EUROPEAN SPACE AGENCY
DIRECTORATE OF TECHNICAL & OPERATIONAL SUPPORT
MISSION OPERATIONS DEPARTMENT

INTEGRAL
Mission Report

INT-MOC-SYS-RP-1001-OPS-OF

No. 235
Week 12

26.03.07

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 17.03.07 until 23.03.07 (both dates inclusive) and covers the revolutions 541 and 542.

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 Orion OB1 (RA 05:17:00.30, DEC +01:47:17.7), raster dithers of AO-4 KP: l=-6.9 (RA 17:28:08.54, DEC -34:45:18.6) and AO-4 KP: l=+6.9 (RA 18:01:12.94, DEC -22:59:28.5), hexagonal dithers of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), and the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), and a raster dither of GX 339-4, which was a Target of Opportunity (RA 17:02:49.50, DEC -48:47:23.0)

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 lost of guide star on the STR unit.

The fuel consumption over the period between 14/03/2007 and 22/03/2007 was 0.1575 Kg. The remaining propellant is in the order of 147.6223 Kg.

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

3.1.2 Power

The EPS is working nominally, available power from the arrays is of the order of 2100W.

3.1.3 Thermal

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

3.1.4 OBDH

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

3.1.5 RFS

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

3.2 Payload

3.2.1 SPI

Following the 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.

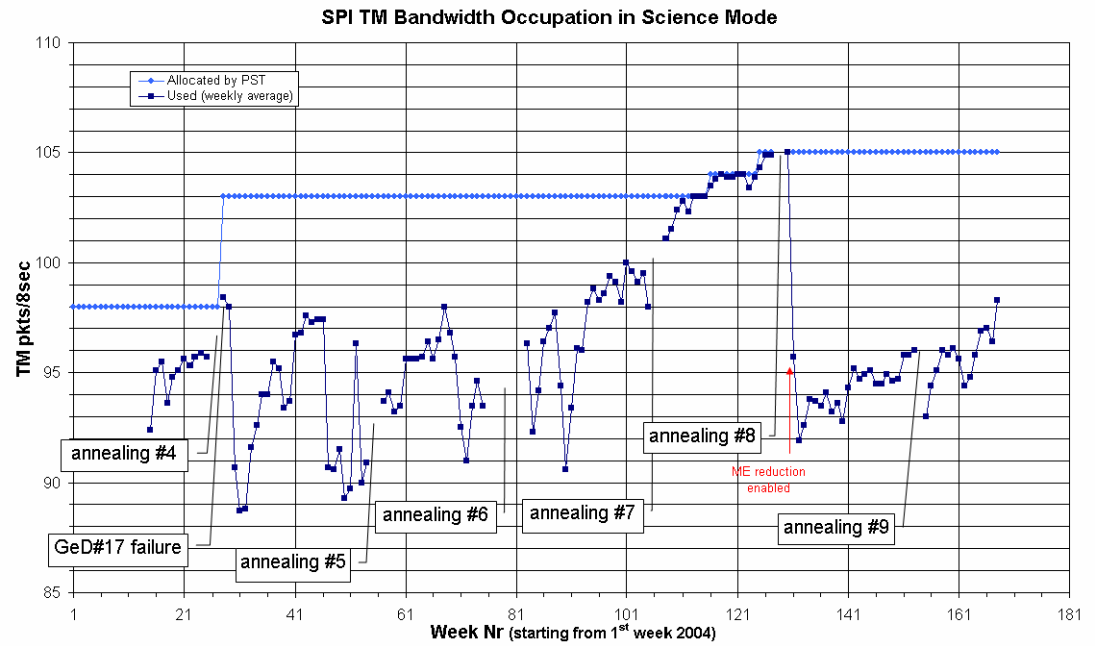
The Stirling compressors are working nominally, maintaining the Germanium detectors at 80 +/-1K. The stroke of all four compressors has been set to 40 since 03.02.2007 at 13:16Z.

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, except for the following times during the Crab calibration in Rev. 541:

- 2007-03-20T15:49:01Z - 2007-03-20T21:28:10Z: 97 packets/cycle
- 2007-03-20T21:28:10Z - 2007-03-21T00:08:00Z: 83 packets/cycle

The average telemetry occupation when the band-width was 105 packets/cycle was 98.3 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

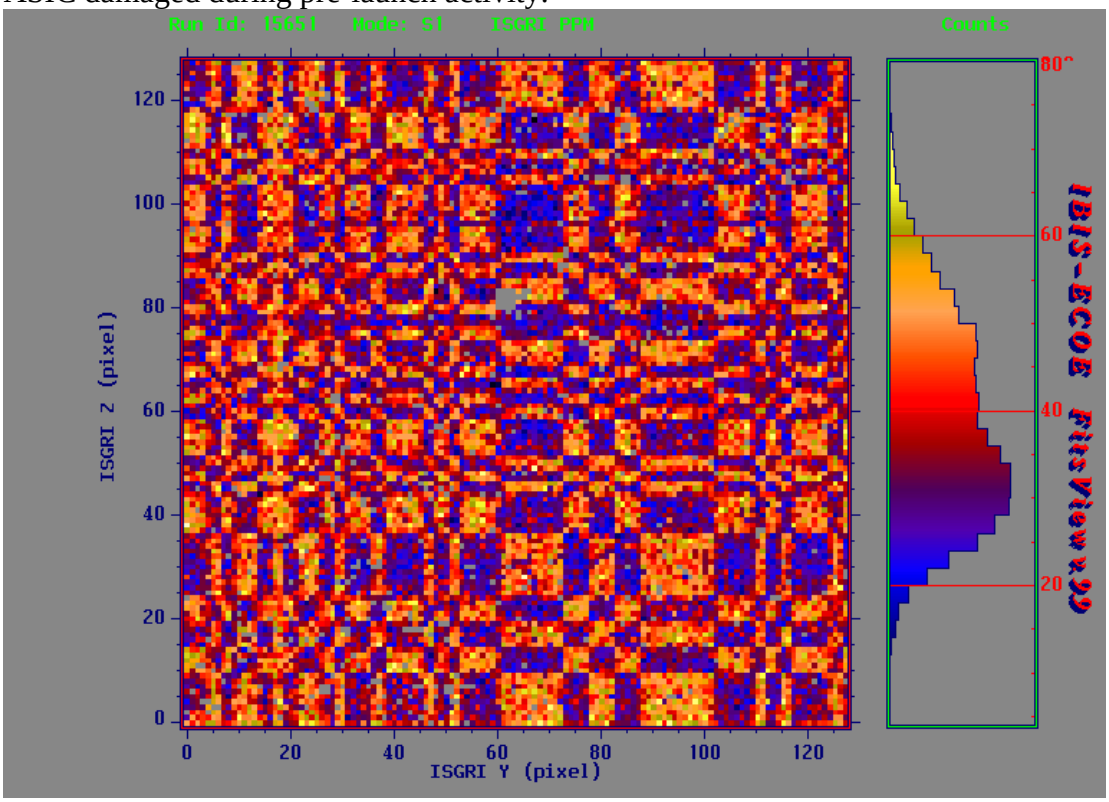
The overall status of the unit is nominal.

In revolution 541, the CRAB calibration was executed. No specific configuration was required for IBIS which ran in Scientific Standard mode. The calibration was performed nominally except on 21/03/2007 (DoY 2007.080) between 10:08Z and 11:43Z when no histograms were downloaded. The operator followed the reaction of FDIR to fix the problem (see more details in the appendix).
The following table presents the planning for the calibration (source: ISOC website).

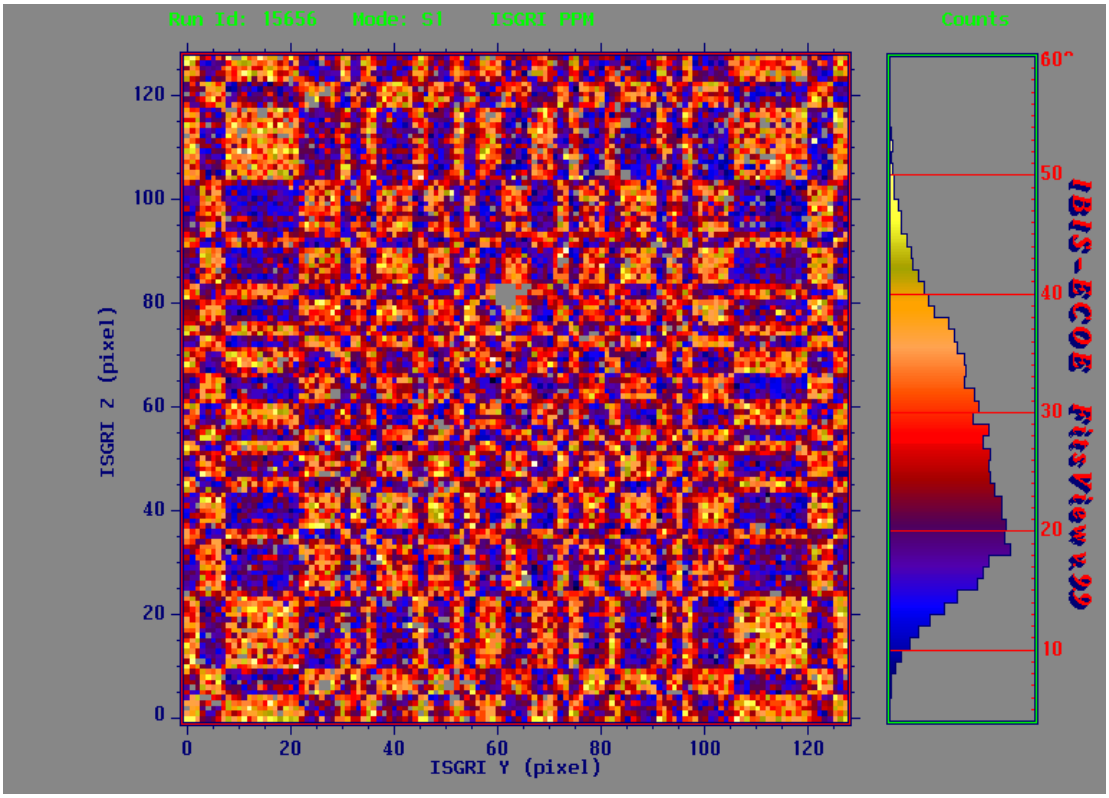
Rev	Start time (UTC)	End time (UTC)	Exp. time (s)	Source	Ra (J2000)	Dec (J2000)	Pattern	PI	Proposal
541	2007-03-19 12:53:18	2007-03-20 15:34:16	90000	Crab cal IBIS/SPI	05:34:31.90	+22:00:52.0	5x5	Public	8860127
541	2007-03-20 15:50:16	2007-03-20 18:36:56	10000	Crab cal JEM-X	05:34:31.90	+22:00:52.0	Staring	Public	8860123
541	2007-03-20 18:38:26	2007-03-20 20:11:47	5601	Crab cal JEM-X	05:34:31.90	+22:00:52.0	Staring	Public	8860124
541	2007-03-20 20:39:36	2007-03-20 21:27:55	2899	Crab cal JEM-X	05:34:31.90	+22:00:52.0	Staring	Public	8860124
541	2007-03-20 21:29:25	2007-03-21 00:07:45	9500	Crab cal JEM-X	05:34:31.90	+22:00:52.0	Staring	Public	8860125
541	2007-03-21	2007-03-22	96041	Crab cal IBIS	05:34:31.90	+22:00:52.0	Staring	Public	8860126

	00:09:15	02:49:56							

During one pointing of the first 5x5 dithering observation, the following shadow of the coded mask was detected by ISGRI (source: ECOE). As expected the image of the mask is not centred. In addition a grey area at about (Y=60, Z=80) shows the ISGRI ASIC damaged during pre-launch activity.

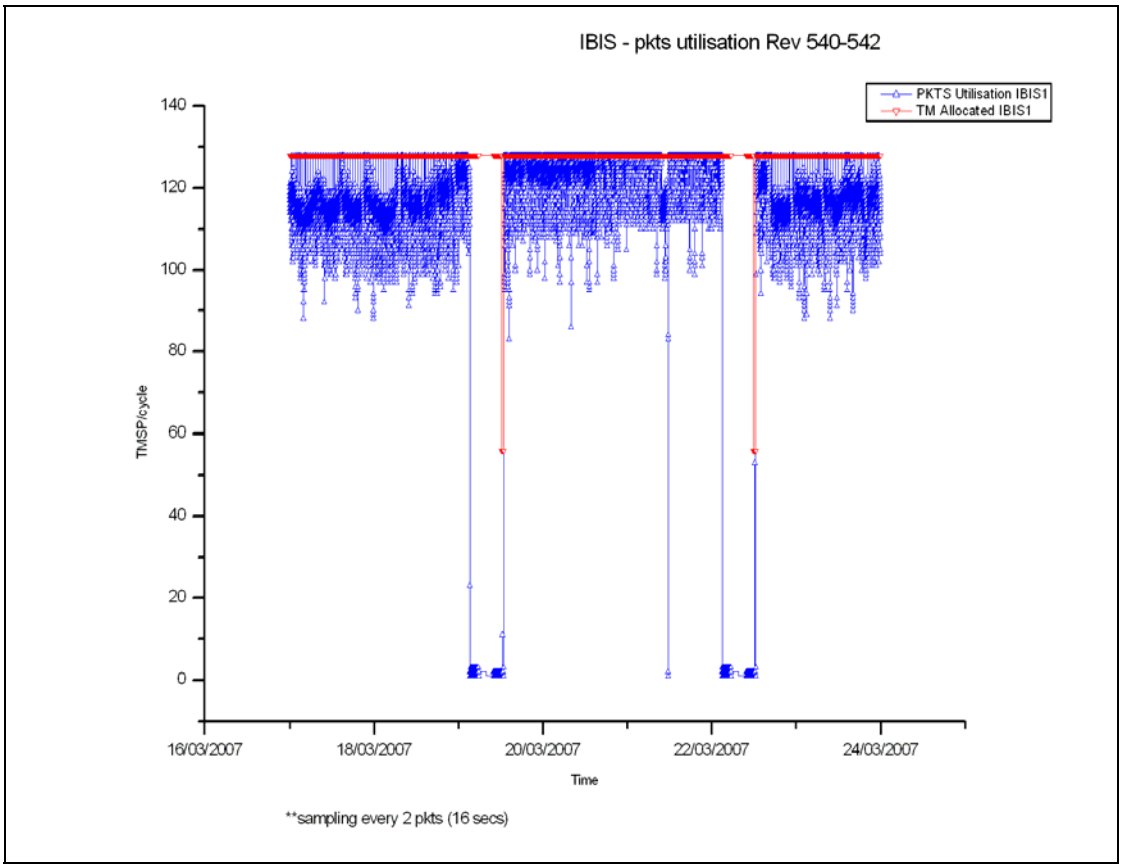


During the last staring observation, the following shadow of the coded mask was reported by ISGRI (source: ECOE). As expected during this staring, the image of the mask is centred. In addition a grey area at about (Y=60, Z=80) shows the ISGRI ASIC damaged during pre-launch activity.



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 119.66 TMPS/cycle, up 6.61 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.

In revolutions 540 and 541 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.

In revolution 541 both JEM-X units were activated for the Crab calibration, with the following TM allocation:

- 2007-03-19T12:50:34Z - 2007-03-20T15:49:01Z: 4 packets/cycle each
- 2007-03-20T15:49:01Z - 2007-03-20T21:28:10Z: 8 packets/cycle each
- 2007-03-20T21:28:10Z - 2007-03-21T00:08:00Z: 15 packets/cycle each
- 2007-03-21T00:08:00Z – end of revolution: 4 packets/cycle each

During this revolution, various different configuration settings for both JEM-X units were used for tests during the Crab calibration, in line with OCR-224. These are detailed in Section 8.3.4.

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, 160 of the 164 planned science pointings for OMC were executed nominally, 1 started late and 3 were lost.

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

3.2.5 IREM

Prepared by (Lisa Marx, trainee)

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. On the 24/03/2007 new sunspot 947 posed no threat of solar flares. The rest of the time, the sun was blank.

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

4 Ground Facilities

The Operational ground facilities performance was good this week. Three science pointings were lost. The overall performance was well over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was very good this week although the TC history task crashed twice, and also the Global MMI task crashed, there was, however, no impact. 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, 6 occasions of data drops from Redu, and 1 from DSS-24, none of which has any impact. The overall performance was well over the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSFs are available and observations have been planned up to revolution 549.

TSF's up to revolution 544 have been received.

2. Observation status

No new ECS files have been received this week.

3. ISOC Science Data Archive

A second beta version of ISDA 2.7 is under testing.

4. ISOC system

Version 14.5 is being finished to be tested next week.

5. Problems

None.

4.3.2 ISDC

Status of ISDC observation processing on 26/03/2007:

- Latest Standard Analysis completed: observation 04200560170 (GX 339-4, Revolution 531) on 19/03/2007.

- Latest products archived: observation 04200560170 (GX 339-4, Revolution 531) on 19/03/2007.

- Latest observation products sent to the observer: observation 04200300001 (IGRJ11215-5952, Revolution 529-530) on 19/03/2007.

5 Special Events

6 Anomalies

The following problems were reported that impacted operations:

- On DoY 078, at 17:08, due to a hit on the line, all the TM links with Redu dropped. They were recovered at 17:10. The impact was the loss of OMC pointing 05410010.
- On DoY 081, at 13:07, the loss of the guide star led to the loss of pointings 05420003, and the OMC part for pointing 05420004.
- At 23:18:39, another lost guide star caused about a 15 minute delay in the start of pointing 05420018.

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

AR id	Date Created	Subject	Segment	Status
INT-2907	20/03/2007	Lost track at DSS-27 - corrupted	NASA	Closed

AR id	Date Created	Subject	Segment	Status
		prediction file	Station	
INT-2908	20/03/2007	IFTS instance on IMCA using 50% of CPU	IMCS	Closed
INT-2909	20/03/2007	EEORTM01 was not in Timeline	IMCS	Closed

7 Future Milestones

The following activities are foreseen in the next few weeks.

- Crab Calibration 19/03/2007 Rev. 541
- IMU Calibration and Health Check 10/04/2007 Rev. 548
- RMU-B Health Check 10/04/2007 Rev. 548
- Summer eclipse season starts 18/04/2007 Rev. 550
- Periodic Thruster Torque rescaling 24/07/2007 Rev. 583

Appendix

The appendix includes various detailed information.

7.1 Overview of Revolutions

Revolution 541

The observations in revolution 541 consisted entirely of the "Crab Calibration", with all pointings targeted at (RA 05:34:31.90, DEC +22:00:52.0). They began with a raster dither, to calibrate IBIS & SPI, lasting ~25.0 hours. They continued with a staring observation to calibrate JEM-X, lasting ~7.8 hours. Finally another staring, primarily for IBIS, lasting ~26.7 hours was performed up to the end of the revolution.

During these observations, all instruments were in their nominal science modes. The TM allocation initially at 2007-03-19T12:51:17Z was IBIS 128; SPI 105; JEM-X1 4; JEM-X2 4; OMC 5. At 2007-03-20T15:49:44Z, coinciding with the start of the second part of the observation, the allocation changed to: IBIS 128; SPI 97; JEM-X1 8; JEM-X2 8; OMC 5. At 2007-03-20T21:28:53Z, the allocation changed to: IBIS 128; SPI 83; JEM-X1 15; JEM-X2 15; OMC 5, and at 2007-03-21T00:08:43Z, coinciding with the start of the final part of the observations, the allocation returned to: IBIS 128; SPI 105; JEM-X1 4; JEM-X2 4; OMC 5, until the critical altitude descending at 2007-03-22T03:03:09Z.

Revolution 542

The observations in revolution 542 began with a hexagonal dither of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. It continued with a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), lasting ~5.6 hours. This was followed by a raster dither of AO-4 KP: l=+6.9 (RA 18:01:12.94, DEC -22:59:28.5), lasting ~8.1 hours. After that, raster dithers of AO-4 KP: l=-6.9 (RA 17:28:08.54, DEC -34:45:18.6) and AO-4 KP: l=+6.9 (RA 18:01:12.94, DEC -22:59:28.5), each lasting ~18.5 hours were performed. Finally another raster dither of AO-4 KP: l=-6.9 (RA 17:28:08.54, DEC -34:45:18.6), lasting ~1.5 hours was performed 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.

7.2 Consumables

7.2.1 Detailed Fuel Book-keeping

```
2007-03-02T21:58:45.000Z     147.9808    F   Automatic TM processing.
2007-03-04T11:39:44.000Z     147.9728    F   Automatic TM processing.
2007-03-05T21:13:00.000Z     147.9590    F   Automatic TM processing.
2007-03-07T11:29:29.000Z     147.9456    F   Automatic TM processing.
2007-03-07T17:27:46.000Z     147.8648    F   Automatic TM processing.
2007-03-10T11:15:21.000Z     147.8492    F   Automatic TM processing.
2007-03-11T21:44:52.000Z     147.8042    F   Automatic TM processing.
2007-03-13T11:04:56.000Z     147.7933    F   Automatic TM processing.
2007-03-13T23:32:58.000Z     147.7798    F   Automatic TM processing.
2007-03-16T10:54:00.000Z     147.7652    F   Automatic TM processing.
```

```
2007-03-17T21:08:44.000Z     147.7164    F   Automatic TM processing.
2007-03-19T10:42:16.000Z     147.6978    F   Automatic TM processing.
2007-03-20T20:20:19.000Z     147.6410    F   Automatic TM processing.
2007-03-22T10:30:15.000Z     147.6223    F   Automatic TM processing.
2007-03-22T16:28:00.000Z     147.5993    F   Automatic TM processing.

This report was generated  Fri Mar 23 08:00:31 GMT 2007
```

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, 17/03/2007 –23/03/2007

AOCS operations were executed from the Automatic Timeline.

During this period, 91 Open Loop Slews, 87 Closed Loop Slews and 5 Momentum Biases were executed.

2 slews (2 CSL) were missed from TL during the observation period due lost of guide star reported by the STR unit.

The OTF was not reached during PID 05420017, due to lost of guide star.

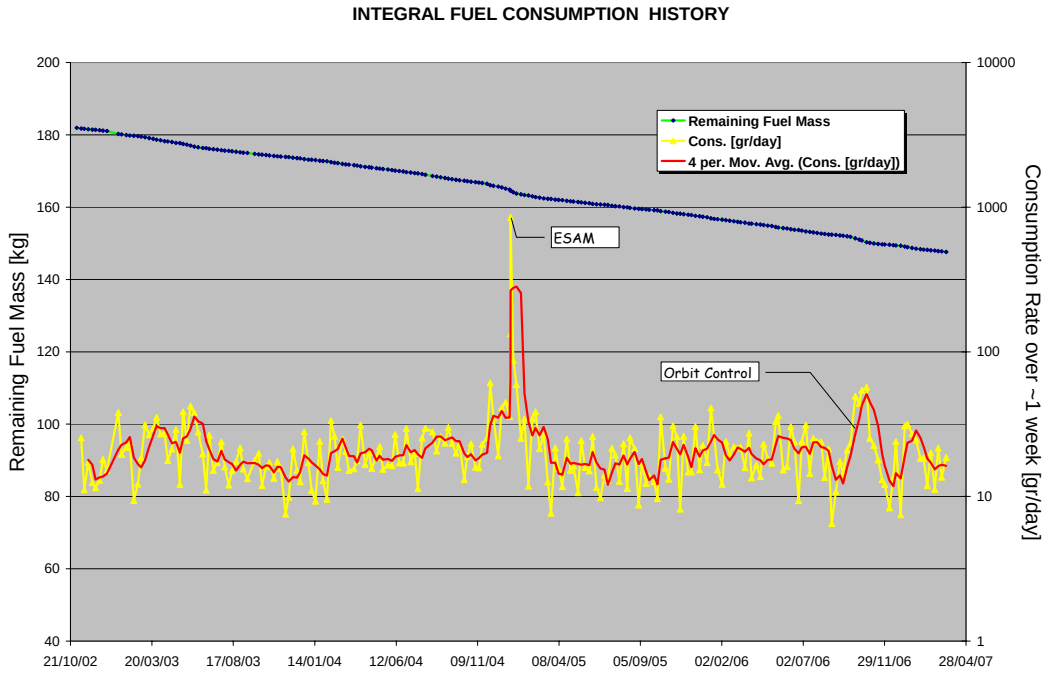
This is equivalent to a ~1.1 % of the total number of slews planned (178).

Orbit Control

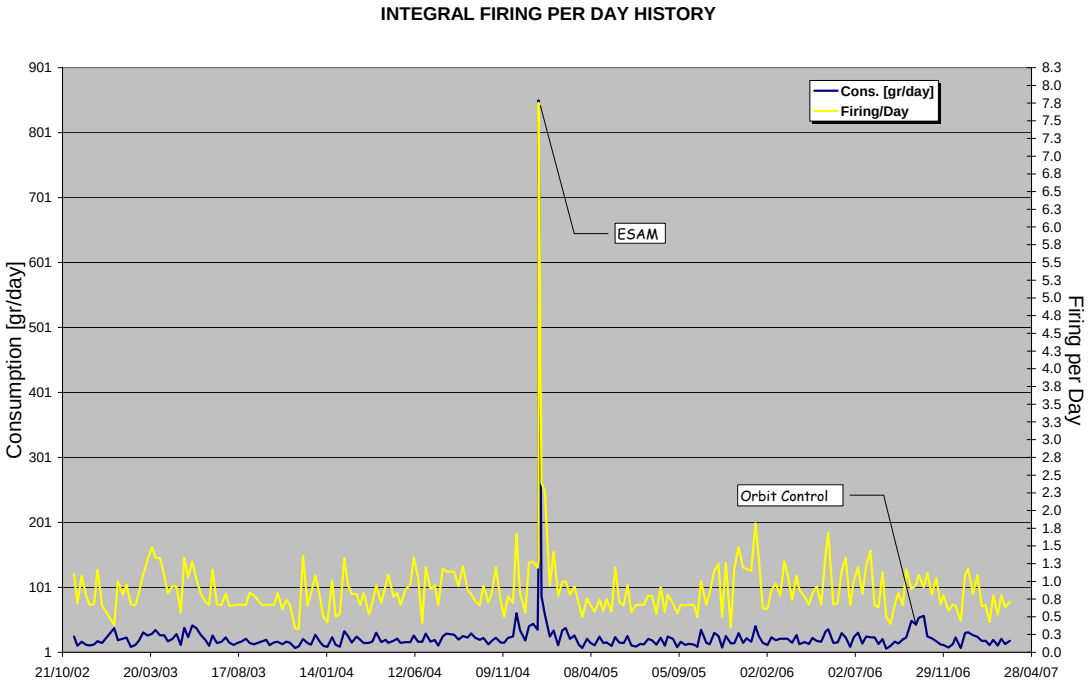
No update.

Fuel consumption

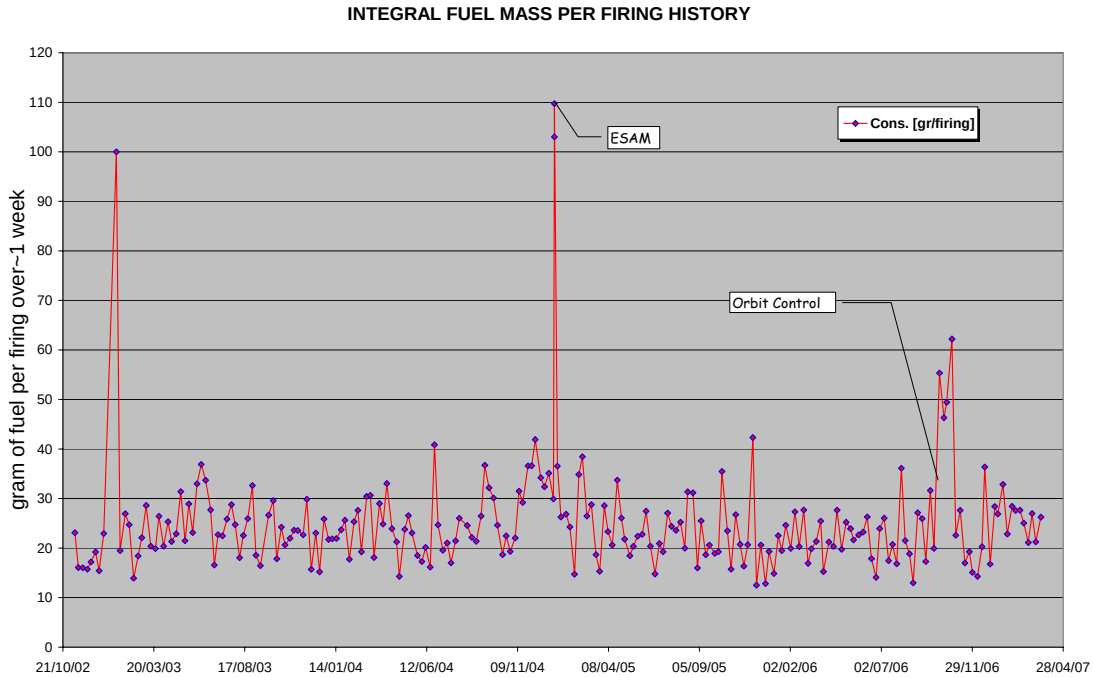
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 22/03/2007 is reported in the plot below.



The firing per day over the period between 01/11/2002 and 22/03/2007 is reported in the plot below.

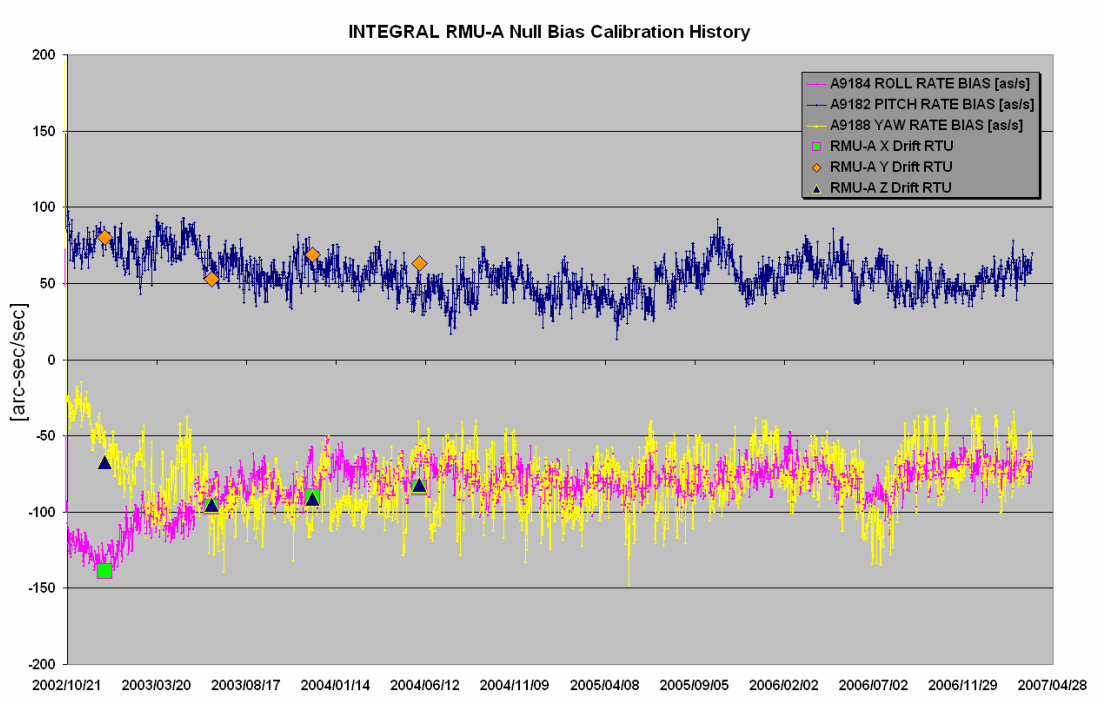


The fuel per firing over the period between 01/11/2002 and 22/03/2007 is reported in the plot below.

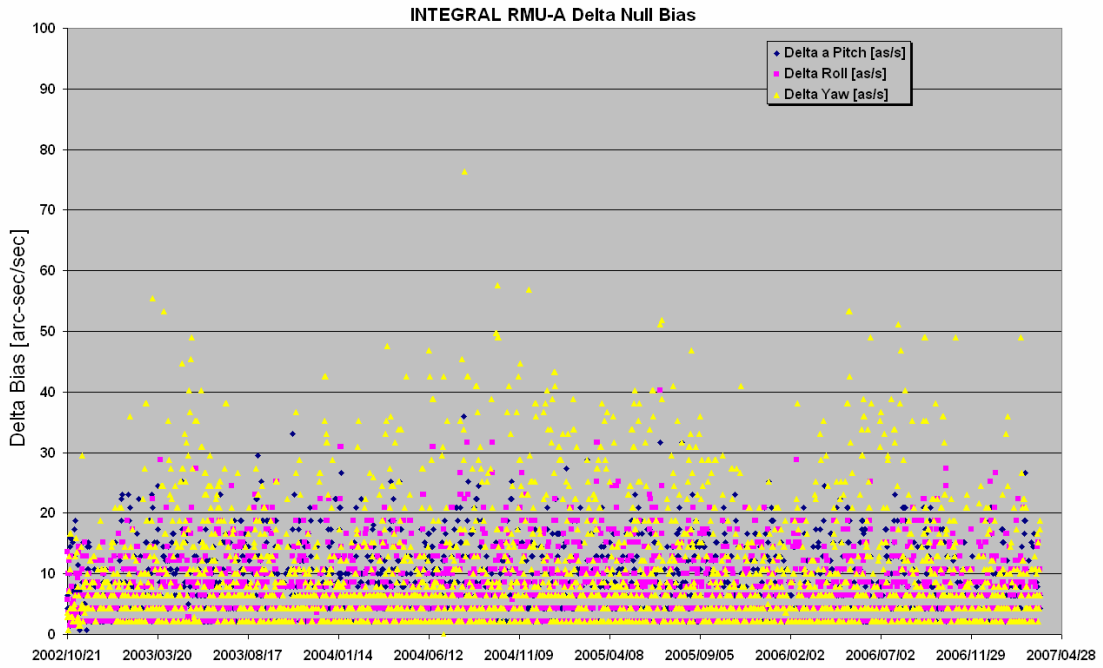


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 23/03/2007 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 23/03/2007 is reported in the plot below



17/03/2007 (Day of Year 076, Revolution 540)

Nothing to report.

18/03/2007 (Day of Year 077, Revolution 540)

Nothing to report.

19/03/2007 (Day of Year 078, Revolution 540-541)

Nothing to report.

20/03/2007 (Day of Year 079, Revolution 541)

Nothing to report.

21/03/2007 (Day of Year 080, Revolution 541)

Nothing to report.

22/03/2007 (Day of Year 081, Revolution 541-542)

STR lost of guide star: at 13:07:08z the guide star was lost between the successful execution of S/T for slew ID 05420003 and the swap of the new guide star in slot#2. The PTV (Pre-Transmission Verification) associated to the slew sequence prevented the release of the next slew commands. As automatic reaction the ACC switched ON the IMU 1 and an automatic mapping was commanded.

The guide star when the event occurred, was Mi 8.4 @ CCD location [2999, -22101], about at the edge of the STR FOV (in Z coordinate).

After the automatic mapping a new guide star was picked.

A manual recovery was then performed from attitude of PID 05420002 to PID 05420003. The next slew ID 05420004 was manually updated in TL and the AOCS enabled in TL at 14:39z.

The reason for the lost of guide star is still under investigation.

The following slew was not executed from TL: 05420003 (CSL).

STR lost of guide star: at 23:18:39z the guide star was lost, with the manoeuvre timer still running (AOCS in tranquilisation phase after the end of the slew execution) for slew ID 05420017. Being the event occurred >1 minute after the slew end (23:17:21z), as automatic reaction the ACC switched ON the IMU 1 (to control the yaw axis) and commanded an automatic mapping.

The guide star when the event occurred, was Mi 8.0 @ CCD location [-19101, 21884], about at the edge of the STR FOV (in Z coordinate).

After the automatic mapping a new guide star, Mi 6.85 @ CCD location [5947, 1565] was picked but the OTF was not reached during PID 05420017. The update (based on first mapping after slew end but before the IMU1 ON) for next slew ID 05420018 was received in time but the AOCS s/s was left disabled in TL because the update based on old attitude information (pre IMU1 ON) and too short in time to perform a new slew update (commanding for slew ID 05420018 expected at 23:24z). Therefore the slew ID 05420018 failed release from TL.

The reason for the lost of guide star is still under investigation.

A manual recovery was then performed from attitude of PID 05420017 to PID 05420018. The next slew ID 05420019 was manually updated in TL and the AOCS enabled in TL at 23:54z.

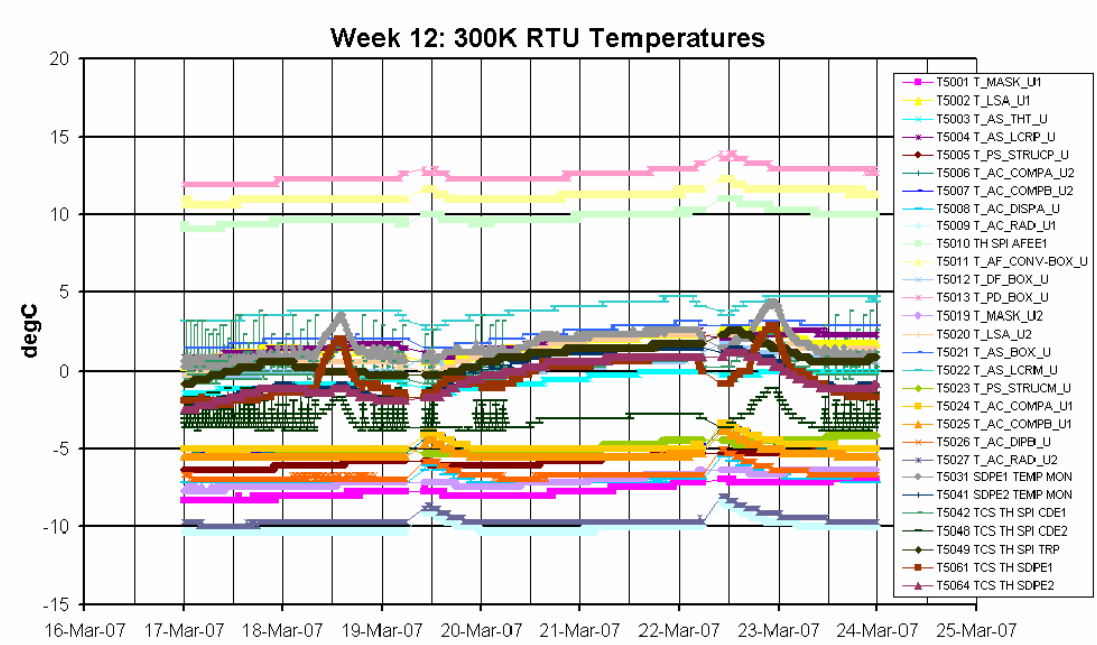
The following slew was not executed from TL: 05420018 (CSL).

23/03/2007 (Day of Year 082, Revolution 542)

Nothing to report.

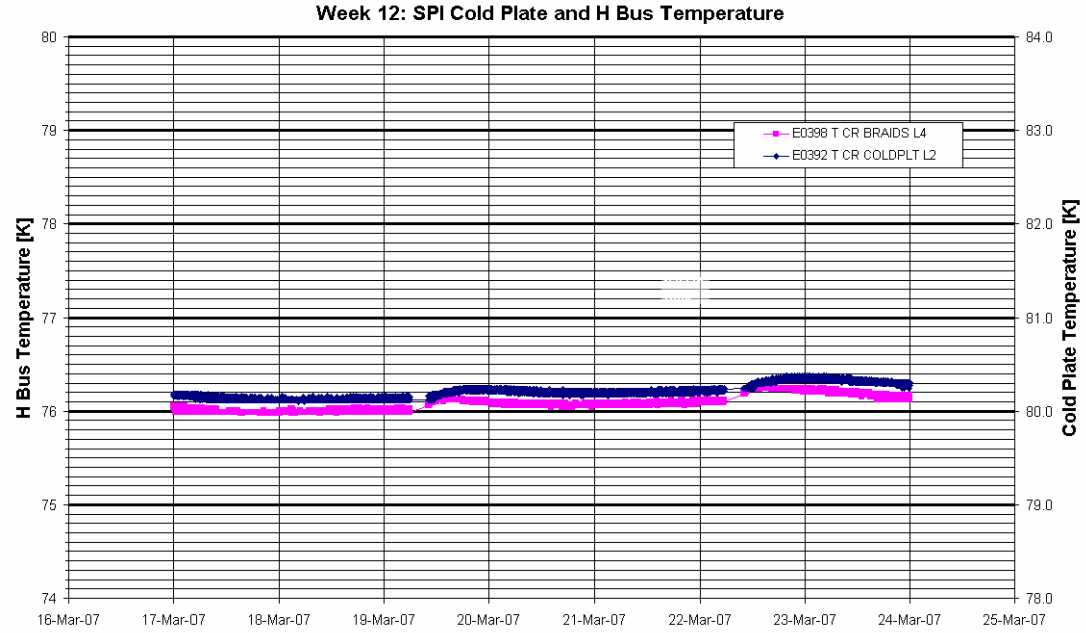
7.3.2 SPI Operations

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.

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

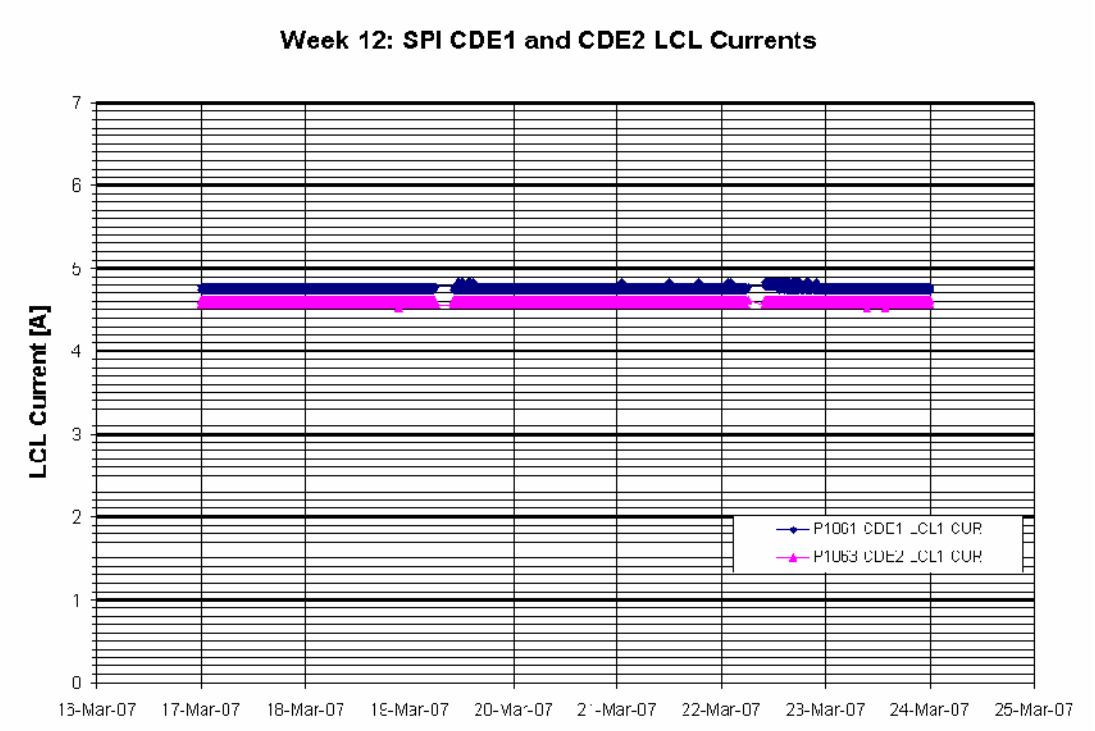


The stroke of all four compressors has been 40 since 03-02-2007 at 13:16Z.

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

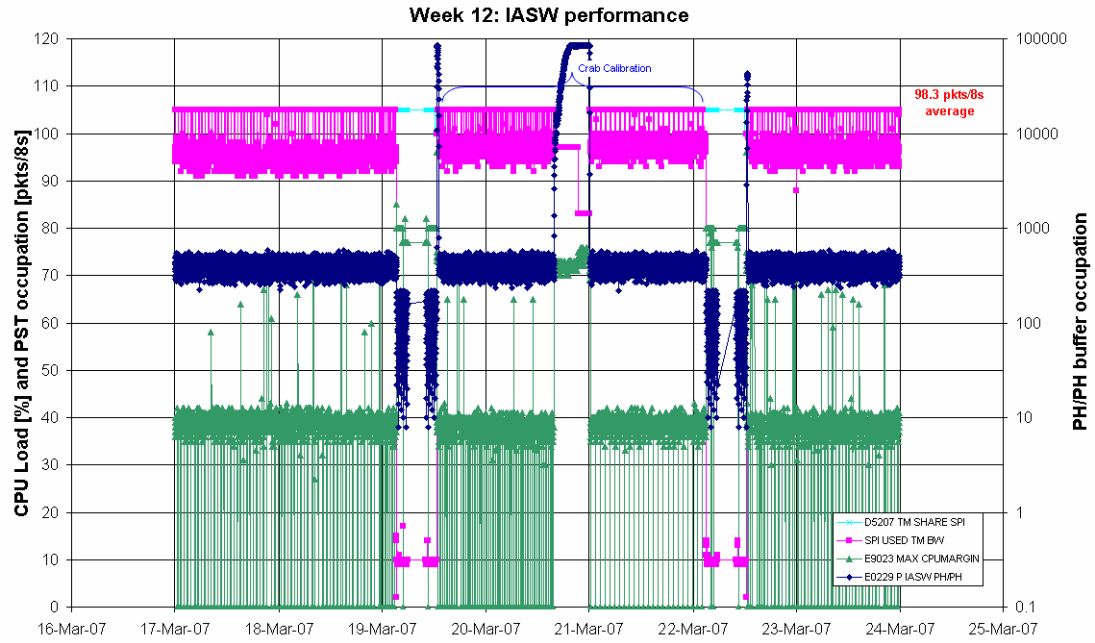
- Average CDE1 LCL Current = 4.77A
- Average CDE2 LCL Current = 4.58A

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



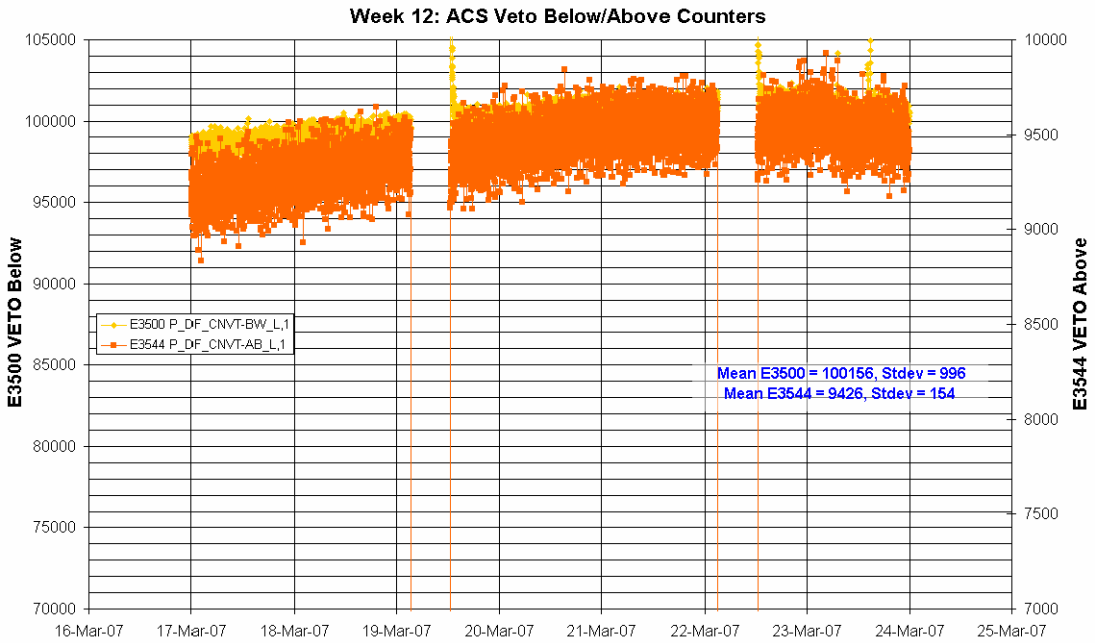
DPE & IASW: The DPE health and IASW performance is nominal. The IASW version installed is 433. The spectra scaling parameter was set to 9/19 SE.

The average TM bandwidth occupation of SPI was 98.3 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).

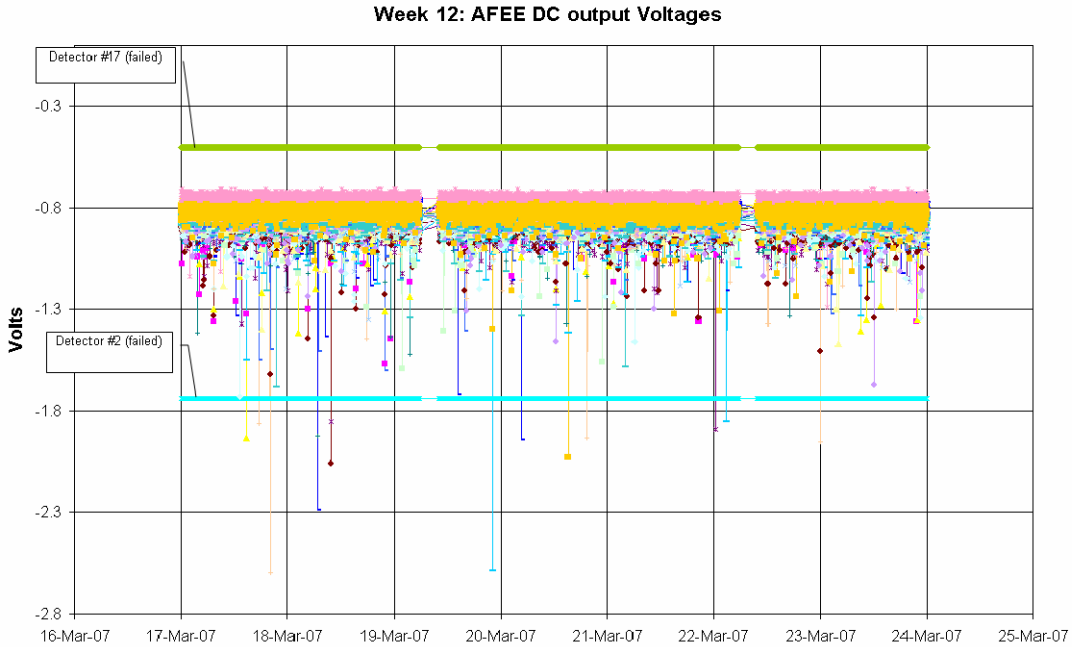
The following plot shows the ACS overall count rate evolution during the reporting period:



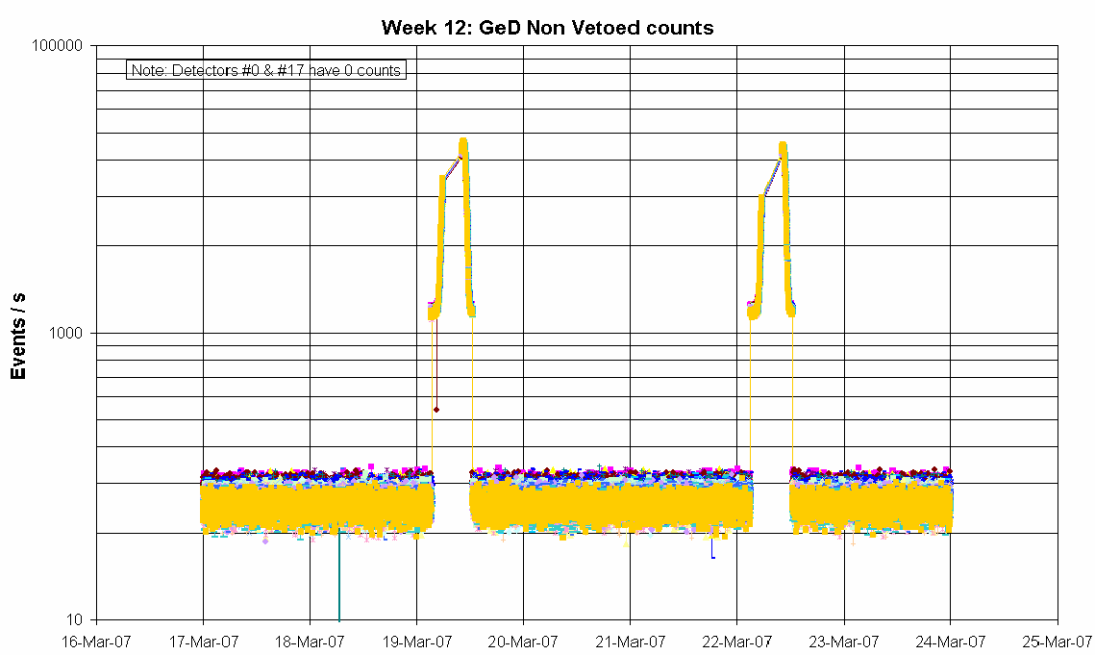
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution. The energy resolution of GeD#4 was recovered with the last annealing.

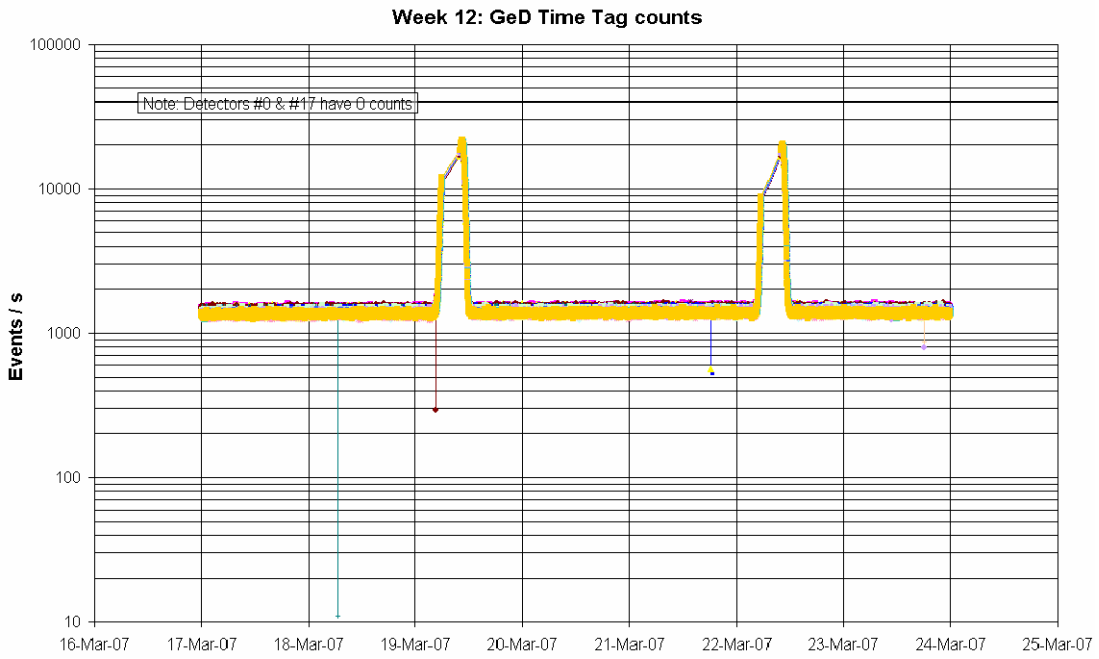
The GeD#12 HV remained at 3.5kV throughout the reporting period.

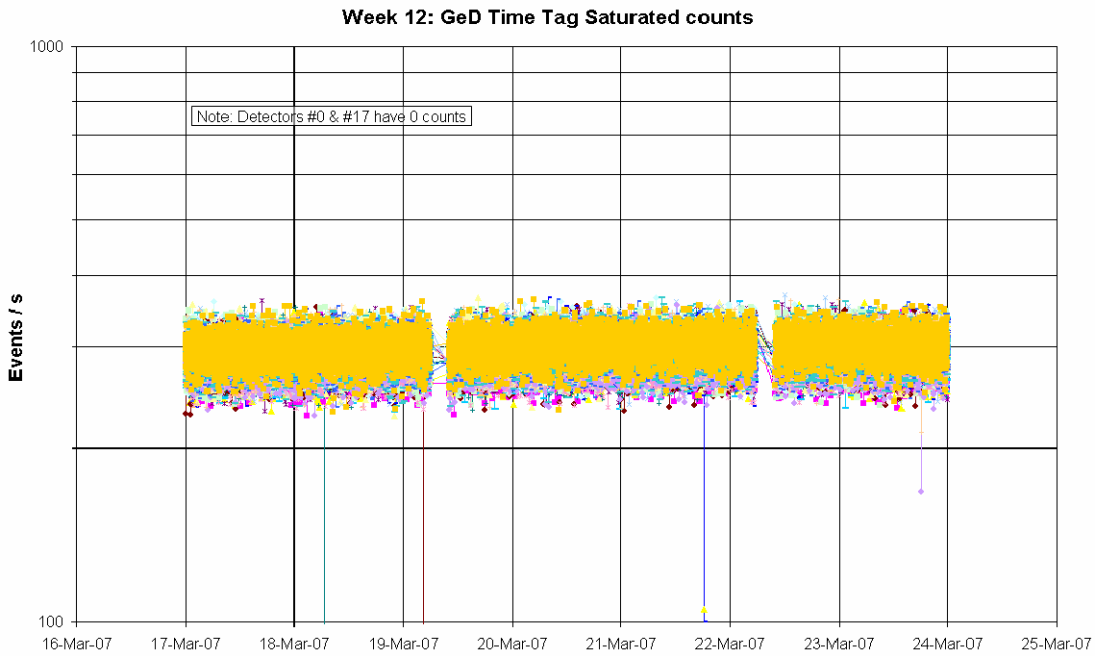
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004.



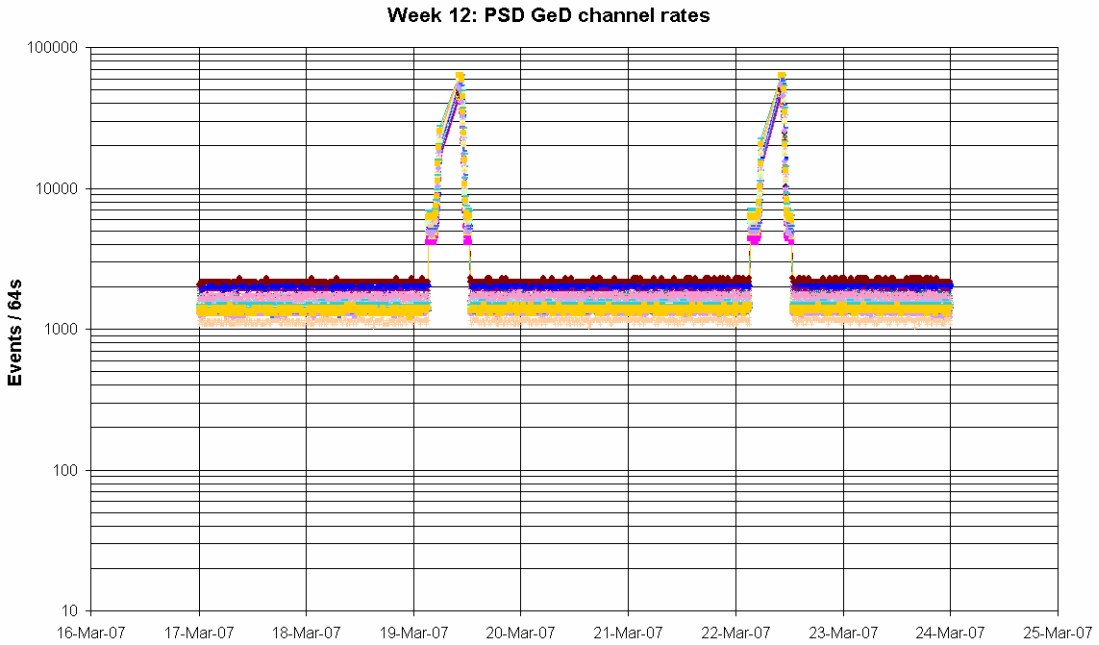
DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.







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 2007-03-17 at 16:38:50Z TM parameter E3826 U PD 5V-ANL L went OOL Low (value = -5.2724 V). This is the PSD - 5V analogue voltage. It returned within limits when the next packet was received at 16:39:54Z.
- On 2007-03-19 at 10:27:24Z one occurrence of OEM 1024 RealTime 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was just after AOS of revolution 541, when the time verification TC was sent. This is sometimes received when this TC is sent and no action was taken.

- On 2007-03-19 at 12:42:46Z the TM parameter E3500 P_DF_CNVT-BW_L went OOL High. This was just after radiation belt exit of revolution 541. It returned within limits at12:49:42Z.
- On 2007-03-21 at 03:48:20Z and on 2007-03-23 at 05:58:28Z one occurrence of the following OEM was received:

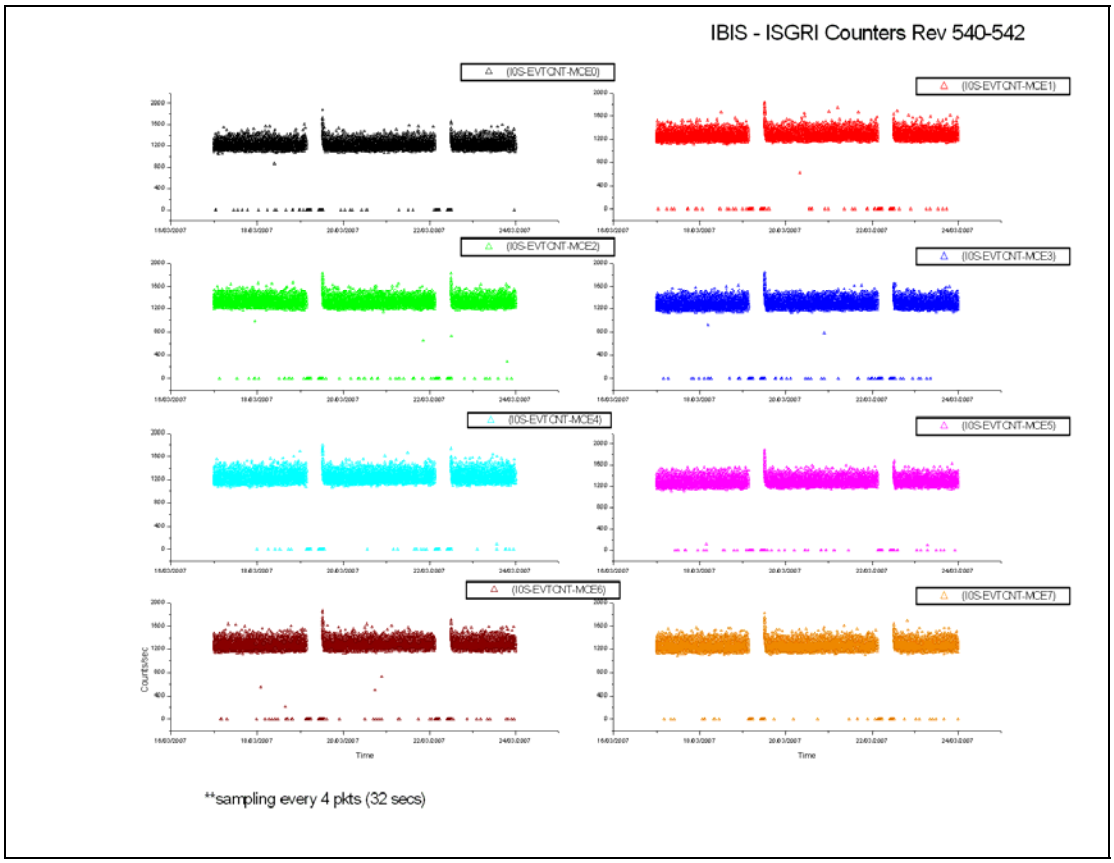
  APID 1024 ID 243 EVENT SPI1 SPECTRA BUILDING NOT COMPLETED

was received, for GeD13 and GeD15 respectively. This was during pointing IDs 05410057 and 05420026 respectively. As they were one-off occurrences, no action was taken.

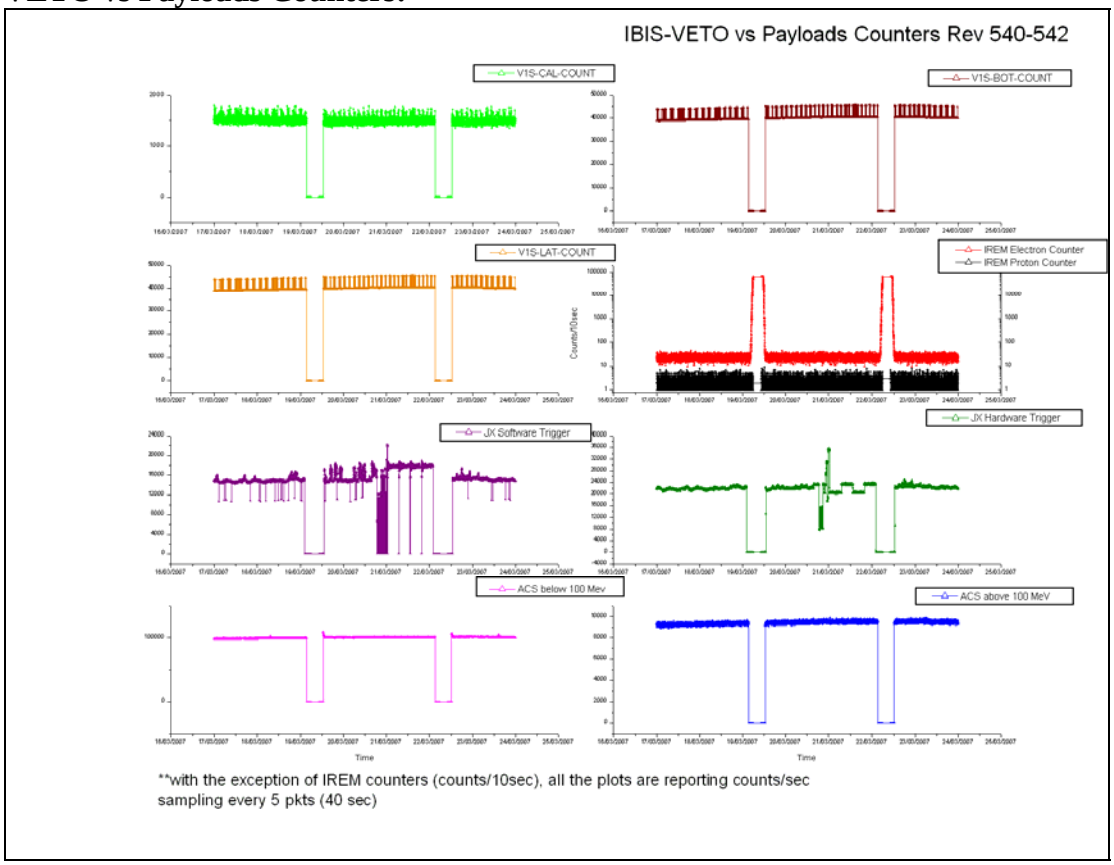
7.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

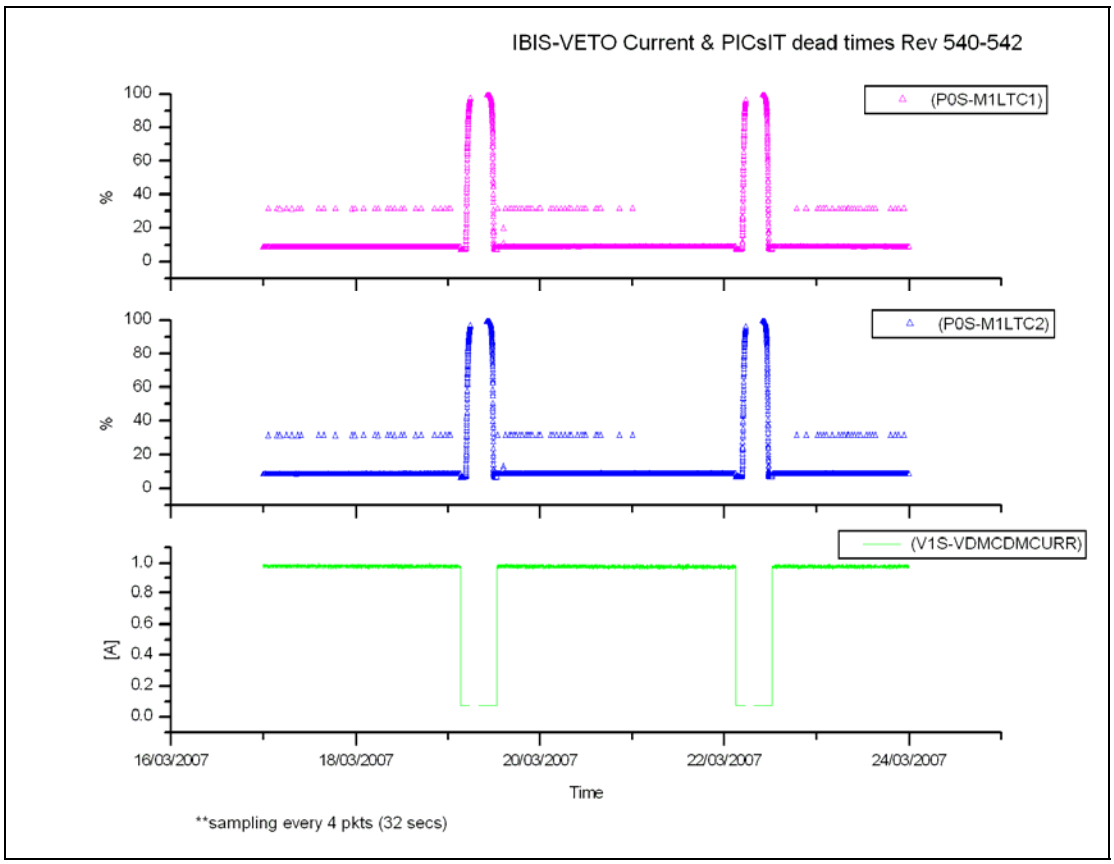


VETO vs Payloads Counters:

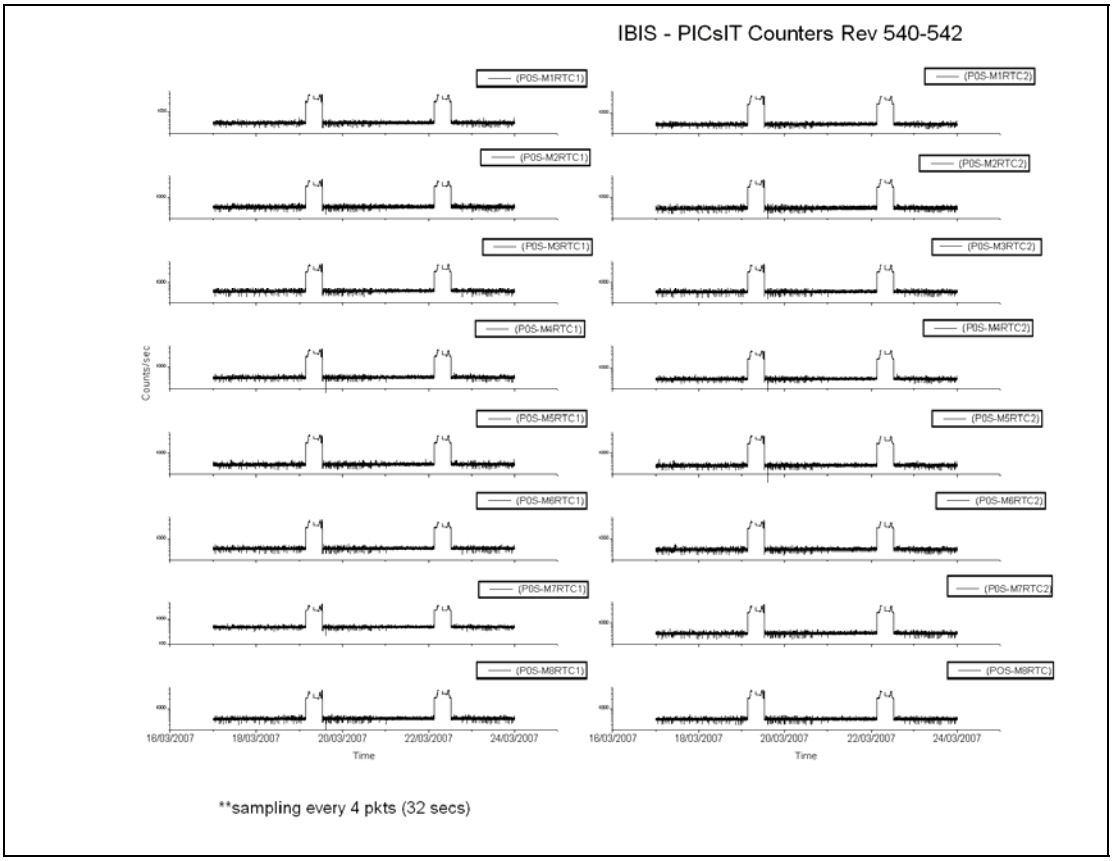


The week was characterised by low radiation.

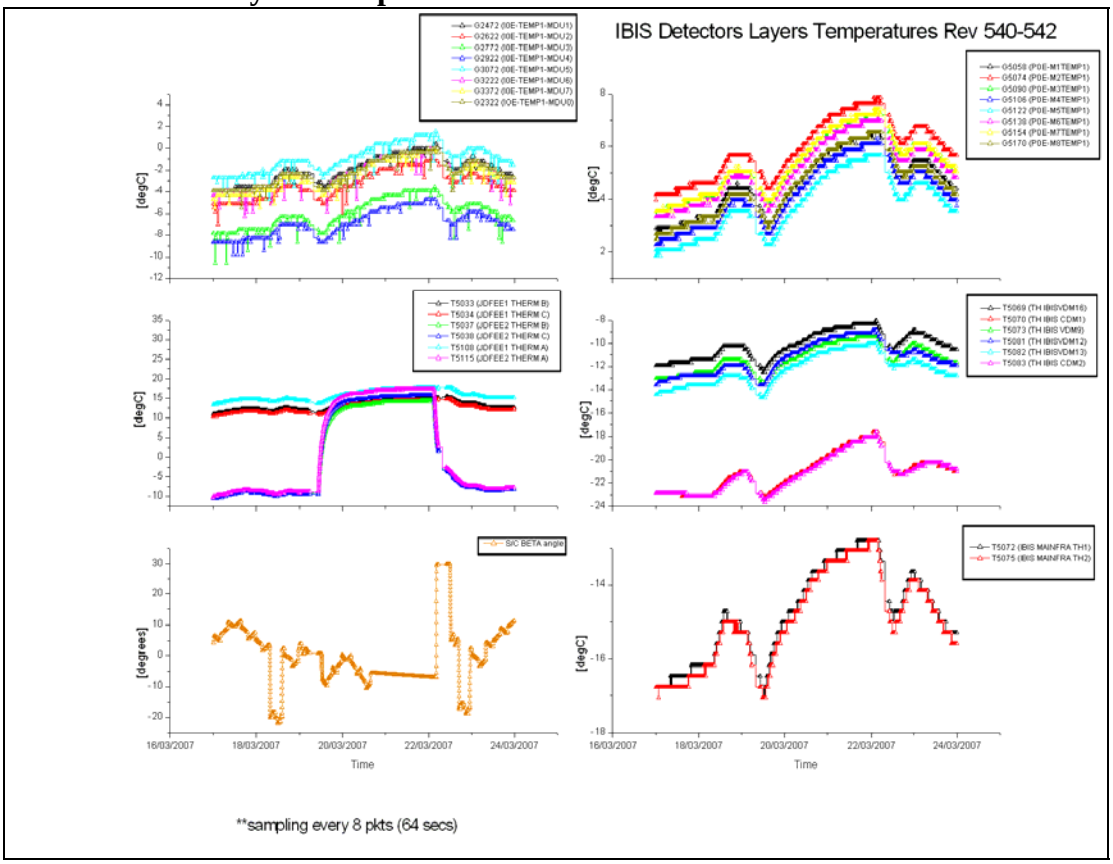
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



Note: JEMX-2 was activated for the CRAB calibration in revolution 541.

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 2007.078 (19/03/2007):

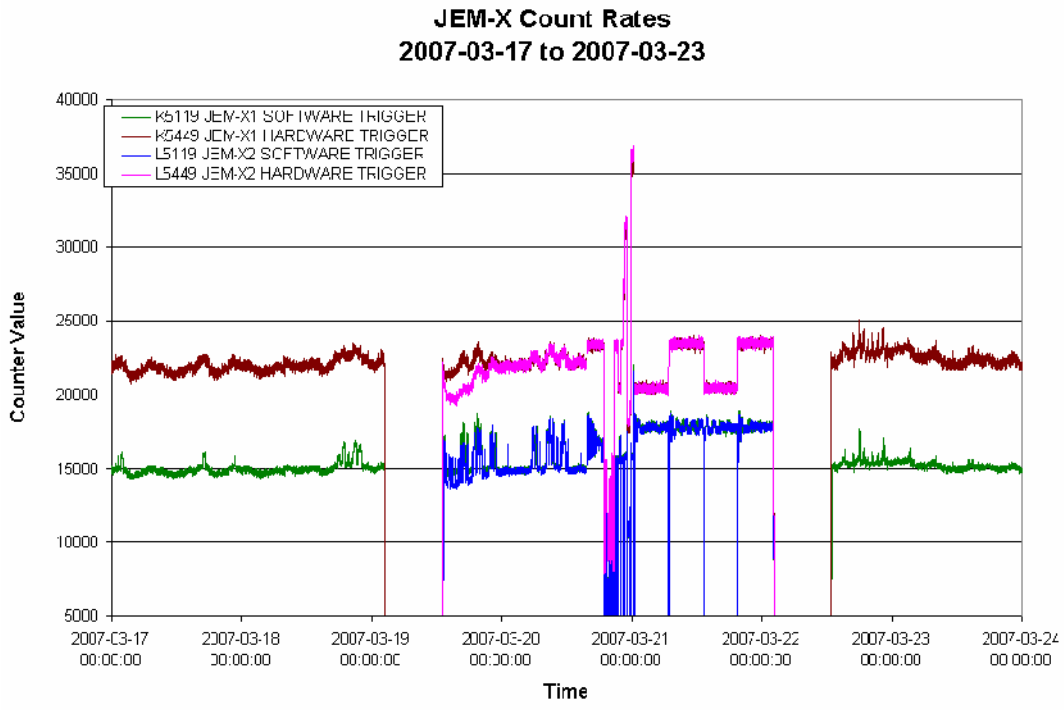
At 14:28Z parameters from TM families G5068 and G5072 (P0S-MiF1 and 2 ERRF) were reported failing SCC. According to FDIR, no action was required as the parameters went back into limit in the next cycle.

DoY 2007.080 (21/03/2007): Histogram problems

At 10:08Z, after Ground Station Hand-Over, TM parameter X7500 (IBIS HIST DWN LD) was reported OOL flagging a problem with IBIS histograms downloading.
Following the indication in the FDIR, the operator waited to see if the histograms would restart after the next slew. This did not occur, and at 11:45Z the operator forced the downlink of all remaining histograms with FCP_IBIS1_0312 as indicated in FDIR. IBIS was back in Scientific Standard mode at 11:46Z and during the next pointing it was verified that the histograms were downloaded nominally.

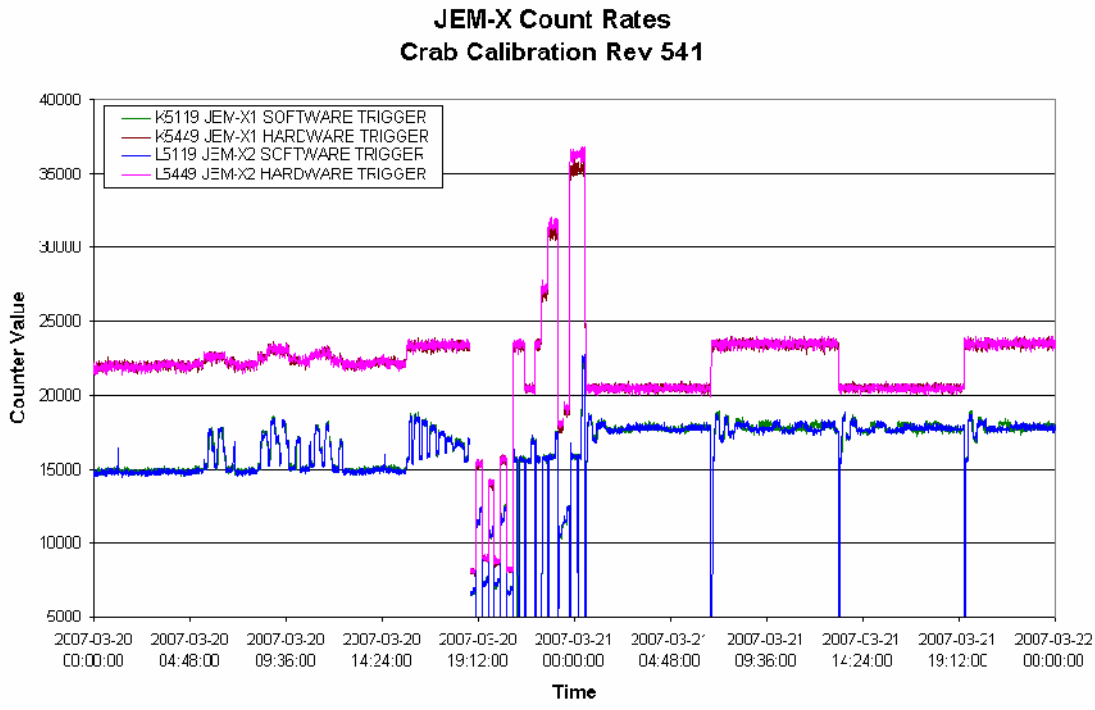
7.3.4 JEM-X Operations

JEM-X Count Rates
JEM-X count rates over the reporting period are displayed in the following graph[1].



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

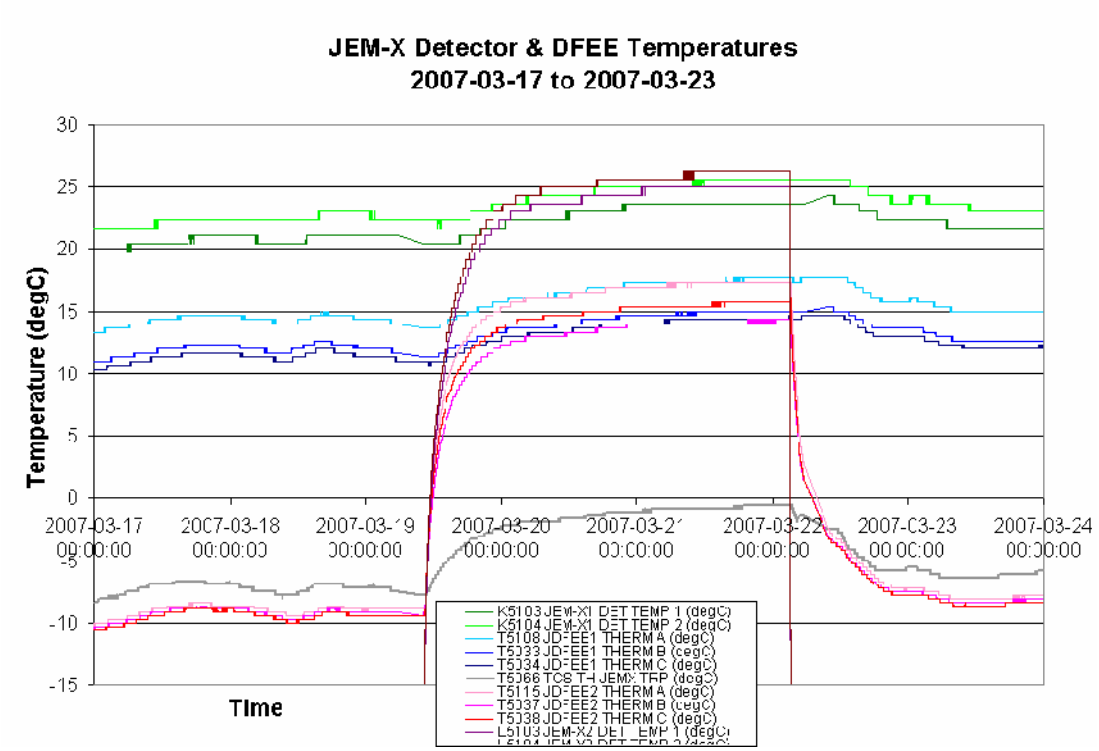
A zoomed plot of the count rates during the Crab calibration observations is given below:



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 graph[2].

[2] Data sampled (1 frame in 8)



JEM-X Daily Report

2007-03-17 (DOY 076, Rev 540) to 2007-03-18 (DOY 077, Rev 540)

JEM-X1 operations executed nominally.

2007-03-19 (DOY 078, Rev 540-541)

In line with OCR-224, in order to activate JEM-X2 for the upcoming Crab calibration observations in revolution 541, starting at 03:20Z, after radiation belt entry of revolution 540, the JEM-X2 DPE and DFEE by were switched on by executing:

- Uplink ED DEBWHI00 to assign bandwidth to JEM-X2
- FCP_JEM2_0010 JEMX2 DPE AND CSSW ACTIVATION
- FCP_JEM2_0011 JEMX2 IASW DPE PATCH FOR BCP PID INTERPRETATION
- FCP_JEM2_0015 JEMX2 IASW ACTIVATION
- FCP_JEM2_0016 JEMX2 ENABLE BCP DISTRIBUTION
- FCP_JEM2_0017 JEMX IASW EXTENDED TM CHECK
- FCP_JEM2_0020 JEMX2 DFEE 1ST ACTIVATION AFTER DPE SWITCH ON.
- FCP_JEM2_0040 JEMX2 TRANSITION TO SAFE

The operations were completed by 11:45Z, before radiation belt exit of revolution 541.

For the remainder of the day JEM-X1 and JEM-X2 operations were executed nominally via the Timeline.

2007-03-20 (DOY 079, Rev 541)

Throughout the day special manual configuration settings of both JEM-X1 and JEM-X2 were performed for the Crab calibration (OCR-224). The operations were performed according to INT_OR_0281. For these tests, the JEM-X1 and JEM-X2 reactions to the OTF flag in the Broadcast Packet was disabled. This was performed at 15:52:59Z via FCP_JEM1/2_0120. In summary the configuration settings for the tests were as follows:

- **Starting at 15:50:16Z: Test 1** (8 TM pkts/cycle for each JEM-X)

Both JEM-X units in Data Taking with nominal HV and the following different settings of the Grey Filter for the following observation times:

Grey Filter	31	1	29	3	27	7	25	11	23	15	21	17	19	31
Observation Time (ksec)	.4	1	.5	1	.5	1	.5	1	.5	1	.5	1	.5	.4

- **18:38:26Z - 21:10:00Z: Test 2** (8 TM pckts/cycle for each JEM-X)

Both JEM-X units in Data Taking with nominal HV and the following different settings of the Grey Filter and Anode configuration for the following observation times:

Grey Filter	Anodes on	Observation Time
15	1+2+3+4	0.5 ks
31	1	0.5 ks
15	1	0.5 ks
31	1+4	0.5 ks
15	1+4	0.5 ks
31	2	0.5 ks
15	2	0.5 ks
31	2+3	0.5 ks
15	2+3	0.5 ks
31	3	0.5 ks
15	3	0.5 ks
31	2+4	0.5 ks
15	2+4	0.5 ks
31	4	0.5 ks
15	4	0.5 ks
31	1+2+3+4	0.5 ks

At 21:10Z the DFEE Integer parameter 64 was set to 1023 (RAW DEC) for both JEM-X units to allow calibration source data in the science TM in preparation for Test 3.

- **Starting at 21:29:25Z: Test 3** (15 TM pckts/cycle for each JEM-X)

Both JEM-X units in Data Taking with the following different settings of the Grey Filter; Anode configuration and Cathode Voltages for the following observation times:

Obs num	Grey Filter	Anodes on	VC setting	Obs Time
1	31	1+2+3+4	80(hex)	1.0 ks
2	15	1+2+3+4	80(hex)	0.5 ks
3	31	1+2+3+4	70(hex)	1.0 ks
4	31	1+2+3+4	60(hex)	1.0 ks
5	31	1+2+3+4	50(hex)	1.0 ks
6	15	1+2+3+4	50(hex)	0.5 ks
7	31	2+3	50(hex)	0.5 ks

8	15	2+3	50(hex)	0.5 ks
9	31	1+4	50(hex)	0.5 ks
10	15	1+4	50(hex)	0.5 ks
11	31	1+2+3+4	40(hex)	1.0 ks

During observation numbers 5, 6 and 11 above, the TM parameter K5449 HARDWARE TRIGGER was OOL High.

2007-03-21 (DOY 080, Rev 541)

Starting at 00:09:15Z the following configuration settings of both JEM-X units were restored:

- The DFEE Integer parameter 64 was reset to 760 (RAW DEC) for JEM-X1 and 774 (RAW DEC) for JEM-X2
- The automatic grey filter was re-enabled by executing FCP_JEM1/2_0090 JEMX1/2 SET GREY FILTER SELECTION, setting the following value for the parameter of TC K/L0037:

  K/L0161 = FFFF (hex)
- The JEM-X1 and JEM-X2 reactions to the BCP OTF were re-enabled by executing FCP_JEM1/2_0120 JEMX1/2 SET BCP OVERRIDES

- **Starting at 00:30:00Z: Test 4** (4 TM pckts/cycle for each JEM-X)

Both JEM-X units in Data Taking with nominal Grey Filter and Anode configuration but with different settings for the Cathode Voltage as follows:

- At 00:30:00Z, both units commanded to Setup mode, VC set to 80 Hex and both units returned to Data Taking
- At 06:50:00Z, both units commanded to Setup mode, VC set to 70 Hex and both units returned to Data Taking
- At 13:10:00Z, both units commanded to Setup mode, VC set to 80 Hex and both units returned to Data Taking
- At 19:30:00Z, both units commanded to Setup mode, VC set to 70 Hex and both units returned to Data Taking

2007-03-22 (DOY 081, Rev 541-542)

JEM-X1 and JEM-X2 operations were performed nominally via the Timeline until the deactivation of the units at the end of the revolution. JEM-X1 was commanded to Safe nominally via the Timeline. However commanding to JEM-X2 was disabled from the Timeline to prevent the ED LESAFE02 scheduled erroneously at 01:08:21Z from being uplinked. JEM-X2 was then commanded to Safe manually by uplinking the ED LESAFE02 at 02:07:54Z (at the same time as KESAFE02).

Starting at 03:05Z, after radiation belt entry of revolution 541, the JEM-X2 DFEE and DPE were switch off again by executing:

- FCP_JEM2_9010 JEMX2 DFEE SWITCH OFF.
- FCP_JEM2_9001 JEMX2 DISABLE BCP DISTRIBUTION
- FCP_JEM2_9000 JEMX2 DPE SWITCH OFF

These operations were completed by 03:16Z.

In revolution 542 JEM-X1 operations were executed nominally.

2007-03-23 (DOY 082, Rev 542)

JEM-X1 operations executed nominally.

7.3.5 OMC Operations

2007-03-17 (DoY 076, Rev 540)

Nothing to Report

2007-03-18 (DoY 077, Rev 540)

At 08:06:16, a Trigger command was sent by ISDC. This command was rejected, as the unit was in Stand-by mode at the time. There was no impact.

```
2007.077.08.06.16.076   2007.077.08.06.20.736   1792   RealTime   131     TC REJECT
REJECTED TC1                                          0       0    65535   PR    N
E   E
```

2007-03-19 (DoY 078, Rev 541)

At 17:08, due to a hit on the line, all the TM links with Redu dropped. They were recovered at 17:10. The impact was the loss of pointing 05410010.

2007-03-20 (DoY 079, Rev 541) to 2007-03-21 (DoY 080, Rev 541)

Nothing to Report

2007-03-22 (DoY 081, Rev 542)

At 13:07, a lost guide star caused the loss of slew 05420003. The timeline was suspended, and a recovery performed. The impact was the loss of pointings 05420003 & 05420004. It was at this time the following commands were rejected:

```
2007.081.13.42.33.664   2007.081.13.42.36.810   1792   RealTime   131     TC REJECT
REJECTED TC1                                          0       0    65535   PR    N
E   E
2007.081.13.42.39.914   2007.081.13.42.44.858   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 pointing 05420004.

At 23:18:39, another lost guide star caused a delay in the start of pointing 05420018, originally scheduled for a start about 23:30, it was eventually manually started at 23:46:43.

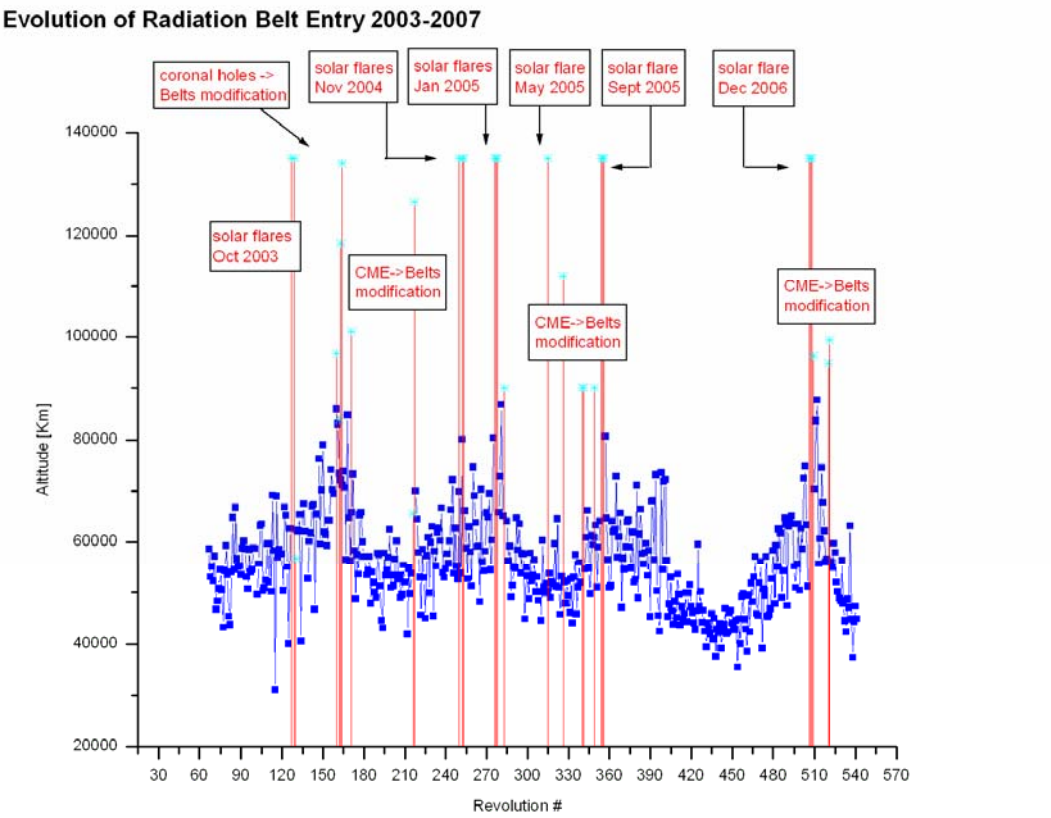
2007-03-23 (DoY 082, Rev 542)

Nothing to Report

On DoY 078 at 03:17:31 and DoY 081 at 03:03:31 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



IREM daily report

Nothing to report

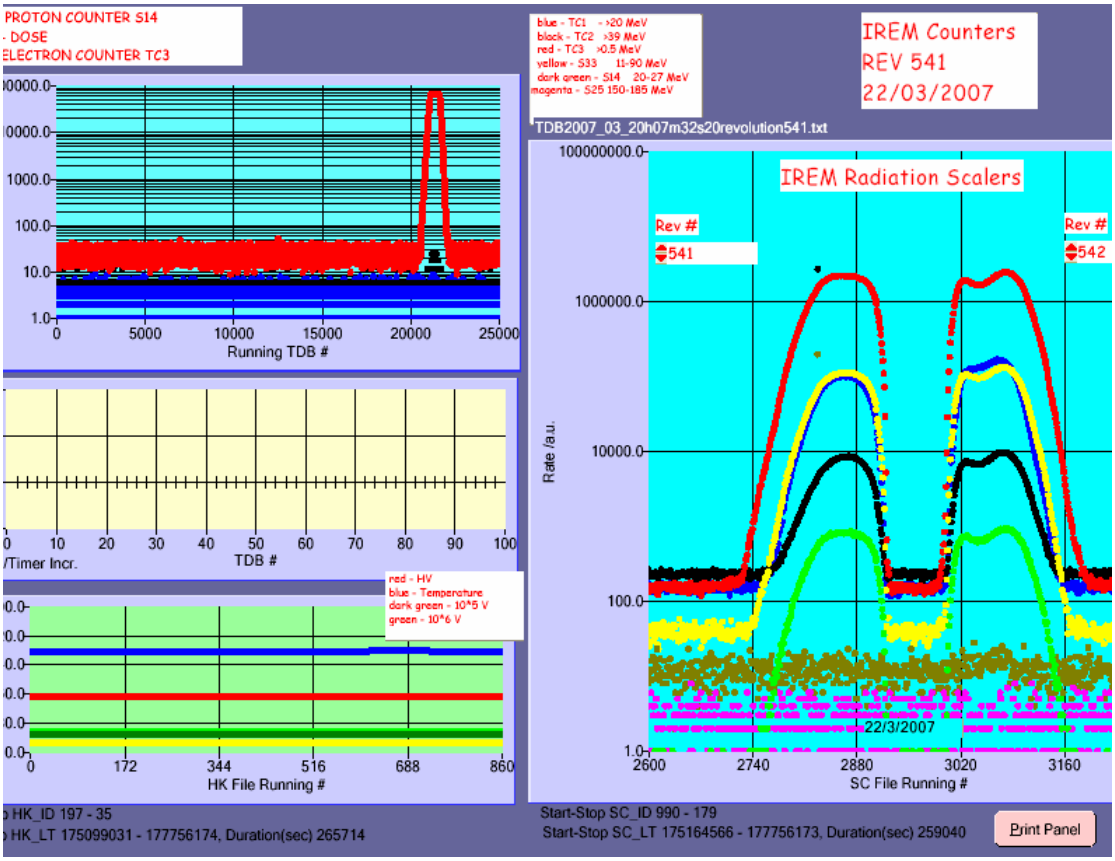
Electron Belts

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]
540	RAD_ENTR R 2007-03-19T03:17:29Z	2007-03-19 04:38:35	47264.7	2007-03-19 04:21:57	46858
541	RAD_EXIT R 2007-03-19T12:35:42Z	2007-03-19 12:31:39	42632.1	2007-03-19 12:11:57	41781
541	RAD_ENTR R 2007-03-22T03:03:23Z	2007-03-22 04:40:35	44852.8	2007-03-22 4:11:04	46807
542	RAD_EXIT R 2007-03-22T12:22:21Z	2007-03-22 12:14:27	41969.1	2007-3-22 12:01:04	41765

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

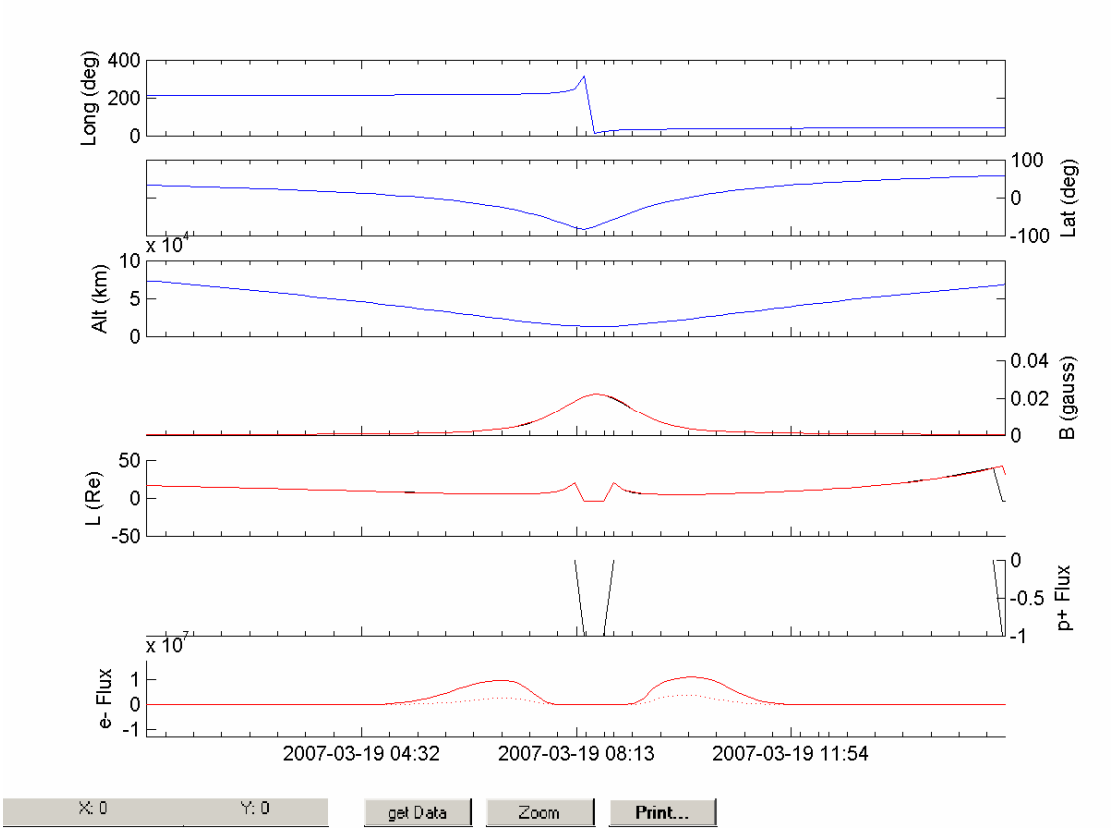
IREM radiation counters:

The data for revolution 540 was corrupted. There is no chart available this week.

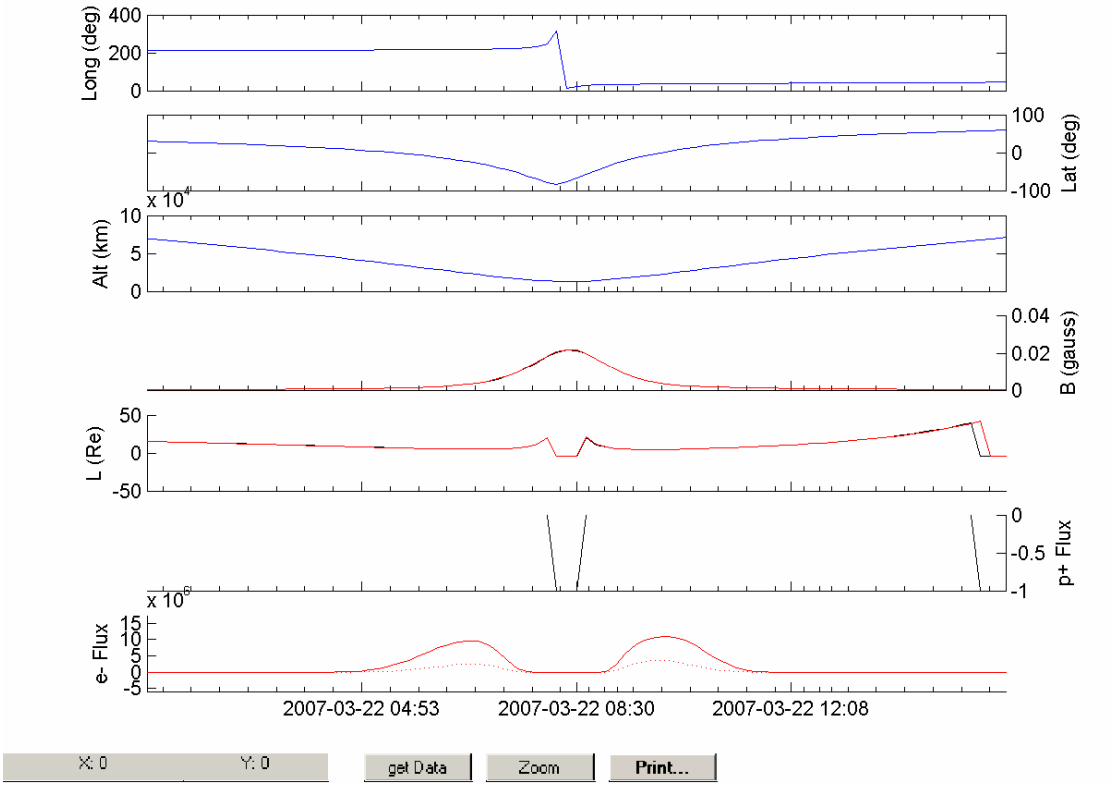


IREM Predicted Radiation Belt Passages

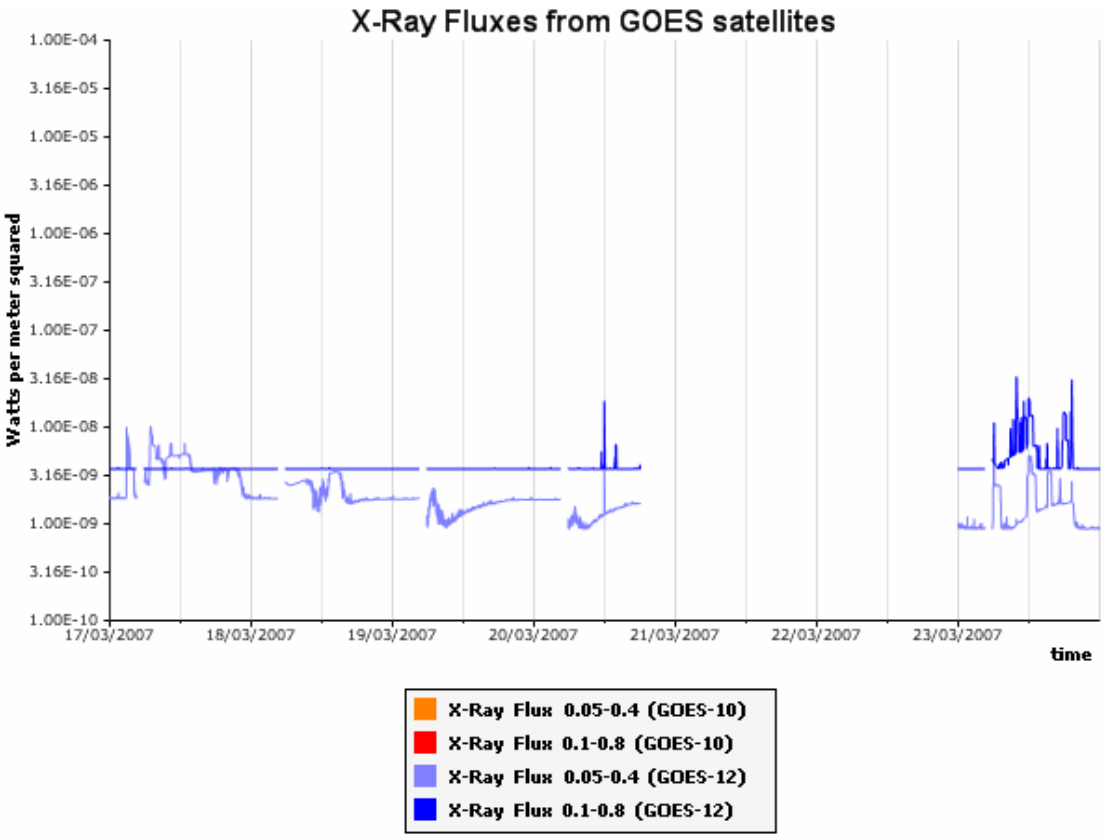
Rev 540



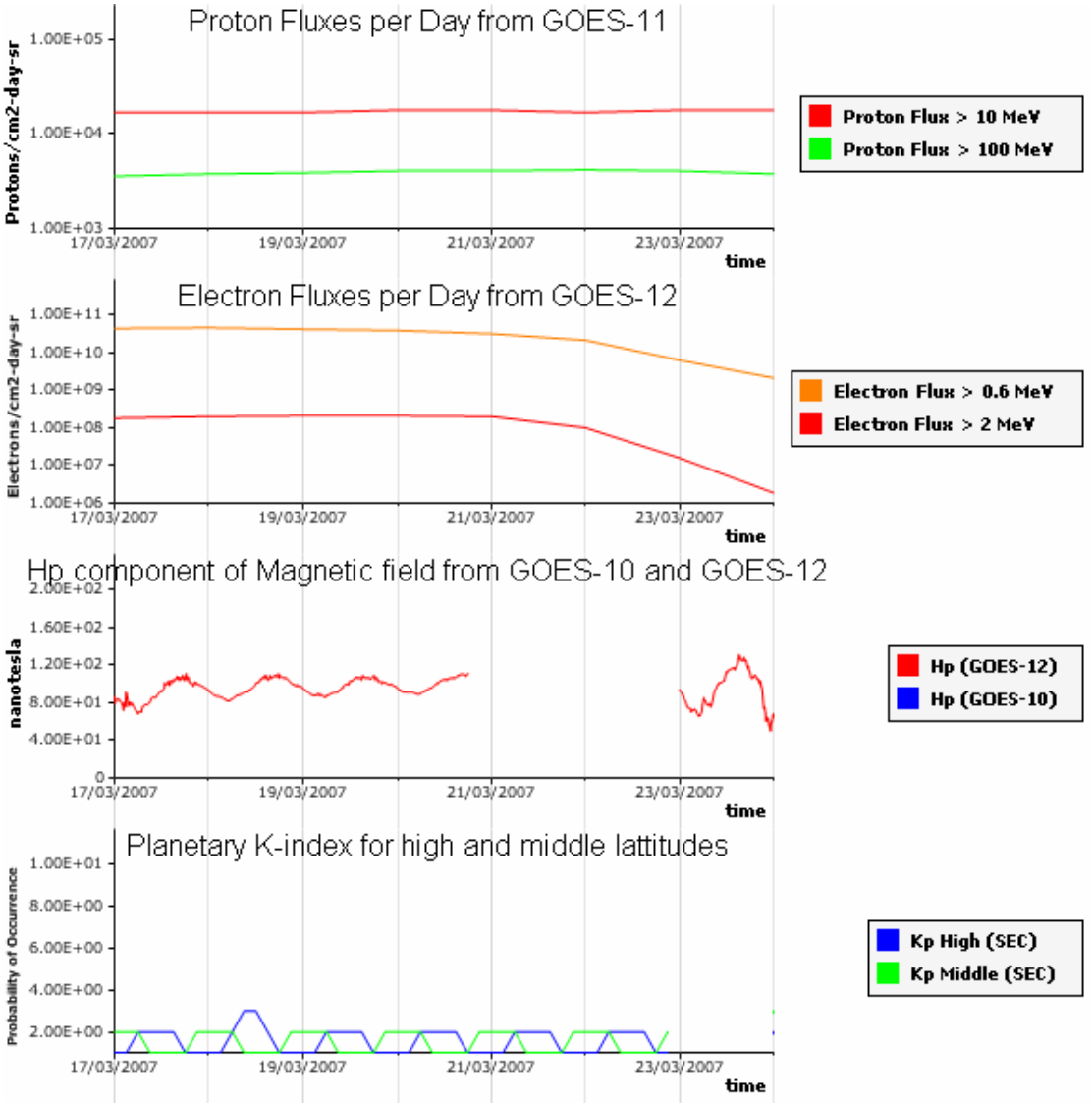
Rev 541



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



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 are reporting low radiation background this week.
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.