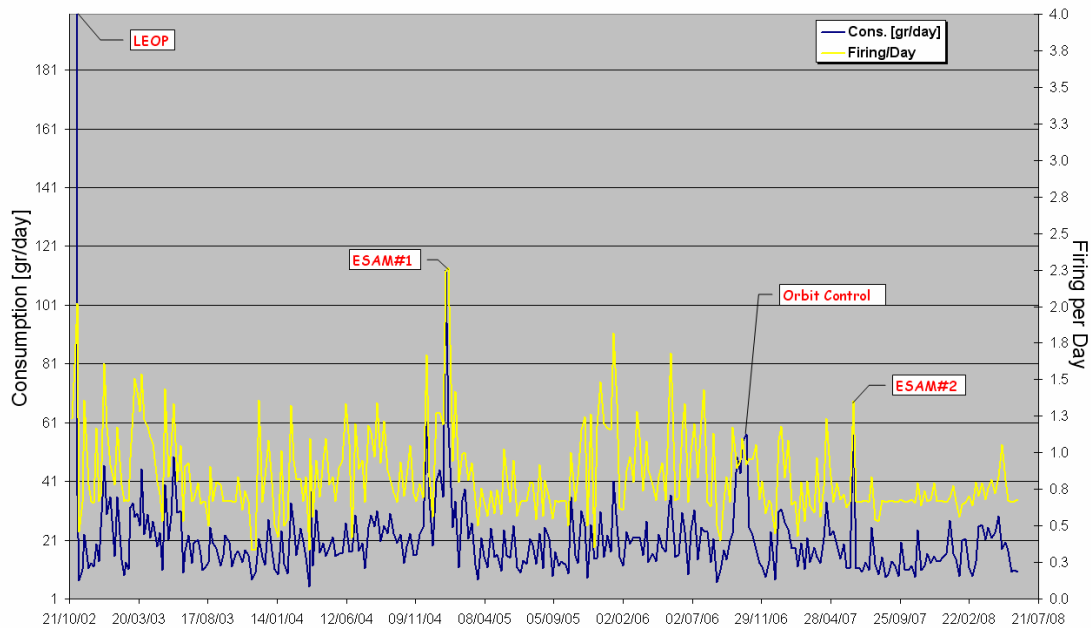
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 05/06/2008 is reported in the plot below.



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 05/06/2008 is reported in the plot below.

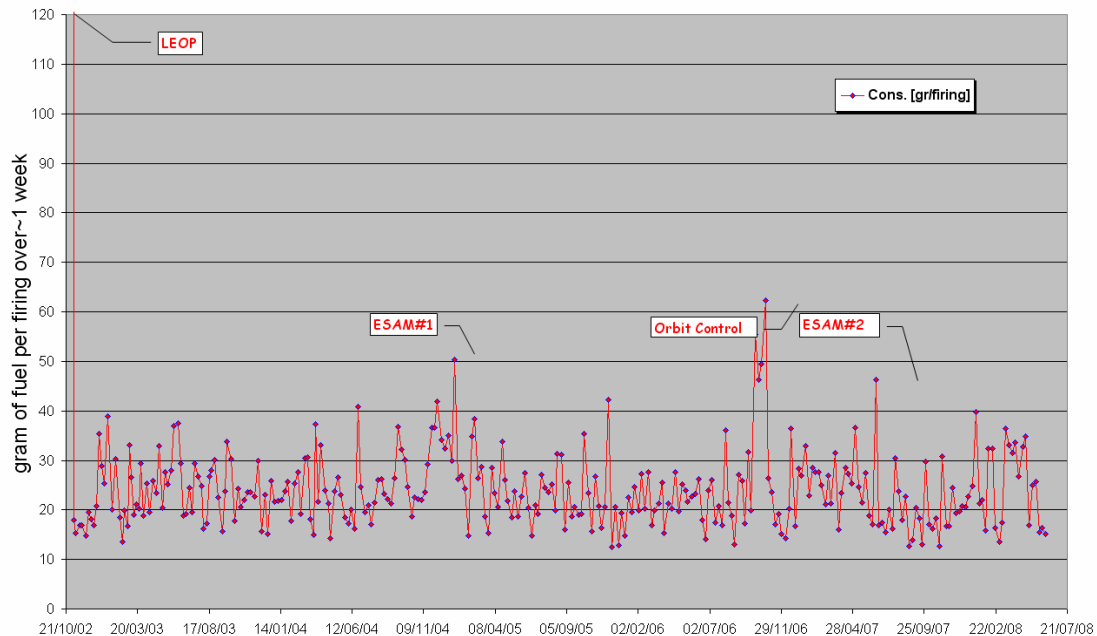
INTEGRAL FIRING PER DAY HISTORY



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 05/06/2008 is shown in the plot below.

INTEGRAL FUEL MASS PER FIRING HISTORY

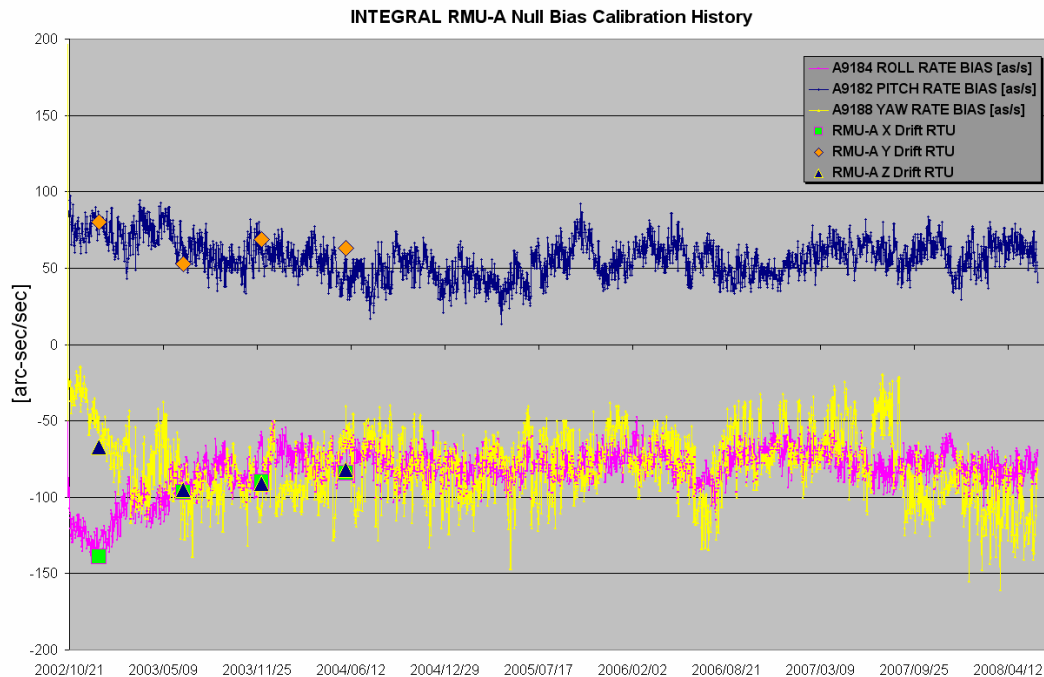


The RMU-A null bias calibration

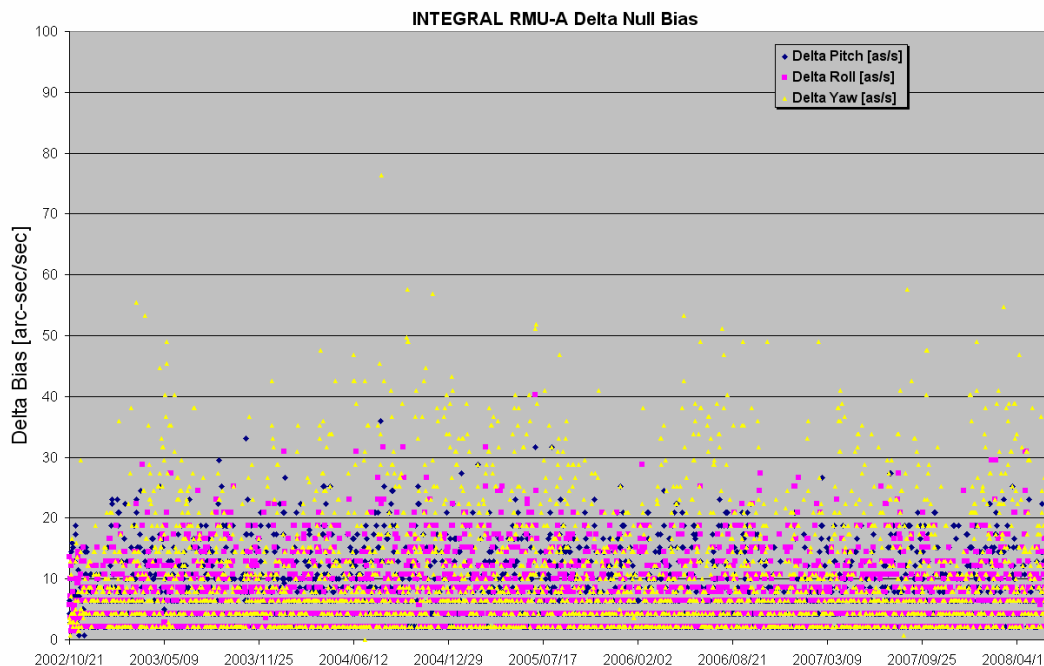
The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 06/06/2008 is reported in the plot below.

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 06/06/2008 is reported in the plot below.



31/05/2008 (Day of Year 152, Revolution 687)

Nothing to report.

01/06/2008 (Day of Year 153, Revolution 687-688)

Doc. Title : INTEGRAL Mission Report #298
Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OAI
Date : 09/06/08

Issue : 1
Rev. : 0
Page : 13

Problem during Search/Track process: at 19:22z a problem (star not found in slot #2) during the Search/Track process selecting the slew star caused the PTV to fail and the slew 06880015 to fail release.

A manual recovery was performed from attitude of PID 06880014 to the attitude of PID 06880015. The next slew ID 06880016 was manually updated in TL.

The following slew was missed in TL: 06880015 (CSL)

02/06/2008 (Day of Year 154, Revolution 688)

Nothing to report.

03/06/2008 (Day of Year 155, Revolution 688)

Problem on DSS-27 station: at 01:55z a problem on antenna of DSS-27 station (DR Nr G108648) caused the loss of TM links and consequent release failure of slew ID 06880045.

A manual recovery was started to slew from attitude of PID 06880044 to the attitude of PID 06880045. The next slew ID 06880046 was manually updated at 02:53z.

The following slew was missed in TL: 06880045 (CSL).

Thrusters Torque re-scaling: in synch with the end of summer eclipse 2008 a Thrusters torque re-scaling was performed based on the estimated thrust level. The TIMs thresholds, AMD on-times and thrusters torque reciprocals were updated during rev 688 as follows (source FD team).

Fuel content: 0.1401692E+03 [kg]
Tank pressure: 0.6622923E+01 [bar]
Mean Thruster Force: 0.9378415E+01 [N]

TIMs

TTIM: 432.0 s [27] raw
RTIM: 6.625 s [53] raw
PTIM: 2.250 s [18] raw
YTIM: 34.750 s [1112] raw

The new values for AMD On-Times, Thruster torque reciprocals resulted consistent with the past values (winter calibration 2007). The PWM look up table (ESA mode gain) did not change wrt the past value.

Below are reported the TPFs uplinked, for completeness (source FD team).

AMD On-Times

AEOTA_00 S MF 32
2008-06-04T01:05:00Z
2008-06-04T01:05:00Z
A

MON_W1T1 R 0.6514800E-01	sec D AMD decrease on-time (W1,Th1)
MON_W1T2 R 0.2298480E+00	sec D AMD decrease on-time (W1,Th2)
MON_W1T3 R 0.0000000E+00	sec D AMD decrease on-time (W1,Th3)
MON_W1T4 R 0.2967040E+00	sec D AMD decrease on-time (W1,Th4)
MON_W2T1 R 0.6295200E-01	sec D AMD decrease on-time (W2,Th1)
MON_W2T2 R 0.1429840E+00	sec D AMD decrease on-time (W2,Th2)
MON_W2T3 R 0.7930000E-01	sec D AMD decrease on-time (W2,Th3)
MON_W2T4 R 0.0000000E+00	sec D AMD decrease on-time (W2,Th4)
MON_W3T1 R 0.3040240E+00	sec D AMD decrease on-time (W3,Th1)
MON_W3T2 R 0.0000000E+00	sec D AMD decrease on-time (W3,Th2)
MON_W3T3 R 0.2342400E+00	sec D AMD decrease on-time (W3,Th3)
MON_W3T4 R 0.6880800E-01	sec D AMD decrease on-time (W3,Th4)
MON_W4T1 R 0.1361520E+00	sec D AMD decrease on-time (W4,Th1)
MON_W4T2 R 0.6197600E-01	sec D AMD decrease on-time (W4,Th2)
MON_W4T3 R 0.0000000E+00	sec D AMD decrease on-time (W4,Th3)
MON_W4T4 R 0.7124800E-01	sec D AMD decrease on-time (W4,Th4)
MOFFW1T1 R 0.2330200E+00	sec D AMD increase on-time (W1,Th1)
MOFFW1T2 R 0.8344800E-01	sec D AMD increase on-time (W1,Th2)
MOFFW1T3 R 0.3162240E+00	sec D AMD increase on-time (W1,Th3)
MOFFW1T4 R 0.0000000E+00	sec D AMD increase on-time (W1,Th4)
MOFFW2T1 R 0.7320000E-01	sec D AMD increase on-time (W2,Th1)
MOFFW2T2 R 0.0000000E+00	sec D AMD increase on-time (W2,Th2)
MOFFW2T3 R 0.6490400E-01	sec D AMD increase on-time (W2,Th3)
MOFFW2T4 R 0.1354200E+00	sec D AMD increase on-time (W2,Th4)
MOFFW3T1 R 0.0000000E+00	sec D AMD increase on-time (W3,Th1)
MOFFW3T2 R 0.3196400E+00	sec D AMD increase on-time (W3,Th2)
MOFFW3T3 R 0.8808400E-01	sec D AMD increase on-time (W3,Th3)
MOFFW3T4 R 0.2337520E+00	sec D AMD increase on-time (W3,Th4)
MOFFW4T1 R 0.0000000E+00	sec D AMD increase on-time (W4,Th1)
MOFFW4T2 R 0.8125200E-01	sec D AMD increase on-time (W4,Th2)
MOFFW4T3 R 0.1444480E+00	sec D AMD increase on-time (W4,Th3)
MOFFW4T4 R 0.6441600E-01	sec D AMD increase on-time (W4,Th4)

Thruster Torque Reciprocals, PWM Look up Table

AERCA_00 S M F 4
 2008-06-04T01:05:00Z
 2008-06-04T01:05:00Z
 A
 TORQ_X_A R 0.2681840E+00 1/Nm D Reciprocal Roll Torque (A)
 TORQ_Y_A R 0.8775594E-01 1/Nm D Reciprocal Pitch Torque (A)
 TORQ_Z_A R 0.7305671E-01 1/Nm D Reciprocal Yaw Torque (A)
 PWM_TORQ R 7 D PWM Look Up Table

Spacecraft Inertia Matrix

AESCI_00 S M F 6
 2008-06-04T01:05:00Z
 2008-06-04T01:05:00Z
 AAAA1
 IXX R 0.6188930E+04 Kgm2 D S/C inertia Ixx
 IYY R 0.8150230E+04 Kgm2 D S/C inertia Iyy
 IZZ R 0.8299320E+04 Kgm2 D S/C inertia Izz
 IXY R 0.3665580E+02 Kgm2 D S/C inertia Ixy
 IXZ R -0.1627600E+03 Kgm2 D S/C inertia Ixz
 IYZ R 0.1333860E+02 Kgm2 D S/C inertia Iyz

04/06/2008 (Day of Year 156, Revolution 688-689)

Nothing to report.

05/06/2008 (Day of Year 157, Revolution 689)

Nothing to report.

06/06/2008 (Day of Year 158, Revolution 689)

Problem during Search/Track process: at 03:10z a problem (star not found in slot #2) during the Search/Track process selecting the slew star caused the PTV to fail and the slew 06880015 to fail release.

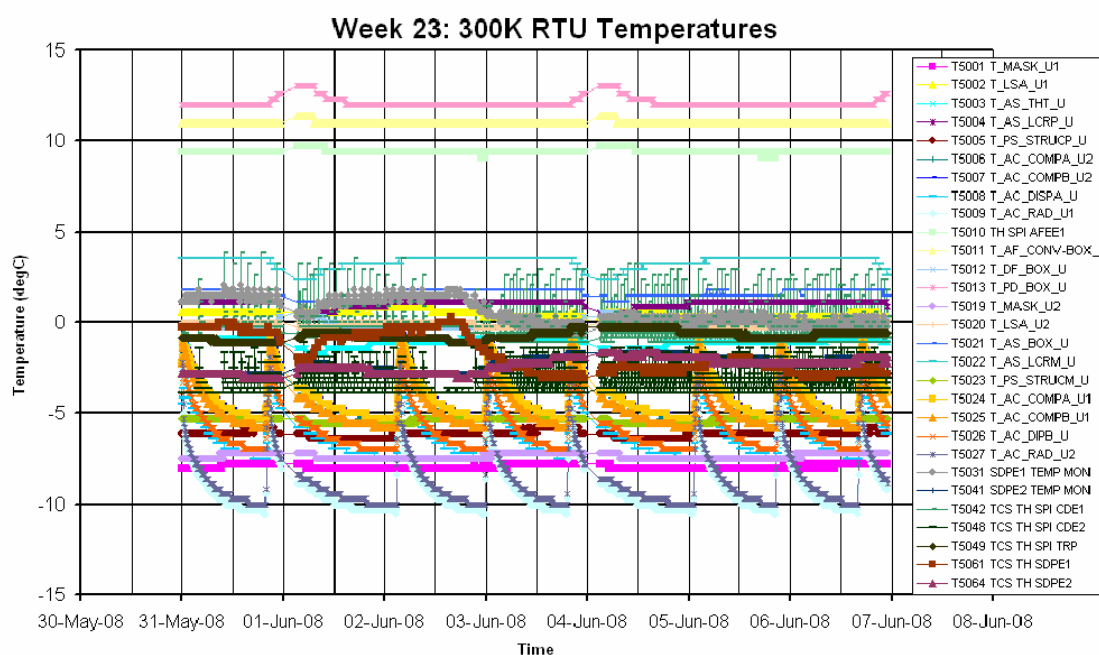
A manual recovery was performed several times from attitude of PID 06890045 to the attitude of PID 06890046 without success. The operator performed therefore a recovery from the attitude of PID 06890045 to the attitude of PID 06890047 as OSL (open loop slew). The next slew ID 06890048 was manually updated in TL.

At the requested target attitude (17:22:09.71 +65:32:41.8) corresponded a sparse star field (for the STR limit magnitude of 8.5 Mi) with 1 bright object (star Zeta Draco, Mi 3.18). The combination of the two conditions likely caused the problem in finding a suitable guide star for the slew execution.

The following slews were missed in TL: 06890046 (CSL) - 06890047 (CSL).

8.3.2 SPI Operations

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

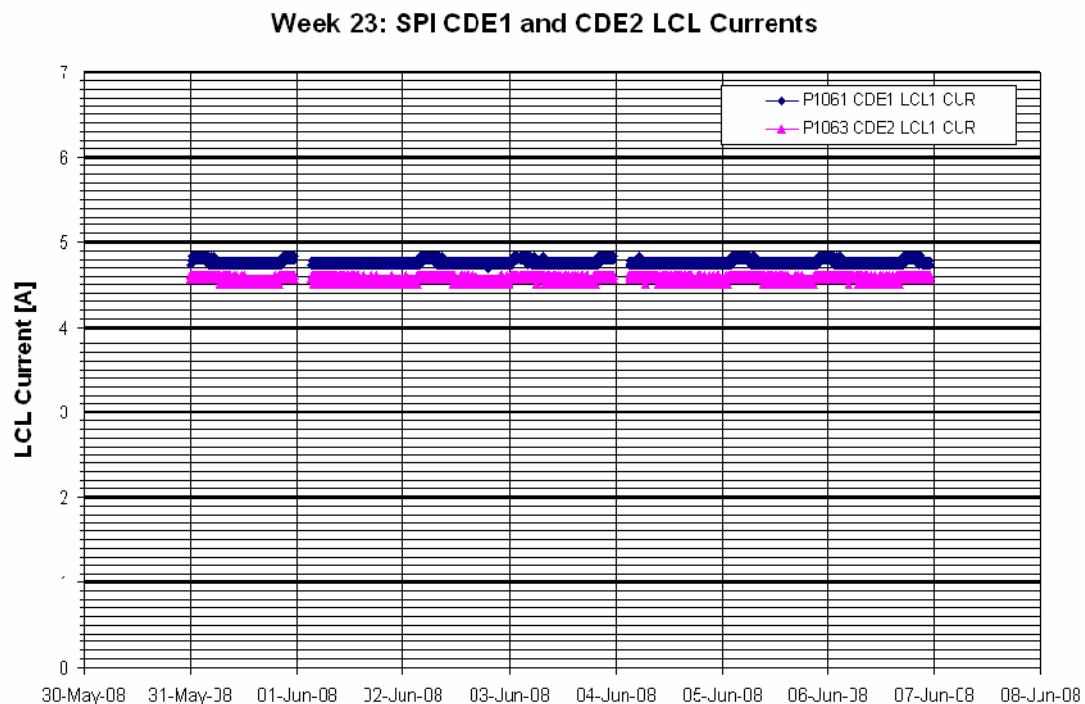


Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range 80K +/-1K.

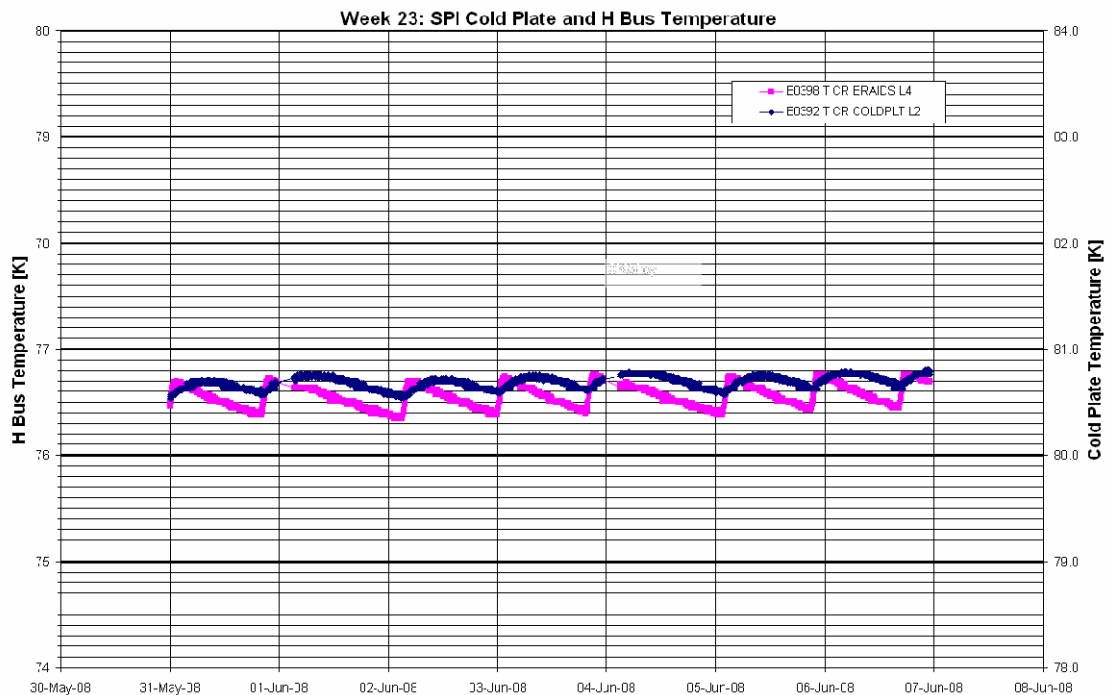
The stroke of all four compressors was set to 40 throughout the week. The average CDE LCL currents were as follows:

- CDE1 LCL Current = 4.77A
- CDE2 LCL Current = 4.56A

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



The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period. From this plot it can be seen that the radiator compensation heater was cycling throughout the week. With the compressors' stroke set to 40, this is still acceptable from a power budget point of view.

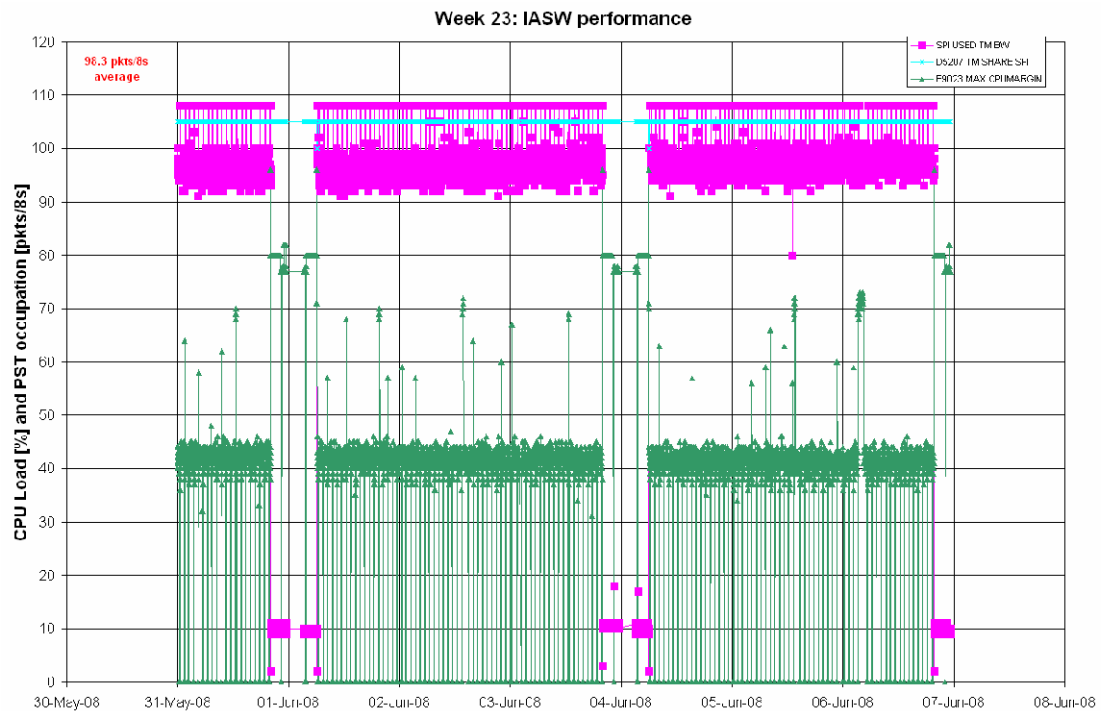


DPE & IASW: The DPE health and IASW performance is nominal.

The IASW version installed is v4.3.4 with SE compression only enabled and the spectra scaling factor set to 8/19 SE.

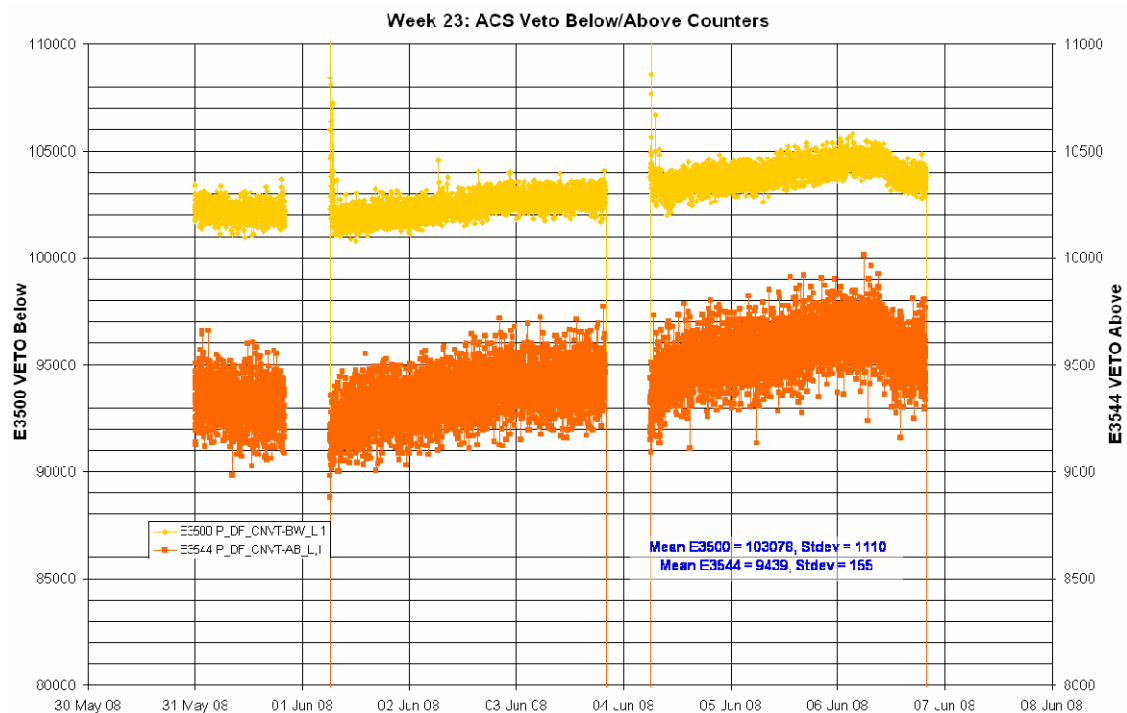
The average TM bandwidth occupation of SPI was 98.3 packets/cycle over the science window. The TM allocation in the science window was 108 packets/cycle. This allocation is considering that the over-allocated PST with the additional 3 packets/cycle for SPI was being used, however the Broadcast Packet TM allocation was not updated (see plot below).

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

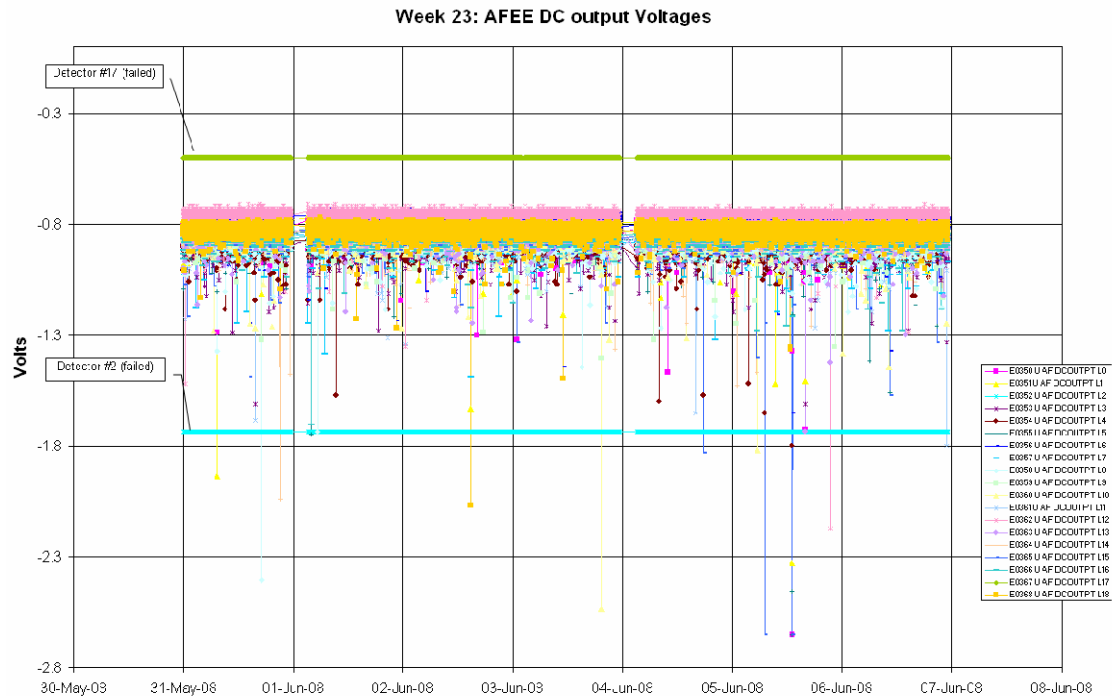


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

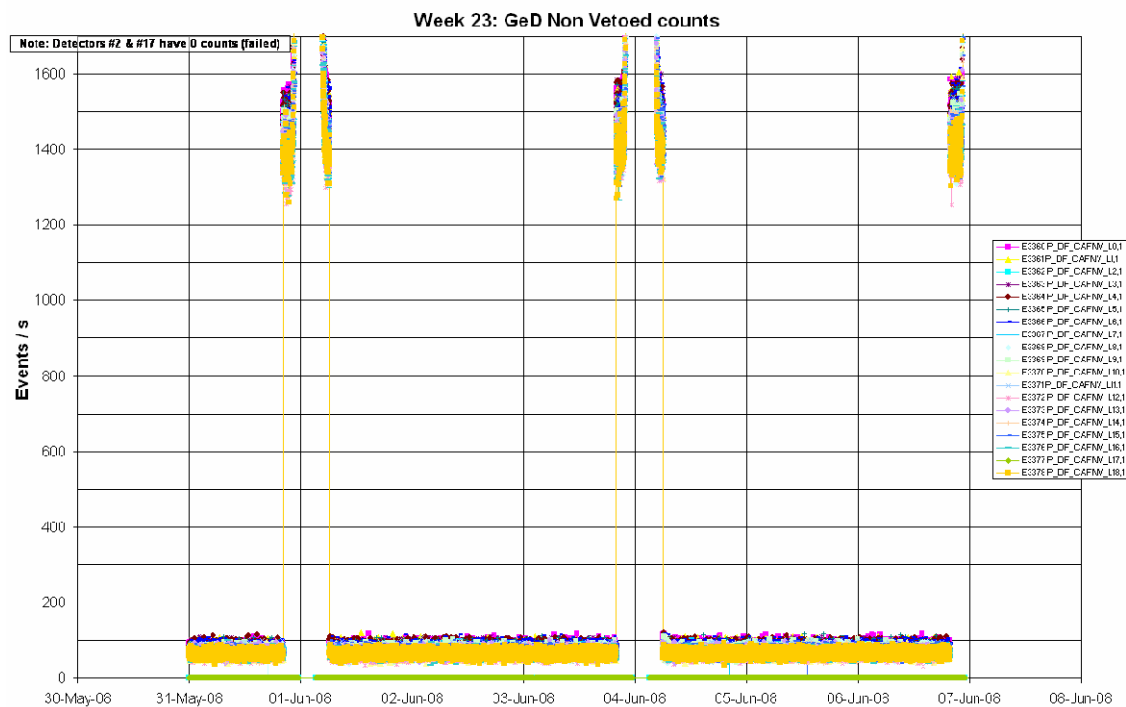
The following plot shows the ACS overall count rate evolution during the reporting period:

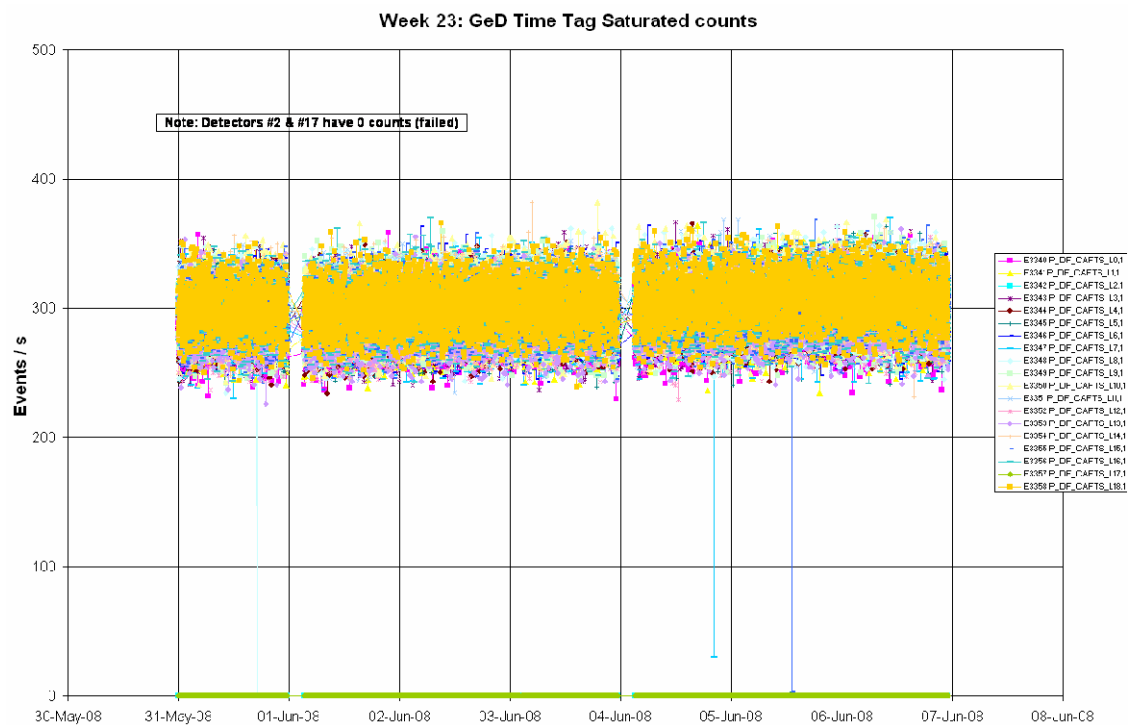
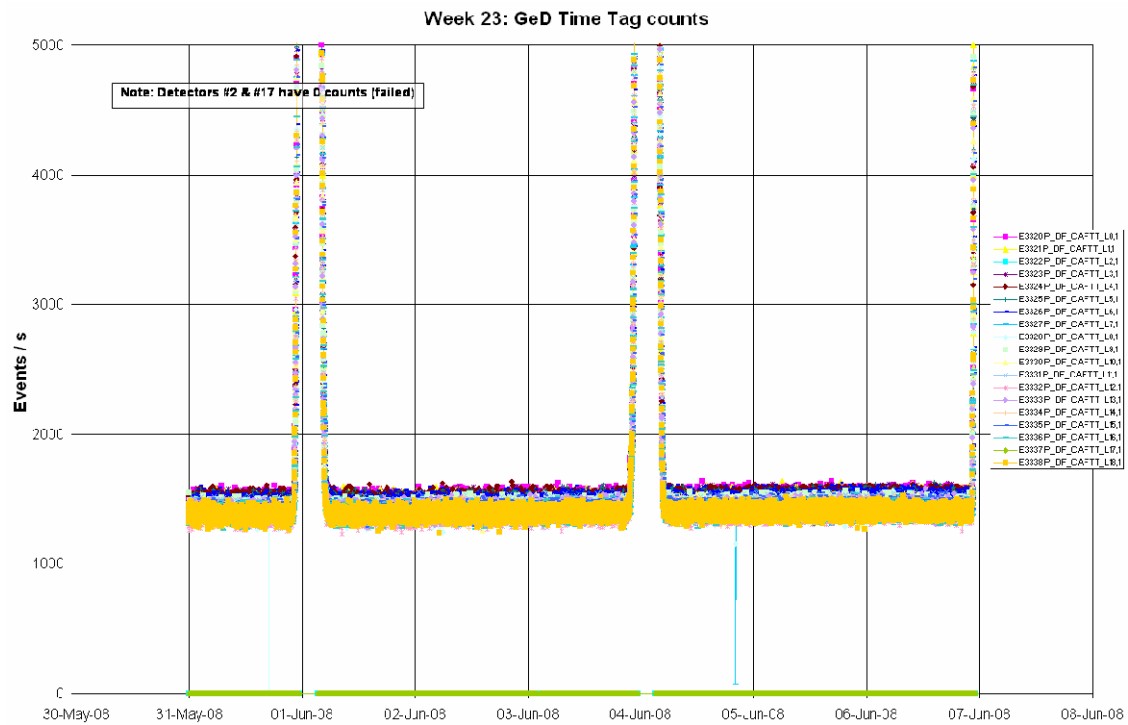


AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.

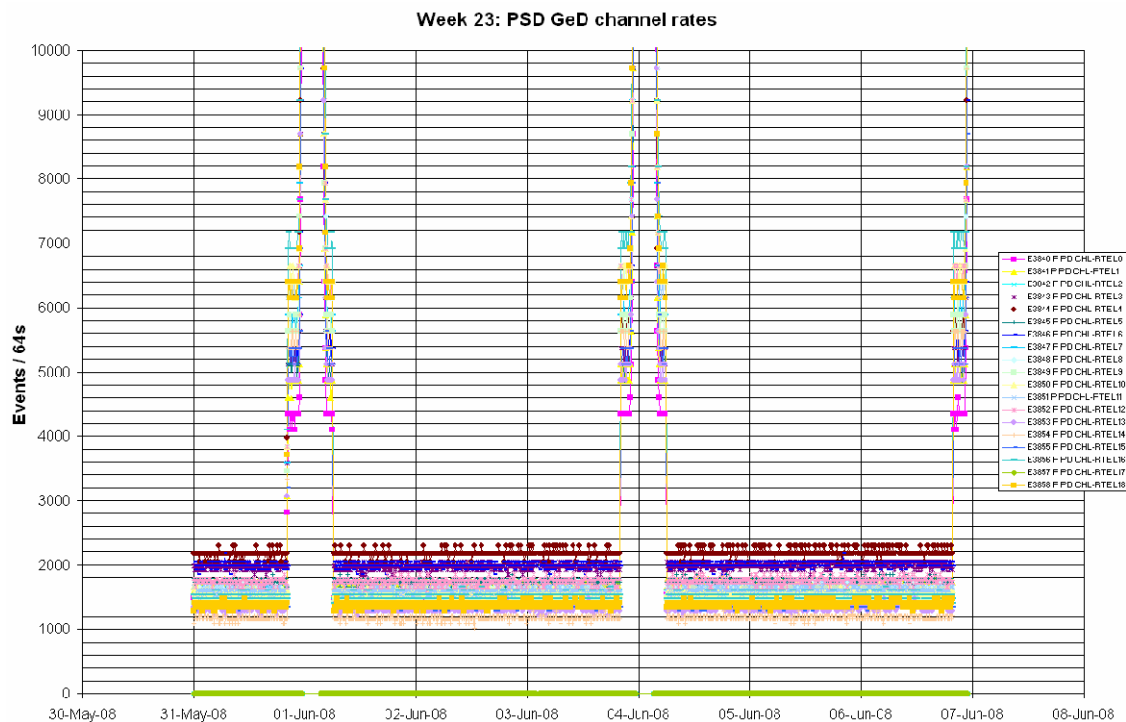


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event count rates during the reporting period.





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



Event Log:

The following non-nominal events occurred on SPI over the reporting period:

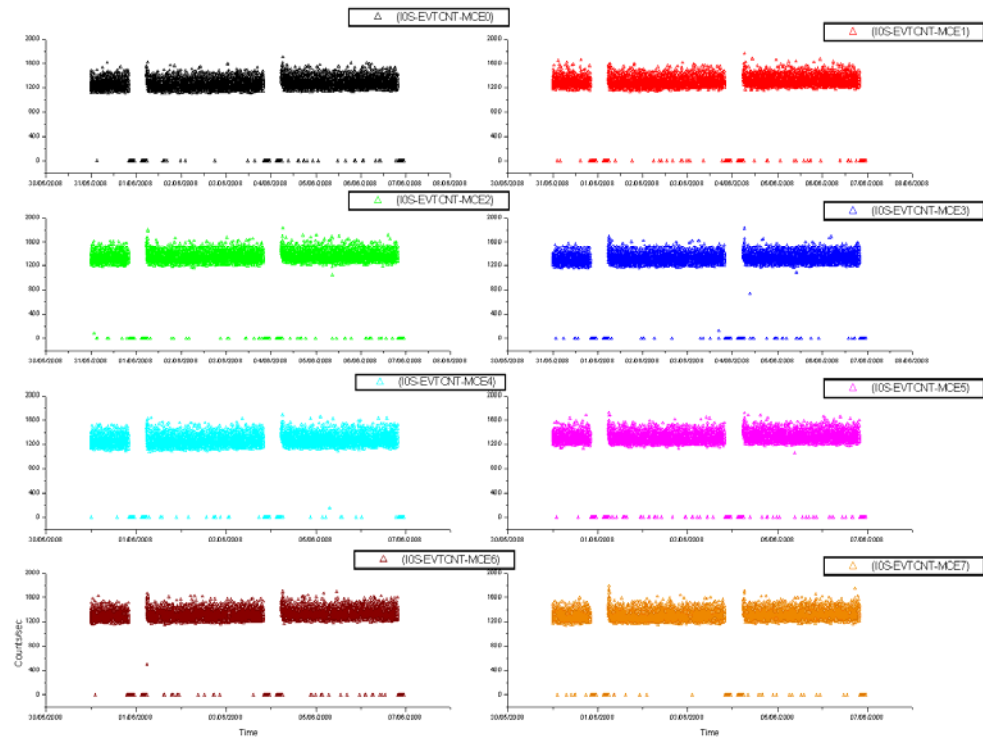
- Due to high radiation continuing briefly after the expected radiation belt exit of revolution 688, TM parameter E3500 ACS CntVetoBelow went OOL on 2008-06-01 at 06.24.29Z, returning within limits at 06.25.01Z.

8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

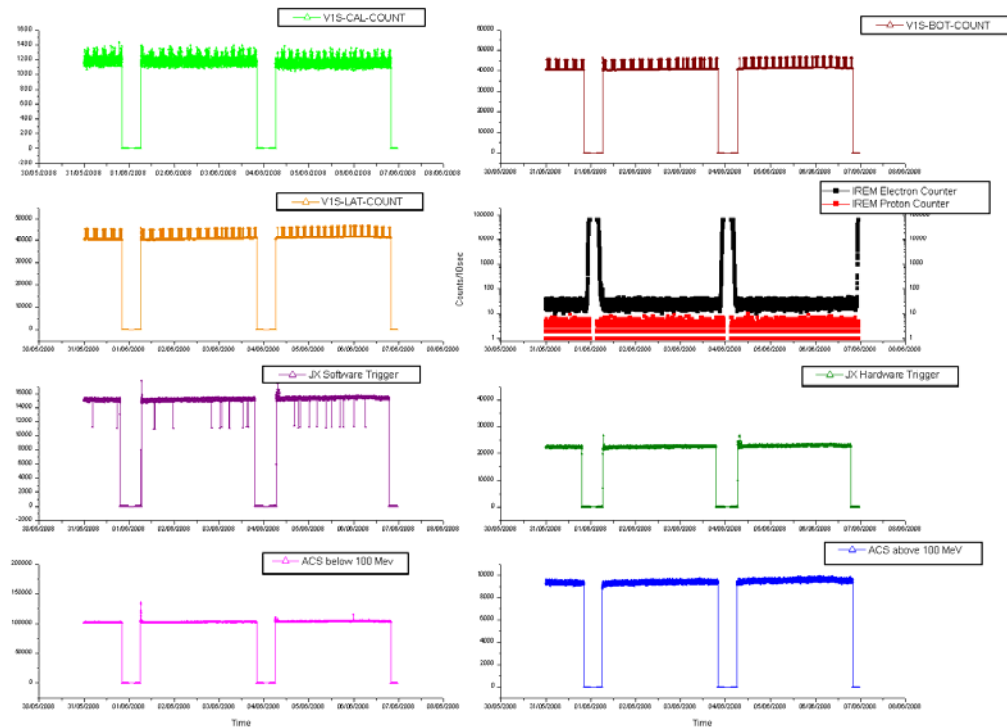
IBIS - ISGRI Counters Rev 687-689



**sampling every 4 pkts (32 secs)

VETO vs Payload Counters:

IBIS-VETO vs Payloads Counters Rev 687-689

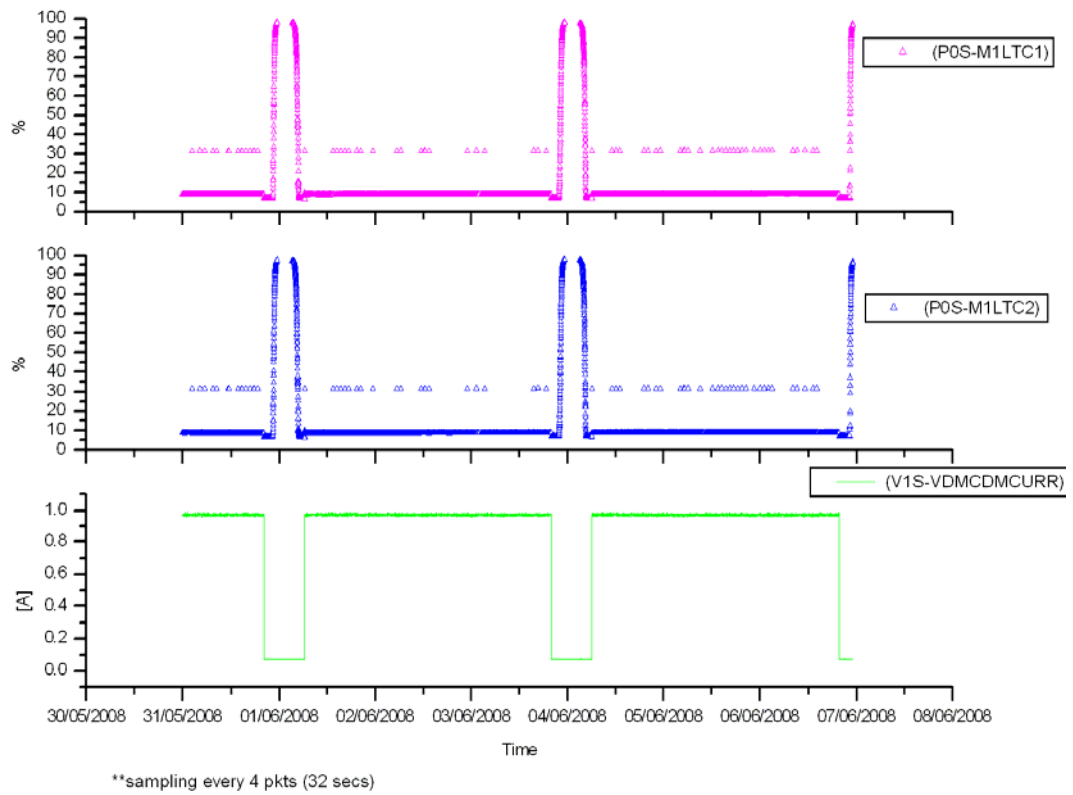


**with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec sampling every 5 pkts (40 sec)

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

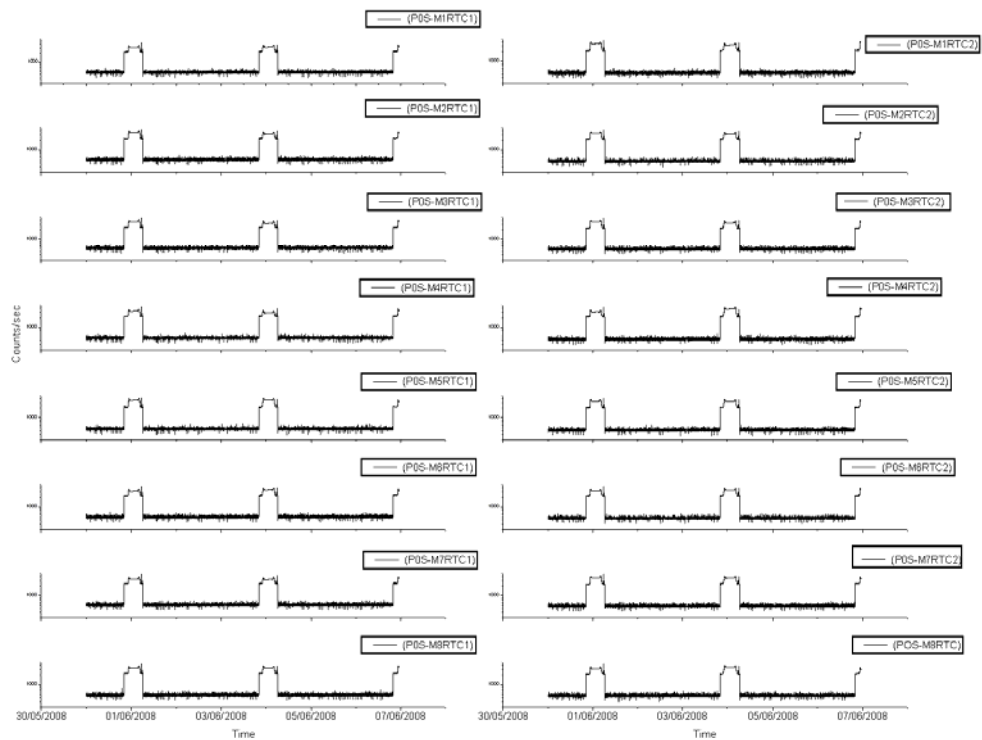
VETO Current:

IBIS-VETO Current & PICsIT dead times Rev 687-689



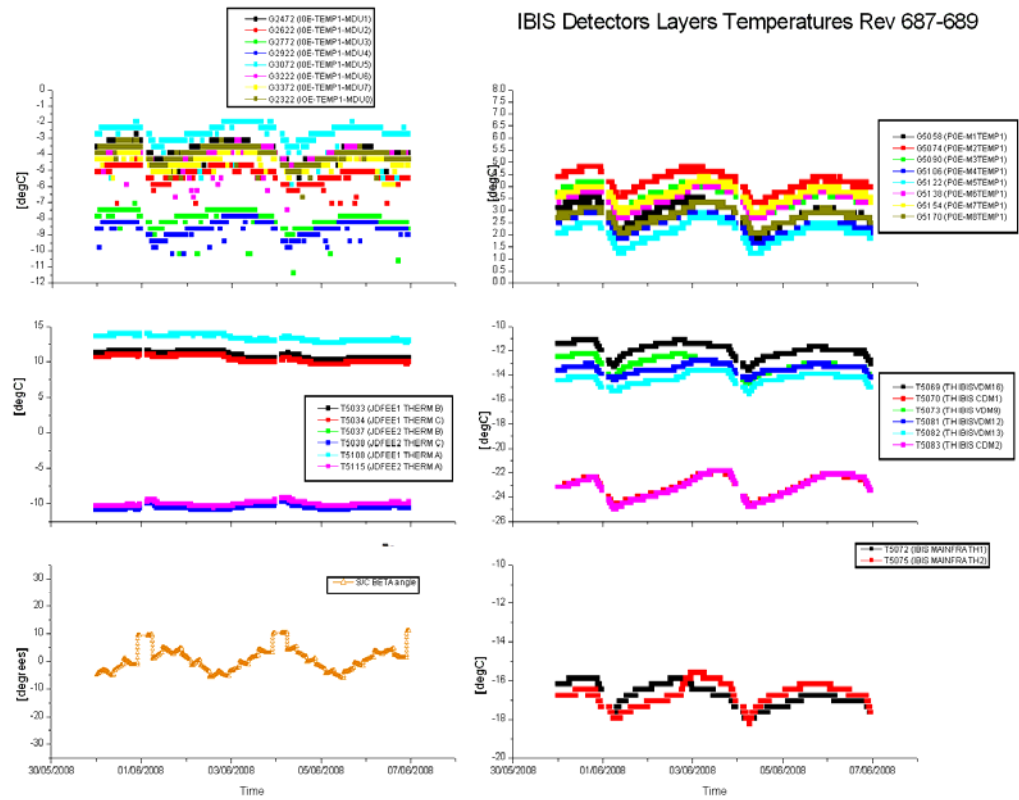
PICsIT Counters:

IBIS - PICsIT Counters Rev 687-689



**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures:



**sampling every 8 pkts (64 secs)

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IBIS daily report:

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

2008-05-31 (DOY 152, Rev 687)

IBIS operations executed nominally.

2008-06-01 (DOY 153, Rev 687-688)

At 22.36.05Z TM parameter G6216 went OOL Warning Low (value -5.40249894V). This is the VETO VDM15 -5V monitor. It returned within limits of its own accord at 22.47.17Z and no action was taken.

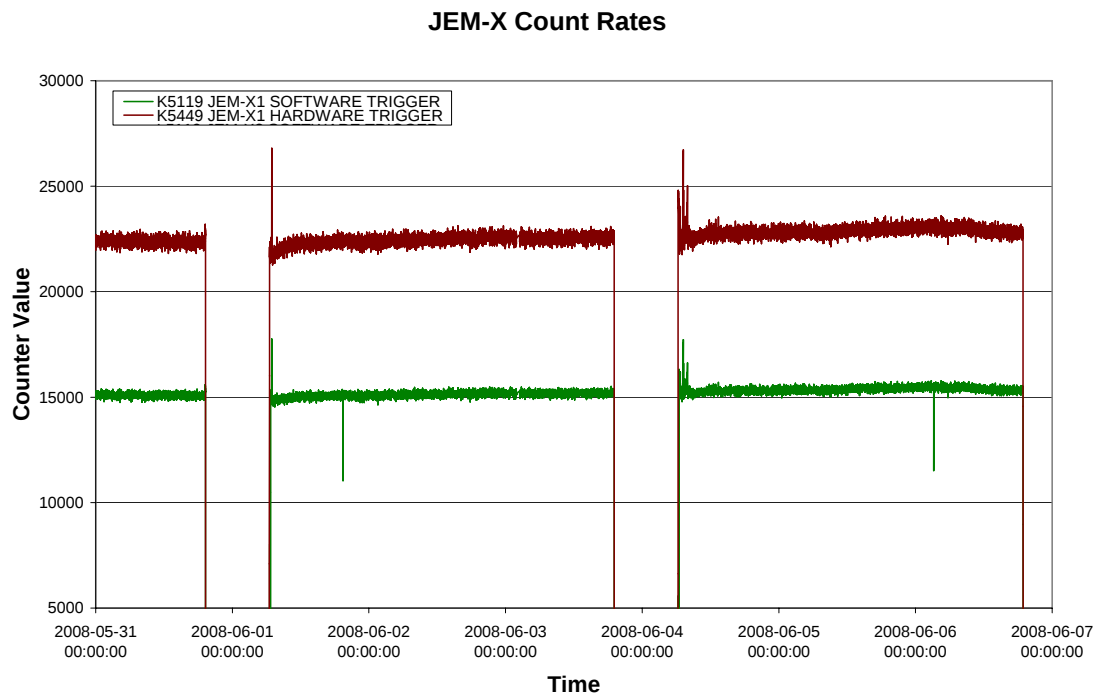
2008-06-02 (DOY 154, Rev 688) to 2008-06-06 (DOY 158, Rev 689)

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.



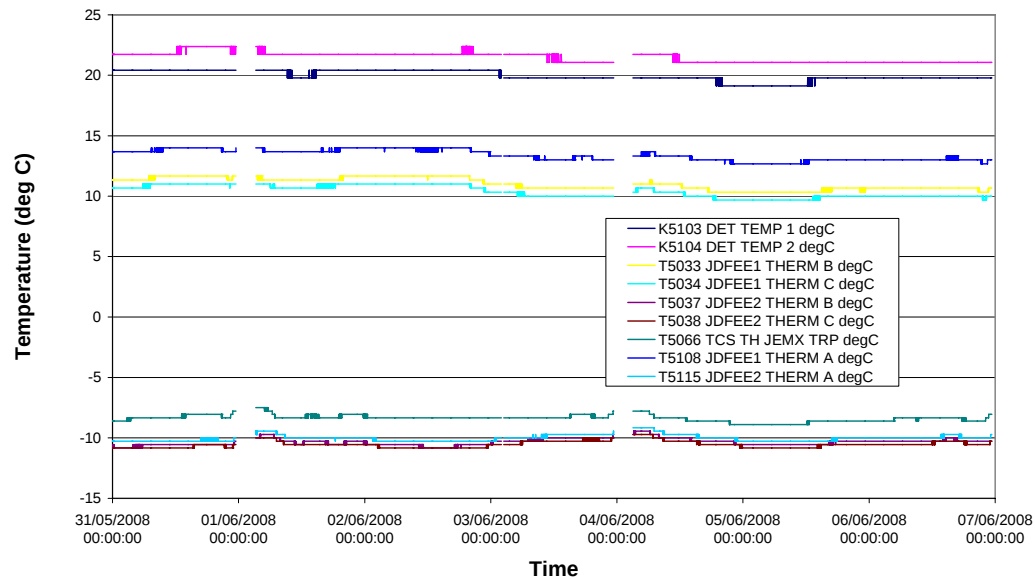
JEM-X Temperatures

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

2008-05-31 (DoY 152, Rev 687)

JEM-X1 operations executed nominally.

2008-06-01 (DoY 153, Rev 688)

From 06:23:00 to 06:23:54, parameter K5317 exceeded hard limits. No action was taken and there was no impact.

2008-06-02 (DoY 154, Rev 688)

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

2008.154.00.20.01.724	2008.154.00.20.02.800	1536	RealTime	5	ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535 PR N
E E					
FIX6		0			
K9079	MESS CLASS	2			
K9080	MESS ID	5			
K9074	TASK ID 16	12			
K9067	LOGICAL ADDRESS	4989			
2008.154.00.20.01.724	2008.154.00.20.02.819	1536	RealTime	5	ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535 PR N
E E					
FIX6		0			
K9079	MESS CLASS	2			
K9080	MESS ID	5			
K9074	TASK ID 16	12			
K9067	LOGICAL ADDRESS	4989			
2008.154.00.20.01.724	2008.154.00.20.02.821	1536	RealTime	5	ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535 PR N
E E					
FIX6		0			
K9079	MESS CLASS	2			
K9080	MESS ID	5			
K9074	TASK ID 16	12			
K9067	LOGICAL ADDRESS	4989			

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2008.154.00.20.01.724	2008.154.00.20.02.822	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079 MESS CLASS		2				
K9080 MESS ID		5				
K9074 TASK ID 16		12				
K9067 LOGICAL ADDRESS		4989				
2008.154.00.20.01.724	2008.154.00.20.02.822	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079 MESS CLASS		2				
K9080 MESS ID		5				
K9074 TASK ID 16		12				
K9067 LOGICAL ADDRESS		4989				
2008.154.00.20.01.724	2008.154.00.20.02.823	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079 MESS CLASS		2				
K9080 MESS ID		5				
K9074 TASK ID 16		12				
K9067 LOGICAL ADDRESS		4989				
2008.154.00.20.01.724	2008.154.00.20.02.824	1536	RealTime	5		ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	PR N
E E						
FIX6		0				
K9079 MESS CLASS		2				
K9080 MESS ID		5				
K9074 TASK ID 16		12				
K9067 LOGICAL ADDRESS		5336				

No action was taken and the messages did not reappear. There was no impact.

2008-06-03 (DoY 155, Rev 688) to 2008-06-06 (DoY 158, Rev 689)

JEM-X1 operations executed nominally.

8.3.5 OMC Operations

2008-05-31 (DoY 152, Rev 687)

Nothing to Report.

2008-06-01 (DoY 153, Rev 688)

At 19:22:00, an AOCS command failed due to a guide star problem. The Timeline was stopped, and a recovery performed. The impact was the loss of pointing 06880015. It was at this time the following OEMs were received:

2008.153.19.25.40.956	2008.153.19.25.46.853	1792	RealTime	131		TC REJECT
REJECTED TC1			0	0	65535	PR N
E E						
2008.153.19.25.46.956	2008.153.19.26.00.493	1792	RealTime	131		TC REJECT
REJECTED TC1			0	0	65535	PR N
E E						

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for that pointing.

2008-06-02 (DoY 154, Rev 688)

Nothing to Report.

2008-06-03 (DoY 155, Rev 688)

From 01:56:45 to 02:27:59 there was no TM from DSS27. This forced the suspension of the automatic commanding. A recovery was performed and the Timeline rejoined at 02:54:51. The OMC commands for pointing 06880045 were manually sent at 02:46:30. The impact was this pointing was shortened from a planned 3479 to 1920 seconds.

2008-06-04 (DoY 155, Rev 689) to 2008-06-05 (DoY 157, Rev 689)

Nothing to Report.

2008-06-06 (DoY 158, Rev 689)

At 03:10, an AOCS command failed due to a guide star problem. The Timeline was suspended and a recovery performed. At 03:27, the command again failed, forcing another recovery. At 03:46, the command again failed forcing a third recovery. The Timeline was eventually rejoined at 04:39. The impact was the loss of pointings 06890046 & 06890047.

It was at this time the following OEMs were received:

2008.158.03.12.14.304	2008.158.03.12.22.199	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					
2008.158.03.12.20.304	2008.158.03.12.29.227	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					
2008.158.04.12.25.181	2008.158.04.12.29.373	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					
2008.158.04.12.31.306	2008.158.04.12.37.266	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					

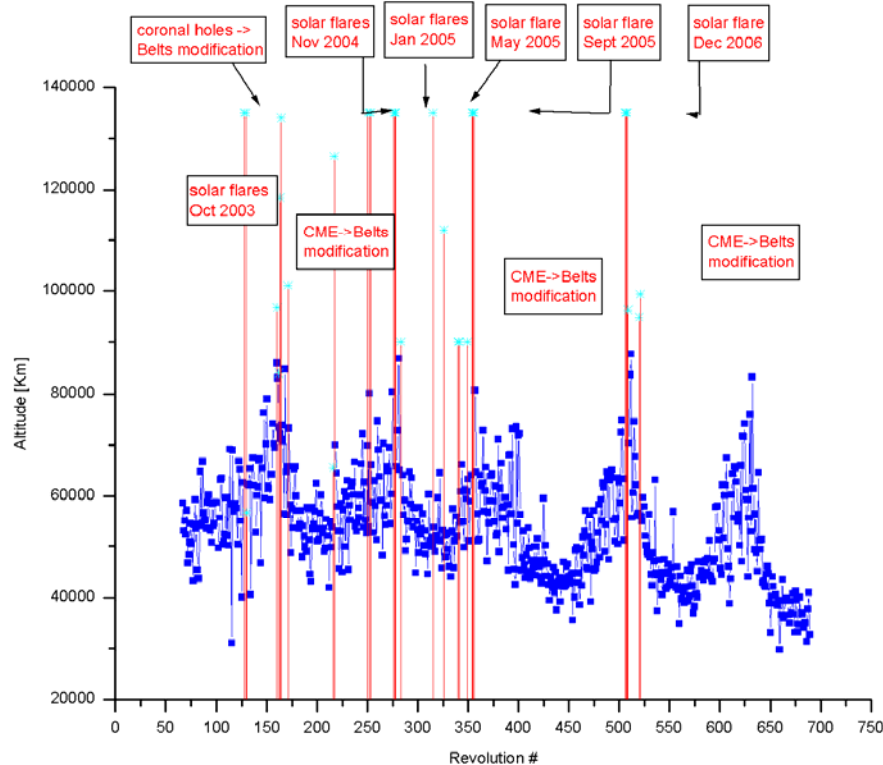
These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for those pointings.

On DoY 152 at 20:12:19, DoY 155 at 19:59:15 and DoY 158 at 19:46:51 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]
687	RAD_ENTR R 2008-05-31T20:12:11Z	31/05/2008 22:16:02	37738.4	31-May-2008 21:59:34	40310.07
688	RAD_EXIT R 2008-06-01T06:09:48Z	01/06/2008 06:23:38	54898.4	01-Jun-2008 05:19:34	45698.13
688	RAD_ENTR R 2008-06-03T19:59:07Z	03/06/2008 21:44:42	40973.0	03-Jun-2008 21:41:09	40942.93
689	RAD_EXIT R 2008-06-04T05:55:43Z	04/06/2008 05:02:02	>>33443.5	04-Jun-2008 05:01:09	45236.24
689	RAD_ENTR R 2008-06-06T19:46:49Z	06/06/2008 22:22:10	32699.1	06-Jun-2008 21:31:09	40400.34

Reference

High radiation

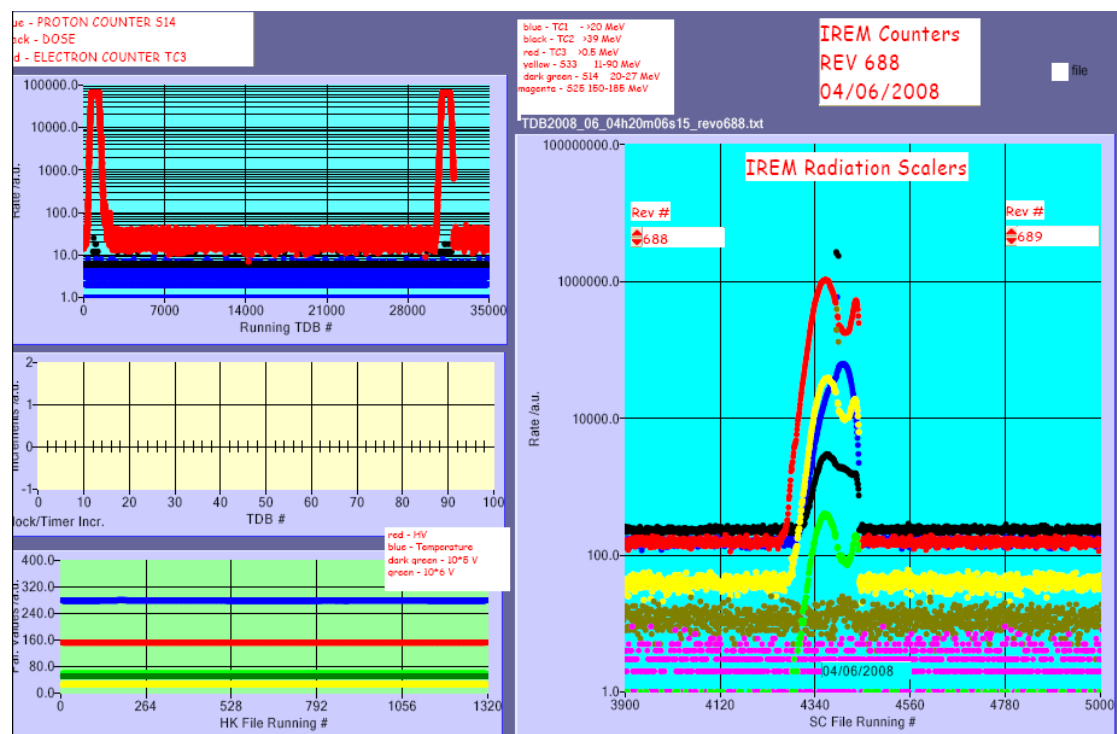
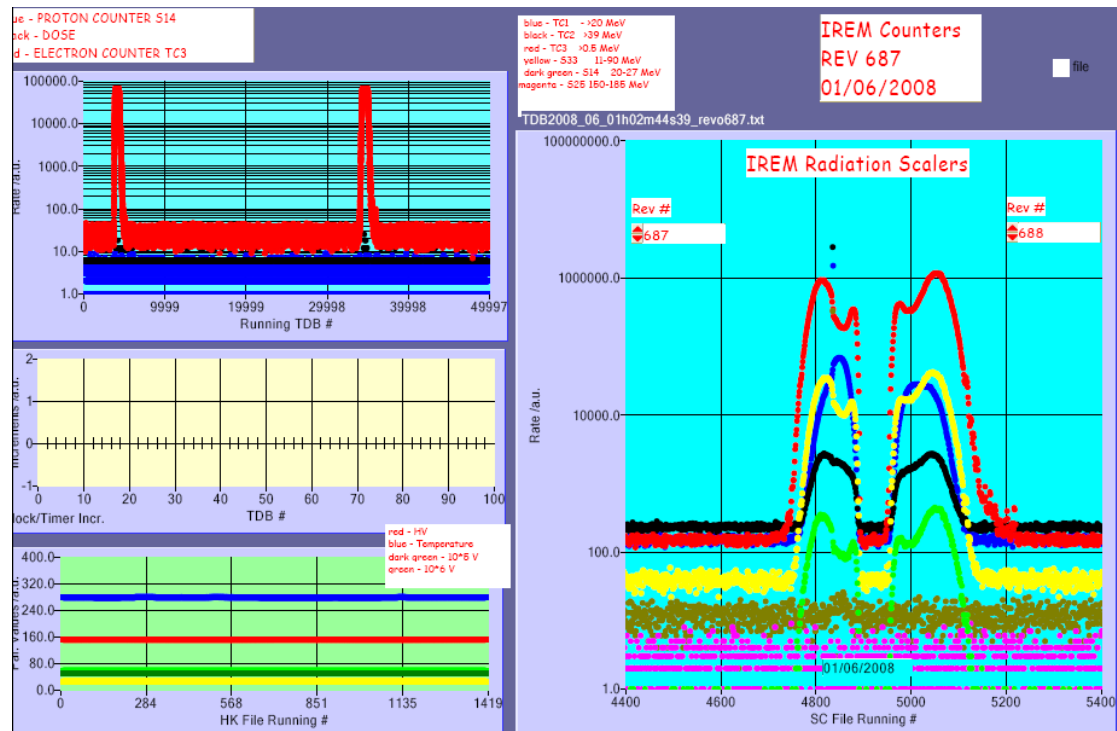
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

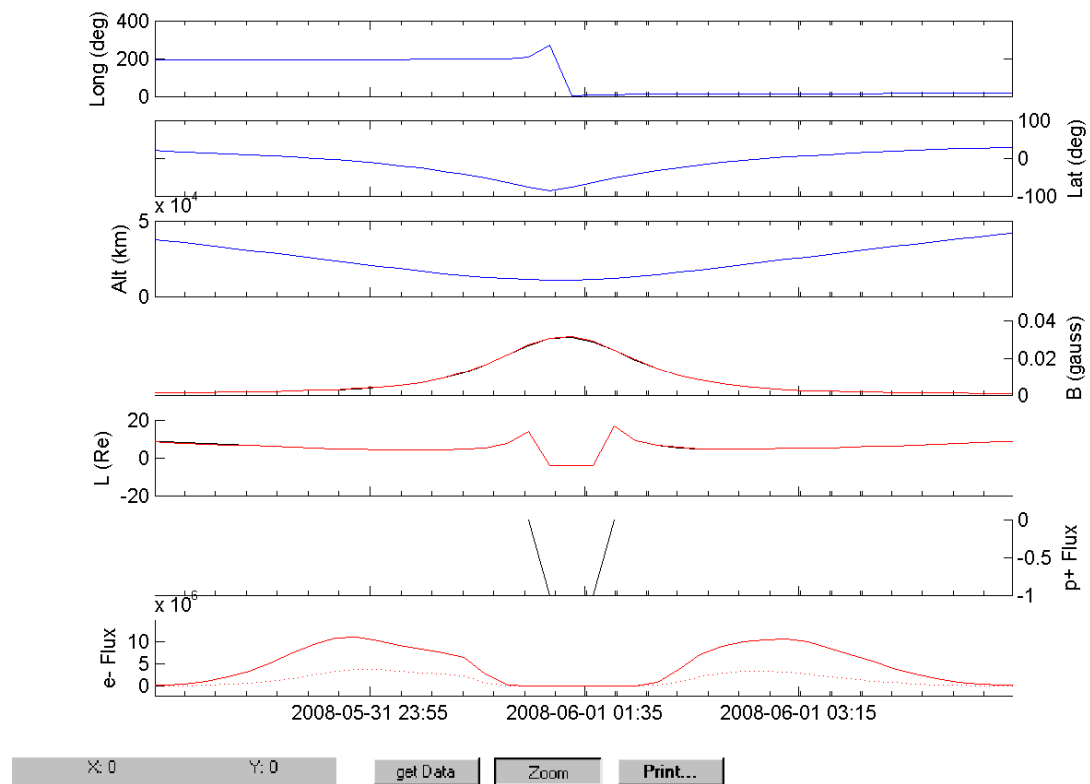
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

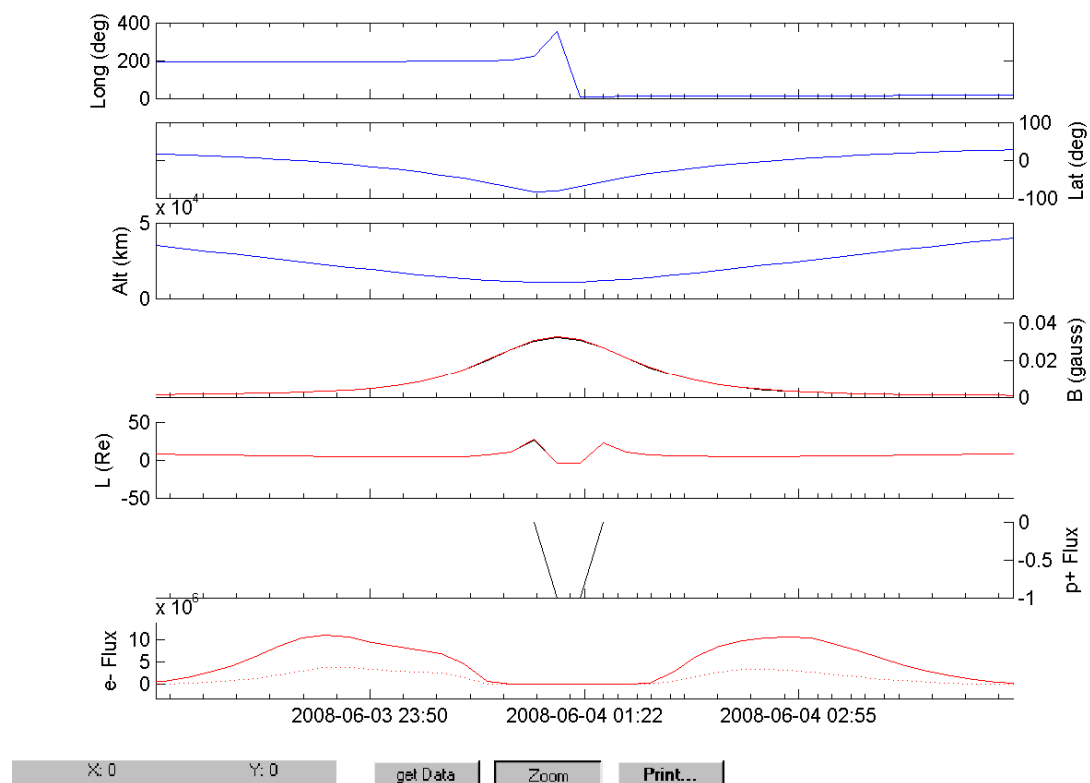


IREM Predicted Radiation Belt Passages

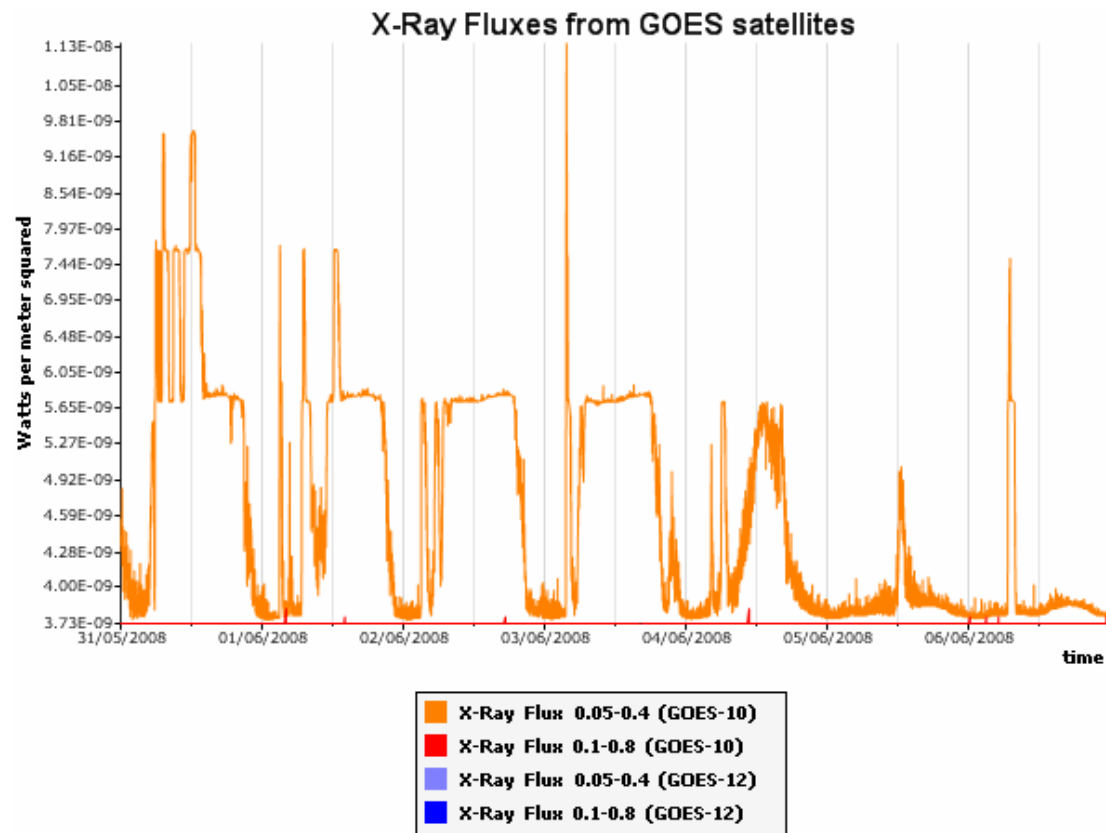
Rev 687



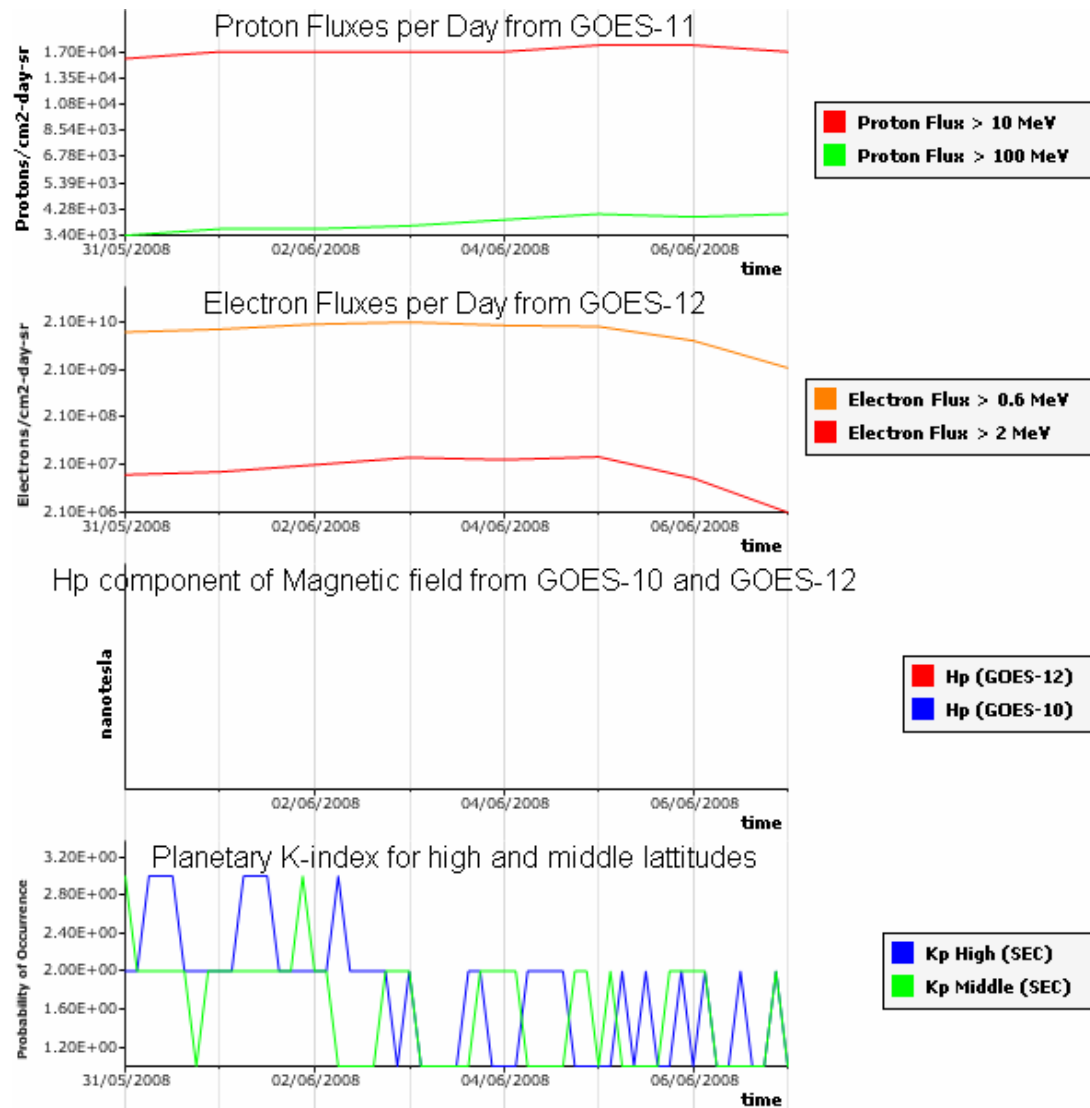
Rev 688



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.