

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 231
Week 08
26.02.07
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 17.02.07 until 23.02.07 (both dates inclusive) and covers the revolutions 531, 532 and 533.

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 hexagonal dithers of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0) a raster dither of GX 339-4 (RA 17:02:49.50, DEC -48:47:23.0, which was a Target of Opportunity, a Galactic Disk Latitude Scan at attitude (RA 14:51:45.60, DEC -61:36:00.0) a raster dither of Orion OB1 (RA 05:17:00.30, DEC +01:47:17.7) and a raster dither of SN1006/Cen X-4 (RA 15:00:26.27, DEC -36:47:29.6).

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.

4 slews were missed during the observation period due to problem on FDS and on the links to the REDU and DSS27 stations.

The fuel consumption over the period between 16/02/2007 and 21/02/2007 was 0.1251 Kg. The remaining propellant is in the order of 148.0840 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. The 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

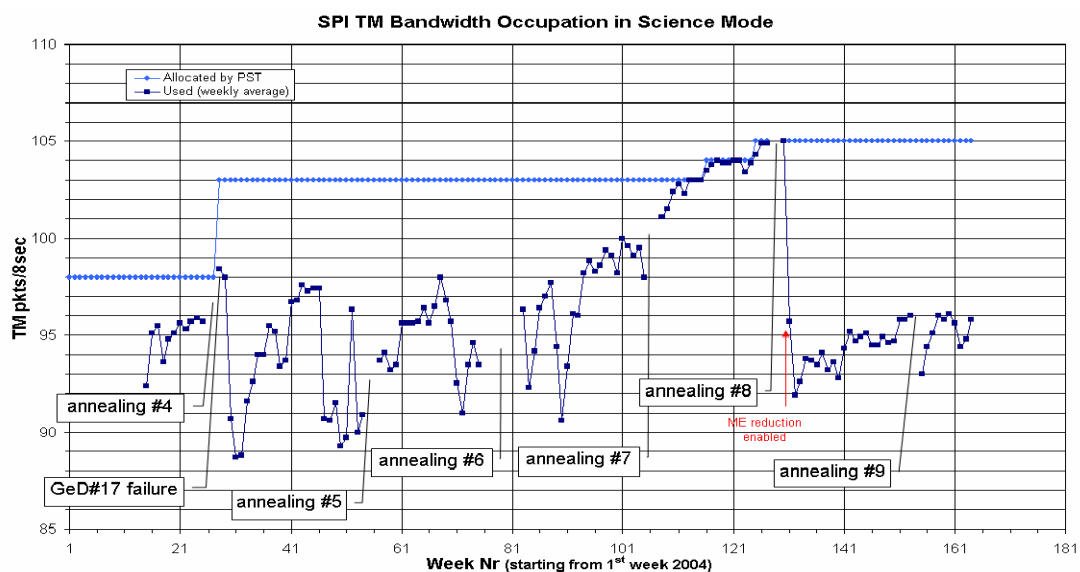
Following the 9th annealing, which ended on 22nd December, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution and is therefore operating at a lower HV setting of 3.5kV (instead of 4kV). The energy resolution of GeD#4 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. The stroke of all four compressors has been set to 40 since 03.02.2007 at 13:16Z.

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 94.8 packets/cycle.

A patch of the IASW to version 4.3.3 was applied on 23-02-2007, during the radiation belt passage (rev 532-533), between 04:50Z and 14:08Z.

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



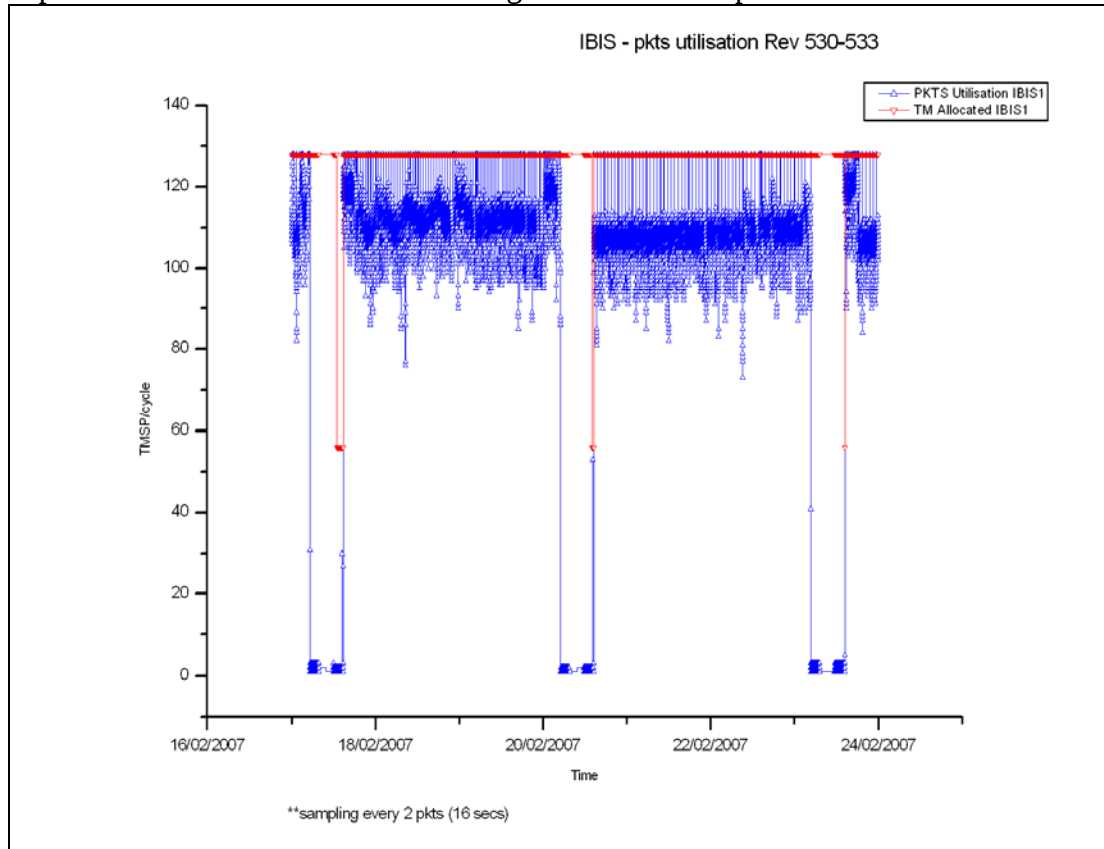
Note: Some more information concerning the SPI operations is provided in the Appendix.

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 110.84 TMPS/cycle, up 0.58 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.

OCR-222 to reduce the nominal microstrip gas gain voltage of JEM-X1 by 1 step to 73 raw was implemented from revolution 533 onwards.

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, 164 of the 166 planned science pointings for OMC were executed nominally, 2 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.

The sun was quiet this week. Two small sunspots were present: 942 and 943. Neither of them posed a threat of strong solar flares.

Reference: www.spaceweather.com

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

4 Ground Facilities

The Operational ground facilities performance was good this week. Two pointings were lost and two manually conducted 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 although a problem with the FD system prevented the updating of the slews near the time of a partial lunar eclipse. Two slews were missed from the Timeline. These were uplinked manually, with minimal science loss. 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 data drops from Redu, 1 of which caused the loss of a pointing, and 1 drop from DSS-27, which also caused the loss of a pointing. The overall performance was well over the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs are available up to revolution 539. Observations have been planned and files sent up to revolution 538. Revolutions 536-538 had to be planned twice because of a misunderstanding w.r.t. the Long Term Plan.

TSF's up to revolution 536 have been received.

2. Observation status

ECS files have been received and processed up to revolution 525.

3. ISOC Science Data Archive

Sample data is available from 3rd ISGRI catalogue and the software updated to handle the minor changes. There are some data right issues which will be further discussed with Southampton

Some differences were found between time stamps in the 3rd ISGRI catalogue and the ScW data in the DB. This is being explored.

4. ISOC system

Work is almost finished on V14.4, a test version is expected on Monday, 26 Feb. Version 14.5 has been scoped and is expected to be ready just before opening of AO-5.

5. Problems

None.

4.3.2 ISDC

Status of ISDC observation processing on 26/02/2007:

- Latest Standard Analysis completed: observation 04200730011 (Galactic disk latitude scans, Revolution 520) on 14/02/2007.
- Latest products archived: observation 04200730011 (Galactic disk latitude scans, Revolution 520) on 15/02/2007.
- Latest observation products sent to the observer: observation 04200730011 (Galactic disk latitude scans, Revolution 520) on 16/02/2007.

5 Special Events

6 Anomalies

The following problems that impacted operations were reported:

- On DoY 048, 049 and 050 there were repeated problems with the FD system failing to update slew commands. The problem lay with a shallow lunar eclipse during the previous revolution that had been removed from the planning. During the subsequent revolution, the wheel speeds had been

planned with normal limits, but the update task still had the narrower eclipse limits. Manual intervention over the week-end held the problems in check. Pointings 05310048, and 05310057 had to be manually executed.

- On DoY 050, at 22:42, a TM drop from Redu caused a loss of commanding. The TM was recovered at 22:44, and a recovery performed. The Timeline recovered at 23:37. The impact was the loss of pointing 05310086.
- On DoY 053, at 13:26, a problem with the DSS-27 antenna caused an interruption in the link with the s/c. The TM was reacquired at 13:37, and the TC at 13:39. A manual recovery was performed and the timeline rejoined at 14:32. The impact was the loss of pointing 05320048.

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

AR id	Date Created	Subject	Segment	Status
INT_SC-178	20/02/2007	IREM Anomaly: Reset of IREM_CSCI S/W #44, 11/02/2007	Payload	Open
INT-2899	17/02/2007	FDS: several slews failed update due to incorrect handling of lunar eclipse	FDS	Open

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 531

The observations in revolution 531 began with a hexagonal dither of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), which lasted ~3.5 hours. This was followed by a raster dither of the Target of Opportunity GX 339-4 (RA 17:02:49.50, DEC -48:47:23.0), for ~31.8 hours. After this, a Galactic Disk Latitude Scan was performed at attitude (RA 14:51:45.60, DEC -61:36:00.0) for ~17.1 hours. Finally another hexagonal dither of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours, was performed up to the end of the revolution.

Revolution 532

The observations in revolution 532 consisted entirely of a raster dither of Orion OB1 (RA 05:17:00.30, DEC +01:47:17.7), for ~58.4 hours.

Revolution 533

The observations in revolution 533 began with a hexagonal dither of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), which lasted ~3.5 hours. This was followed by a raster dither of SN1006/Cen X-4 (RA 15:00:26.27, DEC -36:47:29.6), for ~54.3 hours, which lasted up to 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

2007-01-30T13:48:11.000Z	148.4569	F	Automatic TM processing.
2007-01-31T23:46:54.000Z	148.4369	F	Automatic TM processing.
2007-02-02T18:00:43.000Z	148.4023	F	Automatic TM processing.
2007-02-05T13:22:50.000Z	148.3891	F	Automatic TM processing.
2007-02-05T17:48:59.000Z	148.3516	F	Automatic TM processing.
2007-02-08T13:11:38.000Z	148.3380	F	Automatic TM processing.
2007-02-08T17:37:54.000Z	148.2920	F	Automatic TM processing.
2007-02-11T13:00:09.000Z	148.2524	F	Automatic TM processing.
2007-02-14T12:47:37.000Z	148.2310	F	Automatic TM processing.
2007-02-15T17:05:09.000Z	148.2091	F	Automatic TM processing.
2007-02-17T07:21:22.000Z	148.1929	F	Automatic TM processing.
2007-02-17T12:37:46.000Z	148.1748	F	Automatic TM processing.
2007-02-18T22:18:06.000Z	148.1097	F	Automatic TM processing.
2007-02-20T12:29:06.000Z	148.1000	F	Automatic TM processing.
2007-02-21T22:56:06.000Z	148.0840	F	Automatic TM processing.

This report was generated Fri Feb 23 08:00:32 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, 17/02/2007 –23/02/2007

AOCS operations were executed from the Automatic Timeline.

During this period, 79 Open Loop Slews, 103 Closed Loop Slews and 6 Momentum Biases were executed.

4 slews (3 CSL, 1 OSL) were missed during the observation period due to problem on the update jobs on FDS and links problems with REDU and DSS27.

The problem on FDS was due to wrong handling of the lunar eclipse in revolution 0530 in all orbit related products.

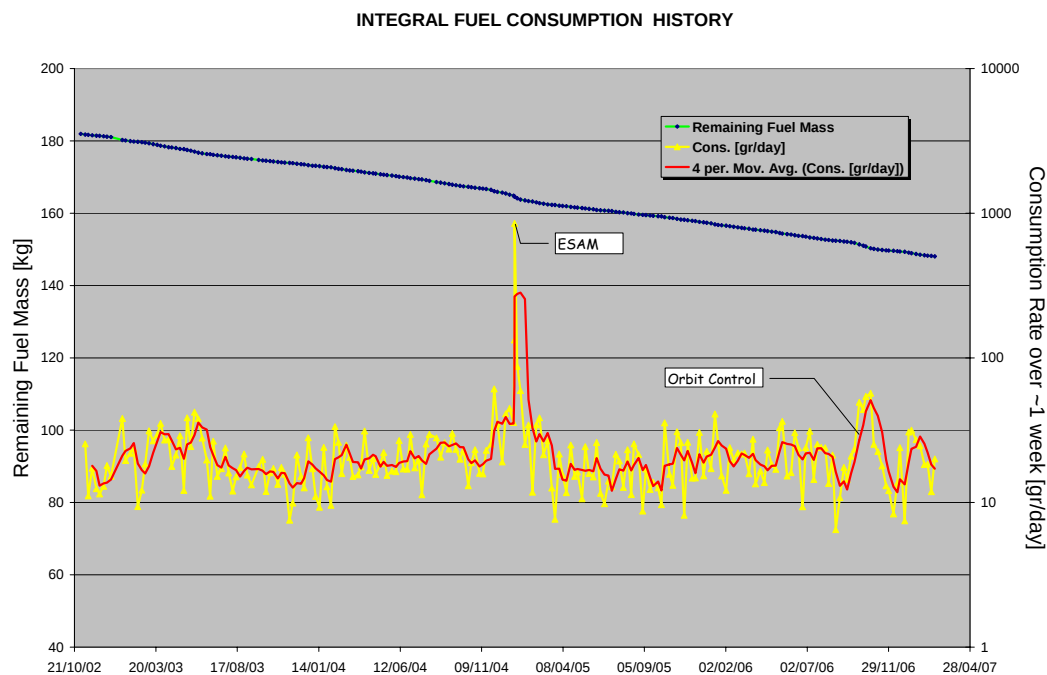
This is equivalent to a $\sim 2\%$ of the total number of slews planned (183).

Orbit Control

No update.

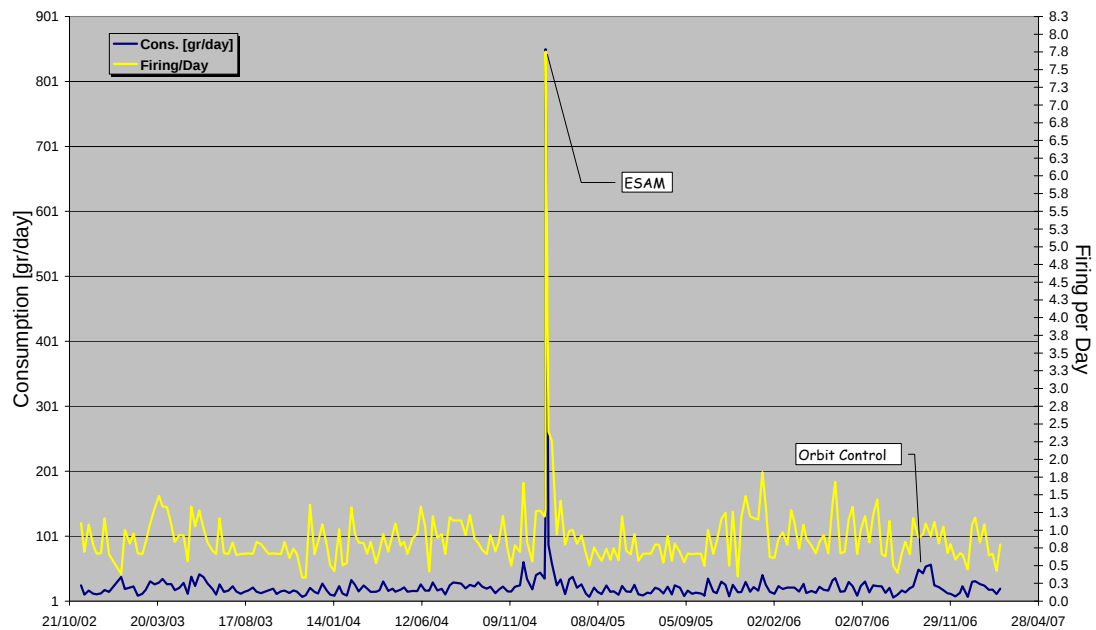
Fuel consumption

The fuel consumption (total, grams per day) over the period between 01/11/2002 and 21/02/2007 is shown in the plot below.



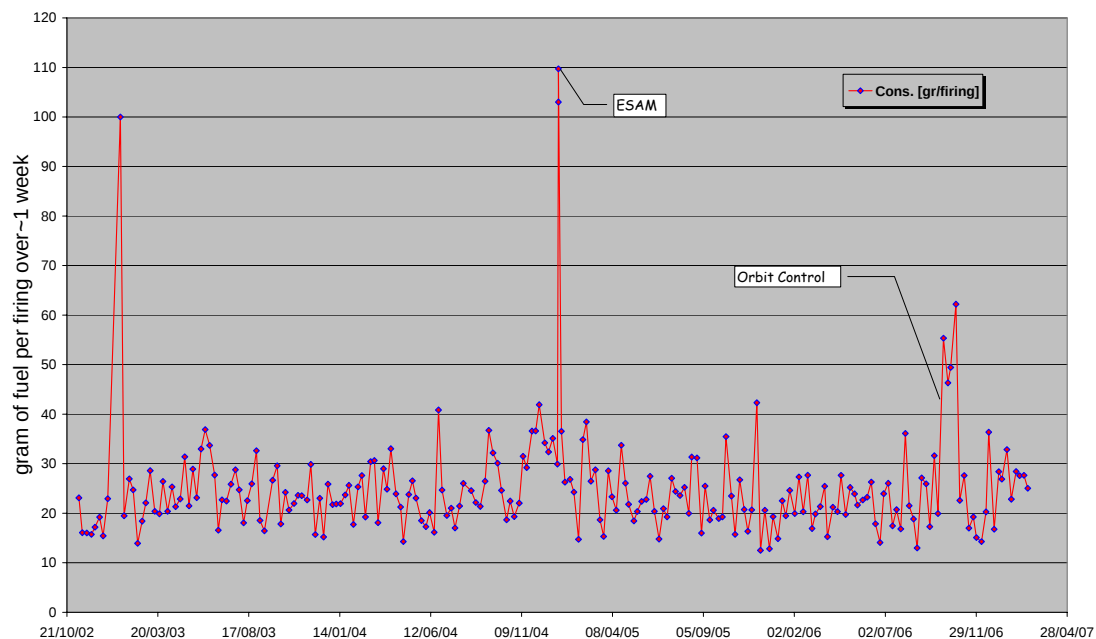
The firing per day over the period between 01/11/2002 and 21/02/2007 is shown in the plot below.

INTEGRAL FIRING PER DAY HISTORY



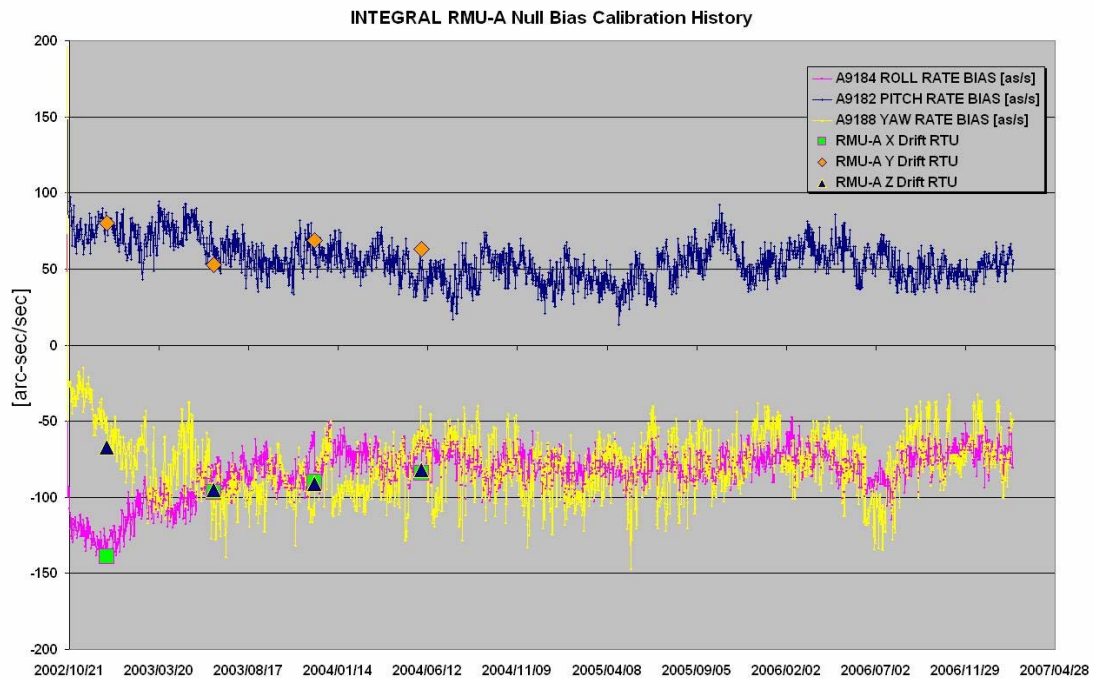
The fuel per firing over the period between 01/11/2002 and 21/02/2007 is shown in the plot below.

INTEGRAL FUEL MASS PER FIRING HISTORY

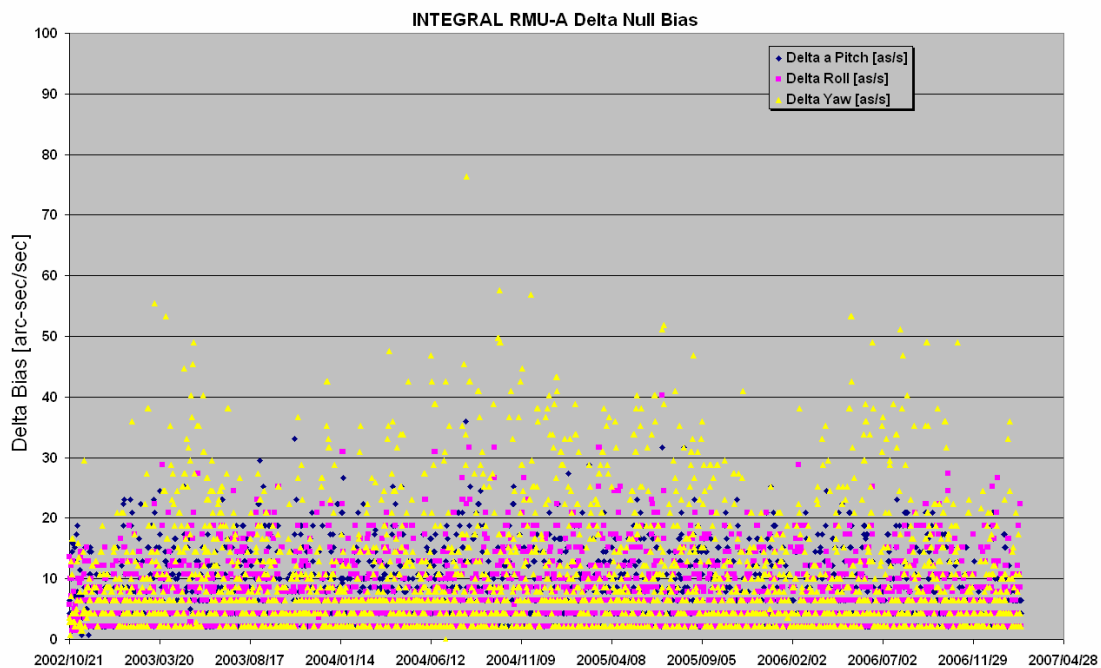


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 23/02/2007 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 23/02/2007 is reported in the plot below



17/02/2007 (Day of Year 048, Revolution 530-531)

FDS failed slew update: at 13:38z the FDS started to fail continuously the update of several slews across rev 531.

The planning for revolutions 0530 and 0531 was done under "sunlight" conditions ignoring, by error, to remove the lunar eclipse (as requested by FCT), on 17/02/2007, in revolution 0530 in all orbit related products. The orbit update early in revolution

0531 reinstated the eclipse events causing the mission planning software to recognize revolution 0531 as the subsequent revolution of an eclipse revolution and hence considering it as a part of an eclipse season. The more stringent reaction wheel margins were applied in all subsequent update jobs. Since this limits were not consistent with the planned profile most of the update jobs failed until the eclipse event.

The FD support was called in. A case by case evaluation of the current attitude error, wheels speeds and next slew magnitude, gave good indication to let running several slews with the parameters as defined originally in TL (i.e. without update).

No impact reported in TL.

18/02/2007 (Day of Year 049, Revolution 531)

FDS failed slew update: FDS failed to update several slews across rev 531. The origin of the problem was the same as that for DoY 48.

The FD support was called in. A case by case evaluation of the current attitude error, wheels speeds and next slew magnitude, gave good indication to let running several slews with the parameters as defined originally in TL (i.e. without update).

The following slew was missed in TL: ID 05310048 (CSL)

19/02/2007 (Day of Year 050, Revolution 531)

FDS failed slew update: FDS failed to update several slews across rev 531. The origin of the problem was the same as that for DoY 48.

The FD support was called in. A case by case evaluation of the current attitude error, wheels speeds and next slew magnitude, gave good indication to let running several slews with the parameters as defined originally in TL (i.e. without update).

The following slew was missed in TL: ID 05310057(CSL).

At 08:45z FD Team identified the origin of the problem (related to the update of the orbit file) and the next slew ID 05310064 was automatically and correctly updated in TL.

Problem on links to REDU: at 22:42z due to a problem on the TM link from REDU, the slew ID 05310086 failed release.

A manual recovery was then performed from attitude of PID 05310085 to the attitude of PID 05310086. The next slew ID 05310087 was manually updated in TL and the AOCS enabled in TL at 23:37z.

The following slew was not executed from TL: 05310086 (OSL).

20/02/2007 (Day of Year 051, Revolution 531-532)

FDS failed slew update: at 12:41z the FDS failed to update slew ID 05320001.

The SODA server was not running and no TM could be processed causing the update job to fail. FD support was called in.

The slew ID 05320001 was manually updated in TL and no impact was reported.

21/02/2007 (Day of Year 052, Revolution 532)

Problem on links to DSS27: at 13:26z due to a problem on the TM link to DSS27 (antenna stopped tracking, DR#G107524), the slew ID 05320048 failed release.

A manual recovery was then performed from attitude of PID 05320047 to the attitude of PID 05320048. The next slew ID 05320049 was manually updated in TL and the AOCS enabled in TL at 14:32z.

The following slew was not executed from TL: 05320048 (CSL).

22/02/2007 (Day of Year 053, Revolution 532)

Nothing to report.

23/02/2007 (Day of Year 054, Revolution 532-533)

FDS failed CGS update: at 12:41z the FDS failed to update the CGS at the end of rev 532.

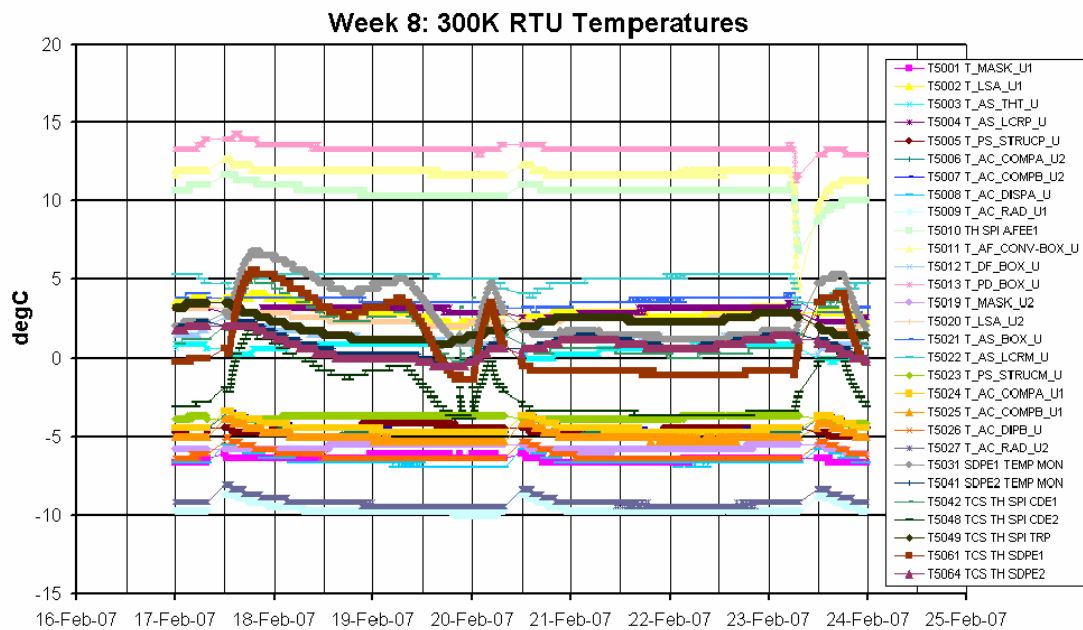
Due to a problem on the HFA task on IMCS-A, the FDS stopped receiving TM: the SODA server was not running and caused the GTPs to stop. TM could not be processed causing the CGS update to fail. FD support was called in.

The CGS was manually recovered at the beginning of rev 533 before the execution of the first RWB of the revolution 533.

No impact reported in TL.

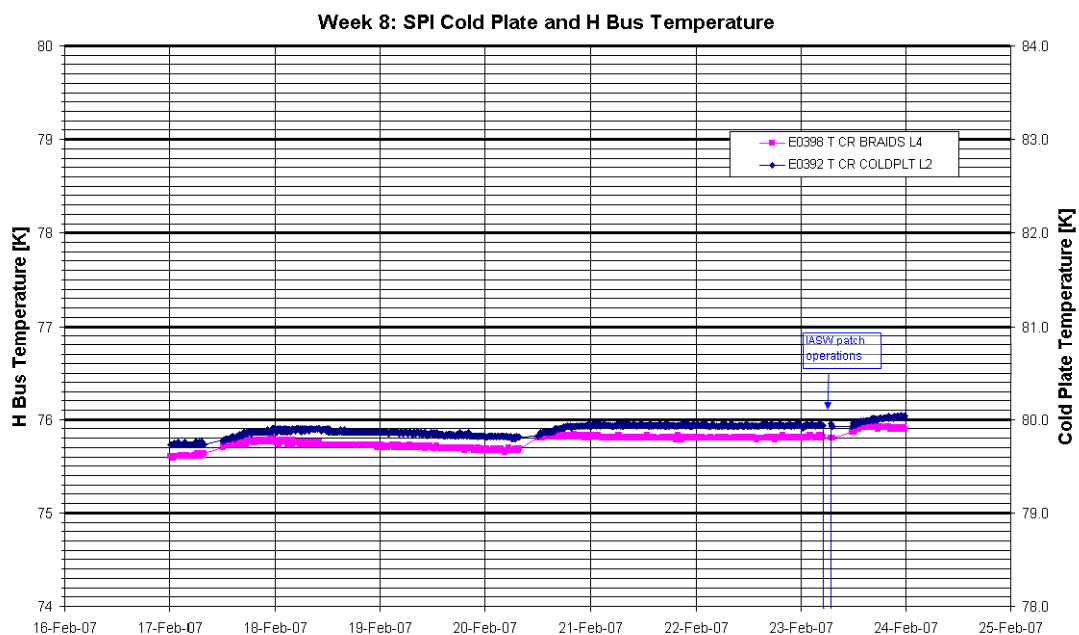
8.3.2 SPI Operations

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



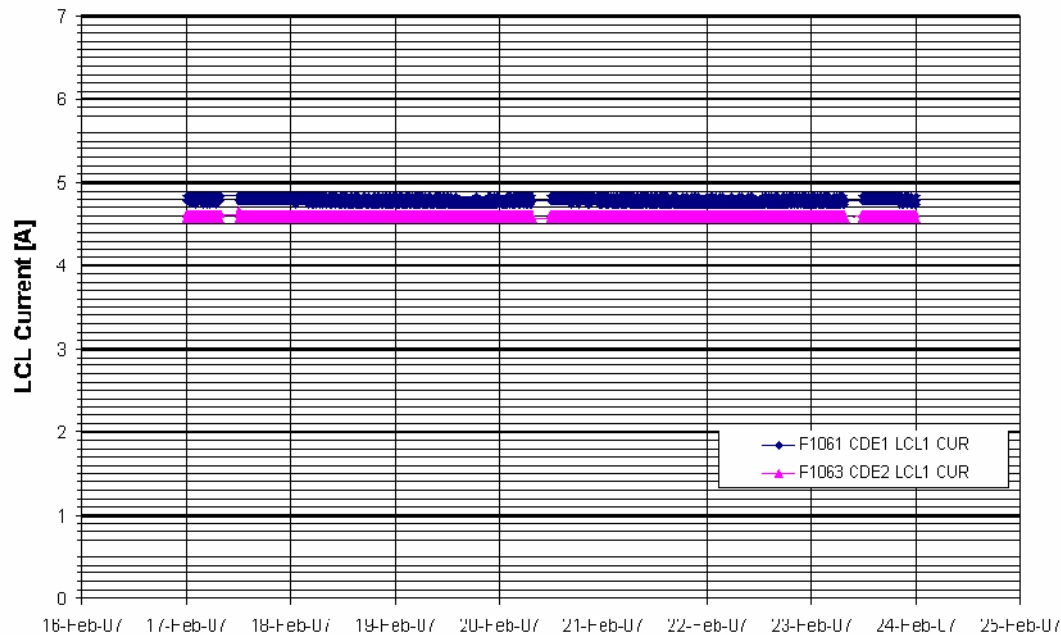
The stroke of all four compressors has been 40 since 03-02-2007 at 13:16Z.

The average LCL currents of the CDEs over the week were:

- Average CDE1 LCL Current = 4.79A
- Average CDE2 LCL Current = 4.59A

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

Week 8: SPI CDE1 and CDE2 LCL Currents



DPE & IASW: The DPE health and IASW performance is nominal. The IASW version installed was 432 until radiation belt entry of revolution 532, on 23-02-2007 at 04:50Z, when the patch to IASW version 433 was performed. The operations were performed according to INT_OR_0279 and in line with the SPI DPE SW Release Note IASW 433 (SPI-SRN-0433-VEGA). The operations were nominal and were completed before radiation belt exit of revolution 533, at 14:08Z.

After radiation belt exit SPI was briefly returned to CONF mode in order to uplink the ACS nominal flight configuration.

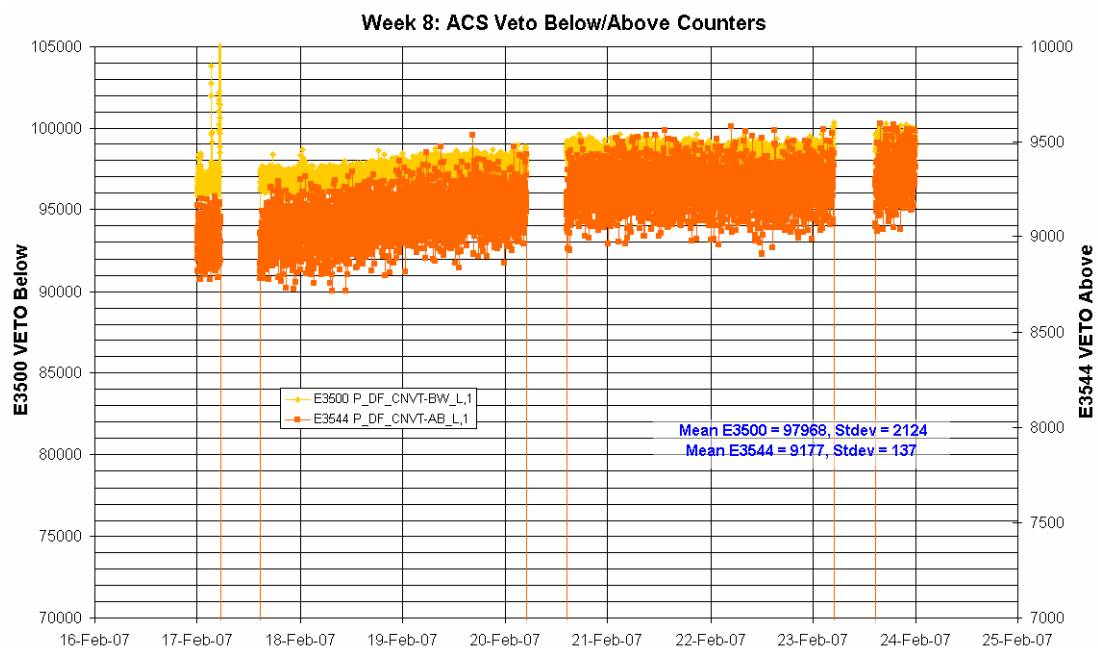
The new spectra scaling parameter is currently set to 19/19, i.e. no spectra scaling (as with IASW 432), pending the tests and scaling parameter tuning to be performed on 05-03-2007.

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).

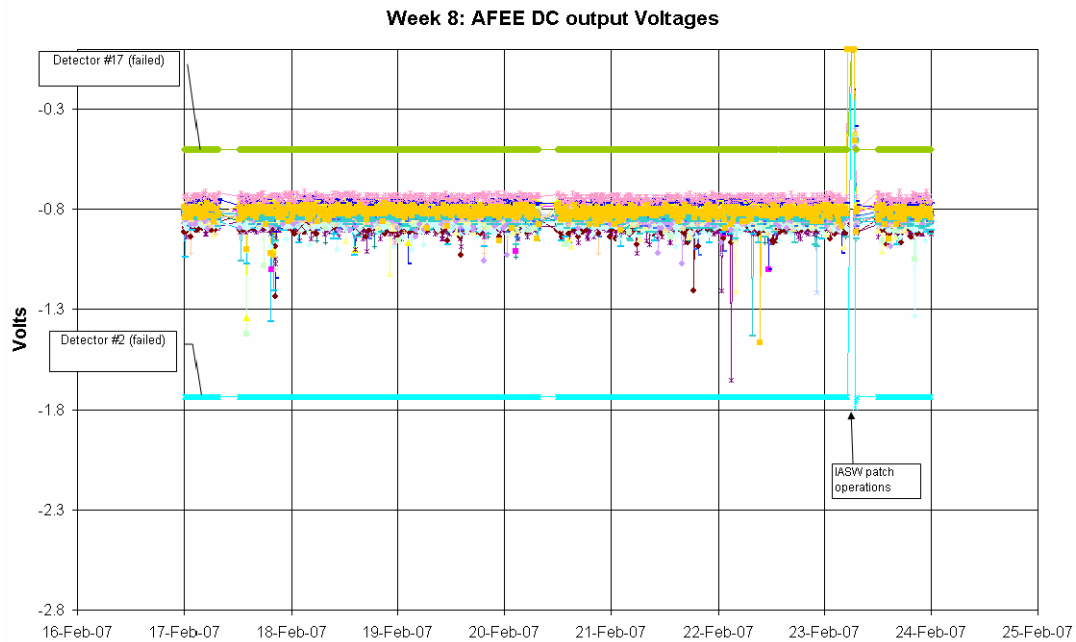
The following plot shows the ACS overall count rate evolution during the reporting period:



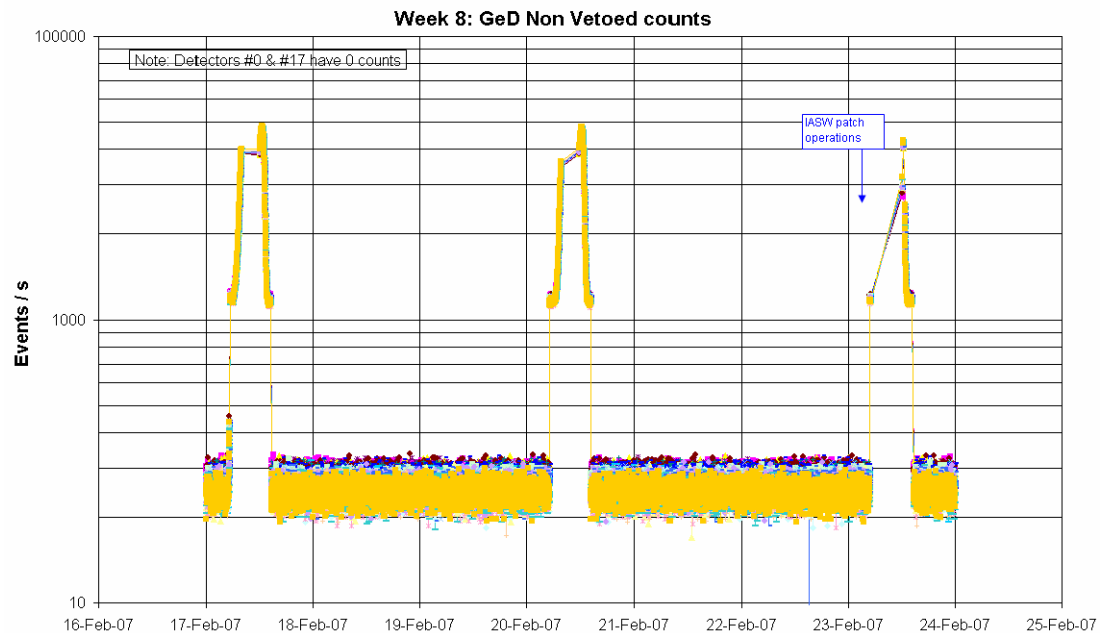
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution. The energy resolution of GeD#4 was recovered with the last annealing.

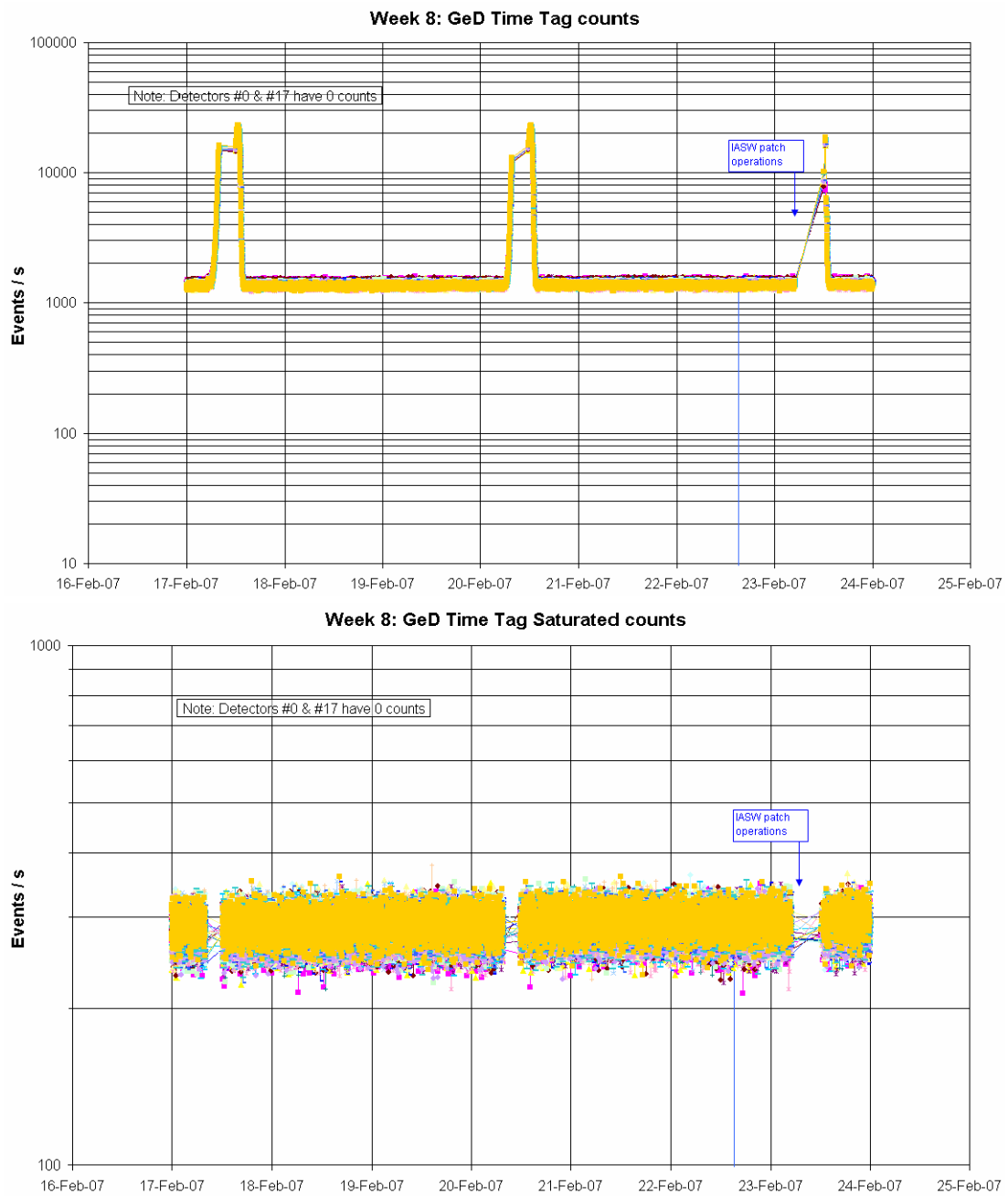
The GeD#12 HV remained at 3.5kV throughout the reporting period.

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.

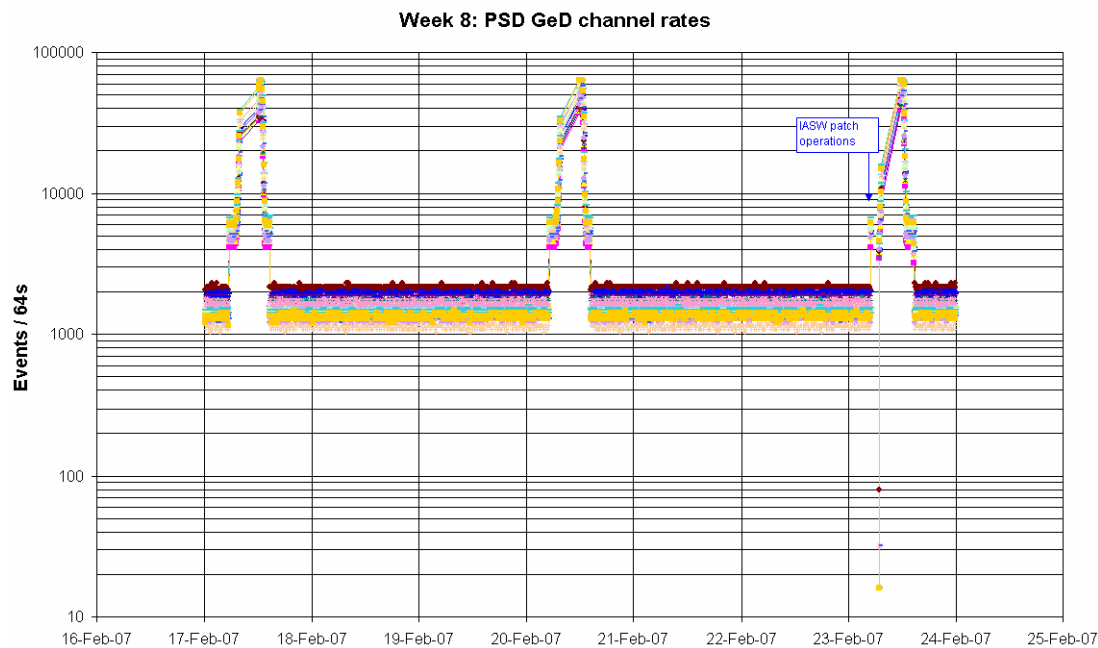


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.





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



Event Log:

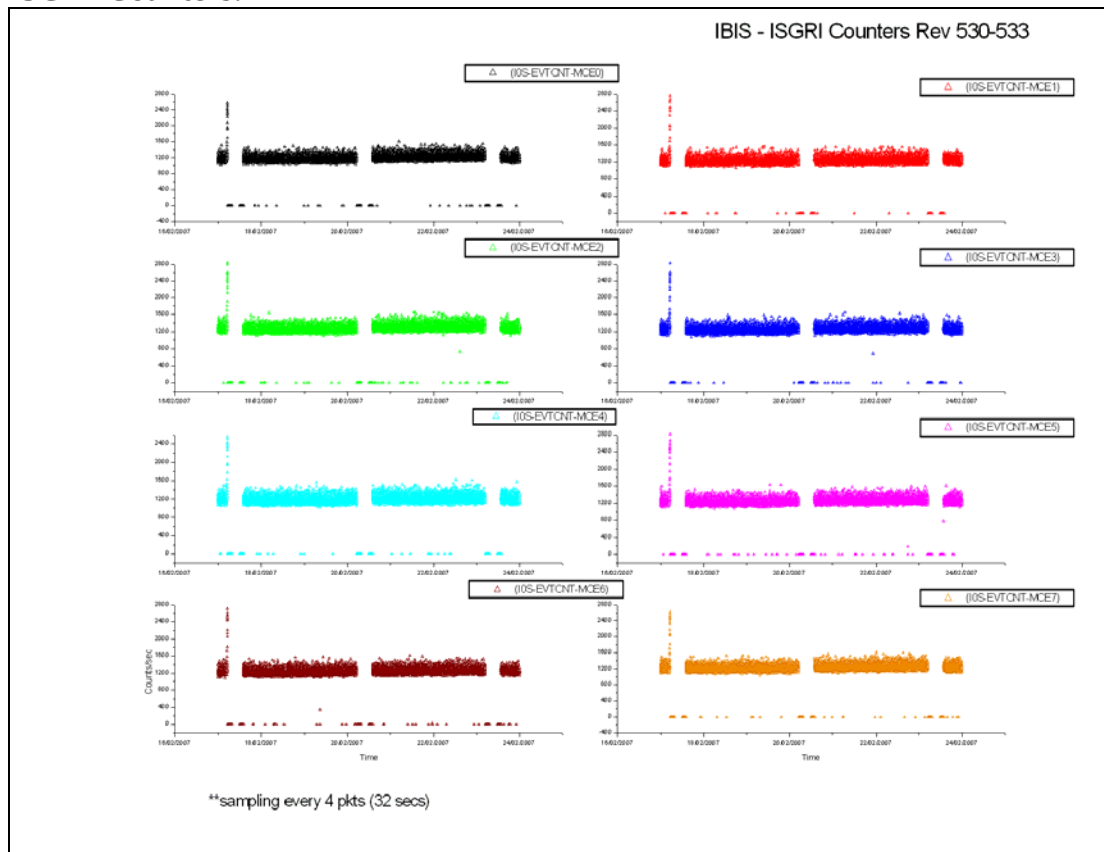
The following non-nominal events occurred on SPI during the reporting period:

- On 2007-02-17 at 05:10:12Z the TM parameter E3500 P_DF_CNVT-BW_L started toggling OOL High. This was a few minutes before radiation belt entry of revolution 530 and therefore no action was taken.
- On 2007-02-17 at 07:38:27Z OEM APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the LOS_CHK window of revolution 530, 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 2007-02-20 at 14:23:38Z the following two OEMs were received:
 APID 1024 ID 3 TC REJECT SPI1 TC REP TC SBFULL
 APID 1024 ID 4 ANOMALY SPI1 CSSW INT ER BUF OVER
 indicating a TC rejection due to the buffer being full. This was during the radiation belt exit of revolution 532 and probably relates to a BCP request which could not be executed due to pending reconfiguration TCs. The rest of the post-belt activation proceeded nominally.
- TM parameter E2116 T AS PSAC L2 (Plastic Scintillator temperature) went OOL Low several times at the start of 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 were updated in the IODB release propagated to the control system during the perigee pass of revolution 531-532, on 2007-02-20, after which this parameter remained within limits.

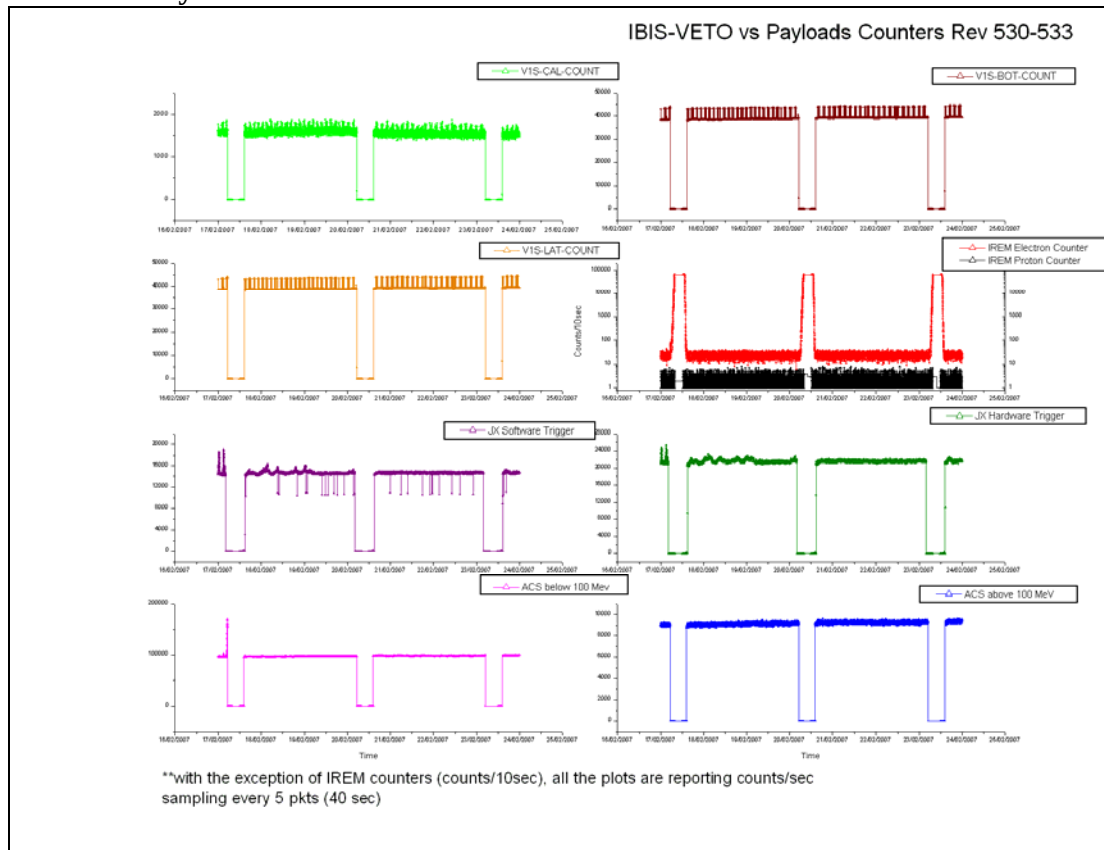
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

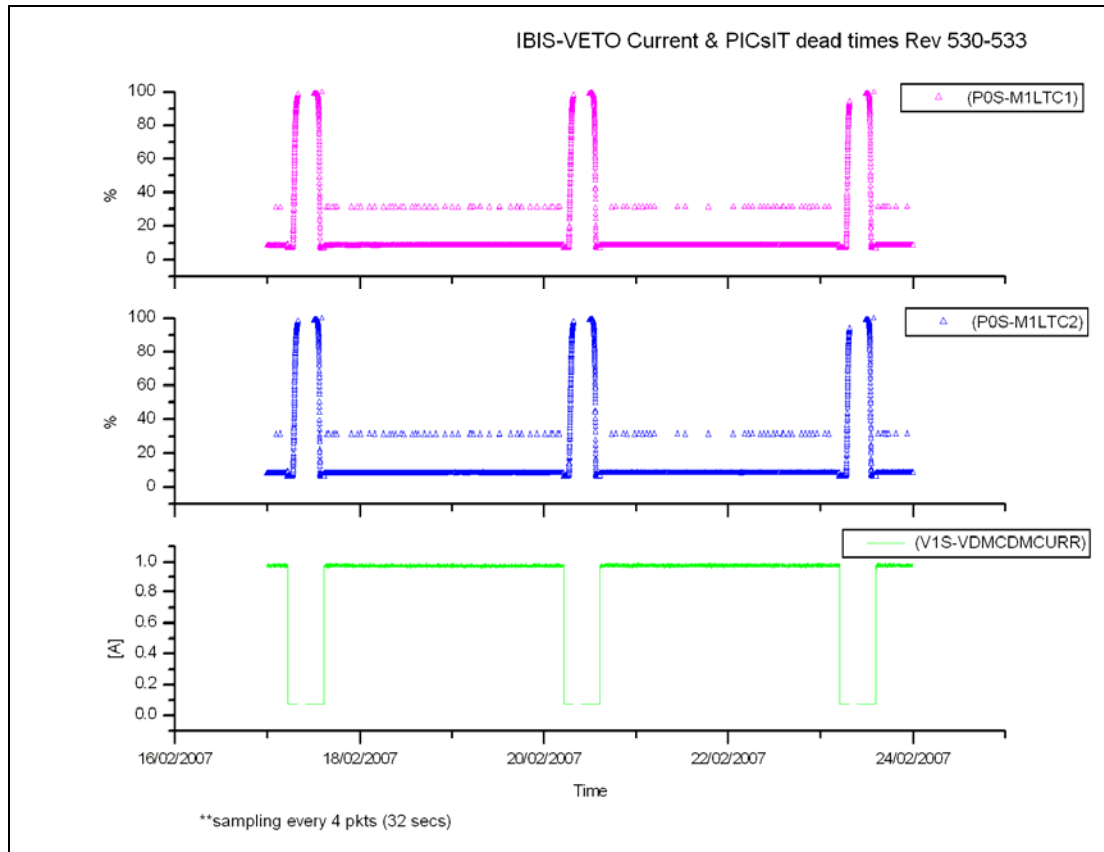


VETO vs Payloads Counters:

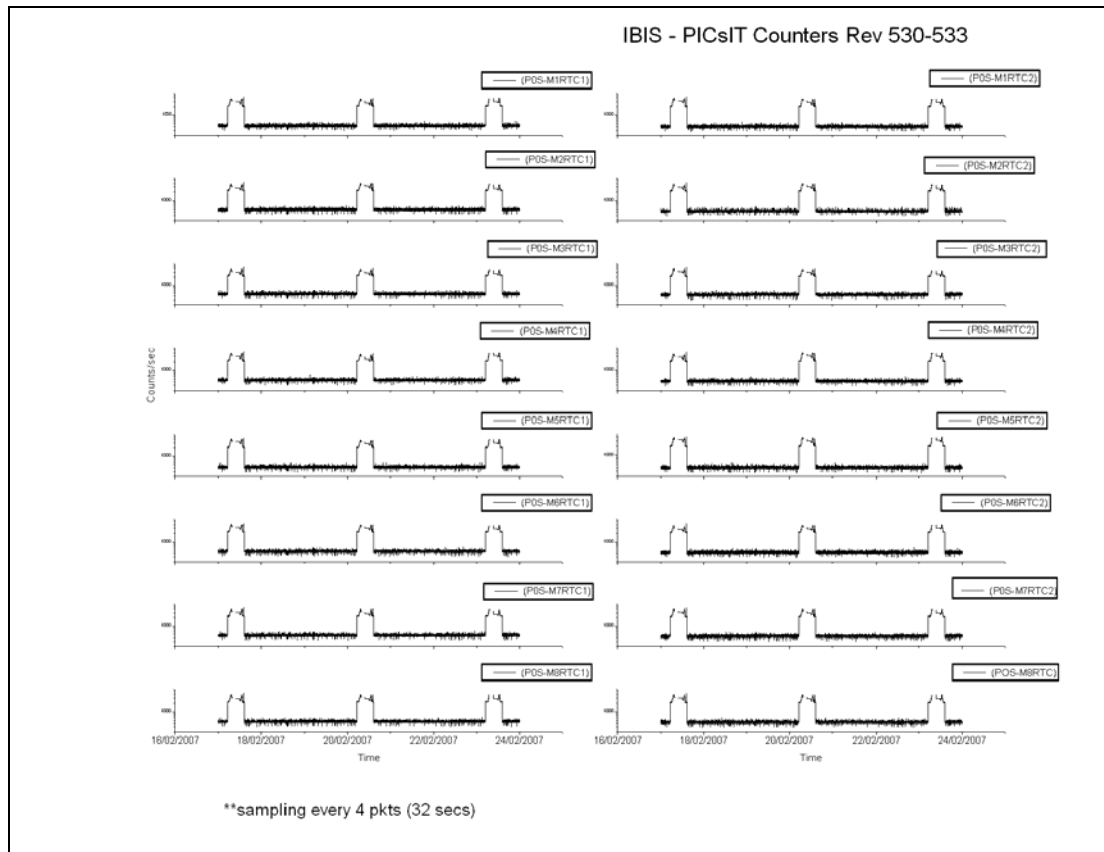


The week was characterised by low radiation.

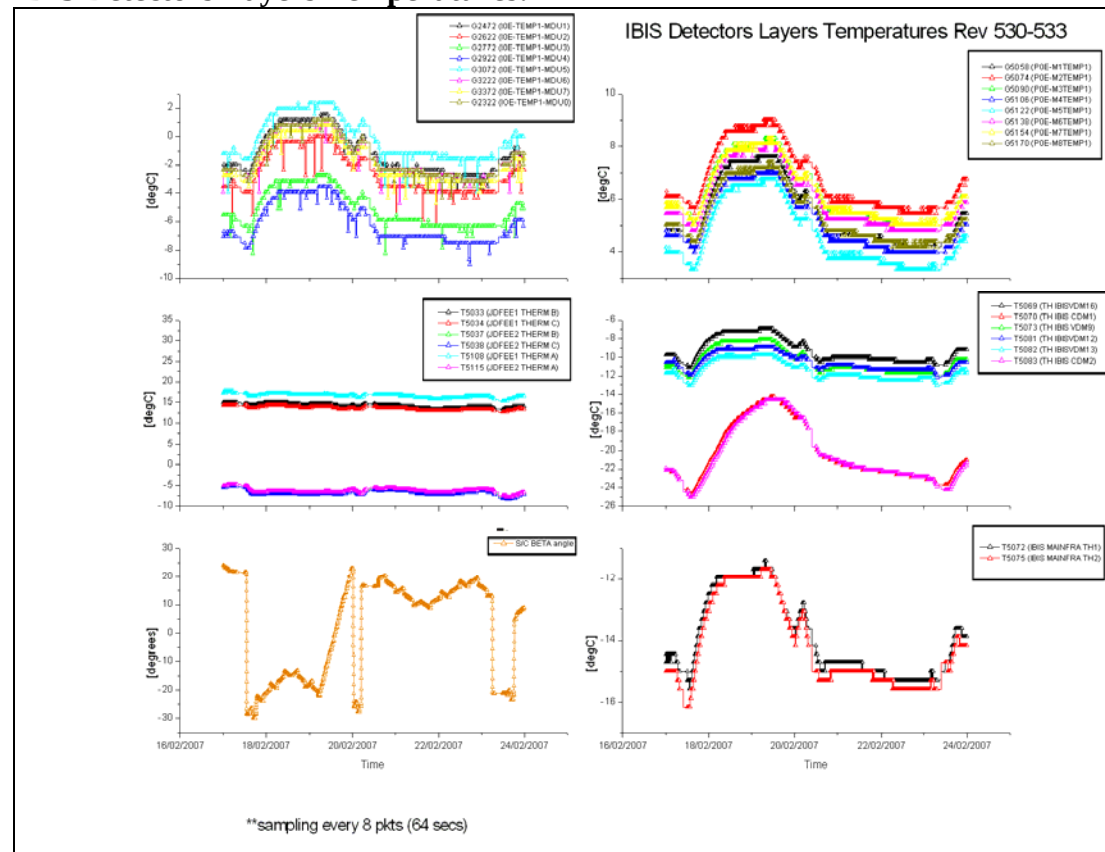
VETO Current:



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 2007.048 (17/02/2007):

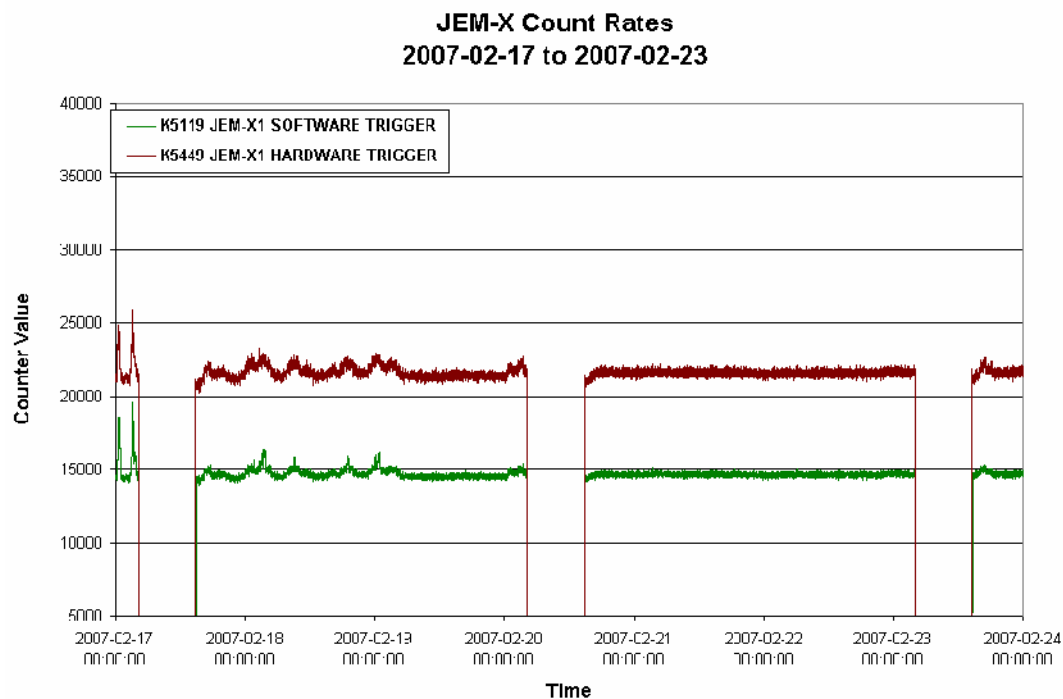
At 05:13Z TM family G2013 (I0S-EVTCNT_MCEi) was toggling OOL High due to high radiation background as the S/C was approaching the Radiation Belts. They went back inside limit at belts entry at 05:16Z.

8.3.4 JEM-X Operations

JEM-X Count Rates

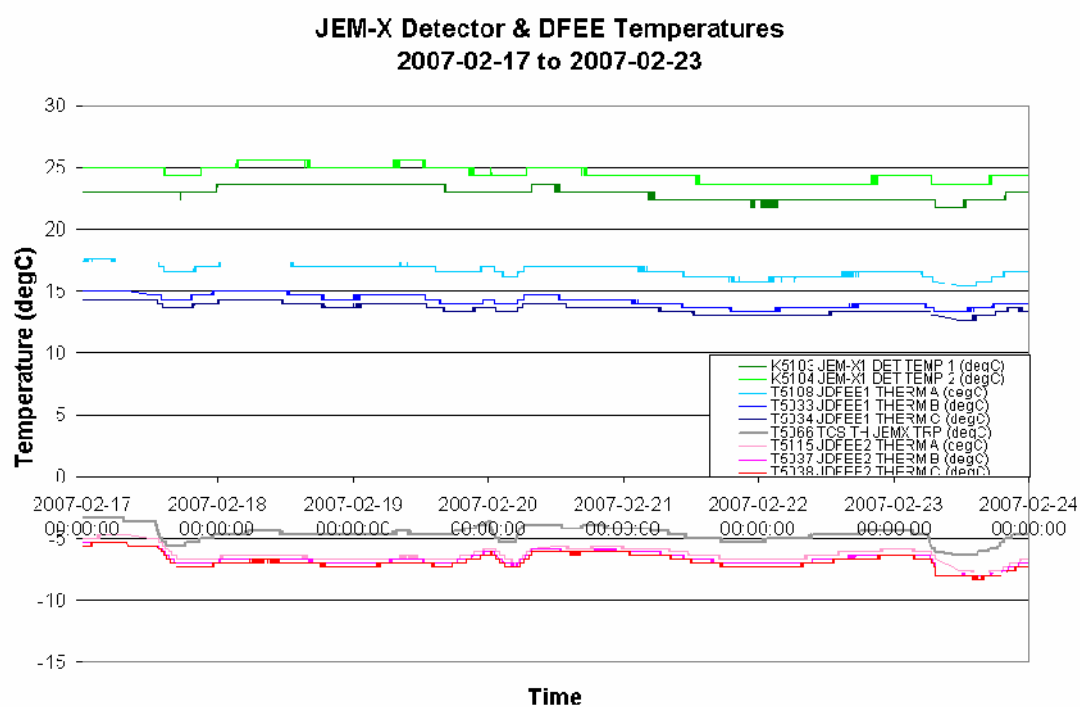
JEM-X count rates over the reporting period are displayed in the following graph¹.

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 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 Daily Report

² Data sampled (1 frame in 8)

2007-02-17 (DOY 048, Rev 530-531) to 2007-02-22 (DOY 053, Rev 532)

JEM-X1 operations executed nominally.

2007-02-23 (DOY 054, Rev 532-533)

OCR-222 to reduce the nominal microstrip gas gain voltage of JEM-X1 by 1 step to 73 raw was implemented from the start of revolution 533. This was done by ISOC via the POS, the IODB having been updated in the release already propagated to the IMCS on 2007-02-20 (perigee pass of revolution 531-532).

8.3.5 OMC Operations

2007-02-17 (DoY 048, Rev 530) to 2007-02-18 (DoY 049, Rev 531)

Nothing to Report

2007-02-19 (DoY 050, Rev 531)

At 12:42, a drop in TM from Redu caused the commanding to fail. A recovery was performed, and the timeline rejoined at 23:15. The impact was the loss of pointing 05310086.

2007-02-20 (DoY 051, Rev 531) to 2007-02-23 (DoY 054, Rev 533)

Nothing to Report

2007-02-22 (DoY 053, Rev 532)

At 13:26, a problem with the DSS-27 antenna caused an interruption in the link with the s/c. A recovery was performed after the links were restored, and the timeline rejoined at 14:32. The impact was the loss of pointing 05320048.

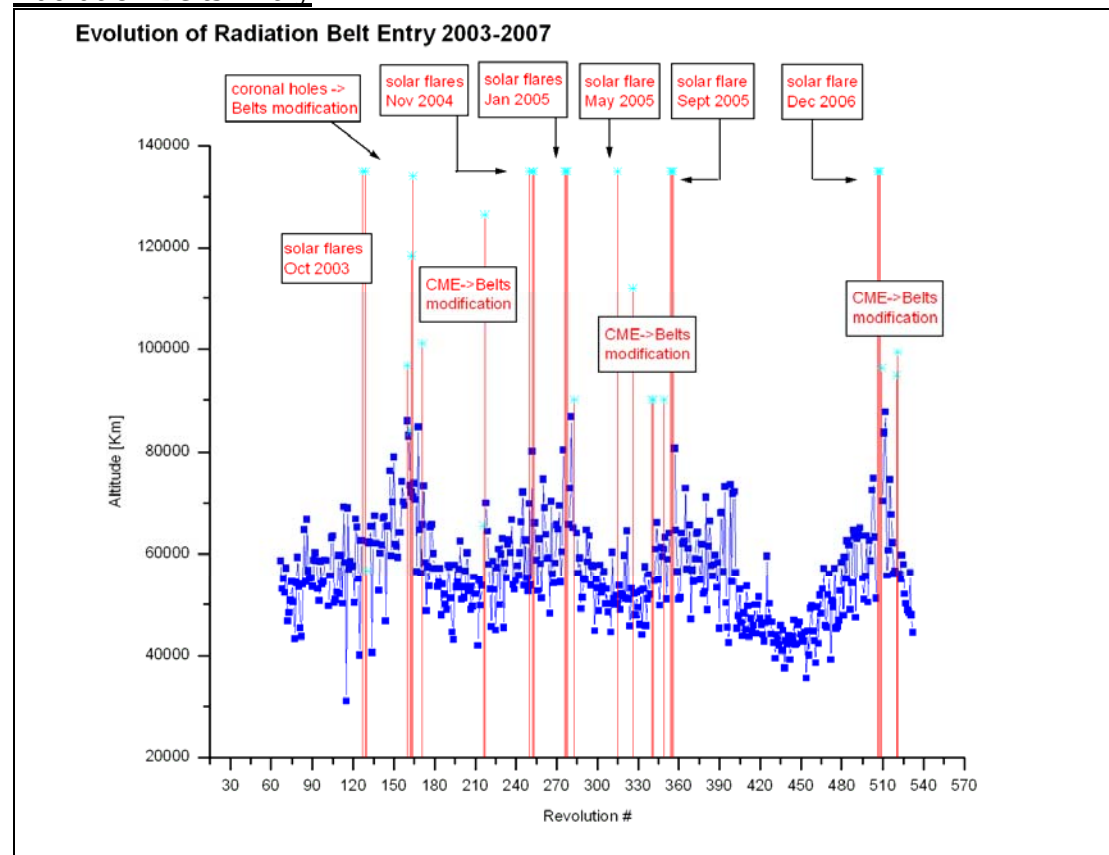
2007-02-23 (DoY 054, Rev 532)

Nothing to Report

On DoY 048 at 05:16:26, DoY 051 at 05:05:38 and DoY 054 at 04:52:26 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]
530	RAD_ENTR R 2007-02-17T05:16:23Z	2007-02-17 05:14:32	56336.0	2007-02-17 06:14:13	47928
531	RAD_EXIT R 2007-02-17T14:32:31Z	2007-02-17 13:59:04	40006.0	2007-02-17 14:04:13	40968
531	RAD_ENTR R 2007-02-20T05:05:31Z	2007-02-20 06:04:56	47930.2	2007-02-20 06:03:15	47798
532	RAD_EXIT R 2007-02-20T14:22:26Z	2007-02-20 13:44:32	<<43191.1	2007-02-20 13:53:15	40969
532	RAD_ENTR R 2007-02-23T04:52:24Z	2007-02-23 06:15:44	44468.7	2007-02-23 05:53:15	47123
533	RAD_EXIT R 2007-02-23T14:09:54Z	2007-02-23 13:25:52	>>29763.1	2007-02-23 13:43:15	41619

Reference

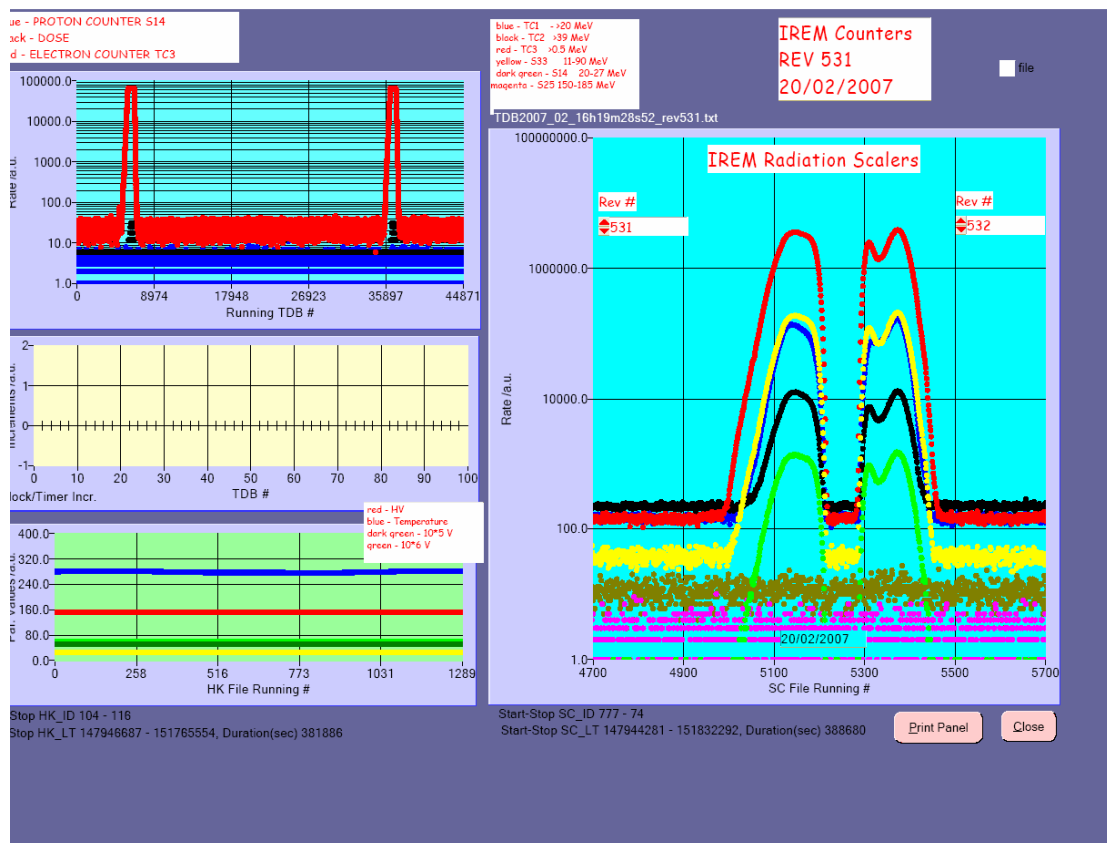
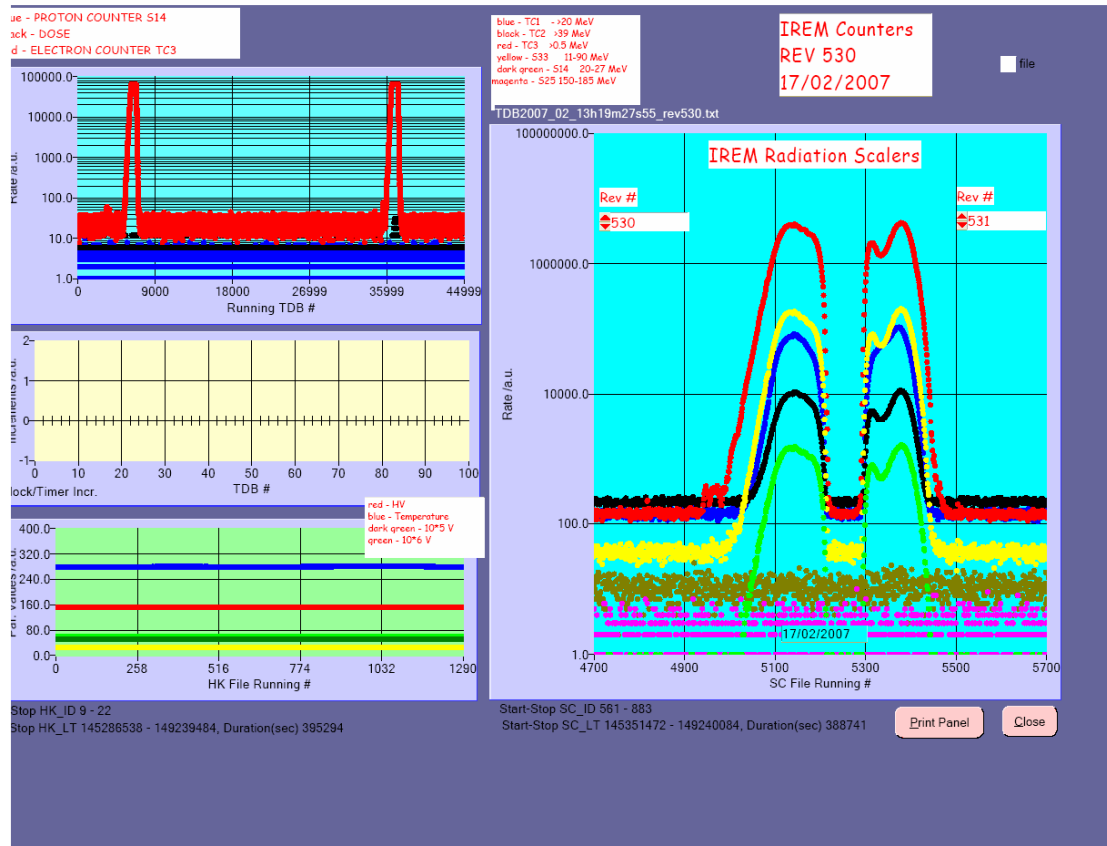
Very small error vs reference (less than 10 minutes)

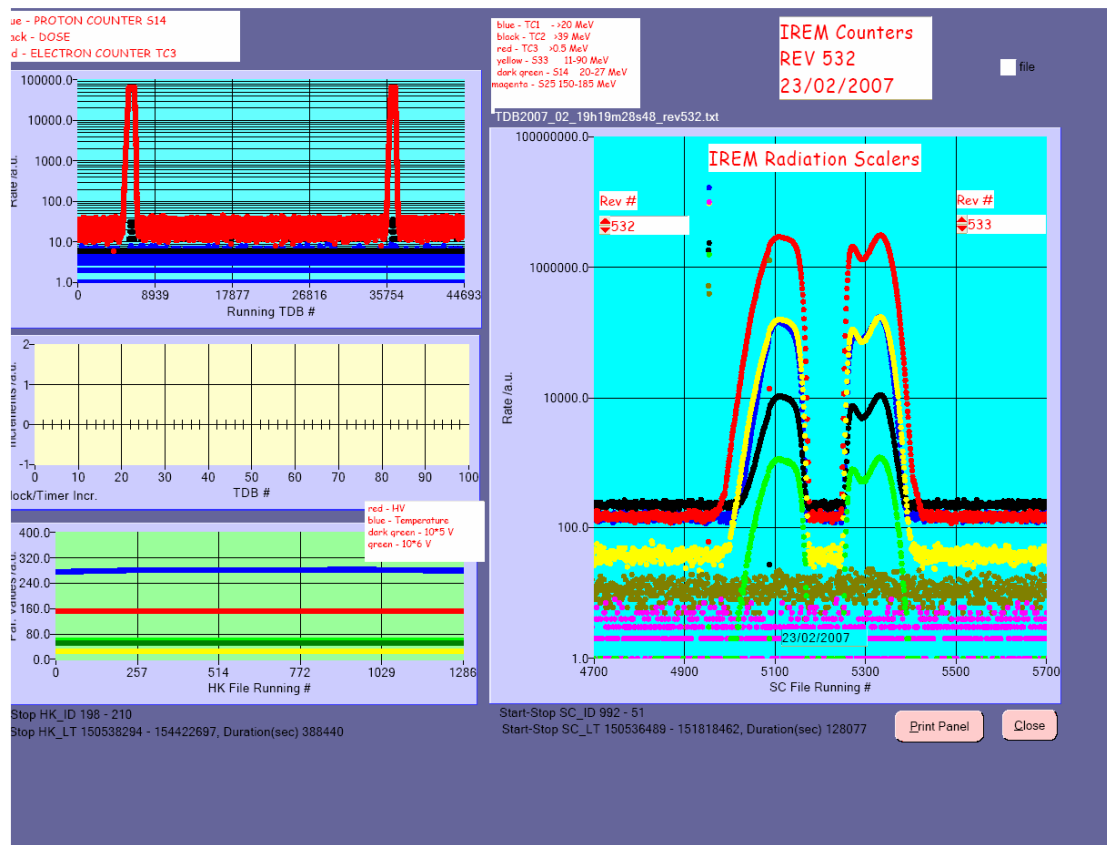
Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

Radiation Spike

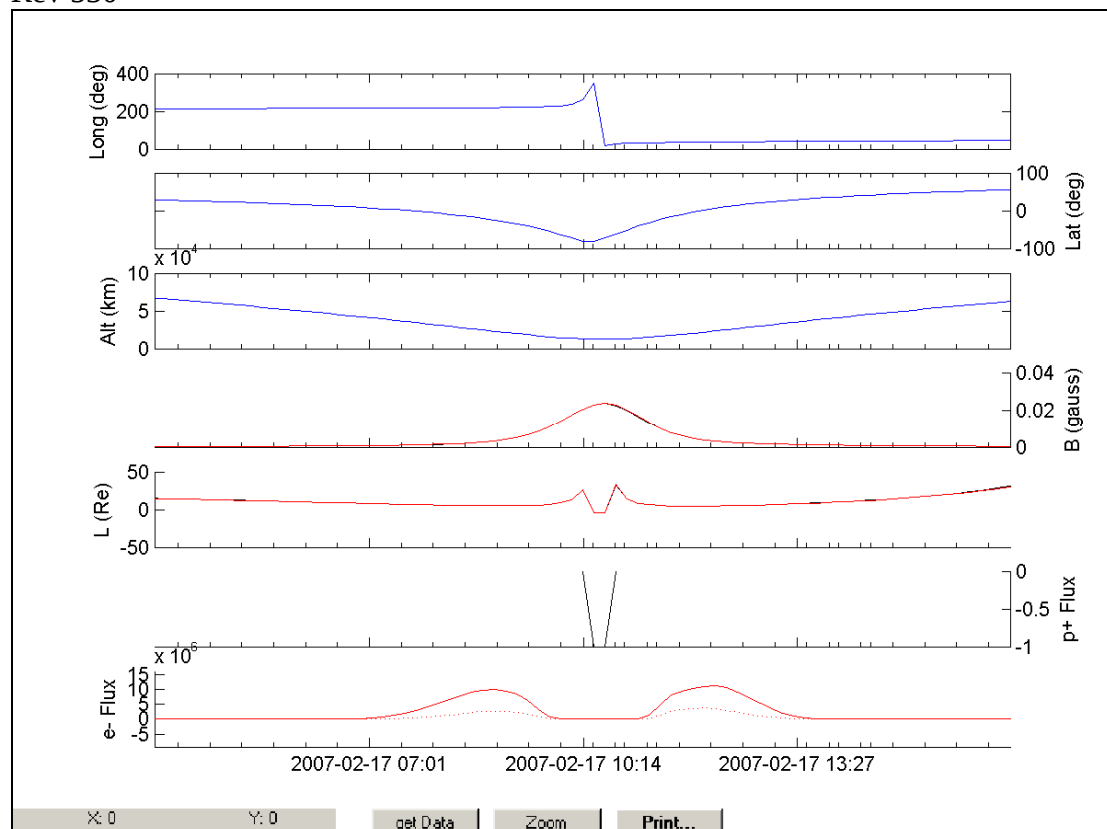
IREM radiation counters:



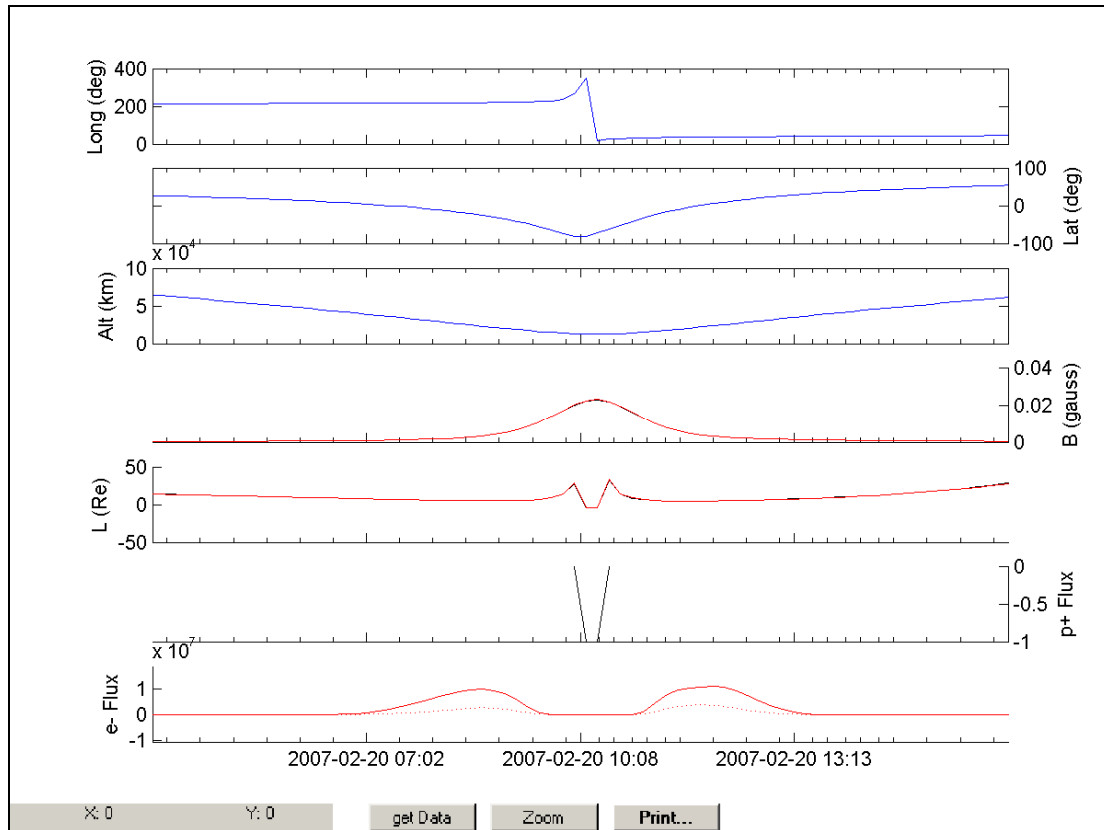


IREM Predicted Radiation Belt Passages

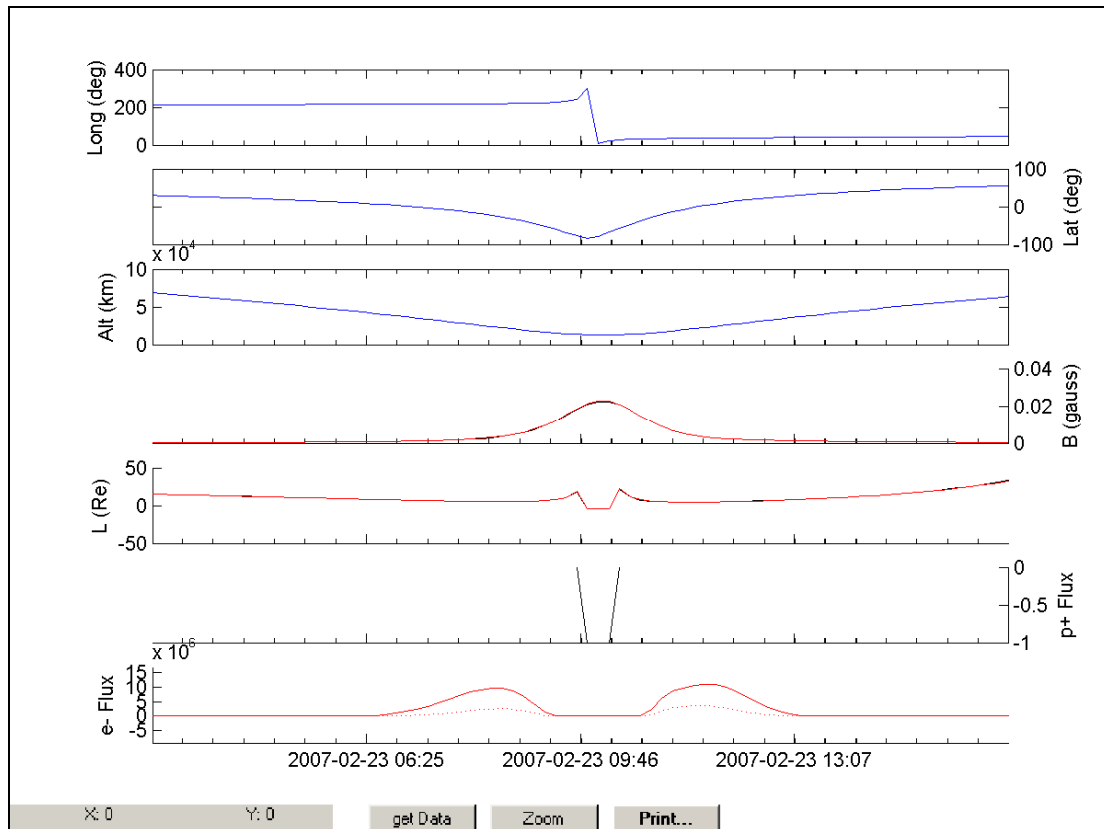
Rev 530



Rev 531



Rev 532



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

No plot is available this week. But the background was essentially low.