

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 218
Week 47
27.11.06
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 18.11.06 until 24.11.06 (both dates inclusive) and covers the revolutions 501 and 502.

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), a Fine Sun Sensor and Star Tracker Calibration, an Inertia Calibration, and four raster dithers of the Galactic Plane Region 3

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 winter 2006 Eclipse season was completed on 16/11/2006. The eclipse passages were all nominal from an AOCS point of view.

As part of the AOCS reconfiguration after the winter eclipse season, the AMD thresholds were set to their non-eclipse season values at the beginning of rev 501.

As part of the AOCS periodic calibrations, after the end of the eclipse season, the following calibrations were performed:

FSS/STR Misalignment calibration and the SAS calibration (Alpha and Beta Scale Factors);

S/C Inertia calibration and STR Blemish pixel test.

- The pointings required for the FSS\STR and SAS calibrations were planned in dedicated window in the Timeline of revolution 501.
- The pointings required for the Inertia Calibration were planned in dedicated window in the Timeline of revolution 502.

Twelve slews were missed during the observation period due to problems on the IMCS.

The fuel consumption over the period between 17/11/2006 and 24/11/2006 was 0.0963 Kg. The remaining propellant is in the order of 149.7545 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

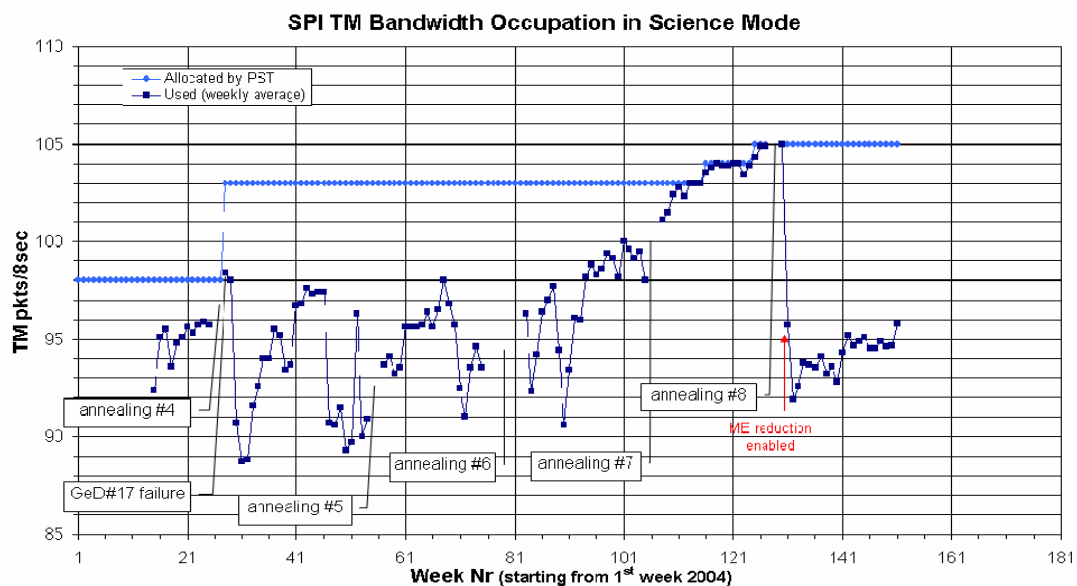
3.2.1 SPI

Following the 8th annealing, which ended on 26th June, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detectors #4 and #12 which are showing a slightly degraded energy resolution. The energy resolution of GeD#15 was recovered with this annealing. 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 and the average telemetry occupation when the allocation was 105 packets/cycle was 95.8 packets/cycle.

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



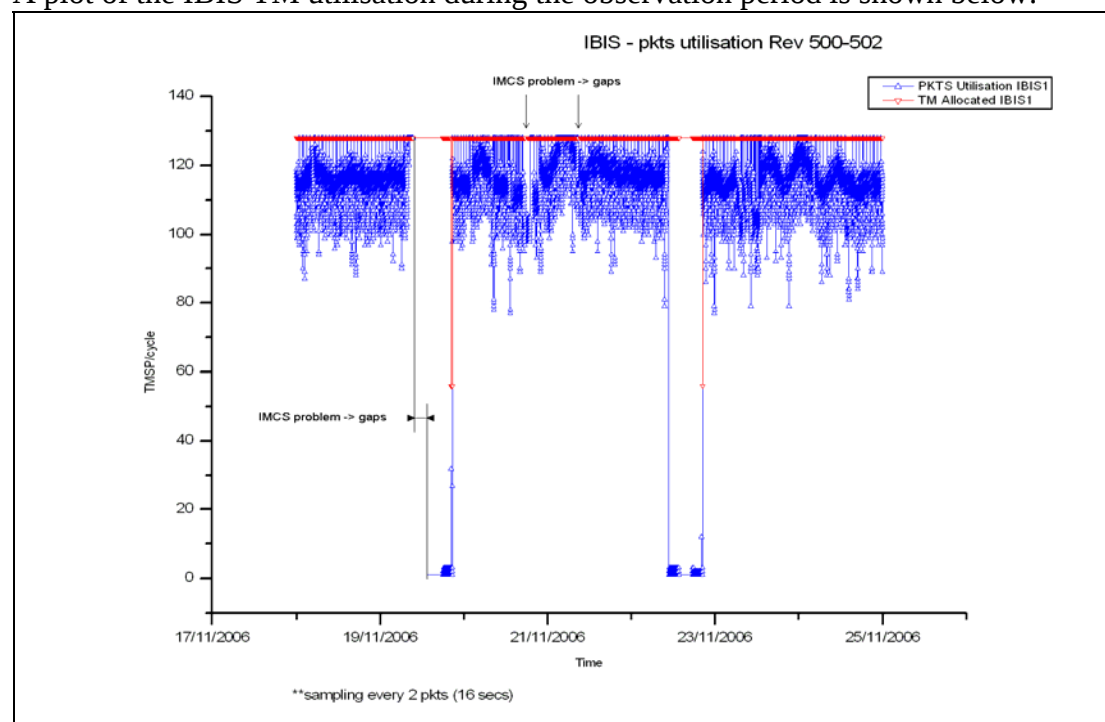
Note: Some more information concerning the SPI operations is provided in the Appendix.

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 was 116.10 TMPS/cycle, up 1.02 on last week.

A plot of the IBIS TM utilisation during the observation period 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 during science observations. JEM-X2 was dormant (DPE OFF) with no TM slots allocated.

JEM-X1 made one autonomous transitions to Safe mode, triggered by the Software Ratemeter, during the reporting period. This was 45 minutes before the planned transition to Safe mode before radiation belt entry of revolution 500.

Further information on the JEM-X operations can be found 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/cycle.

During this reporting period, 148 of the 162 planned science pointings for OMC were executed nominally, 3 were manually executed slightly later than planned, or were interrupted and 11 were lost.

Note: Some more information concerning the OMC operations is provided in the Appendix Section 8.3.5.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity.

At the beginning of the observation period, big sunspot 923, sunspots 924 and 925 were present but posed no threat for strong solar flares. They had all disappeared by 21/11/2006. From 22/11/2006 until 24/11/2006 the sun was blank.

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 excellent this week. No slews were lost, although on one occasion the TM was down for 21 minutes. The overall performance was well above the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was poor this week. The main problems reported were the HFA task crashed twice, the Auto-stack on the b-chain being incorrectly configured, lost connections to the TMRT cache, and the TC History task crashing. The overall performance was below the 95% requirement.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There were, however, a 2 small TM drops from Redu, without impact. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's have been received up to revolution 508. Observations have been planned up to revolution 505. Planning for revolutions 506 and onward with SPI annealing will be done in week 48.

TSF's up to revolution 504 have been received.

2. Observation status

ECS have been received and processed up to revolution 495 with no gaps.

3. ISOC Science Data Archive

ISDA 2.6 Beta2 has been released to external testers

The ISDA database server (INTDB01) will be used to support the INTEGRAL Schedule Web Application after ESAC has been moved inside the ESA firewall.

4. ISOC system

Work ongoing routinely on ISOC system v14.0.

5. Problems

None

4.3.2 ISDC

Status of ISDC observation processing on 27/11/2006:

- Latest Standard Analysis completed: observation 04200870001 (Ginga 1826-24, Revolution 495) on 23/11/2006.

- Latest products archived: observation 04200240001 (PKS 0537-286, Revolution 493-494) on 24/11/2006.

- Latest observation products sent to the observer: observation 04200340009 (Gamma Ray Source 1915+105, Revolution 495) on 23/11/2006.

5 Special Events

6 Anomalies

The following problems that impacted operations were reported:

- On DoY 323, at 09:30, the HFA on sun125 died. A switch was performed to the b-chain, and a manual recovery performed to the perigee attitude. The impact was the loss of pointing 05000060.
- On DoY 324, at 12:13, the PDS task failed, necessitating a switch to the b-chain, where the Autostack was incorrectly configured (not noticed the previous day as only the manual stack was used). The impact was the loss of pointings 05010022, 05010023, 05010024, 05010031, 05010032, 05010033, 05010034, 05010035 & 05010037. Pointings 05010036 & 05010038 were sent manually slightly later than planned.

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

AR id	Date Created	Subject	Segment	Status
INT-2893	27/11/2006	Window manager not properly configured onto OPS clients	IMCS	Pending
INT-2894	27/11/2006	CMD wrongly released from the A/S	IMCS	Pending

7 Future Milestones

On DoY 338 (04/12/2006) the 9th SPI Annealing process begins. It is scheduled to continue until DoY 356 (22/12/2006)

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 501

The observations in revolution 501 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. It continued with a raster dither of the Galactic Plane Region 3, lasting ~4.9 hours. This was followed by a Fine Sun Sensor/Star Tracker Calibration custom pointing at attitude (RA 19:14:10.26, DEC +20:54:13.2), which lasted ~12.1 hours. Finally another raster dither of the Galactic Plane Region 3 was performed, which lasted ~34.3 hours until the end of the revolution.

Revolution 502

The observations in revolution 502 began with a raster dither of the Galactic Plane Region 3, lasting ~9.8 hours. This was followed by an Inertia Calibration custom pointing at attitude (RA 20:58:36.35, DEC +33:05:27.4), which lasted ~4.9 hours. Finally another raster dither of the Galactic Plane Region 3 was performed, which lasted ~43.2 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

2006-11-08T04:13:23.000Z	150.0078	F	Automatic TM processing.
2006-11-09T05:30:21.000Z	149.9868	F	Automatic TM processing.
2006-11-10T13:40:34.000Z	149.9764	F	Automatic TM processing.
2006-11-10T20:36:10.000Z	149.9733	F	Automatic TM processing.
2006-11-11T14:33:56.000Z	149.9342	F	Automatic TM processing.
2006-11-13T13:31:21.000Z	149.9147	F	Automatic TM processing.
2006-11-13T20:29:30.000Z	149.8839	F	Automatic TM processing.
2006-11-15T04:36:05.000Z	149.8689	F	Automatic TM processing.
2006-11-16T13:26:09.000Z	149.8529	F	Automatic TM processing.
2006-11-16T19:51:29.000Z	149.8508	F	Automatic TM processing.
2006-11-18T05:06:13.000Z	149.8073	F	Automatic TM processing.
2006-11-19T18:37:53.000Z	149.8039	F	Automatic TM processing.
2006-11-21T04:25:00.000Z	149.7865	F	Automatic TM processing.
2006-11-22T18:26:32.000Z	149.7801	F	Automatic TM processing.
2006-11-24T04:50:12.000Z	149.7545	F	Automatic TM processing.

This report was generated Fri Nov 24 08:00:35 GMT 2006

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, 18/11/2006 – 24/11/2006

AOCS operations were executed from the Automatic Timeline.

During this period, 40 Open Loop Slews, 123 Closed Loop Slews and 5 Momentum Biases were executed.

After the end of the season the AMD thresholds were set to their non-eclipse season values at the beginning of rev 501

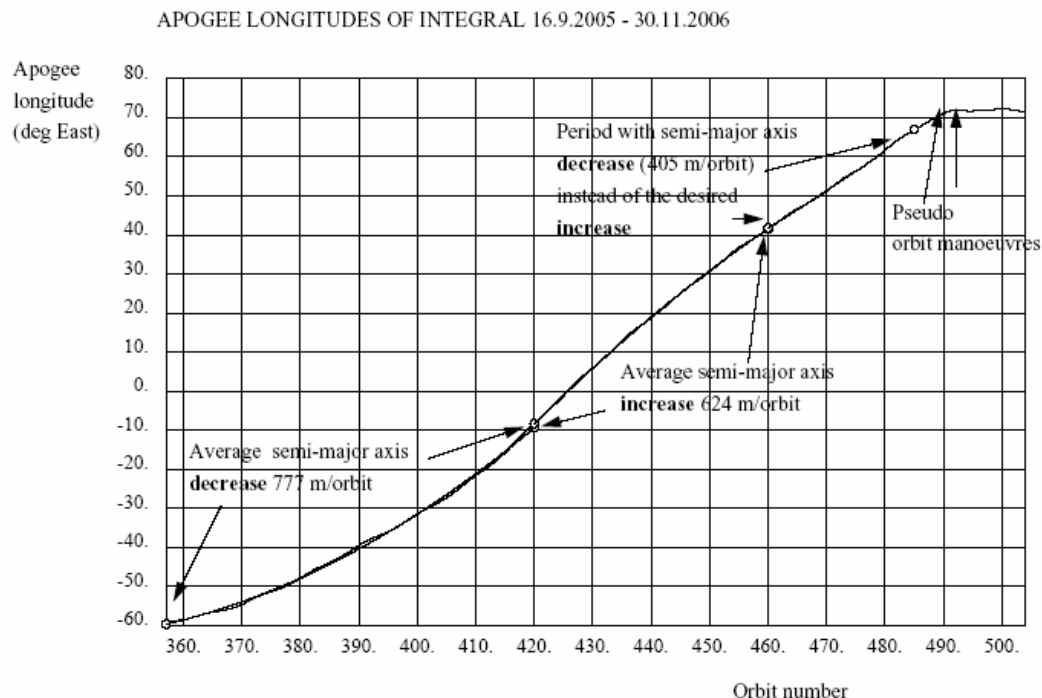
As part of the AOCS periodic calibrations, after the end of the eclipse season, the FSS/STR Misalignment calibration, the calibration of SAS and the Inertia calibration were performed. The pointings required for the Calibrations were planned in dedicated windows in the Timeline of revolution 501-502.

12 slews (9 CSL, 3 OSL) were missed from the TL during the observation period, some of those partially recovered, due to problem on IMCS (HFA and PDS tasks).

This is equivalent to a $\sim 7.1\%$ of the total number of slews (168)

Orbit Control

The attached plot shows the apogee longitude of Integral (in deg East) as a function of the orbit number for the period September 2005 - October 2006.



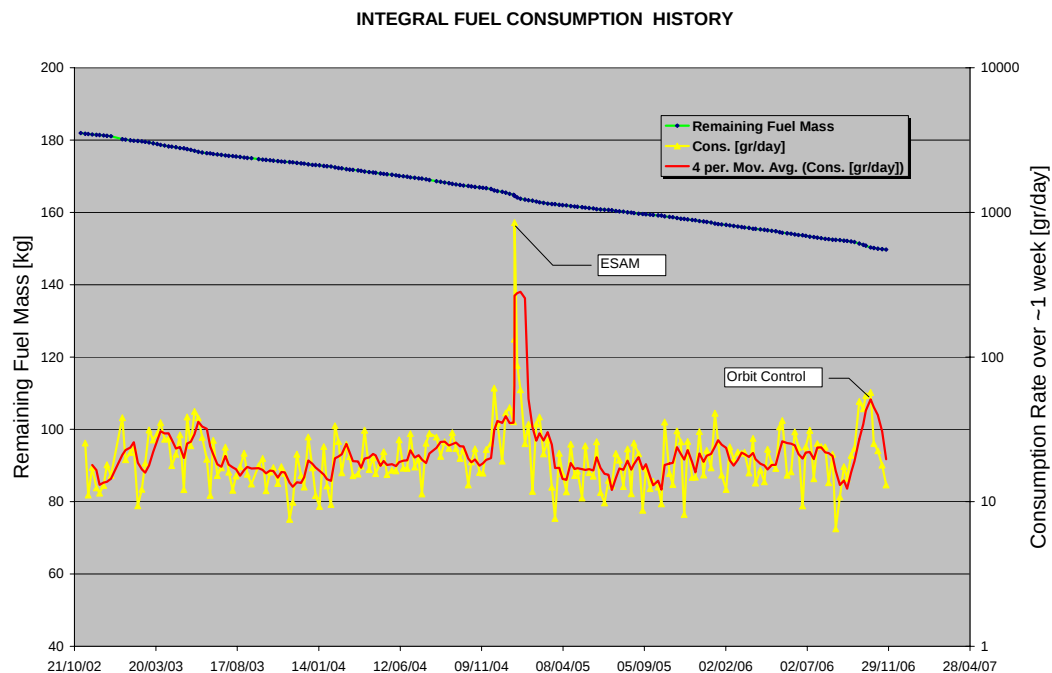
From September 2005 to March 2006 the momentum dumping manoeuvres were systematically executed in attitudes/at epochs to lower the orbit in order to initiate an eastward drift. The average semi-major axis decrease in this period was 777 m/orbit.

From March 2006 and onwards the momentum dumping manoeuvres should systematically be executed in attitudes/at epochs to raise the orbit in order to decrease the eastward drift. Up to July this was successful, the average semi-major axis increase in this period was 624 m/orbit. But after July this was no more the case, the average effect of the momentum dumping was from this time and onwards an orbit lowering with on the average 404 m/orbit instead of the desired raising. Because of this several "pseudo orbit manoeuvres" were executed in October. These "pseudo orbit manoeuvres" are momentum dumping manoeuvres artificially made large by aiming for large reaction wheel rate changes rather than small ones when in attitudes/at epochs for which corresponding orbital effects are advantageous for the orbit control.

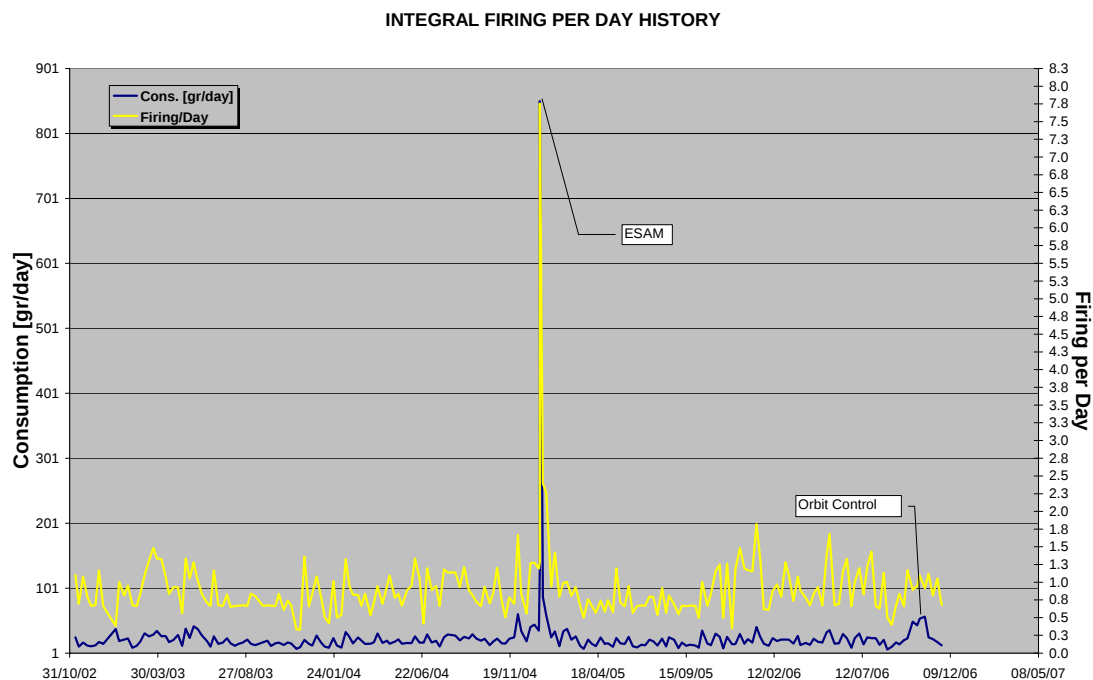
Fuel consumption

The fuel consumption (total, grams/day) over the period between 01/11/2002 and 24/11/2006 is reported in the plot below.

The large fuel consumption observed in the last weeks is due to the combination of the strategy to perform artificial large momentum dump manoeuvres when the pointing is suitable for orbit control and the starting of the eclipse season.

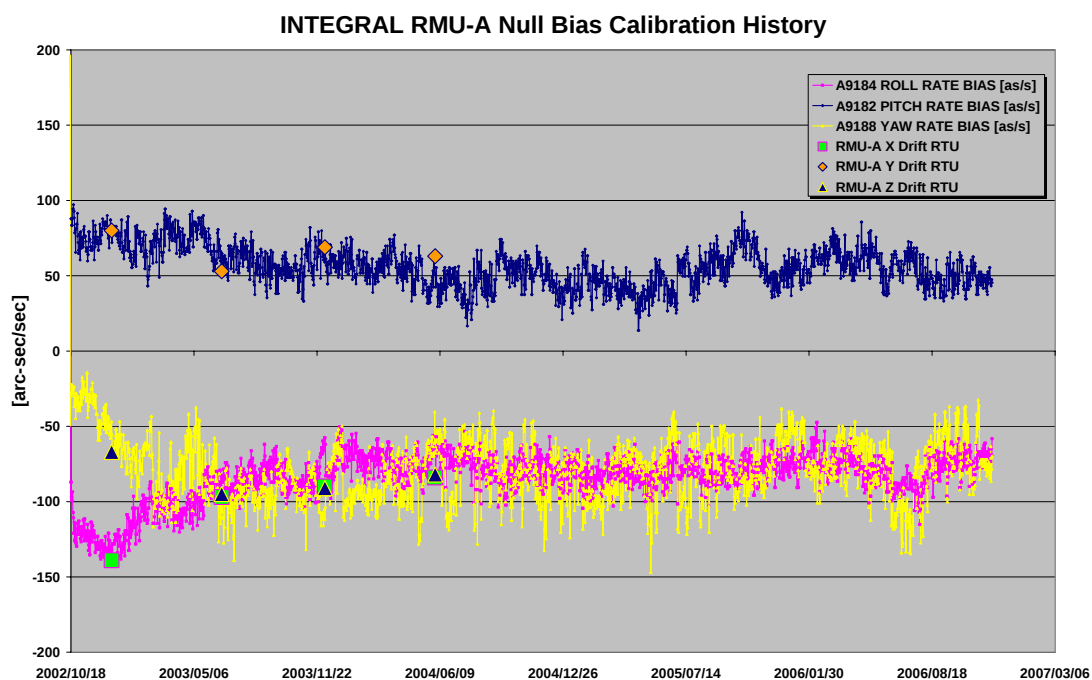


The firing\day over the period between 01/11/2002 and 24/11/2006 is reported in the plot below.

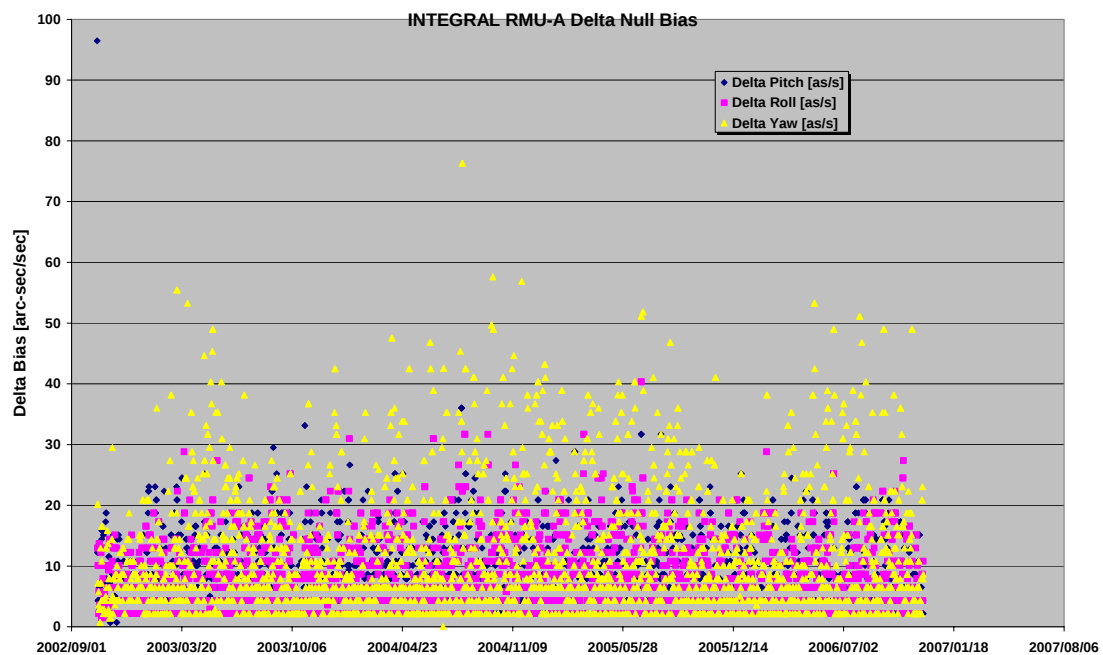


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 24/11/2006 is reported in the plot below.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 24/11/2006 is reported in the plot below



18/11/06 (Day of Year 322, Revolution 500)

Nothing to report.

19/11/06 (Day of Year 323, Revolution 500-501)

Problem on HFA TM on IMCS-A server: at 10:57z due to a problem on HFA TM on IMCS-A server, that forced a swap from A-chain to B-chain, the slew ID 05000060 (CSL) was not uplinked from the TL but manually recovered.

The next slew 05000061 was manually updated at 11:21z.

The following slew was missed in TL: 05000060 (CSL).

Reconfiguration of the AOCS after the eclipse season: With the end of the winter 2006 eclipse season, the AMD thresholds were set back to their non-eclipse season values. The manual operation started at 18:13z and the following AMD thresholds were loaded:

Thresholds from INT-MA-AI-0001, 5.3.2.4.2.2, and INT-PR-MMB-0005 page 5-9, modified as per new AMD Threshold agreement for the eclipse season.							
01- Update of thresholds after uplink of new RW Inertias on 22/01/2004. 0155_0001_M.RWI							
Wheel Inertia:							
RW#1:	0.096000	Kgm**2					
RW#2:	0.097650	Kgm**2					
RW#3:	0.097272	Kgm**2					
RW#4:	0.097649	Kgm**2					
Sunlight Season:							
	Subset 1		Subset 2				
WSMAX	39		35.9				
WSMIN	2.2		4.8				
WSMAX	To Uplink:				In rpm:		
	X1		X2		X1	X2	
RW#1:	406.250000	rd/s	373.958333	rd/s	3879	3571	
RW#2:	399.387606	rd/s	367.641411	rd/s	3814	3511	
RW#3:	400.938401	rd/s	369.068939	rd/s	3829	3524	
RW#4:	399.388015	rd/s	367.641788	rd/s	3814	3511	
WSMIN	To Uplink:				In rpm:		
	X1		X2		X1	X2	
RW#1:	22.916667	rd/s	50.000000	rd/s	219	477	
RW#2:	22.529557	rd/s	49.155398	rd/s	215	469	
RW#3:	22.617038	rd/s	49.346265	rd/s	216	471	
RW#4:	22.529580	rd/s	49.155448	rd/s	215	469	

20/11/06 (Day of Year 324, Revolution 501)

Execution of the FSS/STR Misalignment Calibration: As part of the periodic AOCS calibrations, the FSS/STR Misalignment calibration and SAS calibration were performed in revolution 501. This operation was executed completely from the Timeline.

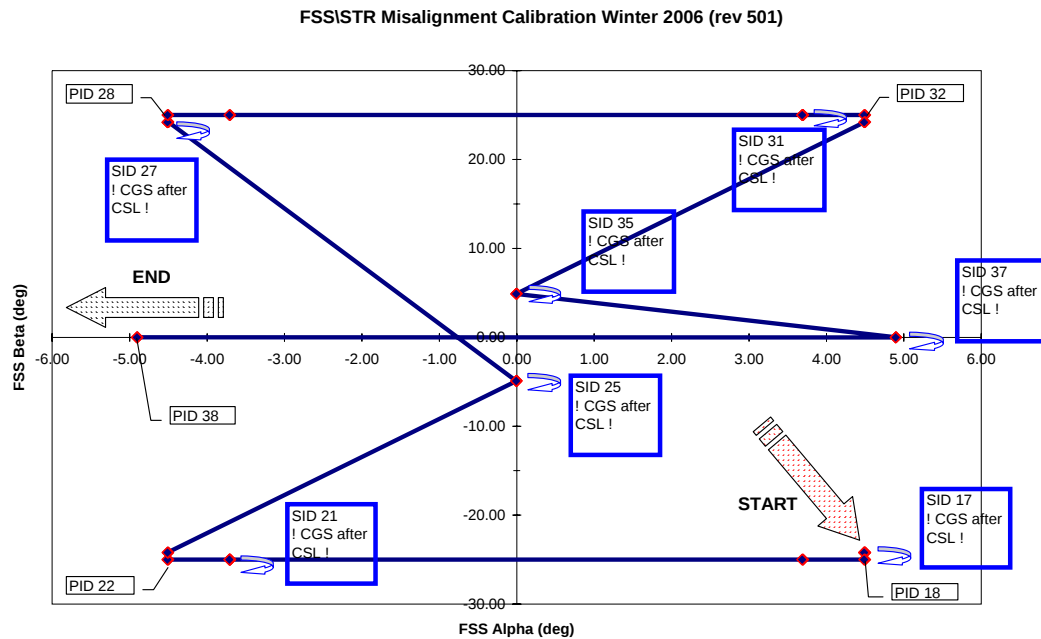
The STR/FSS misalignment calibration is scheduled after each eclipse season. The calibration is executed by performing a 4 corner x 3 points in the FSS FOV: for each point at max 4 SSTs activities are performed in order to acquire data for off-line evaluation.

from PID 05010016 Start of FSS/STR + SAS Calibration

to PID 05010038 End of FSS/STR + SAS Calibration

The FSS/STR calibration itself consists of 3 pointings of 0.8 degrees offset at each corner (Roll= +/- 4.5° Pitch = +/- 25°) of the FSS FoV and tracking four stars (in addition to the Guide Star) for the duration of each pointing.

A plot of the PIDs as reported in the FSS FOV, used for the calibration, is shown below.



Execution of the SAS Calibration: As requested already in the past by FCT, four additional pointings were inserted inside the sequence of slews for the FSS/STR calibration, to be used for the calibration of the SAS Alpha and Beta Scale Factors and update of the SAS thresholds. These included four pointings with (Alpha, Beta) equal to (0.0, +4.9), (0.0, -4.9), (+4.9, 0.0) and (-4.9, 0.0) degrees.

At 12:14z due to a problem on PDS task (transmission of TM packets failed) on IMCS-A server, the slew ID 05010022(CSL) failed release and the AOCS s/s disabled in TL.

A complex manual recovery (with many interactions along the day) was then started at 12:27z to recover the following PIDs:

05010022-23-24

05010034-36-38

The next slew 05010039 was manually updated at 21:25z and the AOCS enabled in TL.

The following slews were missed in TL: 05010022(CSL)-23(CSL)-24(OSL)-31(CSL)-32(CSL)-33(CSL)-34(OSL)-35(CSL)-36(OSL)-37(CSL)-38(CSL)

21/11/06 (Day of Year 325, Revolution 501)

Nothing to report.

22/11/06 (Day of Year 326, Revolution 501-502)

Nothing to report.

23/11/06 (Day of Year 327, Revolution 502)

Execution of the Inertia Calibration: A window of ~5 hours was dedicated in the Timeline to the Inertia periodic calibration.

from PID 05020012 (Start of Periodic Inertia Calibration)

to PID 05020024 (End of Periodic Inertia Calibration + Blemish Pixel Test)

At the end of the Inertia calibration an additional test of the STR blemish pixels was performed (from PID 05020020 to 05020023), as defined by INT-OR 273.

During the calibration some problem occurred, concerning OMC commanding, related to a not correct synch between the OMC EDs and the slew duration time as planned by ISOC: this discrepancy was likely due to the not correct assumption of a slew total execution time (commanding + slew duration) based on CSL instead of CCS (pure trim, without SST, used only for the Inertia calibration). This forced the operator to perform a manual recovery of OMC whenever a large discrepancy occurred.

The Inertia calibration ran completely from the Timeline.

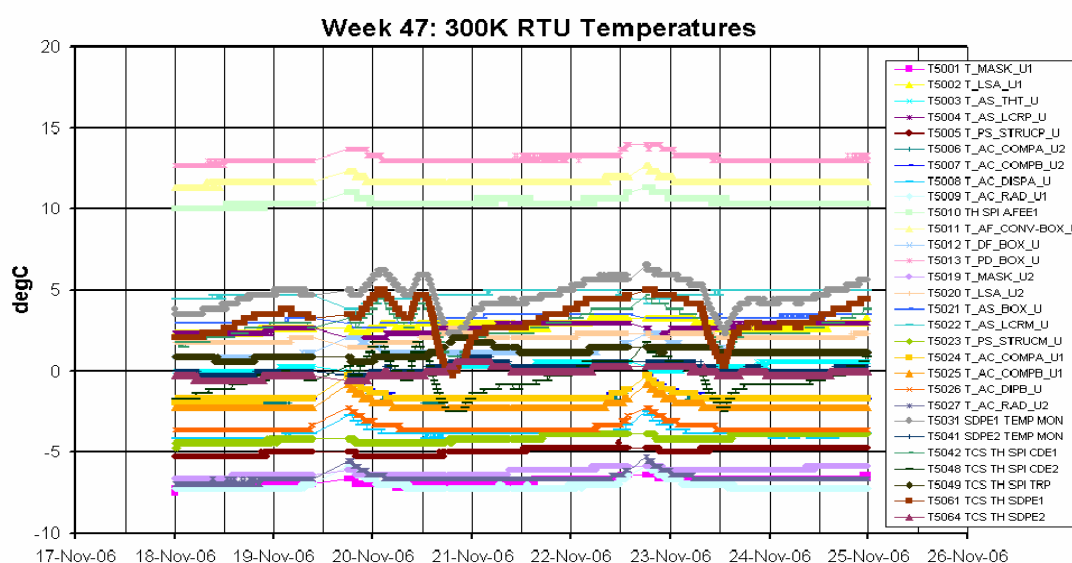
The Blemish pixel test required some manual interaction in order to successfully performed.

24/11/06 (Day of Year 328, Revolution 502)

Nothing to report.

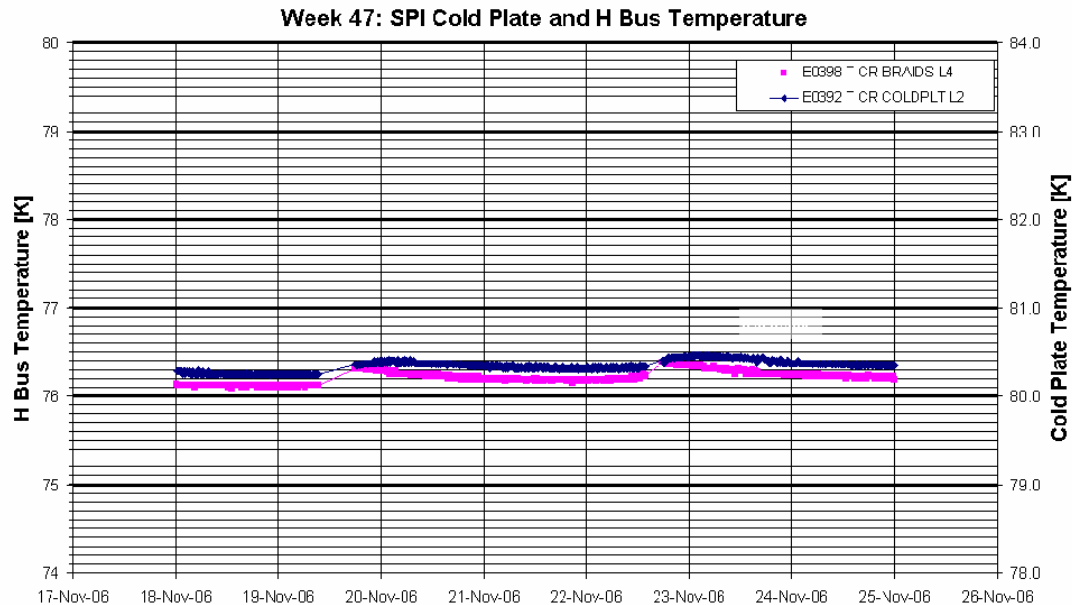
8.3.2 SPI Operations

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 to 80K +/-1K. The temperature was basically steady, with a small increase around the perigee passages.

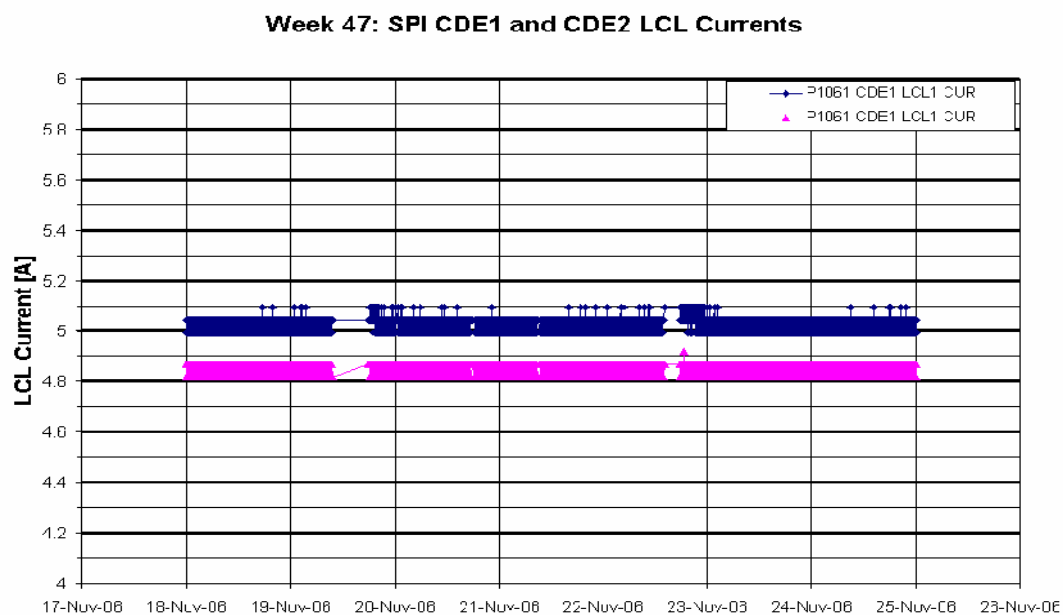
The following plot shows the evolution of the cold plate and H bus temperatures during the reporting period.



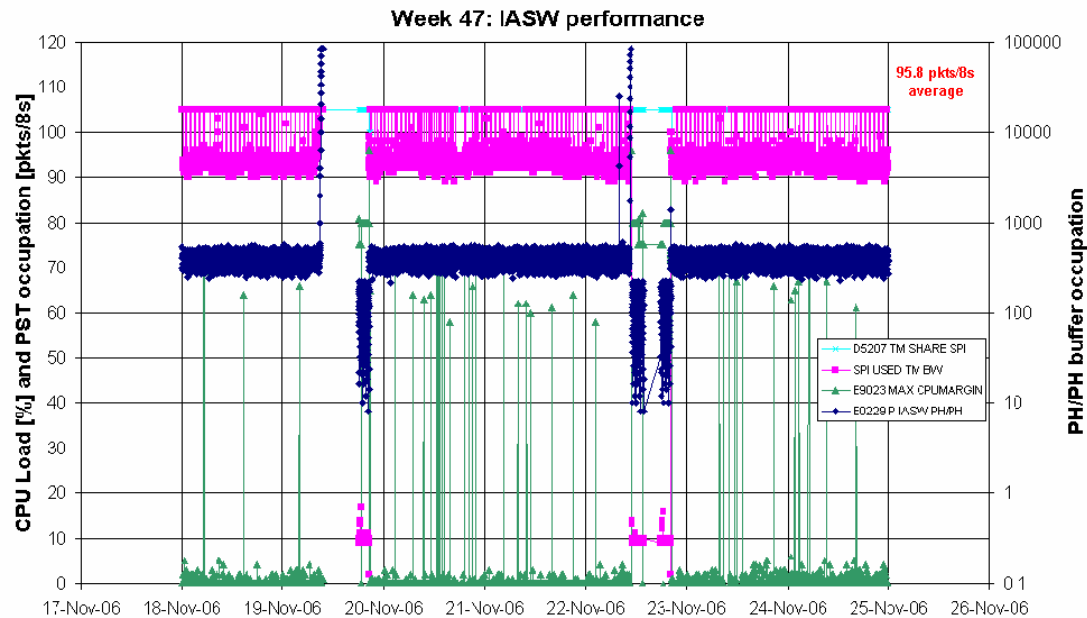
The stroke of all four compressors is currently set to 41. The average LCL currents of the CDEs over the week were:

- Average CDE1 LCL Current = 5.03A
- Average CDE2 LCL Current = 4.84A

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

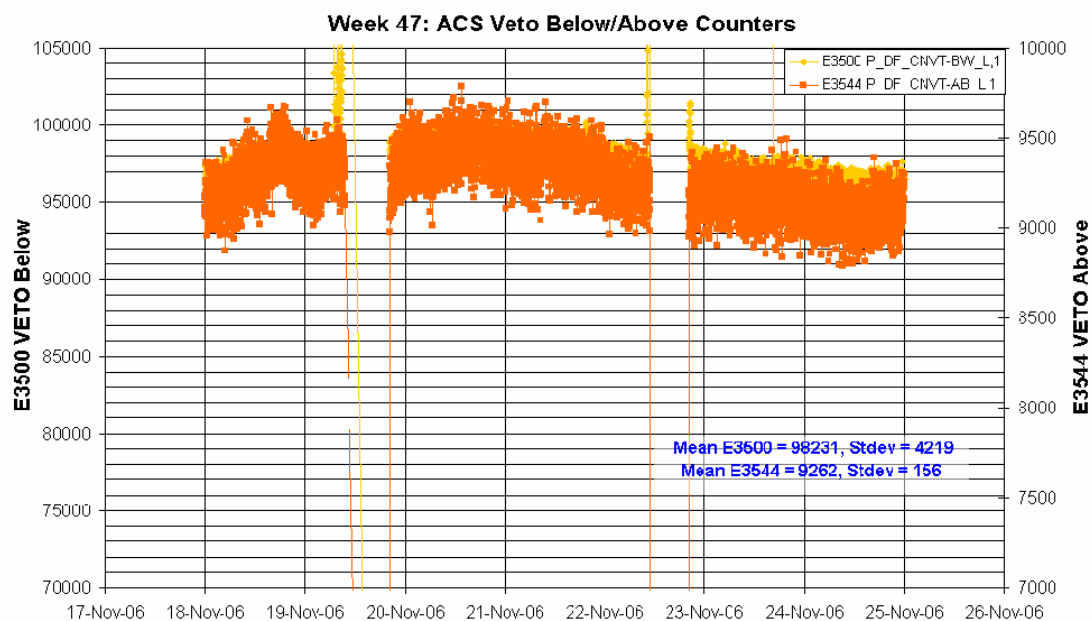


DPE & IASW: The DPE health and IASW performance is nominal. The current IASW version installed is 432. The average TM bandwidth occupation of SPI was 95.8 packets/cycle over the science window, when the TM allocation was 105 packets/cycle. The following plot shows the IASW performance in terms of TM 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). FEE #57 is also still OFF due to the anomaly on 5/8/2003 (INT_SC-61).

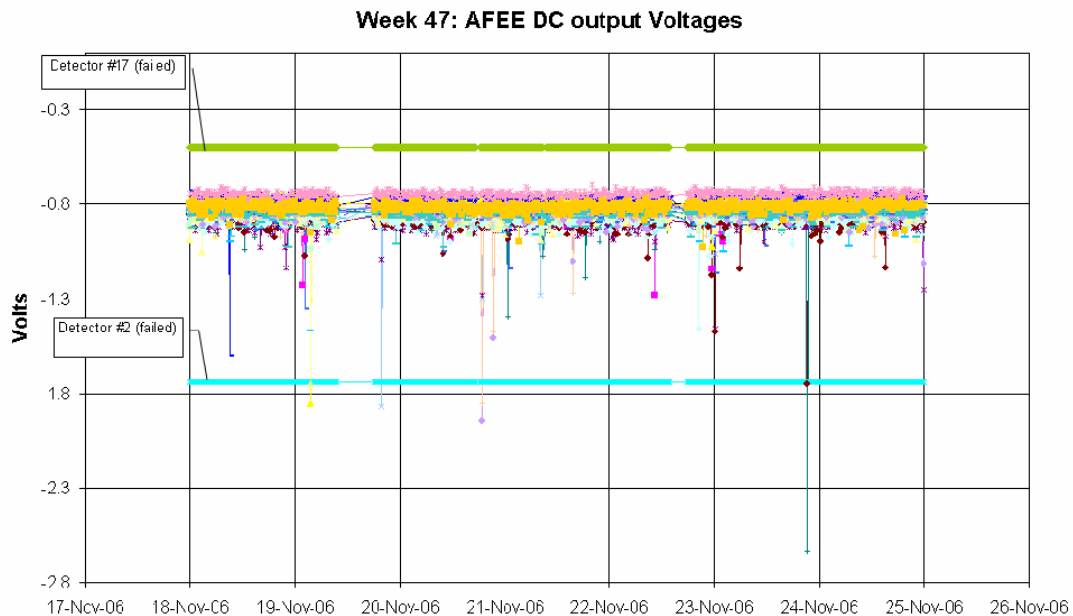
The following plot shows the ACS overall count rate evolution during the reporting period:



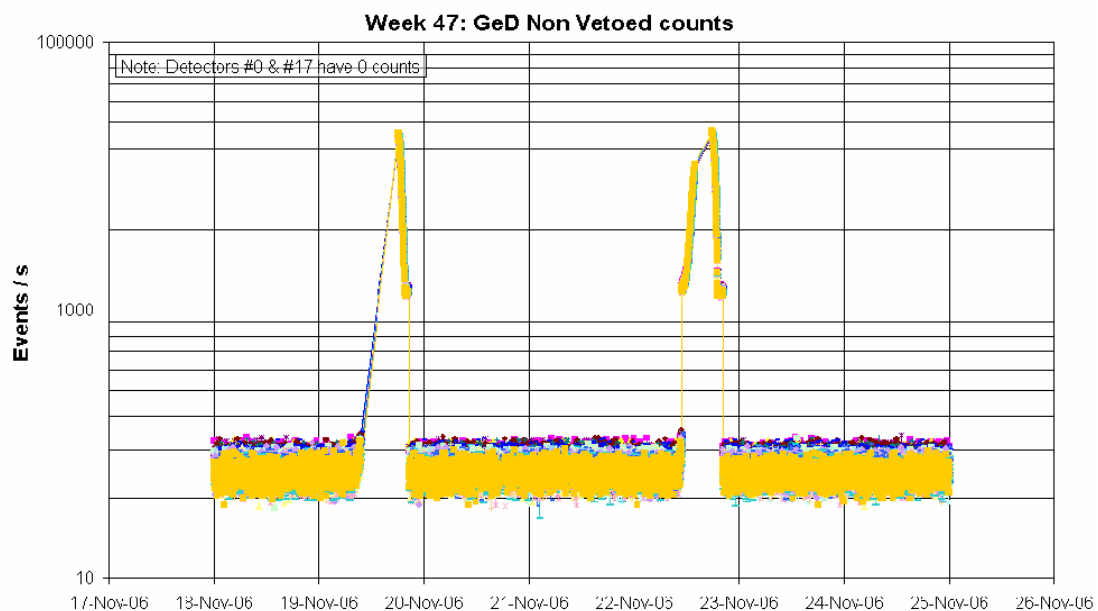
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detectors #4 and #12 which are showing a

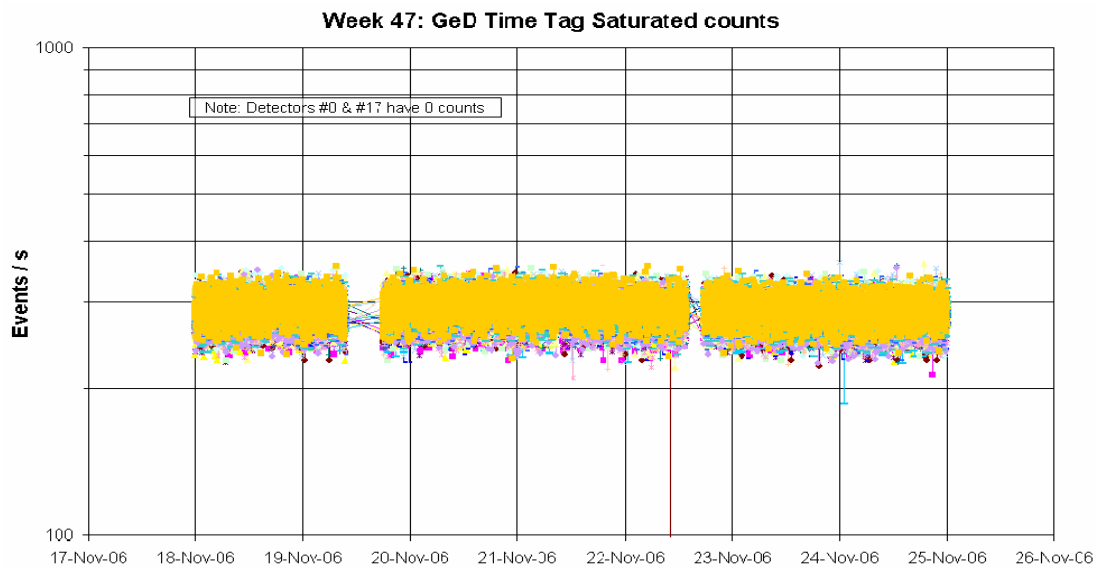
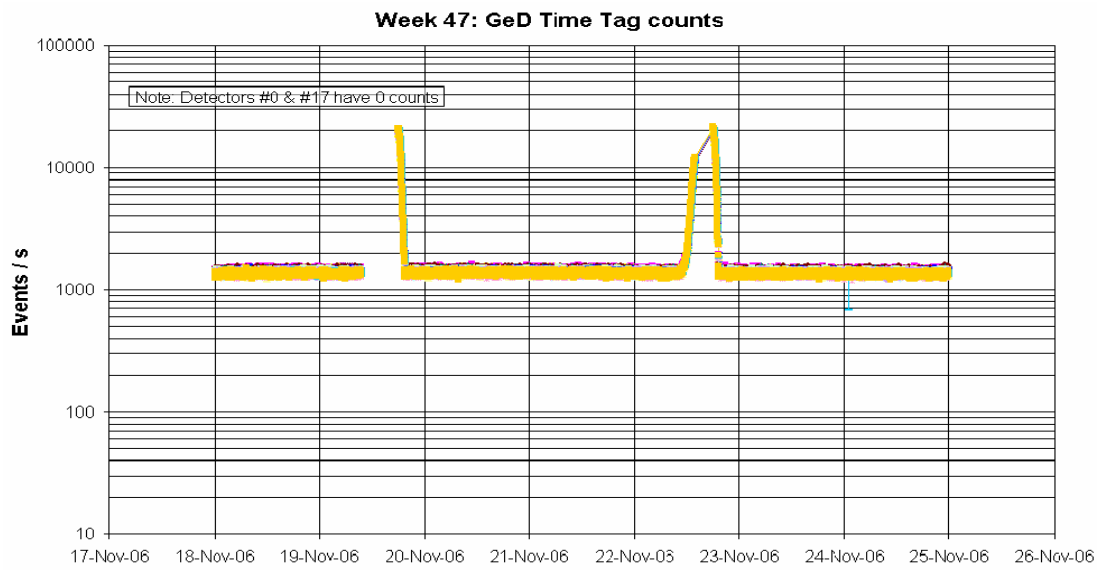
slightly degraded energy resolution. The energy resolution of GeD#15 was recovered with the last annealing.

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

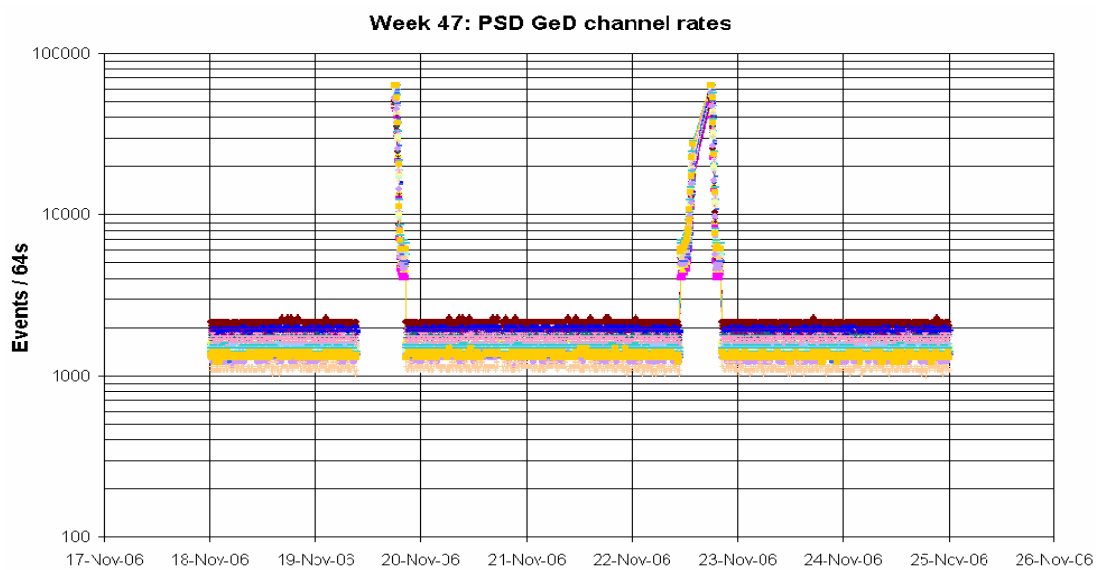


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.





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



Event Log:

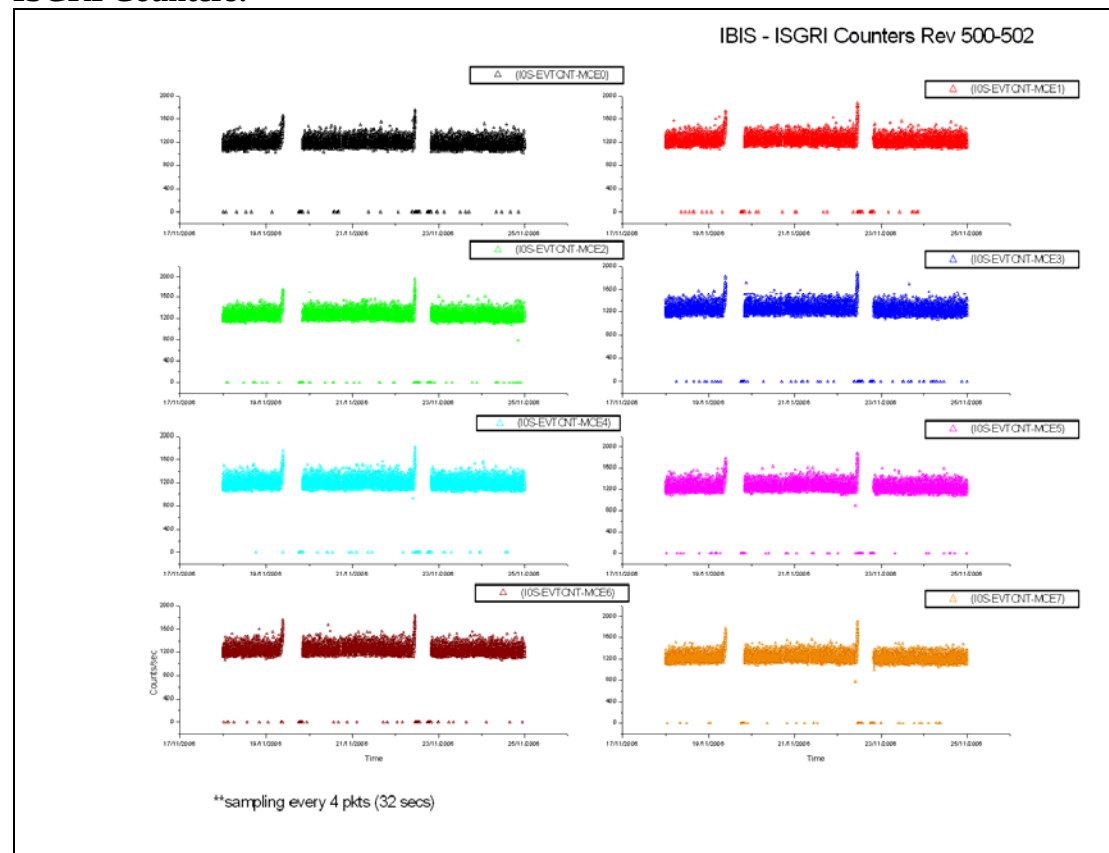
The following non-nominal events occurred on SPI during the reporting period:

- On 2006-11-19 at 08:54:28Z the TM parameter E3500 P_DF_CNVT-BW_L starting going OOL High. This was ~2 hours before radiation belt entry of revolution 500. No action was taken.
- On 2006-11-22 at 10:25:12Z the TM parameter E3500 P_DF_CNVT-BW_L starting going OOL High. This was ~30 minutes before radiation belt entry of revolution 501 and therefore no action was taken.
- On 2006-11-22 at 13:17:19Z APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the LOS_CHK window of revolution 501, when the SPI1 DPE time verification TC was sent. This OEM is sometimes received when this TC is sent and no action was taken.
- On 2006-11-23 at 21:12:25Z TM parameter E0355 went OOL Low (value = -2.6312V). This is the Detector #5 DC output voltage. It returned within limits when the next packet was received at 21:23:05Z.
- TM parameter E2116 T AS PSAC L2 (Plastic Scintillator temperature) went OOL Low several times during the week. No action was taken as this is a known and recurring problem due to this thermistor being unreliable. The limit conditions for this parameter will be updated in the next IODB release.

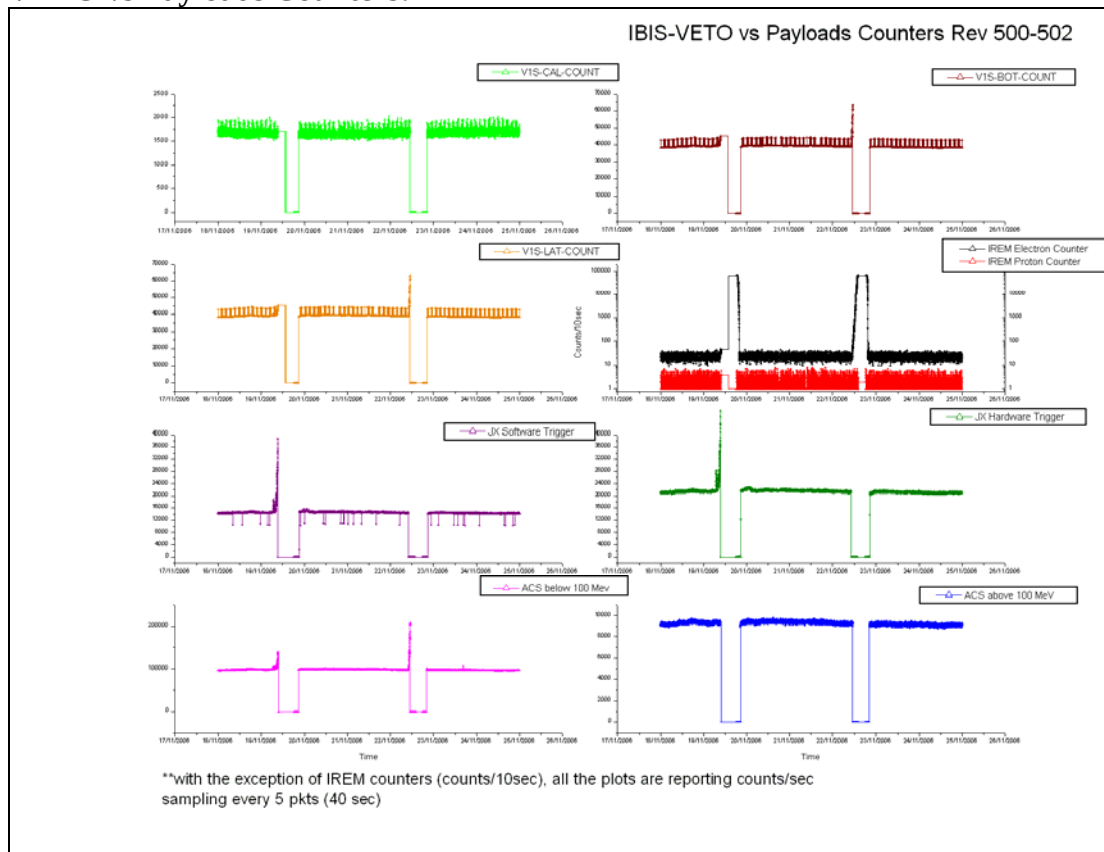
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

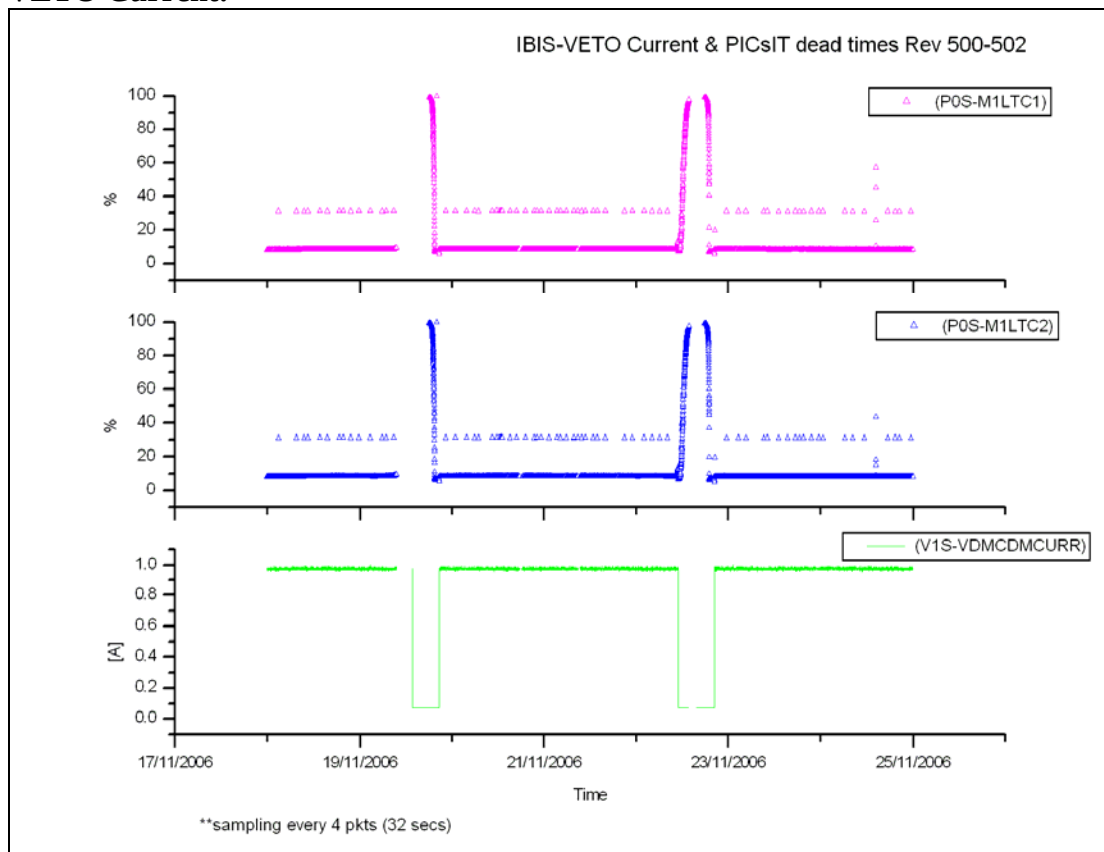


VETO vs Payloads Counters:

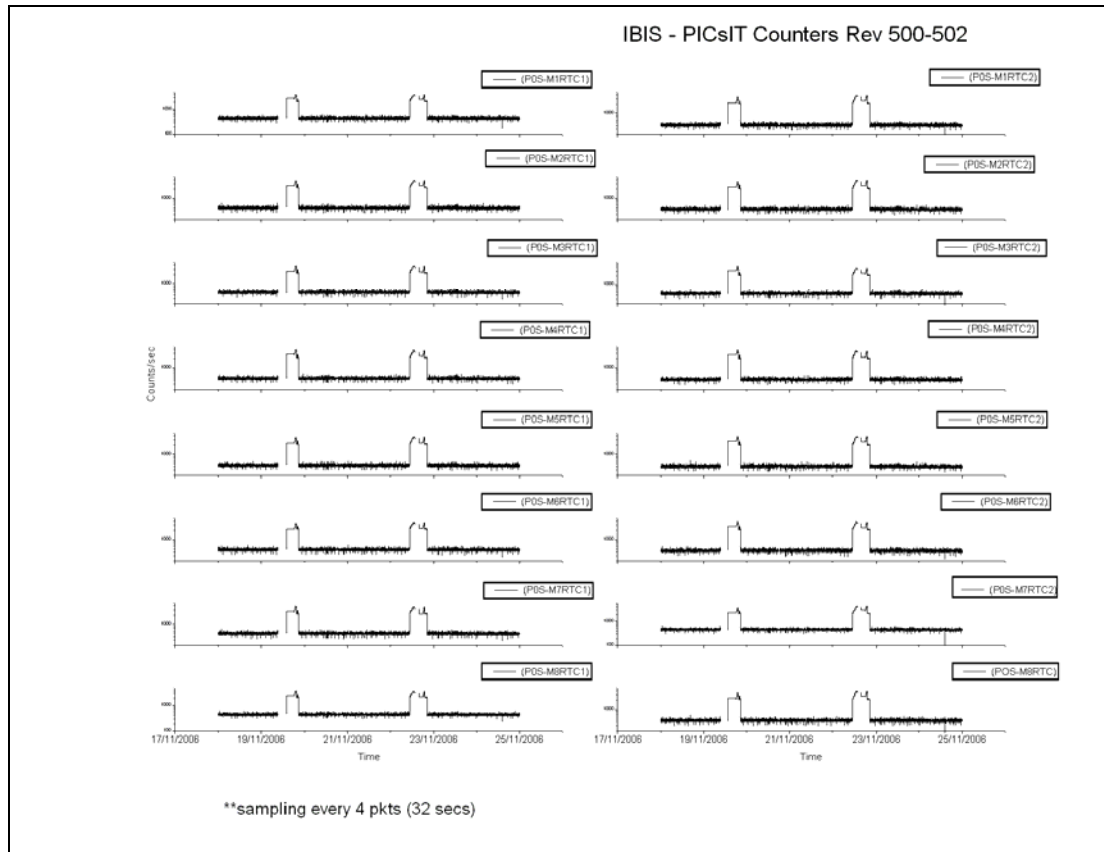


The week was characterised by low radiation.

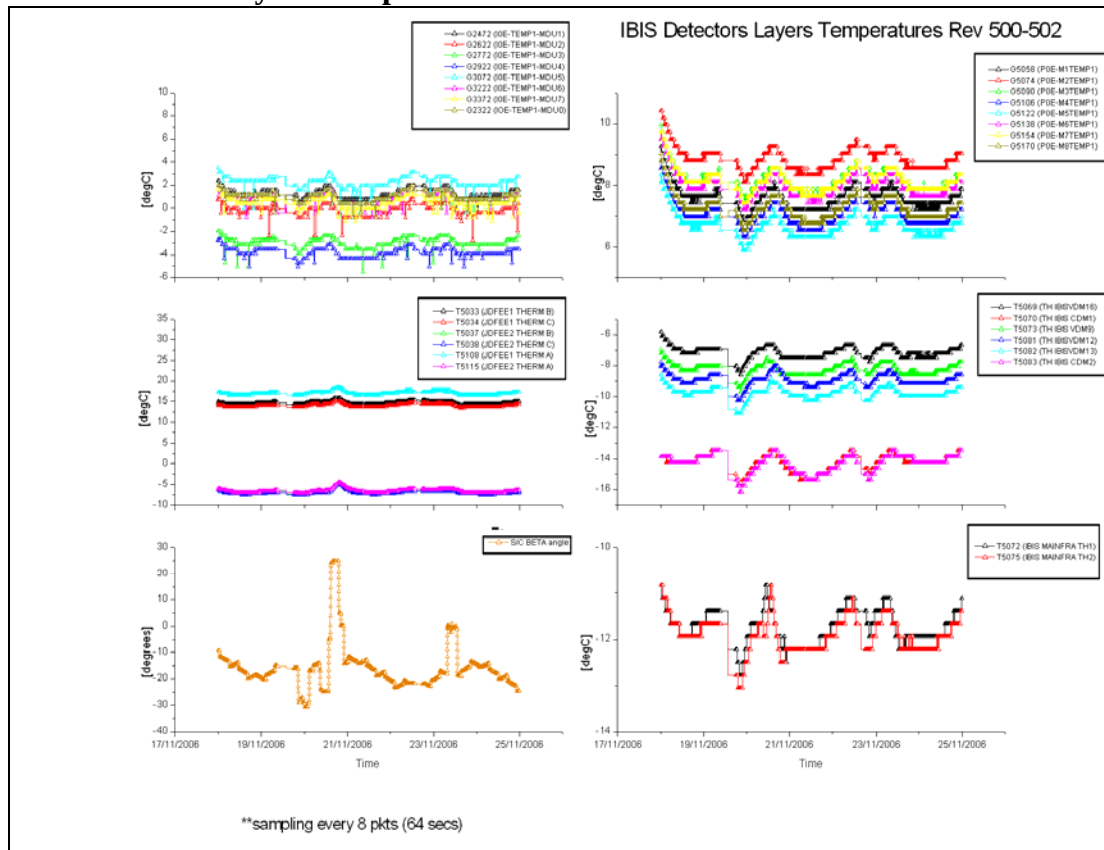
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report

The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), families G5002 (P0S-Mi_RTC1) and G5003 (P0S-Mi_RTC2), families G2014 (I0E-OVFWPXADD-Mi) were reported at Radiation Belts passage.

DoY 2006.323 (19/11/20006):

At 10:08Z TM parameters G6062 (V1S-BOT-COUNT) and G6063 (V1S-LAT-COUNT) were reported Out Of Limit high due to high radiation when approaching the Radiation Belts. The values kept toggling until 10:56Z when VETO went into Stand-By mode following the automatic reaction to IREM (IREM counters crossing the IBIS thresholds). According to V-BOT-1 and V-LAT-1 no action was taken.

At 10:19Z, TM family G2013 (I0S-EVTCNT-MCEi) went OOL High and kept toggling until 10:56Z when IBIS went automatically into Stand-By mode due to high radiation background. According to I-CNT-1, no action was taken.

DoY 2006.329 (25/11/20006):

At 08:40Z TM parameters G6062 (V1S-BOT-COUNT) and G6063 (V1S-LAT-COUNT) were reported Out Of Limit high due to high radiation when approaching the Radiation Belts. The values kept increasing until 09:49Z when the counters wrapped around and were reported Out Of Limits Low. According to V-BOT-1 and V-LAT-1 no action was taken. At 10:55Z VETO went into Stand-By mode as automatic reaction to Broadcast Packet at Belts Entry.

At 09:47Z, TM family G2013 (I0S-EVTCNT-MCEi) went OOL High and kept toggling until 10:55Z when IBIS went automatically into Stand-By mode at Radiation Belts entry. According to I-CNT-1, no action was taken.

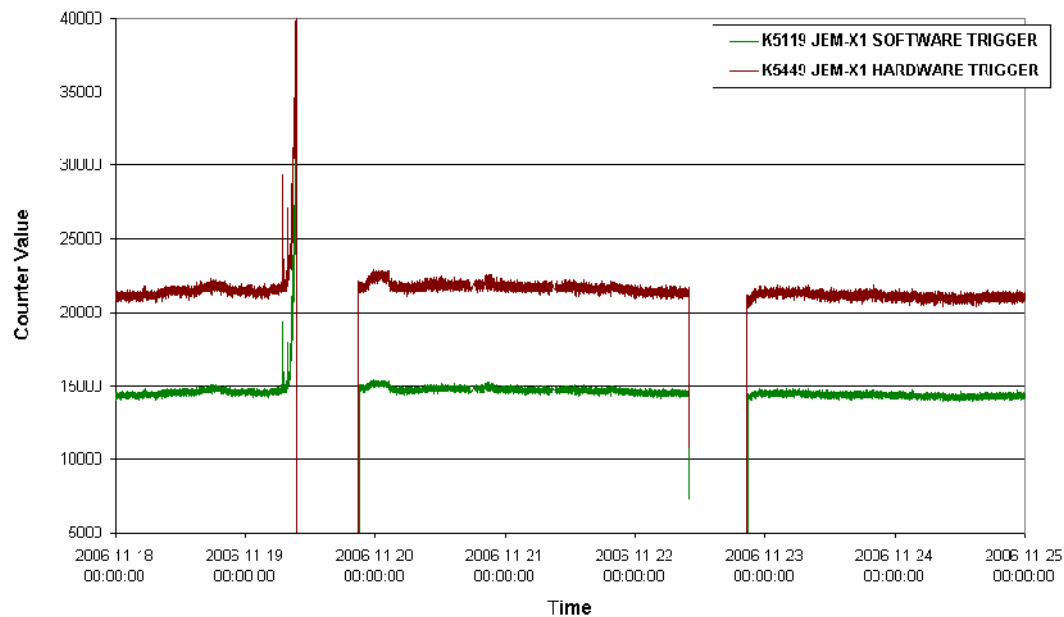
8.3.4 JEM-X Operations

JEM-X Count Rates

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

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

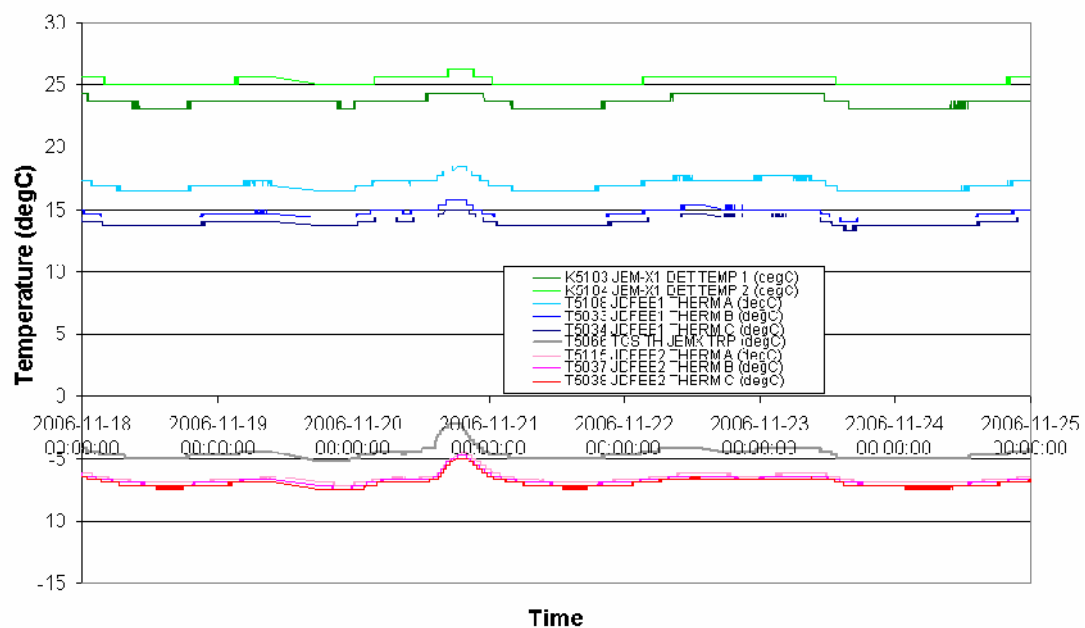
JEM-X Count Rates 2006-11-18 to 2006-11-24



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.

JEM-X Detector & DFEE Temperatures 2006-11-18 to 2006-11-24



² Data sampled (1 frame in 8)

JEM-X Daily Report

2006-11-18 (DOY 322, Rev 500)

JEM-X operations executed nominally.

2006-11-19 (DOY 323, Rev 500-501)

Due to high background radiation conditions before the expected radiation belt entry of revolution 500, at 08:27:39Z the TM parameter K5449 HARDWARE TRIGGER began to go Out of Limits High and from 08:53:31Z to 08:55:07Z K5136 BUFFER LOSS was OOL High. At 09:21:07Z K5119 SOFTWARE TRIGGER also began to toggle OOL High and at 09:25:23Z JEM-X1 made an autonomous transition to Safe mode, triggered by the Software Ratemeter. OEM 189 JEM-X1 PROB DFEE 9 (Unexpected DFEE state reported in housekeeping) was received at this time, followed immediately by OEM 254 ERROR OFF, as both TM parameters K5462 DFEE STATE IASW and K5022 DFEE STATUS were reporting state Safe.

JEM-X1 operations continued nominally.

2006-11-20 (DOY 324, Rev 501) to 2006-11-24 (DOY 328, Rev 502)

JEM-X operations executed nominally.

8.3.5 OMC Operations

2006-11-18 (DOY 322, Rev 500)

Nothing to report

2006-11-19 (DOY 323, Rev 500-501)

At 09:30, HFA problems on the imcs-a forced a switch to the b-chain. The impact was the loss of pointing 05000060.

2006-11-20 (DOY 324, Rev 501)

At 12:13, imcs problems caused the Timeline to be suspended. The impact was the loss of pointings: 05010022, 05010023, 05010024, 05010031, 05010032, 05010033, 05010034, 05010035 & 05010037. Pointings 05010036 & 05010038 were sent manually slightly later than planned. It was at this time that the following pair of commands were rejected:

2006.324.12.17.58.981	2006.324.12.18.06.364	1792	RealTime	131	TC REJECT	
REJECTED TC1			0	0	65535 PR	N
E E						
2006.324.12.18.05.231	2006.324.12.18.14.419	1792	RealTime	131	TC REJECT	
REJECTED TC1			0	0	65535 PR	N
E E						

Which correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for pointing 05010022.

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2006-11-21 (DOY 325, Rev 501) to 2006-11-22 (DOY 326, Rev 502)

Nothing to report.

2006-11-23 (DOY 327, Rev 502)

At 08:30, the commands for pointing 05020013 failed, as OMC was still in Normal mode down-linking the data from the previous pointing. These pointings taken during the Inertia calibration are very short, with insufficient time to transmit the complete image. It was at this time that the following pair of commands were rejected:

2006.327.08.30.31.000	2006.327.08.30.38.431	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					
2006.327.08.30.37.000	2006.327.08.30.46.511	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					

Which correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for pointing 05020013. These commands were manually resent at 08:39.

At 11:50, the same happens with the commands for pointing 05020020. This pointing was lost.

2006.327.11.50.31.007	2006.327.11.50.38.585	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					
2006.327.11.50.37.132	2006.327.11.50.46.553	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					

Which correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for pointing 05020020.

At 12:08, a manual command to return OMC to stand-by was rejected, as the unit had autonomously completed this transition less than a second previously!! There was no impact.

2006.327.12.08.21.382	2006.327.12.08.30.633	1792	RealTime	131	TC REJECT
REJECTED TC1					

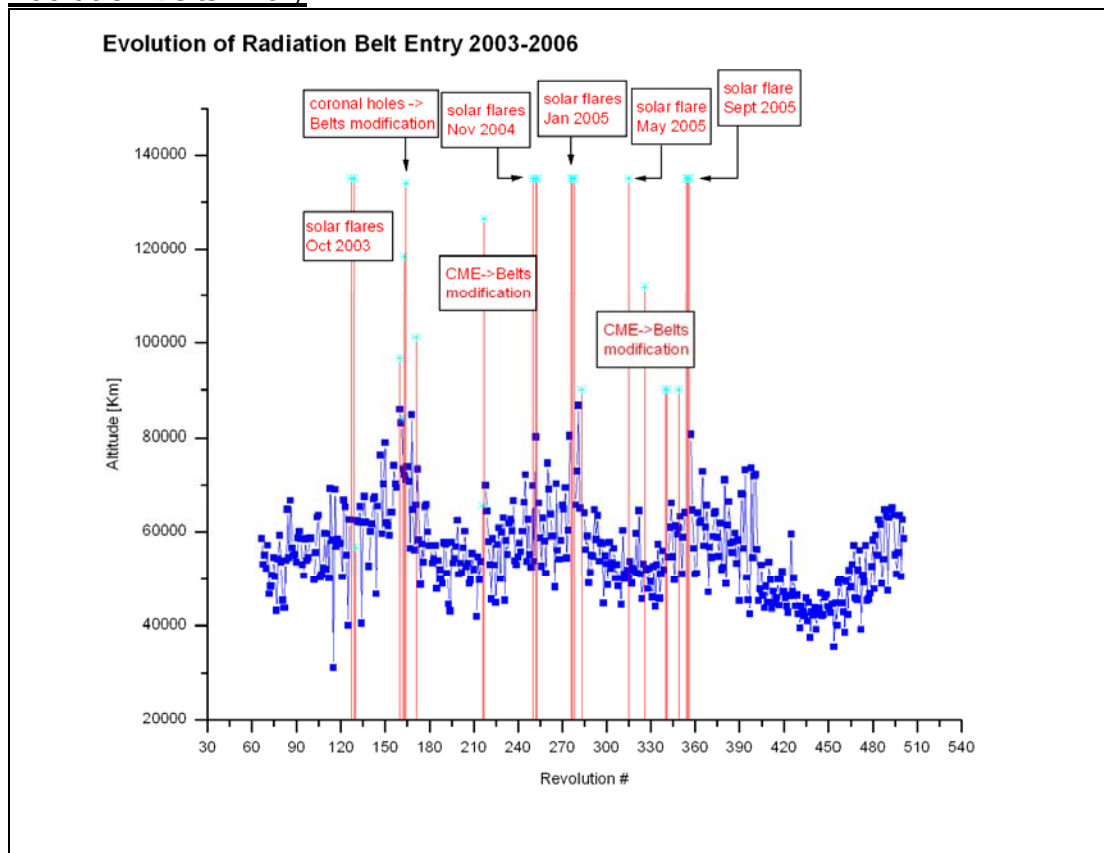
2006-11-24 (DOY 328, Rev 502)

Nothing to report.

On DoY 323 at 11:07:09 and DoY 326 at 10:55:09 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



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]
500	RAD_ENTR R 2006-11-19T11:07:06Z	2006-11-19 10:08:35	62643.2	2006-11-19 11:56:54	49207
501	RAD_EXIT R 2006-11-19T20:28:57Z	2006-11-19 19:33:15	>>29722.9	2006-11-19 20:06:54	41892
501	RAD_ENTR R 2006-11-22T10:55:06Z	2006-11-22 10:30:44	58680.2	2006-11-22 11:39:47	49881
502	RAD_EXIT R 2006-11-22T20:16:20Z	2006-11-22 19:24:20	>>29727.9	2006-11-22 19:49:47	41281

Reference

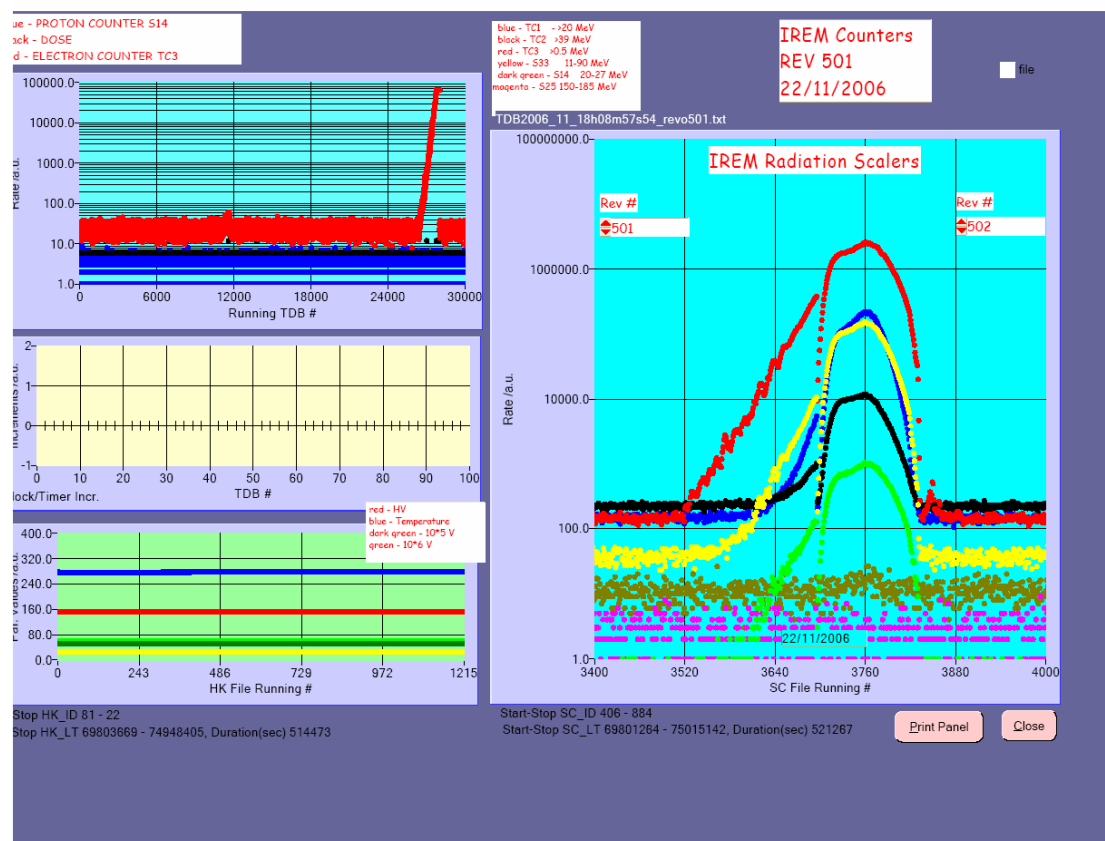
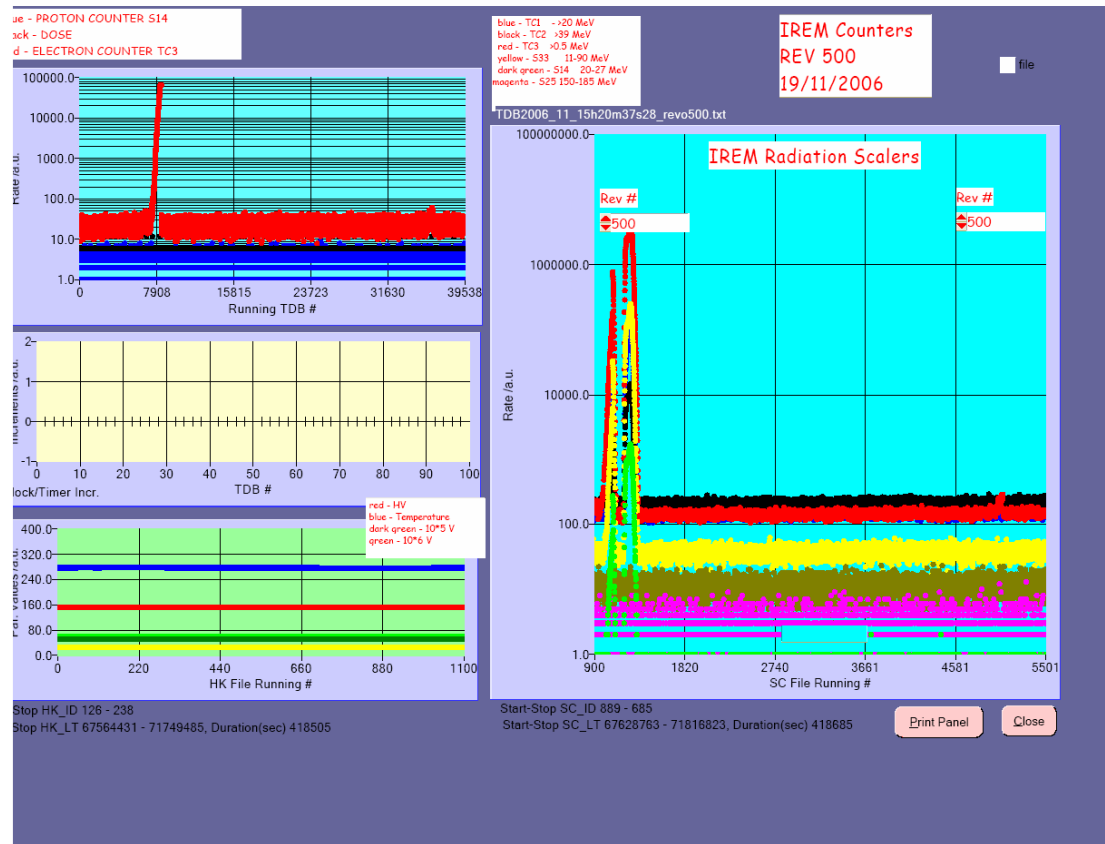
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

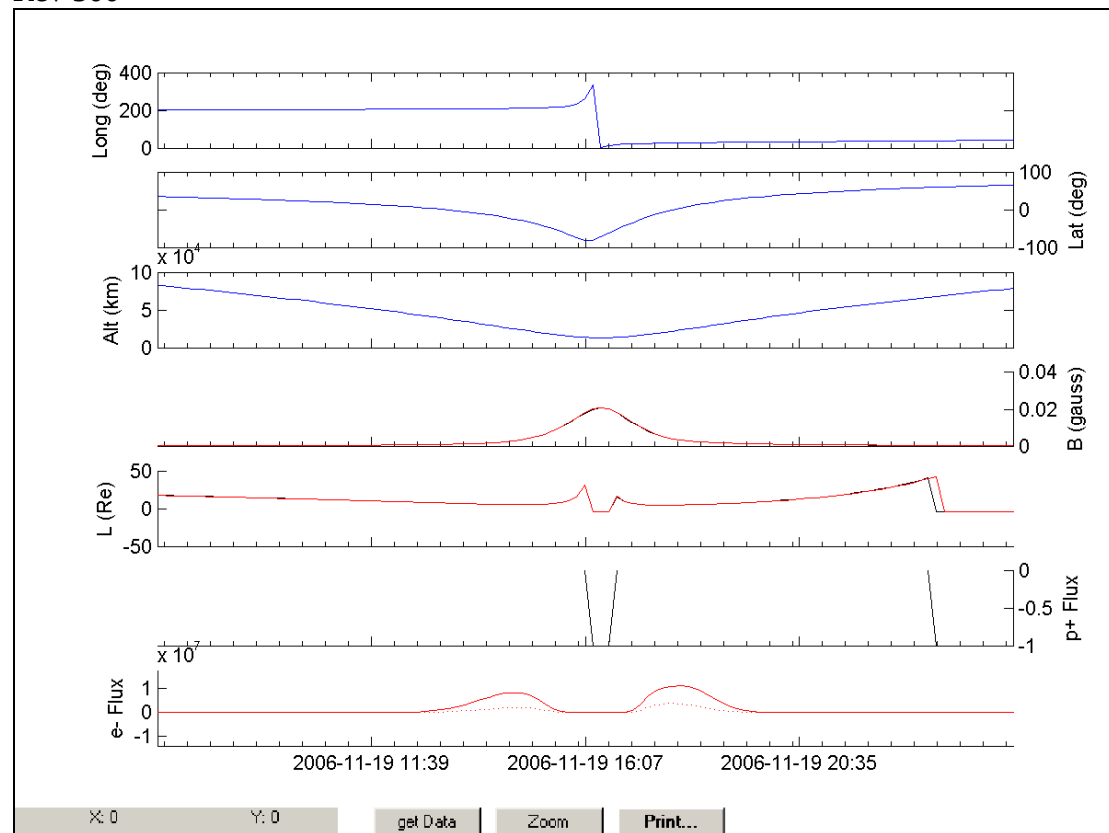
Radiation Spike

IREM radiation counters:

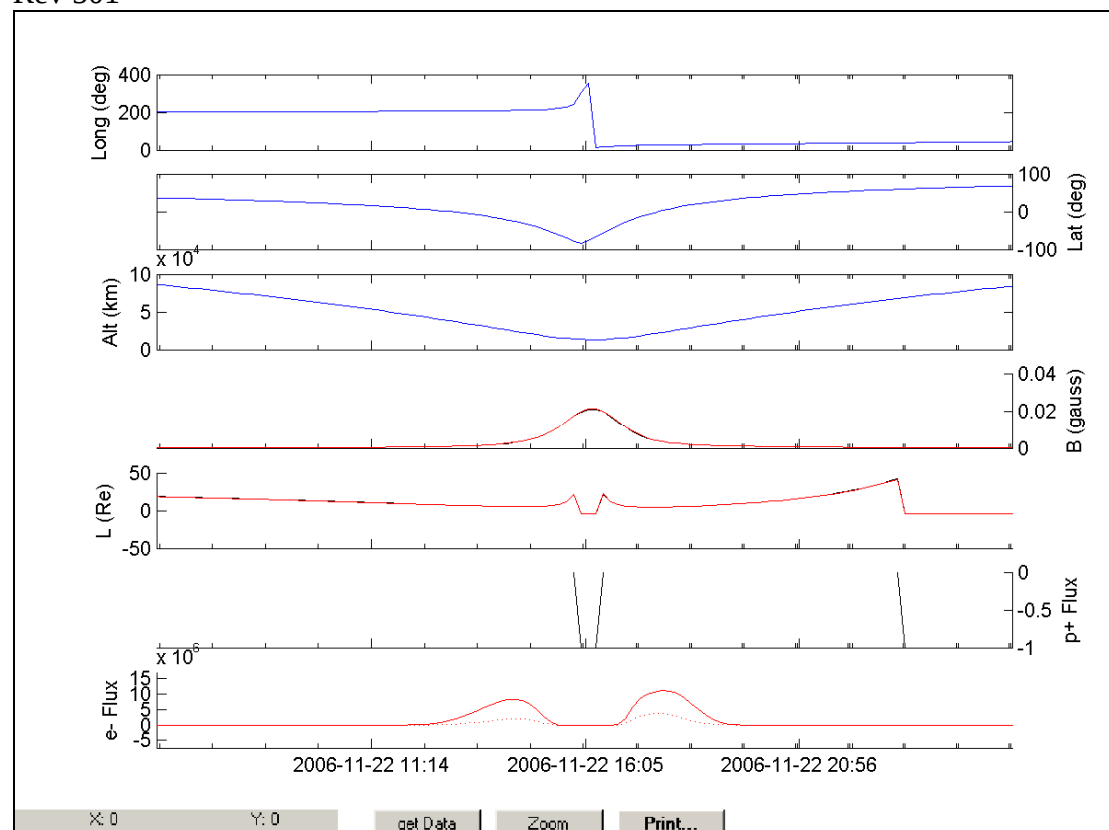


IREM Predicted Radiation Belt Passages

Rev 500



Rev 501



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

The plots are missing due to problems with the SEIS tool.