

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No.325
Week 50
08.12.08
Routine Phase

Prepared by: F.Schmidt (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 06.12.08 until 12.12.08 (both dates inclusive) and covers the revolutions 750, 751 and 752.

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 Galaxy Cluster 47 Tuc and Small Cloud of Magellan SMC (RA 00:53:55.20, DEC -72:26:42.0), a hexagonal dither of the Virgo Cluster (RA 12:26:32.10, DEC +12:43:24.0) and a OMC Flat Field Calibration (RA 09:52:00.00, DEC +17:06:00.0)

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.

The Thrusters calibration, in synch with the winter eclipse season 2008, was successfully executed on 10/12/2008.

No slew was missed from TL, during the observation period.

The fuel consumption over the period between 06/12/2008 and 12/12/2008 was 0.1801 Kg. The remaining propellant is in the order of 137.1097 Kg.

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

3.1.2 Power

All the other units of EPS are working nominally; available power from the arrays is of the order of 2100W.

3.1.3 Thermal

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

3.1.4 OBDH

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

The PST was over-subscribed by 3 packets, which were allocated to SPI during the Instrument window for the entire reporting period.

3.1.5 RFS

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

3.2 Payload

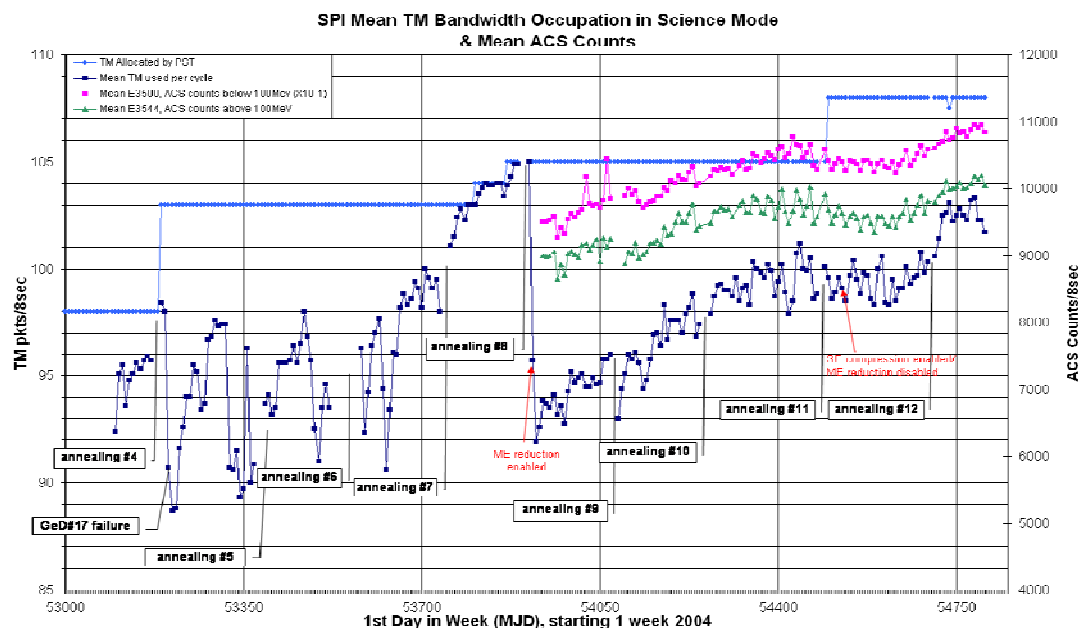
3.2.1 SPI

Following the 12th annealing, ended on 04/09/2008 at 23:50Z, the overall status of the gamma-ray spectrometer is nominal, except for detector #2 (failed since 06/12/2003) and detector #17 (failed since 17/07/2004). The energy resolution of the previously degraded GeD#12 has improved following this annealing and the bias of this detector is now set to 4kV as for the other detectors.

The Stirling compressors are working nominally. The Germanium detectors temperature was kept in the range 80K $\pm$ 1K throughout the week.

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 and the average telemetry occupation was 101.7 packets/cycle.

The following plot shows the evolution of the assigned and the average occupation of the SPI TM bandwidth along with the mean ACS count rate evolution (since July 2006). As can be seen, there is a strong correlation between the evolution of the background as measured by the ACS and the overall TM bandwidth usage.



Note: Some more information concerning the SPI operations is provided in the Appendix 8.3.2.

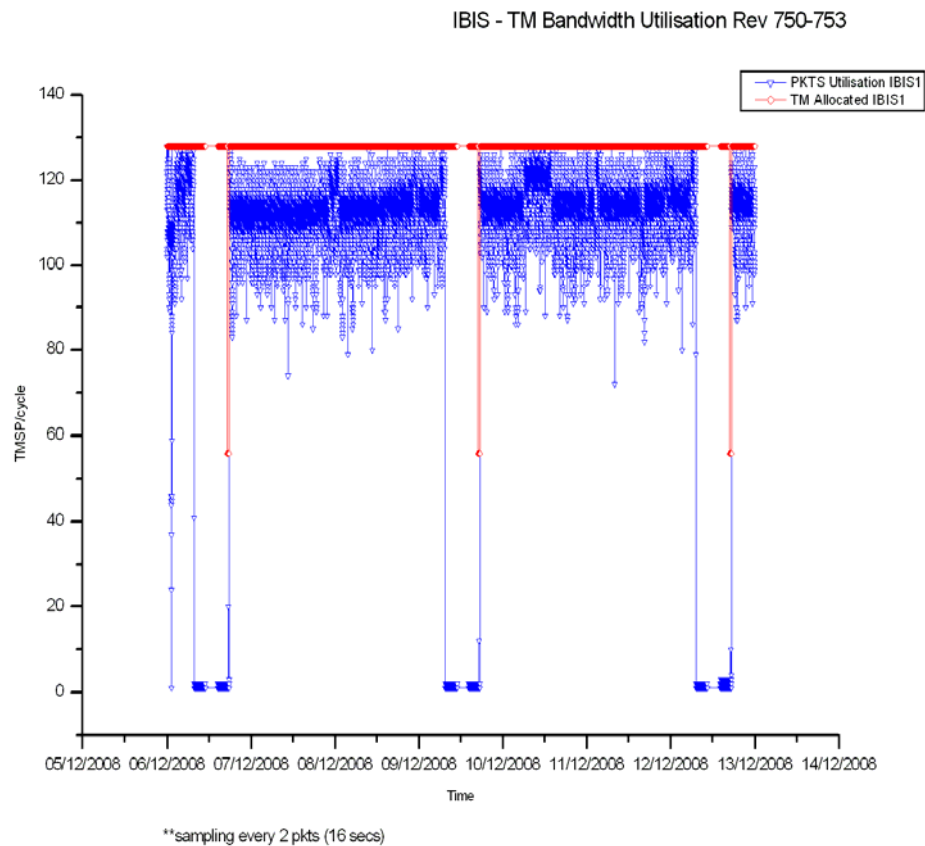
3.2.2 IBIS

The overall status of the unit is nominal.

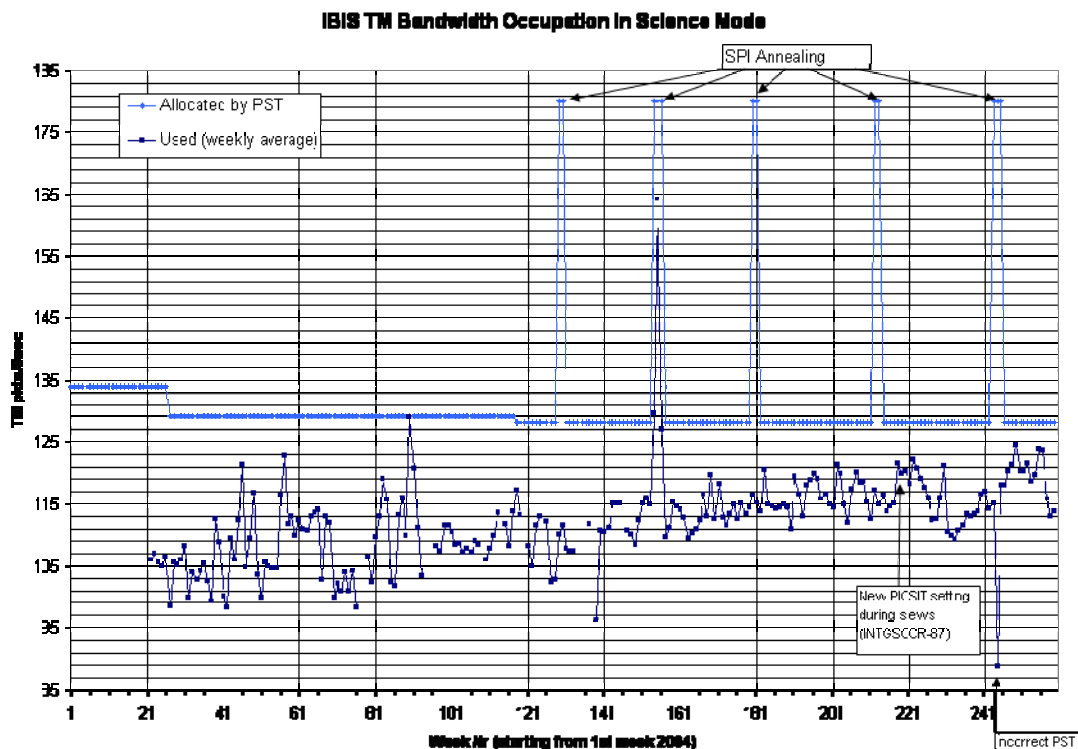
During the reporting period, the TM bandwidth statistics were as follows:

- PST allocation to IBIS above radiation belts: 128 packets/cycle.
- IBIS mean bandwidth utilisation in science mode: 113.67 packets/cycle (up 0.73 on previous week)
- Percentage of TM cycles in which full bandwidth was used: 1.38%

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 Section 8.3.4.

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 per cycle.

During this reporting period, all of the 124 planned science pointings were executed nominally.

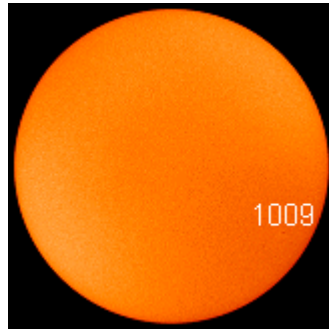
Note: Some more information concerning the OMC operations is provided in the Appendix.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. A new sun-spot #1009 appeared on the 10th, and remained visible until the end of the week. The risk of solar flares was very low.



Reference: www.spaceweather.com

Note: Some more information concerning the IREM operations is provided in the Appendix Section 8.3.6.

4 Ground Facilities

The Operational ground facilities performance was good this week. No pointing was lost due to ground problems. The overall performance though was above the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. No pointing was lost to MOC related issues. More information is given in section 6.

4.2 Ground Stations & Network

2008-12-11 21:05:00 (346)

Drop in VC0 link from Goldstone. No impact in operations.

2008-12-12 20:18:00 (347)

Problem receiving POS files from ISOC. Found to be due to wrong setup of IFTS (running on isdsb as well as on isdsa).

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs have been received for revolutions 761 to 764. Revolutions 758 and 759 were re-planned to adapt to the latest Long-Term Plan. Observations have been planned up to revolution 761, but were waiting for approval.

New TSFs have been received for revolutions 752 and 753.

The possible TOO on 3C279 was finally not approved as the source staid just below the trigger limit.

2. Observation status

New ECS files have been received for revolutions 743-746.

3. ISOC Science Data Archive

Installation of the latest Ingest software is ongoing. Source lightcurves based on the ISGRI survey work have been received from Southampton.

4. ISOC system

Work is ongoing on ISOC system V20.1.

5. Problems

The duty scientist phone still does not receive TOO alerts.

4.3.2 ISDC

Status of ISDC observation processing on 12/12/2008:

- Latest Standard Analysis completed: observation 06200520002 (PKS 0208-512, Revolution 746) on 12/12/2008.
- Latest products archived: observation 06200520002 (PKS 0208-512, Revolution 746) on 12/12/2008.
- Latest observation products sent to the observer: observation 05297000004 (Perseus OB2 Cloud, Revolutions 706-710) on 13/09/2008.

5 Special Events

On DoY 345 at 09:12z the Thruster Calibration started. The Timeline was rejoined at 13:22Z.

Some more information concerning the AOCS Thruster Calibration is provided in the Appendix 8.3.1.

6 Anomalies

Neither platform nor instrument anomalies

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

AR id	Date Created	Subject	Segment	Status
INT-3045	2008-12-12	Problems receiving Mission Planning Files from SOC	I/F to SGS	Pending

7 Future Milestones

- Database installation 15/12/2008

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 750

The observations in revolution 750 began with a hexagonal dither of the Galaxy Cluster 47 Tuc and Small Cloud of Magellan SMC (RA 00:53:55.20, DEC - 72:26:42.0), lasting ~25.1 hours. They continued with a Flat Field Calibration of OMC (RA 09:52:00.00, DEC +17:06:00.0), lasting ~3.4 hours. This was followed by a hexagonal dither of the Virgo Cluster (RA 12:26:32.10, DEC +12:43:24.0), lasting ~27.0 hours until the end of the revolution.

Revolution 751

The observations in revolution 751 began with a hexagonal dither of the Galaxy Cluster 47 Tuc and Small Cloud of Magellan SMC (RA 00:53:55.20, DEC - 72:26:42.0), lasting ~29.0 hours. They continued with a hexagonal dither of the Virgo Cluster (RA 12:26:32.10, DEC +12:43:24.0), lasting ~28.0 hours until the end of the revolution.

Revolution 752

The observations in revolution 752 began with a hexagonal dither of the Galaxy Cluster 47 Tuc and Small Cloud of Magellan SMC (RA 00:53:55.20, DEC - 72:26:42.0), lasting ~25.1 hours. They continued with a hexagonal dither of the Virgo Cluster (RA 12:26:32.10, DEC +12:43:24.0), lasting ~25.1 hours until the end of the revolution.

Throughout these observations, all instruments were in their nominal science modes, except JEM-X2, which is switched off. The TM allocation was IBIS 128; SPI 108; JEM-X1 8; JEM-X2 0; OMC 5, except during the OMC Flat-Field calibration from 2008-12-04T21:49:56Z to 2008-12-05T02:10:25Z when it was IBIS 90; SPI 88; JEM-X1 8; JEM-X2 0; OMC 63.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2008-12-01T17:14:55.000Z	137.3396	F	Automatic TM processing.
2008-12-03T15:24:36.000Z	137.3196	F	Automatic TM processing.
2008-12-04T20:03:59.000Z	137.2898	F	Automatic TM processing.
2008-12-06T15:10:19.000Z	137.2803	F	Automatic TM processing.
2008-12-08T00:31:59.000Z	137.2381	F	Automatic TM processing.
2008-12-09T14:58:03.000Z	137.2259	F	Automatic TM processing.
2008-12-10T08:22:05.000Z	137.1865	F	Automatic TM processing.
2008-12-10T12:30:00.000Z	137.1654	F	After thruster torque calibration
2008-12-10T13:42:46.000Z	137.1275	F	Automatic TM processing.
2008-12-11T00:24:39.000Z	137.1097	F	Automatic TM processing.

This report was generated Fri Dec 12 08:00:23 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, 06/12/2008 – 12/12/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 91 Open Loop Slews, 45 Closed Loop Slews and 7 Momentum Biases were executed (as reported by ACC OEM).

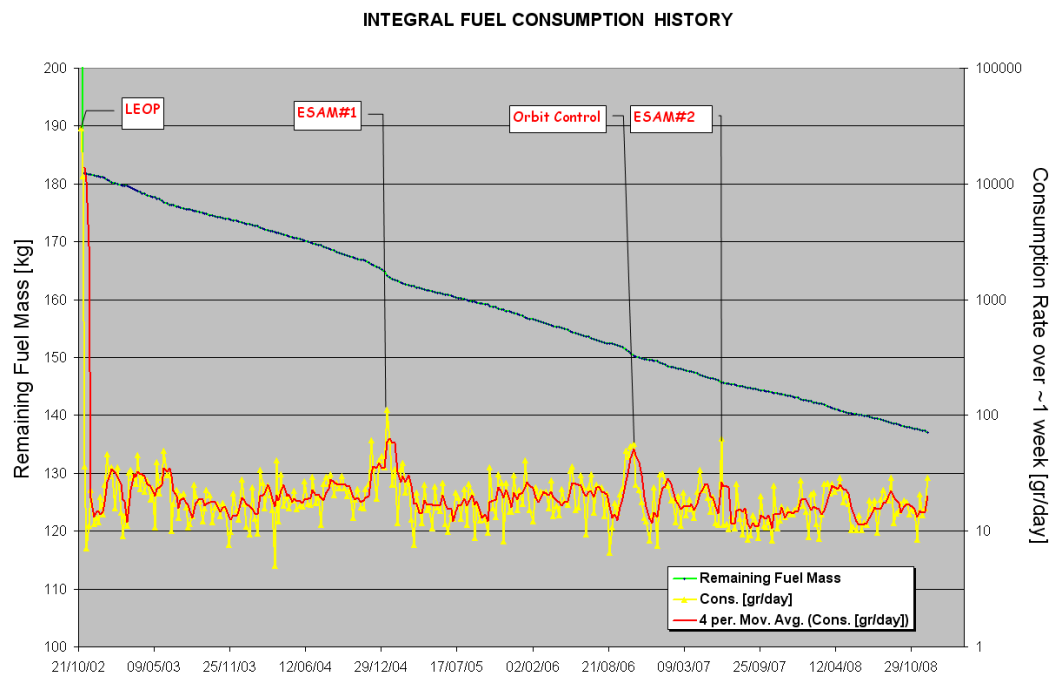
No slew was missed from TL, during the observation period.

Orbit Control

No update

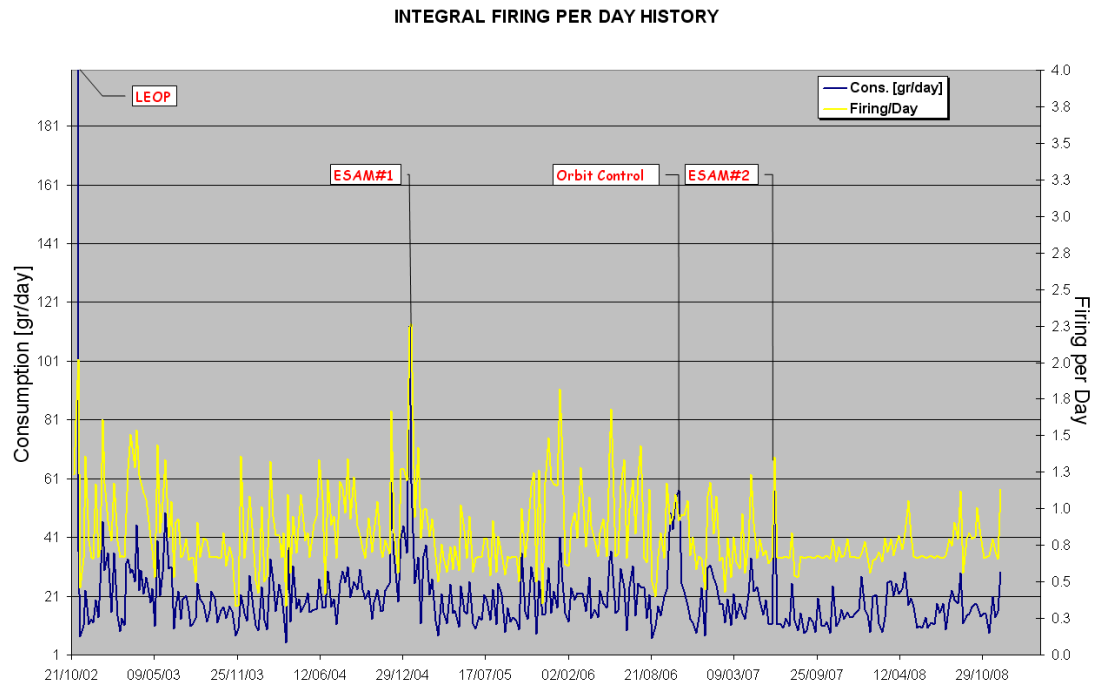
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 12/12/2008 is reported in the plot below.



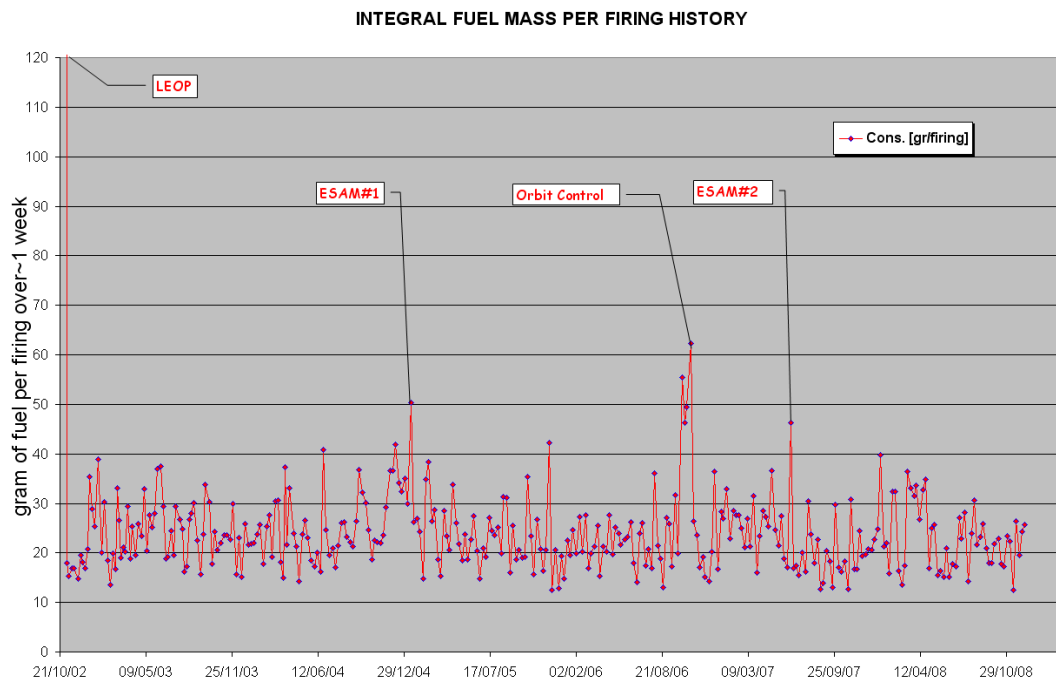
The above plot considers the ESAM fuel consumption spread over period of ~1 week.

The firing per day over the period between 01/11/2002 and 12/12/2008 is reported in the plot below.



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

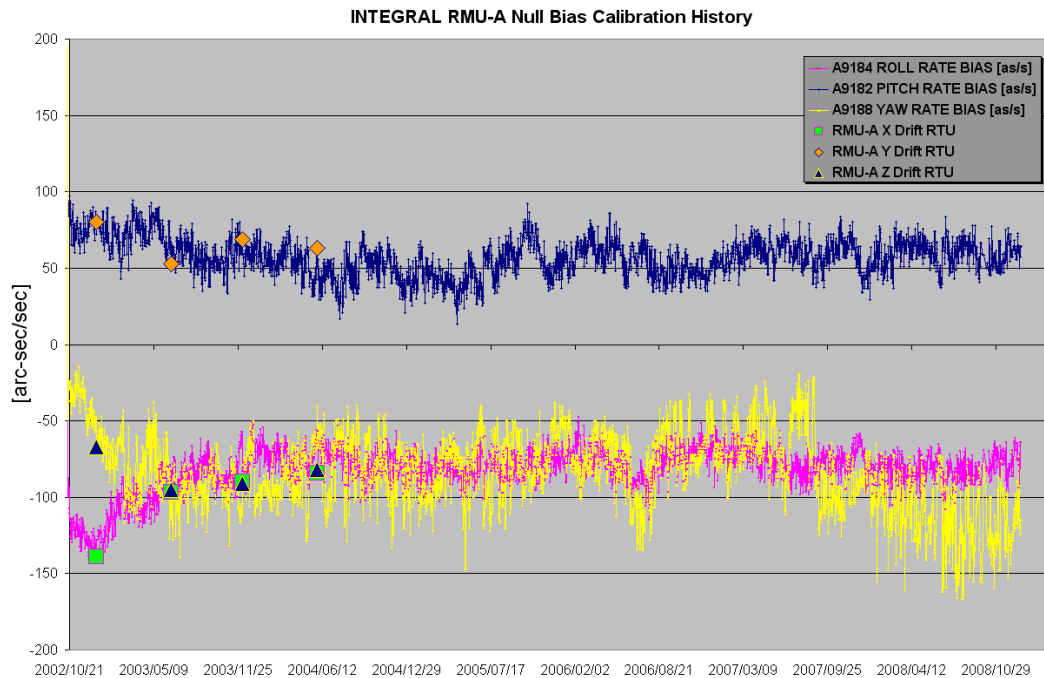
The fuel per firing over the period between 01/11/2002 and 12/12/2008 is shown in the plot below.



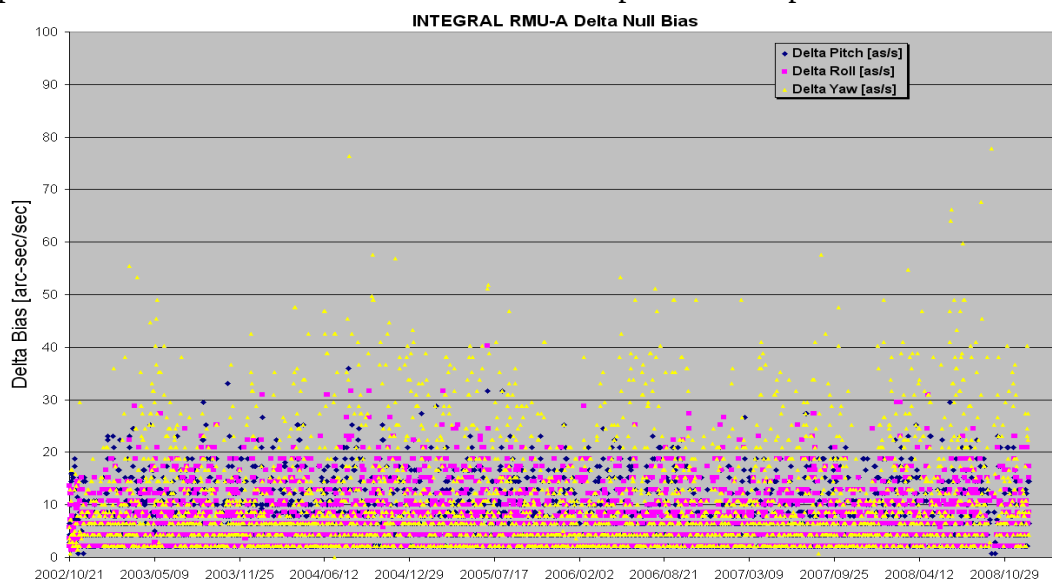
The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 26/12/2008 is reported in the plot below.

The evolution of the drift on yaw channel is under constant monitoring but the values are still well within the specs. At moment the current constraints (for drift update generation) on the FDS have been relaxed to cope with the current situation.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over period between 01/11/2002 and 26/12/2008 is reported in the plot below.



06/11/2008 (Day of Year 341, Revolution 750-751)

Nothing to report.

07/11/2008 (Day of Year 342, Revolution 751)

Nothing to report.

08/12/2008 (Day of Year 343, Revolution 751)

Nothing to report.

09/12/2008 (Day of Year 344, Revolution 751-752)

Nothing to report.

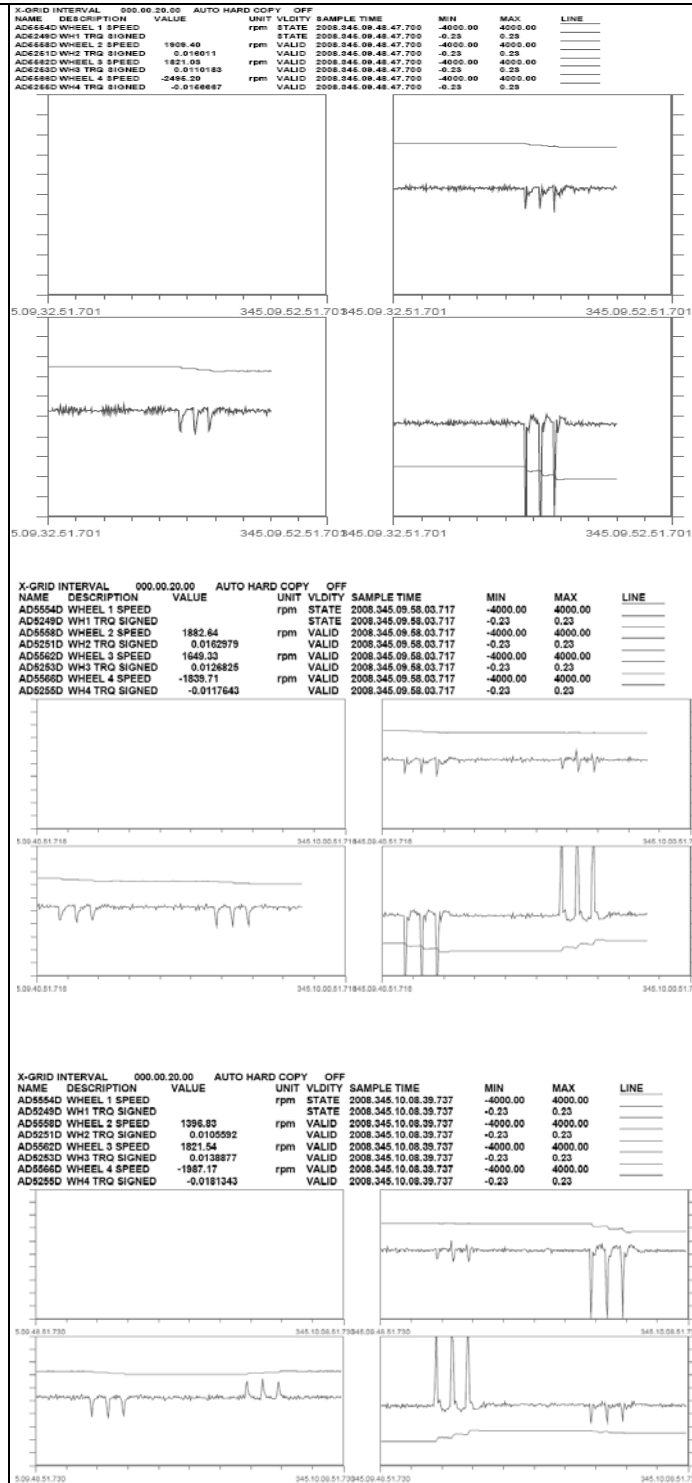
10/12/2008 (Day of Year 345, Revolution 752)

Thrusters Torque Calibration: the Thrusters calibration was executed according to EPOS for revolution 752_11. The calibration was performed based on the following timeline:

Time	Event	Execution
2008-12-10T08:14:25Z	Engineering Window Open	Timeline
	<u>AOCS and FD engineers requested</u>	
2008-12-10T08:05:25Z	ED AECGS_00 Change of guide star before the execution of the RWB to meet the pointing requirements (FCP_AOC_0529)	Timeline
2008-12-10T08:14:25Z	ED AERWB_00 Reaction Wheel Bias Manoeuvre to set the wheel speeds at RW2=+2000 rpm, RW3=+2000 rpm, RW4=-2000 rpm (RW1 not used)	Timeline
2008-12-10T08:29:25Z	Verify the automatic update of the next slew!	
2008-12-10T08:40:06Z	ED AECSL_00 Corrective Closed Loop Slew (FCP_AOC_0520) Verify SSL enabled. IF lost of guide star, re-generate SSL	Timeline
2008-12-10T08:49:54Z	Verify update of the next CGS in TL	Timeline
2008-12-10T08:52:00Z	Disable AOCS s/s in TL PT1= 6.64bar PT2= 6.97bar PT3= 15.80bar ALPHA= -0.91deg BETA= -11.73deg RW1=NU RW2=+2025 RW3=+1990 RW4=-1987	Timeline

THRUSTER CALIBRATION Manual Thruster Calibration Operations Reference:INT-PR-MMB-0005, OO_017		
2008-12-10T09:00:00Z	Start of Manual Thruster Calibration Operations (FCP_AOC_1520)	
09:12:00Z	ED AECGS_00 Change of guide star before the execution of the RWB requested by (paranoid) AOCS SOE to safer meet the pointing requirements (FCP_AOC_0529) Reset the TIMs accumulators (step 1-3.1 FCP_AOC_1520) WAIT 20 minutes of RW data collection to estimate the external torques. Inform ISDC to disable the IBAS system.	
09:30:00Z	Averaged Reaction Wheels speeds over the 20 mins period RW1=NU RW2=+2031 rpm RW3=+1991 rpm RW4=-1993 rpm	
09:35:00Z	Set FCV-A ON (step 3.2 FCP_AOC_1520)	

09:40:00Z	First execution of the RCS_A thruster calibration sequence (FCP_AOC_1520). On loading TC sequence AS0715, the input value for the formal parameter THR_TIME shall be 565 raw (equivalent to 137.860 msec, where the quoted figure is the output of FD estimates* rounded down to the nearest 244ms LSb.). NOTE: Sequence shall be uplinked with <u>INTERLOCK DISABLED</u> NOTE: verify that the release time in the sequence is consistent with the procedure and <u>NO SET ASAP</u> NOTE: the IMCS will ask authorization before commanding having the TC_seq Hazardous TCs. NOTE: possible occurrence of OEM APID 640 Class 0 ID 48<<ROLL ERR>>, ID 49<<PITCH ERR>>, ID 50<<YAW ERR>>. Due to an over generation of OEMs, potential OOL A5702 (Mod 4096 counter) →download on board OEMs (TC A1091 A1092) Execution duration is ~34 minutes. * on the basis of estimated fuel mass 137.18 Kg and tank temperature 28.6 degC on the 05/12/2008 Reported T0100 TCP-1A (RCS thermocouple) in OOL HIGH for few TM cycles.	Manual
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Just as example, reported the first firing of THR1, THR2, THR3

10:15:00Z	WAIT 20 minutes for IPS settling and RW data collection to determine the post-settling wheel speeds and external torques. Perform Manual Mapping, FCP_AOC_0531, and start Recovery Schedule Tool until attitude reconstruction process to generate the last ASF for ISDC. GUIDE STAR stable across all the calibration PT1= 6.64bar PT2= 6.97bar PT3= 15.80bar ALPHA= -0.85deg BETA= 11.75deg RW1=NU RW2=+2066 rpm RW3=+1995 rpm RW4=-2029 rpm	
10:40:00Z	Second execution of the RCS_A thruster calibration sequence (FCP_AOC_1520). On loading TC sequence AS0715, the input value for the formal parameter THR_TIME shall be 565 raw (equivalent to 137.860 msec, where the quoted figure is the output of FD estimates* rounded down to the nearest 244ms LSb). NOTE: Sequence shall be uplinked with <u>INTERLOCK DISABLED</u> NOTE: verify that the release time in the sequence is consistent with the procedure NOTE: possible occurrence of OEM APID 640 Class 0 ID 48<<ROLL ERR>>, ID 49<<PITCH ERR>>, ID 50<<YAW ERR>>. Execution duration is ~34 minutes. Reported T0100 TCP-1A (RCS thermocouple) in OOL HIGH for few TM cycles.	Manual

11:15:00Z	WAIT 20 minutes for IPS settling and RW data collection to determine the post-settling wheel speeds and external torques. Perform Manual Mapping, FCP_AOC_0531, and start Recovery Schedule Tool until attitude reconstruction process to generate the last ASF for ISDC. GUIDE STAR stable across all the calibration PT1= 6.64bar PT2= 6.97bar PT3= 15.80bar ALPHA= -0.80deg BETA= -11.76deg RW1=NU RW2=+2096 rpm RW3=+1998 rpm RW4=-2061 rpm	Manual
11:32:14Z	SSL in TL not executed because parameters set in TL not taking in account the small deviations of S/C attitude introduced by the on-going calibration. Next update of SSL when rejoining the TL.	Timeline
11:40:00Z	Third execution of the RCS_A thruster calibration sequence (FCP_AOC_1520). On loading TC sequence AS0715, the input value for the formal parameter THR_TIME shall be 565 raw (equivalent to 137.860 msec, where the quoted figure is the output of FD estimates* rounded down to the nearest 244ms LSb.). NOTE: Sequence shall be uplinked with <u>INTERLOCK DISABLED</u> NOTE: verify that the release time in the sequence is consistent with the procedure NOTE: possible occurrence of OEM APID 640 Class 0 ID 48<<ROLL ERR>>, ID 49<<PITCH ERR>>, ID 50<<YAW ERR>>. Execution duration is ~34 minutes. Reported T0100 TCP-1A (RCS thermocouple) in OOL HIGH for few TM cycles.	Manual
12:15:00Z	WAIT 20 minutes for IPS settling and RW data collection to determine the post-settling wheel speeds and external torques. Perform Manual Mapping, FCP_AOC_0531, and start Recovery Schedule Tool until attitude reconstruction process to generate the last ASF for ISDC. GUIDE STAR stable across all the calibration PT1= 6.64bar PT2= 6.97bar PT3= 15.33bar ALPHA= -0.76deg	Manual

	BETA= -11.78deg RW1=NU RW2=+2125 rpm RW3=+2000 rpm RW4=-2092 rpm	
2008-12-10T12:30:00Z	Reset the TIMs accumulators Set FCV-A OFF	Manual
	End of Manual Thruster Calibration Operations Spare time	
2008-12-10T13:22:00Z	Verified that the guide star still suitable for the incoming RWB activity ED AECGS_00 Change of guide star before the execution of the RWB to meet the pointing requirements (FCP_AOC_0529). CGS not executed because the planned guide star already tracked. Enabled AOCS s/s in TL	Timeline
2008-12-10T13:31:45Z	REANTX02 Antenna Swap	Timeline
2008-12-10T13:35:00Z	ED AERWB_00 Reaction Wheel Bias Manoeuvre to set the wheel speeds at target RW1 = NU RW2=-771 rpm RW3=+857 rpm RW4=-1821rpm	Timeline
2008-12-10T13:50:00Z	Verify the automatic update of the next slew	Timeline
2008-12-10T13:50:00Z	Re-enabled IBAS system at ISDC	Manual
2008-12-10T14:14:25Z	Engineering Window close	Timeline
2008-12-10T14:18:44Z	ED AEOSL_00 Open Loop Slew to the science attitude (FCP_AOC_0518)	Timeline

11/12/2008 (Day of Year 346, Revolution 752)

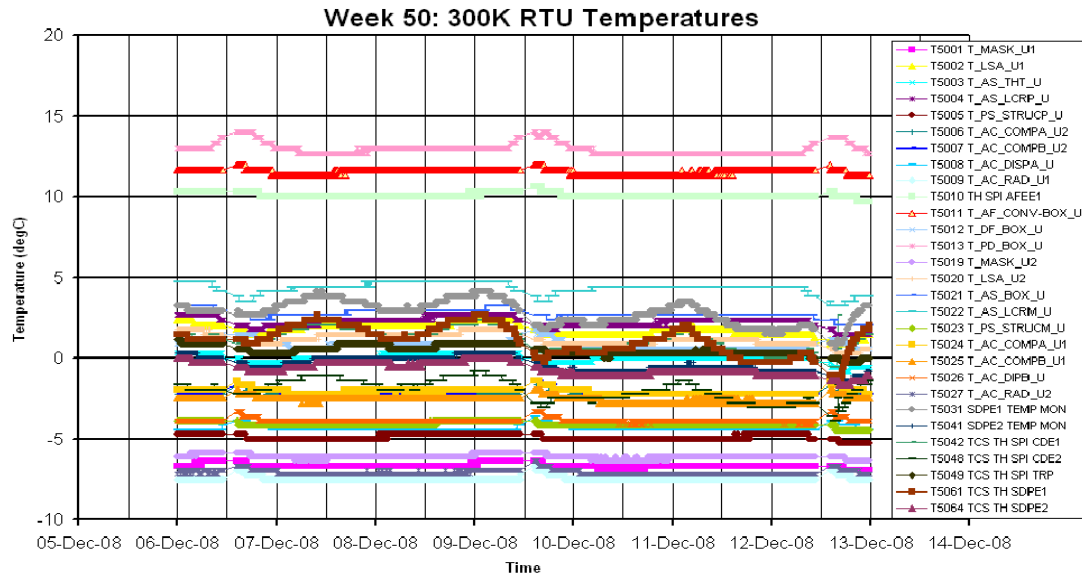
Nothing to report.

12/12/2008 (Day of Year 347, Revolution 752-753)

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.



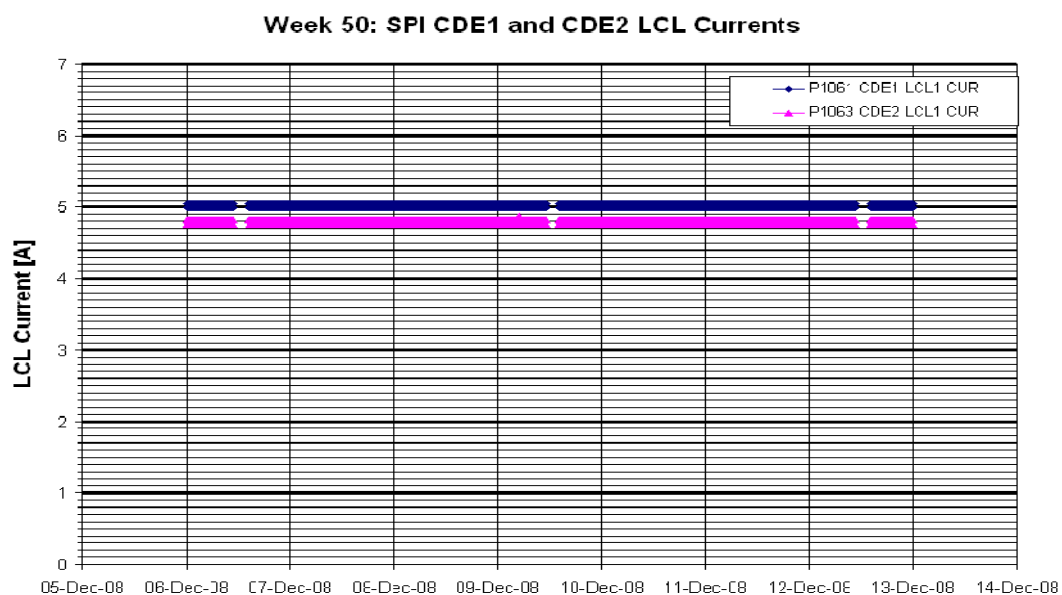
Stirling Compressors and Cryostat: The performance of the compressors is nominal.

The cold plate temperature was maintained in the range 80K +/-1K.

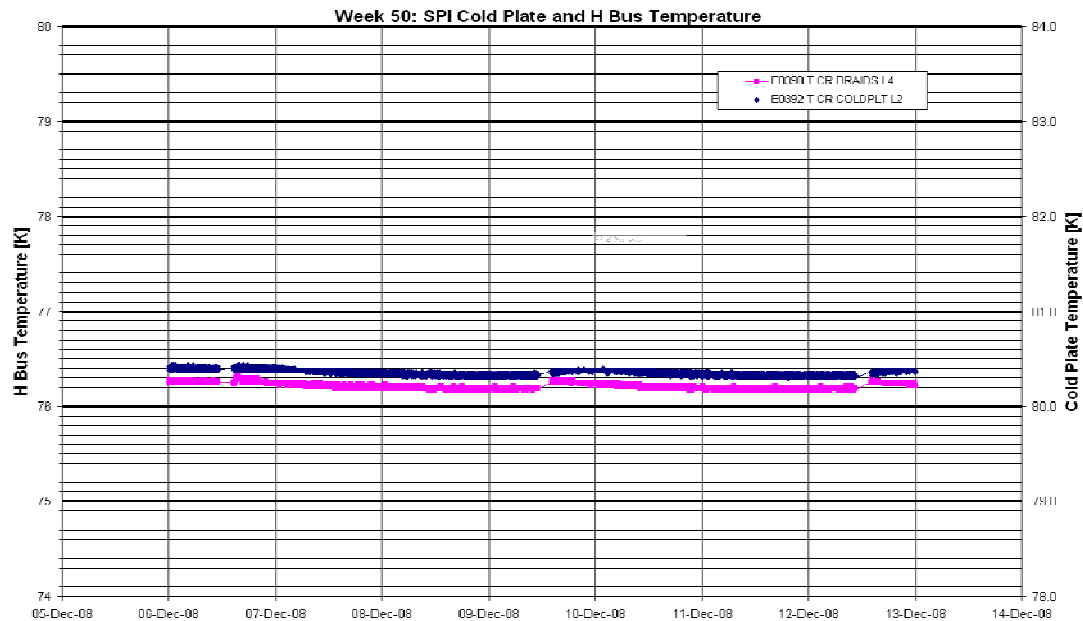
The stroke of all four compressors was set to 41 throughout the week and the average CDE LCL currents were as follows:

- CDE1 LCL Current = 5.01A
- CDE2 LCL Current = 4.80A

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



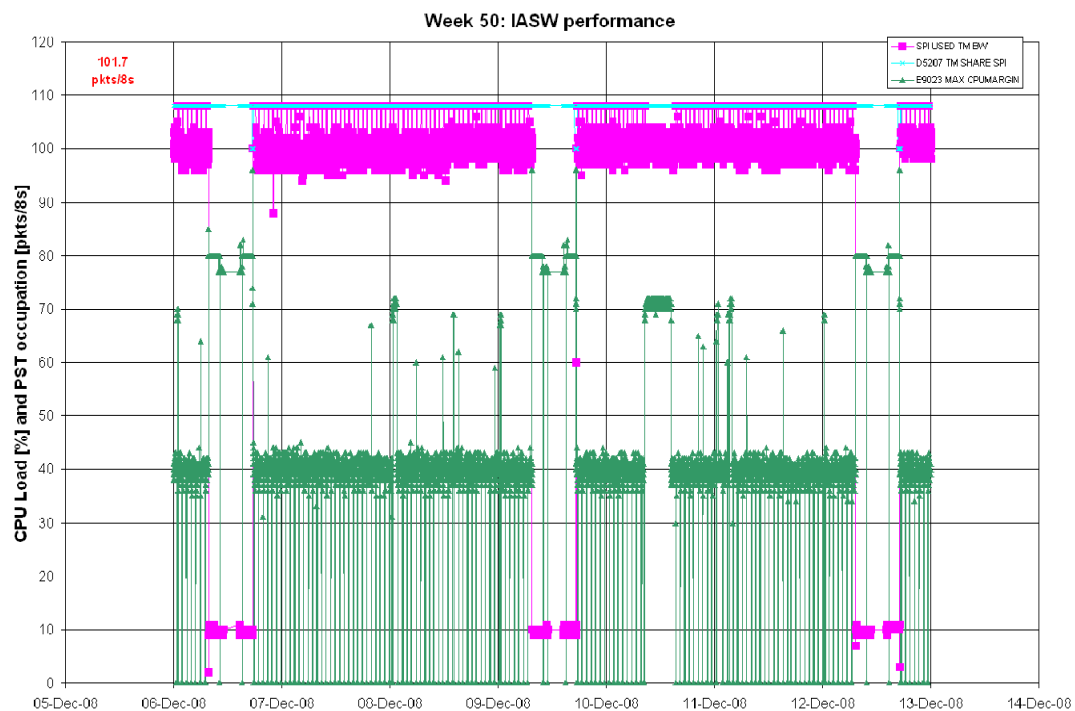
The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period.



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

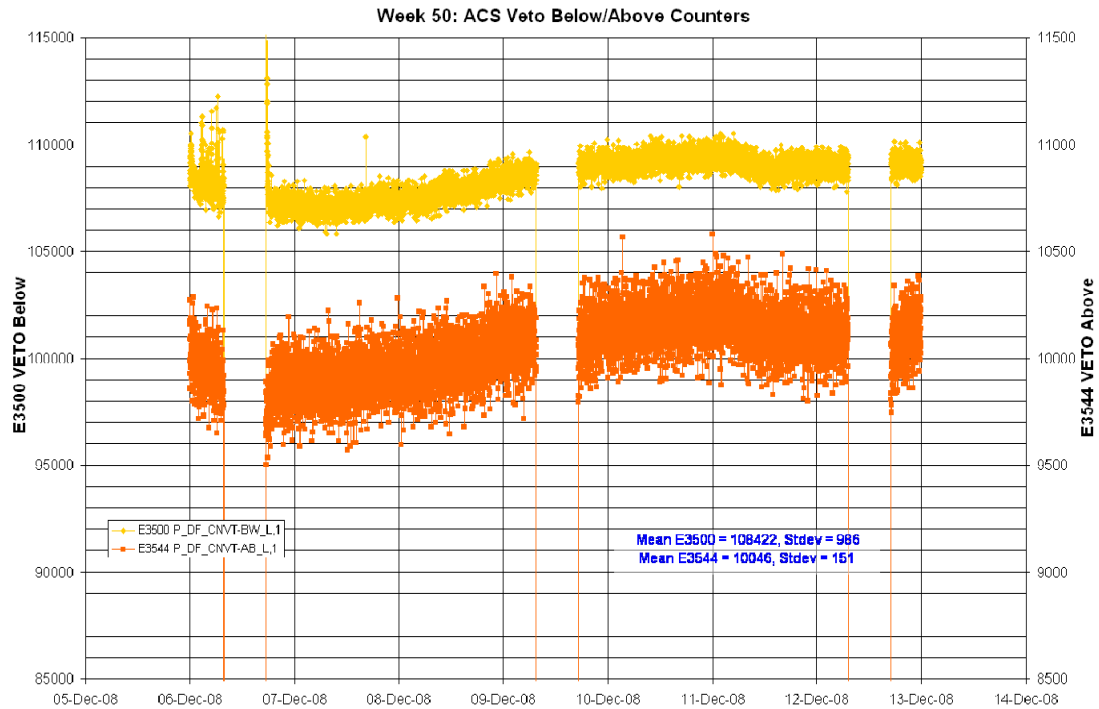
The IASW version installed is v4.3.4 with SE compression only enabled and the spectra scaling factor set to 8/19 SE. The average TM bandwidth occupation of SPI was 101.7 packets/cycle over the science window when the TM allocation was 108 packets/cycle.

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

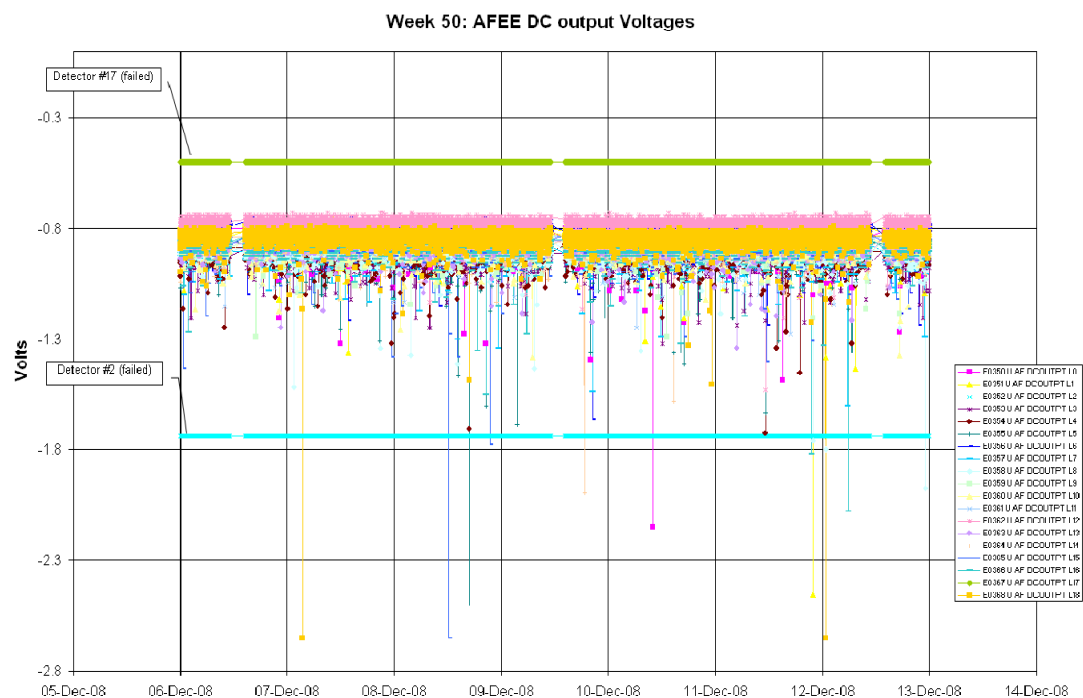


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

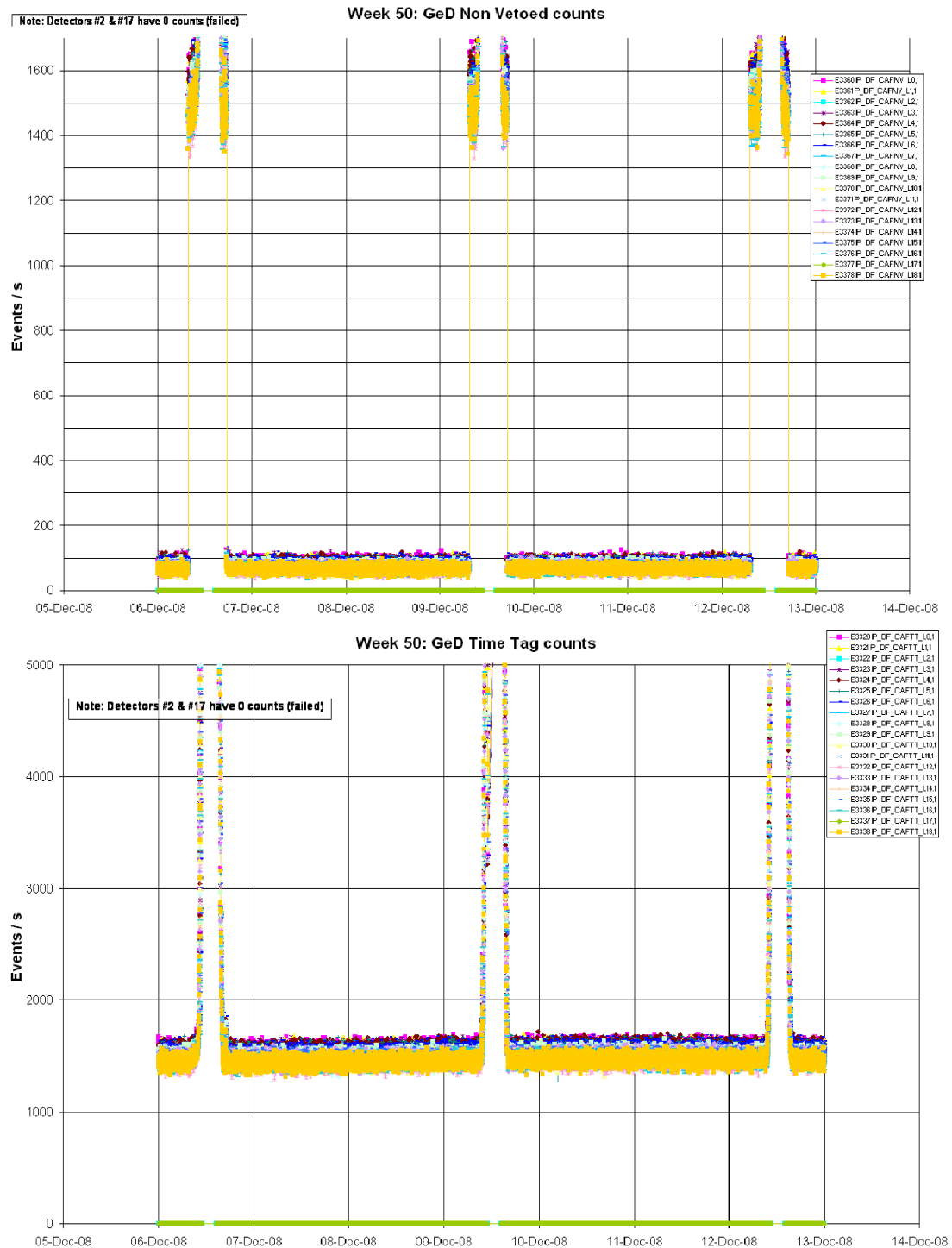
The following plot shows the ACS overall count rate evolution during the reporting period:

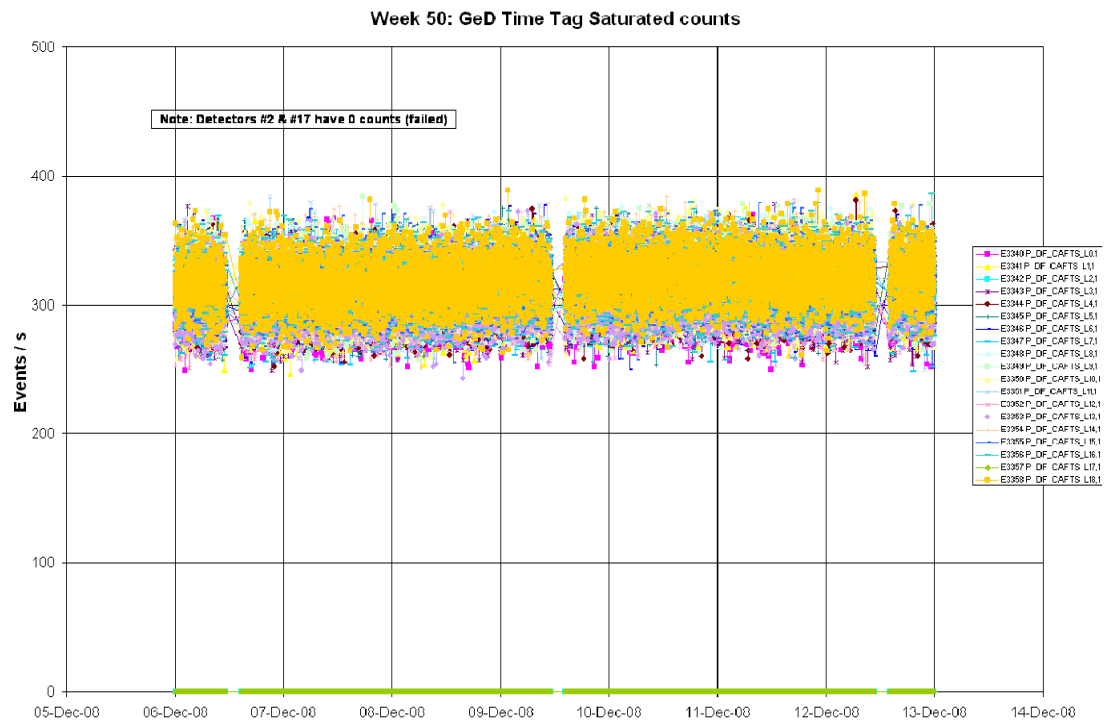


AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.

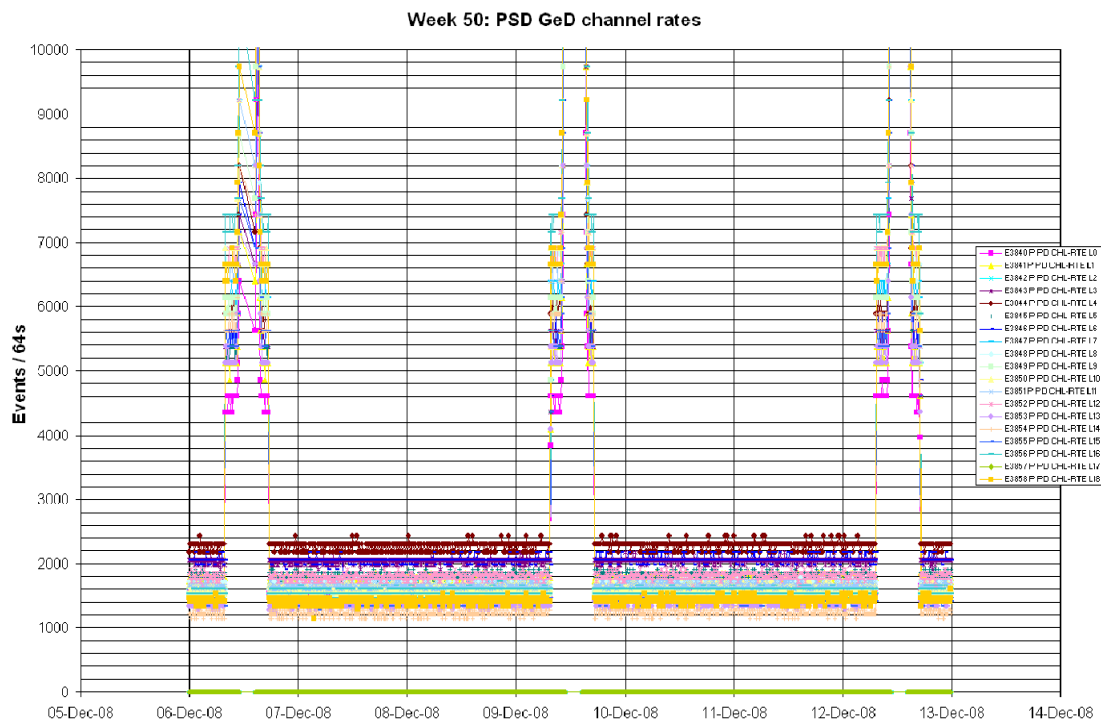


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event count rates during the reporting period.





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



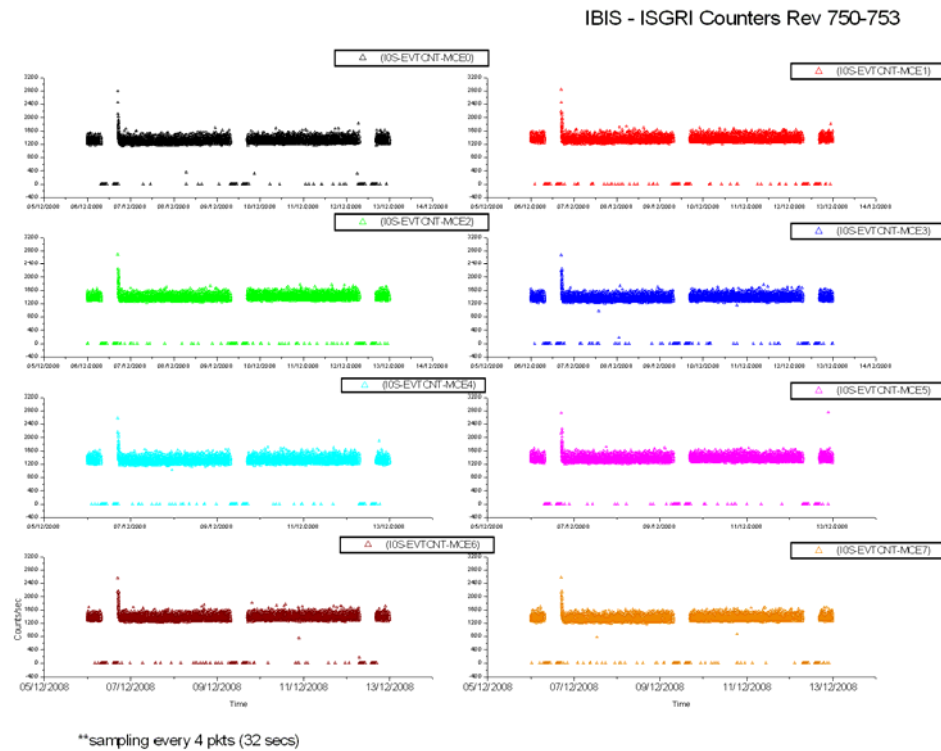
Event Log:

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

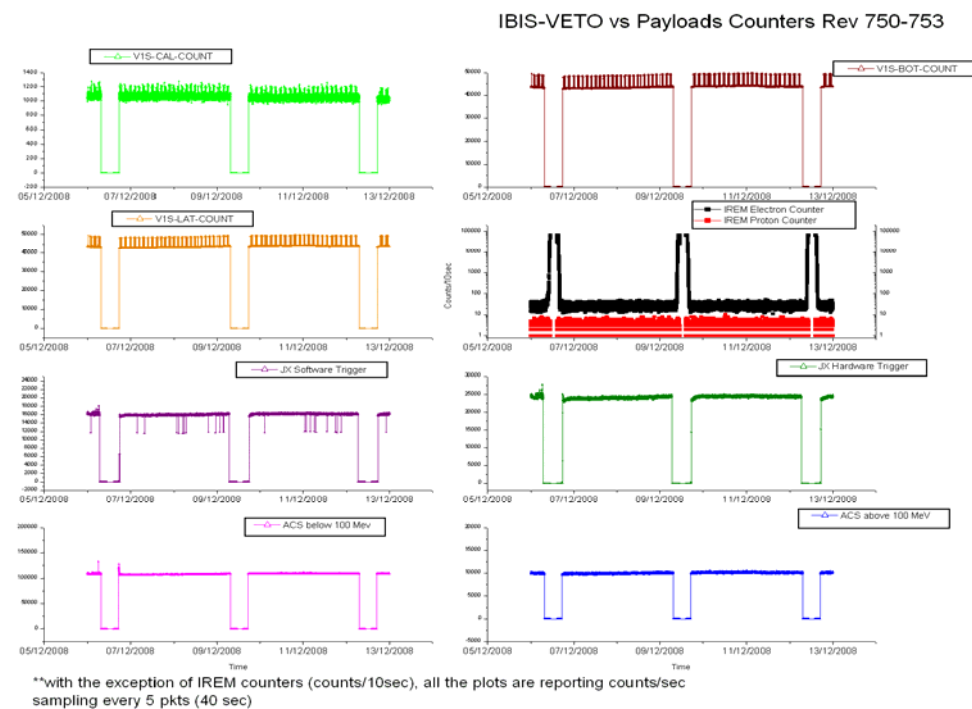
8.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

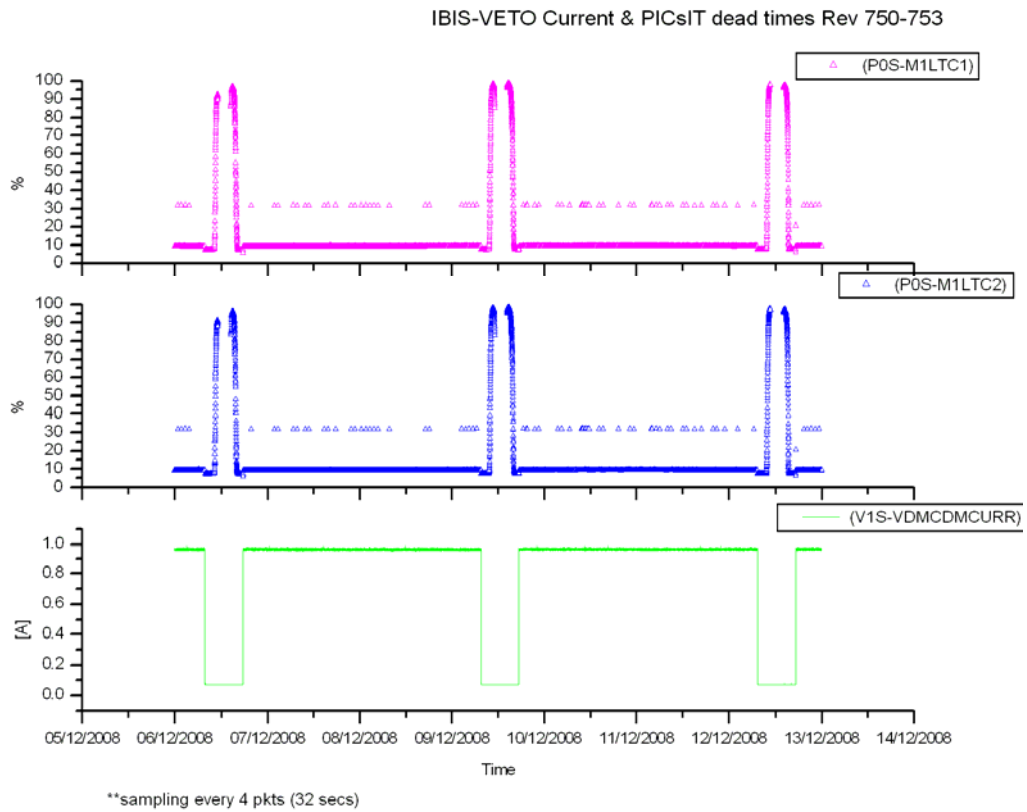


VETO vs Payload Counters:

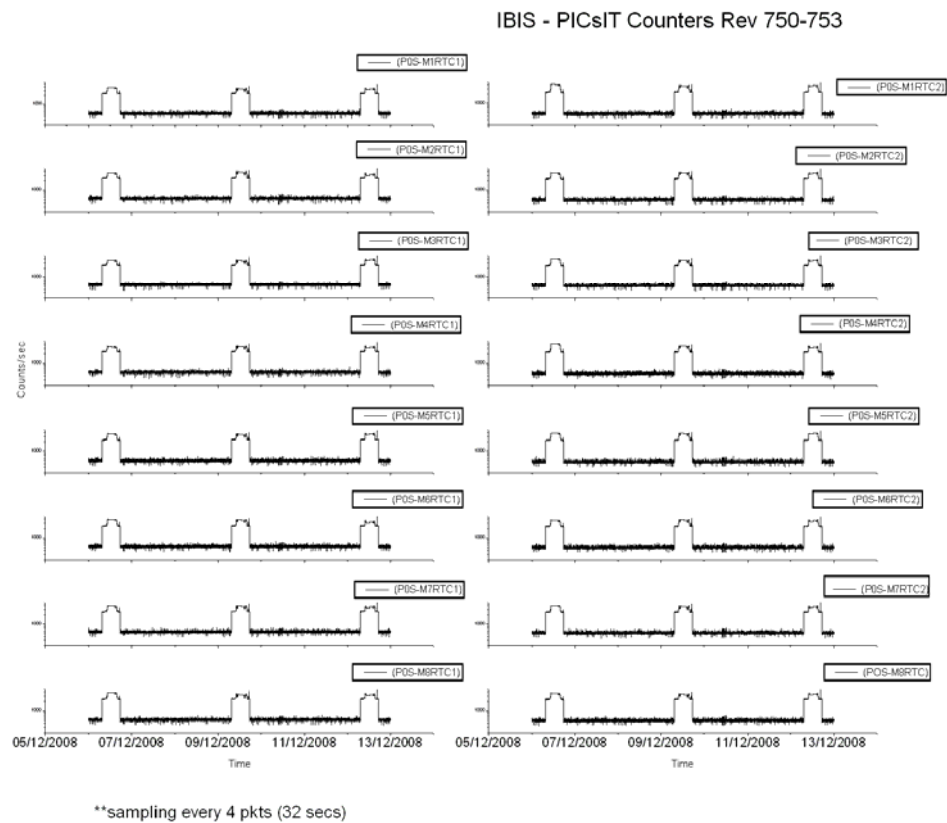


The week was characterised by low radiation as reported by the payload.

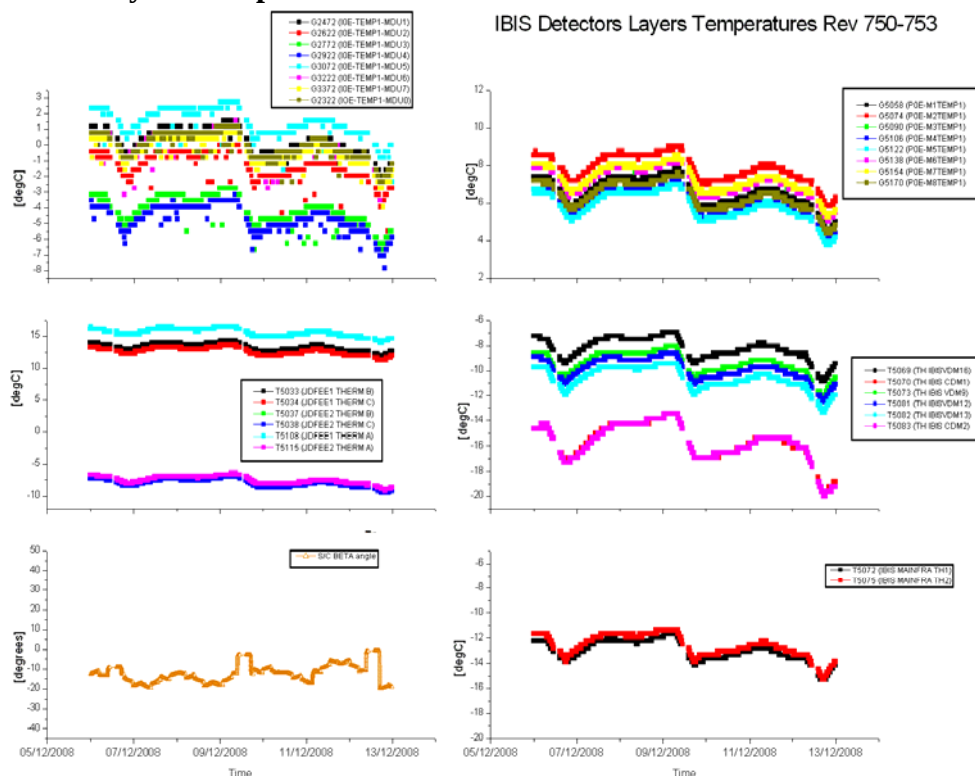
VETO Current:



PICsIT Counters:



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 (POS-Mi_RTC1) and G5003 (POS-Mi_RTC2) families and G2000 family (IOE-OVFWPXADD-Mi) were received during the radiation belt passages.

2008-12-06 (DOY 341, Rev 750-751)

At 00:51Z, 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:

- 01:17:07Z FCP_IBIS1_0312
 - 01:23:00Z TC G0129 uplinked to return IBIS to Science Standard mode.
- IBIS operations continued nominally.

At 10:34:07Z, during the radiation belt passage, TM parameter G5079 went OOL (value = 2.60509804V). This is the PDM2 +2.5V. As it returned within limits of its own accord at 10:34:39Z, no action was taken.

2008-12-07 (DOY 342, Rev 751) to 2008-12-08 (DOY 343, Rev 751)

IBIS operations executed nominally.

2008-12-09 (DOY 344, Rev 751-752)

At 01:37:31Z TM parameter G2070 went OOL, indicating an overflow of the noisy pixel address buffer in MCE5. As it returned within limits of its own accord at 01:37:39Z, no action was taken.

2008-12-10 (DOY 345, Rev 752) to 2008-12-11 (DOY 346, Rev 752)

IBIS operations executed nominally.

2008-12-12 (DOY 347, Rev 752-753)

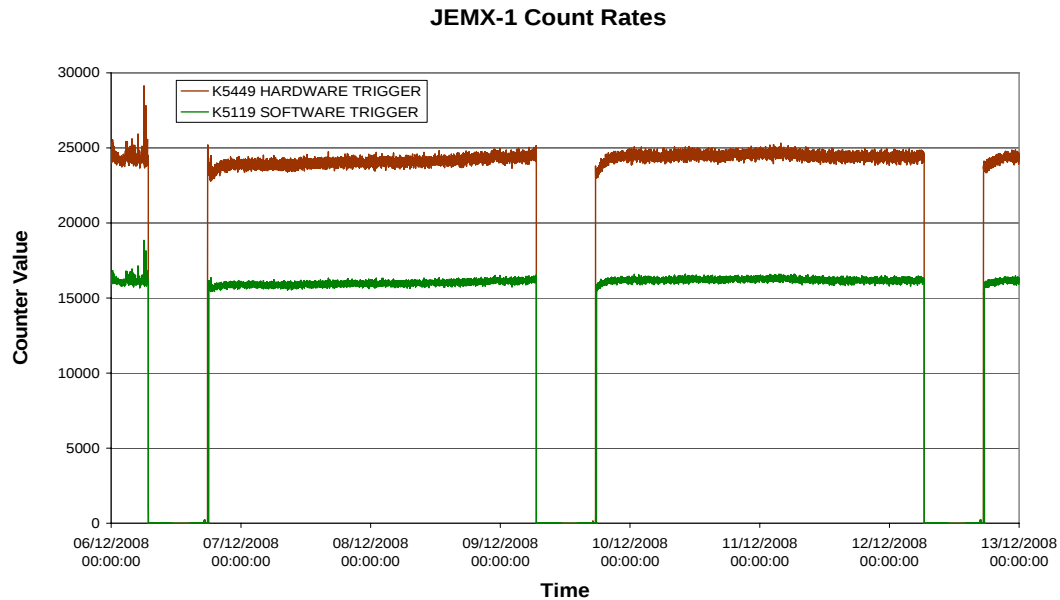
At 17:08:51Z TM parameters G2013 and G2027 went OOL Low (value = 0). These are the number of events triggering the MCE0 and MCE1 per second. As they had both returned within limits of their own accord by 17:10:03Z, no action was taken.

At 21:24:19Z TM parameter G2070 went OOL, indicating an overflow of the noisy pixel address buffer in MCE5. As it returned within limits of its own accord at 21:24:27Z, no action was taken.

8.3.4 JEM-X Operations

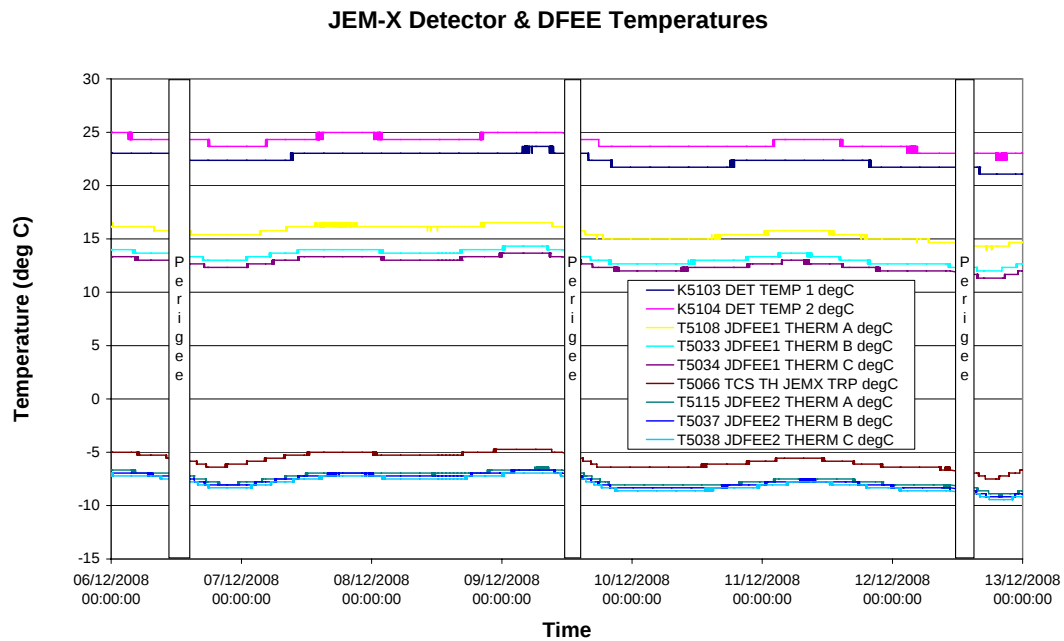
JEM-X Count Rates

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)

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JEM-X Daily Report

2008-12-06 (DoY 341, Rev 750) to 2008-12-09 (DoY 344, Rev 752)

JEM-X 1 operations executed nominally.

2008-12-10 (DoY 345, Rev 752)

The following On-Event Messages were received, at the indicated times:

2008.345.13.24.04.100	2008.345.13.24.08.858	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						
2008.345.13.24.04.100	2008.345.13.24.08.869	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						
2008.345.13.24.04.100	2008.345.13.24.08.870	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						
2008.345.13.24.04.100	2008.345.13.24.08.871	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						
2008.345.13.24.04.100	2008.345.13.24.08.872	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						
2008.345.13.24.04.100	2008.345.13.24.08.873	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						
2008.345.13.24.04.100	2008.345.13.24.08.873	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 there was no impact.

2008-12-11 (DoY 346, Rev 752) to 2008-12-12 (DoY 347, Rev 753)

JEM-X 1 operations executed nominally.

8.3.5 OMC Operations

2008-11-22 (DoY 327, Rev 746) to 2008-11-25 (DoY 330, Rev 747)

Nothing to report.

2008-11-26 (DoY 331, Rev 747)

At 10:39:24, the OEM message for the start of pointing 07470042 arrived twice for some reason, there was no impact.

At 13:37, the MU1323 command in the OMC command sequence failed release due to a brief TM drop from DSS27. The impact was the loss of pointing 07470045.

At 16:33, another TM drop caused the AOCS Search/Track commands to fail release. The impact was the loss of pointing 07470048.

2008-11-27 (DoY 332, Rev 747) to 2008-11-28 (DoY 333, Rev 748)

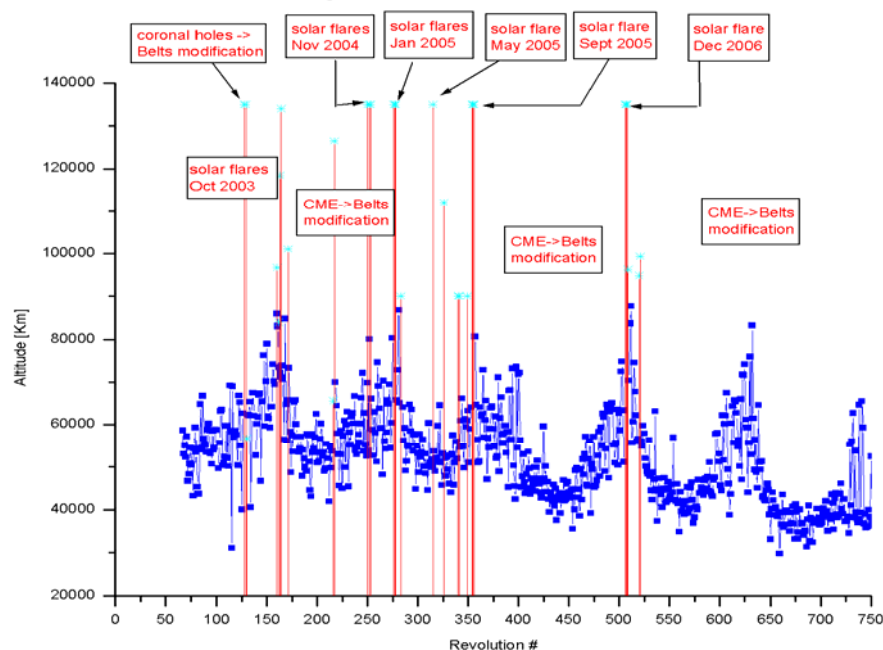
Nothing to report.

On DoY 329 at 08:25:40 and DoY 332 at 08:15:57 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]
750	RAD_ENTR R 2008-12-06T07:44:51Z	06/12/2008 09:14:20	52502.4	06-Dec-2008 10:04:33	35161.48
751	RAD_EXIT R 2008-12-06T17:28:46Z	06/12/2008 16:15:00	>>32153.9	06-Dec-2008 16:44:33	45756.84
751	RAD_ENTR R 2008-12-09T07:31:56Z	09/12/2008 09:35:08	37260.9	09-Dec-2008 09:49:37	35646.44
752	RAD_EXIT R 2008-12-09T17:15:37Z	09/12/2008 16:18:12	>>33904.9	09-Dec-2008 16:39:37	46882
752	RAD_ENTR R 2008-12-12T07:18:14Z	12/12/2008 09:36:12	35230.9	12-Dec-2008 09:39:37	35516.47
753	RAD_EXIT R 2008-12-12T17:00:51Z	12/12/2008 15:43:32	33949.3	12-Dec-2008 16:19:37	45554.93

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)

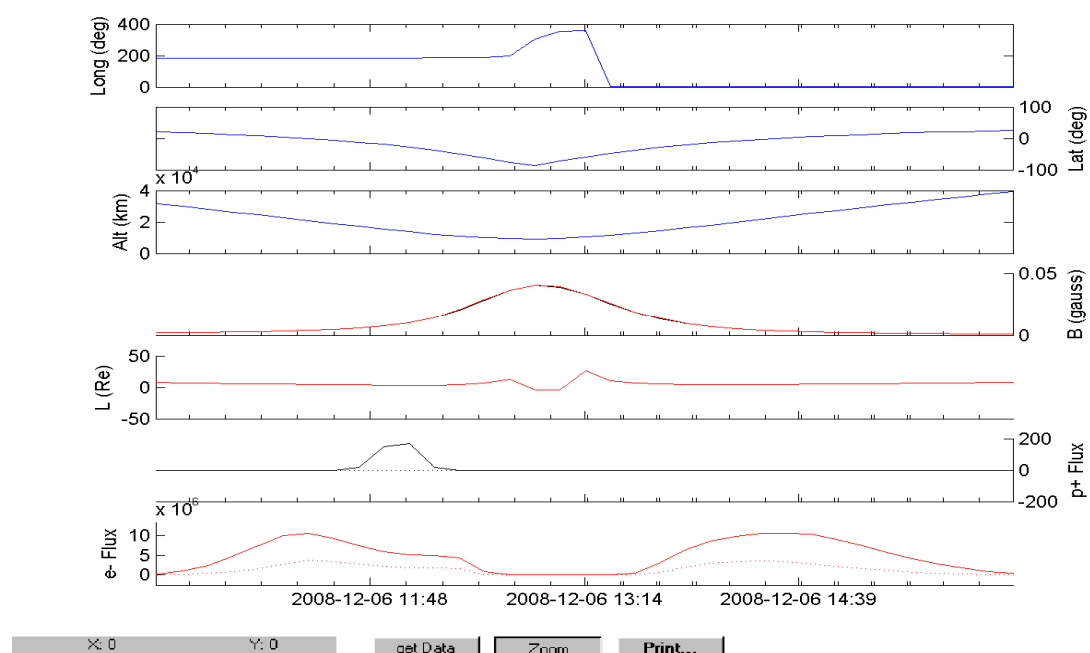
* Rad belt entry time ignoring previous threshold crossings where a gap of more than 30 minutes is present.

IREM radiation counters:

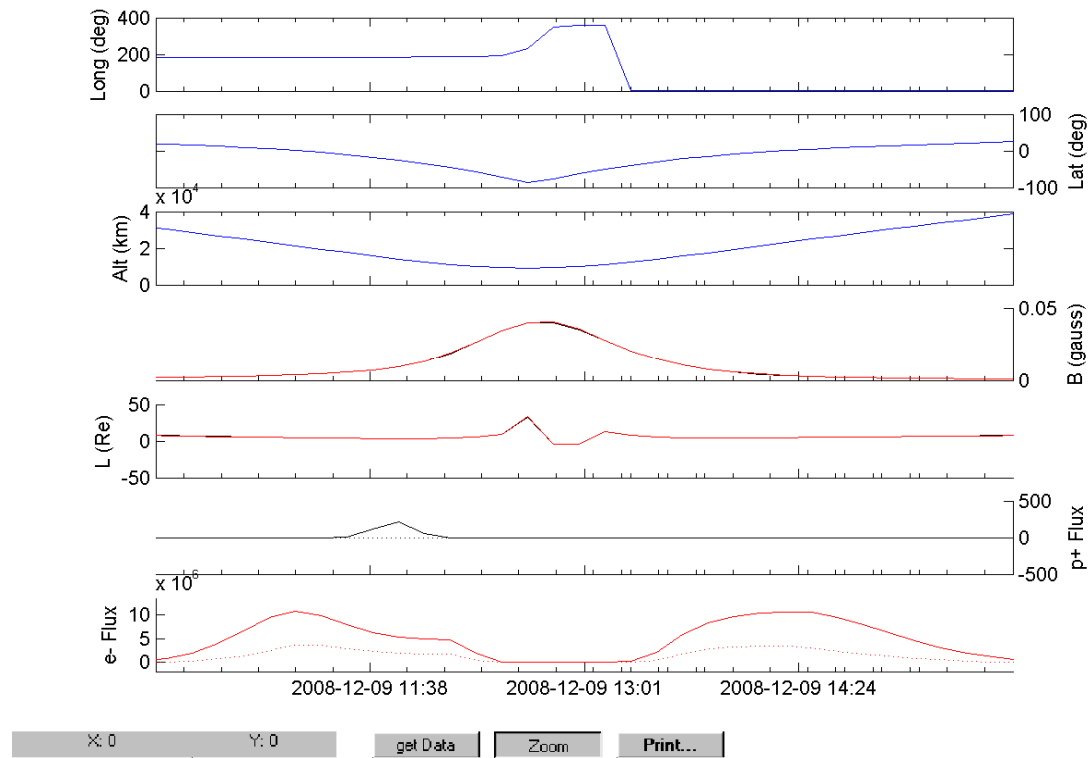
The IREM radiation counter plots are not available this week.

IREM Predicted Radiation Belt Passages

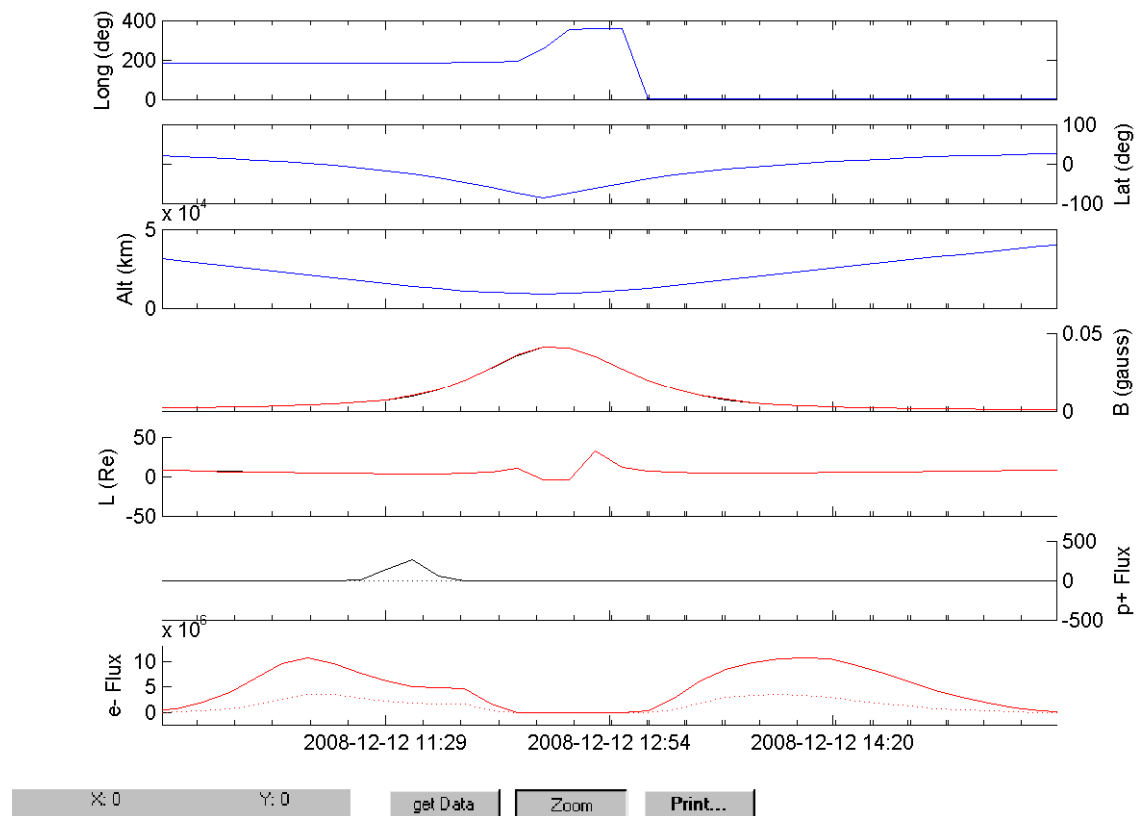
Rev 750



Rev 751



Rev 752



Radiation Assessment

Generated with SEIS Report and Analysis tool.

INTRODUCTION

This note summarises the space weather status during the observation period

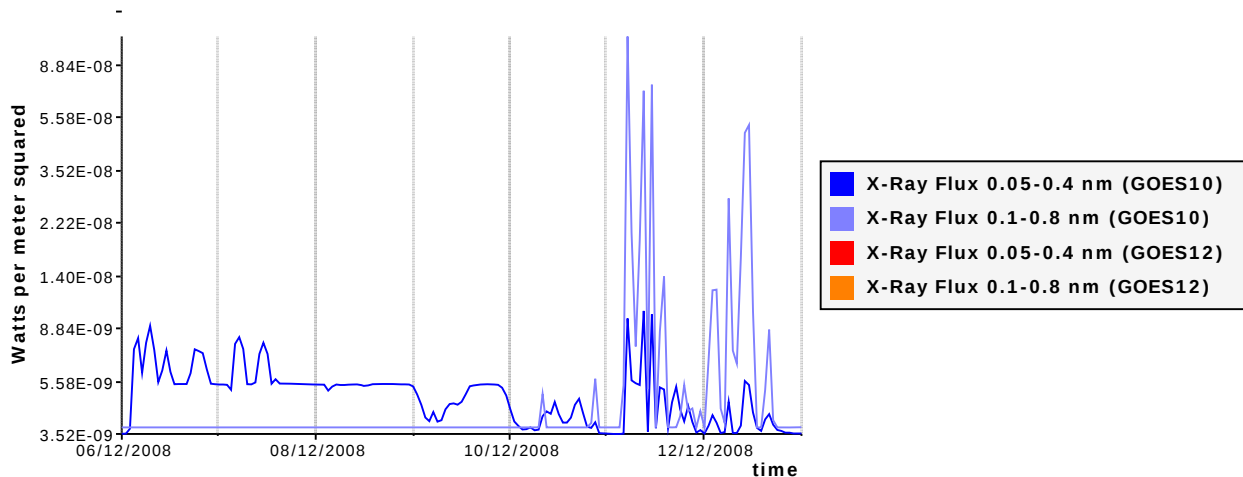
DAILY SUN

see in sections before

RADIATION FLUXES

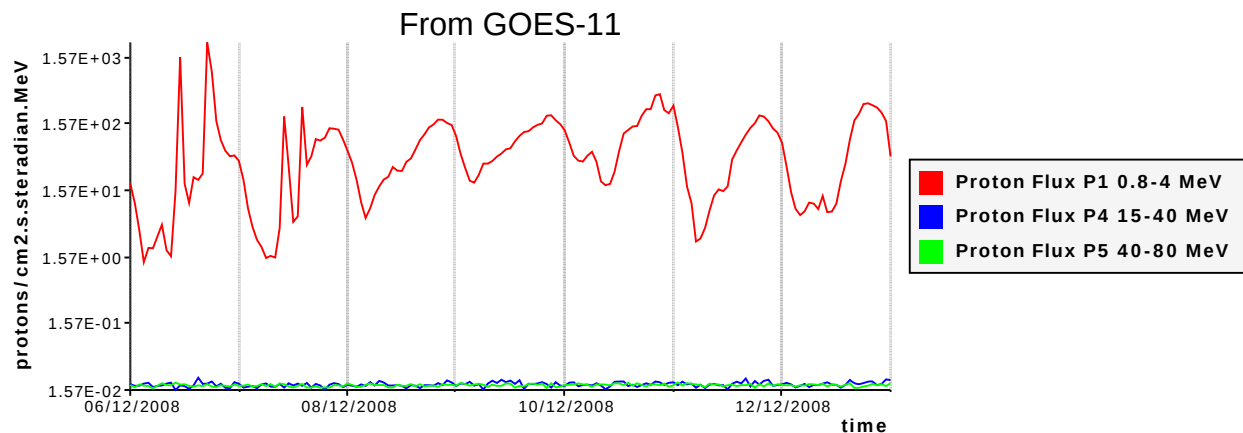
X-ray fluxes

X-ray fluxes for different energies are presented below as reported by GOES satellites. From $1\text{E-}5$ W/m², they start featuring significant radiation activity corresponding to M-class solar flares from $1\text{E-}5$ to $1\text{E-}4$ W/m², and to X-class solar flares from $1\text{E-}4$ and onwards.



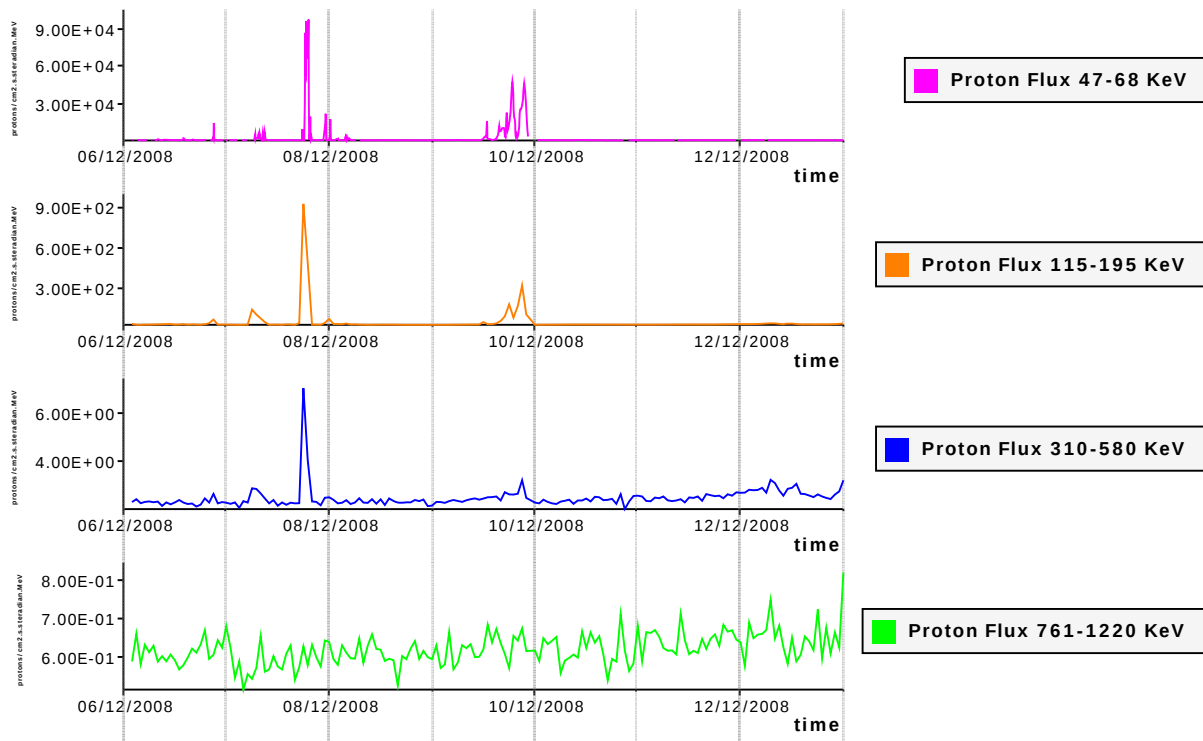
Proton fluxes (GOES-11)

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



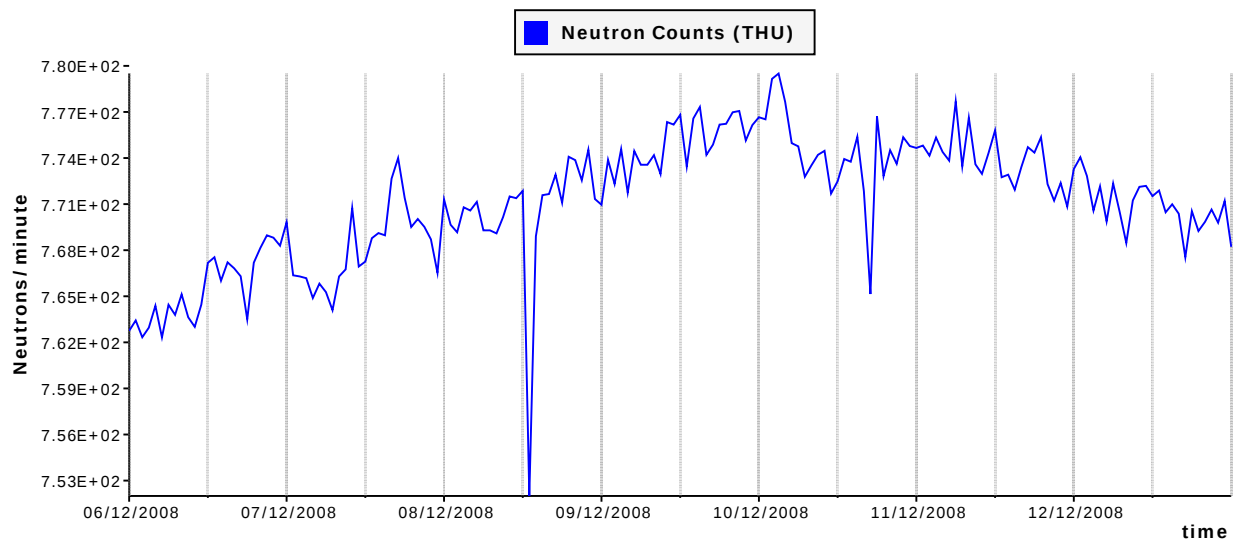
Proton fluxes (ACE)

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



Neutron counts

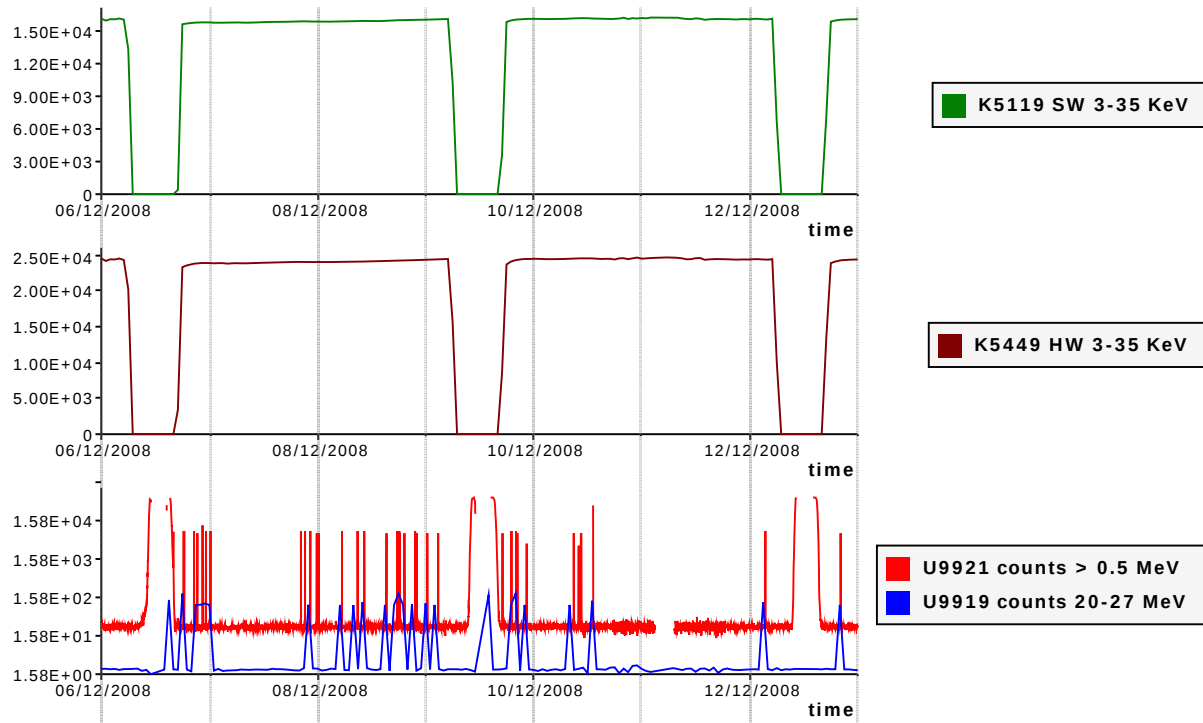
The neutron counts for the last 3 days are presented in the following plot. Nominally they remain stable around 7.2×10^2 .



IREM and JEM-X (INTEGRAL)

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

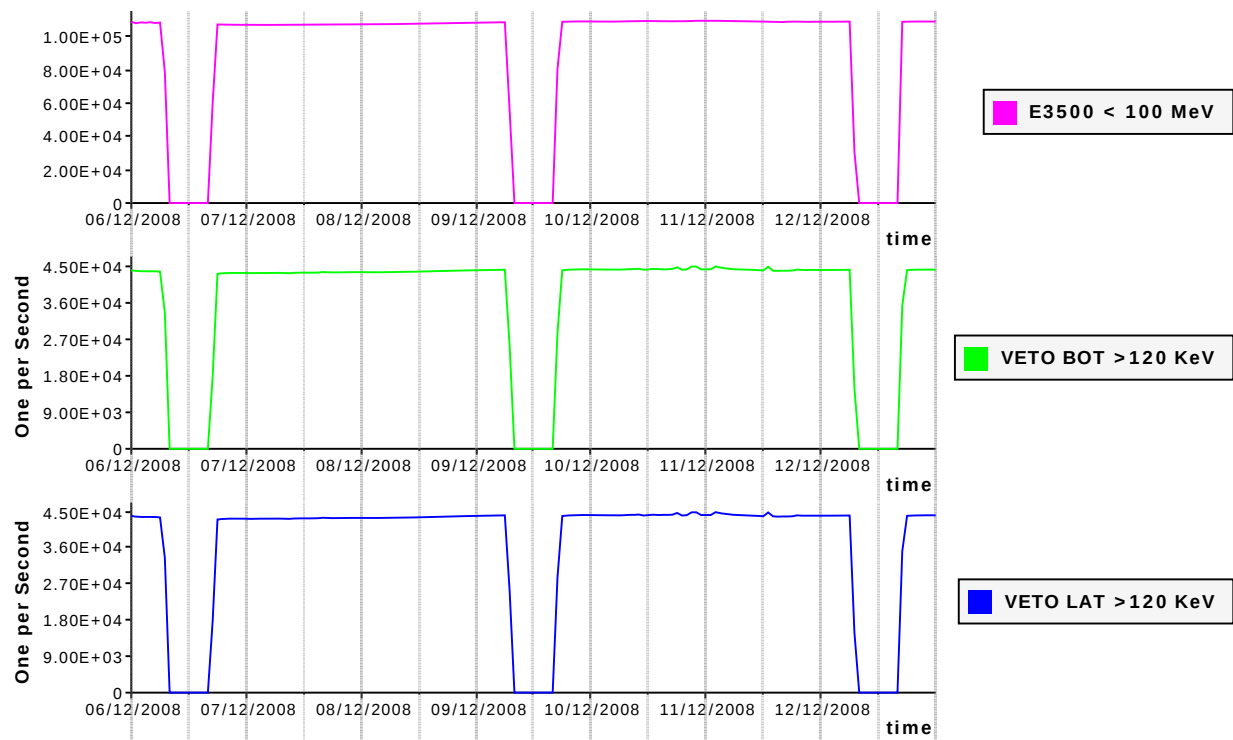
Nominal values are respectively about 1 and 18 for IREM counts, and, 13000 and 19000 for JEM-X ones.



SPI and IBIS (INTEGRAL)

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

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



SOLAR FLARES FORECAST

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

