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

INTEGRAL
Mission Report

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

No. 239
Week 16

23.04.07

Routine Phase

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1 General

The Flight Control Team at MOC has compiled this report with some input provided by the Flight Dynamics Team, ISOC and ISDC.

It addresses the activities from 14.04.07 until 20.04.07 (both dates inclusive) and covers the revolutions 550 and 551.

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 2 hexagonal dithers of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), a raster dither of PKS 0537-286 (RA 05:39:54.28, DEC -28:39:55.9), a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), and a raster dither of Orion OB1 (RA 05:17:00.30, DEC +01:47:17.7).

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

3 Satellite Status

3.1 Platform

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

3.1.1 AOCS

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

The Eclipse season started with the first eclipse passage on 18/04/2007. The first eclipse passage was nominal from an AOCS point of view.

As results of the periodic IMUs (1-2-3-4) calibration performed on 11/04/2007, the IMUs drift corrections were updated during rev 549.

As part of the AOCS preparation for the summer eclipse season, the onboard AMD thresholds were set to their eclipse season values at the beginning of rev 550. In the same time frame were verified the AMD dead band value, the IMU timers, the load of the TT sequence to re-enable the IMU Auto Switch-Off function in the ACC and the Eclipse ACC\FDE\FCE timers.

Seven slews were missed from TL during the observation period due to problem on REDU station and on FDS.

The fuel consumption over the period between 13/03/2007 and 19/04/2007 was 0.2186 Kg. The remaining propellant is in the order of 147.0440 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

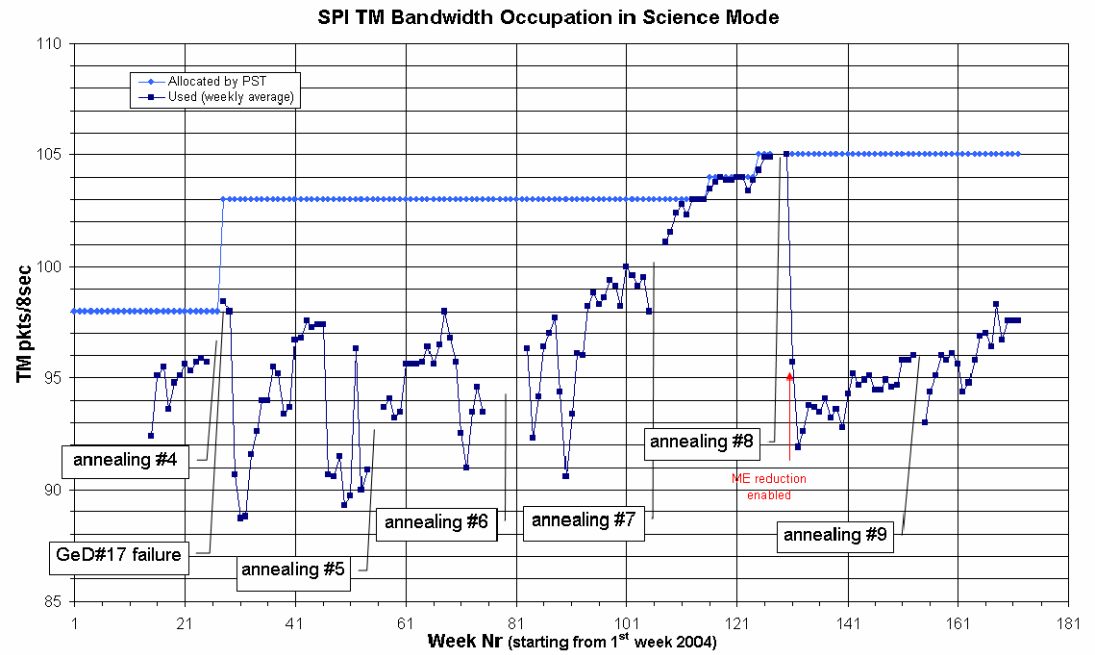
Following the 9th annealing, which ended on 22nd December, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution and is therefore operating at a lower HV setting of 3.5kV (instead of 4kV). The energy resolution 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 and the average telemetry occupation was 97.6 packets/cycle.

The first eclipse of the season occurred on 18.04.2007. Eclipse activities for SPI were executed nominally.

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.

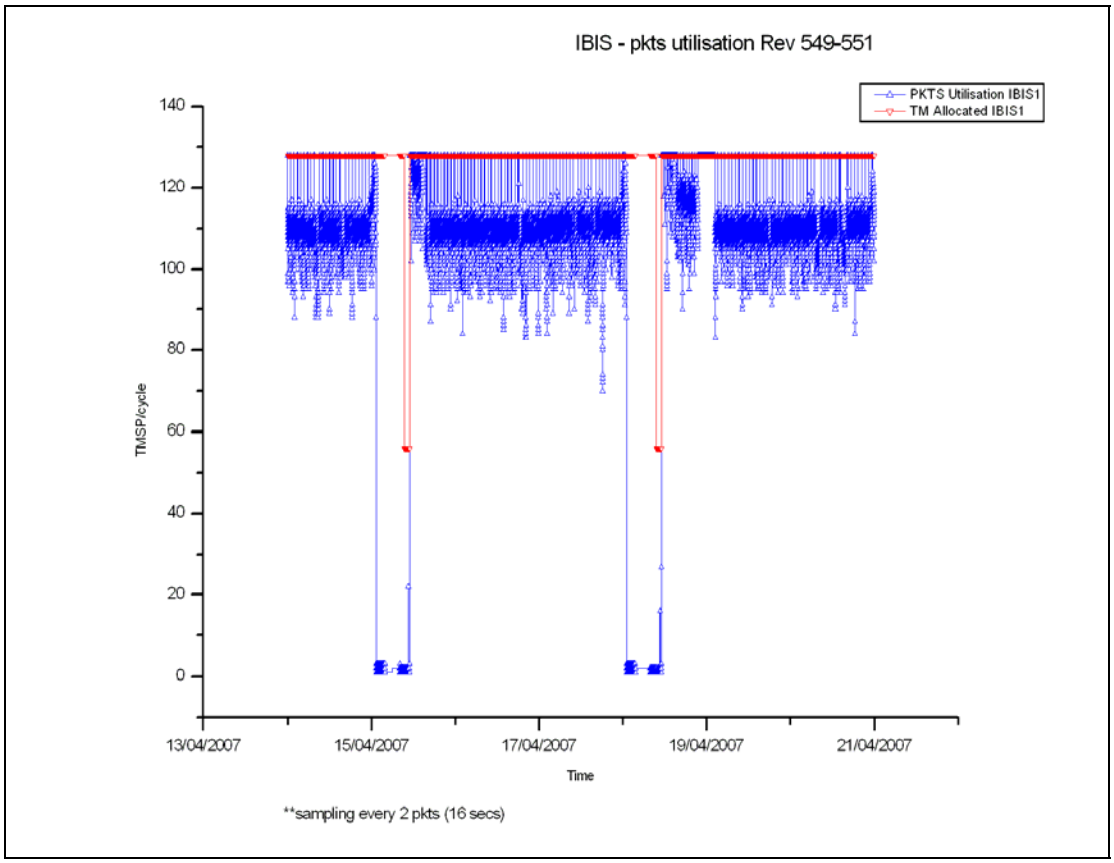
3.2.2 IBIS

The overall status of the unit is nominal.

The first eclipse of the Summer Eclipse Season occurred on 18/04/2007 (DoY 2007.108).
The reconfiguration of IBIS was smoothly performed as per timeline.

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 111.62 TMPS/cycle, down 1.21 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.

The first eclipse of the season occurred on 18.04.2007. Eclipse operations for JEM-X were executed nominally.

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, 144 of the 148 planned science pointings for OMC were executed nominally, 2 were delayed 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.

The sun was blank during the whole observation period except on 18/04/2007 when a tiny sunspot 952 appeared and dissolved on the same day. Hence no threat of strong solar flare was reported.

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. Five pointings were lost, and two slightly delayed. The overall performance was well over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was not so good this week. Five pointings were lost and one delayed, when a problem with the FD software prevented the update of the slews. There was also one occasion when there was a lost connection to the RT cache, this without impact. The overall performance was still 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, 4 occasions of data drops from Redu, one of which caused a 15 minute delay in the start of a pointing and 1 from DSS-24, without 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 up to revolution 559. Observations have been planned and sent to MOC up to revolution 557.

Revolution 558 will contain a FSS/STR Misalignment + SAS calibration. New input (SOP files) from MOC are expected early week 17.

The TOO request on AXP 1E 1048.1-5937, mentioned last week, was cancelled by the PI, due to low flux levels observed with other instruments.

TSF's up to revolution 553 have been received.

Updated AO-4 long-term plan generated on Friday April 20.

2. Observation status

ECS files have been received for revolutions 540-543. Processed OCSs up to 543, except 541 (received on Saturday April 21). No extra time has been credited.

3. ISOC Science Data Archive

ISDA 2.7beta3 was released on Wednesday April 18, 2007. Proper ISDA version 2.7 expected to be released in week 17.

4. ISOC system

Some AO related operational problems were solved which resulted in release ISOC V14.5.1: which contains a new proposal loader, new webapp and new PGT version. The AO closed on Friday, April 20, 14:00 CET. By then, 79 proposals and 92 subscriptions to the Key Program had been received (numbers have not been corrected for duplicates).

5. Problems

A few problems regarding the AO5 proposal submission/reception were encountered, some of which were dealt with immediately.

4.3.2 ISDC

Status of ISDC observation processing on 23/04/2007:

- Latest Standard Analysis completed: observation 04200560171 (GX 339-4, Revolution 536) on 02/04/2007.

- Latest products archived: observation 04200560171 (GX 339-4, Revolution 536) on 02/04/2007.

- Latest observation products sent to the observer: observation 04200560171 (GX 339-4, Revolution 536) on 03/04/2007.

5 Special Events

6 Anomalies

The following problems were reported that impacted operations:

- On DoY 106, a 3 minute drop in TM from Redu, caused the Timeline to be suspended, a recovery was subsequently performed. The impact was a 15 minute delay in the start of pointing 05500040.

- On DoY 108, at 21:50, the FDS system failed to update a slew. Five minutes later, the recovery tool also failed. The problem was traced to a S/W problem within the FD system. The impact was the loss of pointings 05510019 through to 05510023, with a 15 minute delay in the start of pointing 05510024.

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

AR id	Date Created	Subject	Segment	Status
INT-2913	18/04/2007	TC release error due to PTV	IMCS	Pending
INT-2914	20/04/2007	FDS:Oratos Job Scheduler failed to start job for slew update	FDS	Pending
INT-2915	23/04/2007	FDS: RWs speeds margin applied for EPOS 0551 generation not consistent wrt slew update	FDS	Pending

7 Future Milestones

The following activities are foreseen in the next few weeks.

- Summer eclipse season starts 18/04/2007 Rev. 550
- Periodic Thruster Torque rescaling 24/07/2007 Rev. 583
- Planned altitude change for instrument activation.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 550

The observations in revolution 550 began with a hexagonal dither of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. This was followed by a raster dither of PKS 0537-286 (RA 05:39:54.28, DEC -28:39:55.9), lasting ~52.8 hours, until the end of the revolution.

Revolution 551

The observations in revolution 551 began with a hexagonal dither of the Galactic Bulge Region (RA 17:45:36.00, DEC -28:56:00.0), lasting ~3.5 hours. This was followed by a hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), lasting ~5.6 hours. Finally, a raster dither of Orion OB1 (RA 05:17:00.30, DEC +01:47:17.7), lasting ~43.8 hours was performed until the end of the revolution.

Throughout these observations, all instruments were in their nominal science modes, except JEM-X2, which is switched off. The TM allocation was IBIS 128; SPI 105; JEM-X1 8; JEM-X2 0; OMC 5.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2007-04-04T19:19:31.000Z     147.4331    F   Automatic TM processing.
2007-04-06T09:27:43.000Z     147.4146    F   Automatic TM processing.
2007-04-07T19:09:06.000Z     147.3902    F   Automatic TM processing.
2007-04-09T09:14:06.000Z     147.3700    F   Automatic TM processing.
2007-04-10T18:48:26.000Z     147.3005    F   Automatic TM processing.
2007-04-12T09:02:38.000Z     147.2869    F   Automatic TM processing.
2007-04-12T14:57:34.000Z     147.2626    F   Automatic TM processing.
2007-04-13T18:52:01.000Z     147.2368    F   Automatic TM processing.
2007-04-15T09:05:10.000Z     147.2260    F   Automatic TM processing.
2007-04-15T14:51:59.000Z     147.1498    F   Automatic TM processing.
2007-04-18T02:22:29.000Z     147.1280    F   Automatic TM processing.
2007-04-18T14:58:38.000Z     147.1181    F   Automatic TM processing.
2007-04-18T21:40:47.000Z     147.0959    F   Automatic TM processing.
2007-04-18T23:48:55.000Z     147.0700    F   Automatic TM processing.
2007-04-19T02:13:28.000Z     147.0440    F   Automatic TM processing.

This report was generated  Fri Apr 20 08:00:16 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, 14/04/2007 –20/04/2007

AOCS operations were executed from the Automatic Timeline.

During this period, 74 Open Loop Slews, 87 Closed Loop Slews and 8 Momentum Biases were executed.

7 slews (6 OSL, 1 CSL) were missed from TL, during the observation period, due to problem on the TM links with REDU station and FDS slew update task. This is equivalent to ~4.2 % of the total number of slews planned (164).

The AOCS eclipse operations were nominal. For the first eclipse passage, the ACC\FDE\FCE Eclipse Timers and the Time-Tagged sequence to re-enable the IMU Auto Switch-Off function of the ACC were loaded from the Timeline and the pre-eclipse IMU health checks was performed at the planned times. Some information regarding the eclipse times and IMU usage up to this stage of the eclipse season are provided below:

AOCS Eclipse Times															Summer 2007
Date	LOS	AOS	ACC Eclipse Imminent	Eclipse Start						Eclipse End					Eclipse Duration
				ACC	FDE	FCE	Penumbra	FSS Sun Out	Umbra	Umbra	FSS Sun In	Penumbra	FDE/FCE	ACC	
2007-04-18	03:47:00	07:59:00	02:53:42	03:35:52	03:47:16	03:48:00	03:53:22	03:56:08	18/04/200	04:27:00	04:27:38	04:30:04	04:36:36	04:39:56	0:36:42

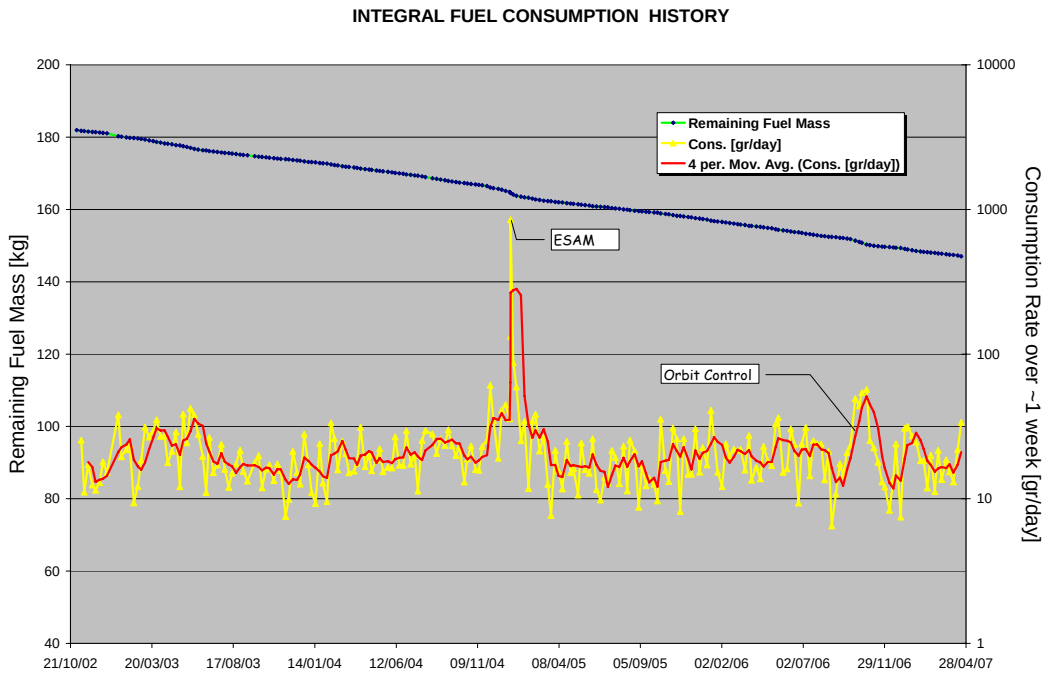
IMU Usage during Eclipse Season						Summer 2007
IMU On	IMU Off	From Health Check		From Auto Calibration	On Time	Accumulated On Time
		Noise Roll [as/s]	Drift Roll [as/s]	Drift Roll [as/s]		
2007-04-18 00:41:01	2007-04-18 04:39:59	0.2048	0.3010	0.2788	3:58:58	3:58:58

Orbit Control

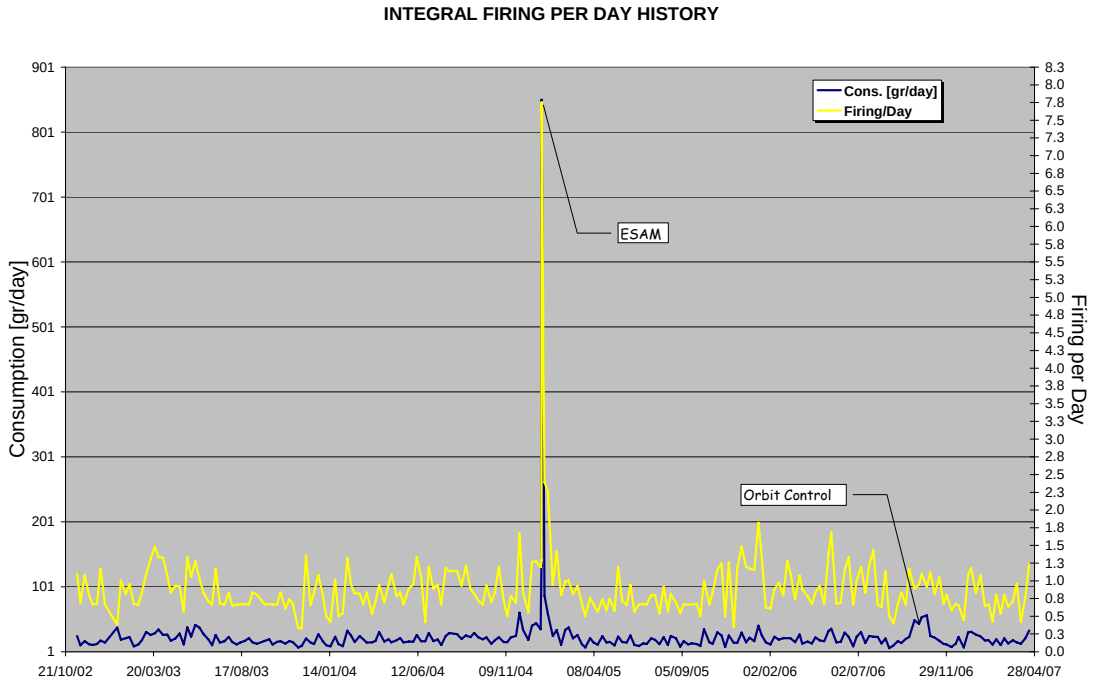
No update.

Fuel consumption

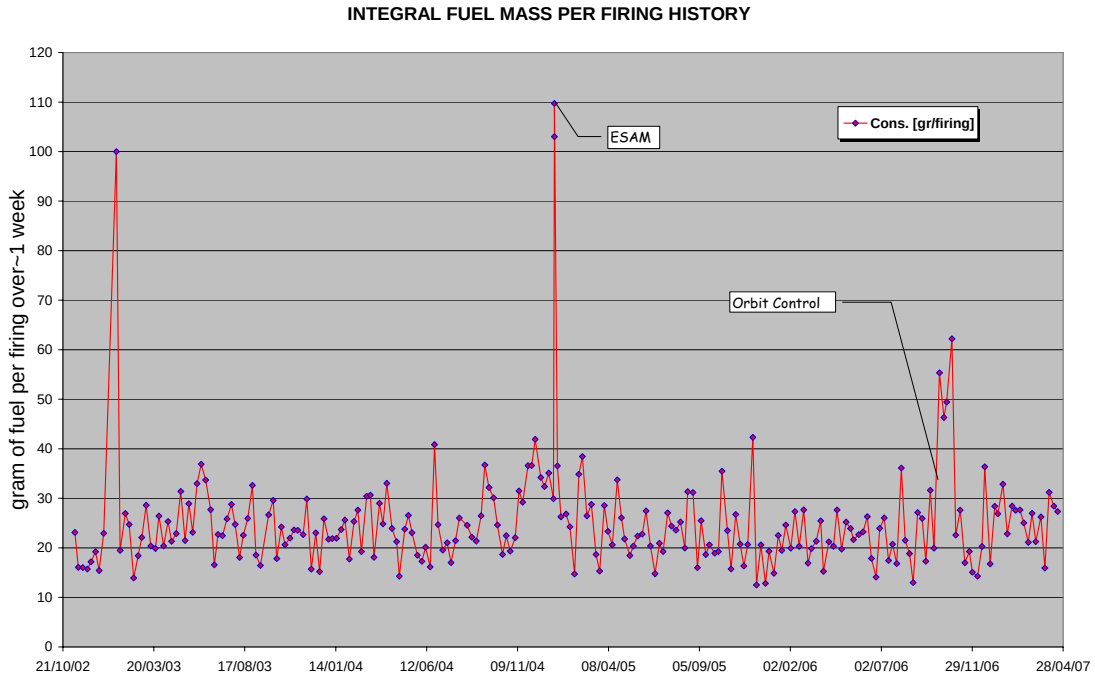
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 19/04/2007 is reported in the plot below.



The firing per day over the period between 01/11/2002 and 19/04/2007 is reported in the plot below.

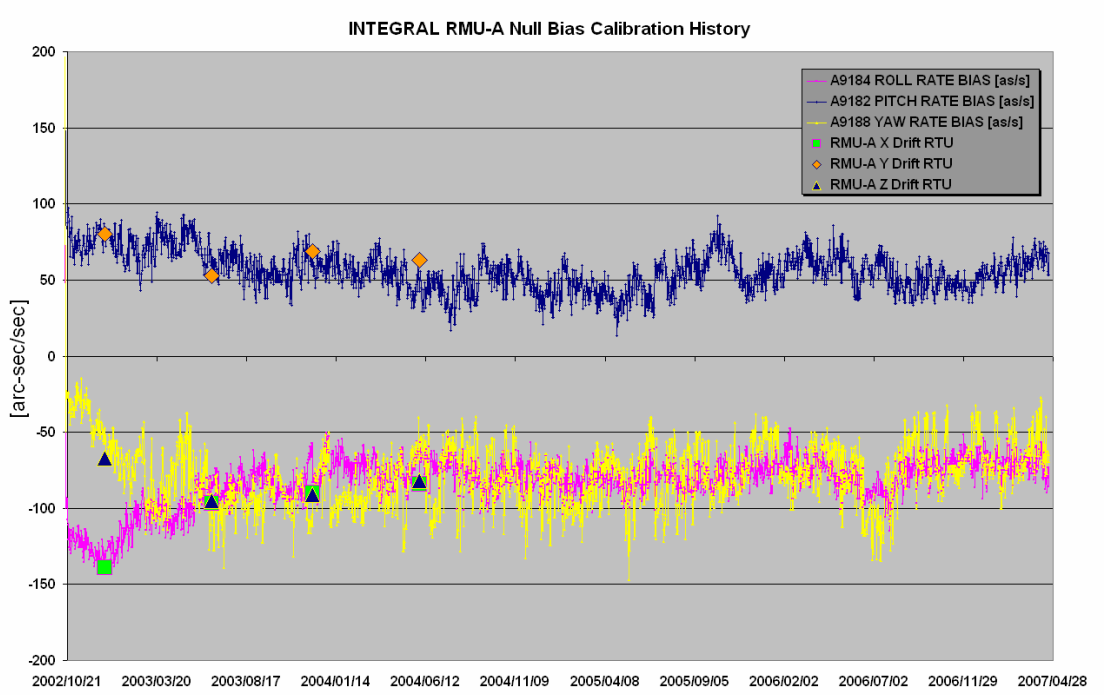


The fuel per firing over the period between 01/11/2002 and 19/04/2007 is reported in the plot below.

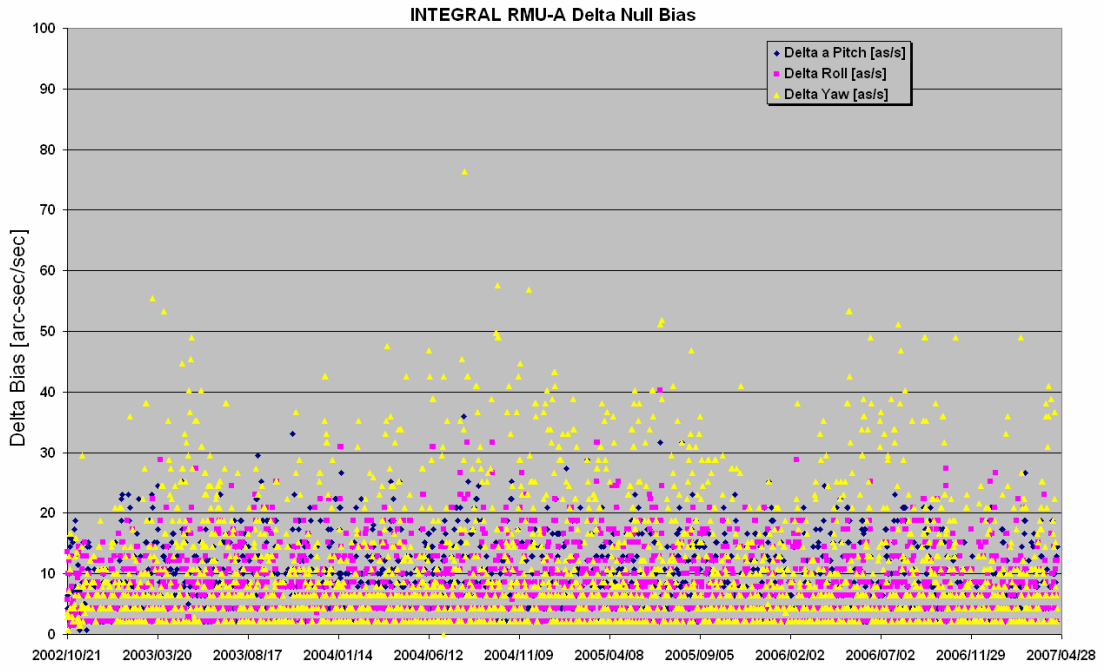


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 20/04/2007 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 20/04/2007 is reported in the plot below



14/04/2007 (Day of Year 104, Revolution 549)

IMUs drifts update: following the latest IMU 1-2-3-4 calibration, in preparation of the summer 2007 eclipse, the ACC IMUs drift corrections were updated during rev 549 at 10:16z.

The calculated drifts from FD resulted consistent with the quick evaluation performed in parallel by FCT and with the drifts history. The IMUs drift corrections were updated accordingly to the following table (source FD, TPF 0549_0001_M.DRA):

```
IMU-1-X= 0.1975  arcsec/sec
IMU-1-Z= 0.1919  arcsec/sec

IMU-2-X= 0.1455 arcsec/sec
IMU-2-Z= 0.0056 arcsec/sec

IMU-3-Z= 0.0555 arcsec/sec

IMU-4-X=-0.0378 arcsec/sec
```

15/04/2007 (Day of Year 105, Revolution 549-550)

Nothing to report.

16/04/2007 (Day of Year 106, Revolution 550)

Loading of the Eclipse Season AMD thresholds: In preparation for the summer eclipse season 2007 (according to FCP_AOC_0524), the on-board AMD thresholds were set to their eclipse season values, accordingly to the table below:

Thresholds from INT-MA-AI-0001, 5.3.2.4.2.2, and INT-PR-MMB-0005 page 5-9, modified as per new AMD Threshold agreement for the eclipse season.

01- Update of thresholds after uplink of new RW Inertias on 22/01/2004. 0155_0001_M.RWI

Wheel Inertia:

RW#1:	0.096000	Kgm**2
RW#2:	0.097650	Kgm**2
RW#3:	0.097272	Kgm**2
RW#4:	0.097649	Kgm**2

Eclipse Season:

	Subset 1		Subset 2	
WSMAX	39.5	Nms	35.9	Nms
WSMIN	1.2	Nms	4.8	Nms

WSMAX	To Uplink:				In rpm:	
	X1		X2		X1	X2
RW#1:	411.458333	rd/s	373.958333	rd/s	3929	3571
RW#2:	404.507960	rd/s	367.641411	rd/s	3863	3511
RW#3:	406.078637	rd/s	369.068939	rd/s	3878	3524
RW#4:	404.508374	rd/s	367.641788	rd/s	3863	3511

WSMIN	To Uplink:	In rpm:

	X1		X2		X1	X2
RW#1:	12.500000	rd/s	50.000000	rd/s	119	477
RW#2:	12.288849	rd/s	49.155398	rd/s	117	469
RW#3:	12.336566	rd/s	49.346265	rd/s	118	471
RW#4:	12.288862	rd/s	49.155448	rd/s	117	469

The uplink was performed during rev 550 at 13:37.

In the same time frame, were verified the AMD dead band value, the IMU timers, the load of the TT sequence to re-enable the IMU Auto Switch-Off function in the ACC and the Eclipse ACC\FDE\FCE timers.

Problem on REDU station: at 17:55z due to a problem on the TM links with REDU station (3 minutes drop), the slew ID 05500040(CSL) failed release and the AOCS s/s disabled in TL.

A manual recovery was then started at 18:11z from attitude of PID 05500039 to the attitude of PID 05500040. The next slew 05500041 was manually updated at 18:24z.

The following slew was missed in TL: 05500040 (CSL).

17/04/2007 (Day of Year 107, Revolution 550)

Nothing to report.

18/04/2007 (Day of Year 108, Revolution 550-551)

The first eclipse operations were nominal from the AOCS point of view. A summary of the first eclipse passage during rev 550 is given below:

AOCS ECLIPSE MONITORING
Summer 2007

Revolution: 550
Date: 18/04/2007
DoY: 108

Penumbra Start:	18/04/2007 03:53:22	**LOS:**	18/04/2007 03:47:00
Umbra Start:	18/04/2007 03:56:56	**AOS:**	18/04/2007 07:59:00
Umbra End:	18/04/2007 04:27:00		
Penumbra End:	18/04/2007 04:30:04		
Eclipse Duration:	0:36:42		
Eclipse Duration [sec]:	2202		

IMU Health Check Start	18/04/2007 00:37:58
Eclipse Imminent Flag	18/04/2007 02:53:42
ACC IMU AutoCal Start	18/04/2007 03:08:08
ACC IMU AutoCal End	18/04/2007 03:28:08
Sun out of FSS FoV	18/04/2007 03:56:08
Sun back in FSS FoV	18/04/2007 04:27:38

Eclipse Timers	**From Loaded Timers**		**Actual From Telemetry**		**UM [sec]**	**LSB [sec]**
	Absolute	**WRT Pen. Start [sec]**	**Absolute**	**WRT Pen. Start [sec]**		
ACC Eclipse Start	18/04/2007 03:35:52	-1050.00	18/04/2007 03:35:54	-1048.00	**-1064**	
FDE Eclipse Start	18/04/2007 03:47:16	-366.00	18/04/2007 03:47:00	-382.00	**-404**	**176**
FCE Eclipse Start	18/04/2007 03:48:00	-322.00	18/04/2007 03:47:00	-382.00	**-360**	**176**

	From Loaded Timers		**Actual From Telemetry**		**UM [sec]**	**LSB [sec]**
	Absolute	**WRT Pen. End [sec]**	**Absolute**	**WRT Pen. End [sec]**		
FCE Eclipse End	18/04/2007 04:36:36	392			**360**	**176**
FDE Eclipse End	18/04/2007 04:36:36	392			**360**	**176**
ACC Eclipse End	18/04/2007 04:39:56	592	18/04/2007 04:39:58	594.00	**578**	

IMU	**Uplink**	**Execution**	**WRT Penumbra End [sec]**
IMU Auto Off Enable	15/04/2007 08:47:49	18/04/2007 04:41:53	709

IMU On	18/04/2007 00:41:01	**IMU H/C Noise Roll [as/s]**	0.2048
IMU Off	18/04/2007 04:39:59	**IMU H/C Drift Roll [as/s]**	0.3010
IMU On Time	3:58:58	**IMU Auto Cal Drift Roll [as/s]**	0.2788

FDS failed slew update: at 21:50z the update of OSL ID 05510019 failed. FDS reported an error during the update process: the slew could not be executed considering the current RWs speeds. This caused the slew update process to fail.

The AOCS s/s was disabled from TL at 21:55z.

The slew update task (on FDS) generated the following error message:

<<The above profile is valid only if the following bias was made before the start of the slew: 0.0 1420.9 1033.4 -1162.7 Wheel speeds at end of intervall: 0.0 -1046.5 -1178.2 1529.5 IPF Type: (L)oad or (N)ormal updateslew: IPFGEN (OSL) FAILED with code 2 - exiting 2007/04/18 21:50:39 GMT '/home/xmmsw/bin/updateslew 551 7 21 AERWB_00 2007-04-18T21:46:54Z 05519003 19:15:55.99 +07:49:01.2 078:12:15.3 Z1 OSL 05510019 2007-04-18T21:56:54Z 2007-04-18T21:56:54Z 08:06:47.72 -02:20:11.2 280:41:51.2 Z1 -------- 200.0 200.00>>

The wheel speed margins applied during EPOS generation were not consistent with the margins (eclipse season) applied during the slew update TPF generation. The pre-planned slew could not be reproduced with the current wheel speeds according to the settings of the TPF update generator.

A complex manual recovery (including 2 OSL, 1 CSL, 1 RWB and 1 CGS) was then started on 19/04/2007 at 00:07z from attitude of PID 05510018 to the attitude of PID 05510024. In detail:

1) OSL from attitude of PID 05510018 to the attitude of PID 05510020
2) OSL from attitude of PID 05510020 to the attitude of PID 05510024
3) RWB to rejoin the RWs speeds profile
4) corrective CSL to the attitude of PID 05510024

The next slew 05510025 was manually updated on 19/04/2007 at 02:39z.

The following slews were missed in TL: 05510019-20-21-22-23-24 (OSL).

The problem is still under investigation by FD team (AR INT-2915).

19/04/2007 (Day of Year 109, Revolution 551)

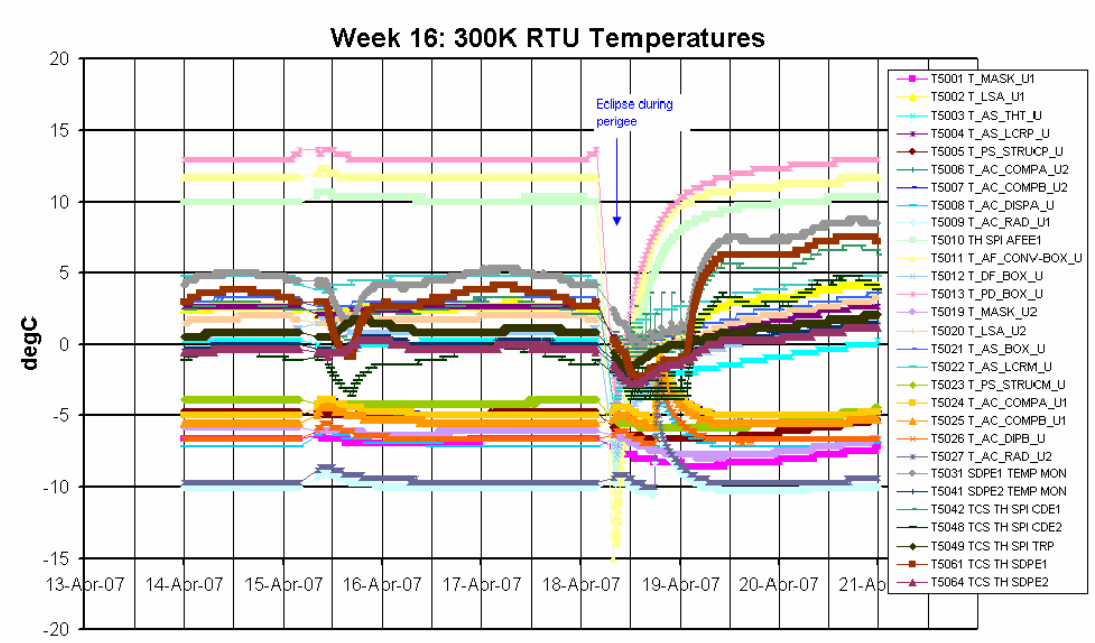
Nothing to report.

20/04/2007 (Day of Year 110, Revolution 551)

Nothing to report.

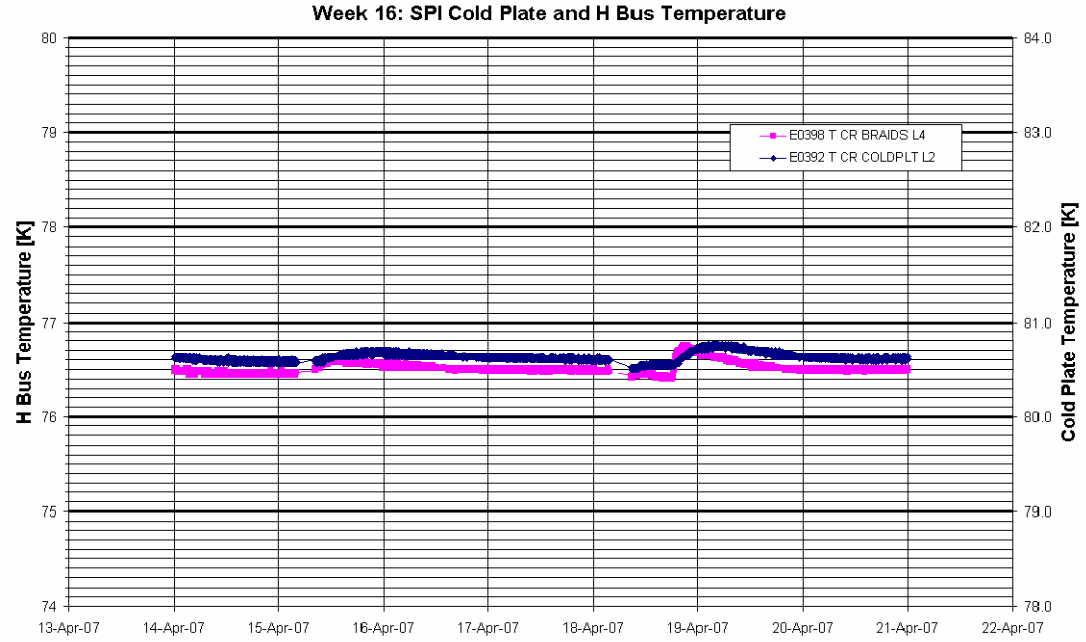
8.3.2 SPI Operations

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



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

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

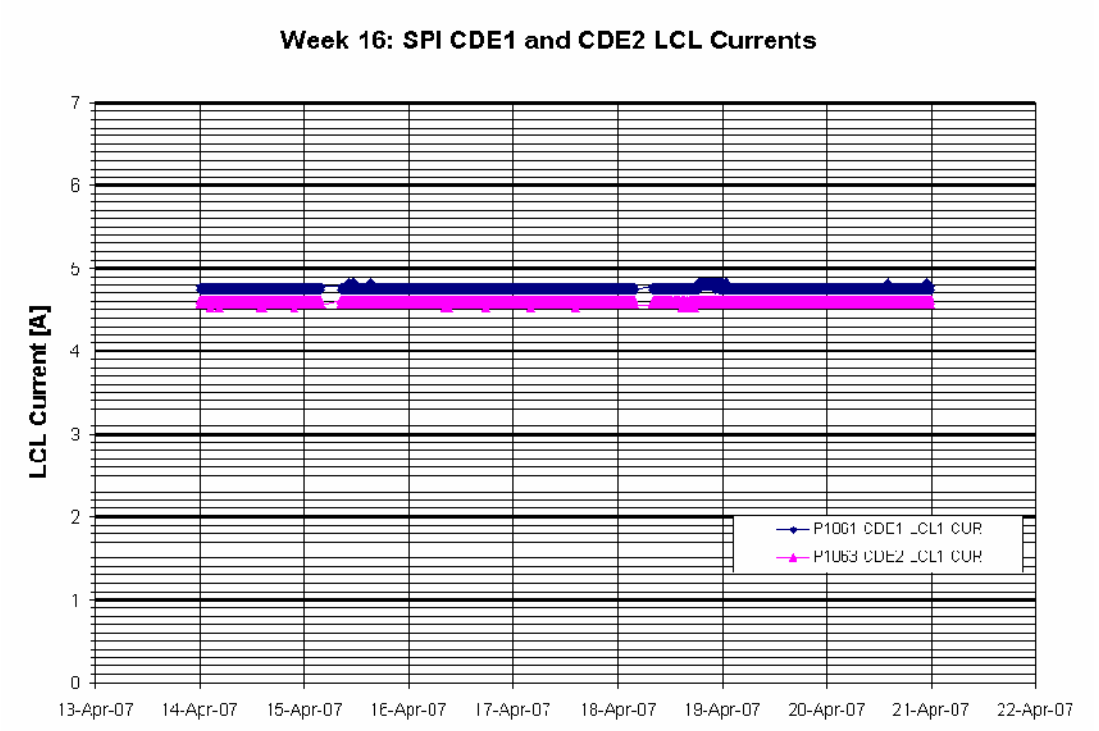


The stroke of all four compressors has been 40 since 03-02-2007 at 13:16Z.

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

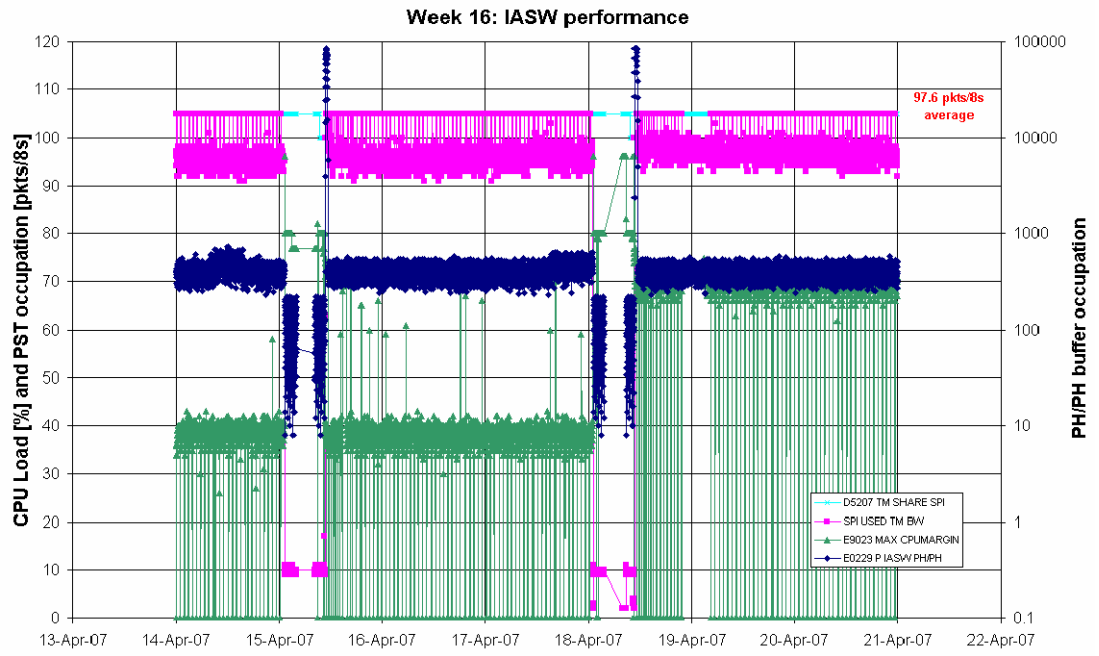
- Average CDE1 LCL Current = 4.77A
- Average CDE2 LCL Current = 4.57A

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



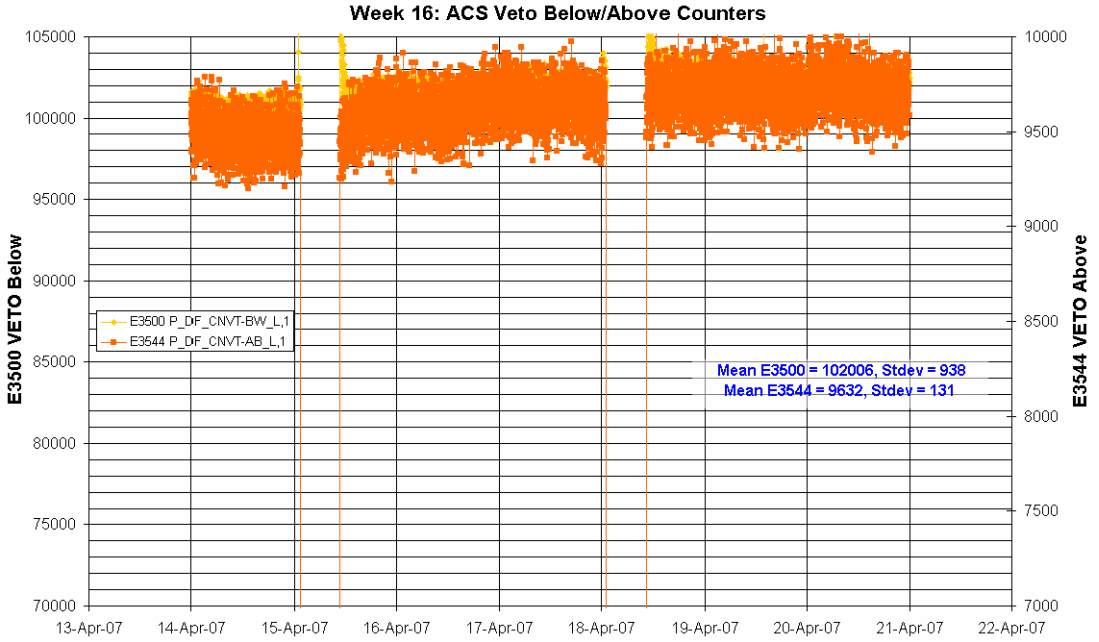
DPE & IASW: The DPE health and IASW performance is nominal. The IASW version installed is v433 patch #1. The spectra scaling factor was set to 9/19 SE until after the first eclipse on 18.04.2007, when it was set to an erroneous value of FF (hex) by the ED EEXIT-02 (see Anomaly Report INT-2916). The higher than usual CPU margin which can be seen in the following plot from 18.04.2007 onwards is due to this; however no OEMs or OOLs were generated. On realising the anomalous value of the spectra scaling factor on 25.04.2007, this was reset to the nominal value of 9/19 SE.

The average TM bandwidth occupation of SPI was 97.6 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) and FEE #57 which is still OFF due to the anomaly on 5/8/2003 (INT_SC-61).

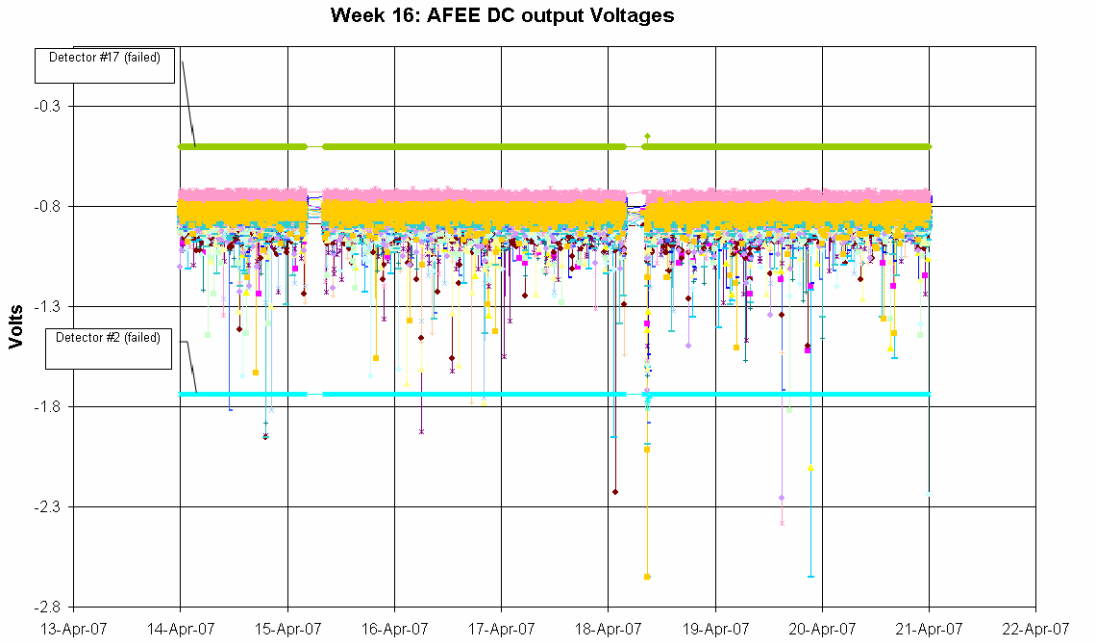
The following plot shows the ACS overall count rate evolution during the reporting period:



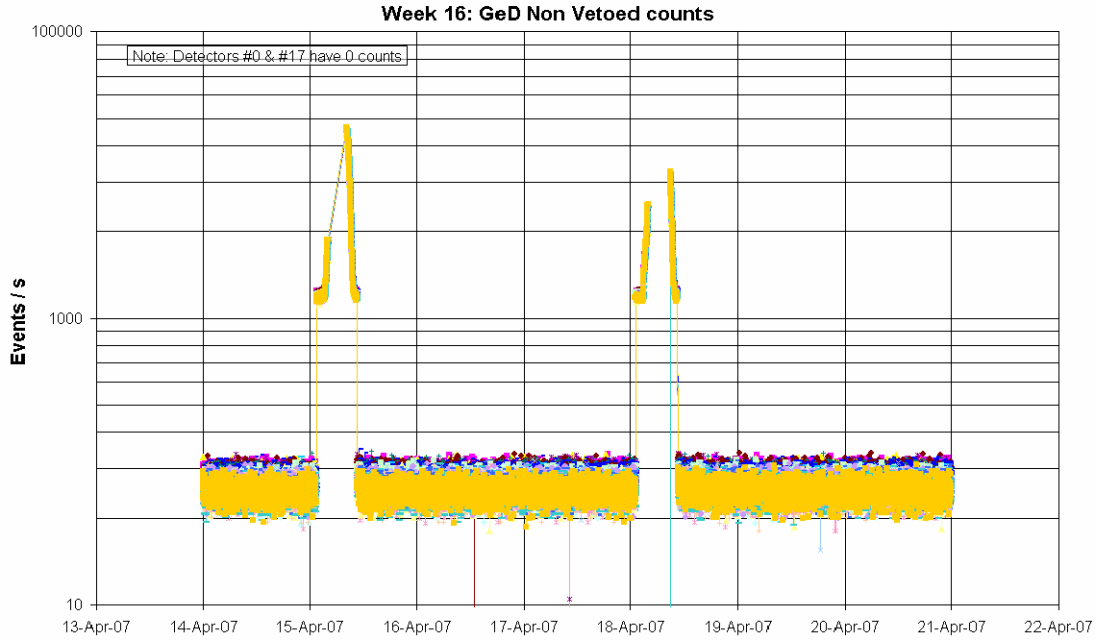
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution. The energy resolution of GeD#4 was recovered with the last annealing.

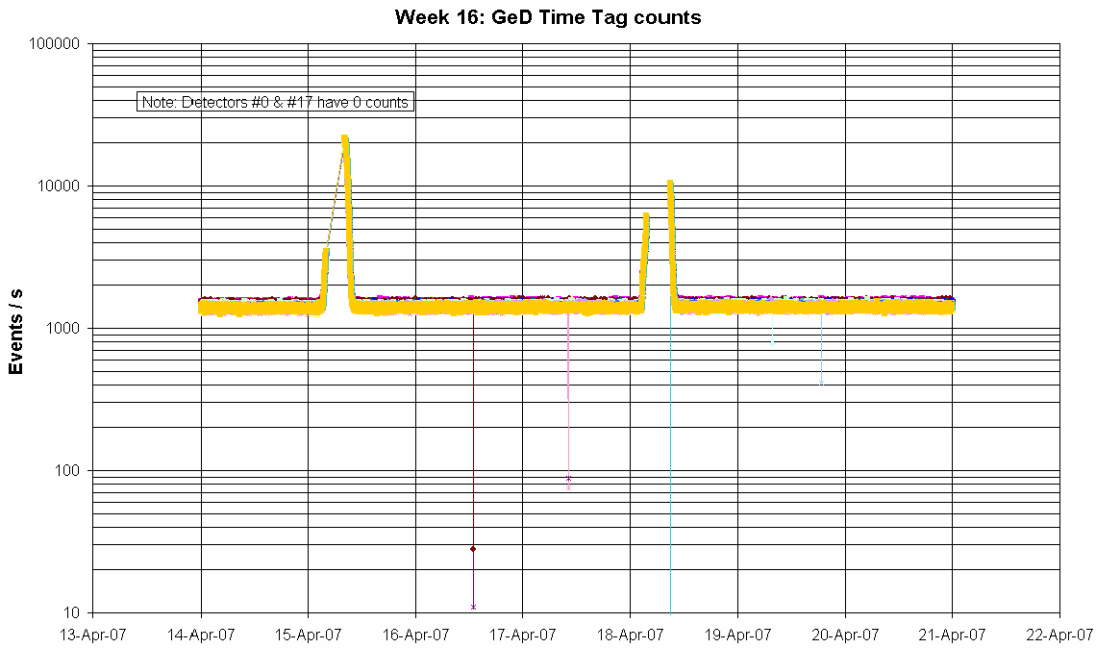
The GeD#12 HV remained at 3.5kV throughout the reporting period.

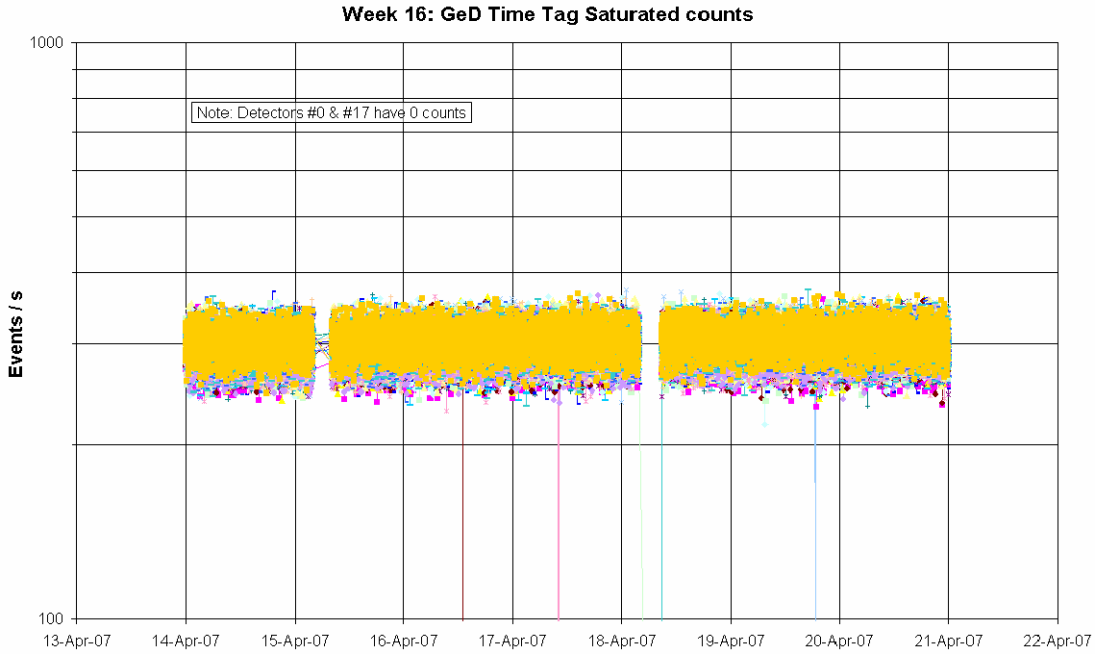
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004.



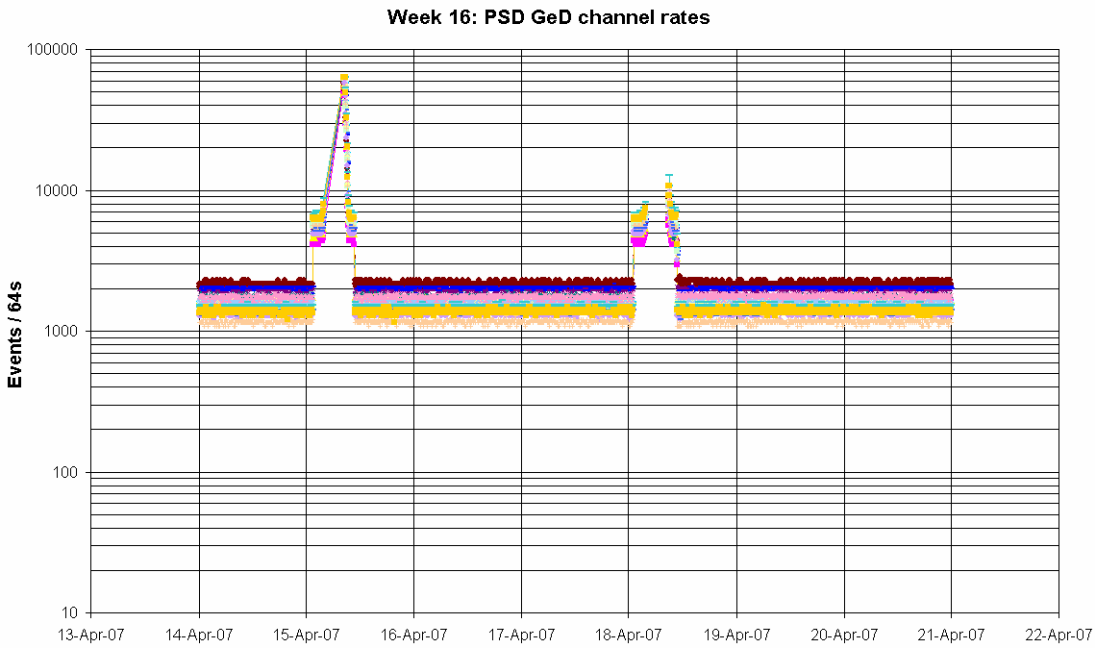
DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.







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



Event Log:

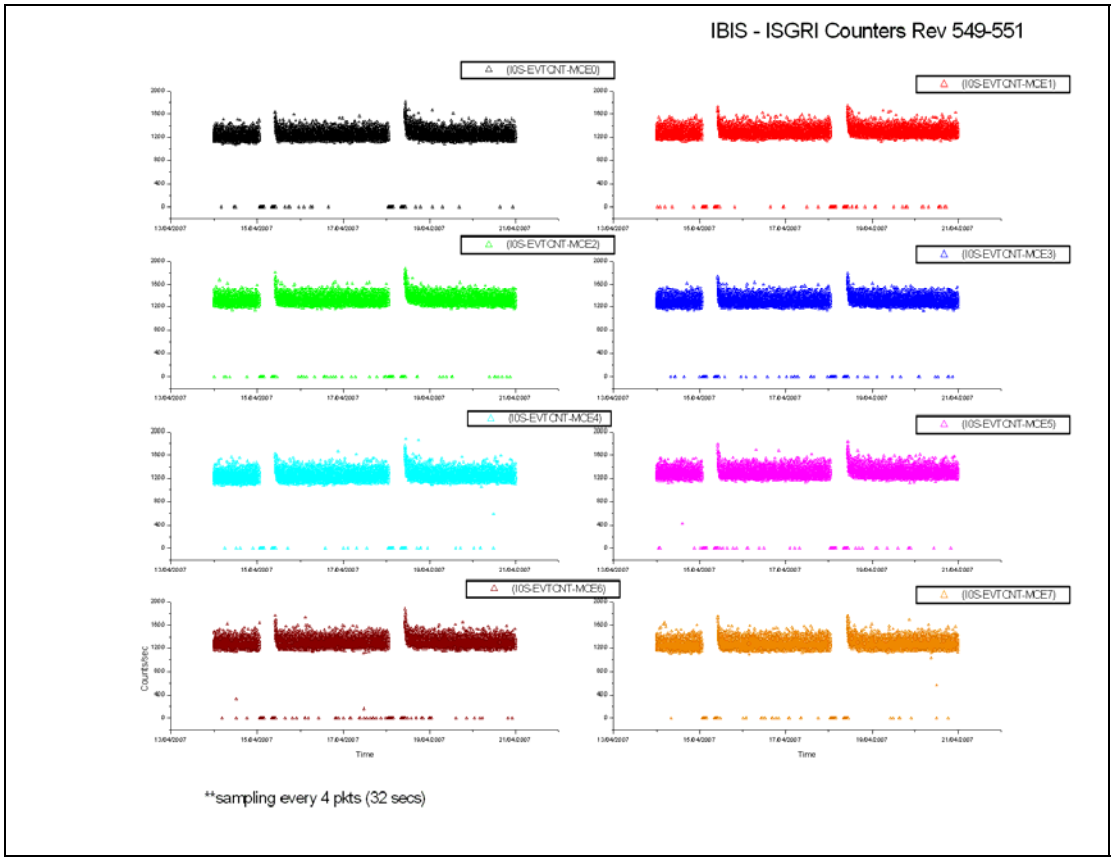
The following non-nominal events occurred on SPI during the reporting period:

- On 2007-04-15 at 10:50:07Z the TM parameter E3500 P_DF_CNVT-BW_L went OOL High. This was just after radiation belt exit of revolution 550. It returned within limits at 10:51:59Z.
- On 2007-04-18 at 10:40:13Z the TM parameter E3500 P_DF_CNVT-BW_L started to toggle OOL High. This was just after radiation belt exit of revolution 551. It returned stably within limits at 11:15:17Z.
- On 2007-04-20 at 19:48:40Z the TM parameter E2283 S AS AN5V L33 went OOL (value = NO EXIST VAL). This is the analogue status 5 V for ACS FEE # 33. It returned within limits when the next packet was received at 19:59:20Z.

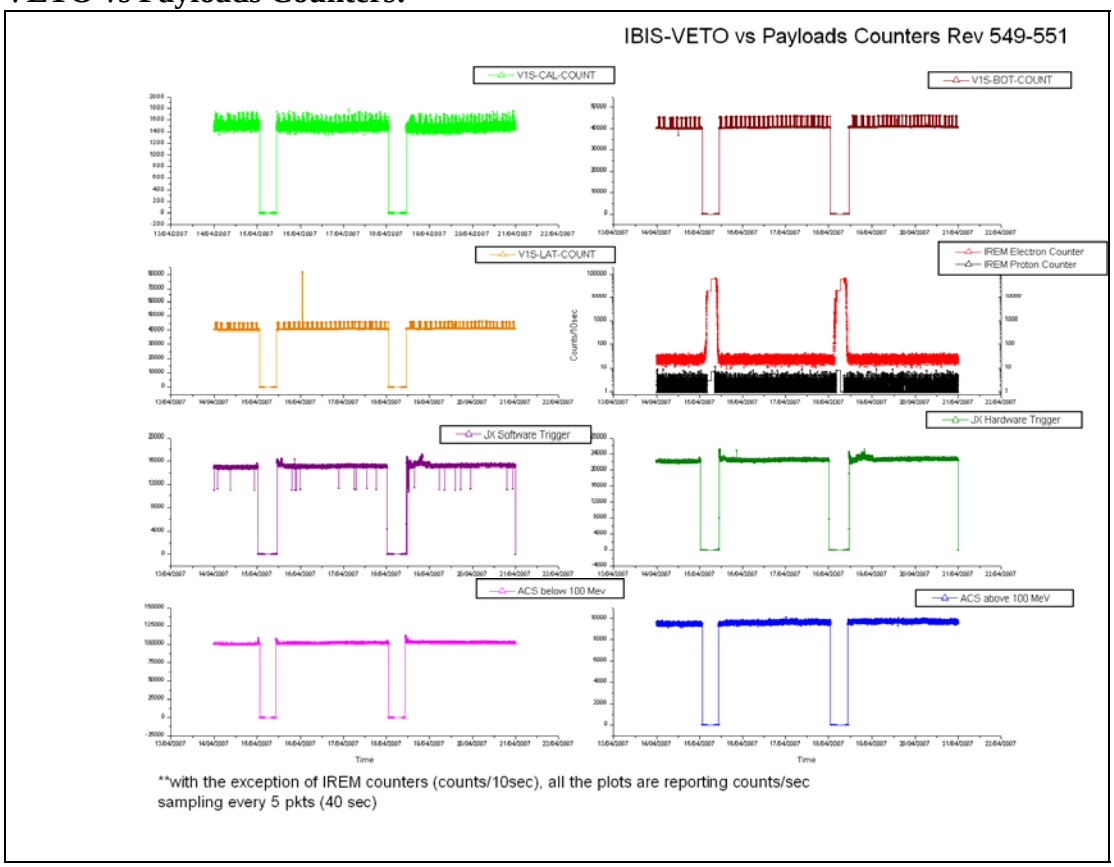
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

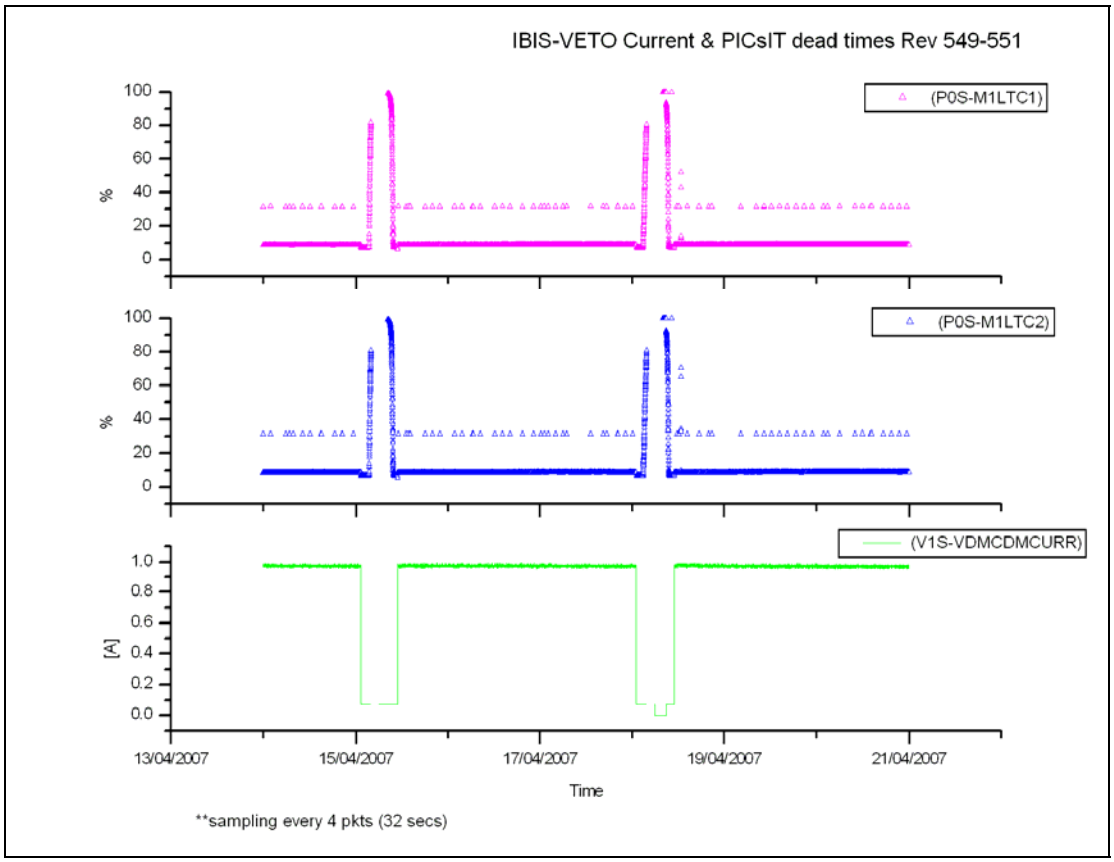


VETO vs Payloads Counters:

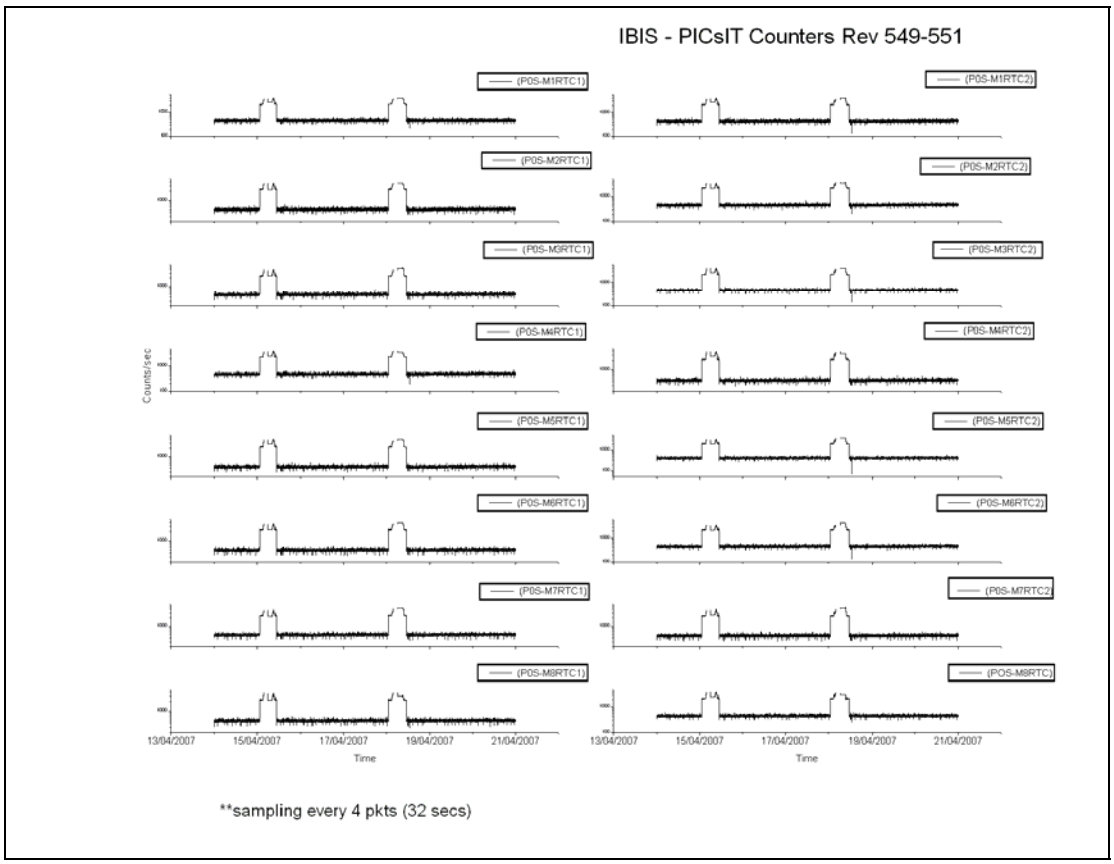


The week was characterised by low radiation.

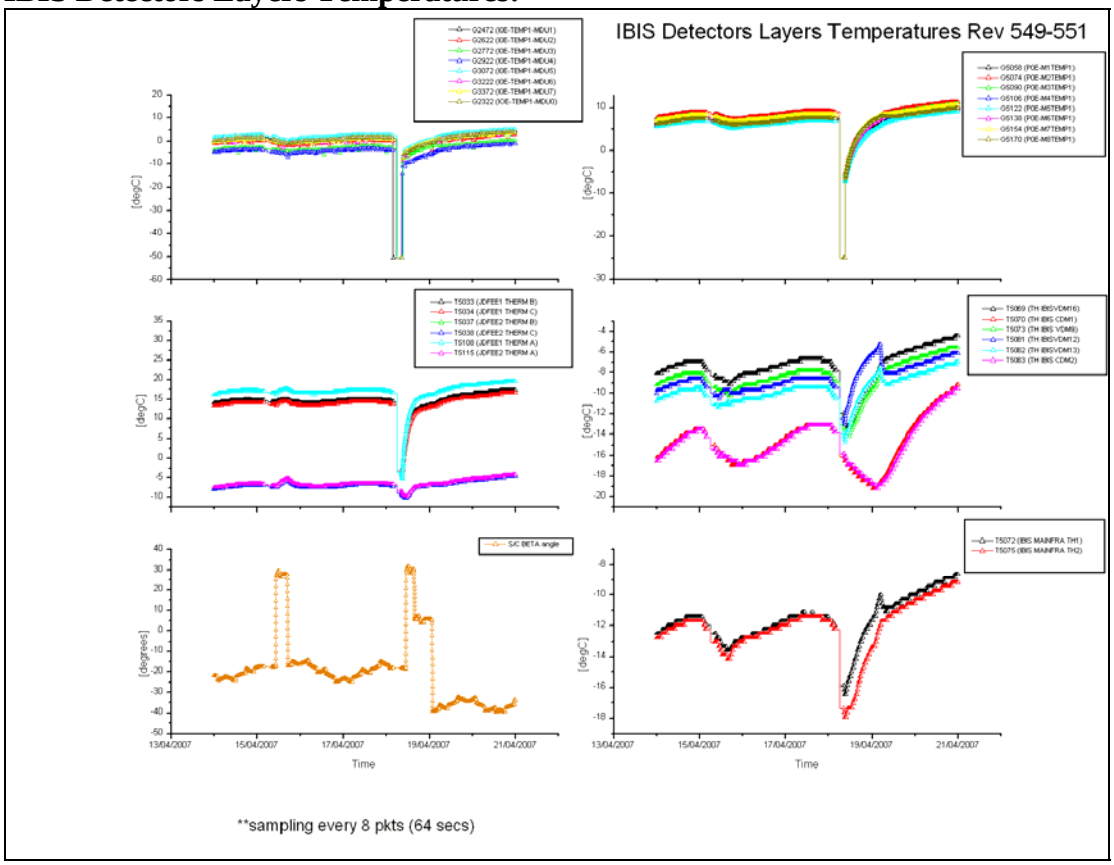
VETO Current:



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 the Radiation Belts passage.

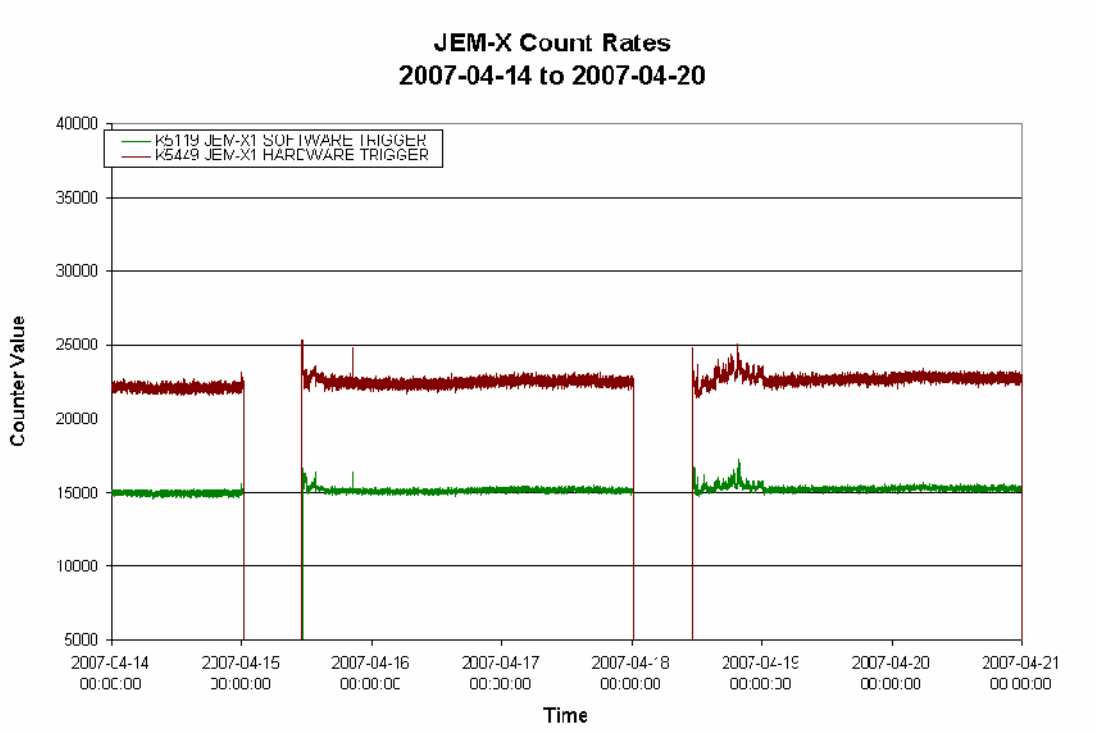
The first eclipse occurred on 18/04/2007 during perigee passage. This caused significant drops in temperatures, (see plot) due to the sub-units being powered off. The reconfiguration of IBIS was performed nominally according to the timeline and no anomaly was reported.

8.3.4 JEM-X Operations

JEM-X Count Rates

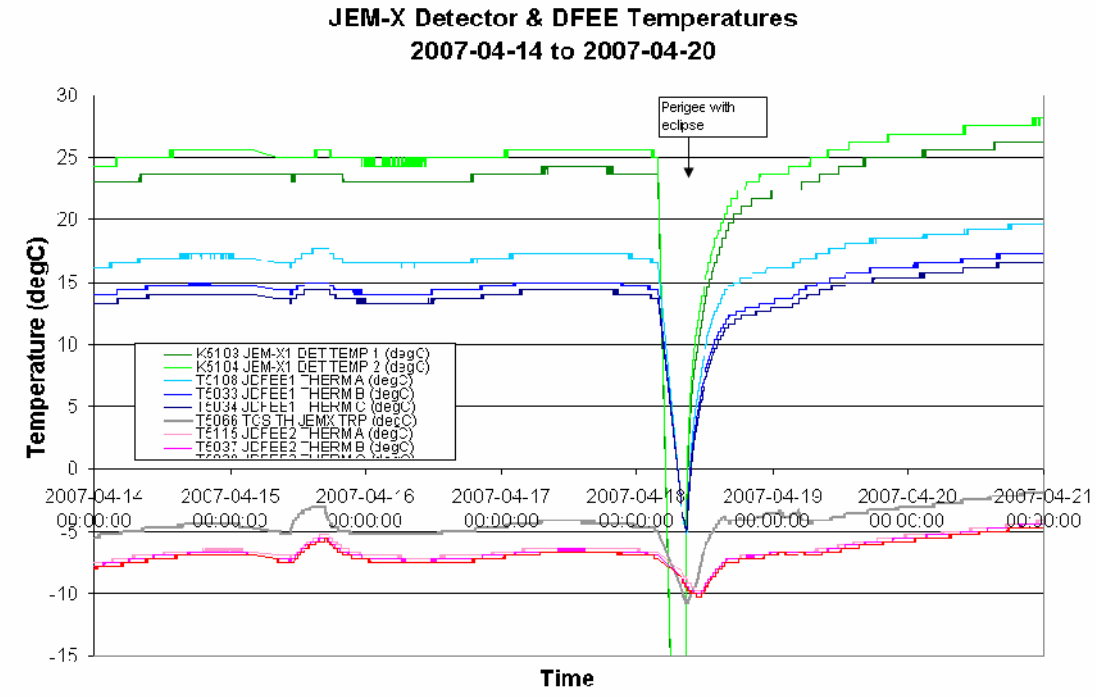
JEM-X count rates over the reporting period are displayed in the following graph[1].

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



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].



JEM-X Daily Report

[2] Data sampled (1 frame in 8)

2007-04-14 (DOY 104, Rev 549) to 2007-04-20 (DOY 110, Rev 551)

JEM-X1 operations executed nominally.

8.3.5 OMC Operations

2007-04-14 (DOY 104, Rev 549) to 2007-04-15 (DOY 105, Rev 550)

Nothing to report.

2007-04-16 (DOY 106, Rev 550)

At 03:41:25, the following OEMs were received:

```
2007.106.03.41.25.089   2007.106.03.41.34.794   1792   RealTime   7       EXCEPTION
OMC CONSTRAINT D                                         0       0    65535   PR    N
E   E
2007.106.03.41.25.089   2007.106.03.41.34.810   1792   RealTime   5       ANOMALY
OMC CSSW INT ER                                          0       0    65535   PR    N
E   E
```

These are harmless, and occur frequently when pointing toward a crowded area of the sky. There was no impact.

At 17:55, a 3 minute TM drop from Redu caused the suspension of the Timeline. A recovery was performed, and the OMC commands sent manually at 18:17. The impact was pointing 05500040 was delayed by 15 minutes.

2007-04-17 (DOY 107, Rev 550)

Nothing to report.

2007-04-18 (DOY 108, Rev 551)

At 21:50, the FD system failed to update a slew. The problems continued, causing the OMC not to be recovered until the commands were manually sent at 02:33 the following day. The impact was the loss of pointings 05510022 and 05510023, with a 15 minute delay in the start of pointing 05510024.

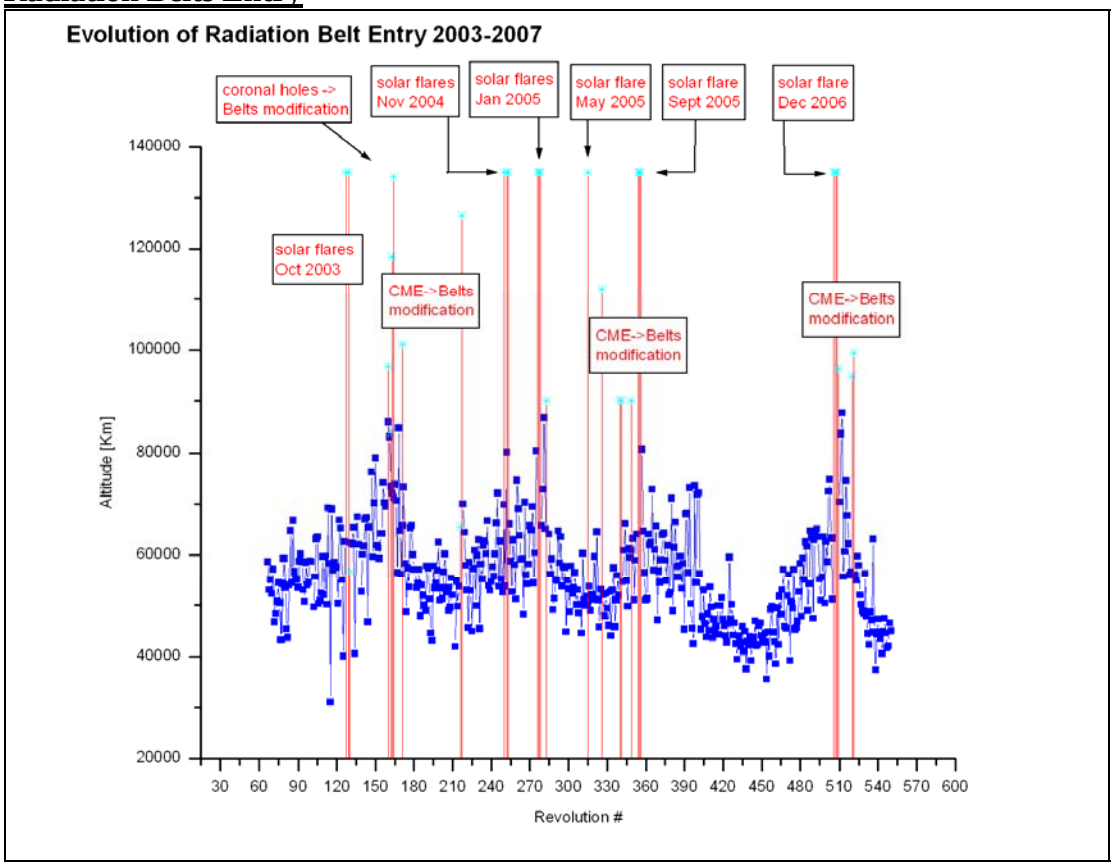
2007-04-19 (DOY 109, Rev 551) to 2007-04-20 (DOY 110, Rev 551)

Nothing to report.

On DoY 105 at 01:22:29 and DoY 108 at 01:08:21 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

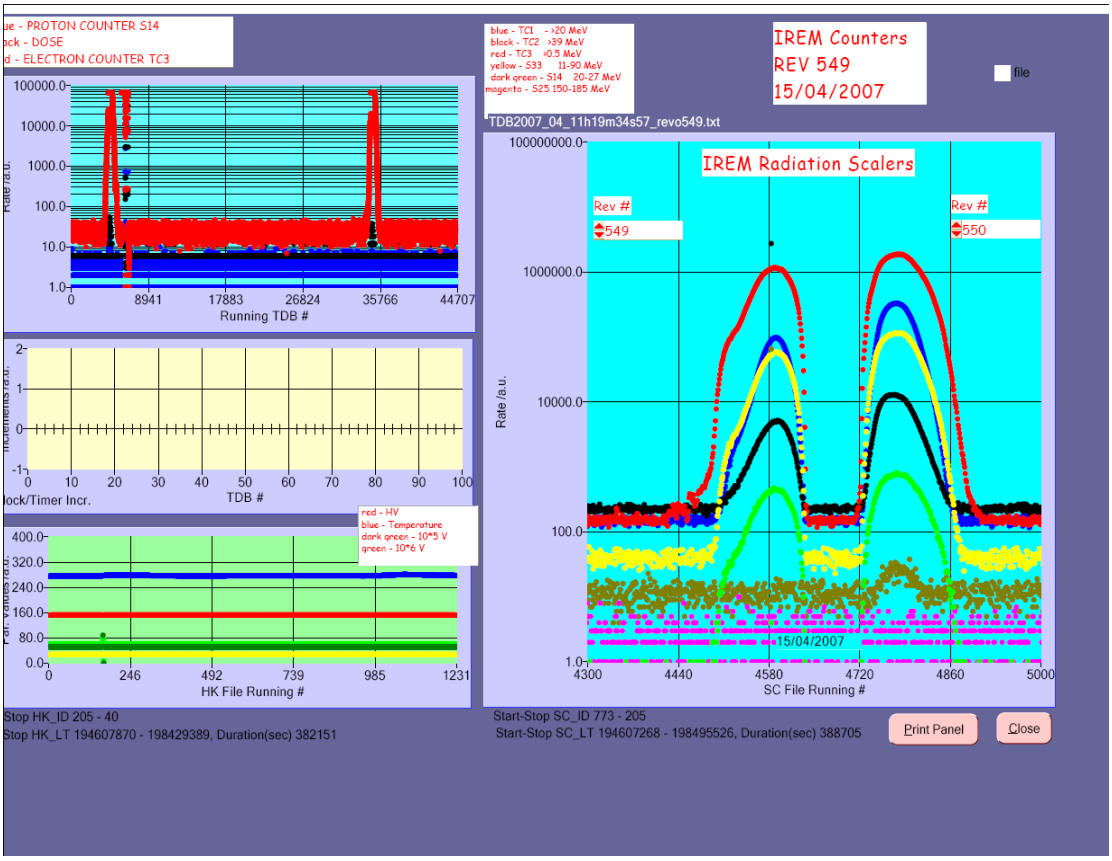
Nothing to report.

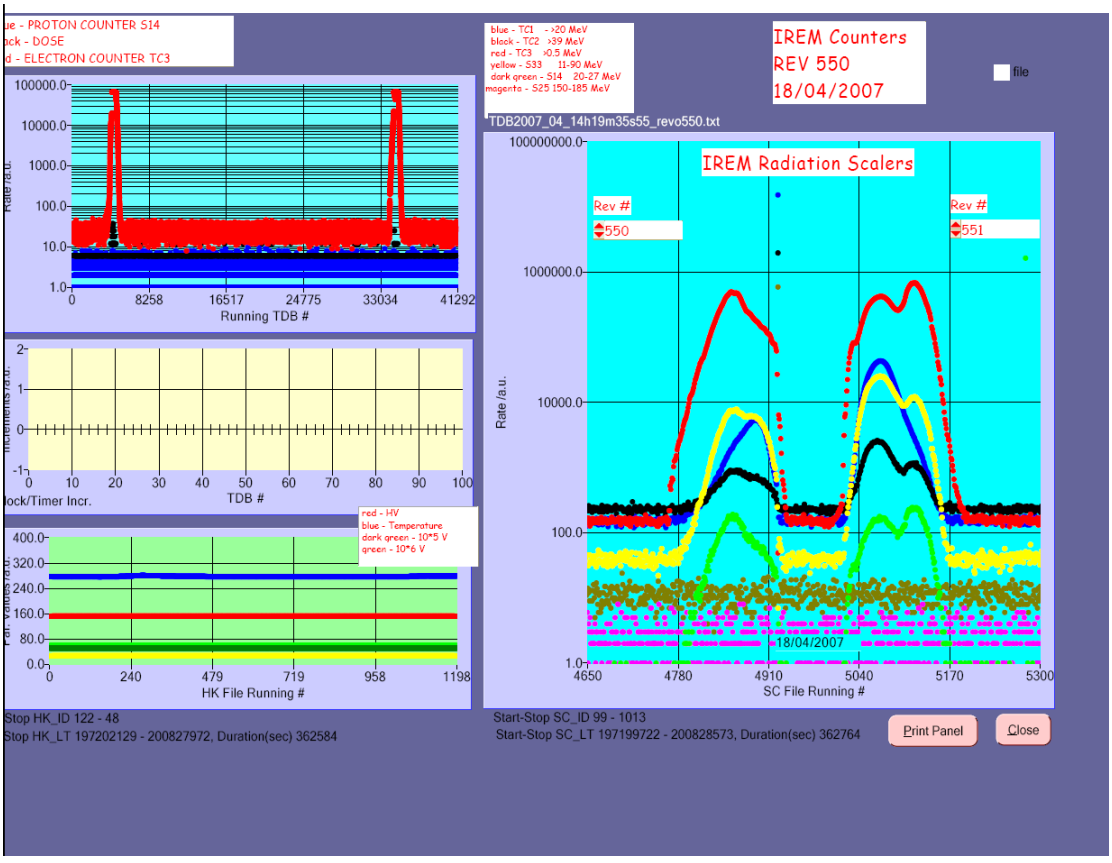
Electron Belts

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]
549	RAD_ENTR R 2007-04-15T01:22:21Z	2007-04-15 02:33:06	46533.2	2007-04-15 02:26:43	47314
550	RAD_EXIT R 2007-04-15T10:41:30Z	2007-04-15 09:49:22	37141.5	2007-04-15 10:26:43	42706
550	RAD_ENTR R 2007-04-18T01:08:15Z	2007-04-18 02:28:42	45036.8	2007-04-18 02:16:56	47047
551	RAD_EXIT R 2007-04-18T10:28:06Z	2007-04-18 09:35:54	37573.4	2007-04-18 10:16:56	42888

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)

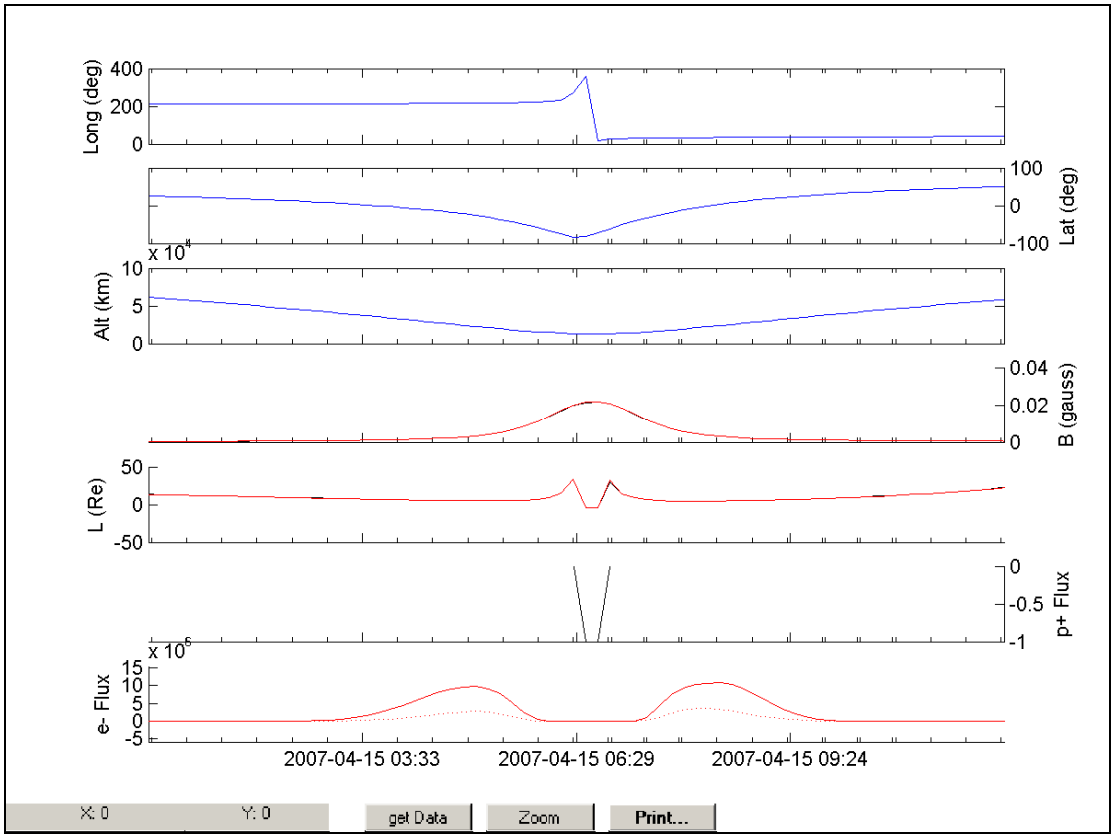
IREM radiation counters:



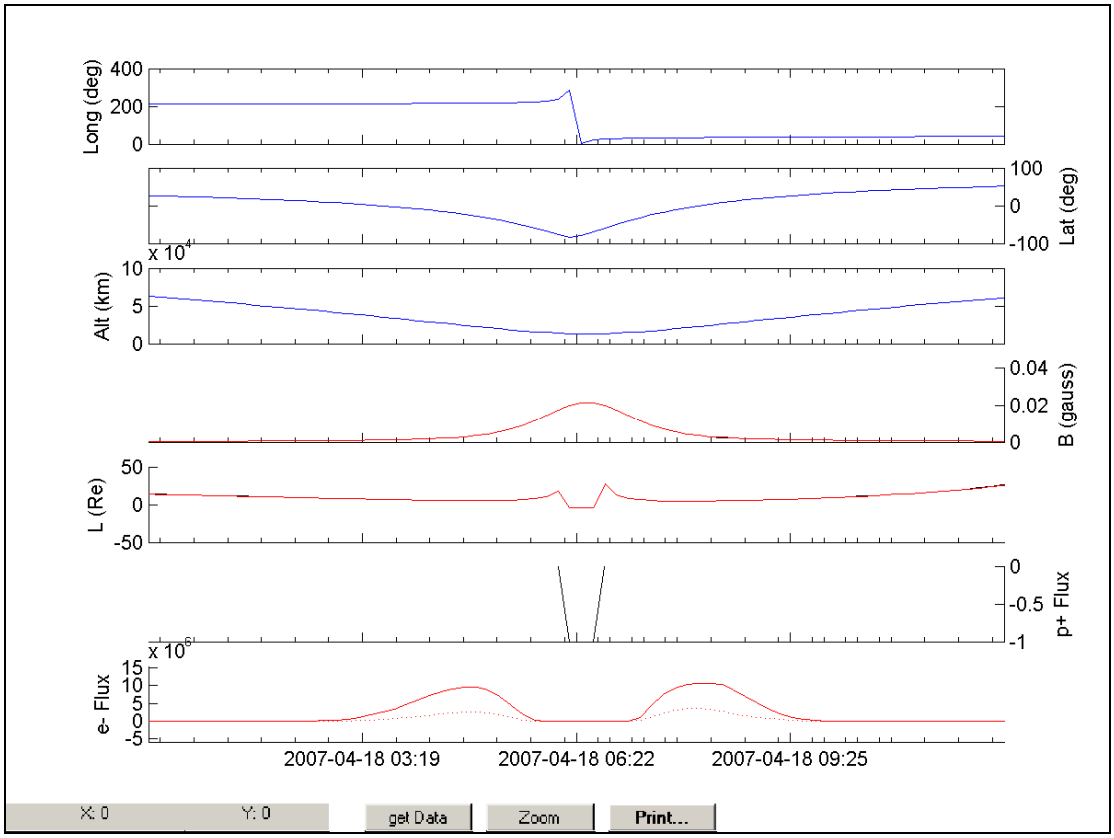


IREM Predicted Radiation Belt Passages

Rev 549



Rev 550



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

Note: no plots are available from the SEIS. However the radiation environment (X-Ray and particles flux) was quiet this week