

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OAI
No. 283
Week 08
25.02.08
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 16.02.08 until 22.02.08 (both dates inclusive) and covers the revolutions 653 and 654.

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 Target of Opportunity: a raster dither of SN 2008S (RA 20:34:45.35, DEC +60:05:59.6), three raster dithers of the mid-latitude 1 region (RA 18:36:17.05, DEC -60:24:50.7), and an OMC Flat Field calibration at attitude (RA 14:32:00.00, DEC -16:00:00.0).

Note: Some further information concerning the activities is provided in the Appendix.

3 Satellite Status

3.1 Platform

The performance of the platform was good. No new unexpected behaviour / malfunction was identified.

3.1.1 AOCS

The AOCS operations were performed from the timeline during this period.

Two slews were missed from TL, during the observation period due to problems on TM link to REDU station and with an on-board Search and Track process.

Problems have been reported during the last period on FDS when generating the drift update for the RMU-A Yaw channel. The evolution of the drift on yaw channel is under constant monitoring but the values are still well within the specs.

The fuel consumption over the period between 15/02/2008 and 22/02/2008 was 0.0822 Kg. The remaining propellant is in the order of 142.1609Kg.

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.

The wrap around of the COBT occurred as expected on the 09/02/2008 at 21:04:20z.

A PST with an over-allocation of 3 packets - all of which were assigned to SPI - was in use the entire week during the instrument window

No build of TM buffer occupancy was observed, SPI used the extra allocation for about 35% of all TM cycles.

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

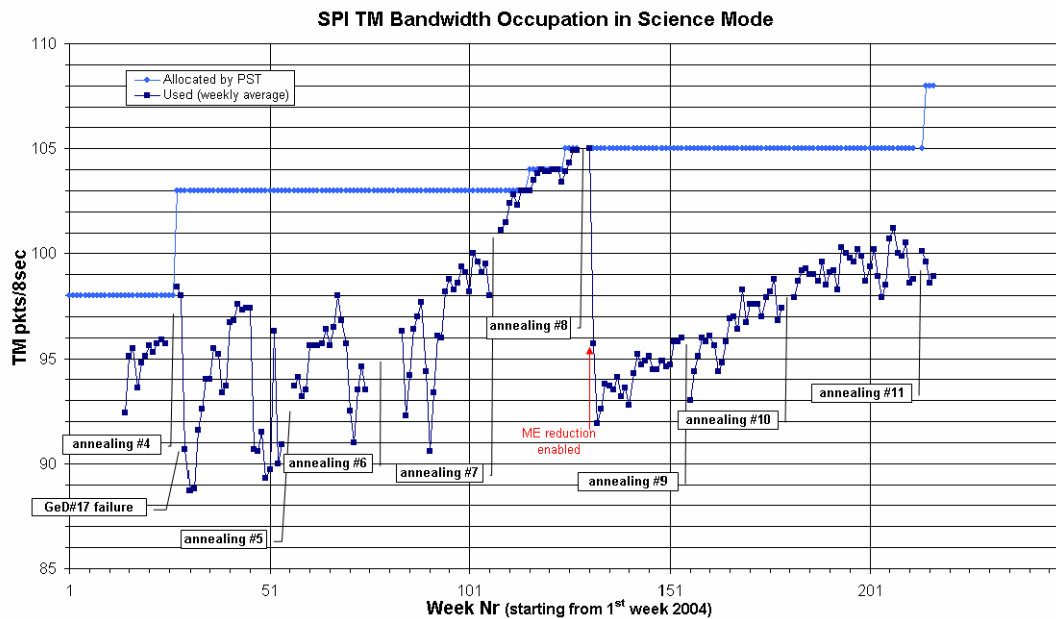
3.2.1 SPI

Following the 11th annealing, which ended on 30th January, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which, although its energy resolution improved since the previous annealing, is still showing a slightly degraded energy resolution compared to the other detectors and is therefore operating at a lower HV setting of 3.5kV (instead of 4kV). Detector #2 is failed since 06.12.2003 and detector #17 since 17.07.2004.

The Stirling compressors are working nominally, maintaining the Germanium detectors at 80 +/-1K.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth in the science observation windows was 105 packets/cycle, except for the period from 2008-02-21T15:18:16Z to 2008-02-21T19:43:32Z, when the TM allocation was 84 packets/cycle due to an OMC Flat Field Calibration. However, when the TM allocation was 105 packets/cycle, the over-allocated PST with 108 packets/cycle for SPI was loaded. The average telemetry occupation in the science window when the TM allocation was 105 packets/cycle was 98.9 packets/cycle.

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



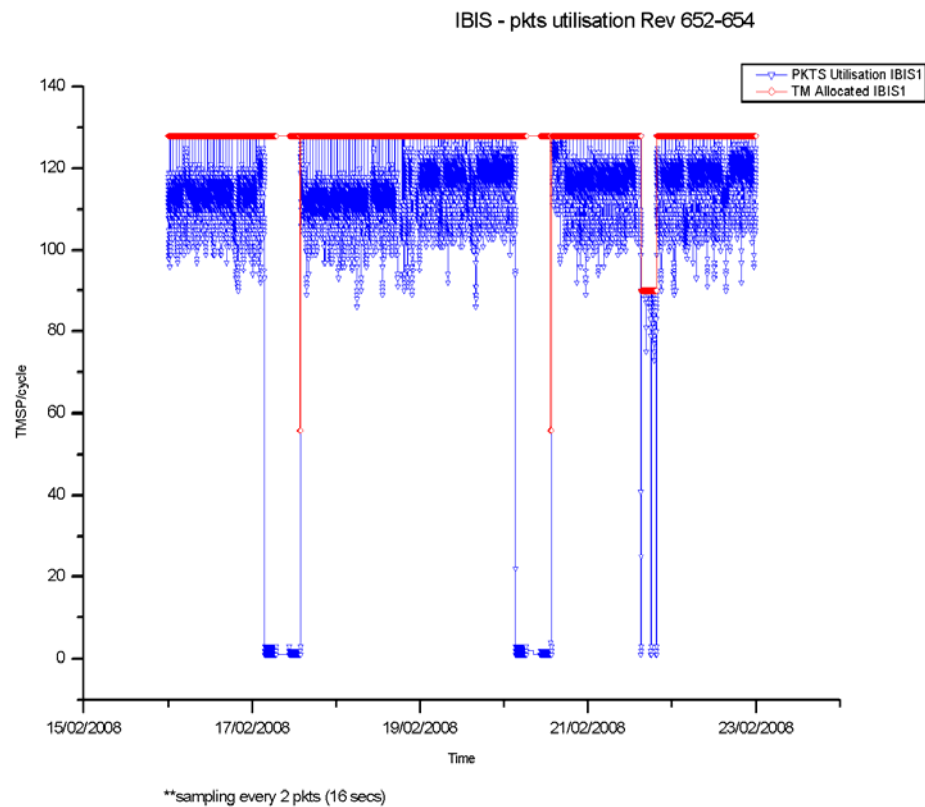
Note: Some more information concerning the SPI operations is provided in the Appendix.

3.2.2 IBIS

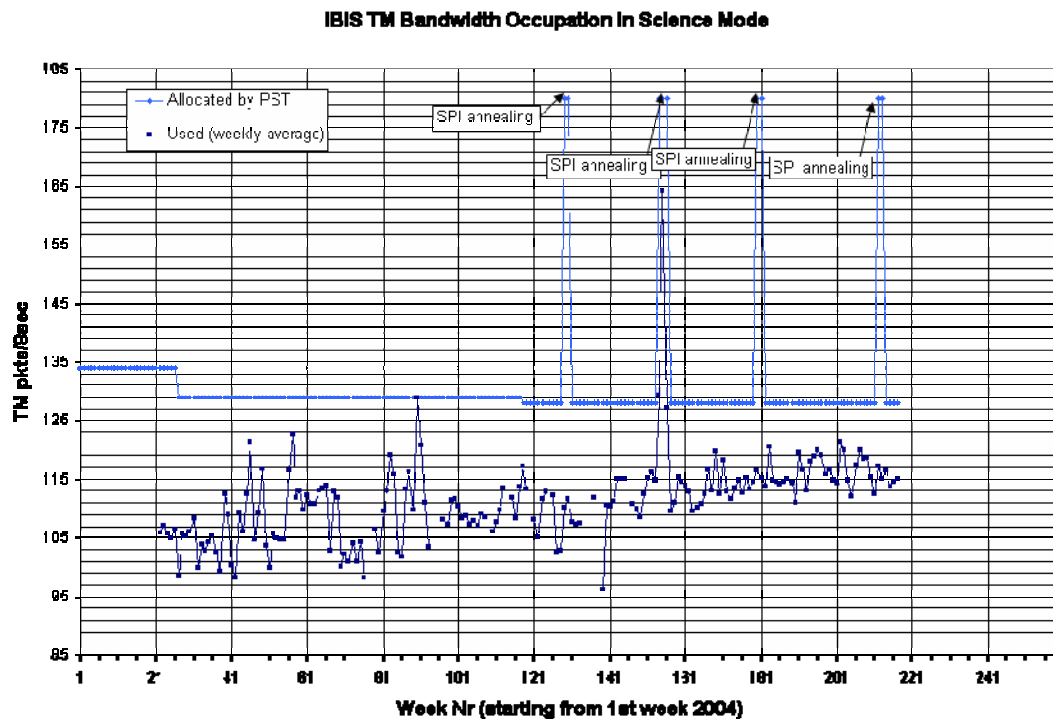
The overall status of the unit is nominal.

During the reporting period, the PST allocation to IBIS above the radiation belts was 128 packets/cycle except for the period from 2008-02-21T15:18:16Z to 2008-02-21T19:43:32Z, when the TM allocation was 90packets/cycle due to an OMC Flat Field Calibration. The IBIS mean bandwidth utilisation during the observation period (when IBIS was in Science mode) was 114.98 packets/cycle, up 0.38 on last week.

A plot of the IBIS TM utilisation during the observation period is shown below:



A plot of the IBIS weekly bandwidth utilisation since 2004 is shown below:



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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

JEM-X1 was operated in Data Taking mode with a TM allocation of 8 packets/cycle. JEM-X2 was dormant (DPE OFF) with no TM slots allocated.

Note: Some more information concerning the JEM-X operations is provided in the Appendix.

3.2.4 OMC

The status of OMC is nominal.

OMC operations were performed by the automatic Timeline. OMC was operated in Science Normal mode during science observations, with a TM allocation of 5 packets/cycle, except from 2008-02-21T15:18:59 to 2008-02-21T19:44:15, during the Flat Field calibration, when the allocation was 63 packets/cycle.

During this reporting period, 142 of the 144 planned science pointings plus the Flat Field calibration were executed nominally, 2 pointings started late and were cut short.

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

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity. The sun was blank all week. There was only a low risk of 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 very good this week. Two pointings were lost to ground problems. The overall performance was above the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was very good this week. There were no MOC problems report that impacted operations.

4.2 Ground Stations & Network

The performance of the ground stations and Network was very good this week. There was, however, three occasions where the links with Redu dropped, one of which led to the loss of a pointing.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

New PSFs or updates have been received for revolutions 660 and 659.

Observations were planned for revolutions 657 to 661. The new PICsIT parameters have been implemented from revolution 657.

TSFs have been received for revolution 656 to 657.

2. Observation status

A new ECSs has been received and processed for revolution 646.

3. ISOC Science Data Archive

Data has been ingested up to revolution 638. Further ingestion is waiting for new disks to be installed and the availability of ISDC ingest v11.

4. ISOC system

Version 18.0 testing is finished. The new software will be installed on Monday 25 February, ready to support AO-6.

5. Problems

The updated Flight Dynamics software received in January gives arithmetic exceptions in tests at ISOC. An investigation is ongoing; for the moment the older software remains in use at ISOC.

4.3.2 ISDC

Status of ISDC observation processing on 25/02/2008:

- Latest Standard Analysis completed: observation 05200560001 (PKS 1510-089, Revolutions 643-645) on 23/02/2008.

- Latest products archived: observation 05200560001 (PKS 1510-089, Revolutions 643-645) on 25/02/2008.

- Latest observation products sent to the observer: observation 05200320001 (X Per, Revolution 646) on 20/02/2008.

5 Special Events

6 Anomalies

There following problem was reported this week that impacted operations.

- On DoY 018, at 09:54, a TM drop from REDU, caused some AOCS commands to fail, a recovery was performed, and the Timeline rejoined at 10:28. The impact was the loss of pointing 06530025.

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

7 Future Milestones

The following activities are foreseen in the next few weeks.

The Spring eclipse season starts on the 30th March 2008, and continues until the last eclipse on 26th April.

Appendix

The appendix includes various detailed information.

7.1 Overview of Revolutions

Revolution 653

The observations in revolution 653 began with a raster dither of SN 2008S (RA 20:34:45.35, DEC +60:05:59.6), lasting ~26.7 hours. They continued with a raster dither of the mid-latitude 1 region (RA 18:36:17.05, DEC -60:24:50.7), lasting ~28.7 hours, until the end of the revolution.

Revolution 654

The observations in revolution 654 began with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. They continued with a raster dither of the mid-latitude 1 region (RA 18:36:17.05, DEC -60:24:50.7), lasting ~19.8 hours. This was followed by an OMC Flat Field calibration at attitude (RA 14:32:00.00, DEC -16:00:00.0), lasting ~3.4 hours. Finally a return to the raster dither of the mid-latitude 1 region (RA 18:36:17.05, DEC -60:24:50.7), was performed for ~27.7 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, except from 2008-02-21T15:18:59Z to 2008-02-21T19:44:15Z during the OMC Flat-Field calibration when it was IBIS 90; SPI 84; JEM-X1 9; JEM-X2 0; OMC 63.

7.2 Consumables

7.2.1 Detailed Fuel Book-keeping

2008-01-31T16:16:51.000Z	142.5346	F	Automatic TM processing.
2008-02-02T12:16:16.000Z	142.5172	F	Automatic TM processing.
2008-02-03T21:51:15.000Z	142.4496	F	Automatic TM processing.
2008-02-05T12:07:51.000Z	142.4190	F	Automatic TM processing.
2008-02-06T21:38:28.000Z	142.4052	F	Automatic TM processing.
2008-02-08T11:50:16.000Z	142.3982	F	Automatic TM processing.
2008-02-09T21:44:12.000Z	142.3444	F	Automatic TM processing.
2008-02-11T11:43:52.000Z	142.2812	F	Automatic TM processing.
2008-02-11T18:13:05.000Z	142.2536	F	Automatic TM processing.
2008-02-14T11:28:16.000Z	142.2431	F	Automatic TM processing.
2008-02-15T20:46:11.000Z	142.2251	F	Automatic TM processing.
2008-02-17T11:15:59.000Z	142.2109	F	Automatic TM processing.
2008-02-18T17:49:46.000Z	142.1885	F	Automatic TM processing.
2008-02-20T11:03:59.000Z	142.1716	F	Automatic TM processing.
2008-02-21T14:25:54.000Z	142.1609	F	Automatic TM processing.

This report was generated Fri Feb 22 08:00:23 GMT 2008

7.3 Detailed Satellite Information

This section contains some detailed information concerning the various subsystems of the satellite and instruments.

7.3.1 AOCS SUMMARY OPERATIONS REPORT, 16/02/2008 – 22/02/2008

The AOCS operations were executed from the Automatic Timeline.

During this period, 70 Open Loop Slews, 88 Closed Loop Slews and 4 Momentum Biases were executed (as executed by ACC).

2 slews (2 CSL) were missed from TL, during the observation period due to a drop on TM links to REDU station and guide star not found during Search and Track process.

This is equivalent to $\sim 1.2\%$ of the total number of slews planned (158).

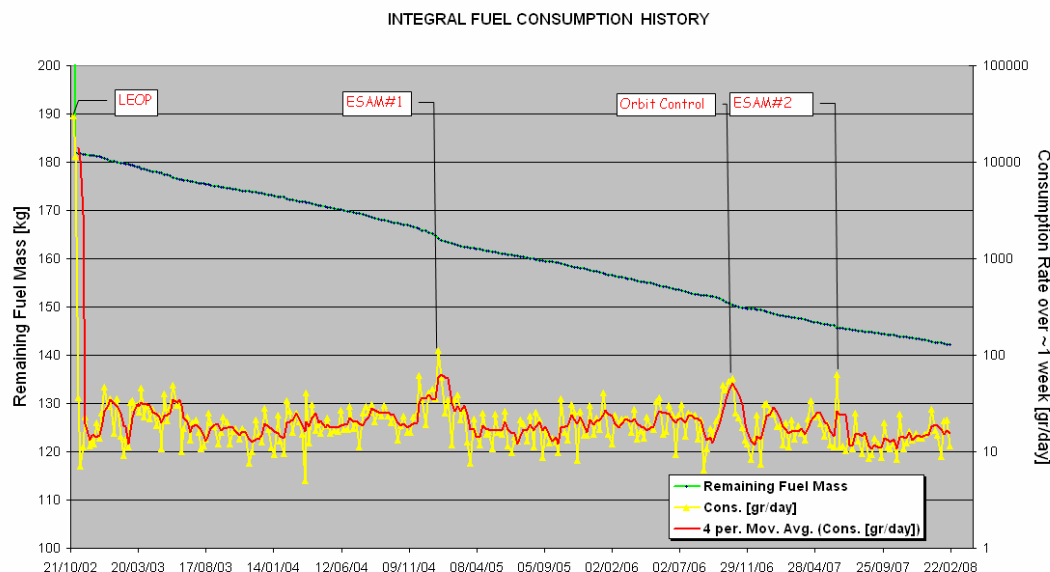
The OTF was not reached during PID 06530039, due to loss of guide star and IMU1 ON.

Orbit Control

No update.

Fuel consumption

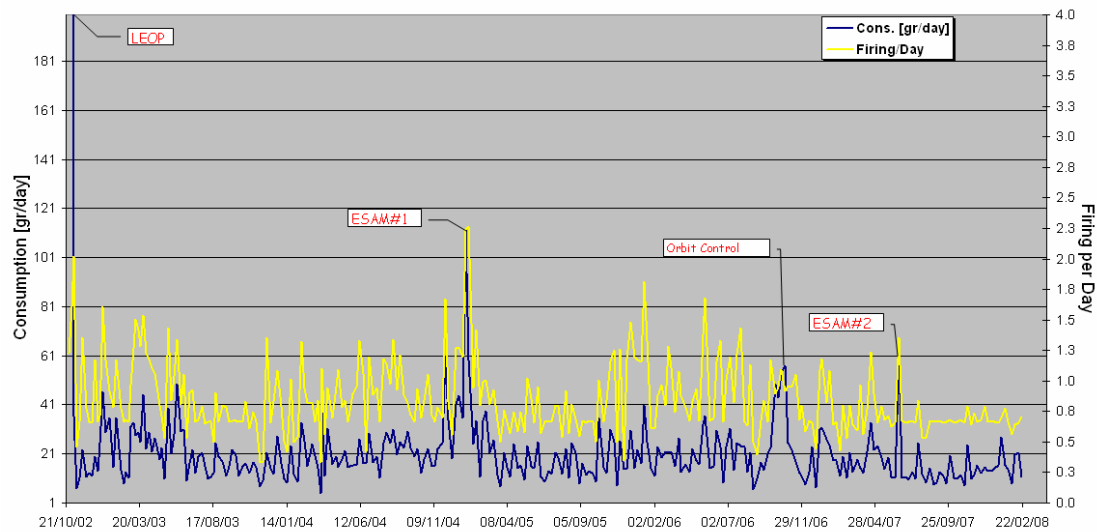
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 21/02/2008 is reported in the plot below.



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

The firing per day over the period between 01/11/2002 and 21/02/2008 is reported in the plot below.

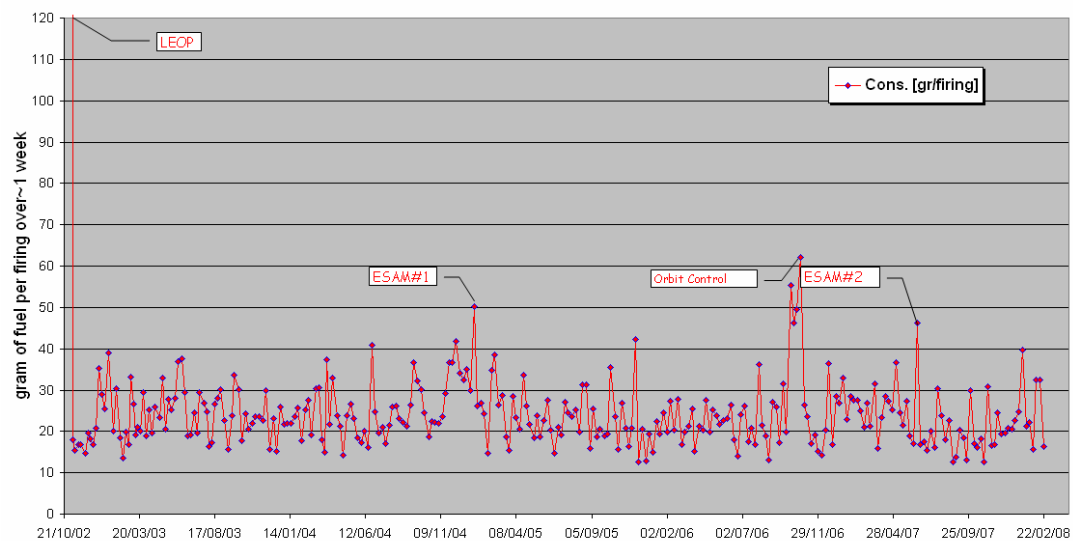
INTEGRAL FIRING PER DAY HISTORY



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

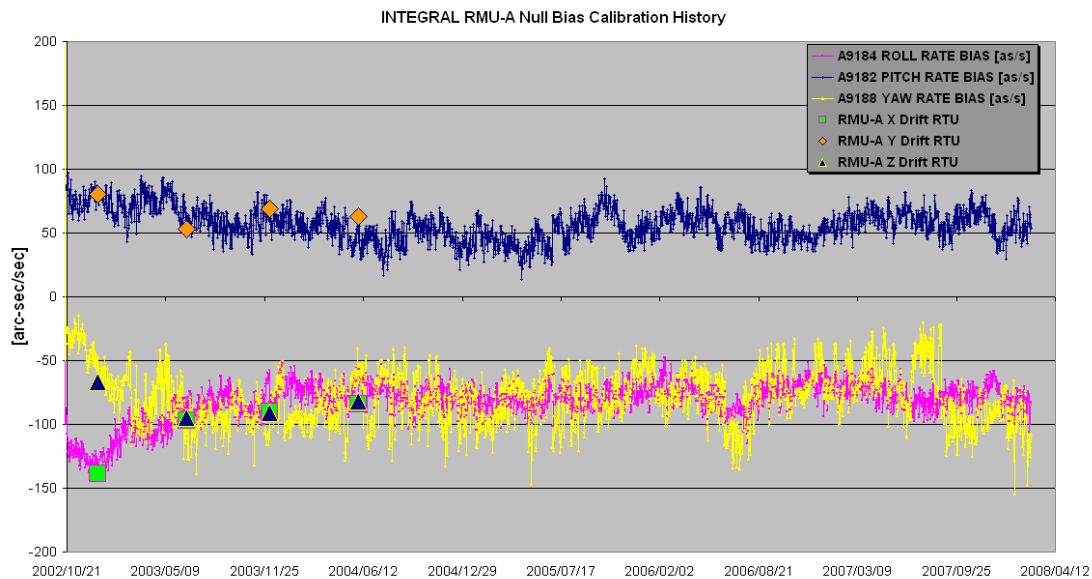
The fuel per firing over the period between 01/11/2002 and 21/02/2008 is reported in the plot below.

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 22/02/2008 is reported in the plot below.

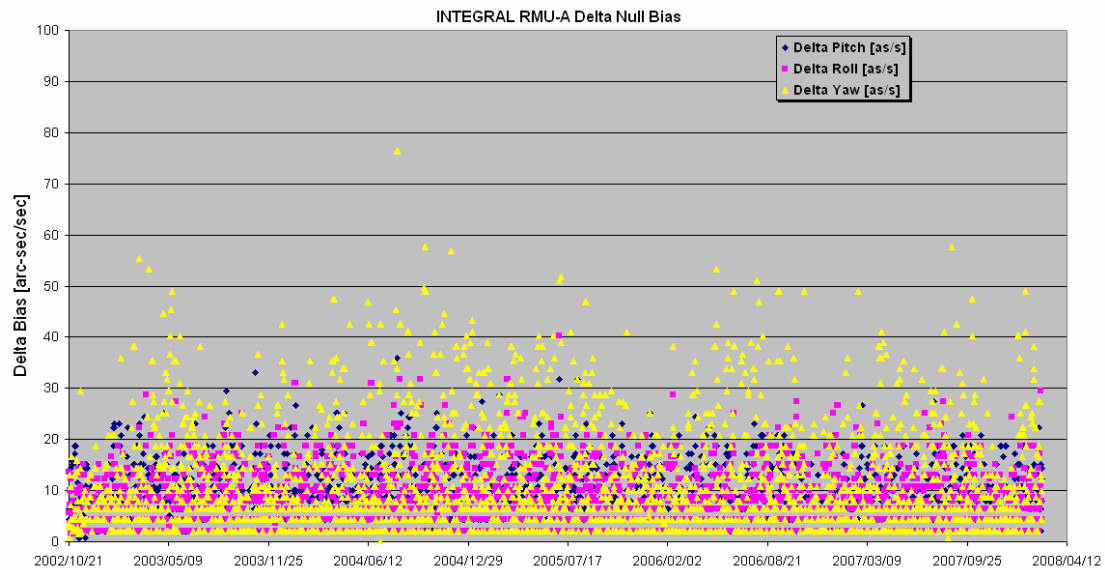


Problems have been reported during the last period on FDS when generating the drift update for the RMU-A Yaw channel: the limits set on FDS have been violated few times. The evolution of the drift on yaw channel is under constant monitoring but the values are still well within the specs. At moment the current constraints (for drift update generation) on the FDS have been relaxed to cope with the current situation. Below are reported the current values applied in FDS.

Target date 2008-03-01			
	RMU-A(X)	RMU-A(Y)	RMU-A(Z)
Average	-78.81	54.66	-99.30
Std. Dev.	7.77	10.33	17.78
Trend	-72.66	43.70	-128.77
Factor	3	3	3
Width	45	63	106
New Lower Hard Limit	-119	-18	-235
New Upper Hard Limit	-27	106	-23
New Lower Soft Limit	-95	12	-182
New Upper Soft Limit	-50	75	-76

Last Change: 2008-02-18			
Old Lower Hard Limit	-119	-18	-235
Old Upper Hard Limit	-27	106	-23
Old Lower Soft Limit	-95	12	-182
Old Upper Soft Limit	-50	75	-76

The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over period between 01/11/2002 and 22/02/2008 is reported in the plot below.



16/02/2008 (Day of Year 047, Revolution 652)

Problem on RMU drift update generation on FDS: at 23:52z a problem on the RMU-A drift update generation (routine FIPOUT) process on the FDS caused the update for RMU calibration to fail.

The drift correction on Yaw axis exceeded the limit set in FDS, causing the abortion of the TPF generation.

FD on-call advised, after investigation, to maintain the current RMU values until the next day, when deeper investigation and assessment to be performed.

No impact on TL.

17/02/2008 (Day of Year 048, Revolution 652-653)

Problem on RMU drift update generation on FDS: at 12:17z, the problem on DoY 47 on the RMU calibration TPF was fixed: the drift update was re-generated with the support of FD engineer.

No impact on TL.

Problem on RMU drift update generation on FDS: again at 17:43z a problem on the RMU-A drift update generation (routine FIPOUT) process on the FDS caused the update for RMU calibration to fail. FD on-call advised, after investigation, to maintain the current RMU values until the next morning (no need to do a new calibration, requirement is every 18 hours), when new assessment to be performed.

On the morning of DoY 49 (18/02) after consultation with FCT was agreed to relax the current limit in yaw drift, being the drift well inside the mission specifications.

FCT is constantly monitoring the drift evolution on Yaw axis (see plot in the section above)

No impact on TL.

18/02/2008 (Day of Year 049, Revolution 653)

Problem on REDU station: at 09:54z a problem on the TM links on REDU station caused the slew 06530025 to fail release.

A manual recovery was performed from attitude of PID 06530024 to the attitude of PID 06530025 and the slew ID 06530026 manually updated in TL.

At 10:30z the AOCS s/s was enabled in TL.

The following slew was missed in TL: 06530025 (CSL)

Loss of guide star: at 18:22:15z a loss of the selected guide star occurred during commanding for slew 06530039.

As foreseen by the IPS logic, the ACC switched ON the IMU 1, a new automatic mapping was commanded and a new guide star picked.

No impact on TL.

The OTF was not reached during PID 06530039.

19/02/2008 (Day of Year 050, Revolution 653)

Problem during Search/Track process: at 13:09z a problem (star not found) during the Search/Track process selecting the slew star caused the PTV to fail and the slew 06530053 to fail release.

A manual recovery was performed from attitude of PID 06530052 to the attitude of PID 06530053. The next slew ID 06530054 was manually updated in TL.

The following slew was missed in TL: 06530053 (CSL)

20/02/2008 (Day of Year 051, Revolution 653-654)

Nothing to report.

21/02/2008 (Day of Year 052, Revolution 654)

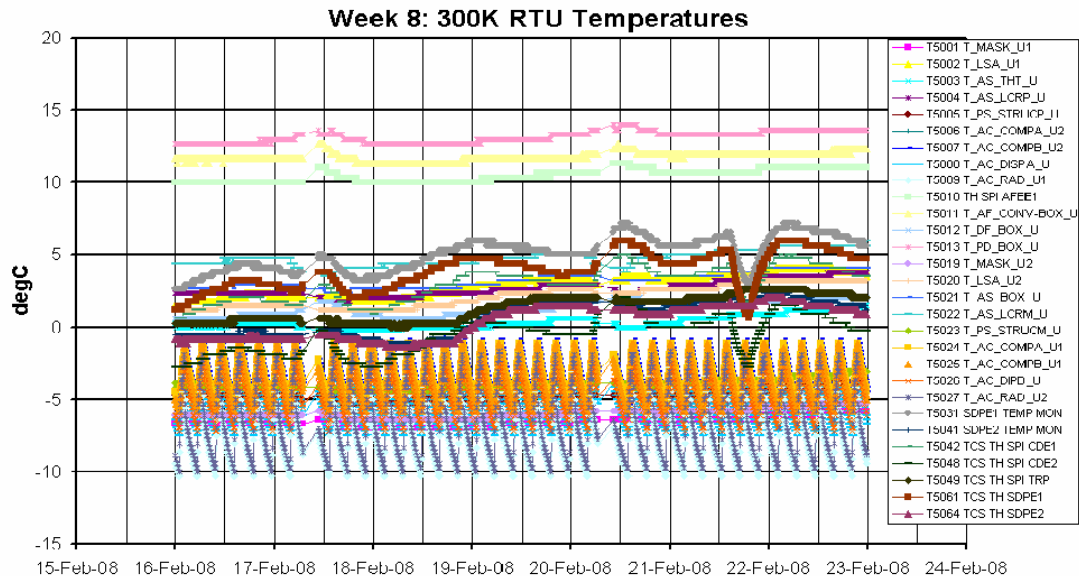
Nothing to report.

22/02/2008 (Day of Year 053, Revolution 654)

Nothing to report.

7.3.2 SPI Operations

Unit Temperatures: All the equipment temperatures are inside the operational limits. The following plot shows their evolution during the reporting period.

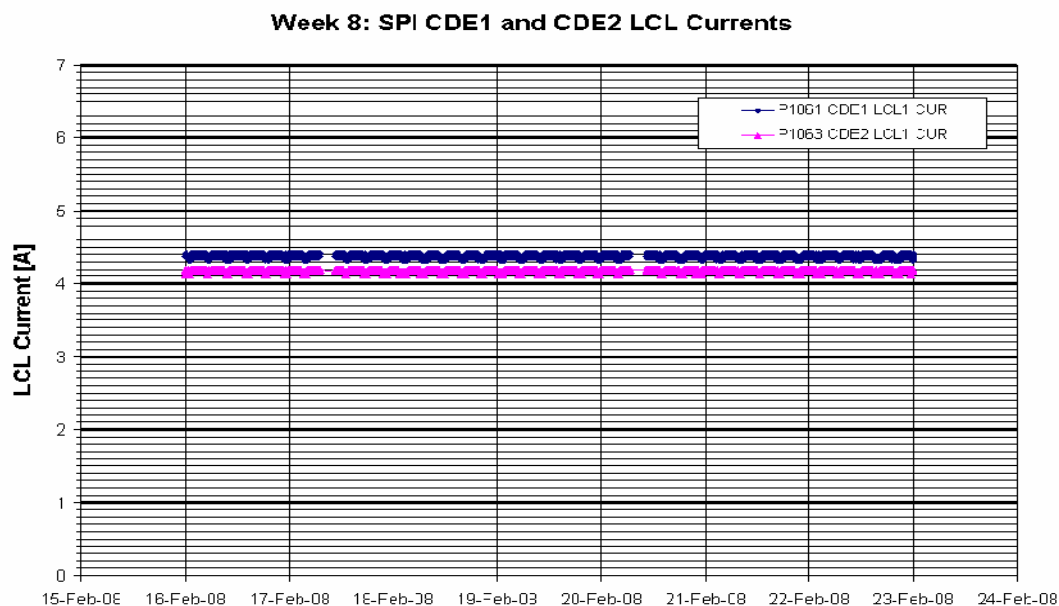


Stirling Compressors and Cryostat: The performance of the compressors is nominal. The cold plate temperature was maintained in the range 80K +/-1K with a positive slope of 0.091K/day.

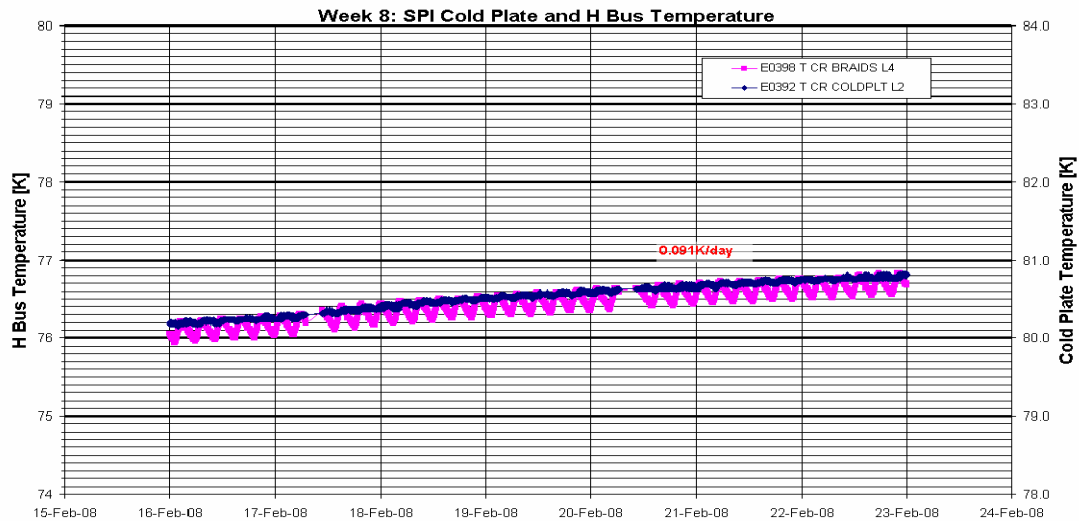
The stroke of all four compressors was set to 38 throughout the week. The average CDE LCL currents were as follows:

- CDE1 LCL Current = 4.39A
- CDE2 LCL Current = 4.17A

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



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

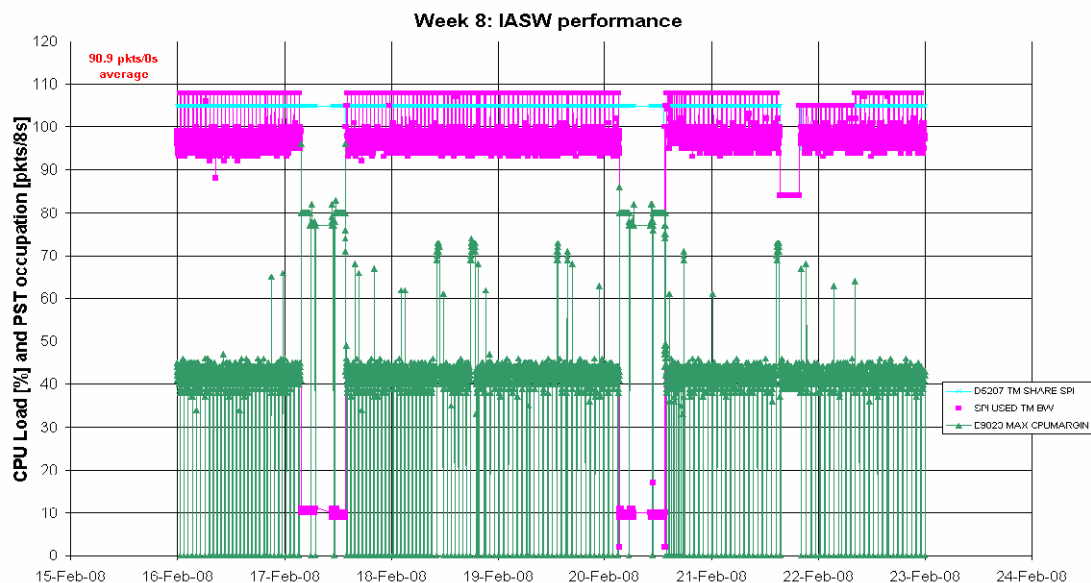


DPE & IASW: The DPE health and IASW performance is nominal.

The IASW version installed is v4.3.4 with ME reduction only enabled and the spectra scaling factor set to 8/19 SE.

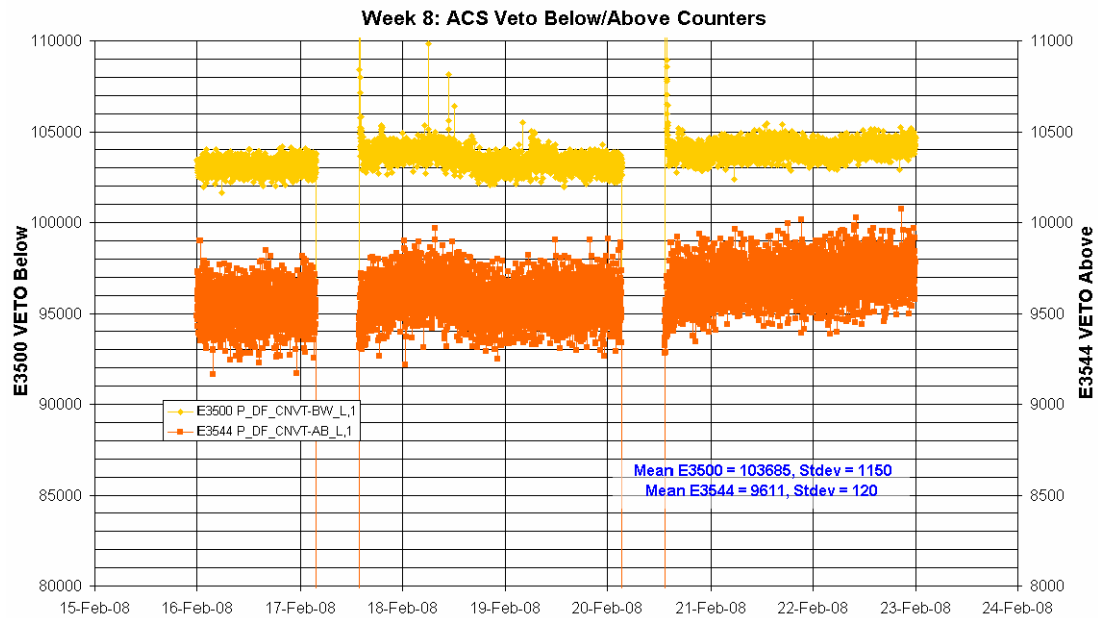
The average TM bandwidth occupation of SPI was 98.9 packets/cycle over the science window. The TM allocation in the science window was 105 packets/cycle, except for the period from 2008-02-21T15:18:16Z to 2008-02-21T19:43:32Z, when the TM allocation was 84 packets/cycle due to an OMC Flat Field Calibration. However, for most of the reporting period the over-allocated PST with 108 packets/cycle for SPI was used (see plot below). Note that the Broadcast Packet TM allocation was not updated. This did not cause any problems and SPI used the additional TM bandwidth during spectra transmission.

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

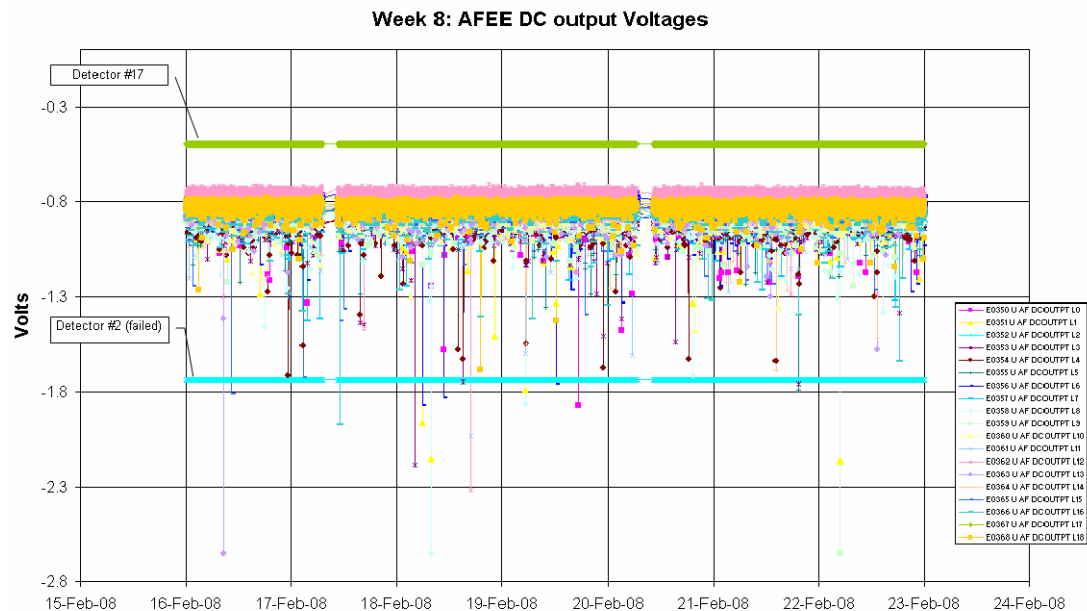


ACS: The performance of the ACS is nominal, except for FEE #81 which remains nominally switched off since the anomaly on 29/10/2006 (INT_SC-162) and FEE #57 which is nominally OFF due to the anomaly on 5/8/2003 (INT_SC-61).

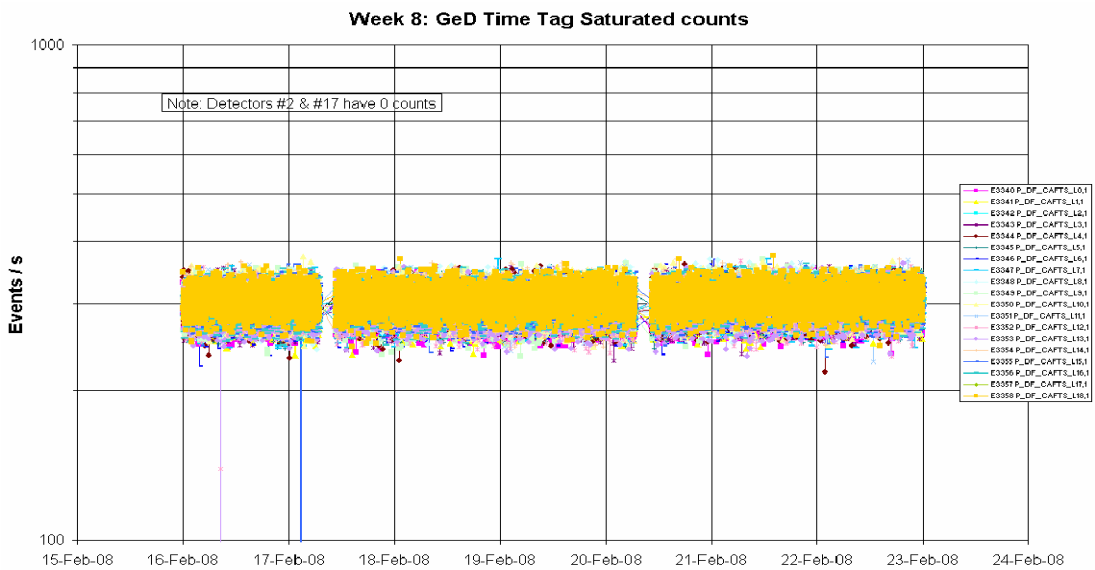
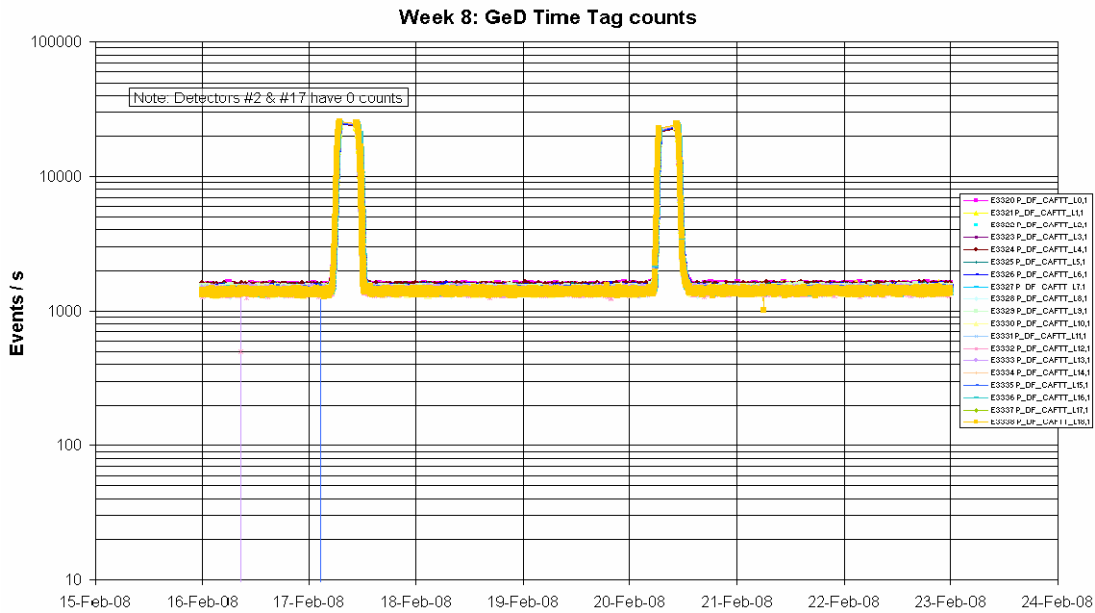
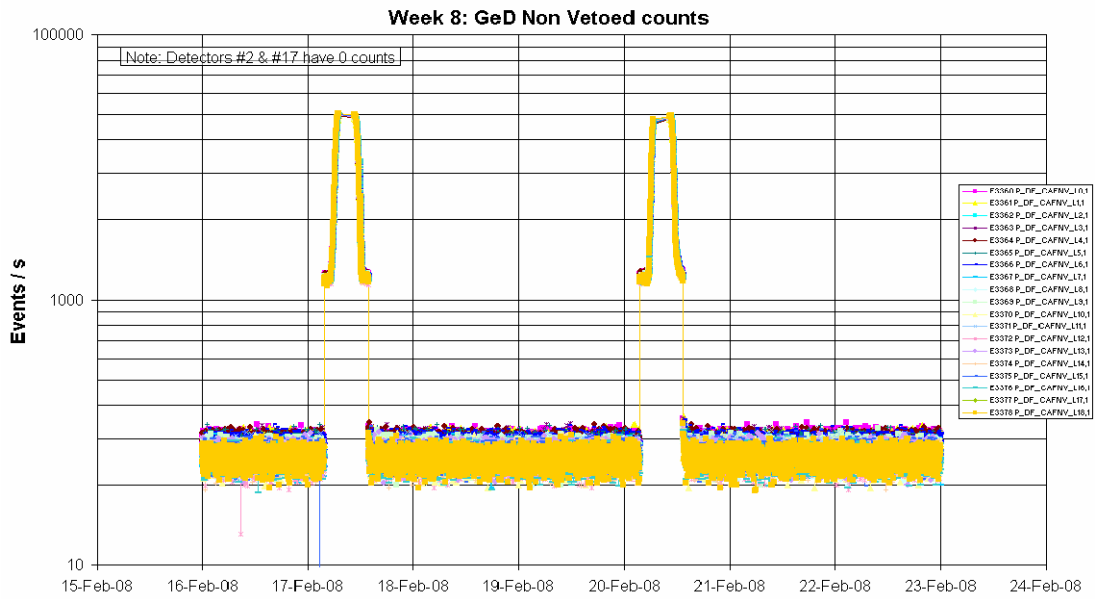
The following plot shows the ACS overall count rate evolution during the reporting period:



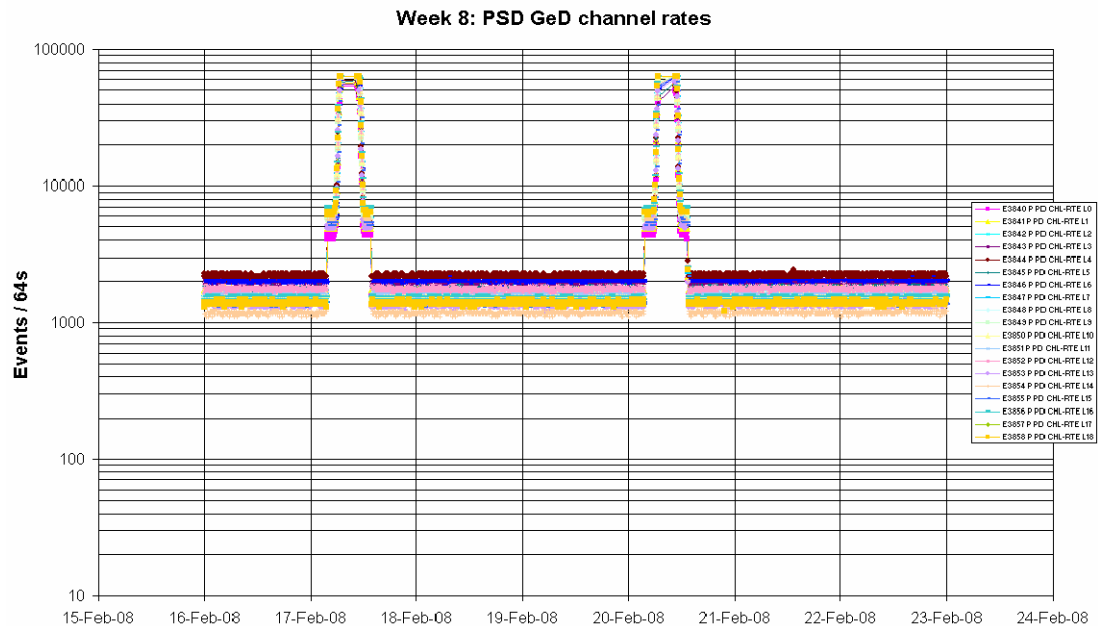
AFEE: The health of the AFEE is nominal. The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06/12/2003 and detector #17 is failed since 17/07/2004.



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



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



Event Log:

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

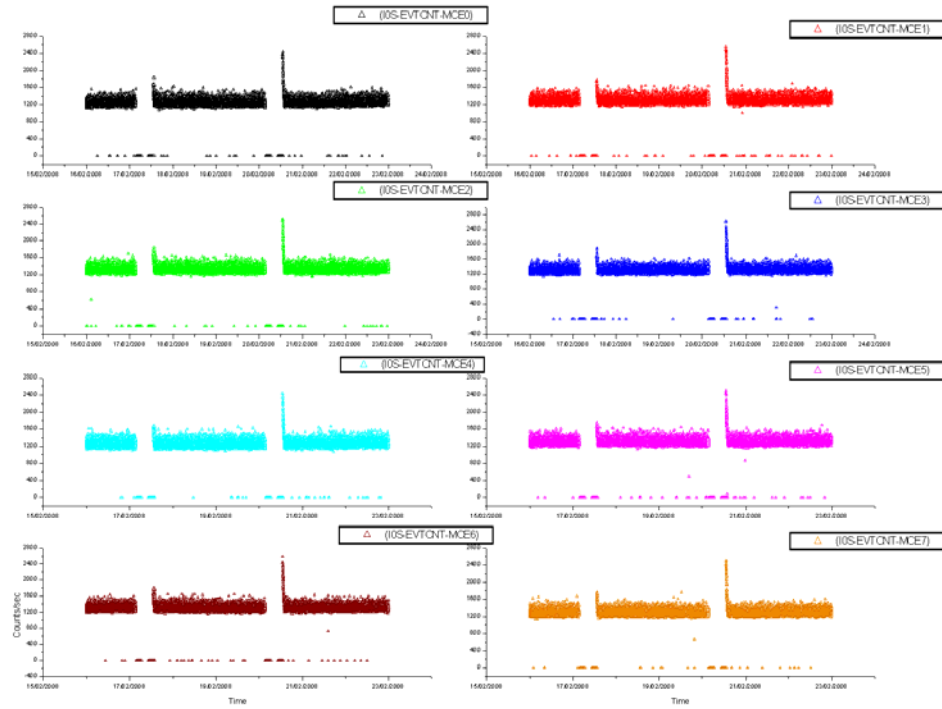
- On 2008-02-20 at 13:36:32Z, just after radiation belt exit of revolution 654, TM parameter E3500 (ACS Counts Below) went OOL High. As it returned within limits at 13:41:52Z no action was taken.
- On 2008-02-21 from 20:01:51Z to 20:07:03Z, 17 occurrences of OEM APID 1024 ID 245 EXCEPTION SPI1 SPECTRA COMPRESSION OVERFLOW were received (one for each GeD), followed at 20:07:03Z by OEM APID 1024 ID 244 EXCEPTION SPI1 SPECTRA COMPRESSION NOT COMPLETED. This was about 20 minutes after the TM allocation to SPI was changed back from 84 packets/cycle (due to the OMC FFC) to 105 packets/cycle. These OEMs, indicating problems with the spectra compression due to insufficient bandwidth, are nominal following periods of low TM allocation to SPI. They stopped of their own accord and SPI operations continued nominally.
- On 2008-02-22 at 07:45:05Z TM parameter E2385 went OOL (value = PARAM < SPEC). This is the ACS FEE #35 analogue status -5 V. As it returned within limits when the next packet was received at 07:55:45Z, no action was taken.

7.3.3 IBIS Operations

IBIS Event Counters Plots

ISGRI Counters:

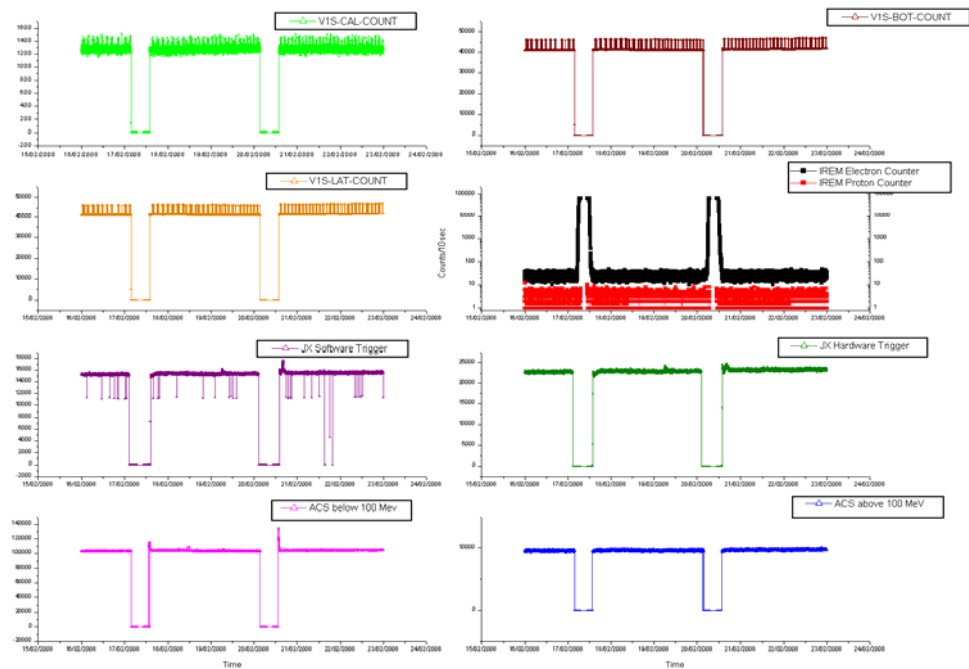
IBIS - ISGRI Counters Rev 652-654



**sampling every 4 pkts (32 secs)

VETO vs Payload Counters:

IBIS-VETO vs Payloads Counters Rev 652-654

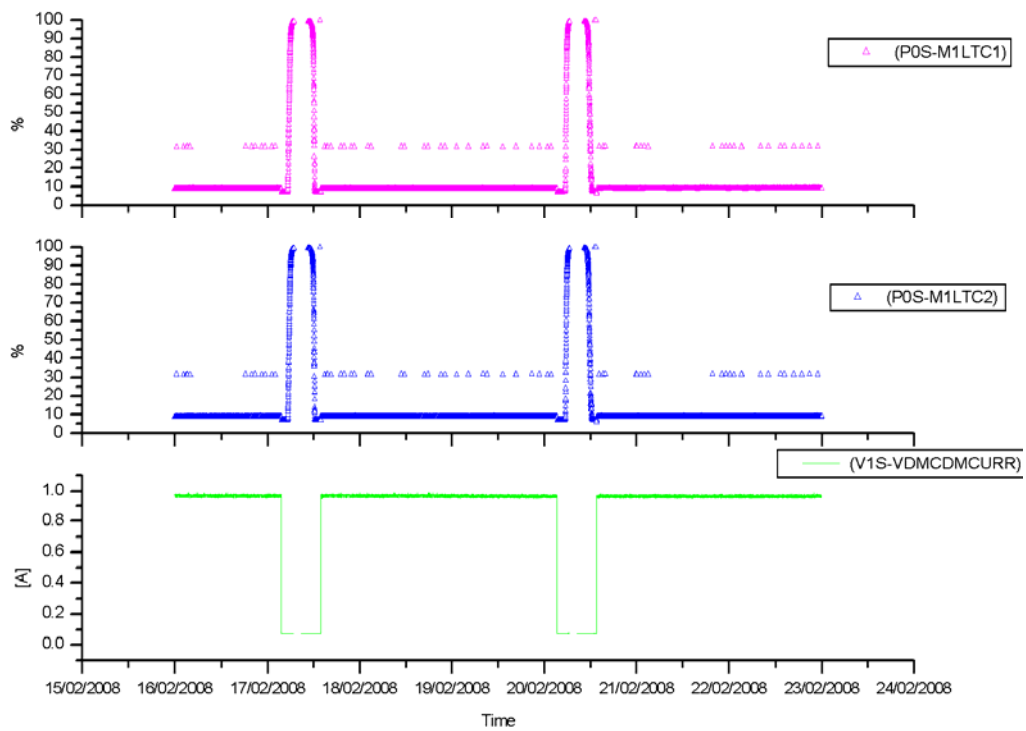


*with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec sampling every 5 pkts (40 sec)

The week was characterised by slightly high radiation after the expected radiation belt exit of revolution 654 as reported by the payload.

VETO Current:

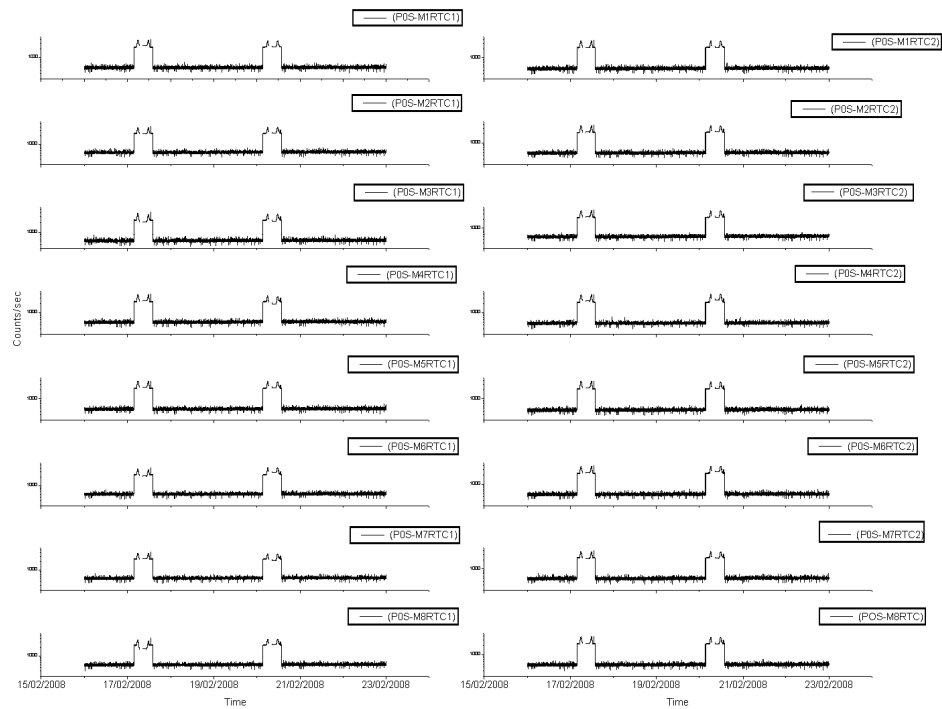
IBIS-VETO Current & PICsIT dead times Rev 652-654



**sampling every 4 pkts (32 secs)

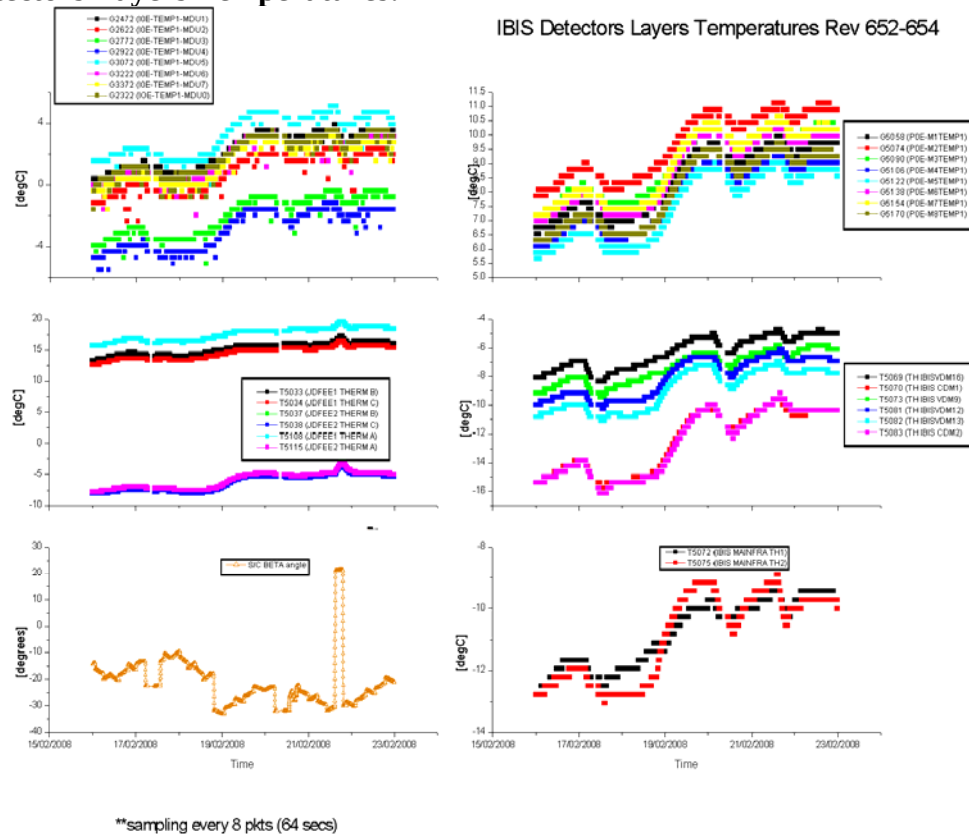
PICsIT Counters:

IBIS - PICsIT Counters Rev 652-654



**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures:



IBIS daily report:

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

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

2008-02-16 (DOY 047, Rev 652) to 2008-02-18 (DOY 049, Rev 653)

IBIS operations executed nominally.

2008-02-19 (DOY 050, Rev 653)

At 17:47:47Z TM parameter G2056 went OOL (Status Consistency Check failed), indicating an overflow of the noisy pixel address buffer in MCE4. As it returned within limits at 17:47:55Z, no action was taken.

2008-02-20 (DOY 051, Rev 653-654)

At 13:09:31Z, during the execution of the ED GEISCL03 before radiation belt exit of revolution 654, all the parameters in the TM parameter family G2013 (number of events triggering the MCEi per second) started toggling OOL warning High. As they had all returned within limits by 13:19:39Z, no action was taken.

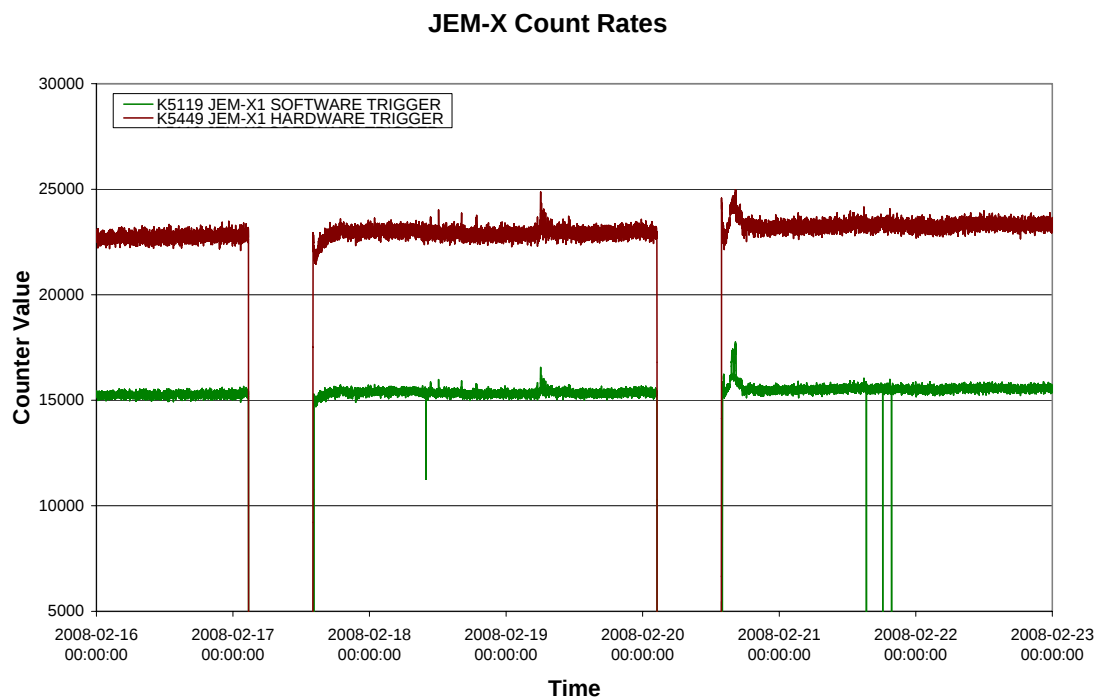
2008-02-21 (DOY 052, Rev 654) to 2008-02-22 (DOY 053, Rev 654)

IBIS operations executed nominally.

7.3.4 JEM-X Operations

JEM-X Count Rates

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

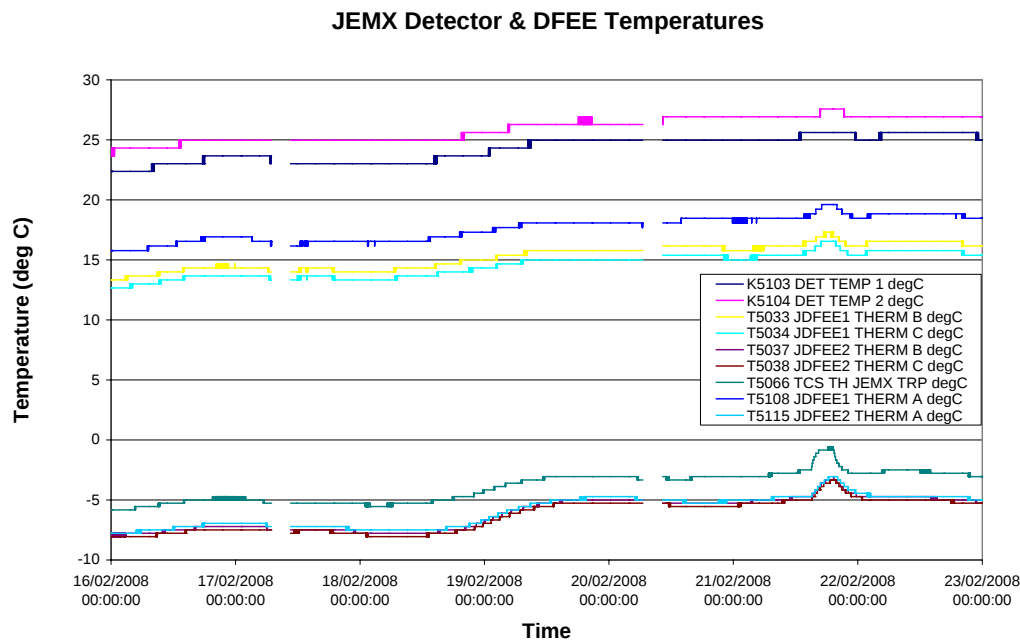


JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph².

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

² Data sampled (1 frame in 8)



JEM-X Daily Report

2008-02-16 (DoY 047, Rev 652) to 2008-02-22 (DoY 053, Rev 654)

JEM-X1 operations executed nominally

7.3.5 OMC Operations

2008-02-16 (DoY 047, Rev 652) to 2008-02-17 (DoY 048, Rev 652-653)

Nothing to Report.

2008-02-18 (DoY 049, Rev 653)

At 09:54, a TM drop from Redu caused some AOCS commands to fail, which forced a suspension of the Timeline. A recovery was performed, and the Timeline rejoined at 10:28. The OMC commands were manually uplinked at 10:18:29. The impact was pointing 06530025 was shortened from a planned 3000 to 536 seconds.

2008-02-19 (DoY 050, Rev 653)

At 13:09, an AOCS command failed release, see AOCS section for details. A recovery was performed, and the OMC commands manually uplinked at 13:34:29. The impact was pointing 06530053 was shortened from a planned 3562 to 2368 seconds.

2008-02-20 (DoY 051, Rev 653-654)

Nothing to Report.

2008-02-21 (DoY 052, Rev 654)

From 15.18.32 to 18.11.31, a Flat Field calibration was performed. This was followed from 18.12.01 to 18.43.41 by a Dark Current calibration. Both were executed nominally.

2008-02-22 (DoY 053, Rev 654)

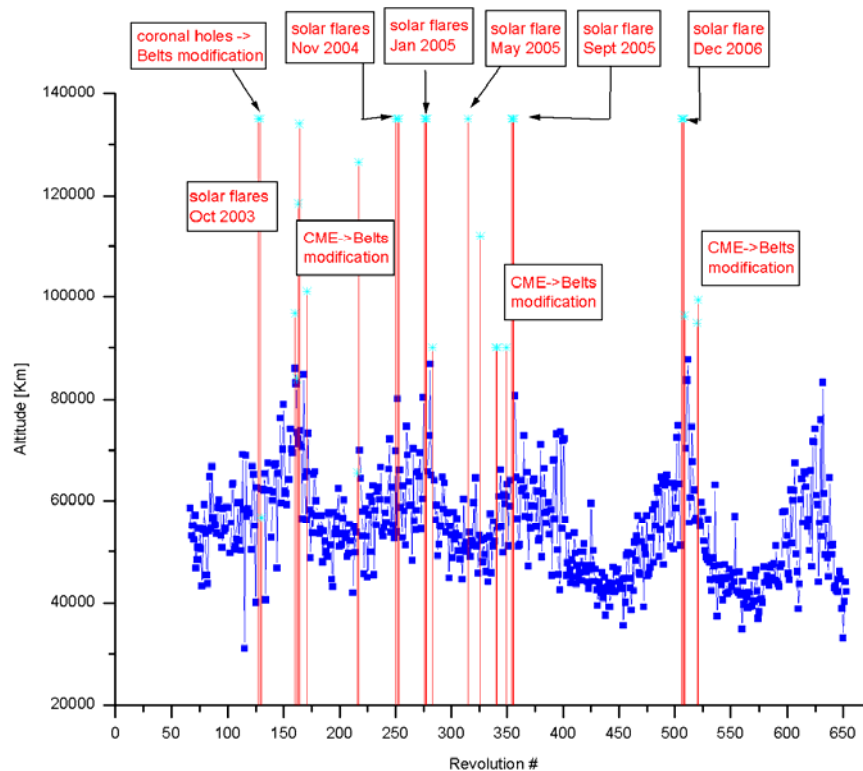
Nothing to Report.

On DoY 048 at 03:38:29 and DoY 051 at 03:24:45 OMC went to SAFE mode nominally, at the radiation belt entry time as set in the Broadcast Packet.

7.3.6 IREM Operations

Radiation Belts Entry

Evolution of Radiation Belt Entry 2003-2008



IREM daily report

Nothing to report.

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
652	RAD_ENTR R 2008-02-17T03:38:23Z	17/02/2008 05:09:32	44032.7	17-Feb-2008 05:10:04	42958. 89
653	RAD_EXIT R 2008-02-17T13:41:07Z	17/02/2008 12:57:56	>>33255.8	17-Feb-2008 12:40:04	44127. 68
653	RAD_ENTR R 2008-02-20T03:24:44Z	20/02/2008 05:07:00	42213.6	20-Feb-2008 05:00:55	42484. 47
654	RAD_EXIT R 2008-02-20T13:27:53Z	20/02/2008 13:08:20	>>33245.1	20-Feb-2008 12:30:55	44525. 81

Reference

High radiation

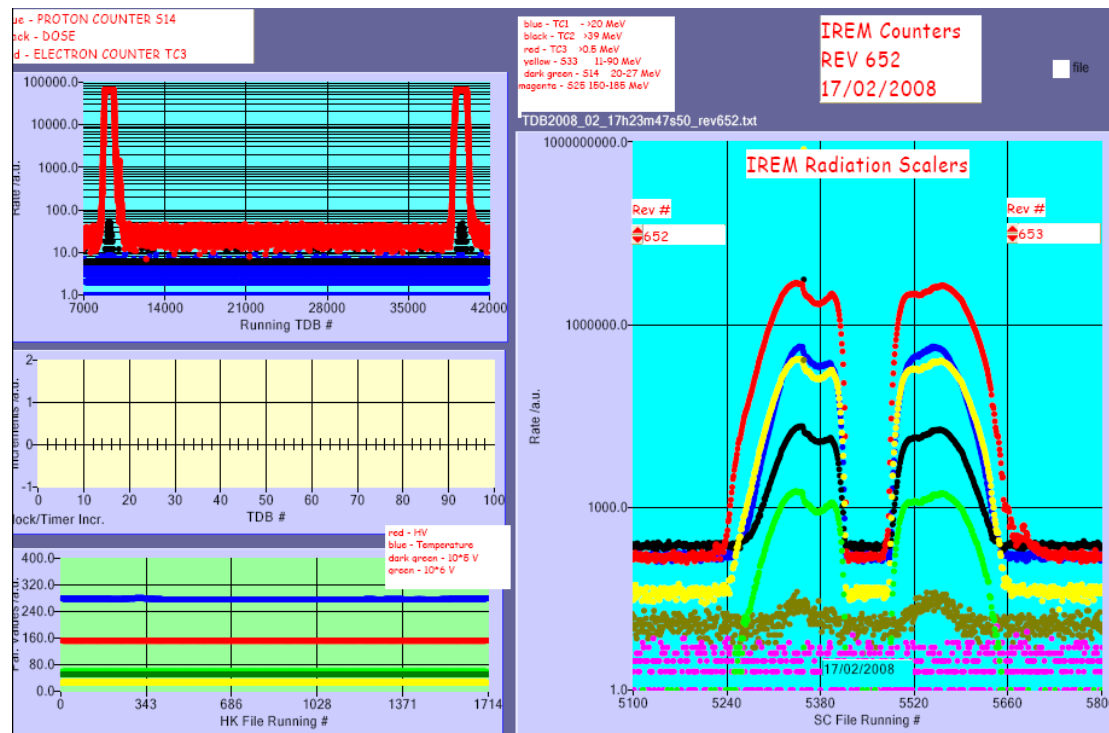
Very small error vs reference (less than 10 minutes)

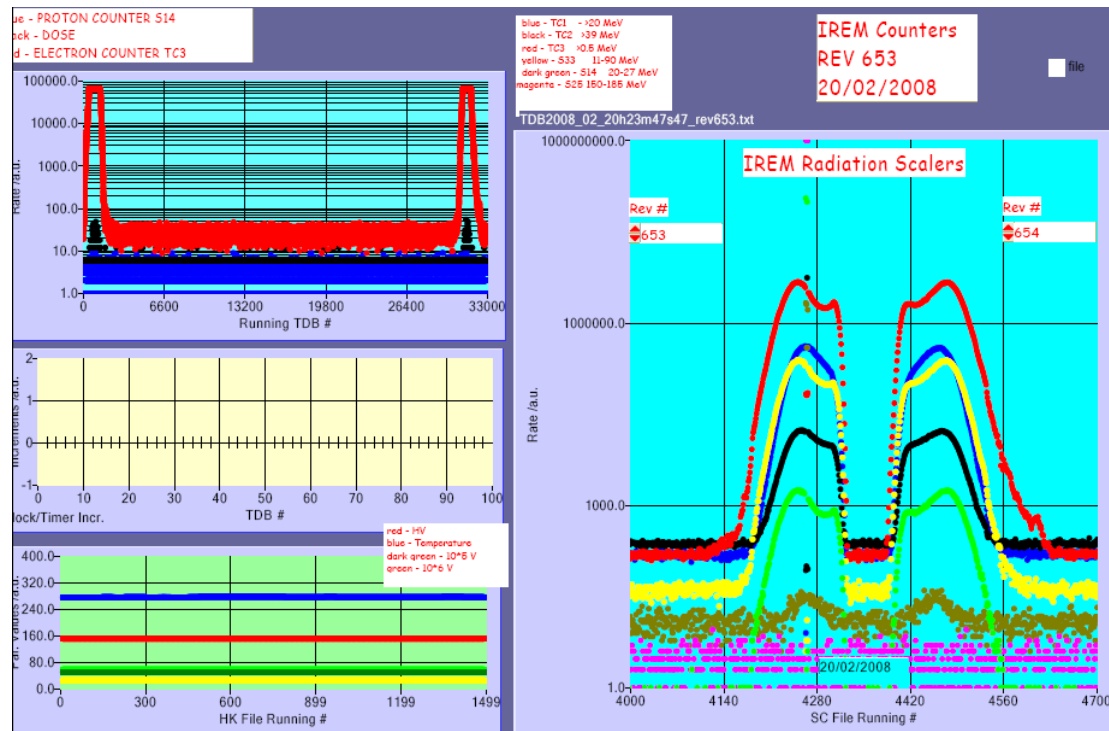
Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

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

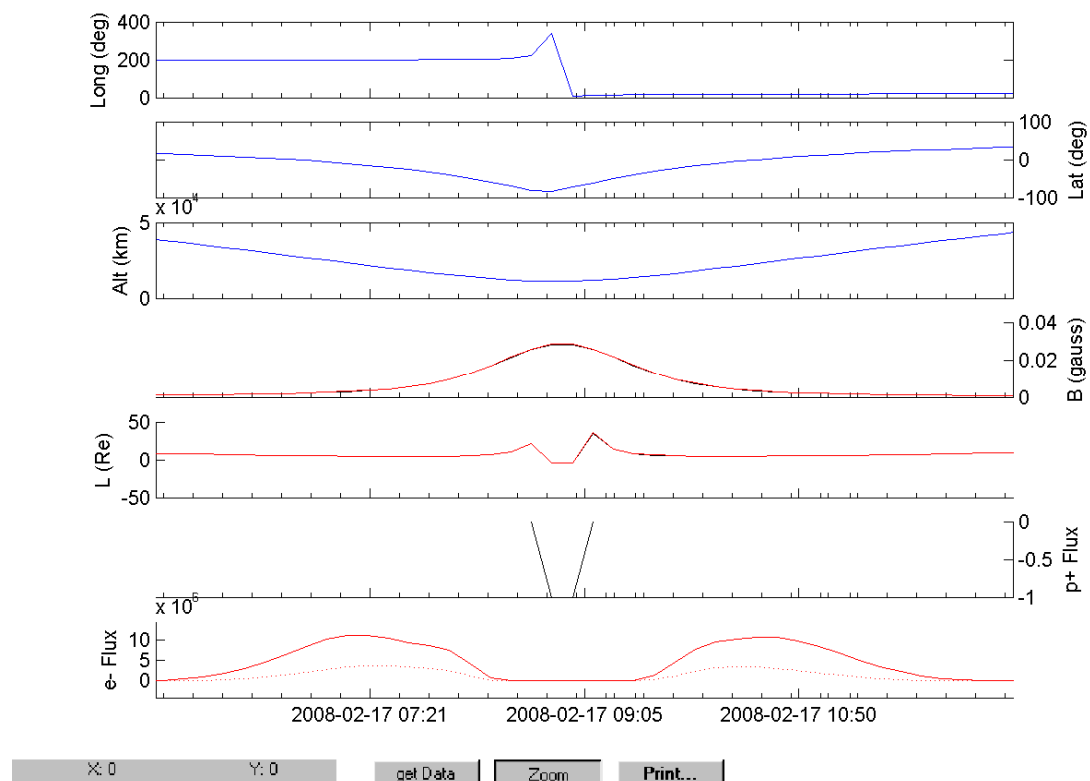
IREM radiation counters:



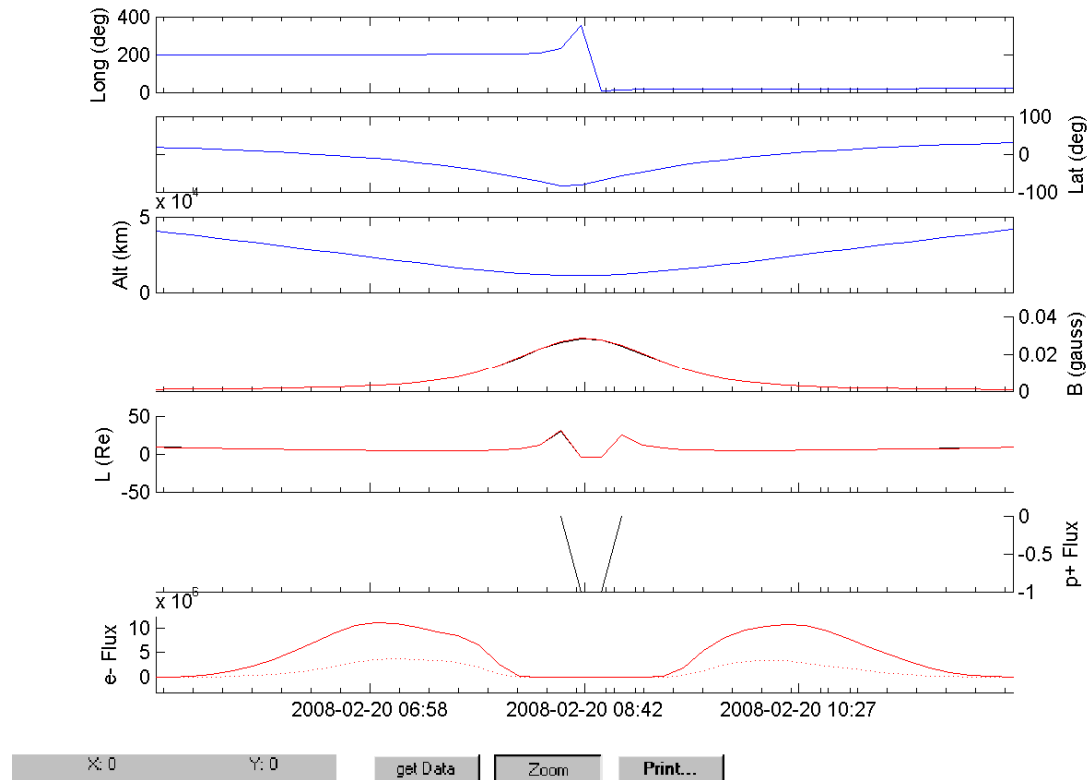


IREM Predicted Radiation Belt Passages

Rev 652



Rev 653



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

Due to a problem on the SEISOP server, no data are available this week. However, the week was very quiet and no radiation was reported.