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

INTEGRAL
Mission Report

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

No. 257
Week 34

27.08.07

Routine Phase

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

LIST OF CONTENTS

DISTRIBUTION LIST

Addressees	Copy	Addressees	Copy
D/OPS		ESA HQ	
G. Winters D/OPS	1	D. Southwood D/SCI	1
J. F. Kaufeler OPS-G	1		
N. Bobrinsky OPS-ON	1	ESTEC	
J. Dodsworth OPS-OA	1	J. Louet SCI-P	1
	1		1
	1	ESTEC / PG	
M. Schmidt	1	G. Sarri	
R. Southworth	1		
F. Di Marco	1	ESTEC/RSSD	1
F. Cordero	1	M. Kessler SCI-SD	
M. Walker	1	C. Winkler	
P. Lippi	1	A. Parmar	
R. Lemme	1		
S. Fahmy	1		
O. Bergogne	1	ISDC	
SPACONs	1	T. Courvoisier	1
I. Bayliss	1	R. Walter	1
G. Di Girolamo	1	N. Mowlavi	1
F. Dreger	1	ISDC Shift Team	1
G. Gienger	1		1
S. Pallaschke	1	ALENIA	
W. Hell	1	M. Montagna	
K.J. Schulz	1	F. Ravera	1
M.A. Larsen	1		1
		PI / Instrument Teams	1
M. Butkovic	1	J. P. Roques – SPI	1
D. Heinzer	1	G. La Rosa – IBIS	
U. Feucht	1	P. Ubertini – IBIS	
Shift - Coord	1	S. Brandt – JEM X	1
Scheduling Office	1	E. De Miguel - OMC	1
T. Beck	1	W. Hajdas – IREM	
J. Wardill	1		
M. Unal	1	JPL / Goldstone	1
P. Maldari	1	D. Holmes	1
		J. Valencia	1
		Jesse Velasco	1
Redu		DSN - MPSETD	1
B. Demelenne			1
ESAC	1		
P. Kretschmar			1
V. Gomez SCI-O			1
E. Kuulkers	1		1
C Gonzales	1		1
ESTEC/SCI-A			
Nicola Rando	1		

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 18.08.07 until 24.08.07 (both dates inclusive) and covers the revolutions 592, 593 and 594.

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 three hexagonal dithers of the Galactic bulge region (RA 17:45:36.00, DEC -28:56:00.0), two raster dithers of the Galactic plane region 1 (RA 18:04:41.75, DEC -05:04:48.4), two raster dithers of the Galactic centre (RA 17:45:40.00, DEC -29:00:29.0) and an OMC flat field calibration at attitude (RA 14:33:36.00, DEC -16:24:00.0).

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.

2 slews were missed from TL, during the observation period, due to problem with the selected guide star at the end of open loop slew and on Search/Track process.

The fuel consumption over the period between 17/08/2007 and 24/08/2007 was 0.1279 Kg. The remaining propellant is in the order of 144.8014 Kg.

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

3.1.2 Power

The EPS is working nominally; available power from the arrays is of the order of 2100W.

3.1.3 Thermal

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

3.1.4 OBDH

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

3.1.5 RFS

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

3.2 Payload

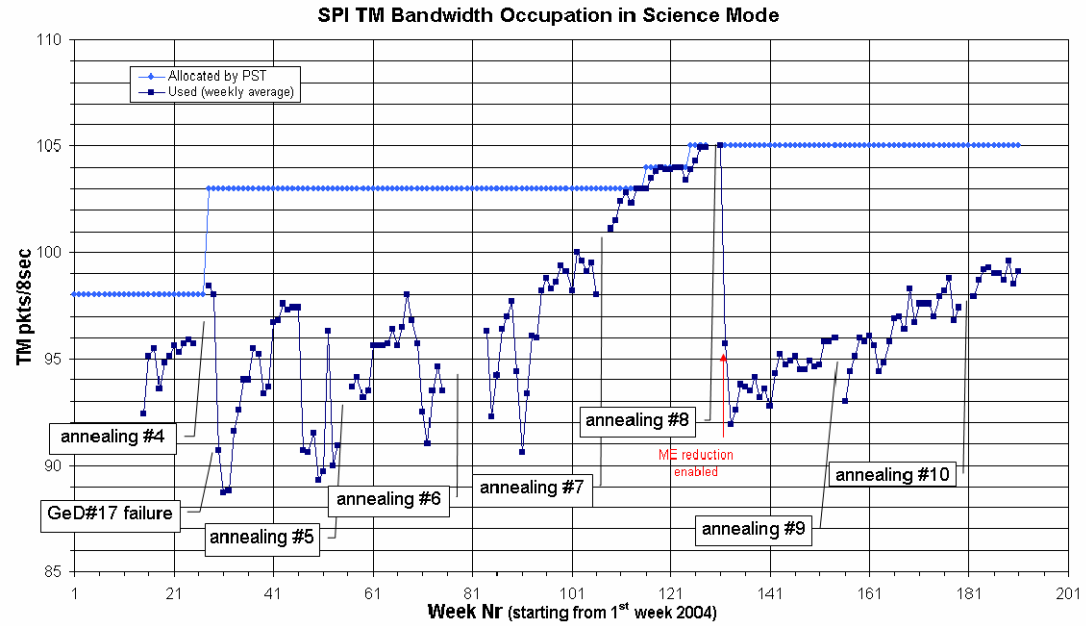
3.2.1 SPI

Following the 10th annealing, which ended on 17th June, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution 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 105 packets/cycle. The average telemetry occupation when the TM allocation was 105 packets/cycle was 99.1 packets/cycle.

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



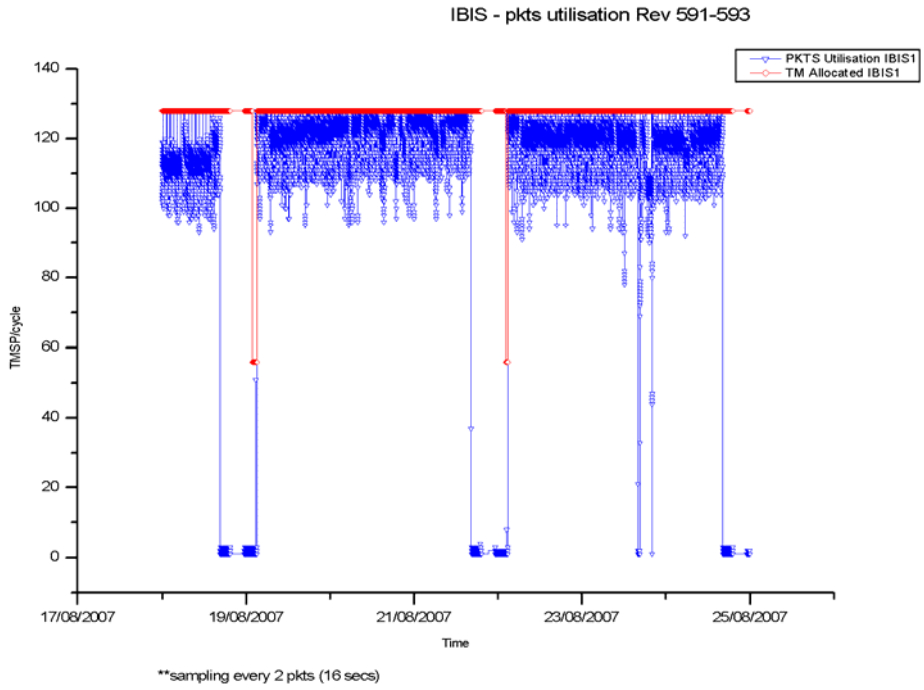
Note: Some more information concerning the SPI operations is provided in the Appendix.

3.2.2 IBIS

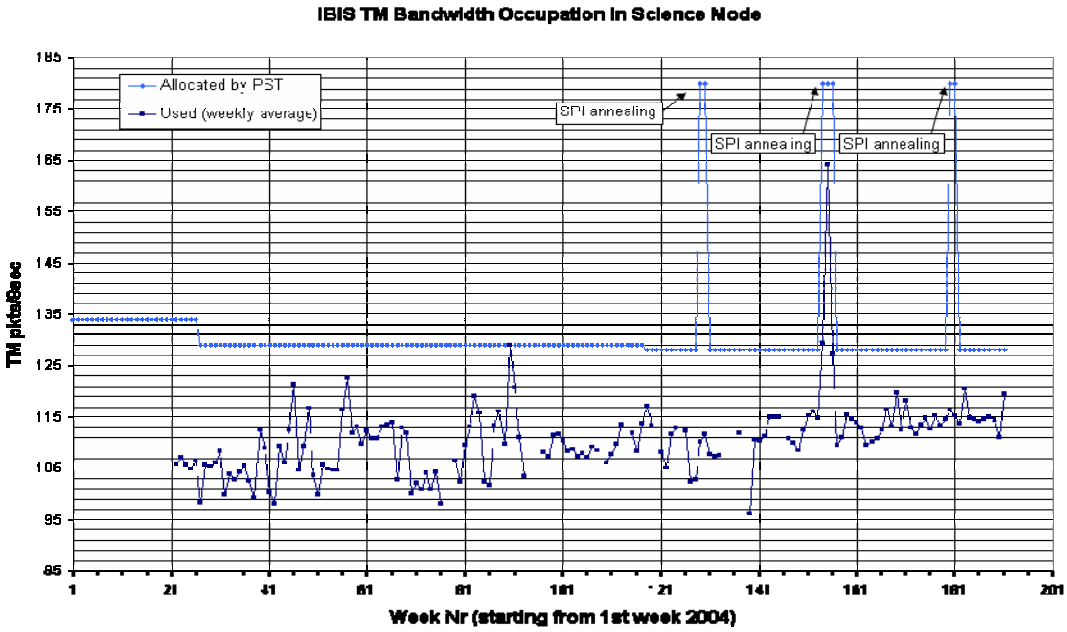
The overall status of the unit is nominal.

During the reporting period, the PST allocation to IBIS was 128 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period (when IBIS was in Science mode) was 119.51 TMPS/cycle, up 8.51 on last week.

A plot of the IBIS TM utilisation during the observation period is shown below:



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, 132 of the 136 planned science pointings for OMC were executed nominally, 3 were shortened and 1 was lost.

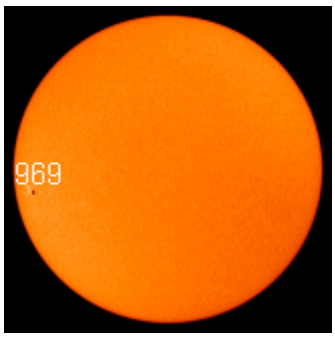
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. For the first 3 days of the week, the sun was blank, sunspot 969 then emerged. It posed, however, no threat of strong flares.



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. One pointing was lost due to ground problems. The overall performance was well over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. A problem with a change of guide star caused a delay in the start of a pointing, and the failure of the automatic TPF updates meant the slew to the perigee attitude had to be conducted manually. The overall performance though, was well over the 95% requirement.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There were, however, 6 occasions of TM drops from Redu, and 1 drop on the bad data link. On one occasion this caused the loss of the OMC data and on another occasion, this resulted in a slight shortening of the OMC part of that pointing. The overall performance was well over the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs are available up to revolution 603. Observations have been planned up to revolution 602. Planning for revolution 603 awaits clarification if and how the Crab calibrations will be done in revolution 604.

No new TSFs have been received this week, the last one is 598.

2. Observation status

No new ECS files have been received this week. The last is for revolution 583.

3. ISOC Science Data Archive

No news.

4. ISOC system

Work is ongoing on Version 16 for a test release the first week of September.

5. Problems

None.

4.3.2 ISDC

Status of ISDC observation processing on 27/08/2007:

- Latest Standard Analysis completed: observation 04200730033 (Galactic disk latitude scans, Revolution 580) on 10/08/2007.

- Latest products archived: observation 04200730033 (Galactic disk latitude scans, Revolution 580) on 10/08/2007.

- Latest observation products sent to the observer: observation 04200730033 (Galactic disk latitude scans, Revolution 580) on 12/08/2007.

5 Special Events

6 Anomalies

The following problems wer reported that impacted operations:

- On DoY 232, at 20:05, link problems with the ground station led to the failure of the OMC commands. The impact was the loss of pointing 05920046.
- On DoY 233, at 07:37, an AOCS problem with 'search and track' caused an interruption in the Timeline. A manual recovery was performed, and the Timeline rejoined at 08:08. The impact was a 1035 second delay in the start of pointing 05920057.
- On DoY 235, at 16:08:12, an IREM SEU (#53) caused OMC and IBIS to switch to SAFE mode. A recovery was performed, with OMC in stand-by at 16:23:09, IBIS in science mode at 16:49. IREM was recovered at 18:25. The impact was the loss of OMC & IBIS data for pointing 05930041.
- On DoY 236, at 13:41, a link problem with Redu caused the OMC commands for pointing 05930062 to fail. The commands were manually uplinked at 13:44. The impact was a shortening of that pointing from 3579 to 3400 seconds.
- At 17:59, the FDS slew update for pointing 05930065 (Slew to perigee attitude) failed to arrive. A manual recovery was performed and completed at 18:17 in time for perigee. There was no impact on science return.

The following anomaly report was entered into the ARTS system this week.

AR id	Date Created	Subject	Segment	Status
INT_SC-202	2007-08-29	IREM Anomaly: Reset of IREM_CSCI S/W #53, 23/08/2007	Payload	Open

7 Future Milestones

The following activities are foreseen in the next few weeks.

- Lunar eclipse on 11th September 2007, at the end of revolution 599.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 592

The observations in revolution 592 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 plane region 1 (RA 18:04:41.75, DEC -05:04:48.4), lasting ~52.7 hours until the end of the revolution.

Revolution 593

The observations in revolution 593 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 plane region 1 (RA 18:04:41.75, DEC -05:04:48.4), lasting ~53.7 hours until the end of the revolution.

Revolution 594

The observations in revolution 594 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 17:45:40.00, DEC -29:00:29.0), lasting ~25.1 hours. This was followed by an OMC flat field calibration at attitude (RA 14:33:36.00, DEC -16:24:00.0), lasting ~3.4 hours, and finally another raster dither of the Galactic centre (RA 17:45:40.00, DEC -29:00:29.0), lasting ~23.2 hours was performed until the end of the revolution.

Throughout these observations, all instruments were in their nominal science modes, except JEM-X2, which is switched off. The TM allocation was IBIS 128; SPI 105; JEM-X1 8; JEM-X2 0; OMC 5, except during the OMC Flat Field Calibration from 2007-08-26T10:03:14Z to 2007-08-26T14:25:06Z, when it was IBIS 90; SPI 85; JEM-X1 8; JEM-X2 0; OMC 63.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2007-08-02T11:01:26.000Z     145.0420    F   Automatic TM processing.
2007-08-04T01:16:18.000Z     145.0150    F   Automatic TM processing.
2007-08-07T01:00:58.000Z     145.0070    F   Automatic TM processing.
2007-08-08T10:31:41.000Z     144.9942    F   Automatic TM processing.
2007-08-10T00:46:01.000Z     144.9782    F   Automatic TM processing.
2007-08-11T11:03:17.000Z     144.9673    F   Automatic TM processing.
2007-08-13T00:34:17.000Z     144.9600    F   Automatic TM processing.
2007-08-14T10:51:56.000Z     144.9388    F   Automatic TM processing.
2007-08-16T00:19:20.000Z     144.9293    F   Automatic TM processing.
2007-08-17T10:39:55.000Z     144.8650    F   Automatic TM processing.
2007-08-19T00:07:11.000Z     144.8560    F   Automatic TM processing.
2007-08-20T09:38:35.000Z     144.8440    F   Automatic TM processing.
2007-08-21T23:55:52.000Z     144.8257    F   Automatic TM processing.
2007-08-23T09:56:35.000Z     144.8116    F   Automatic TM processing.

This report was generated  Fri Aug 24 08:00:21 GMT 2007
```

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, 18/08/2007 – 24/08/2007

The AOCS operations were executed from the Automatic Timeline.

During this period, 71 Open Loop Slews, 77 Closed Loop Slews and 5 Momentum Biases were executed.

2 slews (CSL) were missed from TL, during the observation period, due to problem with the selected guide star at the end of an OSL and problem on the S/T process (slew star not found in slot #2).

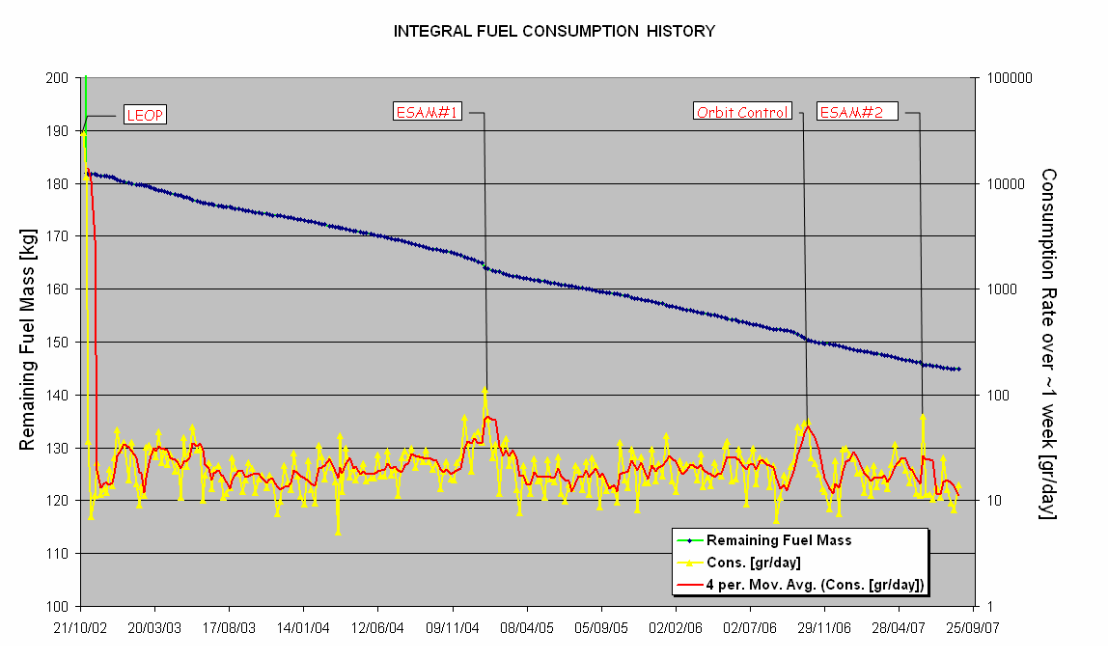
This is equivalent to ~ 1.3 % of the total number of slews planned (148).

Orbit Control

No update.

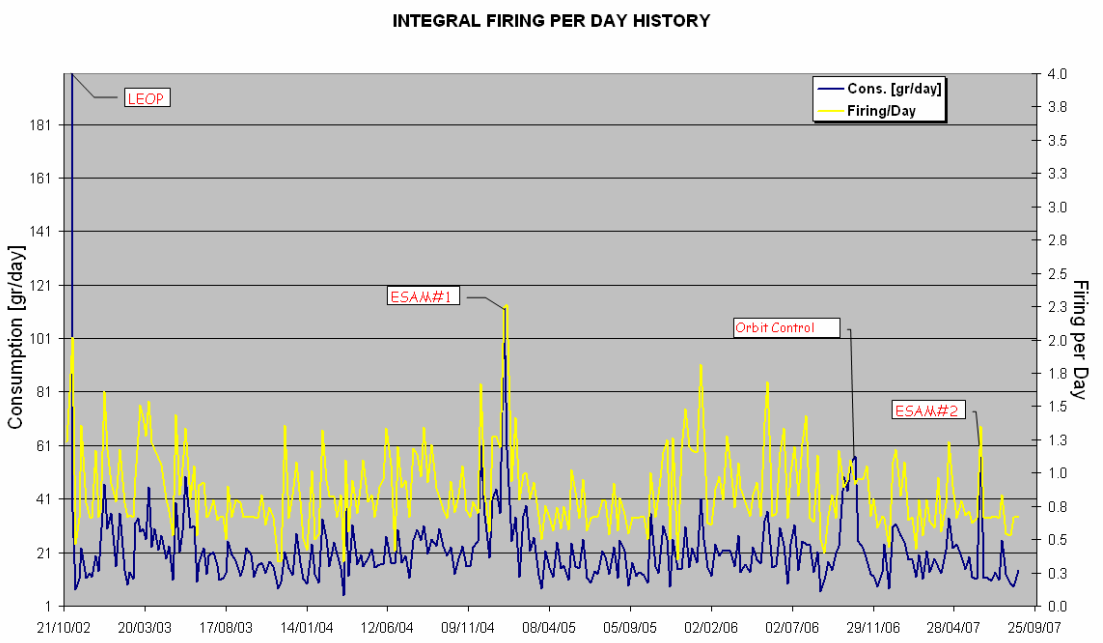
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 24/08/2007 is reported in the plot below.



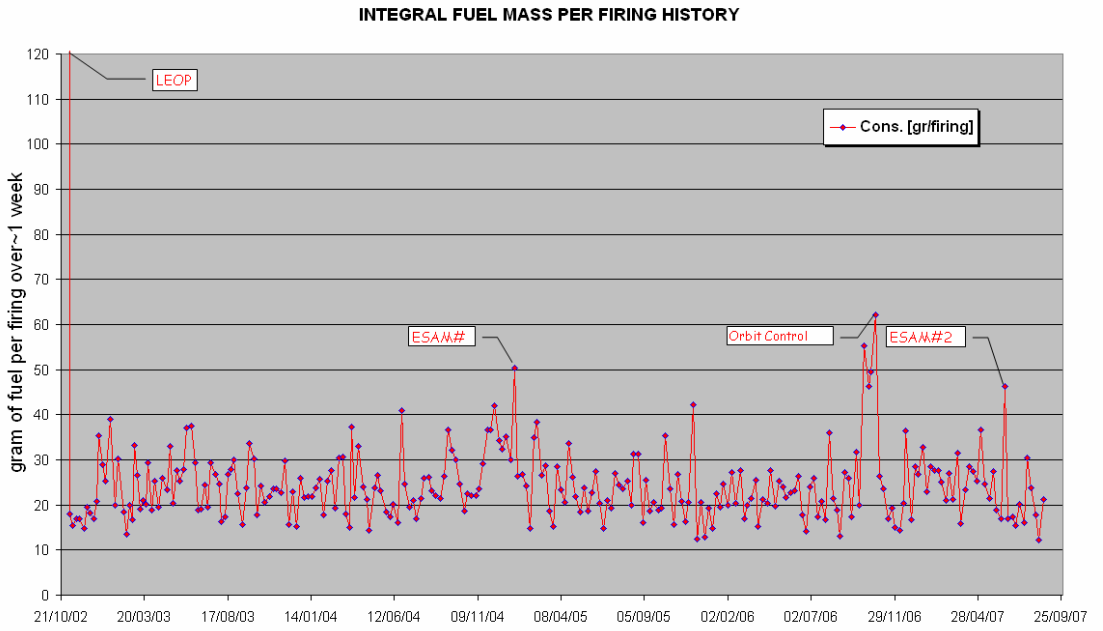
The plot above consider the ESAM fuel consumption spread over period of ~1 week.

The firing per day over the period between 01/11/2002 and 24/08/2007 is reported in the plot below.



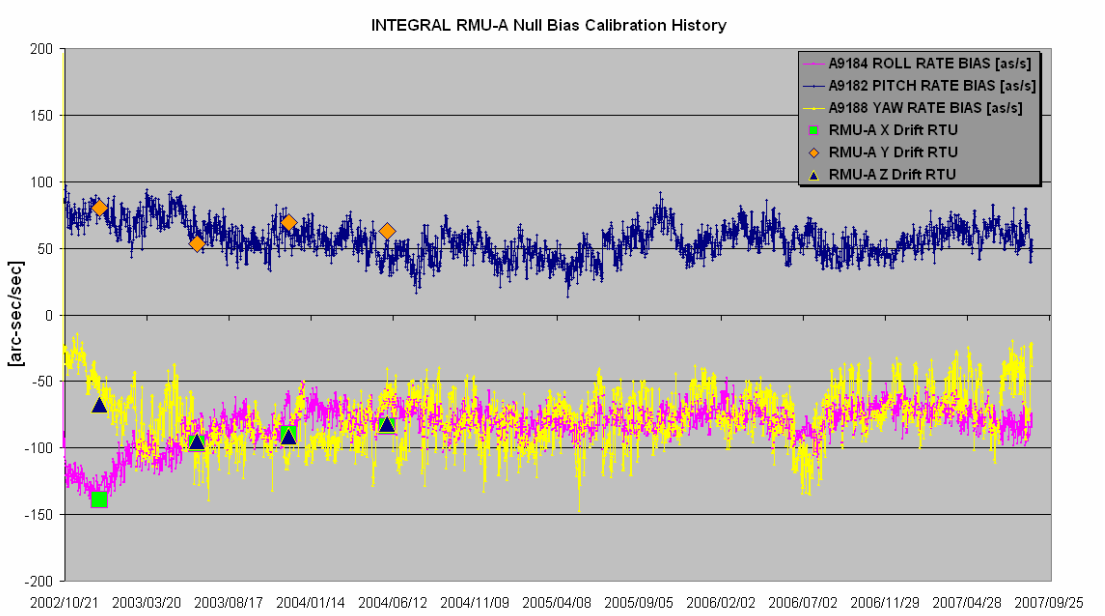
The plot above consider the ESAM fuel consumption spread over period of ~1 week.

The fuel per firing over the period between 01/11/2002 and 24/08/2007 is reported in the plot below.

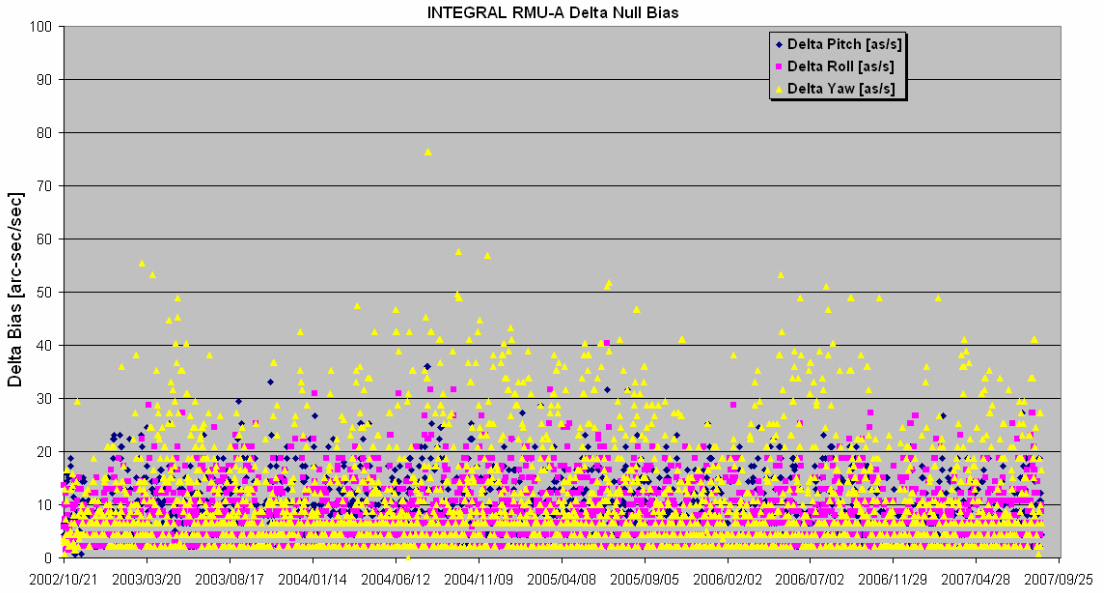


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 24/08/2007 is reported in the plot below.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over period between 01/11/2002 and 24/08/2007 is reported in the plot below.



18/08/2007 (Day of Year 230, Revolution 591)

Nothing to report.

19/08/2007 (Day of Year 231, Revolution 591-592)

Nothing to report.

20/08/2007 (Day of Year 232, Revolution 592)

Nothing to report.

21/08/2007 (Day of Year 233, Revolution 592)

Problem with the S/T process: at 06:30z, the S/T process failed and no slew star was reported in slot#2 for the execution of slew 05920057: the slew star selected (ID 5081- 795) was a star of Mi 8.17. The threshold set for the S/T was likely at the limit of the star magnitude and this caused the STR to not find the star and the slew for PID 05920057 to stop commanding (PTV failure).

A manual recovery was then started at 07:43z, from attitude of PID 05920056 to the attitude of PID 05920057. At 08:06z the slew ID 05920058 was manually updated in TL.

The following slew was missed in TL: 05920057(CSL).

22/08/2007 (Day of Year 234, Revolution 592-593)

Nothing to report.

23/08/2007 (Day of Year 235, Revolution 593)

Nothing to report.

24/08/2007 (Day of Year 236, Revolution 593)

Problem on the links with REDU station: at 13:41z were reported problems on the VC0 and VC7 links to REDU station. As consequence, the update for slew 05930063 was not performed due to command verification failure.

A manual recovery was performed at 13:48z to manually update the next slew 05930063 in TL.

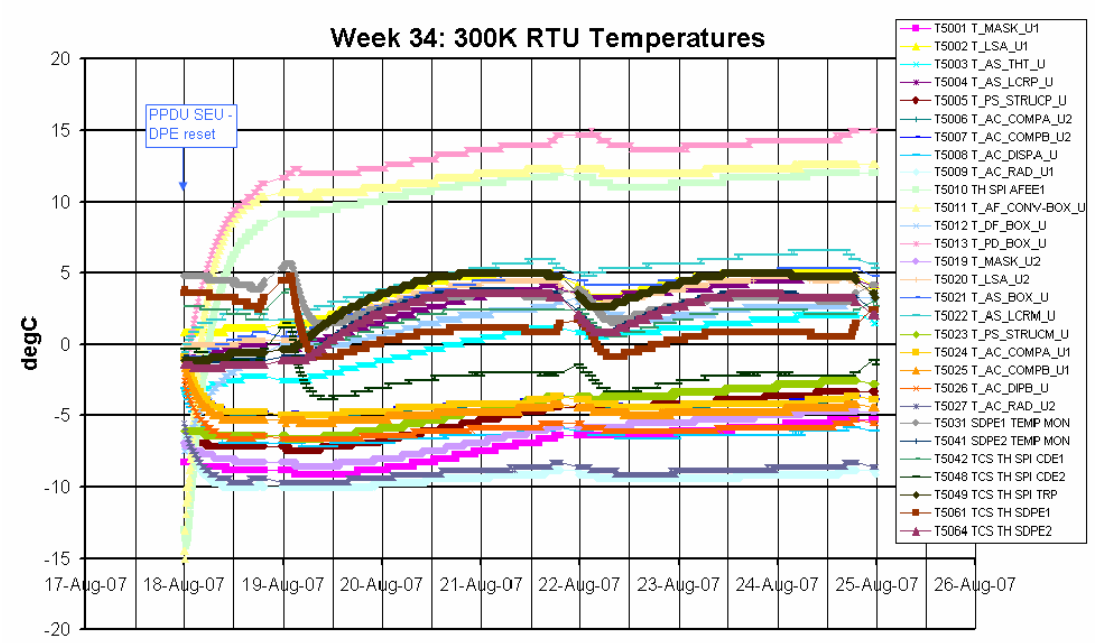
ACC OTF thresholds exceeded: at 17:55z at the end of slew ID 05930064 (OSL), were generated several on event messages (event type) coming from the ACC and flagging an OTF (on target flag) thresholds exceeded on Yaw and Pitch axis. This problem was caused by the guide star picked at the end of the OSL (problem in the determination of the star system barycentre). This caused the update process for slew ID 05930065 to fail.

A manual recovery was performed at 17:59z from attitude of PID 05930064 to the attitude of PID 05930065. The next activity in TL (CGS) was manually updated in TL.

The following slew was missed in TL: 05930065(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.

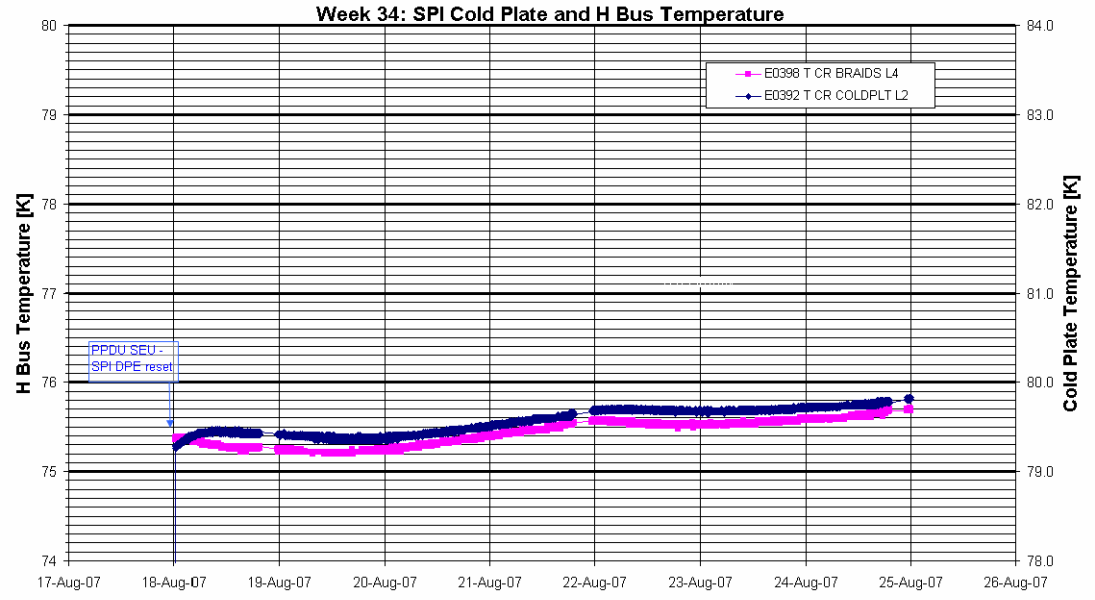


Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range 80K +/-1K.

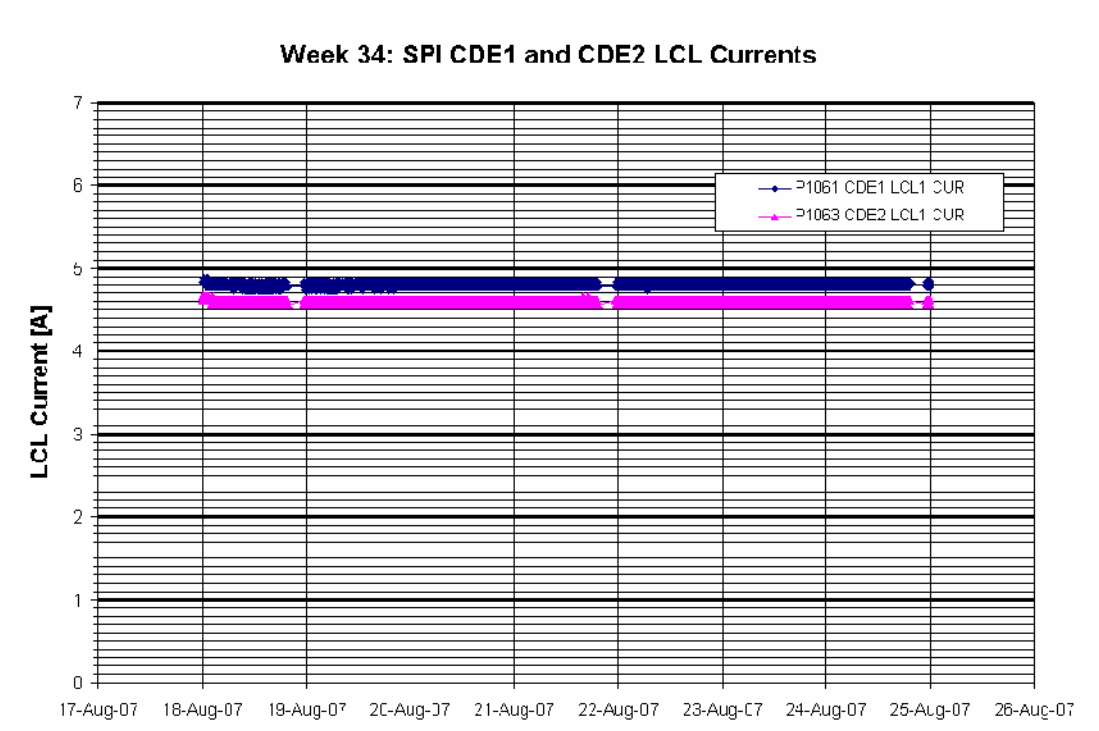
The stroke of all four compressors was set 40 throughout the week with the average CDE LCL currents as follows:

- CDE1 LCL Current = 4.80A
- CDE2 LCL Current = 4.59A

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

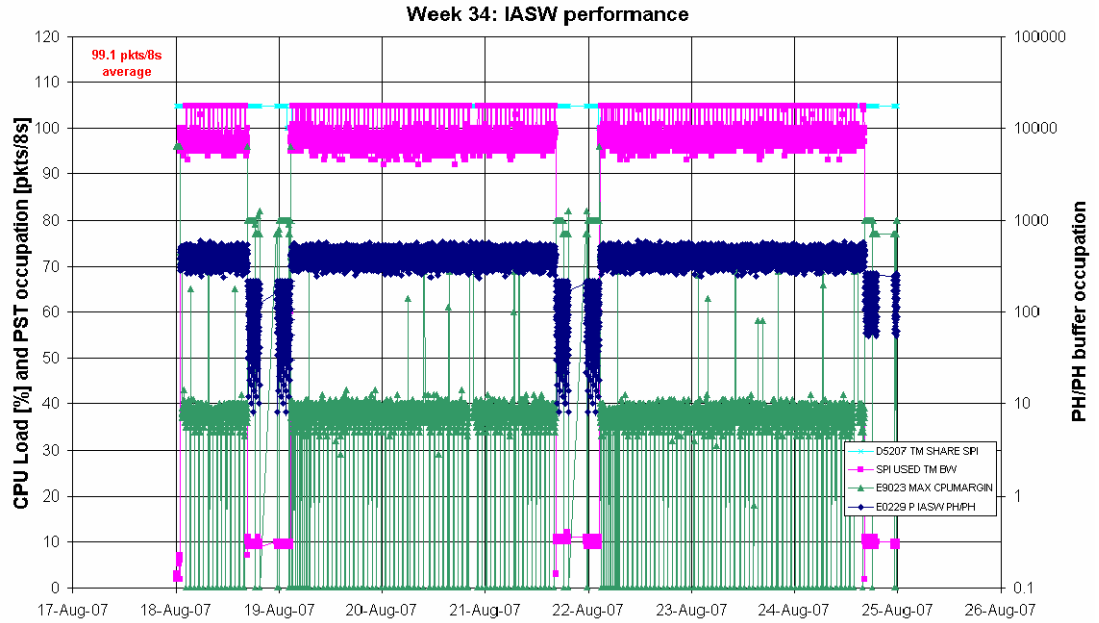


The following plot shows the evolution of the CDE currents during the reporting period.



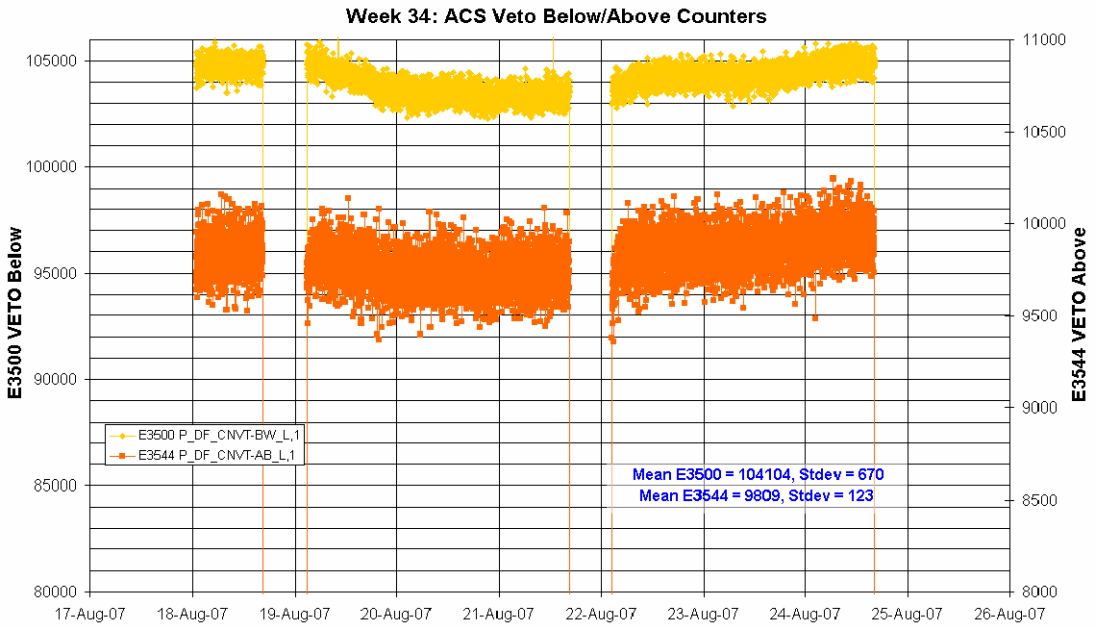
DPE & IASW: The DPE health and IASW performance is nominal. The IASW version installed is v433 patch #1 with the spectra scaling factor set to 9/19 SE. The average TM bandwidth occupation of SPI was 99.1 packets/cycle over the science window, when the TM allocation was 105 packets/cycle.

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



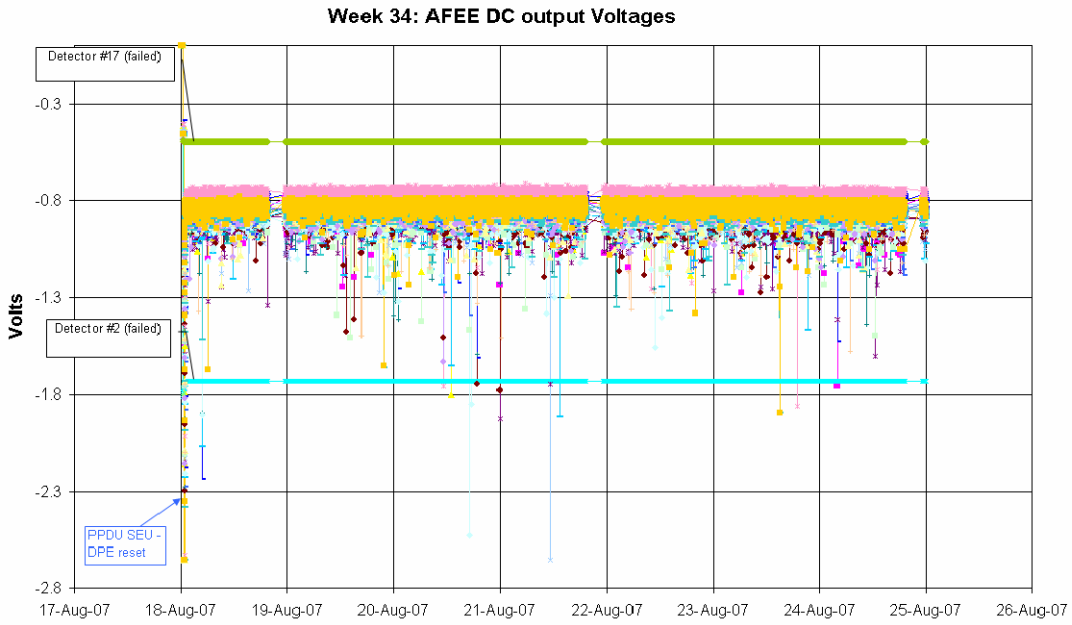
ACS: The performance of the ACS is nominal, except for FEE #81 which remains switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is still OFF due to the anomaly on 5/8/2003 (INT_SC-61).

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

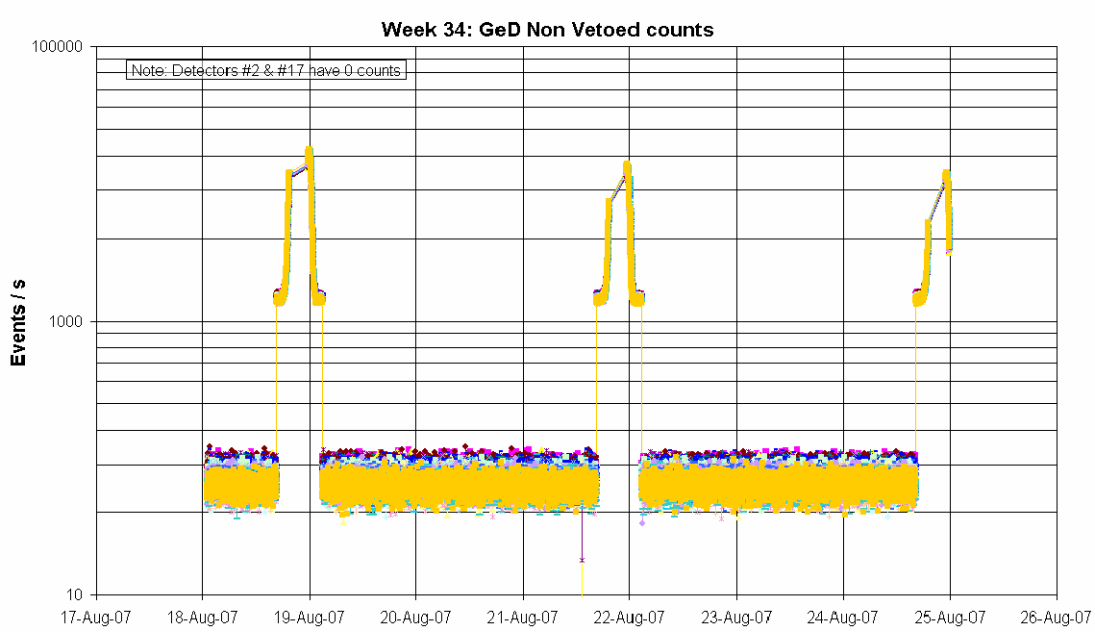


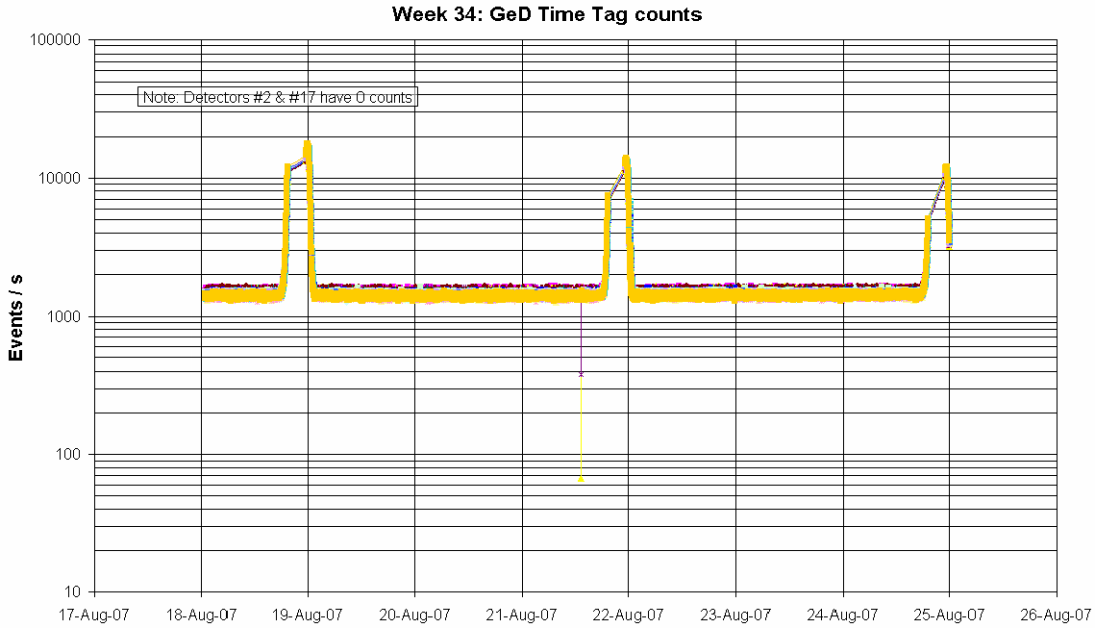
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution and is therefore operated at a lower HV setting of 3.5kV (instead of 4kV).

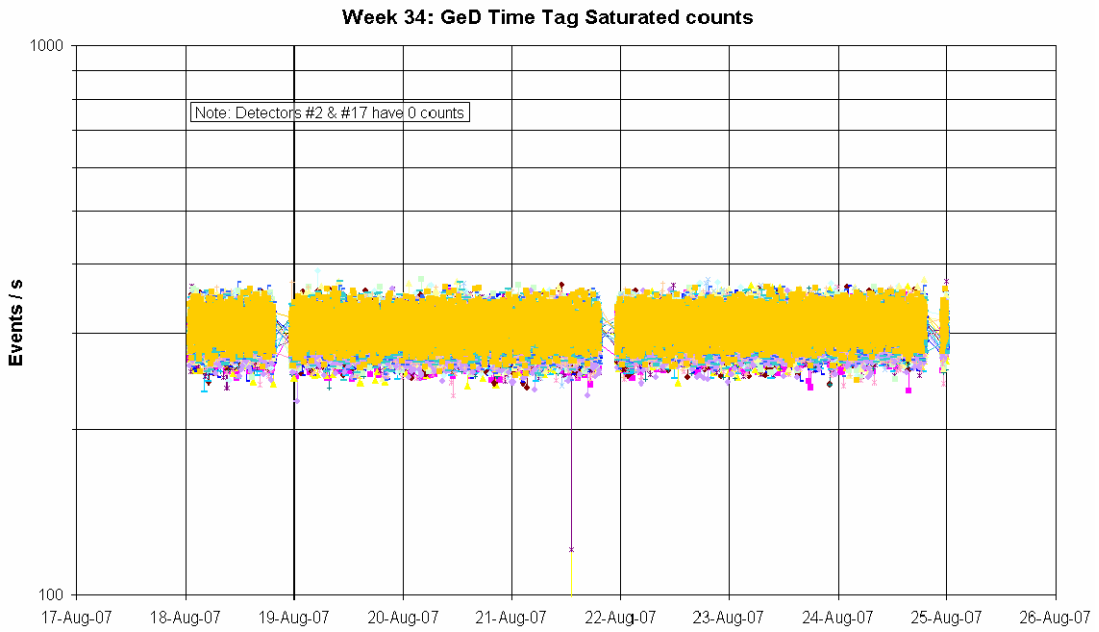
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004.



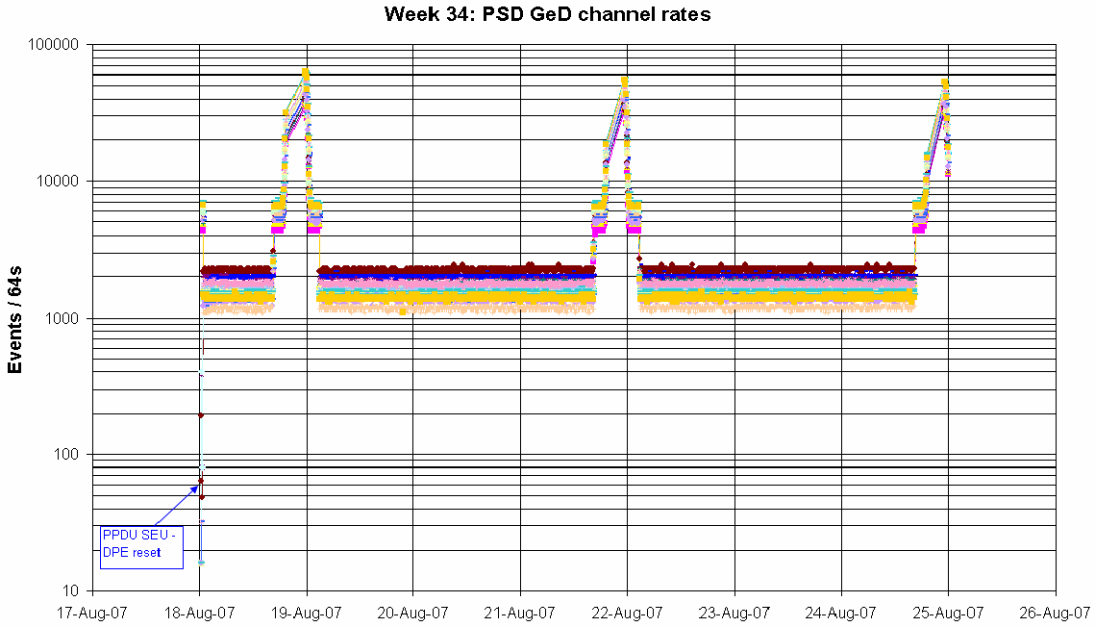
DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.


Week 34: GeD Non Vetoed counts
Note: Detectors #2 & #17 have 0 counts
Events / s
100000
1000
10
17-Aug-07
18-Aug-07
19-Aug-07
20-Aug-07
21-Aug-07
22-Aug-07
23-Aug-07
24-Aug-07
25-Aug-07
26-Aug-07


Week 34: GeD Time Tag counts
Note: Detectors #2 & #17 have 0 counts
Events / s
100000
10000
1000
100
10
17-Aug-07
18-Aug-07
19-Aug-07
20-Aug-07
21-Aug-07
22-Aug-07
23-Aug-07
24-Aug-07
25-Aug-07
26-Aug-07



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



Event Log:

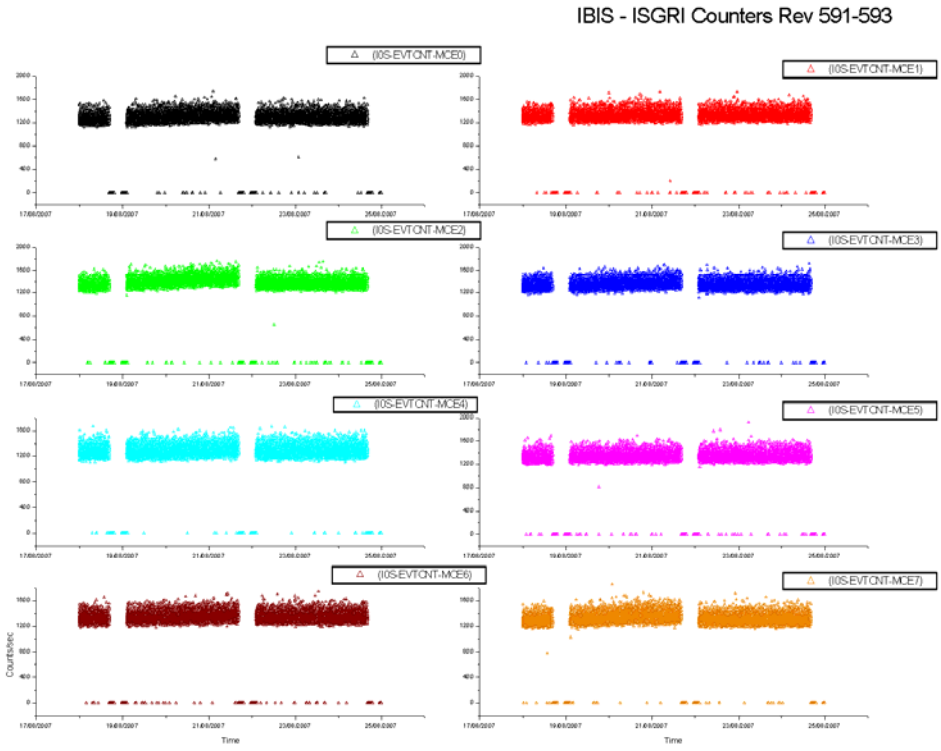
The following non-nominal events occurred on SPI during the reporting period:

- 97 occurrences of OEM APID 1024 ID 243 EXCEPTION SPI1 SPECTRA BUILDING NOT COMPLETED were received throughout the week. As they were each single occurrences, no action was taken. However, as the occurrence of this OEM is becoming more frequent, the SPI PI has been consulted to check whether a modification of the spectra scaling factor may be required.
- On 2007-08-20 at 03:09:43Z the TM parameter E2115 (Plastic scintillator temperature) went OOL Low, returning within limits at 05:39:03Z.

- On 2007-08-22 at 02:37:38Z, during the reconfiguration of SPI at radiation belt exit, the TM parameters E3825, E3826 and E3828- E3831 all went OOL with value = 0 raw. These are the PSD +/-5V analogue and some PSD board temperatures. They returned within limits when the next packet was received at 02:38:42Z.

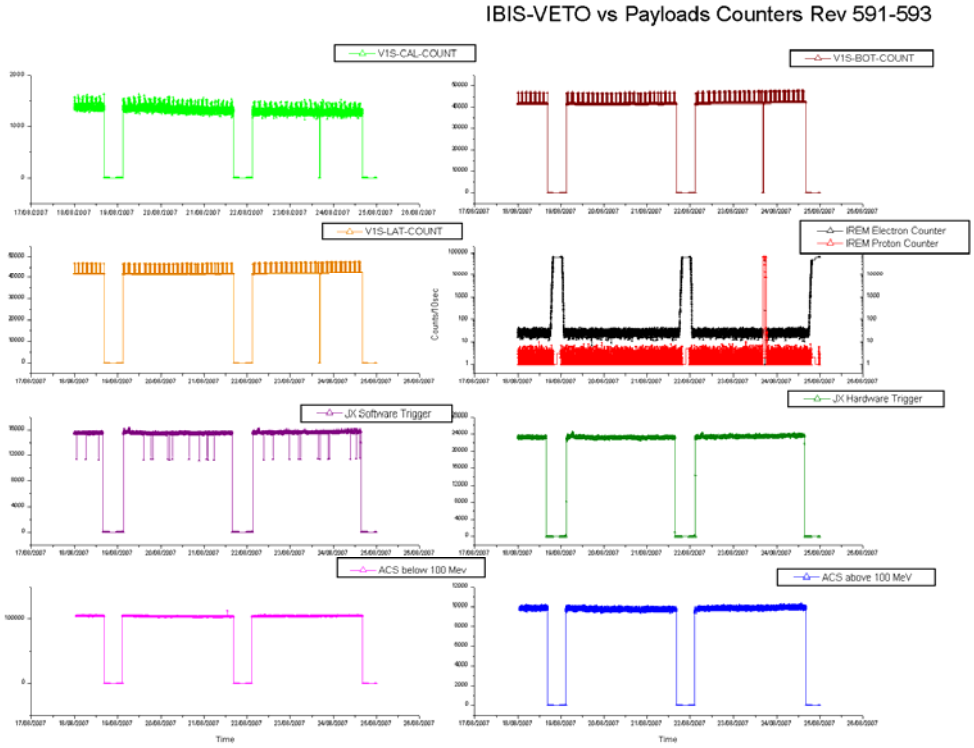
8.3.3 IBIS Operations

IBIS Event Counters Plots
ISGRI Counters:



**sampling every 4 pkts (32 secs)

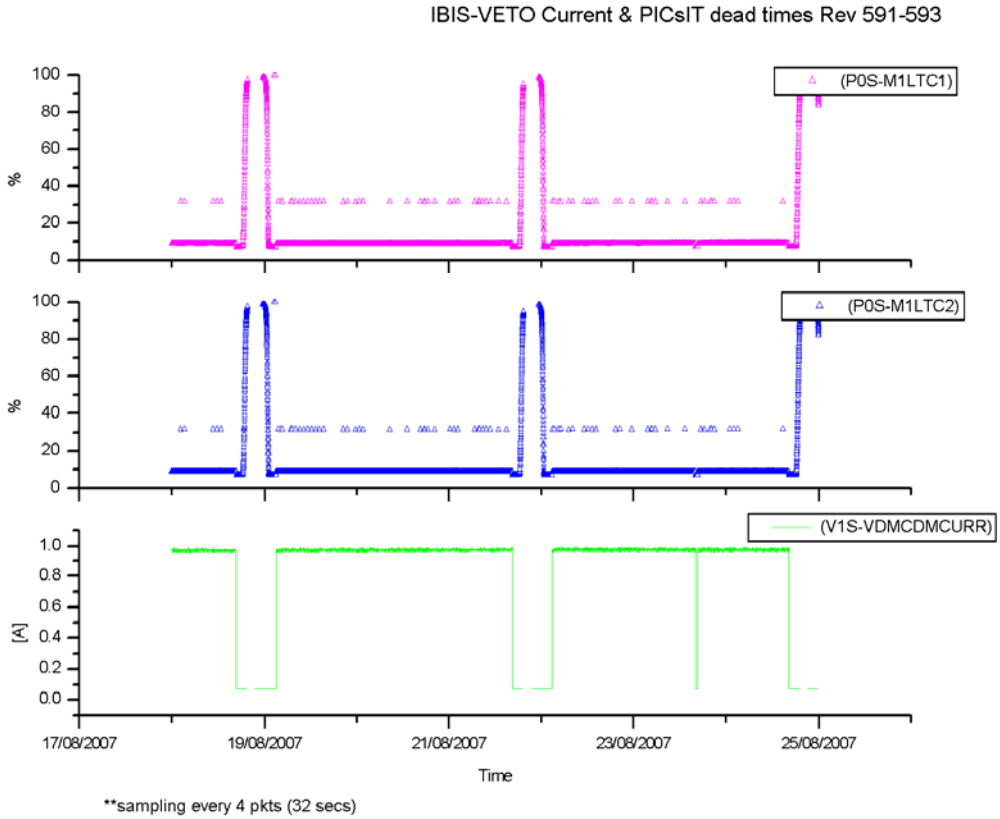
VETO vs Payloads Counters:



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

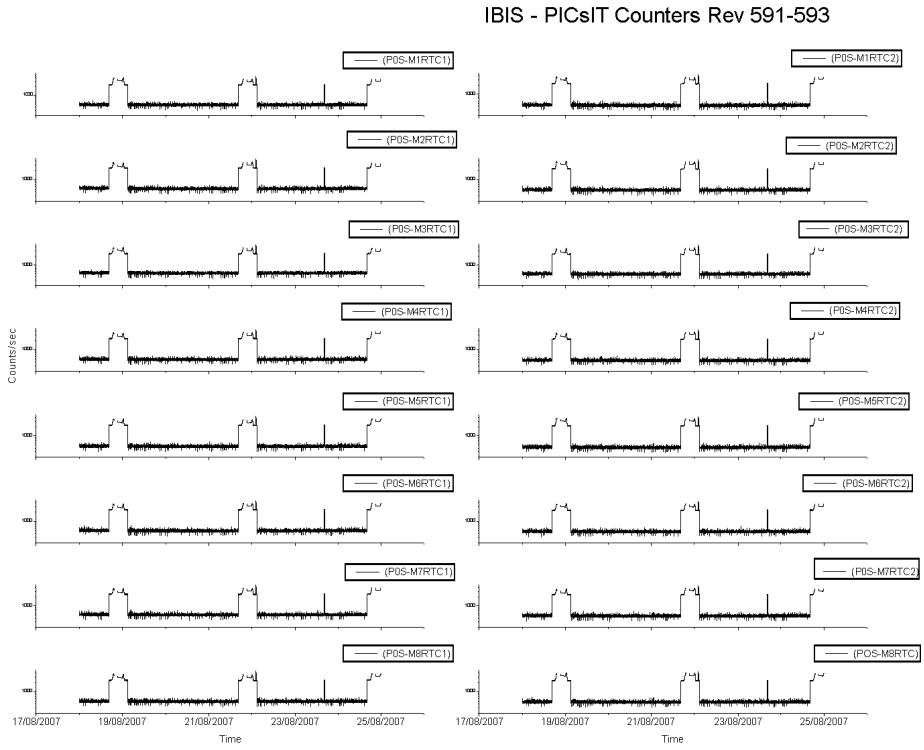
The week was characterised by low radiation as reported by the payload.

VETO Current:



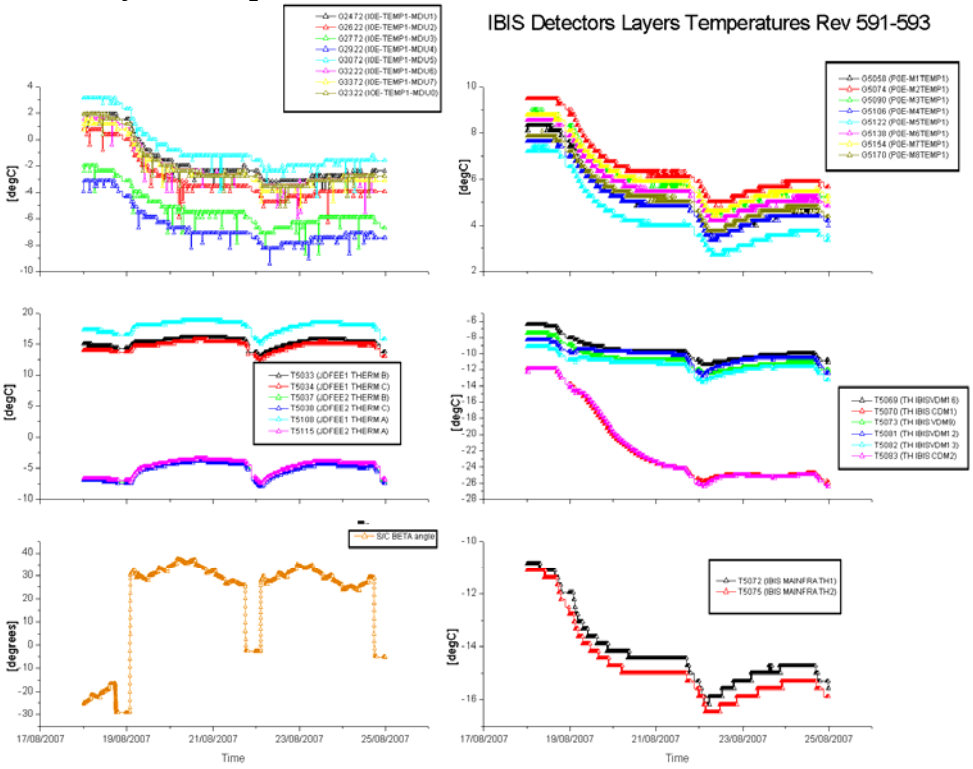
**sampling every 4 pkts (32 secs)

PICsIT Counters:



**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures:



**sampling every 8 pkts (64 secs)

IBIS daily report:

The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), G5002 (P0S-Mi_RTC1) and G5003 (P0S-Mi_RTC2) families and G2000 family (I0E-OVFWPXADD-Mi) were received during the radiation belt passages.

2007-08-18 (DOY 230, Rev 591-592)

IBIS operations executed nominally.

2007-08-19 (DOY 231, Rev 592)

At 02:37:05Z TM parameter G2083 (number of events triggering the ISGRI MCE5 per second) went OOL low (value = 0). This was just before radiation belt exit of revolution 592. As it returned within limits of its own accord at 02:39:13Z no action was taken.

2007-08-20 (DOY 232, Rev 592)

At 20:10:41Z TM parameter G8080 (Valid event rate on HBRA) went OOL High, indicating an overflow error. As it returned within limits at the next TM cycle no action was taken.

2007-08-21 (DOY 233, Rev 592-593)

At 09:45:45Z TM parameter G8080 (Valid event rate on HBRA) went OOL High, indicating an overflow error. As it returned within limits at the next TM cycle no action was taken.

2007-08-22 (DOY 234, Rev 593)

At 02:41:13Z TM parameter G2097 (Number of events triggering the MCE6 per second) went OOL low (value = 0). As it returned within limits of its own accord at 02:41:53Z no action was taken.

At 09:40:33Z TM parameter G6061 (Veto calibration source counter) went OOL Warning Low, returning within limits at the next TM cycle.

2007-08-23 (DOY 235, Rev 593)

At 12:24:25Z and again at 22:23:13Z TM parameter G6061 (Veto calibration source counter) went OOL Warning low. As on each occasion it returned within limits at the next TM cycle no action was taken.

Due to an IREM SEU (see anomaly report INT_SC-202), IBIS transitioned autonomously to Safe configuration at 16:08:20Z It was recovered as follows:

- 16:33:49Z FCP_IBIS1_0803 IBIS EXIT FROM SAFE MODE
- 16:46:06 Z ED GESTAN02 uplinked with the planned observation parameters and commanding to IBIS from the Timeline re-enabled.

At 18:59Z TM parameter X7500 went OOL, indicating the histogram process had stopped. This was verified by the other telemetry and the following recovery procedure was executed to resume the histogram accumulation and download process:

- 20:10:31Z FCP_IBIS1_0312
- 20:16:50Z TC G0129 uplinked to return IBIS to Science Standard mode.

IBIS operations continued nominally.

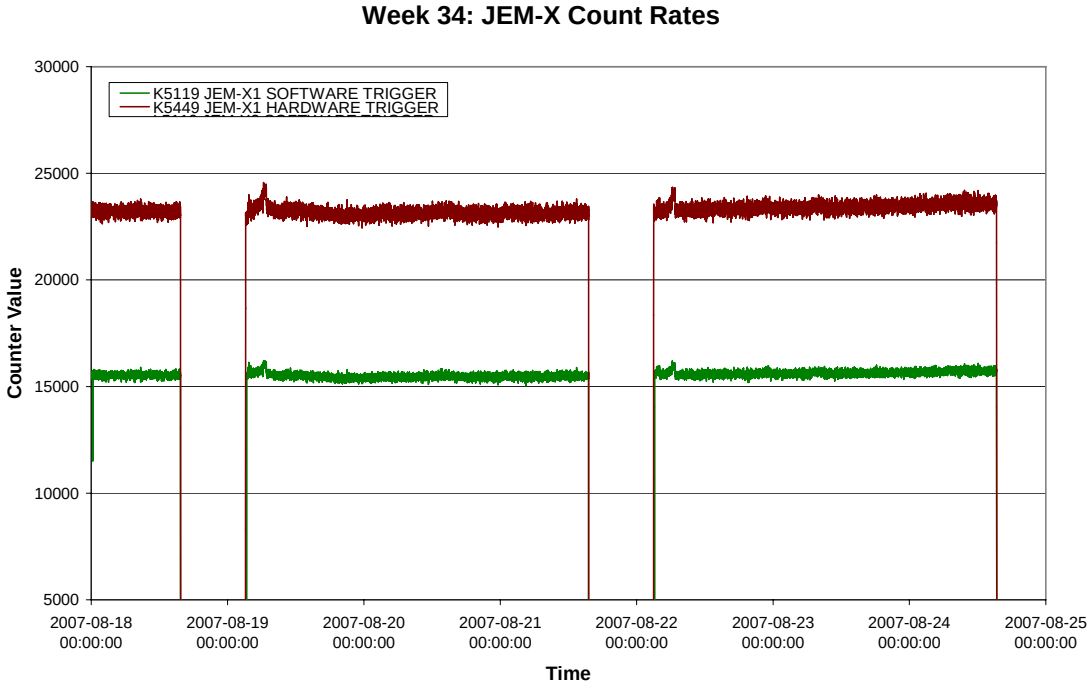
2007-08-24 (DOY 236, Rev 593-594)

At 02:15:53Z TM parameter G6061 (Veto calibration source counter) went OOL Warning Low, returning within limits at the next TM cycle. No action was taken however if this parameter continues to toggle OOL Low (due to the nominal radioactive decay of the calibration source) the limit will be updated in the next IODB release.

8.3.4 JEM-X Operations

JEM-X Count Rates

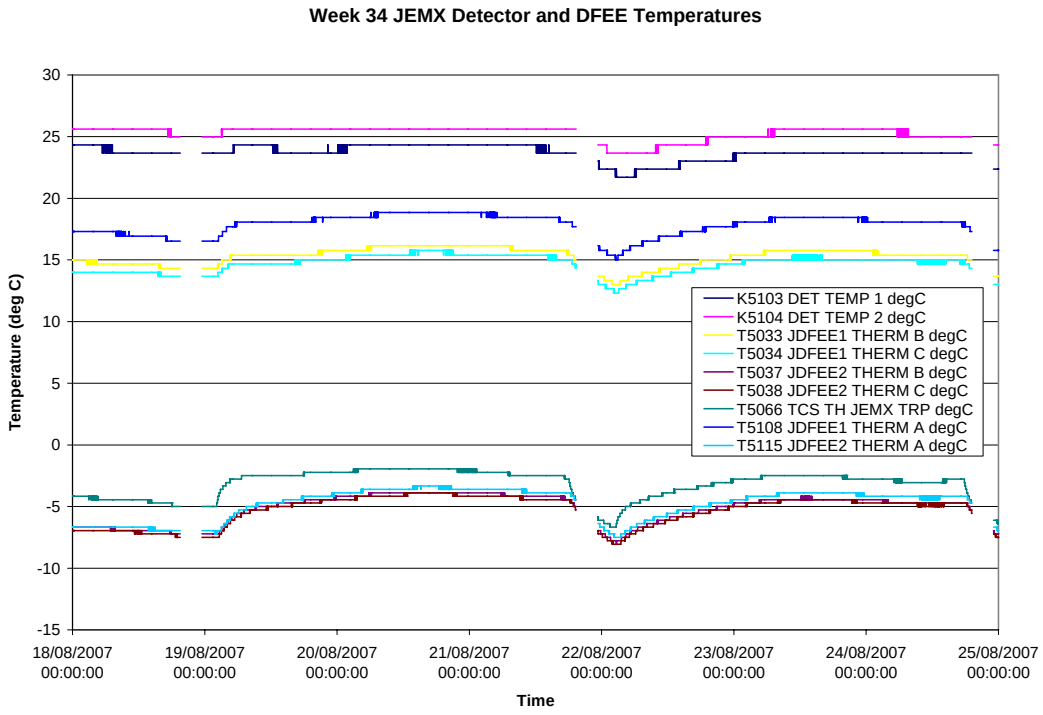
JEM-X count rates over the reporting period are displayed in the following graph[1].



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

JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph[2].



JEM-X Daily Report

2007-08-18 (DOY 230, Rev 591) to 2007-08-22 (DOY 234, Rev 593)

JEM-X1 operations executed nominally.

2007-08-23 (DOY 235, Rev 593)

At 16:08:54 JEMX parameters K5315, K5316 & K5317 went Out-of-Limits due to an IREM SEU (#53). There was no impact as the reaction has been disabled.

2007-08-24 (DOY 236, Rev 594)

JEM-X1 operations executed nominally.

8.3.5 OMC Operations

2007-08-18 (DoY 230, Rev 591) to 2007-08-19 (DoY 231, Rev 592)

Nothing to report.

2007-08-20 (DoY 232, Rev 592)

[2] Data sampled (1 frame in 8)

At 20:05, link problems with the ground station lead to the failure of the OMC commands. The impact was the loss of pointing 05920046.

2007-08-21 (DoY 233, Rev 592)

At 07:37, an AOCS problem caused an interruption in the Timeline. A recovery was performed, and the OMC commands manually sent. The impact was a delay in the start of pointing 05920057 causing that pointing to be shortened from a planned 3579 to 2544 seconds.

2007-08-22 (DoY 234, Rev 593)

Nothing to report.

2007-08-23 (DoY 235, Rev 593)

At 16:08:12, an IREM SEU (#53) caused OMC to switch to SAFE mode. A recovery was performed, and the unit returned to Stand-by at 16:23:09. The impact was that pointing 05930041 was cut short from a planned 3579 to 2456 seconds.

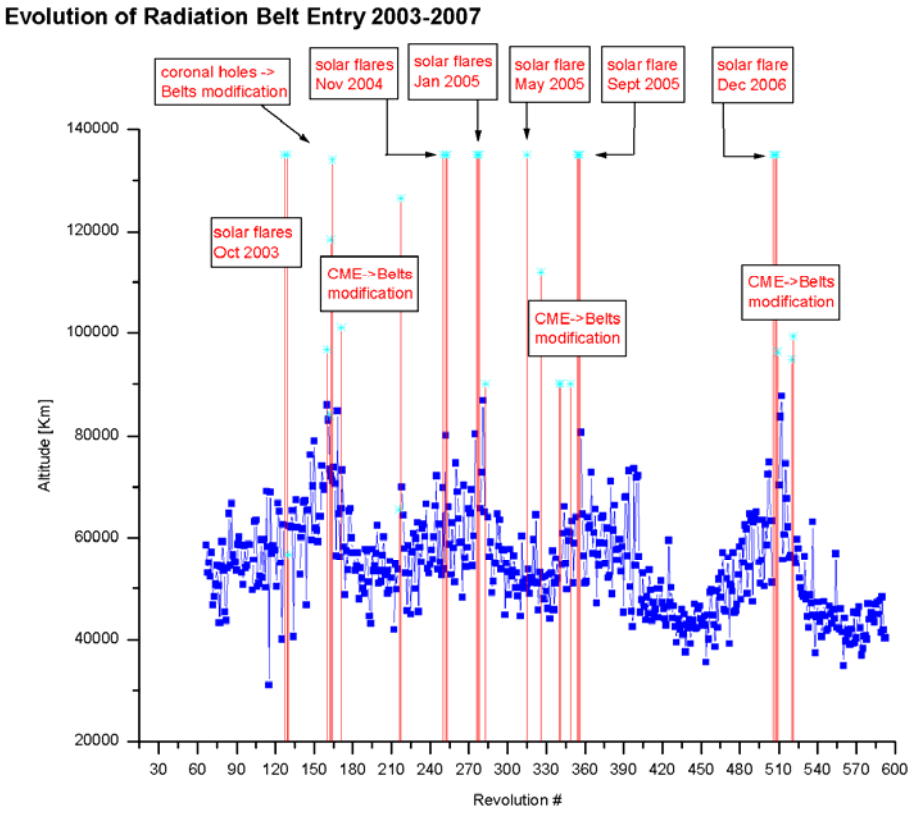
2007-08-24 (DoY 236, Rev 594)

At 13:41, a link problem with the ground station caused the OMC commands for pointing 05930062 to fail. The commands were manually uplinked at 13:44. The impact was a shortening of that pointing from 3579 to 3400 seconds.

On DoY 230 at 16:39:39, DoY 233 at 16:27:48 and DoY 236 at 16:16:36 OMC went to SAFE mode nominally, at the radiation belt entry time as set in the Broadcast Packet.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

DoY 2007.235 (23/08/2007):

At 16:08Z, a local reset of the IREM CSCI S/W (SEU #53) 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 at 2007.235.16.08Z at 147239.5 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 16:56Z using procedure CRP_SYS_2570. The first dump of the status word after the anomaly reported a value of BCC0 HEX = 48320 DEC = 1011110011000000, 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) A dump of all the registers gave a status word BC80 HEX = 48256 DEC = 1011110010000000, ie. the unit was still reporting the status as if it was in Integral

mode but the Checksum Failure flag was this time OFF and the checksum counter in the register number 3 incremented by 1 unit.
7) The patch was performed successfully with the correct re-starting of the S/W following procedure FCP_RM_0081. The operation was completed at 18:25Z.

The IREM automatic transition to Standard Mode affected the instruments by forcing them to automatically enter Safe configuration, except for SPI and JEM-X whose automatisms are disabled according to the PIs request. OMC was recovered at 16:23:09Z and IBIS at 16:49Z.

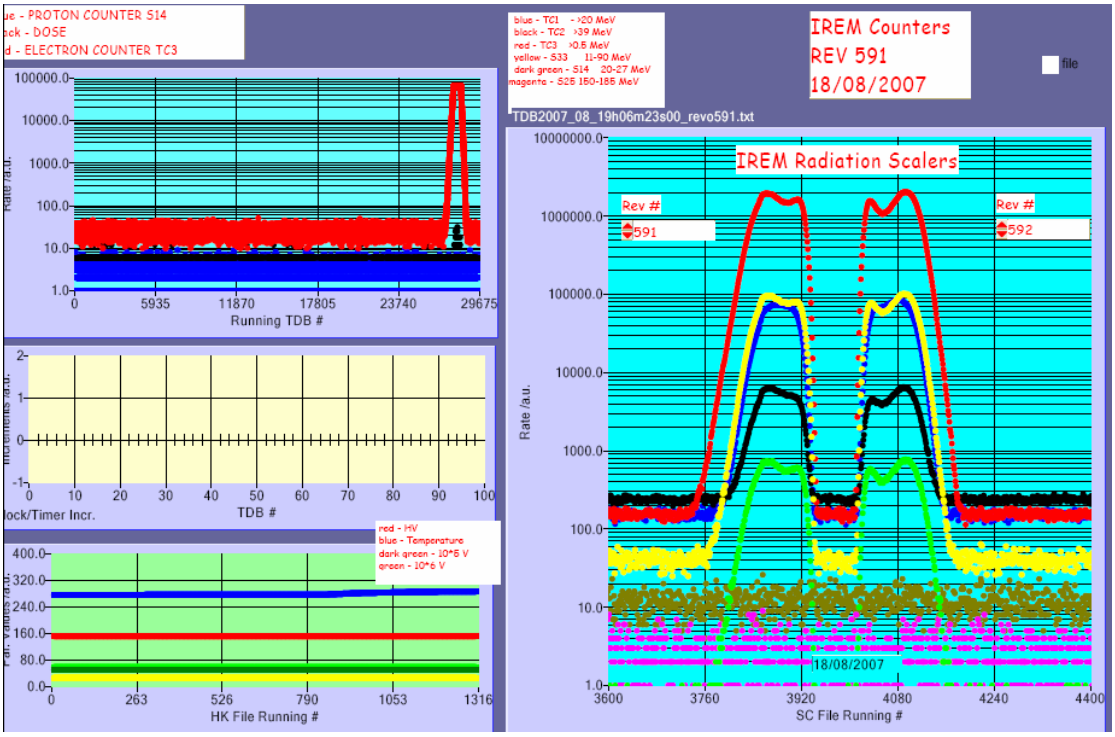
The cause of these S/W resets is apparently due to the unit's memory device that is sensitive to high energy radiation, as proved during test campaign on-ground.

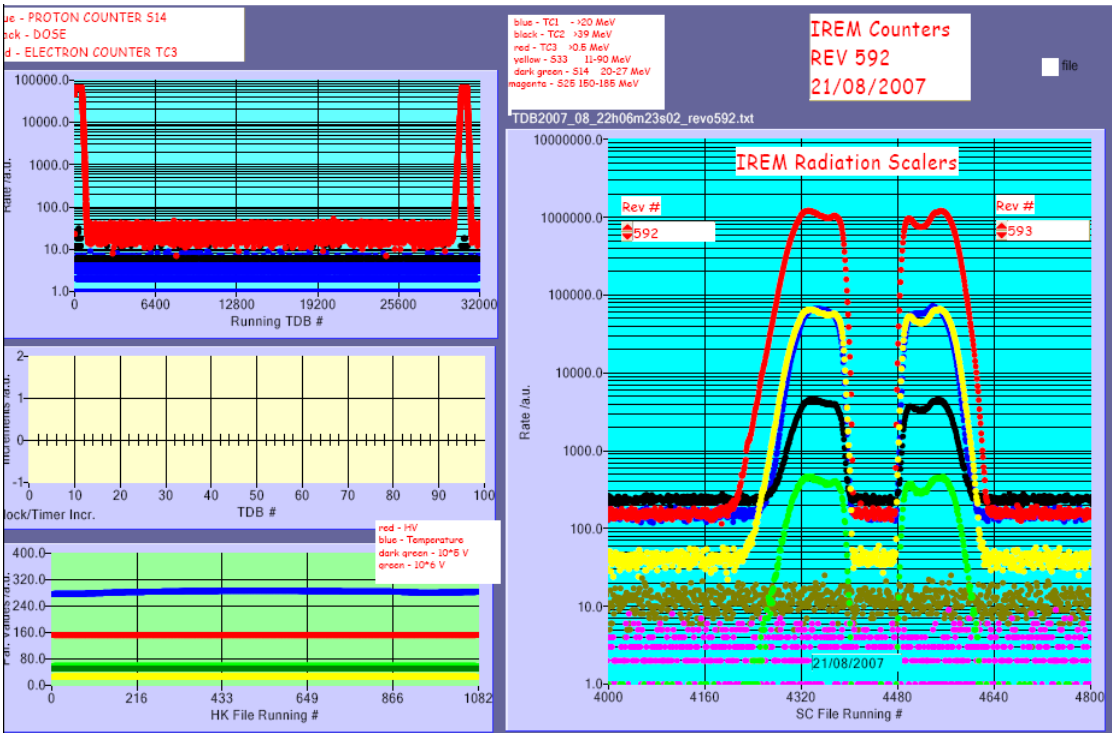
Electron Belts

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]
591	RAD_ENTR R 2007-08-18T16:39:37Z	18/08/2007 18:21:39	41908.7	18-Aug-2007 17:59:49	44779.52
592	RAD_EXIT R 2007-08-19T02:49:39Z	19/08/2007 01:33:23	>> 29813.9	19-Aug-2007 01:39:49	43037.85
592	RAD_ENTR R 2007-08-21T16:27:45Z	21/08/2007 18:13:08	40308.3	21-Aug-2007 17:41:14	45571.1
593	RAD_EXIT R 2007-08-22T02:37:18Z	22/08/2007 01:05:40	>> 29819.0	22-Aug-2007 01:31:14	43803.51
593	RAD_ENTR R 2007-08-24T16:16:32Z	24/08/2007 18:05:48	40279.7	24-Aug-2007 17:31:14	45354.59

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)

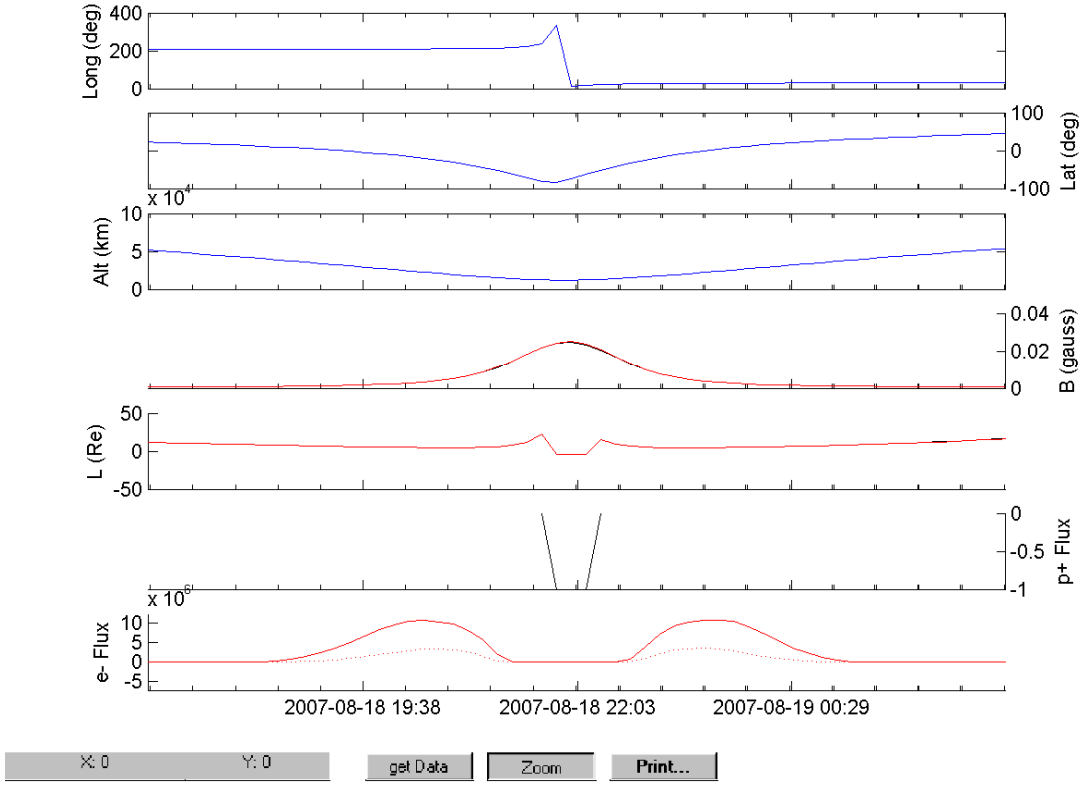
IREM radiation counters:



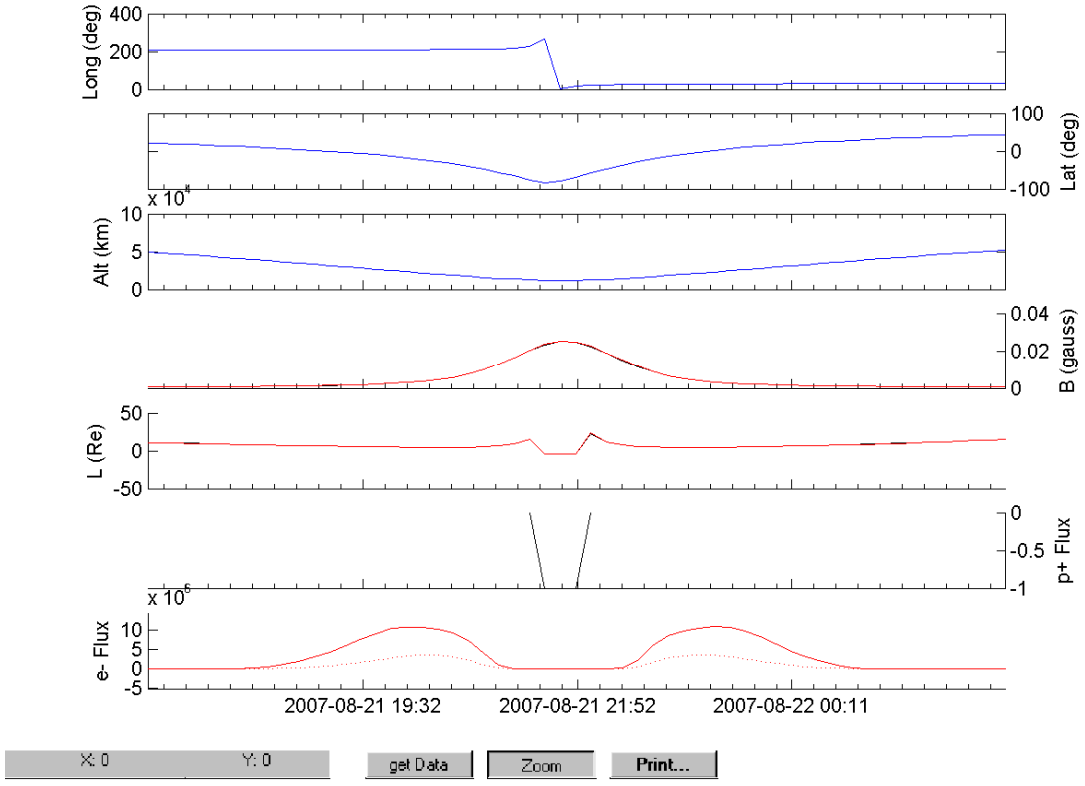


IREM Predicted Radiation Belt Passages

Rev 591



Rev 592



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

Due to a problem on the SEISOP server, no data are available this week. However, the week was very quiet and no radiation was reported.