

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 270
Week 47
26.11.07
Routine Phase

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1 General

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

It addresses the activities from 17.11.07 until 23.11.07 (both dates inclusive) and covers the revolutions 623 and 624..

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 Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), two hexagonal dithers of 3C 454.3 (RA 22:53:57.75, DEC +16:08:53.6), and a raster dither 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.

Three slews were missed from TL, during the observation period, due to a problem during IMCS maintenance.

The fuel consumption over the period between 17/11/2007 and 23/11/2007 was 0.0976 Kg. The remaining propellant is in the order of 143.6284 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

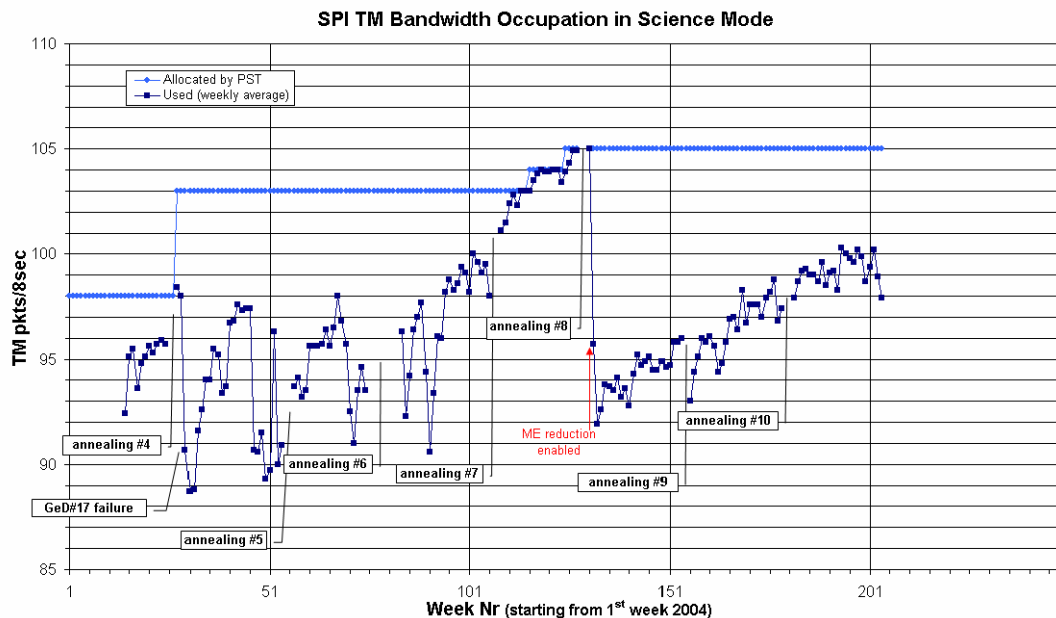
3.2.1 SPI

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 97.9 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.

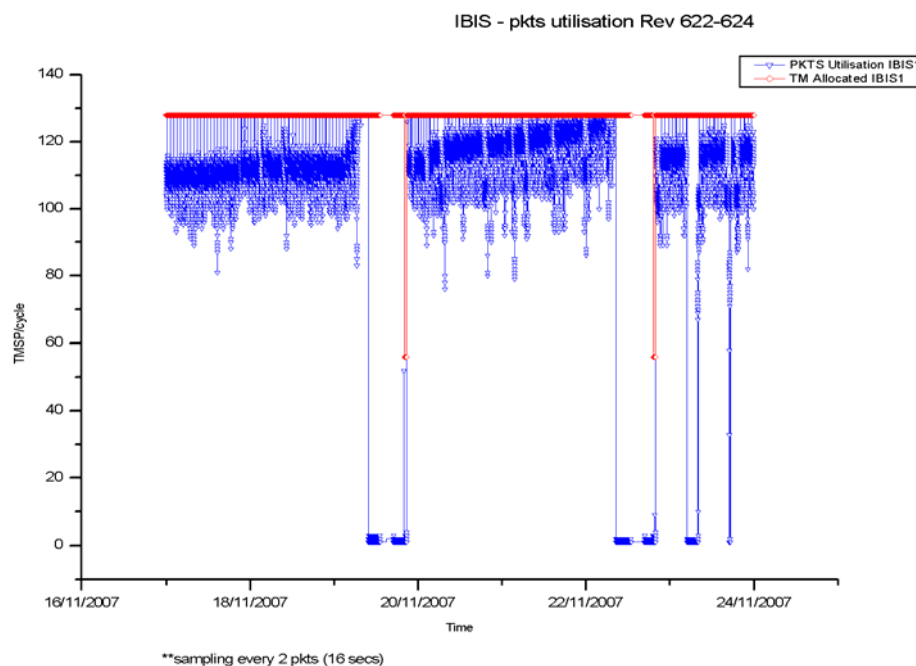
3.2.2 IBIS

The overall status of the unit is nominal.

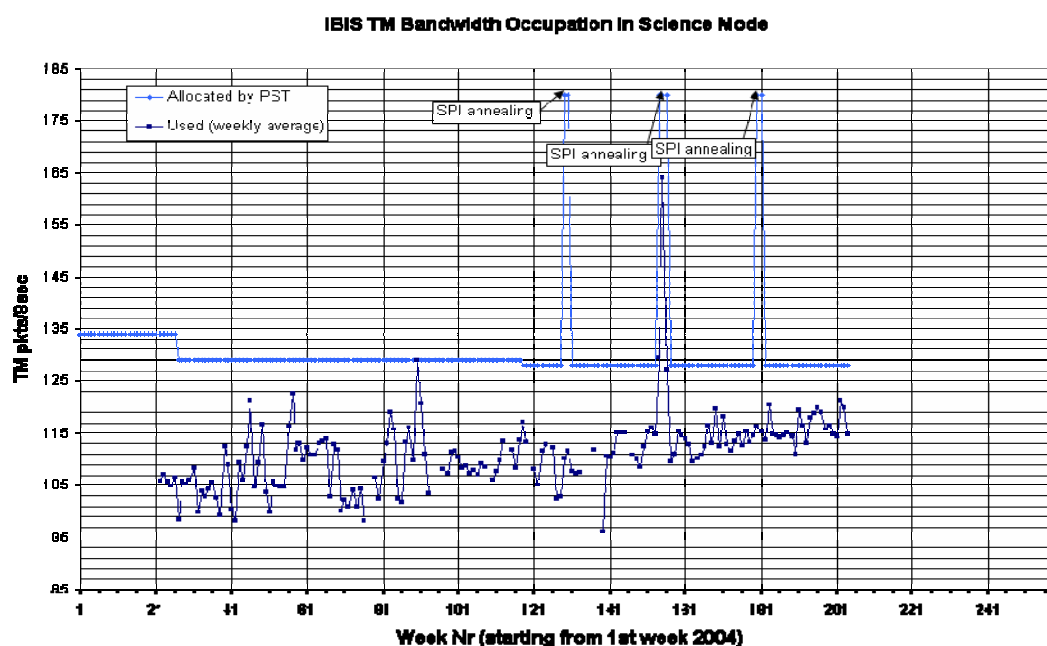
During the reporting period, the PST allocation to IBIS was 128 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period (when IBIS was in Science mode) was 114.74 TMPS/cycle, down 5.26 on last week.

During the reporting period IBIS operations for eclipse continued to be executed nominally.

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, 4 were lost.

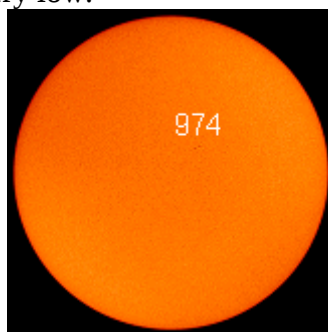
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. The sun was blank all week, except for Saturday 17th November, when a small sun spot #974 was present. 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. Three pointings, of which two were science, were 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. However, three pointings were lost, 1 due to a communications problem, and 2 when the FD processes were not reconnected after an imcs restart necessary due to the database update. The overall performance 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, 5 occasions of TM drops from Redu, 1 of which was quite long, and caused some TM sequences to fail, 3 from Vil2, 2 from DSS24 and 1 from DSS27 and 2 occasions when the isds link stopped data flow. The overall performance was well over the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New or updated PSFs have been received for revolutions 628-632. None of these revolutions have been planned yet due to problems found in setting up the correct pattern for the Cygnus region Key Programme observations.

The TSFs for revolutions 624 to 626 have been received.

2. Observation status

ECS for Revolutions 611-613 have been received and processed.

3. ISOC Science Data Archive

No news.

4. ISOC system

V 16.1 has been tested in-depth during the week; some issues remain to be resolved.

5. Problems

None.

4.3.2 ISDC

Status of ISDC observation processing on 26/11/2007:

- Latest Standard Analysis completed: observation 05200290002 (SS433, Revolution 612-613) on 26/11/2007.

- Latest products archived: observation 05200180001 (Gamma Ray Source 1915+105, Revolution 611) on 24/11/2007.

- Latest observation products sent to the observer: observation 05200010017 (Galactic Bulge region, Revolution 611) on 26/11/2007.

5 Special Events

6 Anomalies

The following problems were reported that impacted operations:

- On DoY 321, at 20:30, a series of TM data drops from Redu caused some EDs to fail (Broadcast packet and star tracker mapping). These were manually uplinked without impact.
- On DoY 323, at 20:30, a TM drop from Redu caused the KEHVAC01 and Slew EDs to fail. A manual recovery was executed without impact.
- At 20:52, the FD TPF updates started to fail. This was triggered by the database installation performed during the LOS. FD were called in to clear the problem. A recovery was performed, and the Timeline rejoined at 22:17. The impact was the loss of pointings 06230001, 06230002 & 06230003.
- On DoY 327, at 04:58:15, an IREM SEU (#57) caused OMC and IBIS to switch to safe mode. For details see the appendix.

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

AR id	Date Created	Subject	Segment	Status
INT-2963	2007-11-26	Communications Problem with VIL2.	COMMS	Pending
INT-2964	2007-11-17	FDS: Reaction Wheel Speed Monitor not updating (several times)	FDS	Pending
INT_SC-211	2007-11-27	SPI IASW 433: Problem in acquiring ACS parameters in TM packet 60601 at belt exit	Payload	Pending
INT_SC-212	2007-11-27	SPI IASW 433: Problem in acquiring parameters in TM packet 60060 at belt exit	Payload	Pending
INT_SC-213	2007-11-29	IREM Anomaly: Reset of IREM_CSCI S/W #57, 23/11/2007	Payload	Pending

7 Future Milestones

The following activities are foreseen in the next few weeks.

- A thruster calibration is foreseen to be performed on the 5th December, during revolution 628..

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 623

The observations in revolution 623 began with a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), lasting ~5.6 hours. This was followed by a hexagonal dither of 3C 454.3 (RA 22:53:57.75, DEC +16:08:53.6), lasting ~45.6 hours, until the end of the revolution.

Revolution 624

The observations in revolution 624 began with a hexagonal dither of 3C 454.3 (RA 22:53:57.75, DEC +16:08:53.6), lasting ~37.7 hours. This was followed by a raster dither of the North Ecliptic Pole (RA 18:00:00.00, DEC +66:33:39.0), lasting ~15.5 hours, until the end of the revolution.

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

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2007-11-02T03:29:15.000Z	143.8929	F	Automatic TM processing.
2007-11-04T18:30:57.000Z	143.8819	F	Automatic TM processing.
2007-11-06T03:51:50.000Z	143.8658	F	Automatic TM processing.
2007-11-07T18:22:02.000Z	143.8490	F	Automatic TM processing.
2007-11-09T03:39:34.000Z	143.8253	F	Automatic TM processing.
2007-11-09T22:45:52.000Z	143.8097	F	Automatic TM processing.
2007-11-10T18:17:54.000Z	143.7986	F	Automatic TM processing.
2007-11-12T03:30:06.000Z	143.7714	F	Automatic TM processing.
2007-11-13T17:52:50.000Z	143.7629	F	Automatic TM processing.
2007-11-15T03:41:58.000Z	143.7418	F	Automatic TM processing.
2007-11-16T17:41:14.000Z	143.7260	F	Automatic TM processing.
2007-11-18T03:20:37.000Z	143.7039	F	Automatic TM processing.
2007-11-19T17:38:49.000Z	143.6869	F	Automatic TM processing.
2007-11-20T02:44:42.000Z	143.6575	F	Automatic TM processing.
2007-11-22T17:28:02.000Z	143.6284	F	Automatic TM processing.

This report was generated Fri Nov 23 08:00:14 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, 17/11/2007 – 23/11/2007

The AOCS operations were executed from the Automatic Timeline.

During this period, 51 Open Loop Slews, 92 Closed Loop Slews and 4 Momentum Biases were executed.

3 slews (1 OSL, 2 CSL) were missed from TL, during the observation period, due to a problem during maintenance on IMCS-A server (ODB loading).

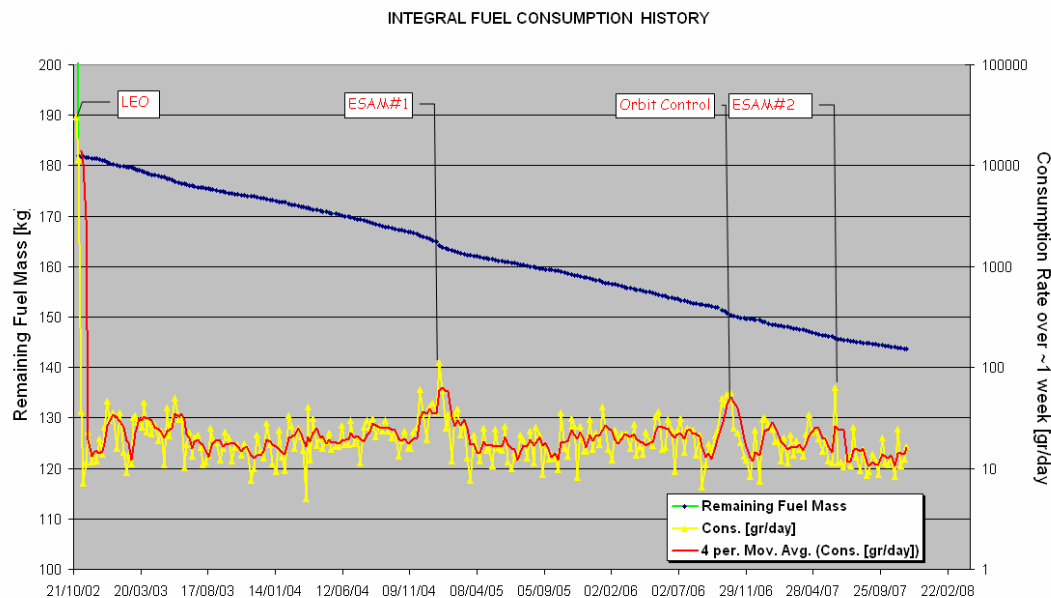
This is equivalent to $\sim 2\%$ of the total number of slews planned (143).

Orbit Control

No update.

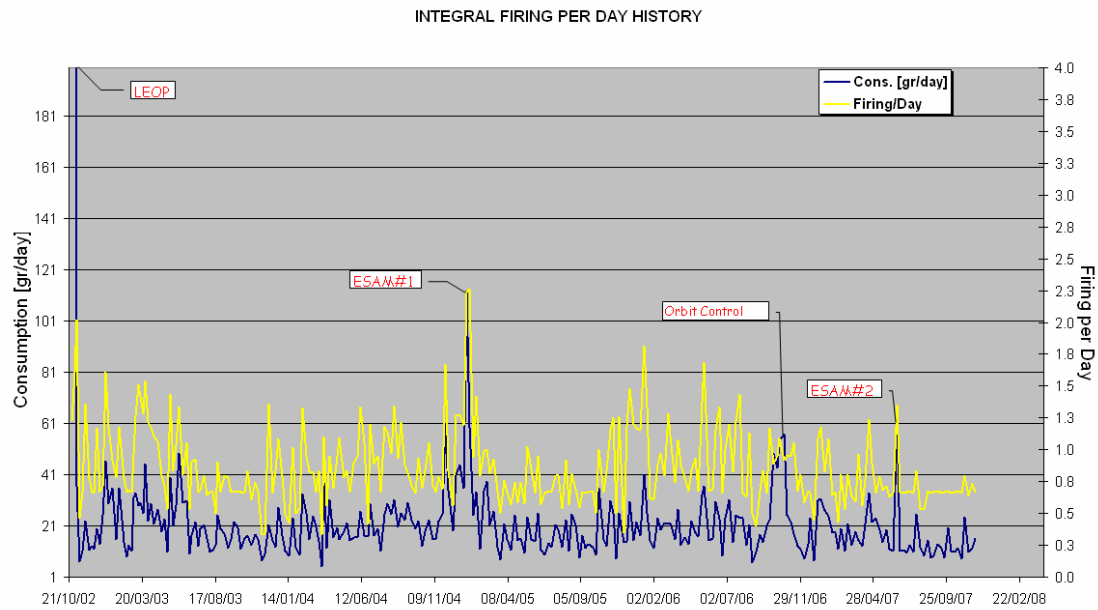
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 16/11/2007 is reported in the plot below.



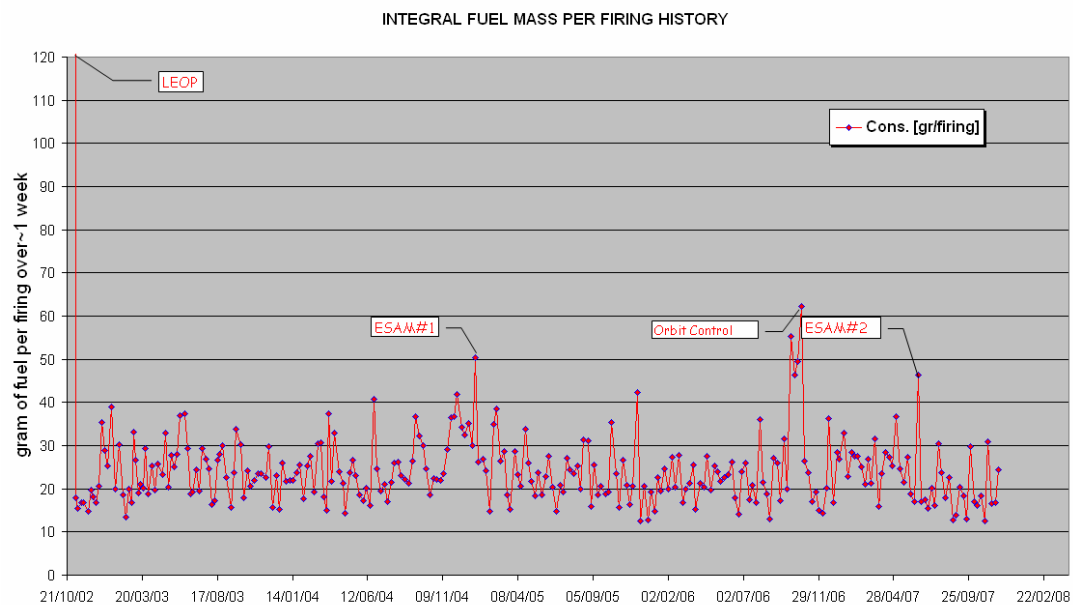
The plot above considers the ESAM fuel consumption spread over period of ~ 1 week.

The firing per day over the period between 01/11/2002 and 16/11/2007 is shown in the plot below.



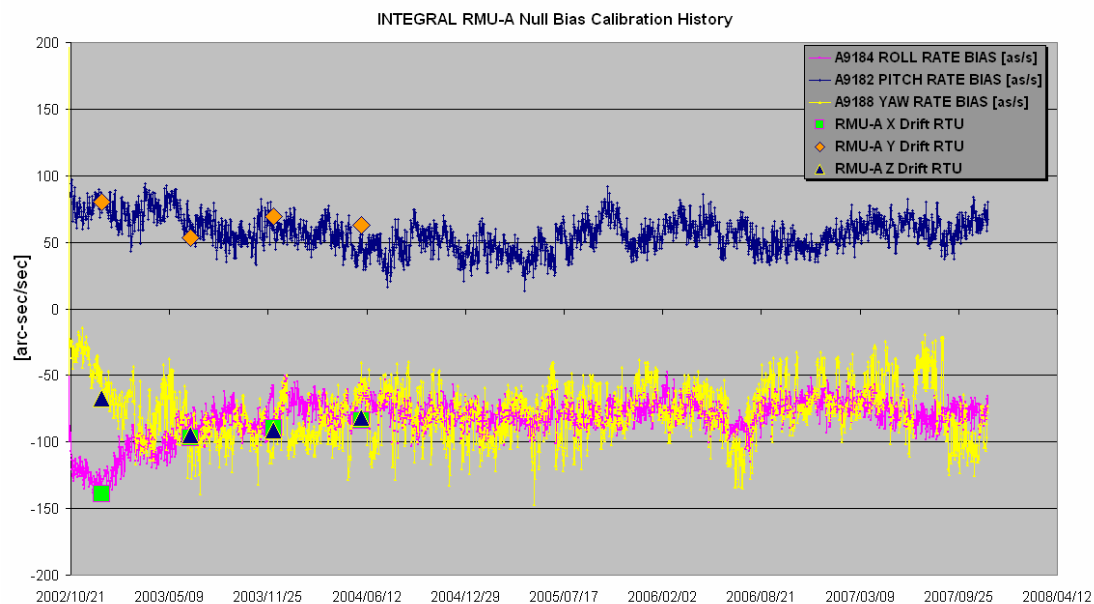
The plot above considers the ESAM fuel consumption spread over period of ~1 week.

The fuel per firing over the period between 01/11/2002 and 16/11/2007 is shown in the plot below.



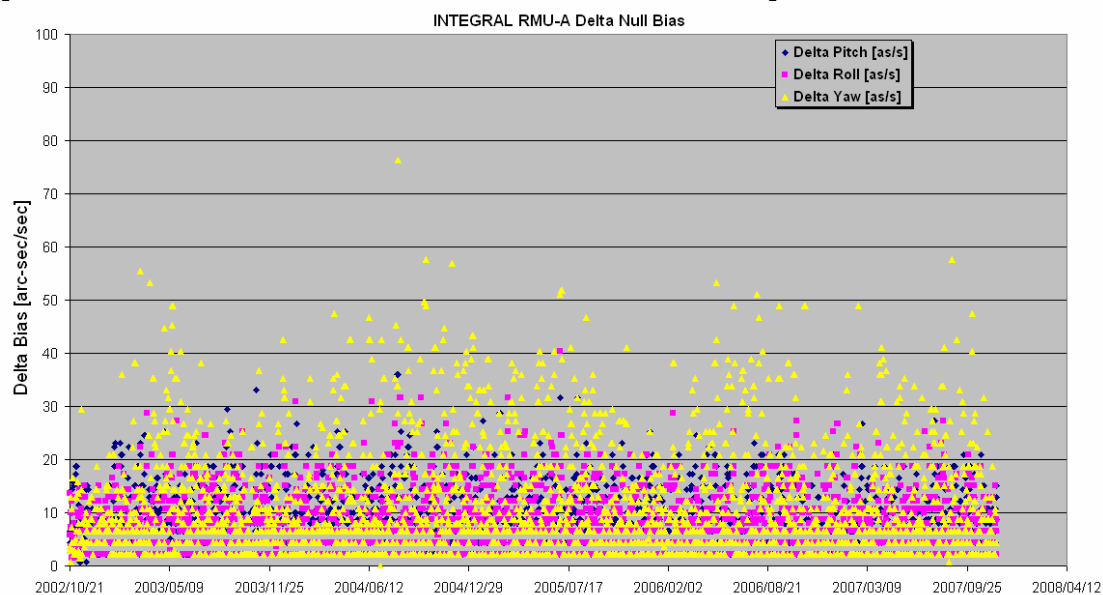
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 23/11/2007 is shown in the plot below.



The evolution of the drift on yaw channel is under constant monitoring.

The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over period between 01/11/2002 and 23/11/2007 is shown in the plot below.



17/11/2007 (Day of Year 321, Revolution 622)

Loss of TM link at REDU station: at 20:31z the update for slew 06220029 failed due to a problem on VC0 TM link at REDU station. The loss of TM caused that the mapping after slew 06220028 did not arrive on the FDS and the TPF update generation was aborted.

At 22:00z the TM link was established and the next slew ID 06220029 was manually updated in TL.

No impact on TL.

18/11/2007 (Day of Year 322, Revolution 622)

Nothing to report.

19/11/2007 (Day of Year 323, Revolution 622-623)

IMCS-A server maintenance: during the perigee of rev 622 the IMCS-A server was rebooted, to load the new ODB, but this information not passed, by mistake, to FD team. As a consequence the GTPs stopped operating and no TM could be retrieved to the FDS for the first update job in the revolution. The TPF update generation was aborted.

The FD engineer was called in and a manual recovery was started at 20:52z from attitude of PID 06220065 to the attitude of PID 06230003. The next slew 06230004 was manually updated in TL.

The following slews were missed in TL: 06230001(OSL)-02(CSL)-03(CSL).

20/11/2007 (Day of Year 324, Revolution 623)

Nothing to report.

21/11/2007 (Day of Year 325, Revolution 623)

IMCS HFA task problem: at 11:05z the HFA (History File Archive) task and SEGS Server were stopped and restarted on IMCS-A server, causing no TM distribution to the FDS and failing of update process for the next coming slew ID 06230038.

A manual recovery was performed at 11:25z and the next slew 06230038 was manually updated in TL.

The reception of live TM on FDS was verified by FD on call.

No impact on TL.

22/11/2007 (Day of Year 326, Revolution 623-624)

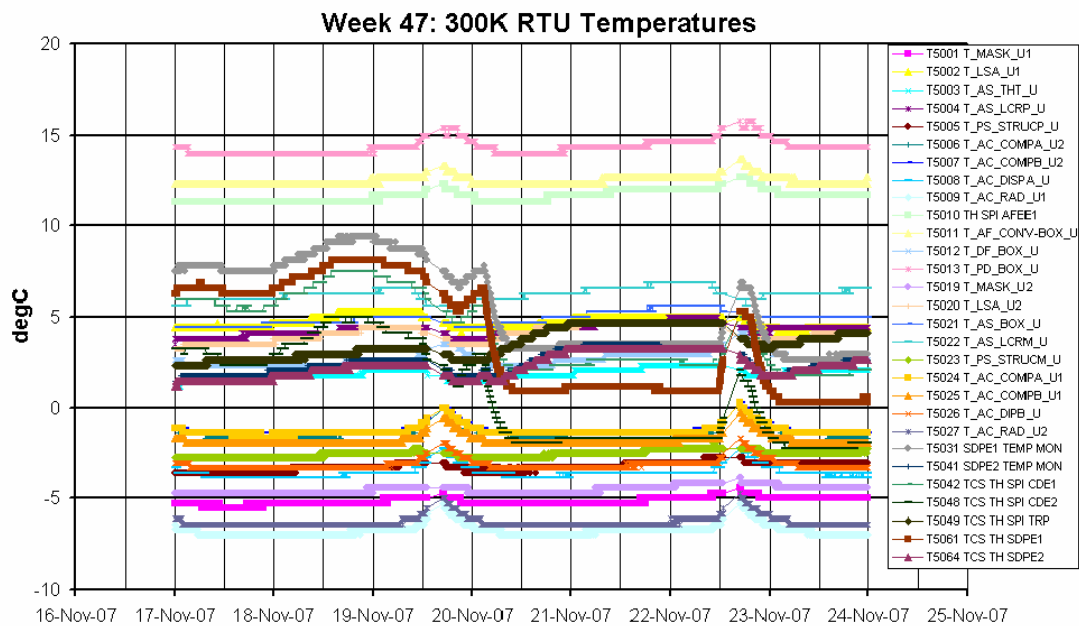
Nothing to report.

23/11/2007 (Day of Year 327, Revolution 624)

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.

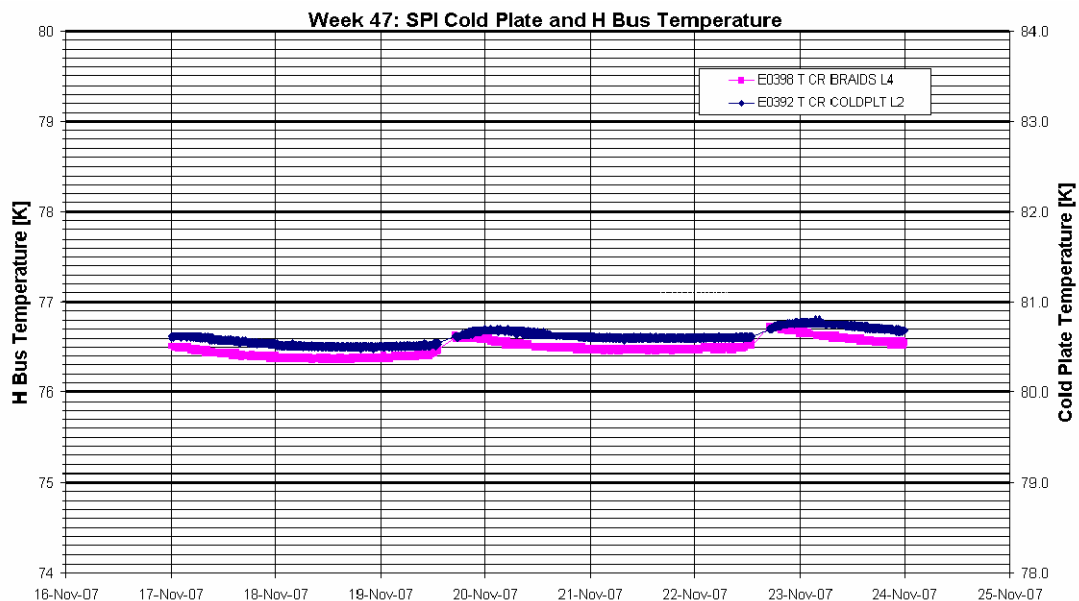


Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range 80K +/-1K.

The stroke of all four compressors was set to 41 throughout the week. The average CDE LCL currents over the week were as follows:

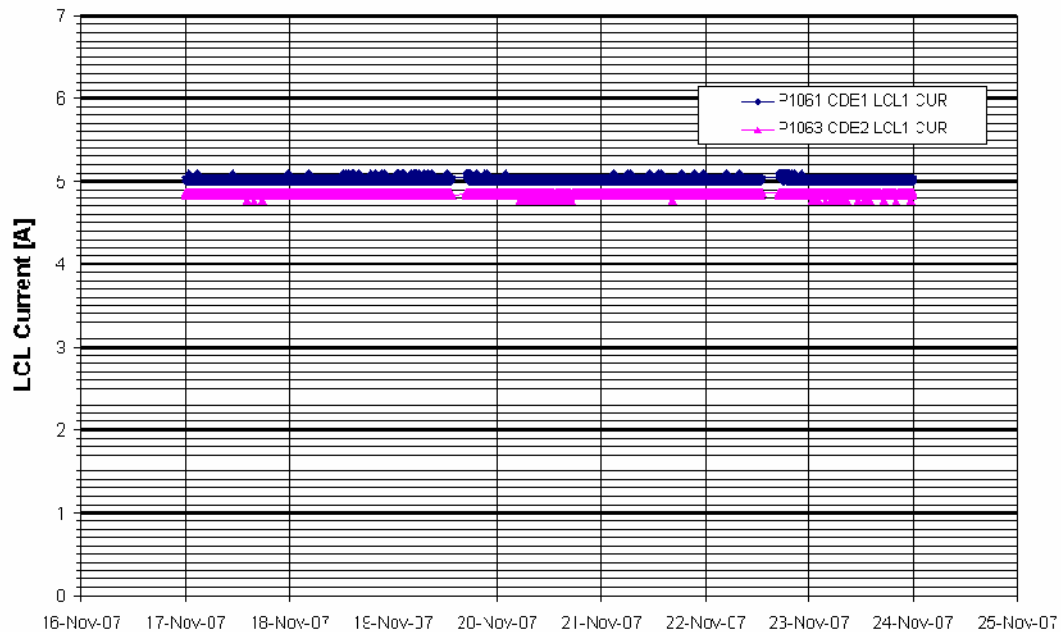
- CDE1 LCL Current = 5.03A
- CDE2 LCL Current = 4.83A

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



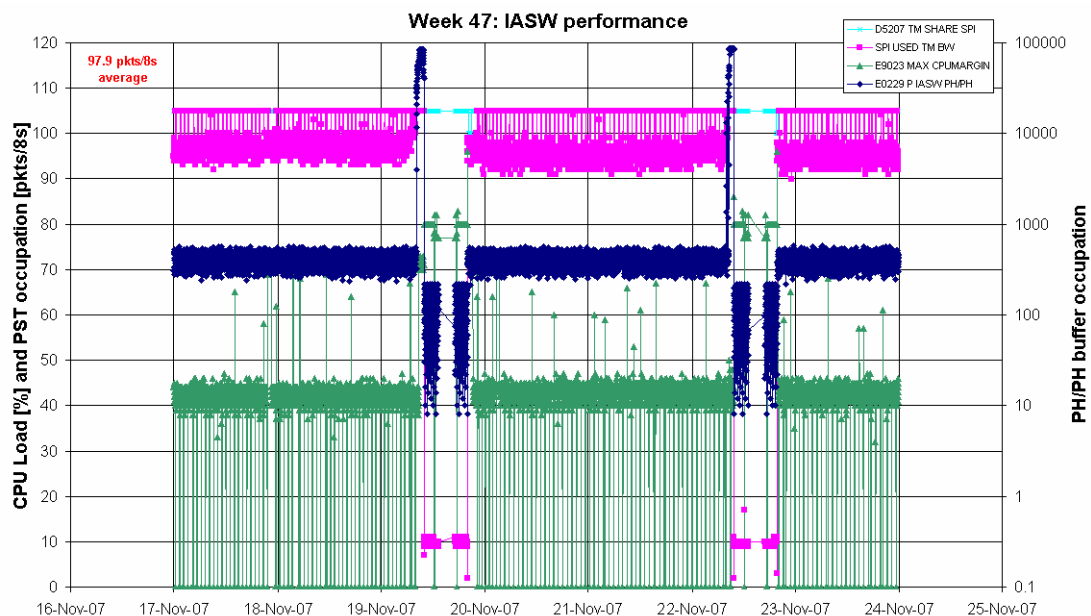
The following plot shows the evolution of the CDE currents during the reporting period.

Week 47: SPI CDE1 and CDE2 LCL Currents



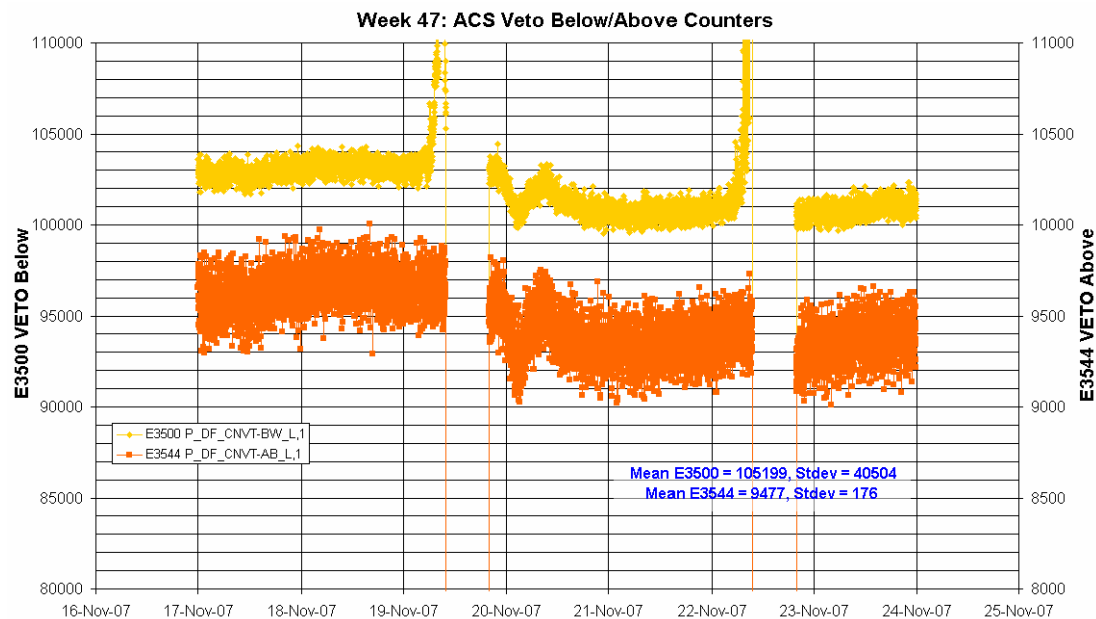
DPE & IASW: The DPE health and IASW performance is nominal. The IASW version installed is v433 patch #1 with the spectra scaling factor set to 8/19 SE. The average TM bandwidth occupation of SPI was 97.9 packets/cycle over the science window, when the TM allocation was 105 packets/cycle.

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



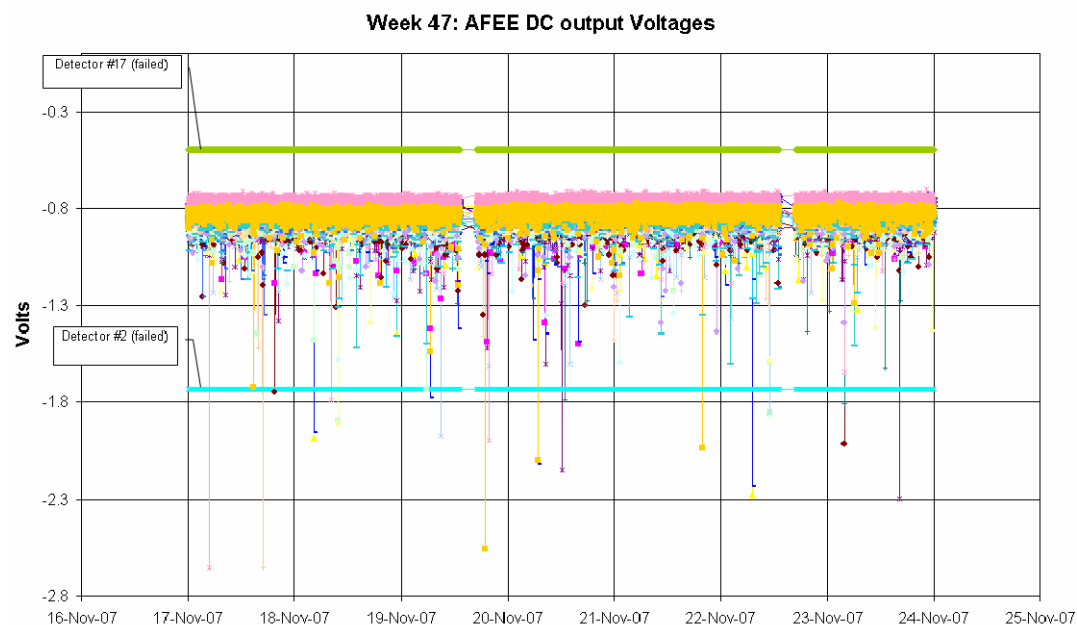
ACS: The performance of the ACS is nominal, except for FEE #81 which remains switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is still OFF due to the anomaly on 5/8/2003 (INT_SC-61).

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

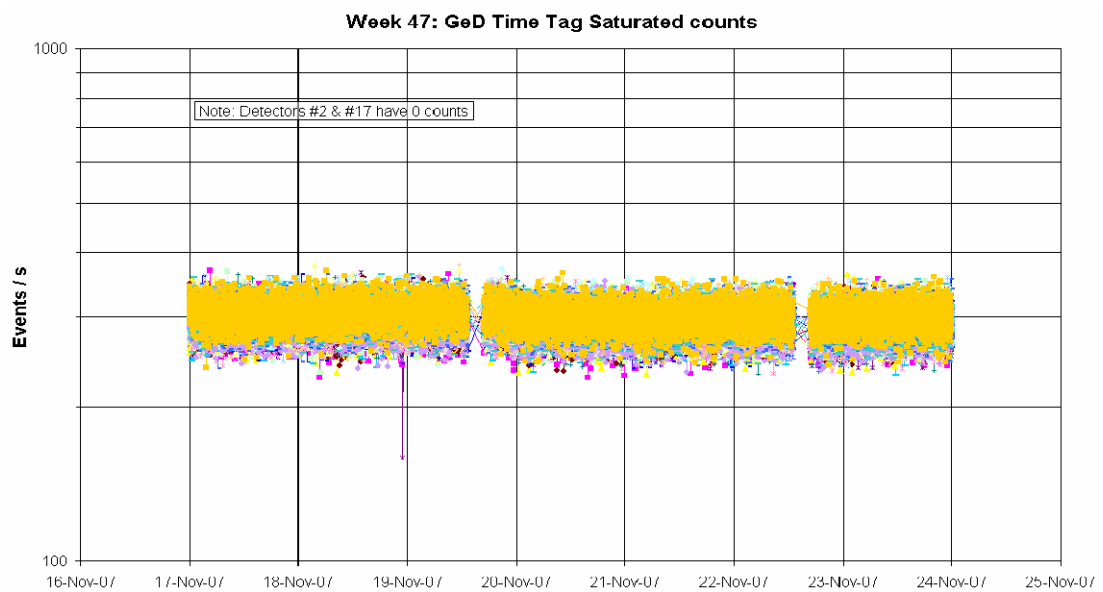
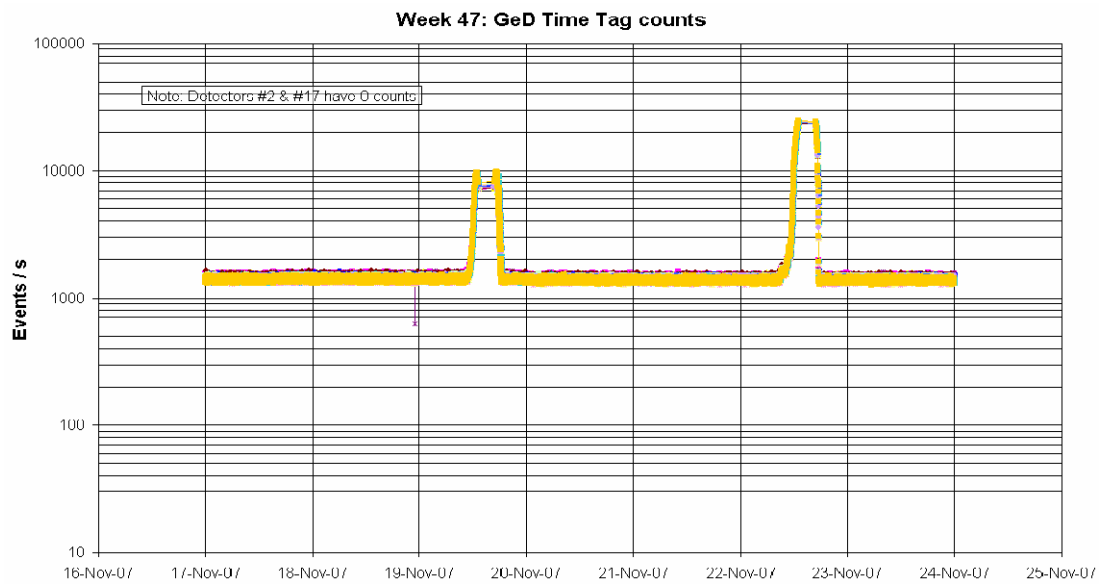
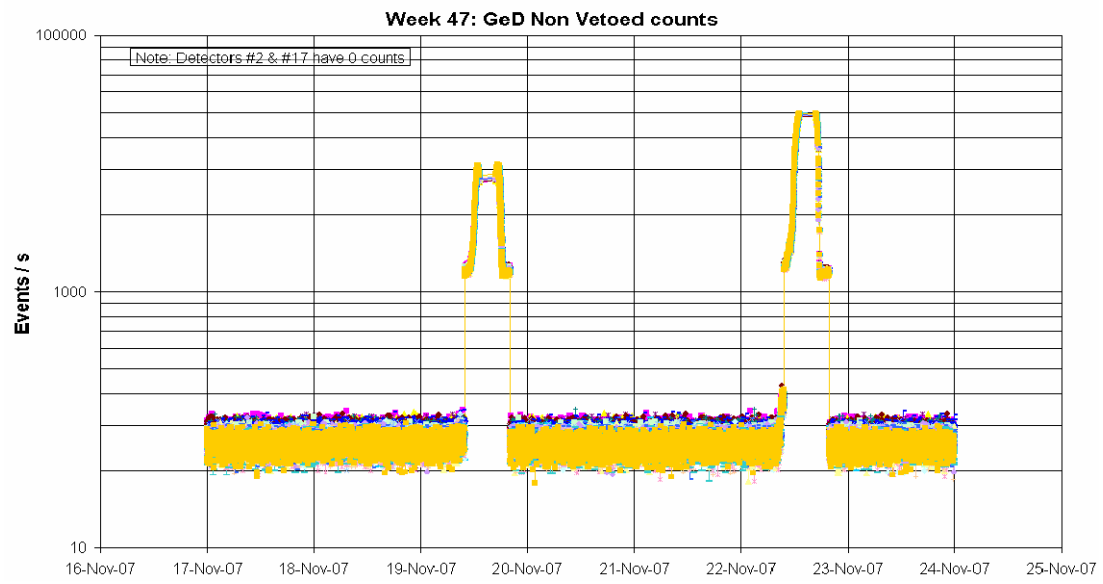


AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution and is therefore operated at a lower HV setting of 3.5kV (instead of 4kV).

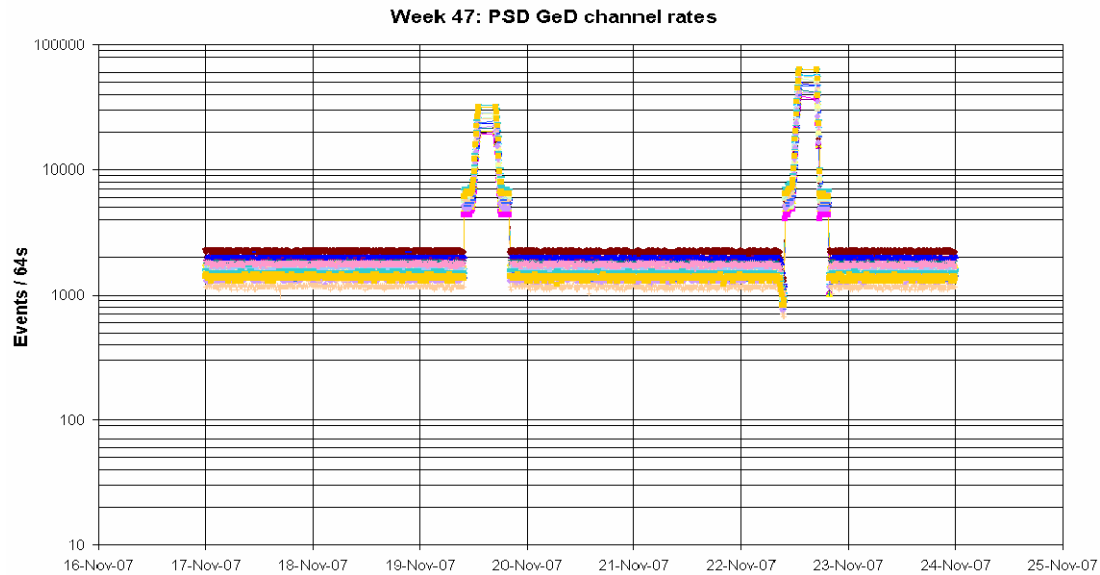
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004.



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.



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



Event Log:

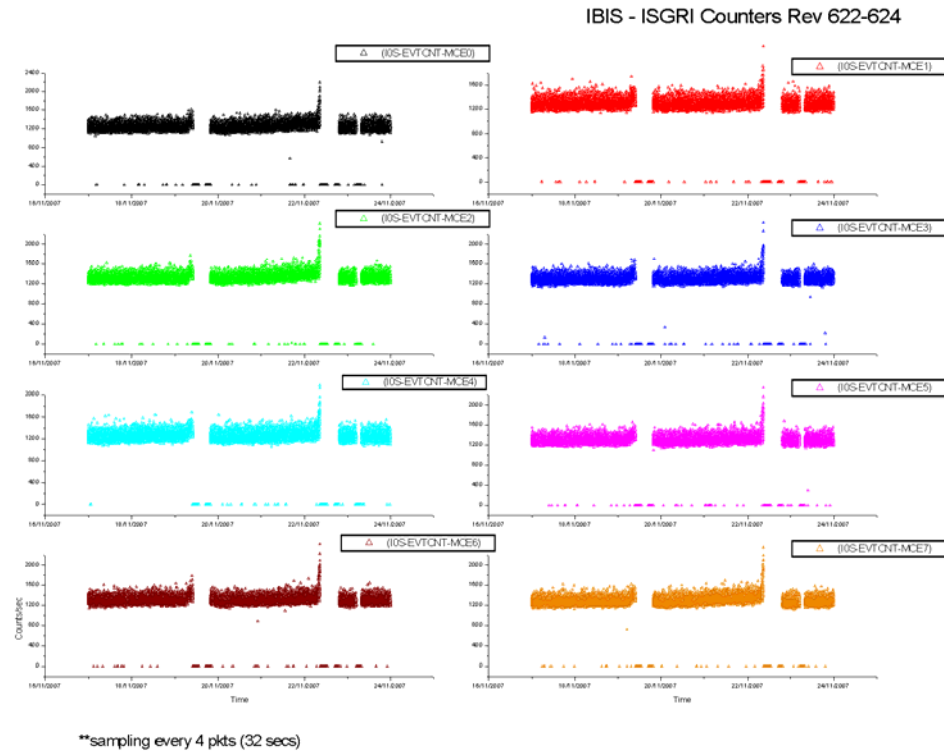
The following non-nominal events occurred on SPI during the reporting period:

- 3 occurrences of OEM APID 1024 ID 243 EXCEPTION SPI1 SPECTRA BUILDING NOT COMPLETED were received during the week. As they were all single occurrences, no action was taken.
- Due to high background radiation conditions before the expected radiation belt entry of revolution 622, on 2007-11-19 at 08:10:19Z TM parameter E3500 went OOL High, fluctuating OOL until radiation belt entry, at 09:52:31Z.
- Due to high background radiation conditions before the expected radiation belt entry of revolution 623, on 2007-11-22 at 08:14:51Z TM parameter E3500 went OOL High, fluctuating OOL until radiation belt entry, at 09:38:05Z.

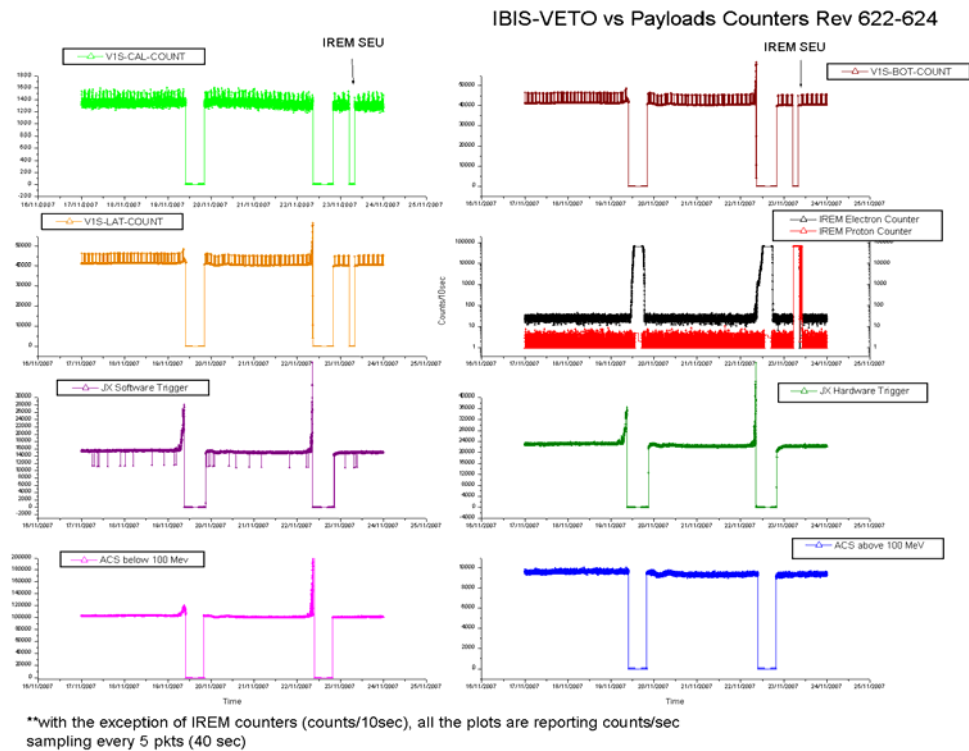
8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

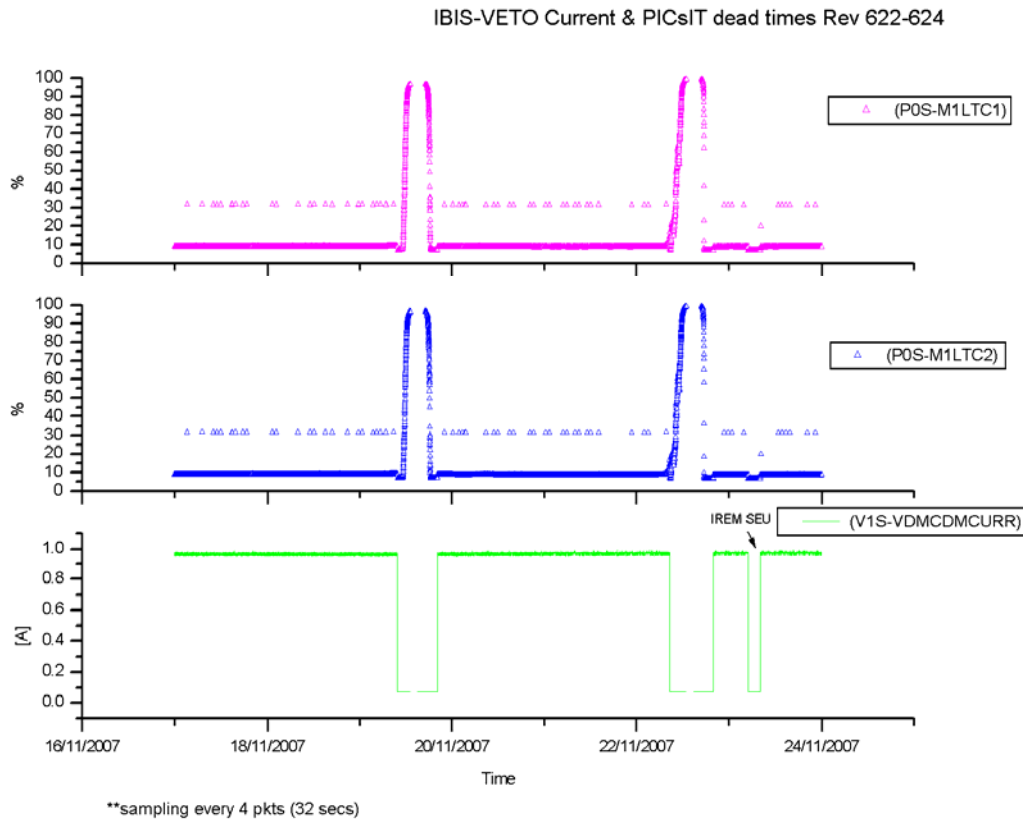


VETO vs Payloads Counters:

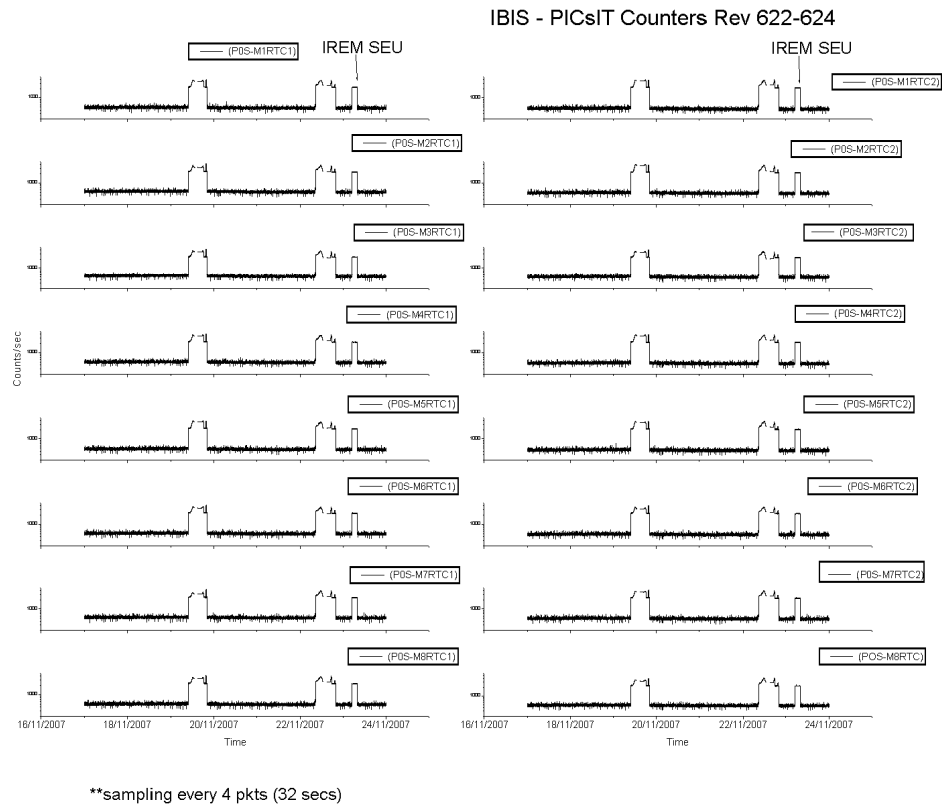


The week was characterised by high radiation before the expected radiation belt entry of revolutions 622 and 623 as reported by the payload. Note that the plot of the ACS below 100MeV has a smaller scale than usual.

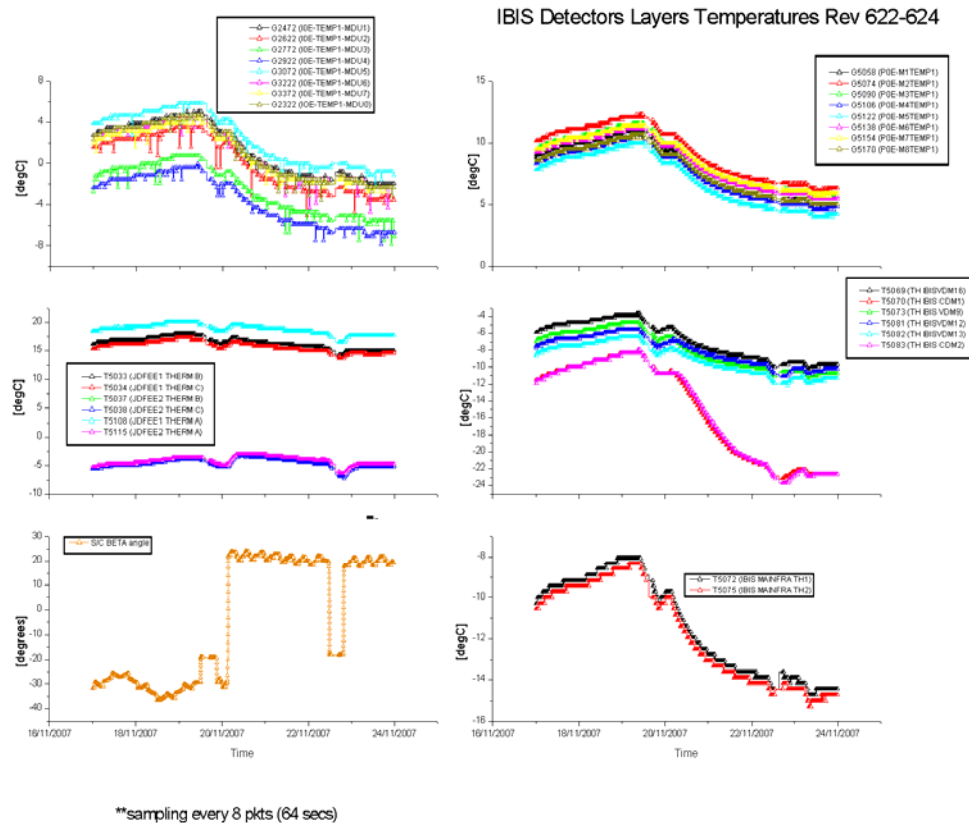
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report:

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

In addition, throughout the week, TM parameter G8080 went OOL Warning High several times. This is the Valid event rate on HBRA. As at each occurrence it remained OOL for only 1 TM cycle, no action was taken. This indicates an overflow in the counters and affects only the quality of the scientific data but not the safety of the instrument.

2007-11-17 (DOY 321, Rev 622) to 2007-11-21 (DOY 325, Rev 623)

IBIS operations executed nominally.

2007-11-22 (DOY 326, Rev 623-624)

At 07:57:34Z, ~1 hour 30 minutes before radiation belt entry of revolution 617, TM parameters G6062 and G6063 started toggling OOL High. These are the VETO bottom and lateral counters respectively. Due to the high background radiation, IBIS then made an autonomous transition to Safe mode at 08:41:20Z, about 1 hour earlier than planned in the Broadcast Packet.

2007-11-23 (DOY 327, Rev 624)

Due to an IREM SEU, IBIS transitioned autonomously to Safe configuration at 04:58:26Z It was recovered as follows:

- At 07:53:29Z FCP_IBIS1_0803 IBIS EXIT FROM SAFE MODE
- At 08:13:51Z ED GESTAN02 uplinked with the planned observation parameters and commanding to IBIS from the Timeline re-enabled.

At 16:32Z, 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:

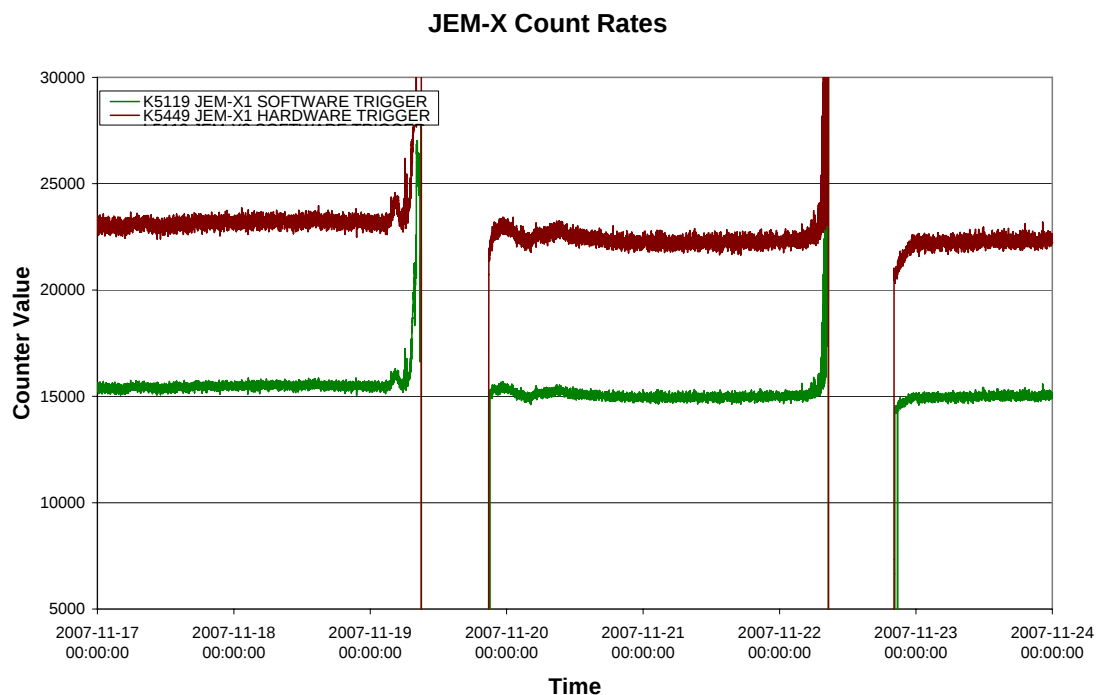
- 16:59:28Z FCP_IBIS1_0312
- 17:14:53Z TC G0129 uplinked to return IBIS to Science Standard mode.

IBIS operations continued nominally.

8.3.4 JEM-X Operations

JEM-X Count Rates

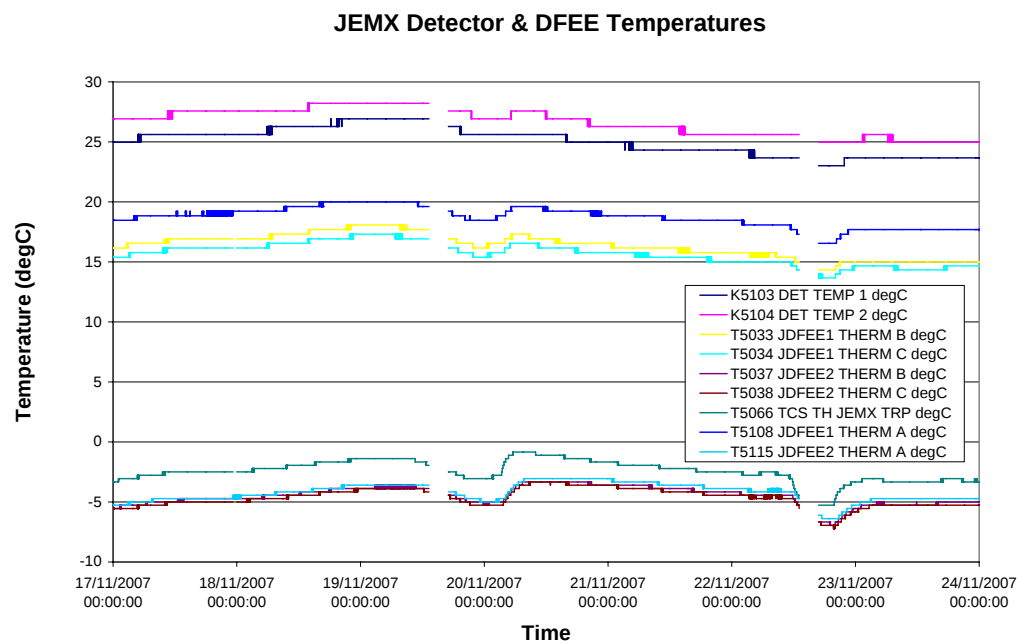
JEM-X count rates over the reporting period are displayed in the following graph¹.



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.



JEM-X Daily Report

2007-11-17 (DoY 321, Rev 622) to 2007-11-18 (DoY 322, Rev 622)

JEM-X1 operations executed nominally

2007-11-19 (DoY 323, Rev 622-623)

At 08:04:34, and again at 08:06:25, K5449 exceeded its soft limits, no action was taken, and there was no impact.

2007-11-20 (DoY 324, Rev 623)

JEM-X1 operations executed nominally

2007-11-21 (DoY 325, Rev 623)

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

2007.325.13.30.39.445	2007.325.13.30.44.235	1536	RealTime	5	ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	PR N
E					
FIX6		0			
K9079	MESS CLASS	2			
K9080	MESS ID	5			
K9074	TASK ID 16	12			
K9067	LOGICAL ADDRESS	4989			
2007.325.13.30.39.445	2007.325.13.30.44.263	1536	RealTime	5	ANOMALY
JEM-X1 CSSW INT ER EXCEPTIO			0	0	PR N
E					
FIX6		0			
K9079	MESS CLASS	2			
K9080	MESS ID	5			
K9074	TASK ID 16	12			

² Data sampled (1 frame in 8)

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K9067	LOGICAL ADDRESS	4989					
2007.325.13.30.39.445	2007.325.13.30.44.265	1536	RealTime	5			
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	ANOMALY	
E E						PR	N
FIX6		0					
K9079	MESS CLASS	2					
K9080	MESS ID	5					
K9074	TASK ID 16	12					
K9067	LOGICAL ADDRESS	4989					
2007.325.13.30.39.445	2007.325.13.30.44.268	1536	RealTime	5			
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	ANOMALY	
E E						PR	N
FIX6		0					
K9079	MESS CLASS	2					
K9080	MESS ID	5					
K9074	TASK ID 16	12					
K9067	LOGICAL ADDRESS	4989					
2007.325.13.30.39.445	2007.325.13.30.44.271	1536	RealTime	5			
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	ANOMALY	
E E						PR	N
FIX6		0					
K9079	MESS CLASS	2					
K9080	MESS ID	5					
K9074	TASK ID 16	12					
K9067	LOGICAL ADDRESS	4989					
2007.325.13.30.39.445	2007.325.13.30.44.273	1536	RealTime	5			
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	ANOMALY	
E E						PR	N
FIX6		0					
K9079	MESS CLASS	2					
K9080	MESS ID	5					
K9074	TASK ID 16	12					
K9067	LOGICAL ADDRESS	4989					
2007.325.13.30.39.445	2007.325.13.30.44.275	1536	RealTime	5			
JEM-X1 CSSW INT ER EXCEPTIO			0	0	65535	ANOMALY	
E E						PR	N
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.

2007-11-12 (DoY 326, Rev 623-624)

From 07:42:41 to 08:44:20, in the run-up to the belt entry, there were repeated warnings and alarms about various parameters being out of both soft and hard limits. The parameters affected were: K5449, K5317, K5316, K5119, K9104 and KD5020D. At 08:43:26, the unit was put to SAFE by the Timeline.

2007-11-23 (DoY 327, Rev 624)

At 04:58:58 JEMX parameters K5315, K5316 & K5317 went Out-of-Limits due to an IREM SEU (#57). There was no impact as the reaction has been disabled.

8.3.5 OMC Operations

2007-11-17 (DoY 321, Rev 622) to 2007-11-18 (DoY 322, Rev 622)

Nothing to Report.

2007-11-19 (DoY 323, Rev 622-623)

Due to problems caused by a new database release, the first few slews of revolution 623 were lost. A recovery was performed, and OMC was returned to Normal mode at 22:32:32. The impact was the loss of pointings 06230002 & 06230003.

2007-11-20 (DoY 324, Rev 623) to 2007-11-22 (DoY 326, Rev 623-624)

Nothing to Report.

2007-11-23 (DoY 327, Rev 624)

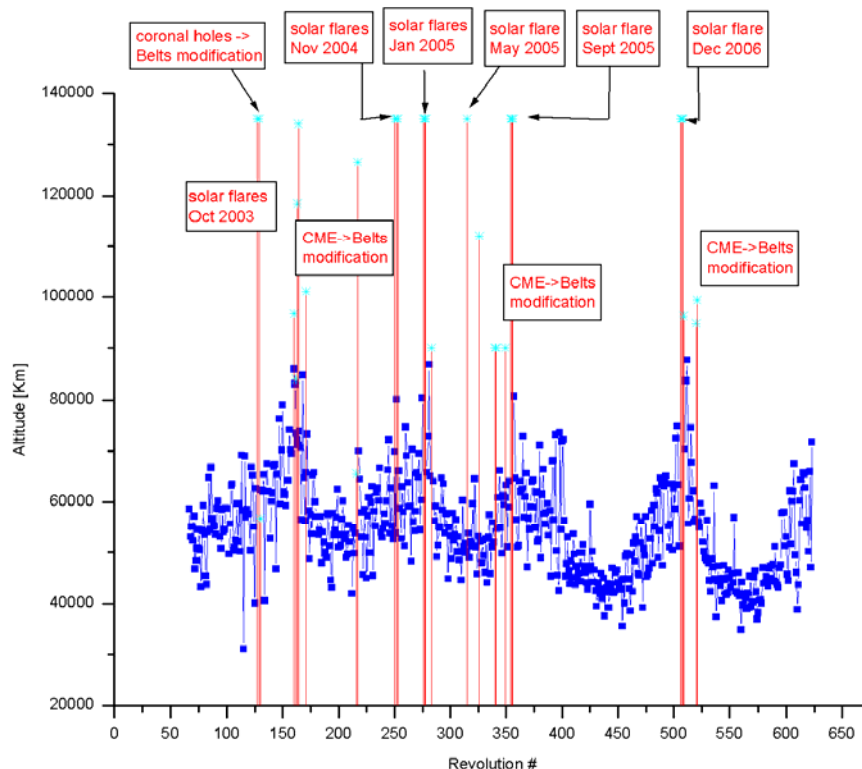
At 04:58:17, OMC was sent to SAFE by an IREM SEU (#57), a recovery was performed, and the unit returned to Standby at 07:29:15. The impact was the loss of pointings 06240010 and 06240011.

On DoY 323 at 09:52:32 and DoY 326 at 09:38:09 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 2003-2007



IREM daily report

DoY 2007.327 (23/11/2007):

At 04.58.15Z, a local reset of the IREM CSCI S/W (SEU #57) 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 2007.327.04.58:15Z at 107818.4 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 05:09Z 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 09:13Z.
- 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 07:29:15Z and IBIS at 07:38Z.

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. This recovery was delayed by about 2 hours due to on-going XMM activities at that time, which took priority.

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]
622	RAD_ENTR R 2007-11-19T09:52:31Z	19/11/2007 10:54:23	47071.1	19-Nov-2007 11:13:33	44841.12
623	RAD_EXIT R 2007-11-19T20:01:03Z	19/11/2007 18:27:27	>>33102.8	19-Nov-2007 19:03:33	44599.22
623	RAD_ENTR R 2007-11-22T09:38:05Z	22/11/2007 07:27:28	71779.8	22-Nov-2007 10:46:50	45139.69
624	RAD_EXIT R 2007-11-22T19:46:56Z	22/11/2007 17:39:20	33093.4	22-Nov-2007 18:36:50	44208.45

Reference

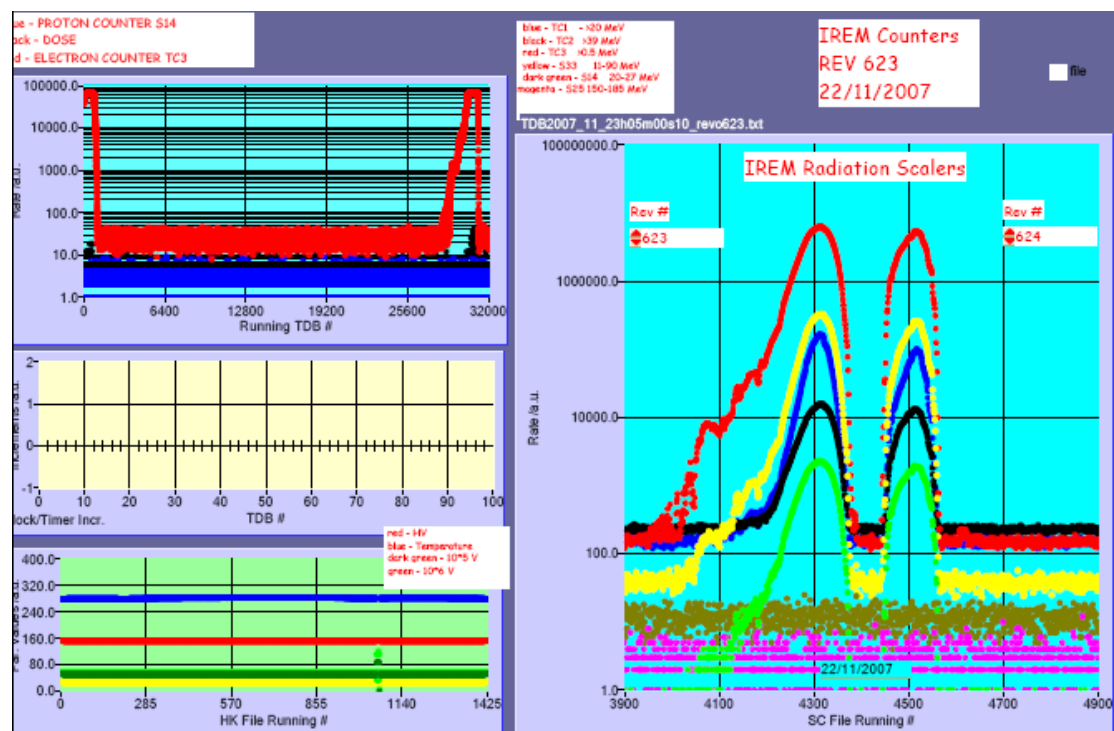
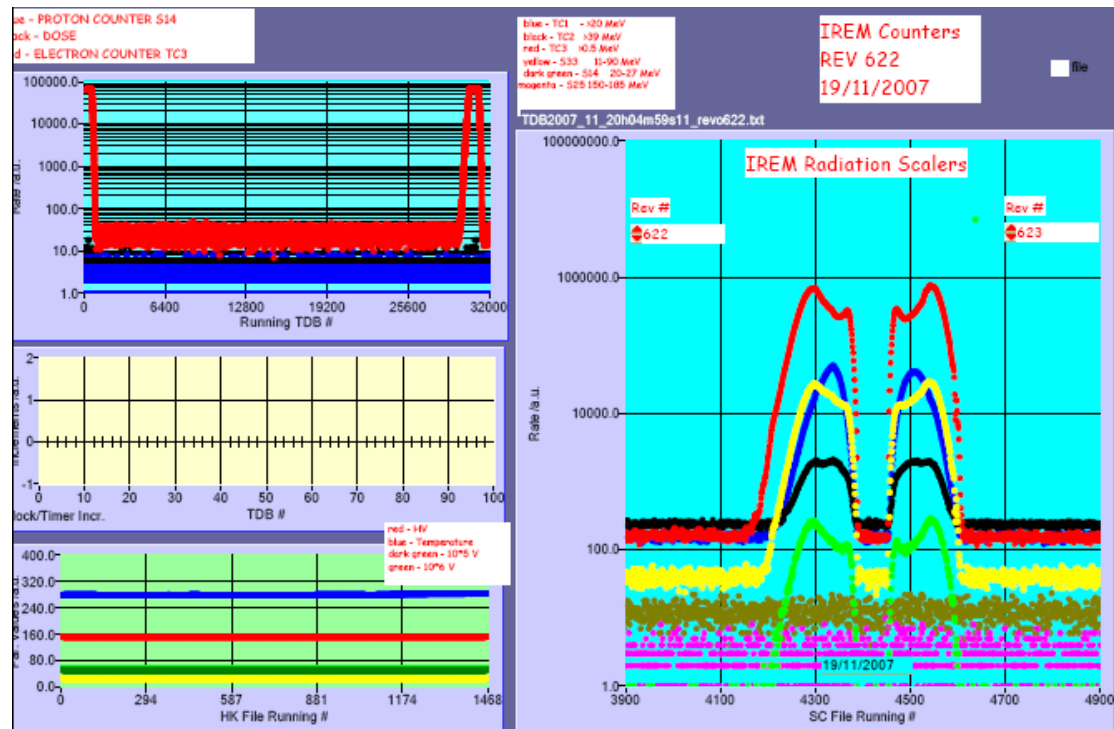
High radiation

Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

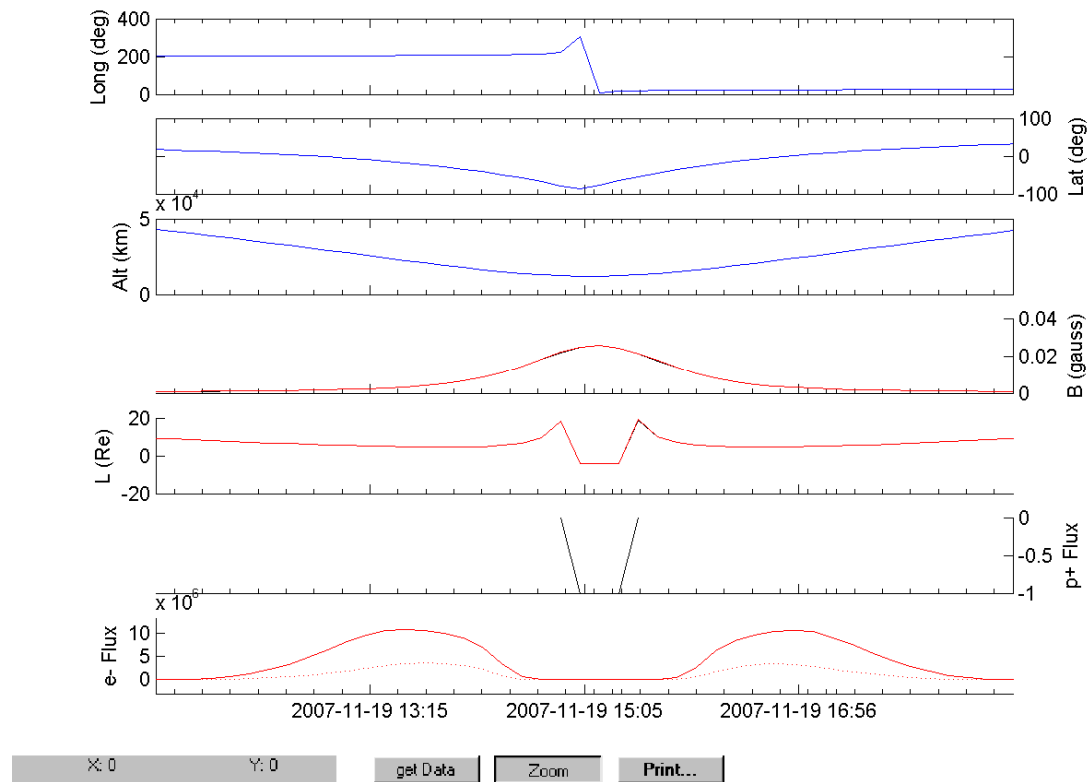
Large error vs reference (more than 30 minutes)

IREM radiation counters:

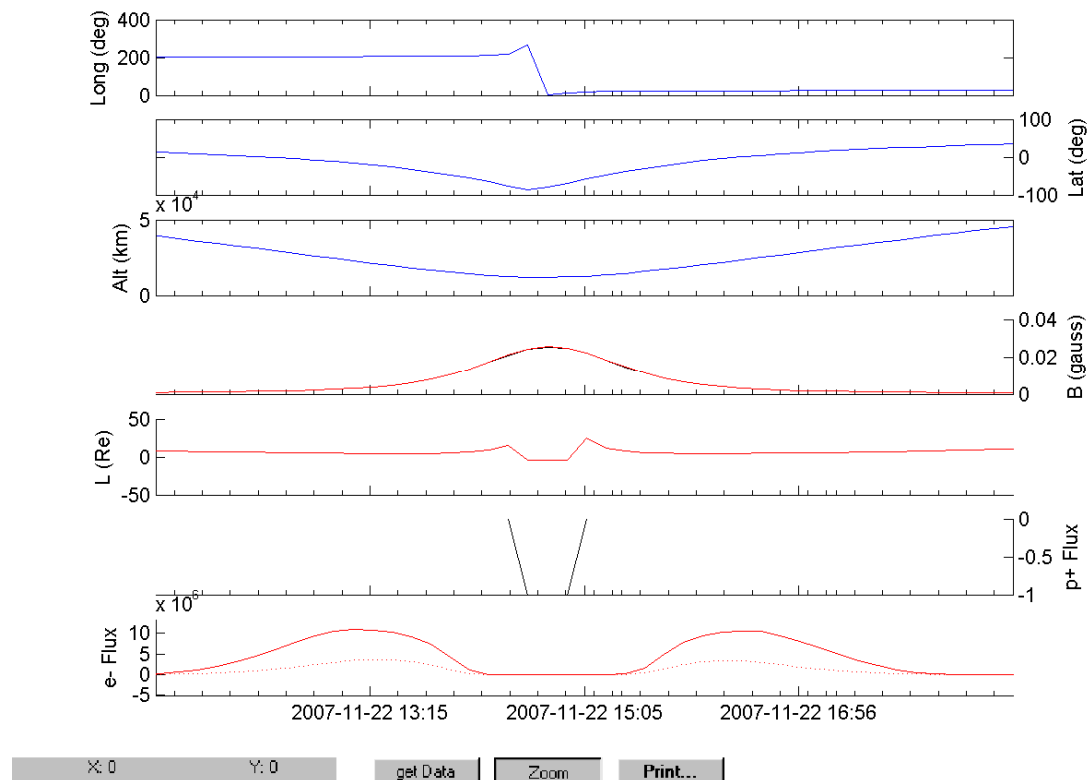


IREM Predicted Radiation Belt Passages

Rev 622



Rev 623



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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.