

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 226
Week 03
22.01.07
Routine Phase

Prepared by: M. Walker (OPS-OFO)

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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 13.01.07 until 19.01.07 (both dates inclusive) and covers the revolutions 520 and 521.

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 raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), 2 Galactic disk latitude scans, at attitudes (RA 14:23:12.00, DEC -58:46:48.0), and (RA 14:18:07.20, DEC -63:15:00.0), a raster dither of the Galactic Plane Region 2 (RA 14:08:36.11, DEC -61:30:20.6).and a hexagonal dither of NGC 4151 (RA 12:10:32.60, DEC +39:24:20.6).

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.

3 slews were missed during the observation period, 2 due to problems with the attitude determination process on FDS, and 1 to problems at Redu.

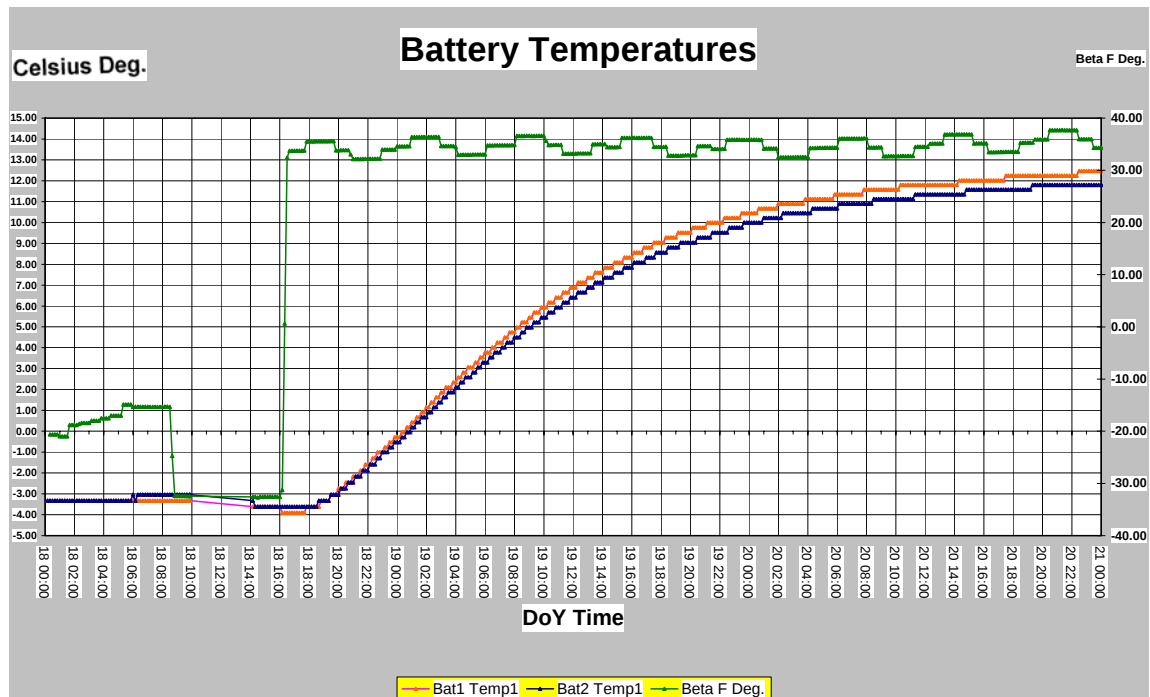
The fuel consumption over the period between 11/01/2007 and 18/01/2007 was 0.23 Kg. The remaining propellant is in the order of 148.7270 Kg.

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.

A plot showing battery temperature is given below. Note the TM gap from 10:00 to 14:00 on the 18th due to the perigee passage between revolutions 520 to 521.



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 LOBT wrap-around occurred on DoY 017 at 12:23:30. INT-OR-0277 was manually executed around this time.

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

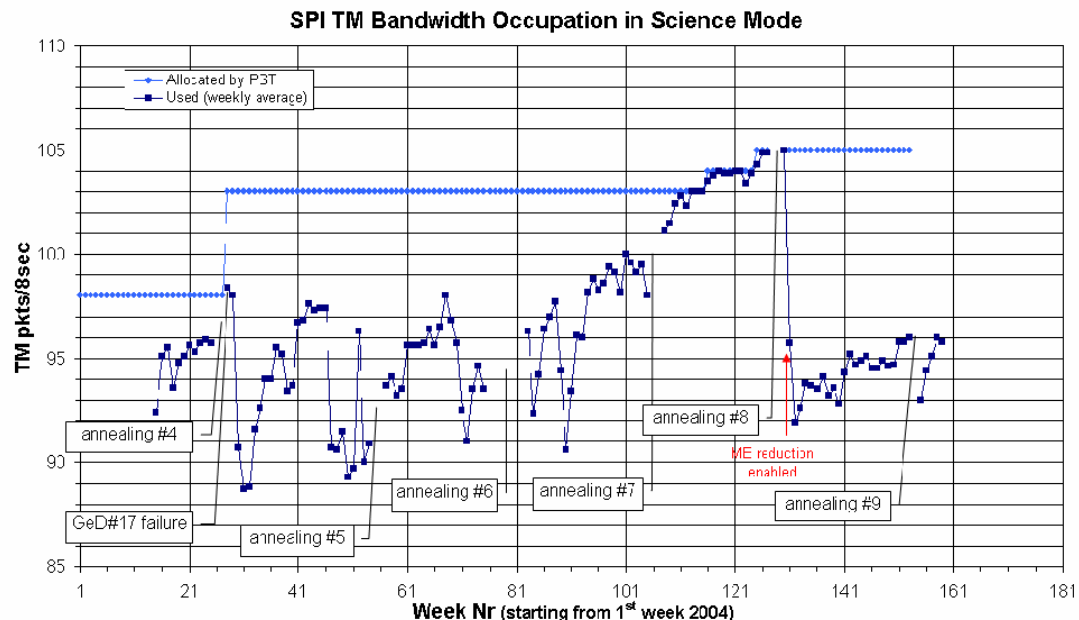
3.2.1 SPI

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 was increased to 39 on 2007-01-19 at 02:00Z.

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.



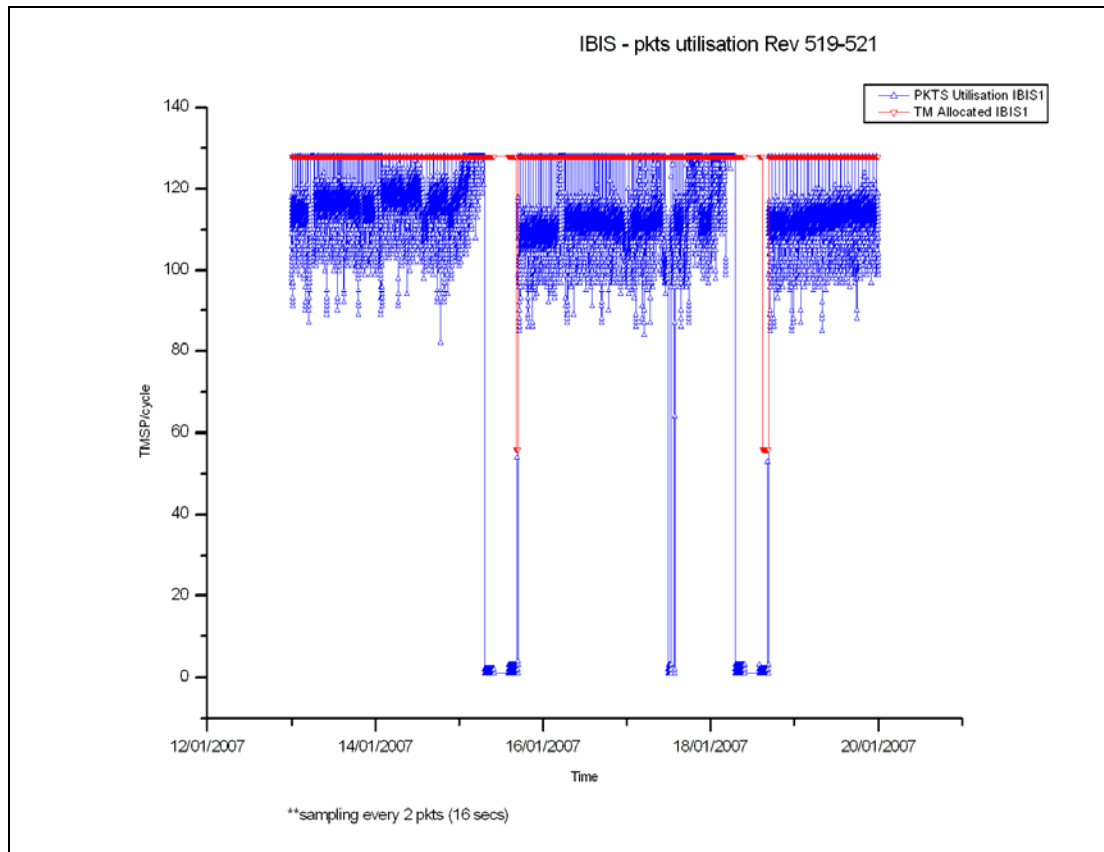
Note: Some more information concerning the SPI operations is provided in the Appendix.

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 (when IBIS was in Science mode) was 114.62 TMPS/cycle, down 0.71 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.

Due to high background radiation conditions, JEM-X1 made an autonomous transition to Safe mode on 2007-01-18 at 04:12:49Z, ~2 hours before planned before radiation belt entry of revolution 520.

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, 186 of the 189 planned science pointings for OMC were executed nominally, 1 started late and 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.

Sunspot 930 disappeared at the beginning of the week. From 14/01/2007 until the end of the observation period, sunspot 938 appeared and moved across the surface of the sun but posed no 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. 1 slew was lost and another delayed 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. There were, however, a couple of incidents: On a couple of occasions the FDS system failed to update a slew, one of which caused a delay in the start of a pointing. The overall performance was well above 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 small TM drops from Redu, one of which caused the loss of a pointings, and one occasion of data dropping from Vilspa. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs are available up to revolution 525, but for the problems described below, observations could only be planned up to revolution 523.

A TOO request for GX339-4 has been accepted, but the source cannot be observed before revolution 525, so no replanning was required. Another TOO request for NGC 262 was not granted as the source had already diminished in strength.

TSF's up to revolution 522 have been received.

2. Observation status

No new ECS files received.

3. ISOC Science Data Archive

Version 1.1 of INVITE with a bug fix for Windows is now available. An investigation into difficulties with handling large data requests is underway. A draft plan for ISDA enhancements in 2007 has been prepared.

4. ISOC system

Version 14.1 has been completed and is currently being tested for a release next week.

5. Problems

While trying to plan revolution 524, no slew to perigee could be planned, not even for the perigee position provided in the PSF, as in all cases an error code is returned from the flight dynamics software.

4.3.2 ISDC

Status of ISDC observation processing on 22/01/2007:

- Latest Standard Analysis completed: observation 04200030001 (MCG -05-23-016, Revolution 508) on 12/01/2007.

- Latest products archived: observation 04200030001 (MCG -05-23-016, Revolution 508) on 12/01/2007.

- Latest observation products sent to the observer: observation 04200030001 (MCG -05-23-016, Revolution 508) on 22/01/2007.

5 Special Events

6 Anomalies

The following problems that impacted operations were reported:

- On DoY 013, at 06:49, the lack of a suitable guide star caused the loss of pointing 05190023.
- On DoY 017, at 00:46, the FDS failed to update the slew due to an attitude constraint violation. The impact was a late start for pointing 05200051.
- At 16:46, the TM links from Redu dropped, which caused the loss of pointing 05200075. A recovery was performed, and the Timeline re-enabled at 17:28.

There were no new anomaly reports entered into the ARTS system this week:

Doc. Title : INTEGRAL Mission Report #226
Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OF
Date : 22/01/07

Issue : 1
Rev. : 0
Page : 9

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 520

The observations in revolution 520 began with a raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), lasting ~11.7 hours. It continued with 2 Galactic disk latitude scans, at attitudes (RA 14:23:12.00, DEC -58:46:48.0), for 17.1 hours and (RA 14:18:07.20, DEC -63:15:00.0), also for 17.1 hours. Finally a raster dither of the Galactic Plane Region 2 (RA 14:08:36.11, DEC -61:30:20.6), lasting ~8.9 hours was performed until the end of the revolution.

Revolution 521

The observations in revolution 521 consisted entirely of a hexagonal dither of NGC 4151 (RA 12:10:32.60, DEC +39:24:20.6), lasting ~59.5 hours.

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

2007-01-04T15:34:39.000Z	149.1339	F	Automatic TM processing.
2007-01-05T01:16:56.000Z	149.1183	F	Automatic TM processing.
2007-01-06T10:08:27.000Z	149.0762	F	Automatic TM processing.
2007-01-06T15:22:04.000Z	149.0598	F	Automatic TM processing.
2007-01-07T04:27:25.000Z	149.0138	F	Automatic TM processing.
2007-01-08T00:58:47.000Z	148.9922	F	Automatic TM processing.
2007-01-09T15:10:20.000Z	148.9843	F	Automatic TM processing.
2007-01-10T03:31:58.000Z	148.9570	F	Automatic TM processing.
2007-01-12T15:00:36.000Z	148.9189	F	Automatic TM processing.
2007-01-13T05:27:41.000Z	148.8958	F	Automatic TM processing.
2007-01-14T00:40:15.000Z	148.8601	F	Automatic TM processing.
2007-01-15T14:43:47.000Z	148.8404	F	Automatic TM processing.
2007-01-16T05:15:49.000Z	148.8040	F	Automatic TM processing.
2007-01-18T07:08:02.000Z	148.7579	F	Automatic TM processing.
2007-01-18T14:34:11.000Z	148.7270	F	Automatic TM processing.

This report was generated Fri Jan 19 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, 13/01/2007 –19/01/2007

AOCS operations were executed from the Automatic Timeline.

During this period, 91 Open Loop Slews, 111 Closed Loop Slews and 6 Momentum Biases were executed.

3 slews (CSL) were missed from the TL during the observation period, due to problems with few particular attitudes (sparse stellar fields and attitude constraints violation), that prevented the correct execution of the attitude determination process on FDS and consequent fail of slew update TL.

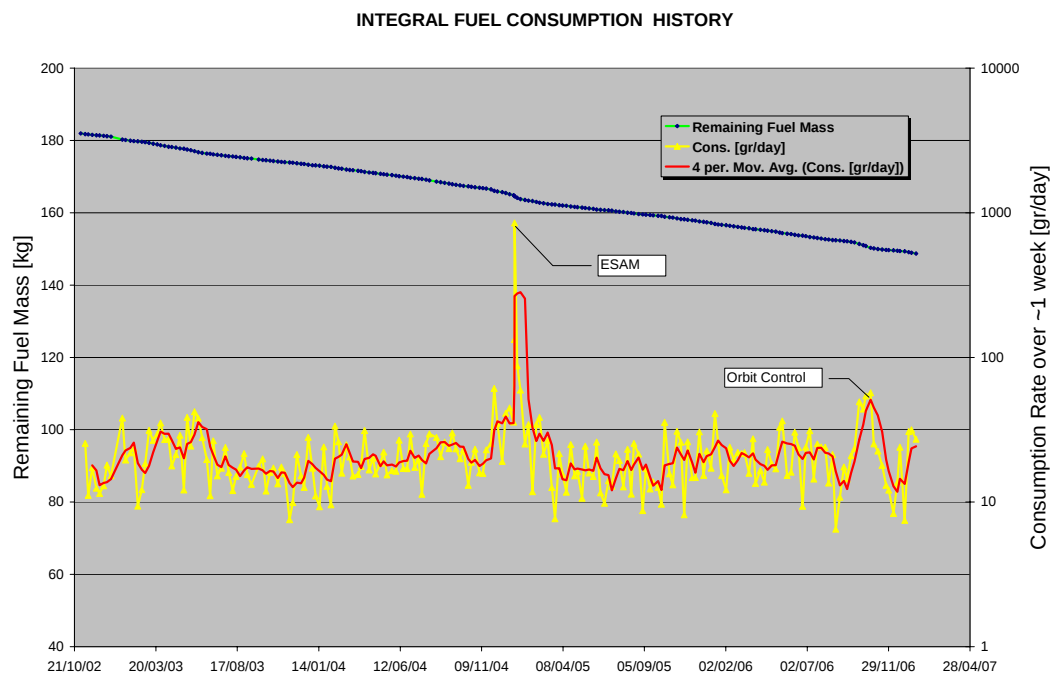
This is equivalent to a $\sim 1.5\%$ of the total number of slews (203)

Orbit Control

No update.

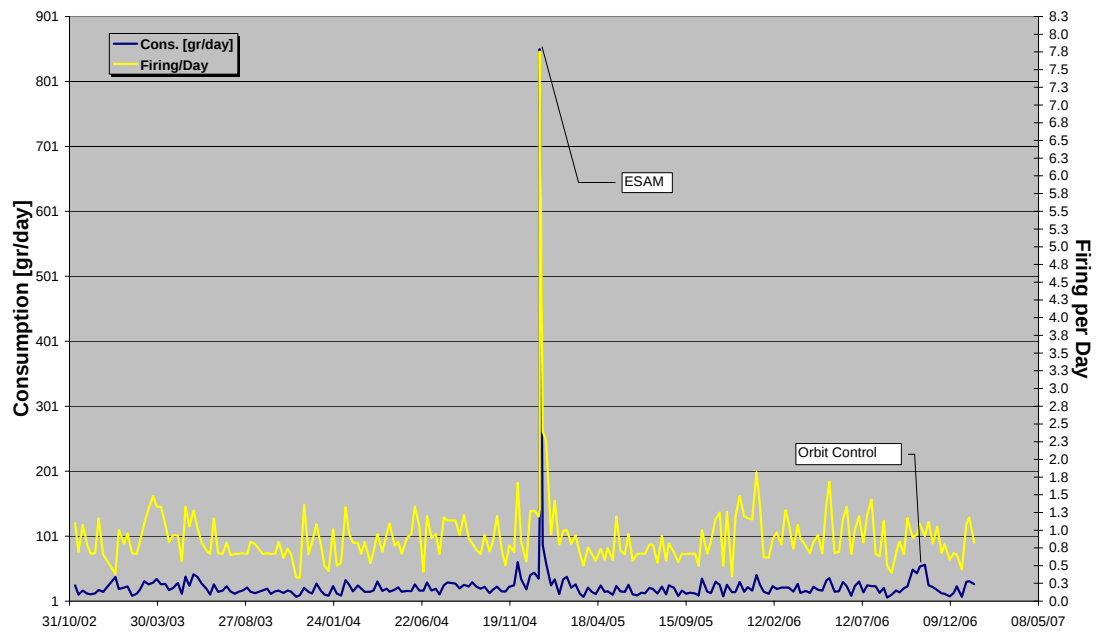
Fuel consumption

The fuel consumption (total, grams/day) over the period between 01/11/2002 and 18/01/2007 is reported in the plot below.



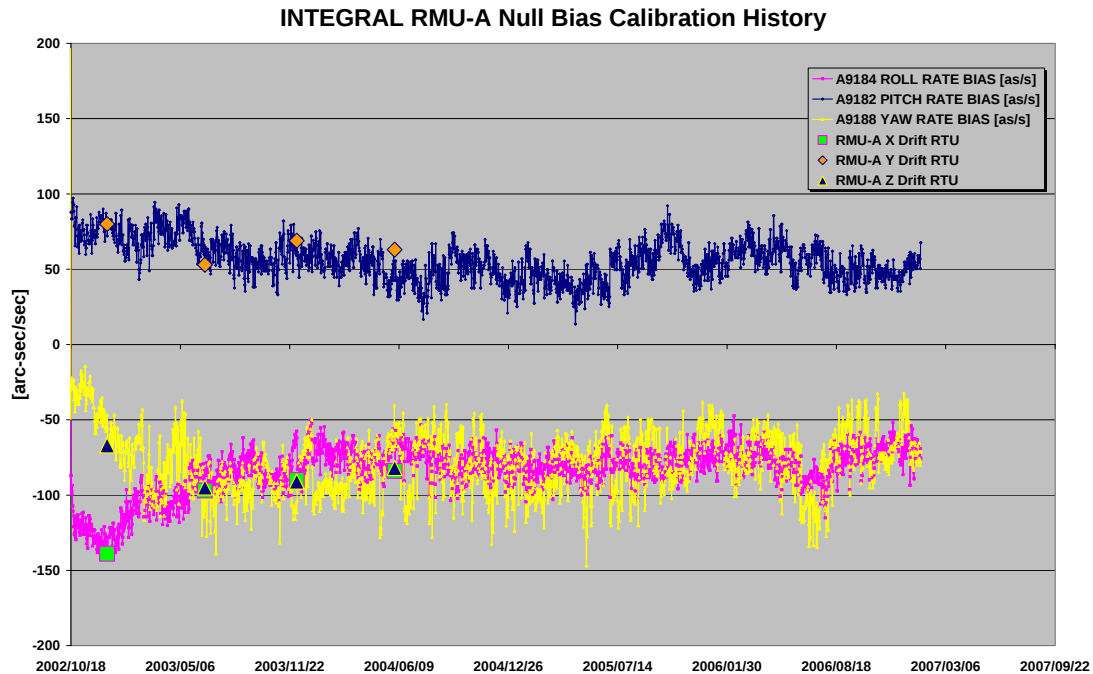
The firing/day over the period between 01/11/2002 and 18/01/2007 is reported in the plot below.

INTEGRAL FIRING PER DAY HISTORY

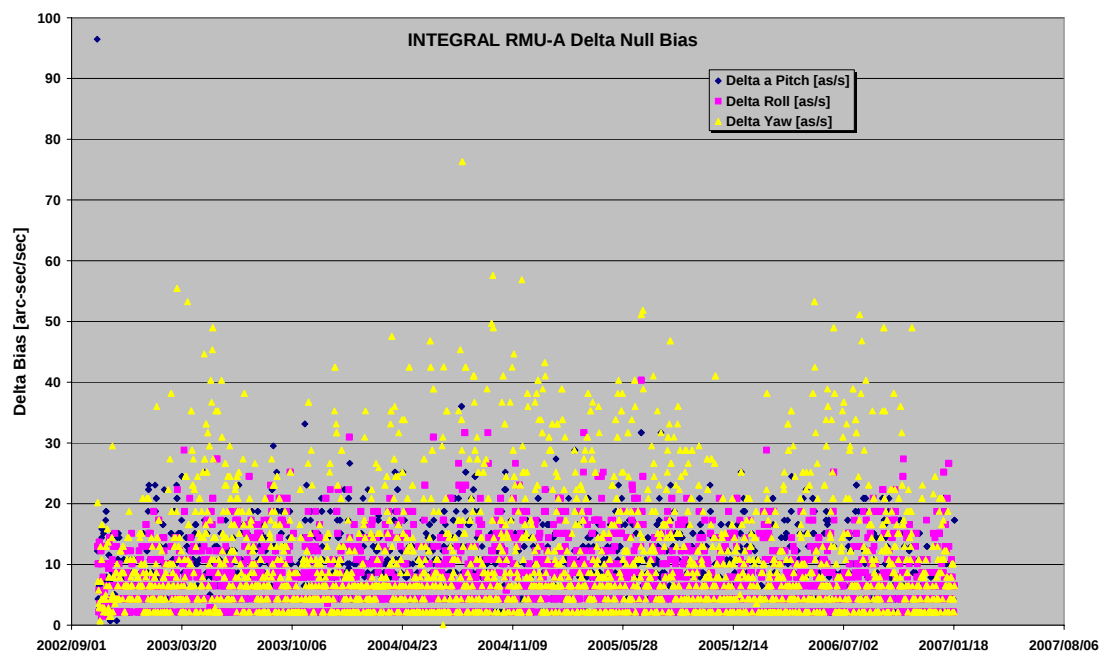


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 19/01/2007 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 19/01/2007 is reported in the plot below



13/01/07 (Day of Year 013, Revolution 519)

FDS failed slew update: at 06:49z due to the particular attitude (RA 13:43:07.38 DEC -33:42:36.8 POS 109:05:22.7), the FDS failed to update slew ID 05190023 (CSL)

No suitable guide star was found for the CSL update. Guide stars have been excluded from being suitable for slewing after a failed blemish pixel test.

A manual recovery was then performed from attitude of PID 05190022 to the attitude of PID 05190023. The next slew was manually updated in TL and the AOCS enabled in TL at 07:39z.

The following slew was not executed form TL: 05190023(CSL).

14/01/07 (Day of Year 014, Revolution 519)

Nothing to report

15/01/2007 (Day of Year 015, Revolution 519-520)

Nothing to report

16/01/2007 (Day of Year 016, Revolution 520)

Nothing to report

17/01/2007 (Day of Year 017, Revolution 520)

FDS failed slew update: at 00:46z due to an attitude constraints violation (RA 20:14:55.34 DEC -80:59:15.4 POS 354:20:41.2), the FDS failed to update slew ID 05200051

The update job, on FDS, flagged a constraint violation (earth occultation) right at the beginning of the next pointing, valid only for short time (few secs). This is a border line case where the orbit update between EPOS generation and TPF update shifted the constraint slightly. When the operator performed a recovery the shifted timing solved the constraint violation problem.

A manual recovery was then performed from attitude of PID 05200050 to the attitude of PID 05200051. The next slew ID 05200052 was manually updated in TL and the AOCS enabled in TL at 01:58z.

The following slew was not executed form TL: 05200051(CSL).

Problem on links to REDU: at 16:46z due to a problem on the TM link to REDU, the slew ID 05200075 failed release.

A manual recovery was then performed from attitude of PID 05200074 to the attitude of PID 05200076. The next slew ID 05200077 was manually updated in TL and the AOCS enabled in TL at 17:28z.

The following slew was not executed form TL: 05200075(CSL).

18/01/2007 (Day of Year 018, Revolution 520-521)

Nothing to report

19/01/2007 (Day of Year 019, Revolution 521)

FDS failed slew update: at 06:07z due to the particular attitude (sparse stellar field, RA 12:08:14.40 DEC +39:45:05.9 POS 088:37:39.6), the FDS failed to update slew ID 05210018 (OSL)

The observation was performed in a sparse star field. The attitude determination could not find the required minimum number of 4 matching stars and therefore the attitude determination process was aborted.

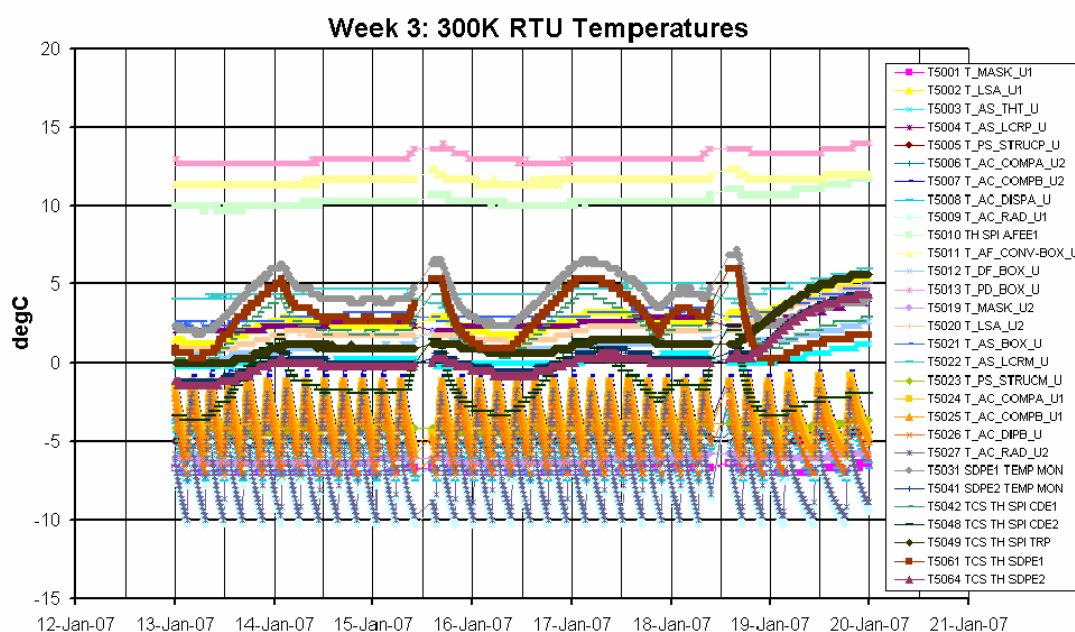
The FD support was called in. An evaluation of the current attitude error, wheels speeds and next slew (05210018) magnitude (~2 deg), gave good indication to let the slew 5210018 running with the parameters as defined originally in TL (i.e. without update).

The next slew ID 05210019 was automatically and correctly updated in TL and no pointing was lost.

No impact reported in TL.

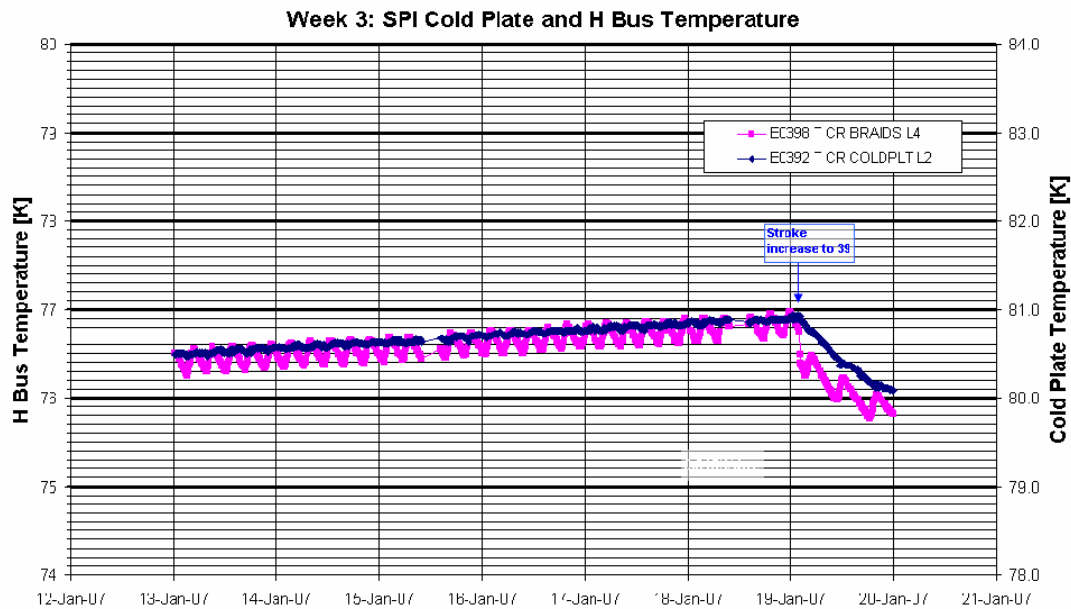
8.3.2 SPI Operations

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 to 80K +/-1K.

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



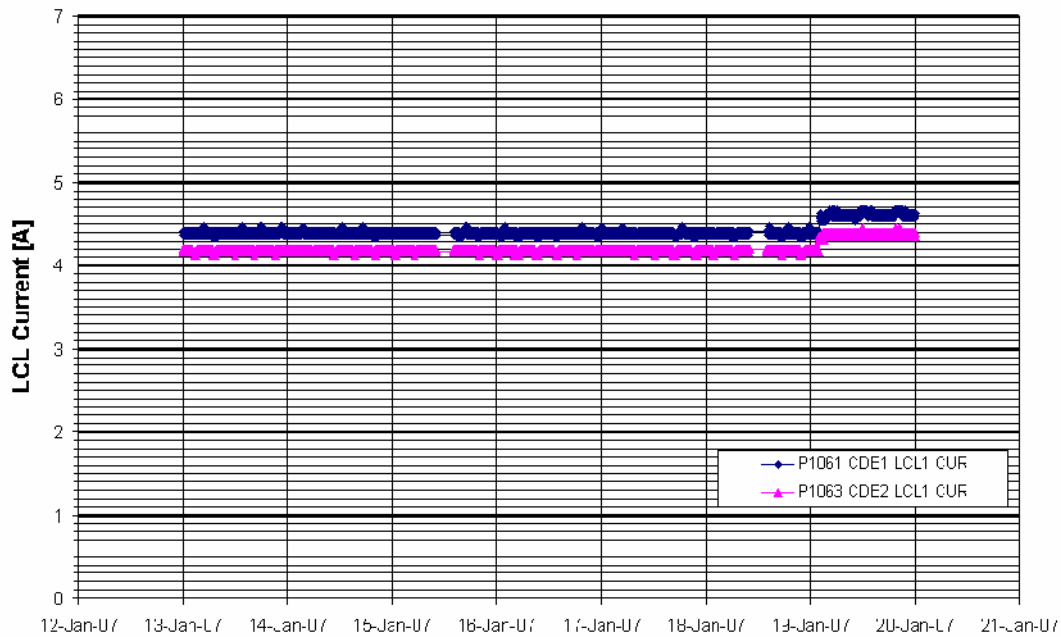
The stroke of all four compressors was set at 38 at the start of the week and increased to 39 on 2007-01-19 at 02:00Z, as the Cold Plate temperature, E0392, had reached 80.9K.

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

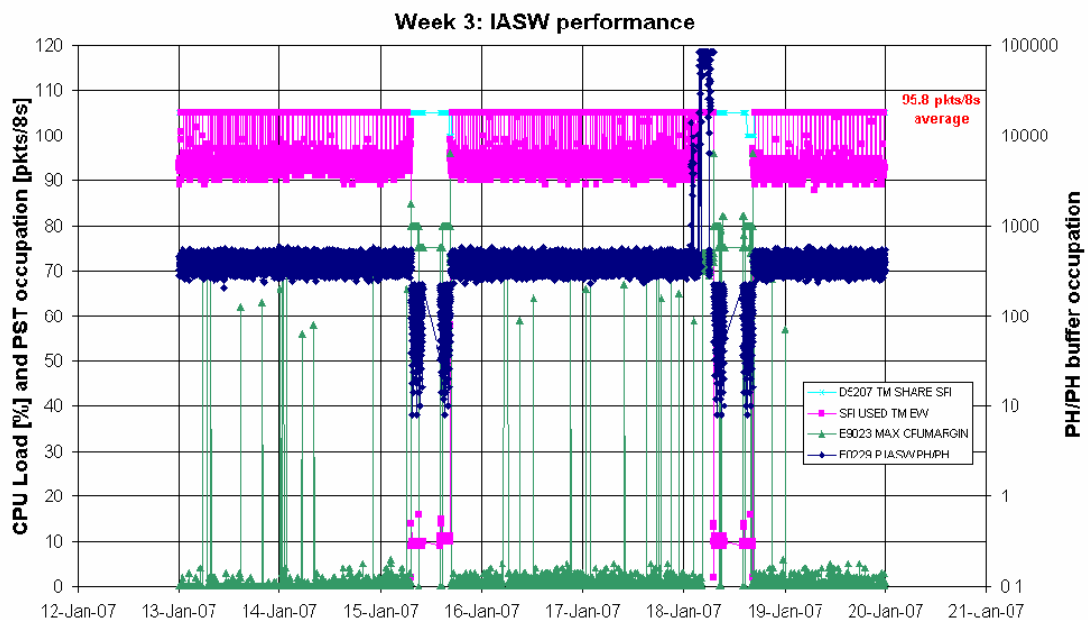
- Average CDE1 LCL Current = 4.43A
- Average CDE2 LCL Current = 4.20A

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

Week 3: SPI CDE1 and CDE2 LCL Currents

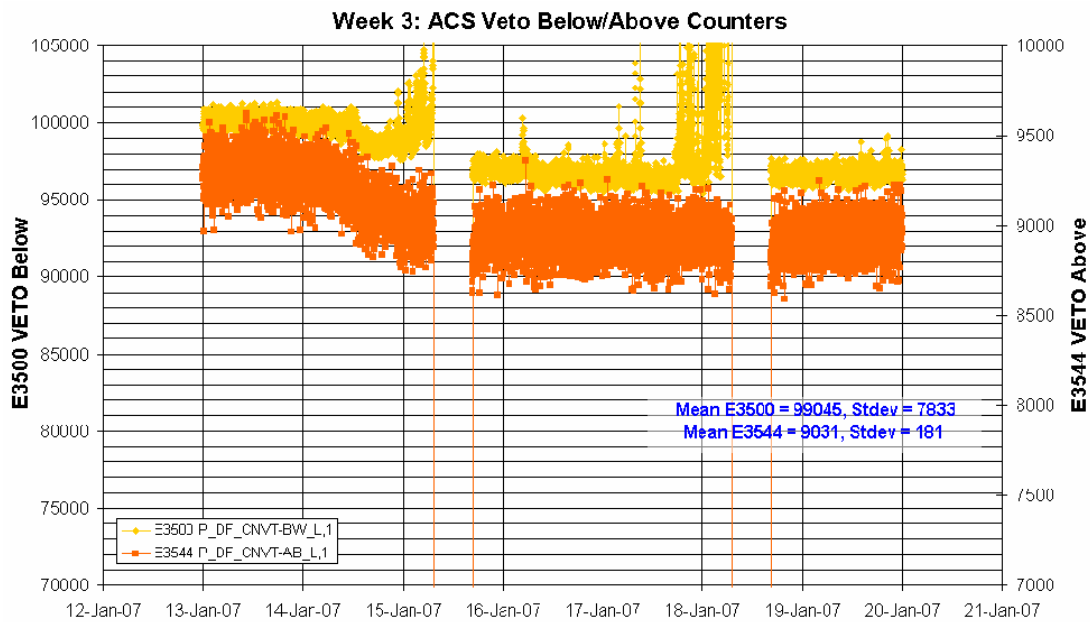


DPE & IASW: The DPE health and IASW performance is nominal. The current IASW version installed is 432. The average TM bandwidth occupation of SPI was 95.8 packets/cycle over the science window, when the TM allocation was 105 packets/cycle. The following plot shows the IASW performance in terms of TM 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).

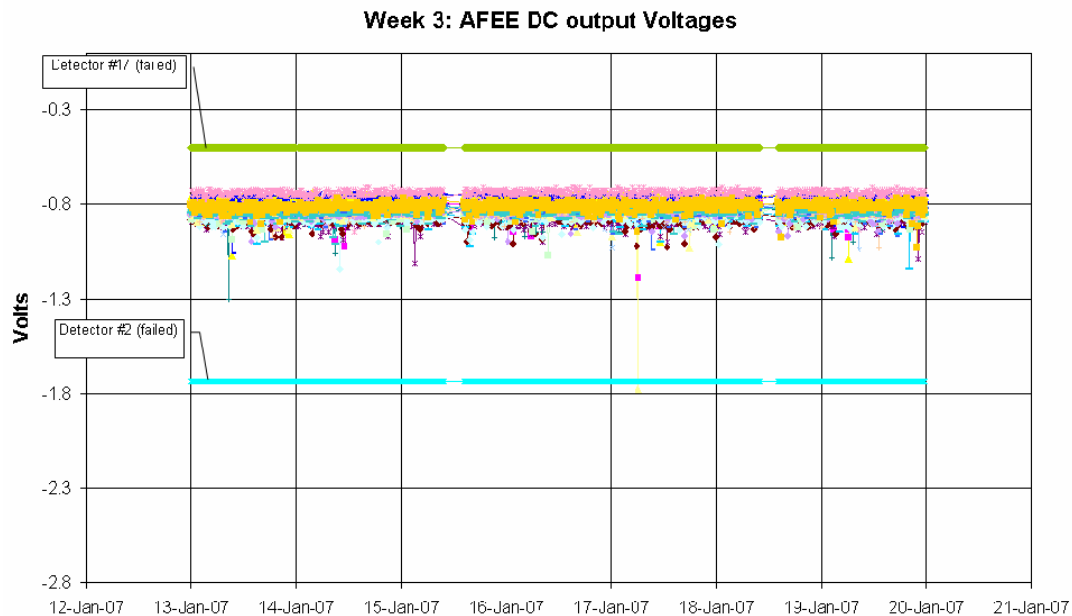
The following plot shows the ACS overall count rate evolution during the reporting period:



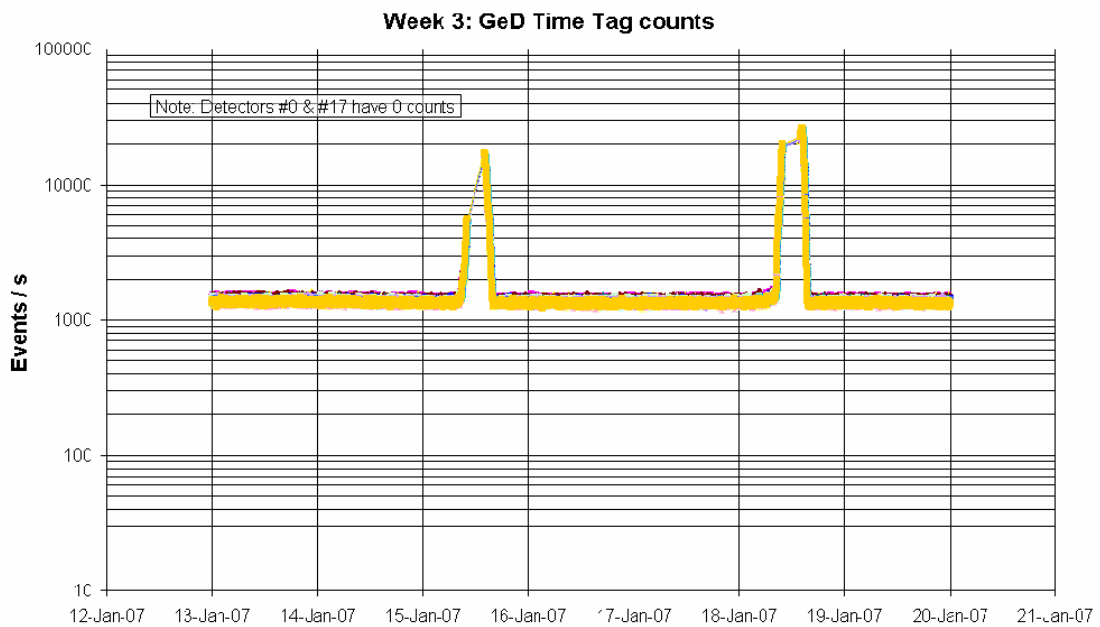
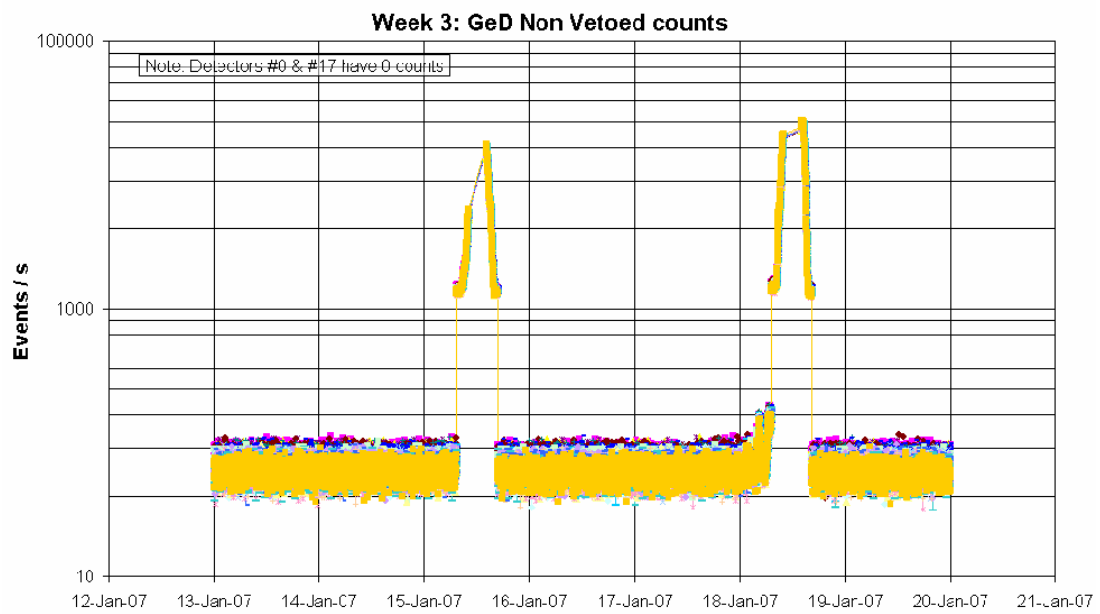
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution. The energy resolution of GeD#4 was recovered with the last annealing.

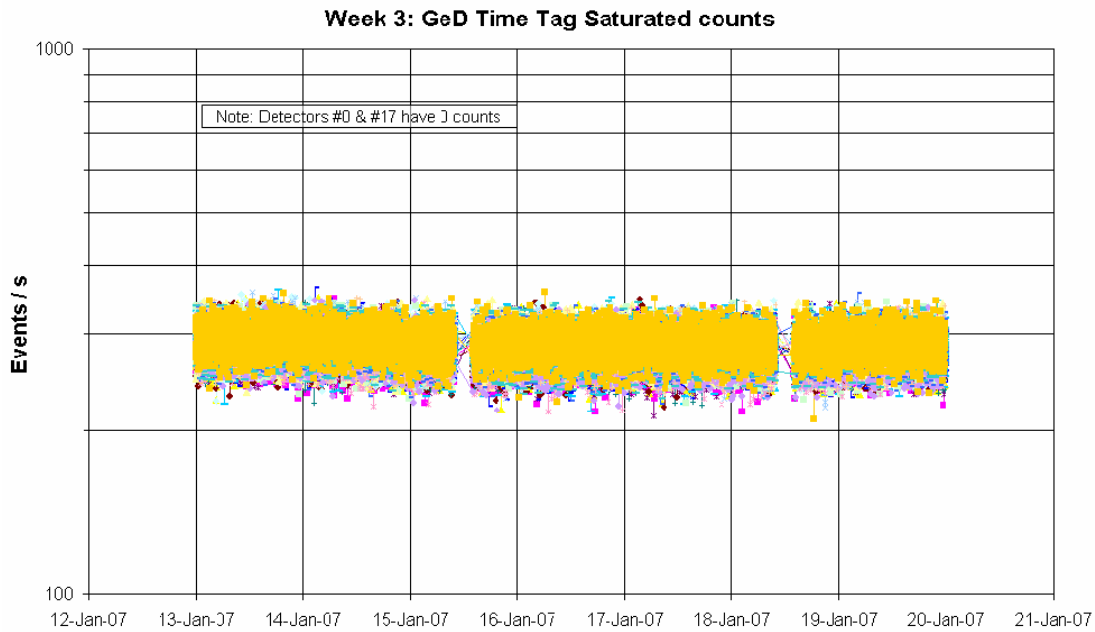
The GeD#12 HV remained at 3.5kV throughout the reporting period.

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

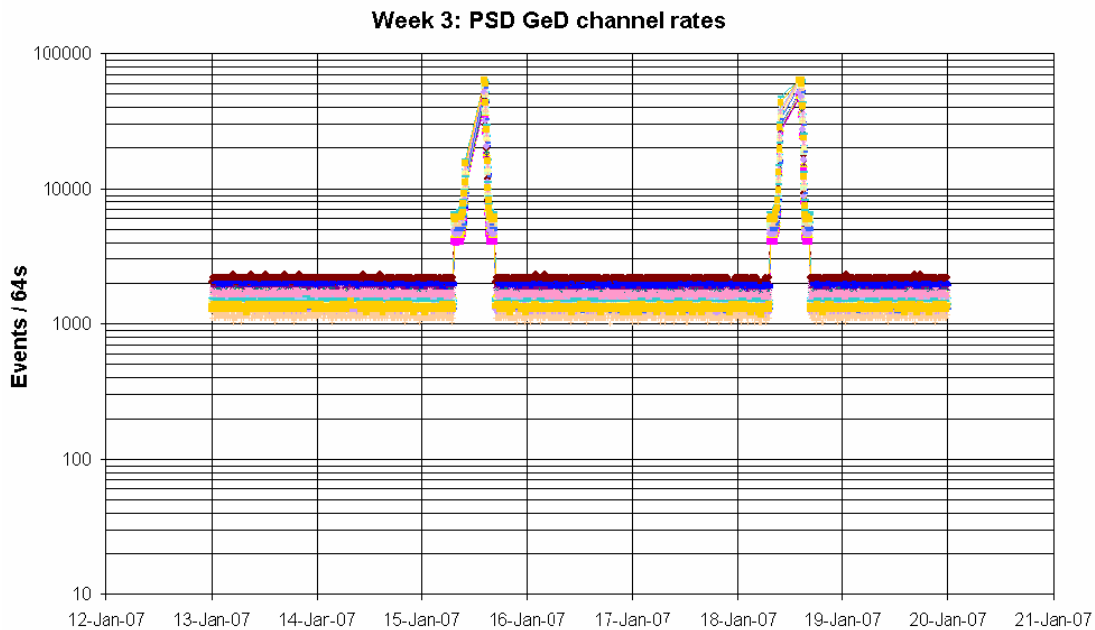


DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.





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 2007-01-14 at 18:32:27Z the TM parameter E2352 went OOL (value = PARAM > SPEC). This is the ACS FEE -5 V analogue status #2. It returned within limits when the next packet was received at 18:43:07Z.
- On 2007-01-15 at 07:11:54Z the TM parameter E3500 P_DF_CNVT-BW_L started going OOL High. This was ~10 minutes before radiation belt entry of revolution 519 and therefore no action was taken.
- On 2007-01-17 at 20:41:22Z the TM parameter E3500 P_DF_CNVT-BW_L went OOL High, returning within limits at 20:44:26Z. It started toggling OOL

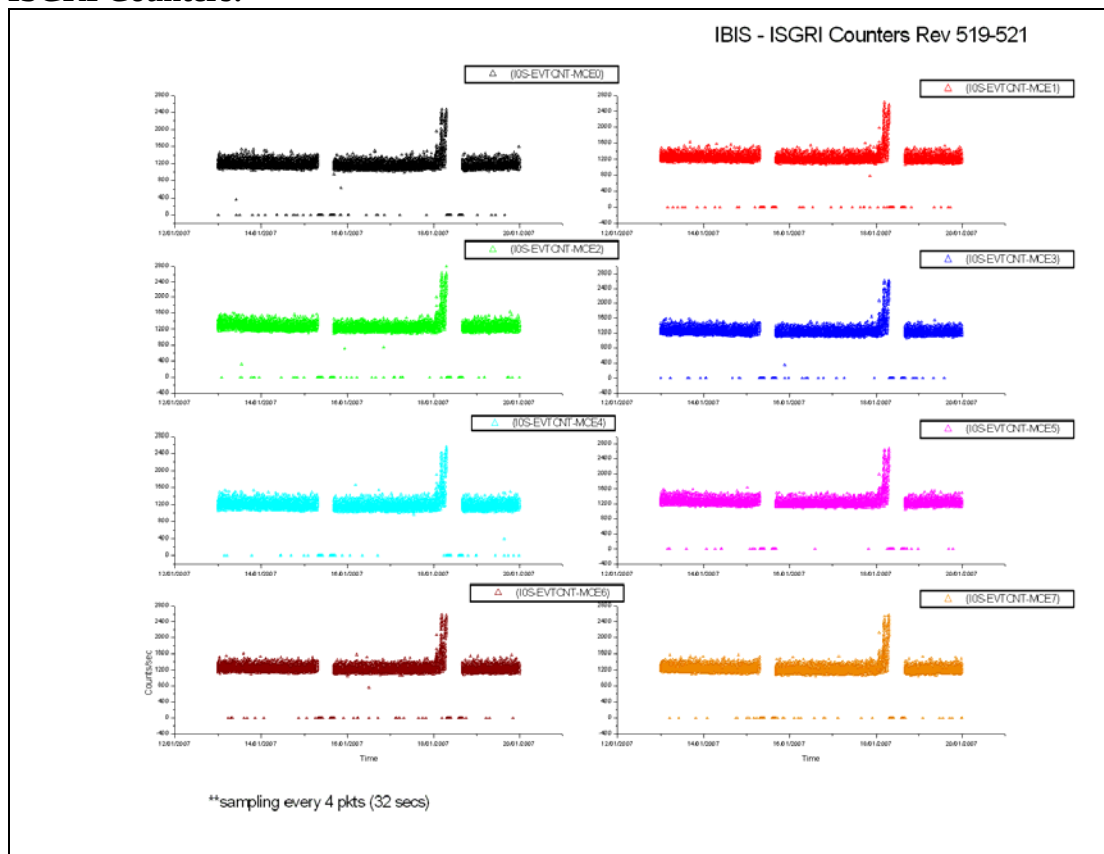
High again on 2007-01-18 at 01:22:26Z. This was ~5.5 hours before radiation belt entry of revolution 520. No action was taken.

- On 2007-01-18 at 09:37:13Z OEM APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the LOS_CHK window of revolution 520, when the SPI1 DPE time verification TC was sent. This OEM is sometimes received when this TC is sent and no action was taken.
- 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.

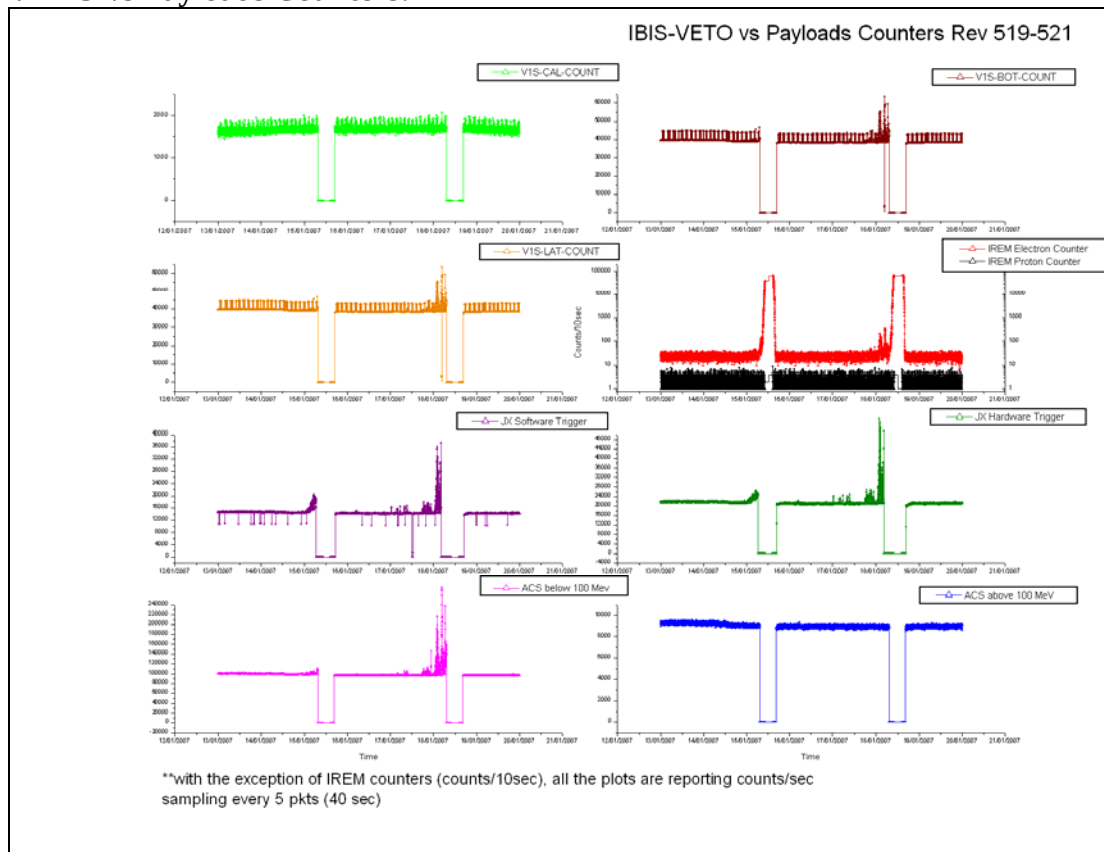
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

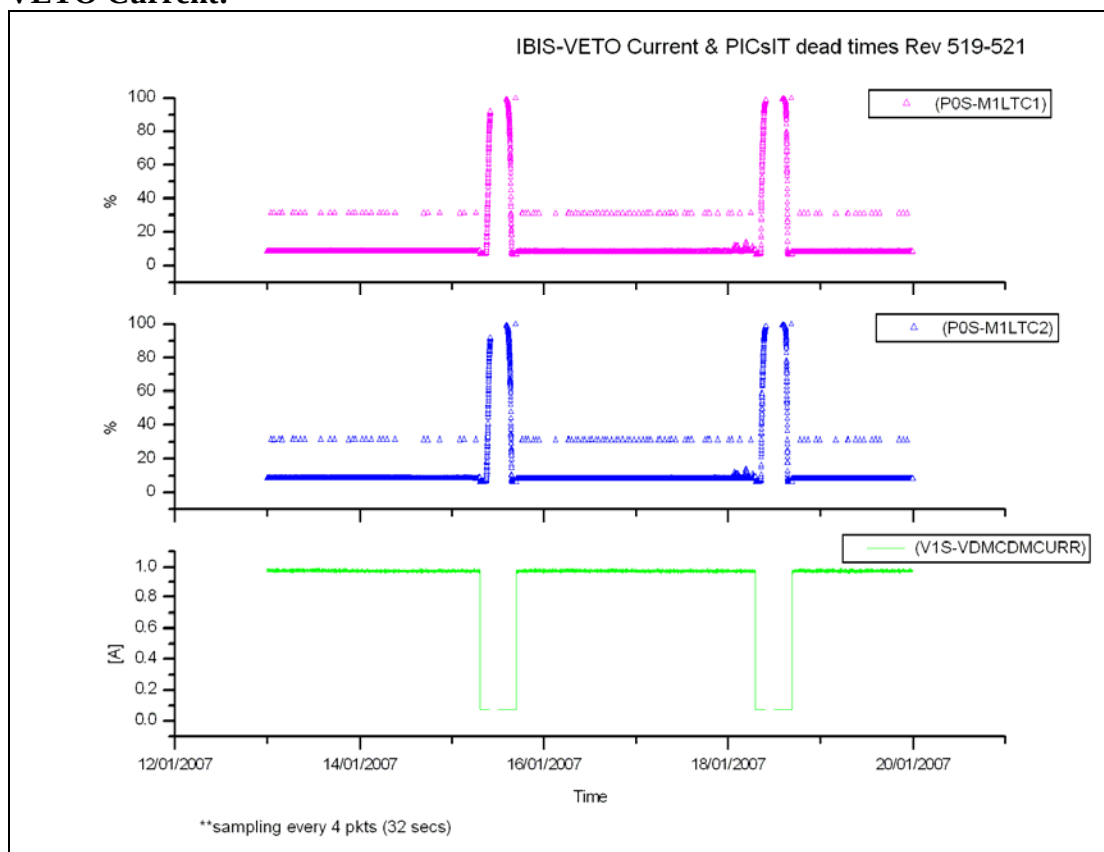


VETO vs Payloads Counters:

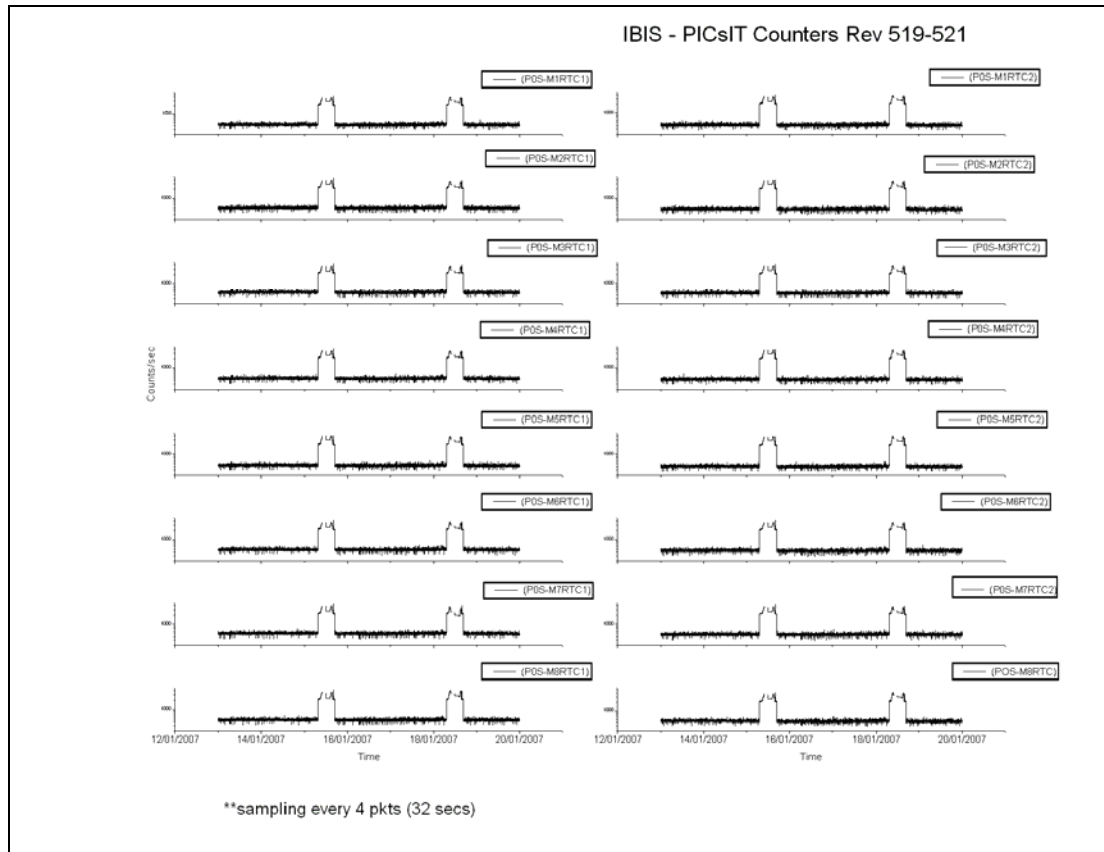


The week was characterised by low radiation.

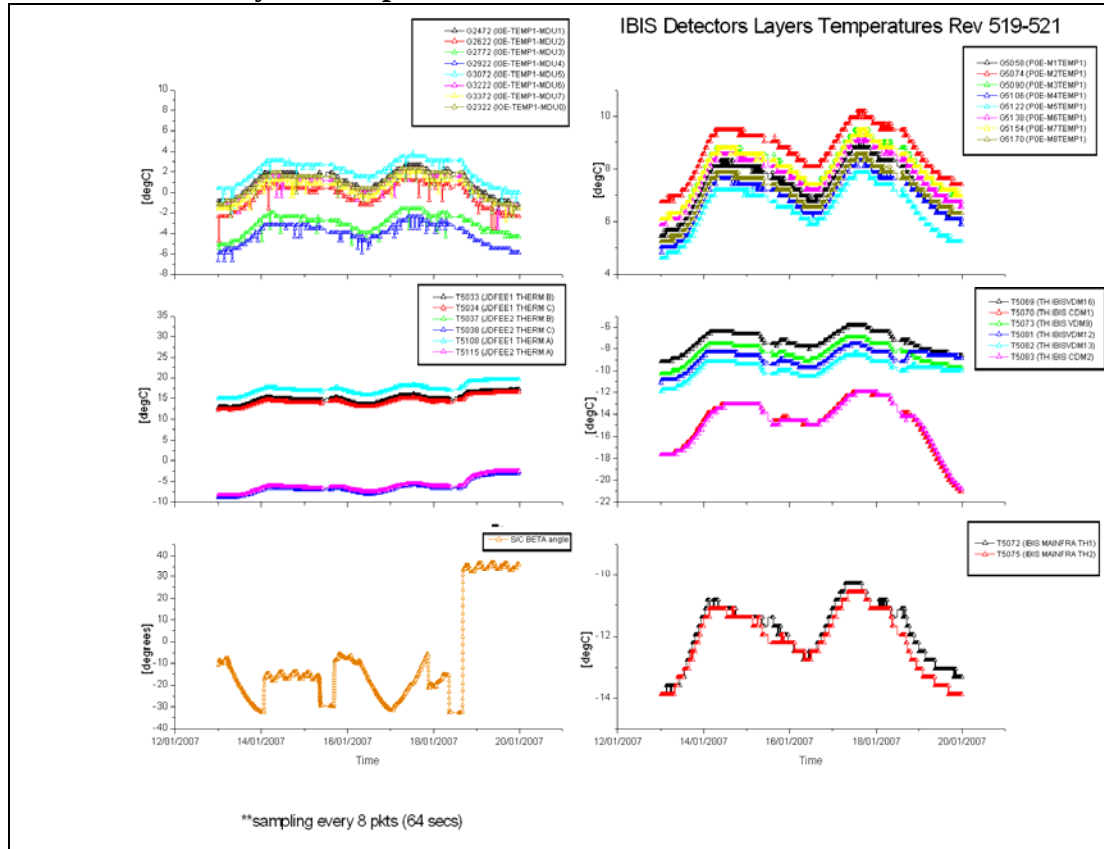
VETO Current:



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 2007.017 (17/01/2007):

At 12:01Z IBIS was put in Stand-By mode following the Operational Request #277 for the on board time wrap-around activity. The time wrapped around at 12:23Z. The CCCF_ED was enabled in the timeline and at 12:44Z IBIS was sent back to Scientific Standard mode.

Following the OR, the operator then sent a report command to get the IBIS synchronised time. However as IBIS was in Science mode, it did not work. At 13:49Z, IBIS was sent to Stand-By mode, the report packet was received and the on-board time was successfully checked. At 13:51Z IBIS was sent back into Scientific Standard mode.

DoY 2007.018 (18/01/2007):

From 01:36 and until the Radiation Belts entry at 07:10Z, TM parameter G8080 (S1E-VS_HBRA-RT) was toggling OOL High. During the same period TM parameters G6062 (V1S-BOT-COUNT) and G6063 (V1S-LAT-COUNT) were also reported toggling OOL High. At 06:38Z TM family G2013 (I0S-EVTCNT-MCEi) was reported OOL High.

All these events are related to high radiation as the S/C was approaching the Belts. No action was taken as per FDIR.

DoY 2007.018 (18/01/2007): **PICsIT Time-Out**

At 04:14Z, the following OEM APID 1280 ID 133 CLASS 2 was reported:

"IBIS1 IASW LSL TRANSFER FAILED (LOW LEVEL)"

together with OEM APID 1280 ID 131 CLASS 2:

"IBIS1 IASW LSL TRANSFER FAIL REPORT FOR HIGH-LEVEL MODULE RESET".

This anomaly is similar to the previous ones that flagged a Time-Out in several peripherals and that refer to the anomaly report INT_SC-113. This time, according to G1581 (parameter of OEM ID 131), the anomaly occurred with PICsIT.

Summarising, IBIS incurred a timing problem on the Low Speed Line that affected the communication with the peripheral. During this time, a request for HK1 was sent to PICsIT without any answer due to a black out in communication between the peripheral and the DPE. The IASW flagged the non-generation of HK1 from PICsIT as an on-board rejection (time-out) of the internal TC indicated in the OEM body. During this time no valid HK was collected from PICsIT therefore, what was reported in the HK1 was simply the IASW default (i.e all 0000...). This is confirmed by the reading of some TM parameters reporting the raw value 0. The unit solved

autonomously the internal conflict on the LSL and reported the valid HK1 for PICsIT in the next cycle. No further action was requested as per recovery action I-REJ-1.

DoY 2007.018 (18/01/2007): MCE3 Time-Out

At 05:13Z, the following OEM APID 1280 ID 133 CLASS 2 was reported:

"IBIS1 IASW LSL TRANSFER FAILED (LOW LEVEL)"

together with OEM APID 1280 ID 131 CLASS 2:

"IBIS1 IASW LSL TRANSFER FAIL REPORT FOR HIGH-LEVEL MODULE RESET".

These 2 OEMs were followed after few seconds by OEM APID1280 ID 222 CLASS 3:

"IBIS1 MCE3 TIME OUT",

the numbering system in the OEM goes from 0 to 7, this OEM indeed concerns HW MCE4.

This anomaly is similar to the previous ones that flagged a Time-Out in several peripherals and that refer to the anomaly report INT_SC-113. This time, according to G1581 (parameter of OEM ID 131), the anomaly occurred with ISGRI MCE3.

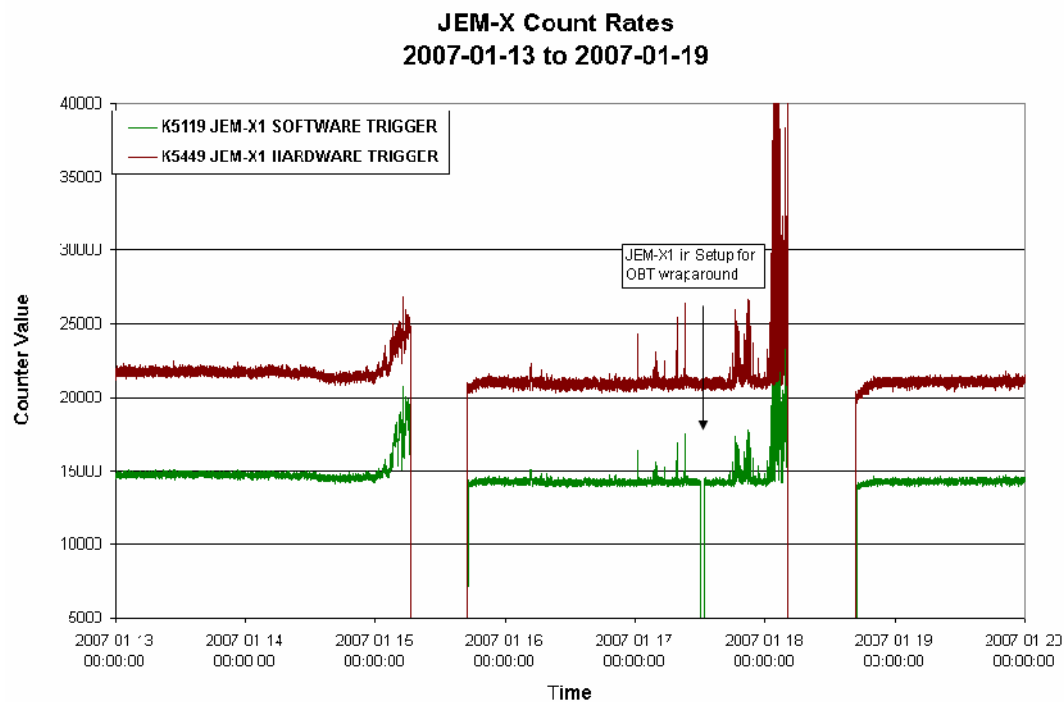
Summarising, IBIS incurred a timing problem on the Low Speed Line that affected the communication with the peripheral. During this time, a request for HK3 was sent to the MCE3 without any answer due to a black out in communication between the peripheral and the DPE. The IASW flagged the non-generation of HK3 from MCE3 as an on-board rejection (time-out) of the internal TC indicated in the OEM body. During this time no valid HK was collected from MCE3 therefore, what was reported in the HK3 was simply the IASW default (i.e all 0000...). This is confirmed by the reading of some TM parameters reporting the raw value 0. The unit solved autonomously the internal conflict on the LSL and reported the valid HK3 for MCE3 in the next cycle. No further action was requested as per recovery action I-REJ-1.

8.3.4 JEM-X Operations

JEM-X Count Rates

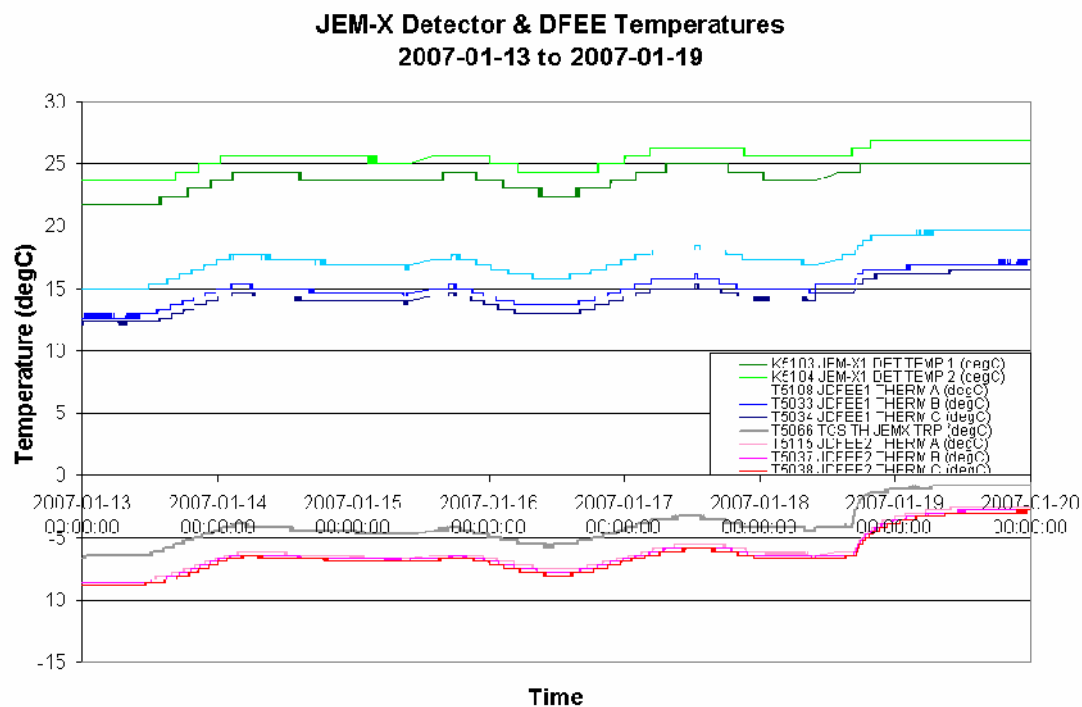
JEM-X count rates over the reporting period are displayed in the following graph¹.

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.



² Data sampled (1 frame in 8)

JEM-X Daily Report

2007-01-13 (DOY 013, Rev 519) to 2007-01-16 (DOY 016, Rev 520)

JEM-X1 operations executed nominally.

2007-01-17 (DOY 017, Rev 520)

Due to the wraparound of the DPE LOBT, at 12:22Z, JEM-X1 was commanded to Setup mode at 12:01:17Z. It was put back in Data Taking via the CCCF_ED KEDATA02 in the Timeline at 12:45:10Z. A SATENG window had been scheduled during this time so as not to impact science observations.

2007-01-18 (DOY 018, Rev 520-521)

Due to high background radiation conditions, at 01:06:38Z the TM parameter K5449 HARDWARE TRIGGER started toggling OOL High and at 01:37:02Z K5136 BUFFER LOSS also started toggling OOL High. At 01:56:30Z K5119 SOFTWARE TRIGGER also began to toggle OOL High and at 04:12:49Z JEM-X1 made an autonomous transition to Safe mode, triggered by the Software Ratemeter. Two occurrences of OEM 189 JEM-X1 PROB DFEE 9 (Unexpected DFEE state reported in housekeeping) was received at this time, as the TM parameter K5462 DFEE STATE IASW was reporting state Setup while K5022 DFEE STATUS was Safe. When the ED KESAFE02 was sent from the Timeline at 06:15:10Z K5462 DFEE STATE IASW went to Safe as well and OEM 254 ERROR OFF was received.

JEM-X1 operations continued nominally.

2007-01-19 (DOY 019, Rev 521)

JEM-X1 operations executed nominally.

8.3.5 OMC Operations

2007-01-13 (DoY 013, Rev 519)

At 06:49, problems with the AOCS caused the loss of pointing 05190023. It was at this time the following commands were rejected:

2007.013.07.20.19.947	2007.013.07.20.25.597	1792	RealTime	131	TC REJECT	
REJECTED TC1			0	0	65535 PR	N
E E						
2007.013.07.20.26.072	2007.013.07.20.33.543	1792	RealTime	131	TC REJECT	
REJECTED TC1			0	0	65535 PR	N
E E						

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

2007-01-14 (DoY 014, Rev 519) to 2007-01-16 (DoY 016, Rev 520)

Nothing to Report

2007-01-17 (DoY 017, Rev 520)

At 00:46, the FDS failed to update the slew to attitude 05200051. This necessitated a manual recovery. The impact was a late start for that pointing, which was then shortened from a planned 1985 to 1104 seconds.

At 16:46, the TM links with Redu dropped causing the commanding to be suspended. A recovery was performed, and the Timeline rejoined at 17:28. The impact was the loss of pointing 05200075. It was at this time the following commands were rejected:

```
2007.017.16.50.20.919  2007.017.16.50.25.457  1792  RealTime  131  TC REJECT
REJECTED TC1          0          0  65535  PR    N
E    E
2007.017.16.50.27.169  2007.017.16.50.33.410  1792  RealTime  131  TC REJECT
REJECTED TC1          0          0  65535  PR    N
E    E
```

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

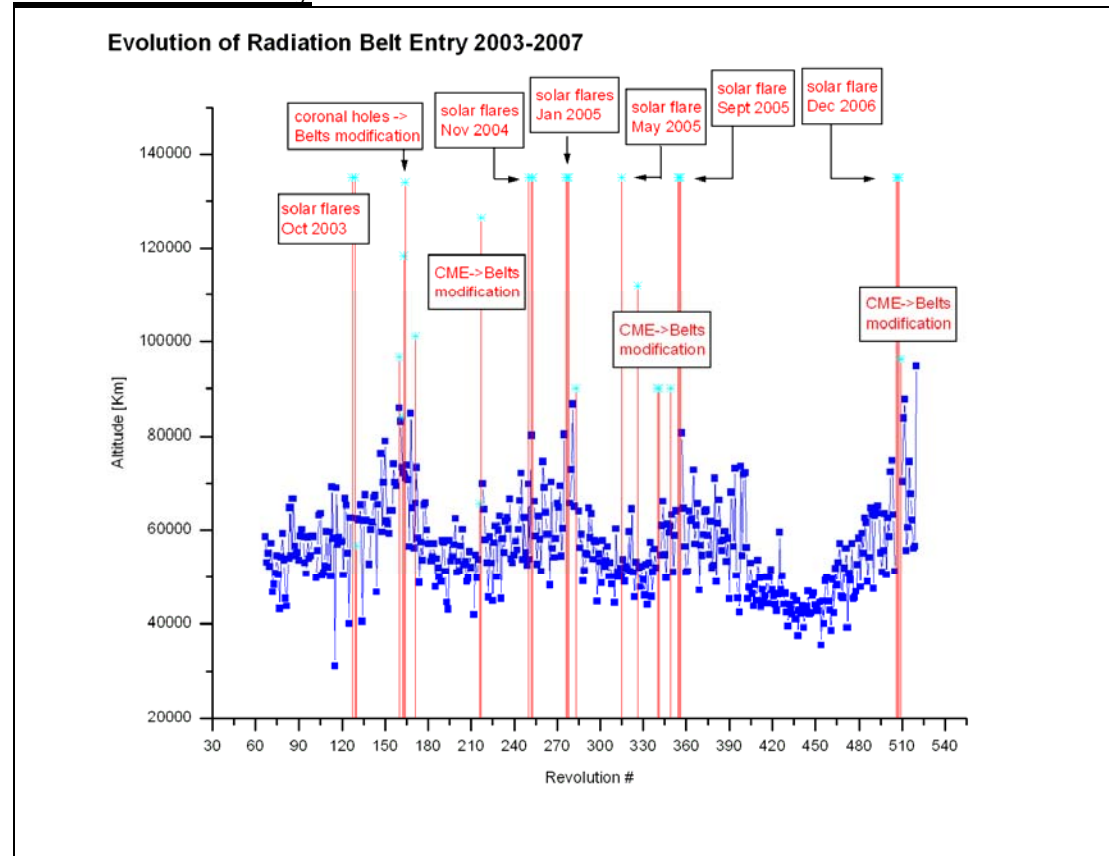
2007-01-18 (DoY 018, Rev 520) to 2007-01-19 (DoY 019, Rev 521)

Nothing to Report

On DoY 015 at 07:20:40 and DoY 018 at 07:10:32 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]
519	RAD_ENTR R 2007-01-15T07:20:38Z	2007-01-15 07:13:50	56566.4	2007-01-15 08:12:54	48530
520	RAD_EXIT R 2007-01-15T16:37:50Z	2007-01-15 15:45:50	<<42377.1	2007-01-15 16:12:54	41778
520	RAD_ENTR R 2007-01-18T07:10:25Z	2007-01-18 01:05:58	94801.8	2007-01-18 08:02:33	48625
521	RAD_EXIT R 2007-01-18T16:26:53Z	2007-01-18 15:35:50	37329.6	2007-01-18 16:02:33	41737

Reference

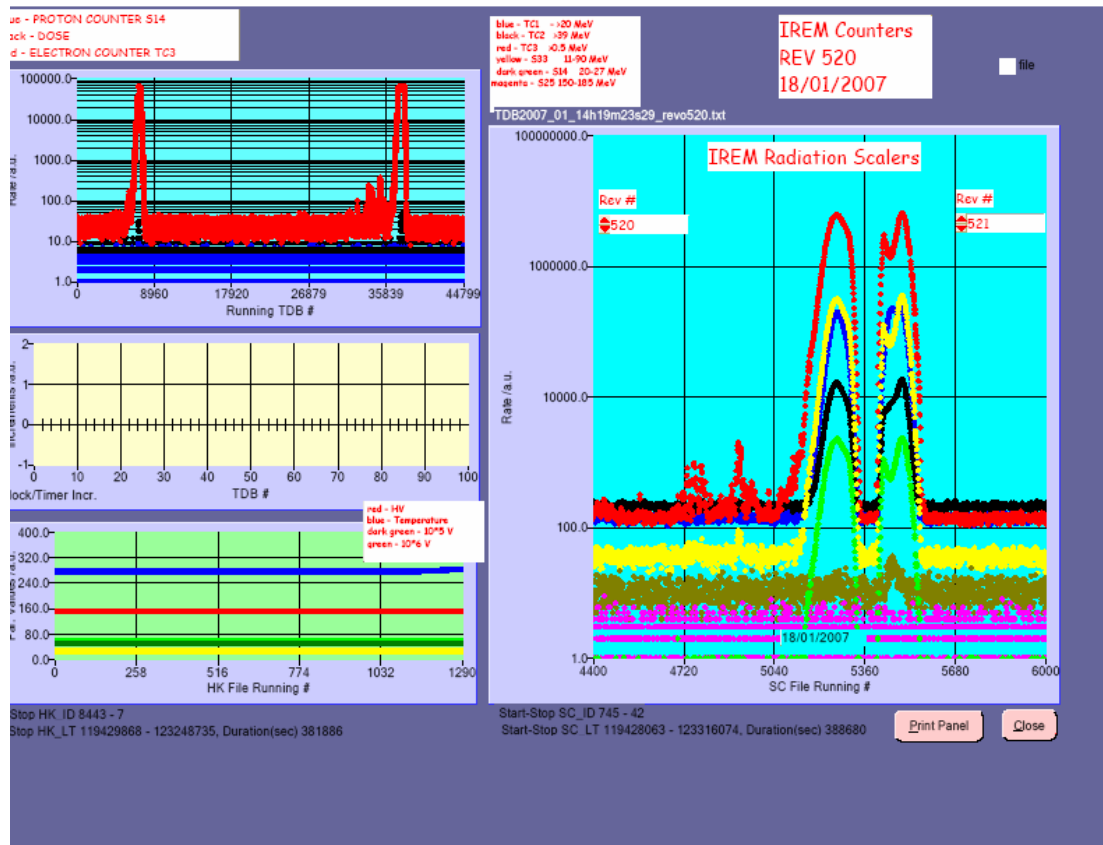
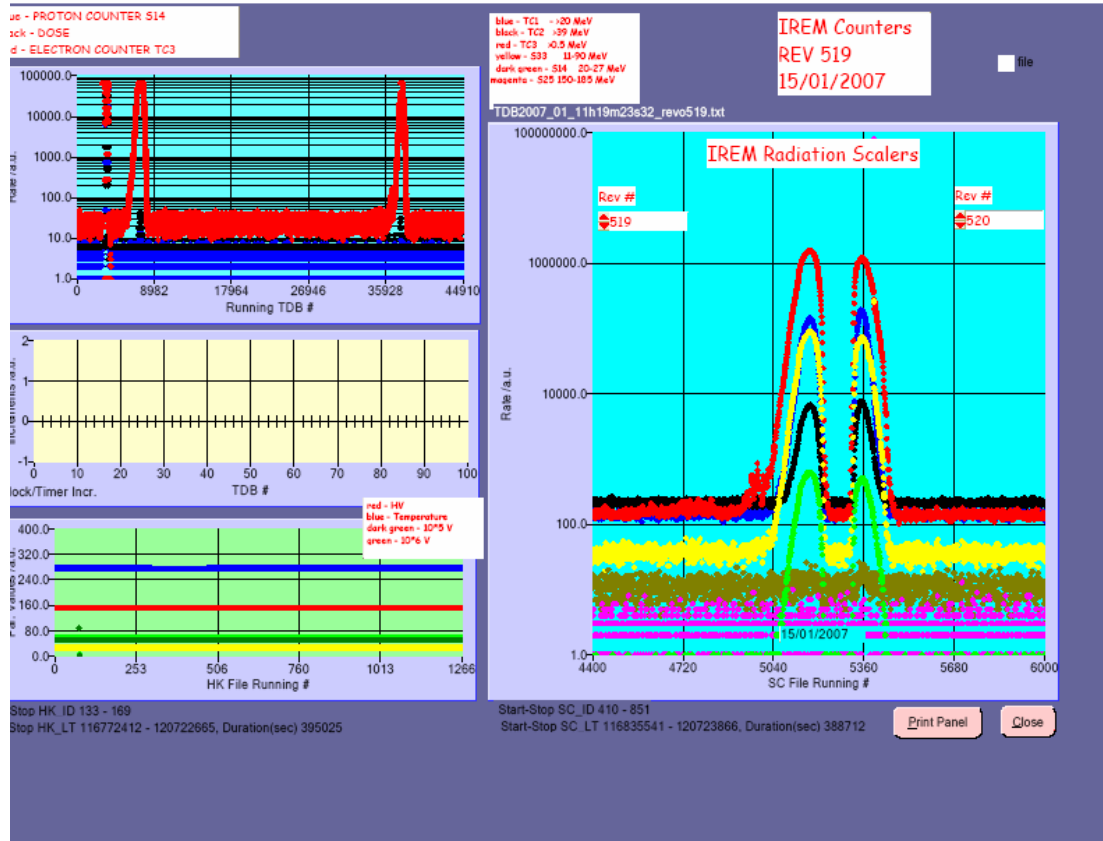
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

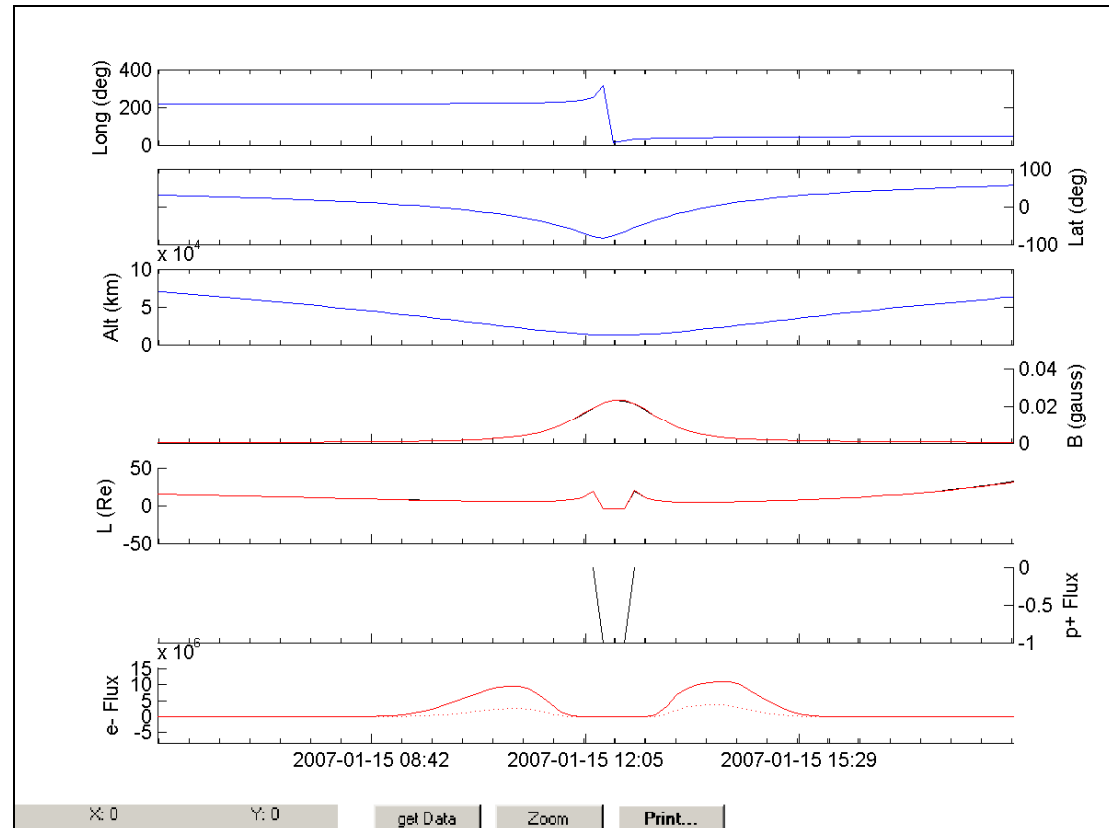
Radiation Spike

IREM radiation counters:

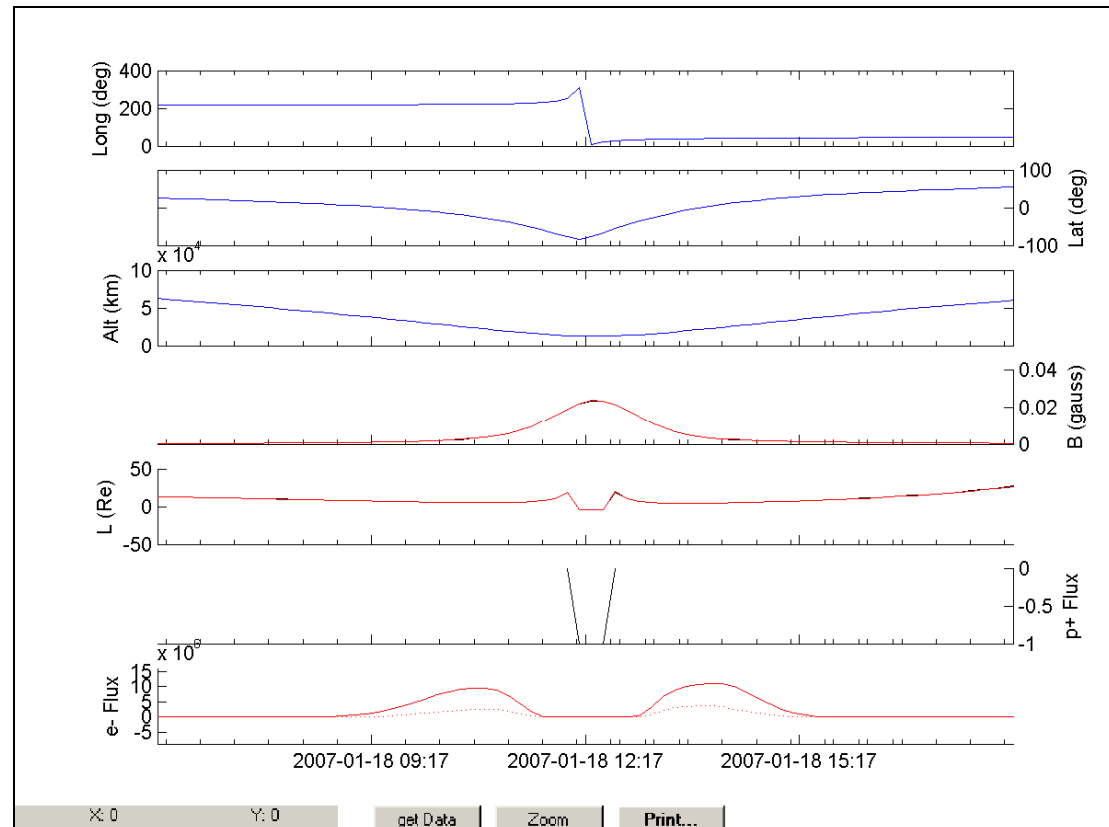


IREM Predicted Radiation Belt Passages

Rev 519

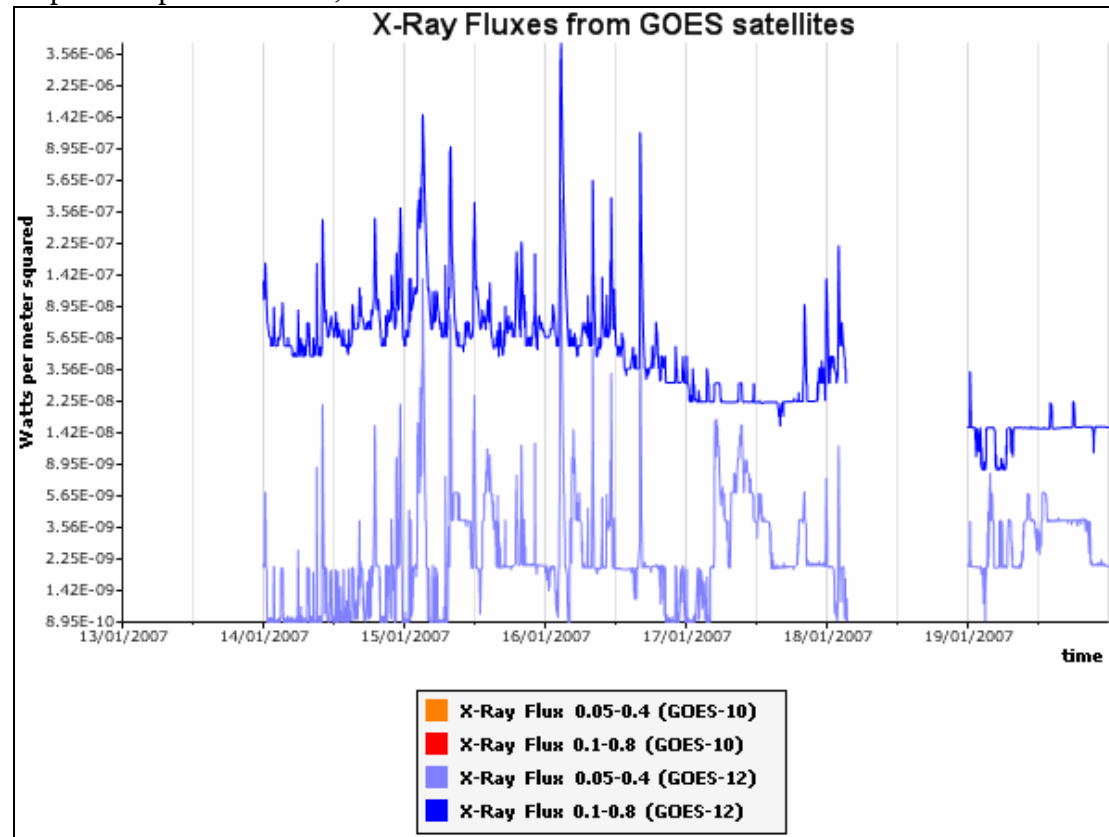


Rev 520

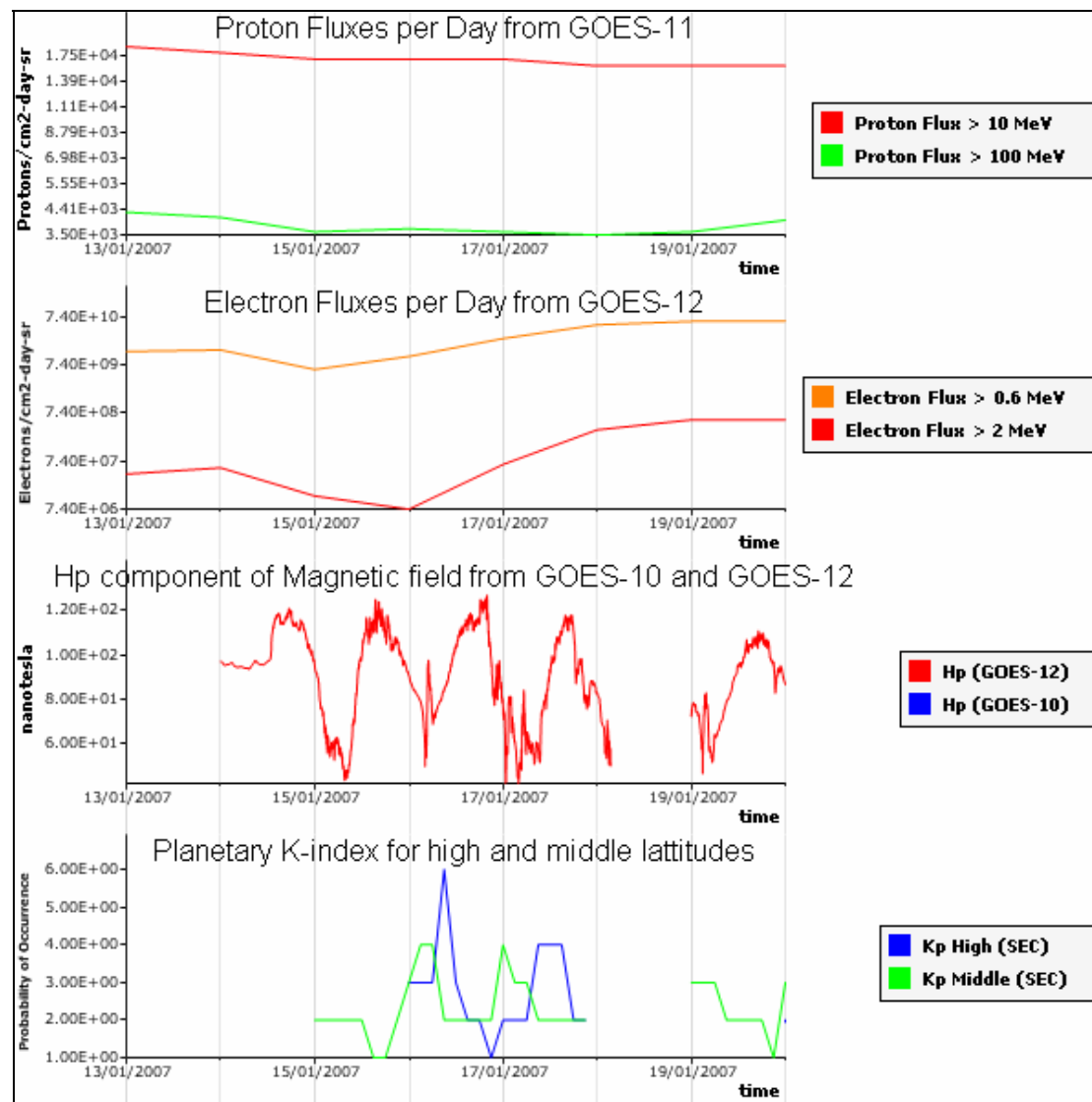


SEC-GOES Observed Particles Fluxes (using SEIS/RAT tool):

Gaps are reported in data, however the radiation was low this week.



X-Ray fluxes start to be significant over 10^{-5} W/m^2 (corresponding to M-class flares). Above 10^{-4} W/m^2 , they correspond to strong X-class flares.



Proton and electron flux report low radiation background.
 Hp component of the Geomagnetic Field is essentially parallel to the Earth's rotation axis. A drop near 0 nT is associated with a significant variation in the magnetic field.
 Kp index is based on ground magnetometers. Kp ≥ 5 features storm-level geomagnetic activity.