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

INTEGRAL
Mission Report

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

No. 242
Week 19

14.05.07

Routine Phase

Prepared by: M.J.H. Walker (OPS-OAI)

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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 05.05.07 until 11.05.07 (both dates inclusive) and covers the revolutions 557 and 558.

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 hexagonal dither of the Gamma Ray Source 1915+105 (RA 19:15:11.50, DEC +10:56:44.0), two raster dithers of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), a raster dither of PKS 0537-286 (RA 05:39:54.28, DEC -28:39:55.9).

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 Summer Eclipse season 2007 was completed with the 7th and 8th eclipse passages. The eclipse passages were nominal from an AOCS point of view.

As part of the AOCS monitoring for the summer eclipse season, were verified 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.

As part of the AOCS reconfiguration after the winter eclipse season, the ACC\FDE\FCE eclipse timers were stopped and the AMD thresholds were set to their non-eclipse season values during rev 558.

No slews were missed from TL during the observation period.

The fuel consumption over the period between 04/05/2007 and 10/05/2007 was 0.1475 Kg. The remaining propellant is in the order of 146.5616 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.

The 7th and 8th eclipses of eclipse season #10 took place on 6th and 9th May, the relevant details are given below

Date	Penumbra Entry	Umbra Entry	Umbra Exit	Penumbra Exit	Total Eclipse Duration	Umbra duration Only	Observed DOD 1 (Ah)	Observed DOD 2 (Ah)	Recharge Duration Battery 1	Recharge Duration Battery 2
06/05/2007	02:50:22	02:52:20	03:35:45	03:37:18	0:46:56	0:43:25	4.25	4.2	2:31:58	2:30:22
09/05/2007	02:52:16	02:55:02	03:21:30	03:23:52	0:31:36	0:26:28	2.76	2.72	1:37:32	1:36:36

From the EPS point of view the eclipse passage was entirely nominal.

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

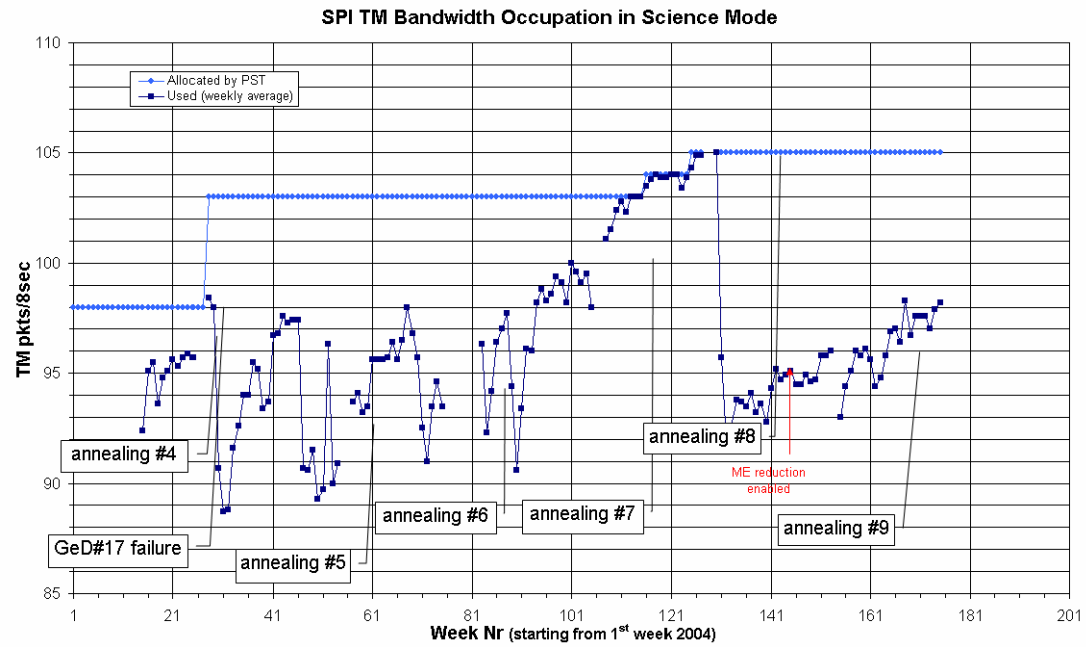
Following the 9th annealing, which ended on 22nd December, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution and is therefore operating at a lower HV setting of 3.5kV (instead of 4kV). The energy resolution 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 was 40 until 2007-05-10 at 07:33Z, when it was increased to 41 on all four compressors.

SPI eclipse operations during this period continued to be executed nominally.

During science operations, the instrument was kept in photon-by-photon mode with spectra TM enabled. The assigned TM bandwidth in the science observation windows was 105 packets/cycle and the average telemetry occupation when the TM allocation was 105 packets/cycle was 98.2 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.

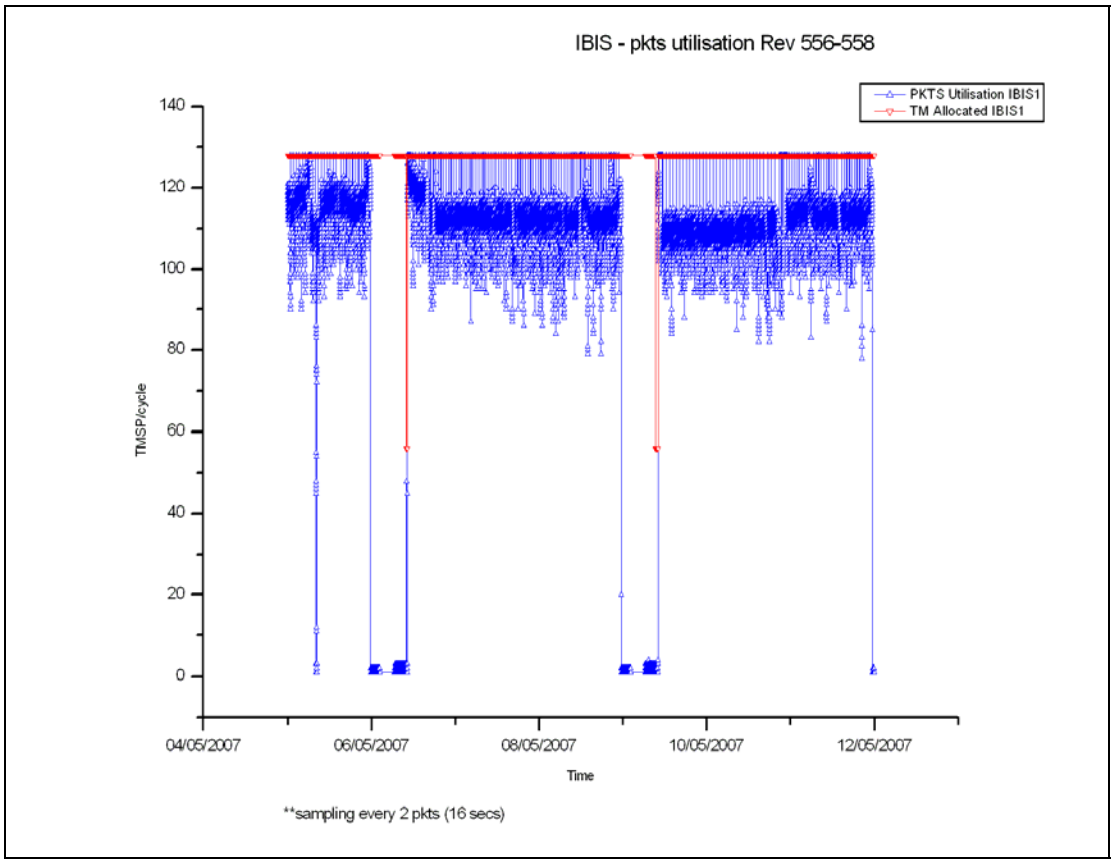
3.2.2 IBIS

The overall status of the unit is nominal.

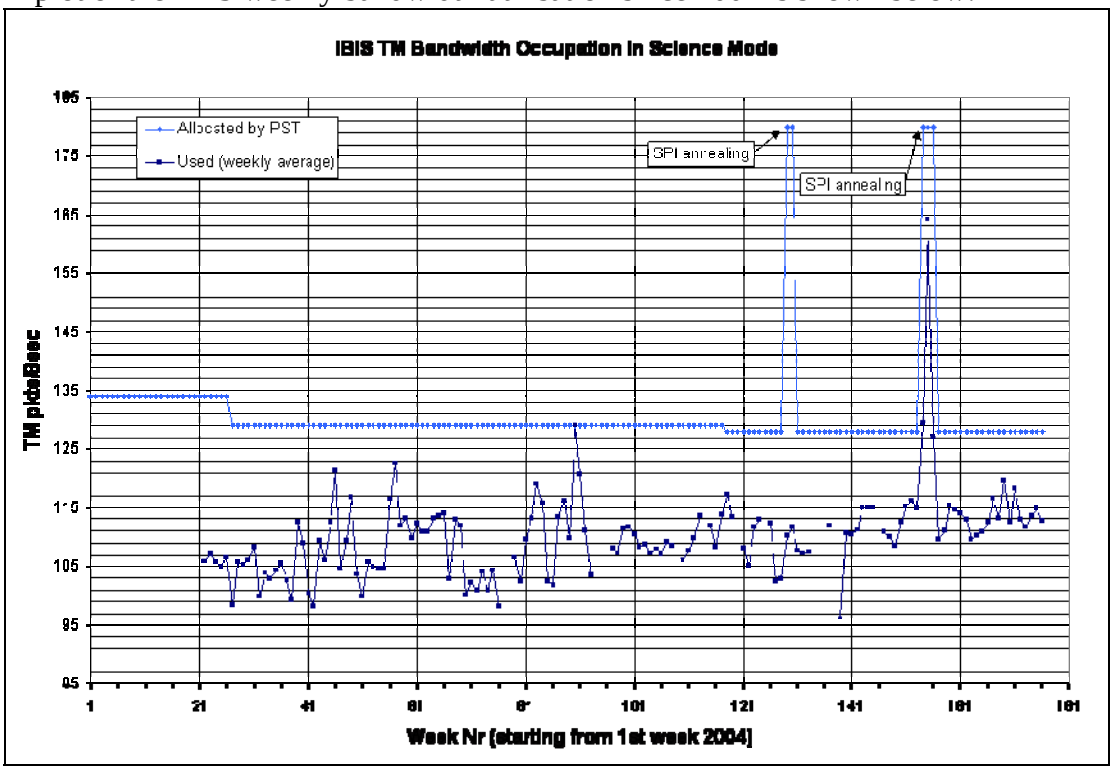
During this week, the 2 last eclipses of the season occurred. Every time, the reconfiguration of IBIS was smoothly performed as per timeline.

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 112.65 TMPS/cycle, down 2.05 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 during science observations. JEM-X2 was dormant (DPE OFF) with no TM slots allocated.

Eclipse operations for JEM-X during this period continued to be 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, all of the 175 planned science pointings for OMC were executed nominally.

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.

Fading away, sunspot 953 still posed a slight threat of M-class solar flare at the beginning of the week. From 07/05/2007 the sun was quiet: 953 disappeared and new growing sunspot 955 was not posing threat of solar flare.

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. No pointings were lost to ground problems. The overall performance was well over the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was very good this week. However, guide stars were lost on 2 occasions, without impact on science return. 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 was, however, 1 occasion of a data drop from Redu, without impact, and an entire DSS-24 backup pass and the first two hours of the next backup pass were lost due to out-of-date default sicf files, however the prime links were ok, and no data was lost. There was also 1 occasion where VC7 TM rate from DSS-24 went low, but recovered after the link was closed and re-opened. 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 564. Observations have been planned and sent to MOC up to revolution 561. The planning for 562 and beyond is held up by complications in correctly planning AOCS calibrations.

Revolution 558 was replanned more than once due to slew constraints at the end of the eclipse season.

A TOO request has been received for on 1E 1048.1-5937 leading to replanning of revolutions 560 and 561.

TSF's up to revolution 560 have been received.

2. Observation status

ECS files have been received this week up to revolution 549.

3. ISOC Science Data Archive

Work is ongoing to include OMC light-curve data into the INVITE tool.

4. ISOC system

ISOC system V14.5.2, with a fix of roll angle handling has been installed on the test system and is undergoing testing.

5. Problems

Setting up the AOCS calibrations correctly has turned up various problems in roll angle handling, ground station handovers, etc. It is not clear yet if the calibrations now

foreseen in Rev 562 can be set up according to procedure within the expected time. There is urgency also due to ESOC holidays in week 20.

4.3.2 ISDC

Status of ISDC observation processing on 14/05/2007:

- Latest Standard Analysis completed: observation 04200620001 (Sgr A*, Revolution 545 & 546) on 08/05/2007.

- Latest products archived: observation 04200620001 (Sgr A*, Revolution 545 & 546) on 09/05/2007.

- Latest observation products sent to the observer: observation 04200340018 (GRS 1915+105, Revolution 546) on 07/05/2007.

5 Special Events

6 Anomalies

There were no problems reported this week that impacted operations.

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

AR id	Date Created	Subject	Segment	Status
INT-2918	08/05/2007	TM VC-0 link on INCTRB not available from DSS-24	NASA Station	Closed
INT-2919	11/05/2007	TCO calculation does not use correct orbit file	IMCS	Pending

7 Future Milestones

The following activities are foreseen in the next few weeks.

- The FSS/STR misalignment calibration has been postponed to 21st May 2007, in Rev. 562
- Periodic Thruster Torque rescaling 24th July 2007 Rev. 583
- On Board Clock wrap around due in Rev. 585.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 557

The observations in revolution 557 began 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 the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), lasting ~50.9 hours, until the end of the revolution.

Revolution 558

The observations in revolution 558 began with a dummy pointing at attitude (RA 07:56:54.12, DEC +46:03:17.5), lasting ~15 minutes. It continued with a raster dither of PKS 0537-286 (RA 05:39:54.28, DEC -28:39:55.9), lasting ~31.5 hours. This was followed by another 15 minute dummy pointing at attitude (RA 07:56:54.12, DEC +46:03:17.5). Finally, a raster dither of the Galactic Plane Region 4 (RA 21:44:04.54, DEC +53:09:58.7), lasting ~22.0 hours, was executed 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

```
2007-04-22T05:23:51.000Z     146.9652    F   Automatic TM processing.
2007-04-24T01:51:32.000Z     146.9230    F   Automatic TM processing.
2007-04-24T08:57:16.000Z     146.9079    F   Automatic TM processing.
2007-04-25T18:42:00.000Z     146.8922    F   Automatic TM processing.
2007-04-27T08:48:52.000Z     146.8518    F   Automatic TM processing.
2007-04-28T18:05:43.000Z     146.7980    F   Automatic TM processing.
2007-04-30T08:26:51.000Z     146.7868    F   Automatic TM processing.
2007-05-01T17:20:47.000Z     146.7659    F   Automatic TM processing.
2007-05-03T08:18:04.000Z     146.7091    F   Automatic TM processing.
2007-05-04T17:34:48.000Z     146.6880    F   Automatic TM processing.
2007-05-06T08:03:16.000Z     146.6771    F   Automatic TM processing.
2007-05-06T16:14:21.000Z     146.6410    F   Automatic TM processing.
2007-05-09T07:38:43.000Z     146.6192    F   Automatic TM processing.
2007-05-09T10:32:20.000Z     146.5987    F   Automatic TM processing.
2007-05-10T22:14:07.000Z     146.5616    F   Automatic TM processing.

This report was generated  Fri May 11 08:00:19 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, 05/05/2007 –11/05/2007

AOCS operations were executed from the Automatic Timeline.

During this period, 79 Open Loop Slews, 104 Closed Loop Slews and 5 Momentum Biases were executed.

No slews were missed from TL, during the observation period.

The OTF was not reached during the execution of PID 05570011 and 05570068.

Summer Eclipse Season 2007 Summary

The AOCS eclipse operations were nominal. 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. The complete eclipse times and IMU usage 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
2007-04-21	03:32:00	07:45:00	02:32:54	03:15:12	03:24:07	03:24:51	03:32:34	03:34:25	03:34:49	04:24:55	04:25:15	04:26:43	04:31:03	04:36:44	0:54:09
2007-04-24	03:21:00	07:30:00	02:18:50	03:01:26	03:10:14	03:10:58	03:18:30	03:20:03	03:20:23	04:18:55	04:19:08	04:20:20	04:24:30	04:30:38	1:01:50
2007-04-27	03:07:00	07:18:00	02:07:30	02:49:55	02:58:49	02:59:33	03:07:10	03:08:37	03:08:55	04:09:43	04:09:56	04:11:00	04:15:17	04:21:09	1:03:50
2007-04-30	02:53:00	07:05:00	01:58:40	02:40:34	02:51:42	02:52:26	02:58:20	02:59:49	03:00:03	03:58:48	03:59:03	04:00:05	04:05:58	04:09:41	1:01:45
2007-05-03	02:44:00	06:53:00	01:53:10	02:35:02	02:43:44	02:44:28	02:52:50	02:54:14	02:54:36	03:47:42	03:47:54	03:49:01	03:52:52	03:58:35	0:56:11
2007-05-06	02:33:00	06:40:00	01:51:11	02:32:41	02:41:36	02:42:20	02:50:51	02:52:22	02:52:48	03:36:14	03:36:31	03:37:48	03:41:12	03:46:59	0:46:57
2007-05-09	02:20:00	06:28:00	01:53:12	02:35:11	02:44:40	02:45:24	02:52:52	02:54:55	02:55:37	03:22:06	03:22:38	03:24:28	03:28:52	03:34:09	0:31:36

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
2007-04-21 00:18:31	2007-04-21 04:39:06	0.2056	0.2173	0.2138	4:20:35	8:19:33
2007-04-24 00:06:42	2007-04-24 04:32:51	0.1850	0.1800	0.1580	4:26:09	12:45:42
2007-04-27 00:07:49	2007-04-27 04:23:27	0.2056	0.2600	0.2978	4:15:38	17:01:20
2007-04-30 00:21:16	2007-04-30 04:12:02	0.2086	0.2842	0.2974	3:50:46	20:52:06
2007-05-02 23:35:39	2007-05-03 04:00:54	0.1867	0.2699	aborted due to CSL recovery	4:25:15	25:17:21
2007-05-05 23:30:18	2007-05-06 03:49:18	0.1030	0.2083	0.2181	4:19:00	29:36:21
2007-05-08 23:16:29	2007-05-09 03:36:27	0.2027	0.1677	0.1846	4:19:58	33:56:19

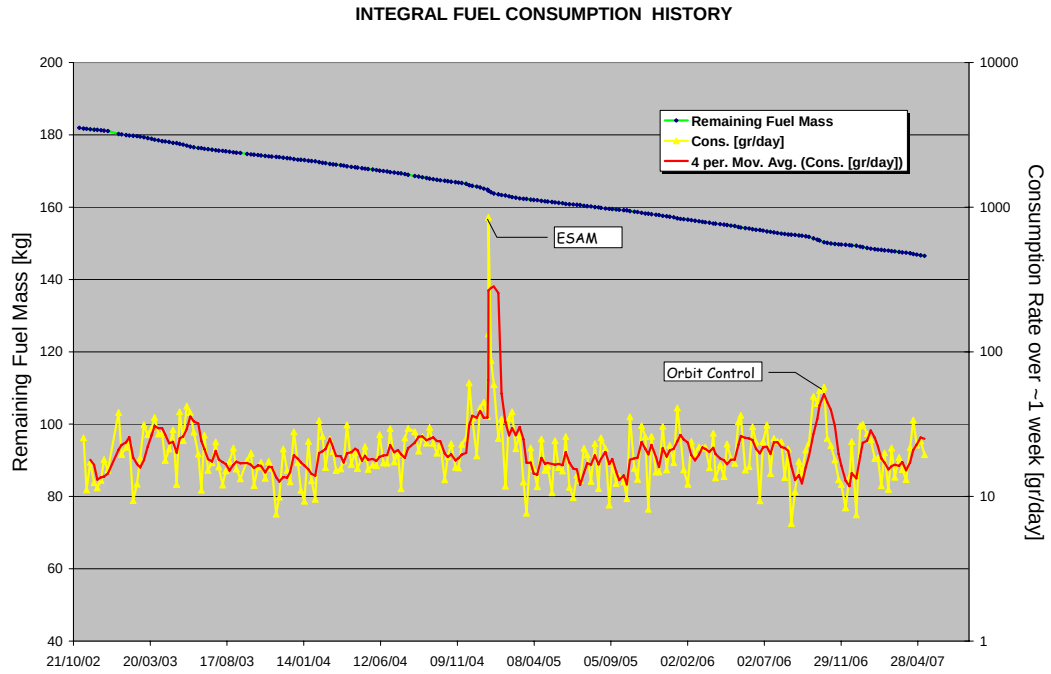
After the end of the season the ACC/FDE/FCE Eclipse Timers were stopped and the AMD thresholds were set to their non-eclipse season values.

Orbit Control

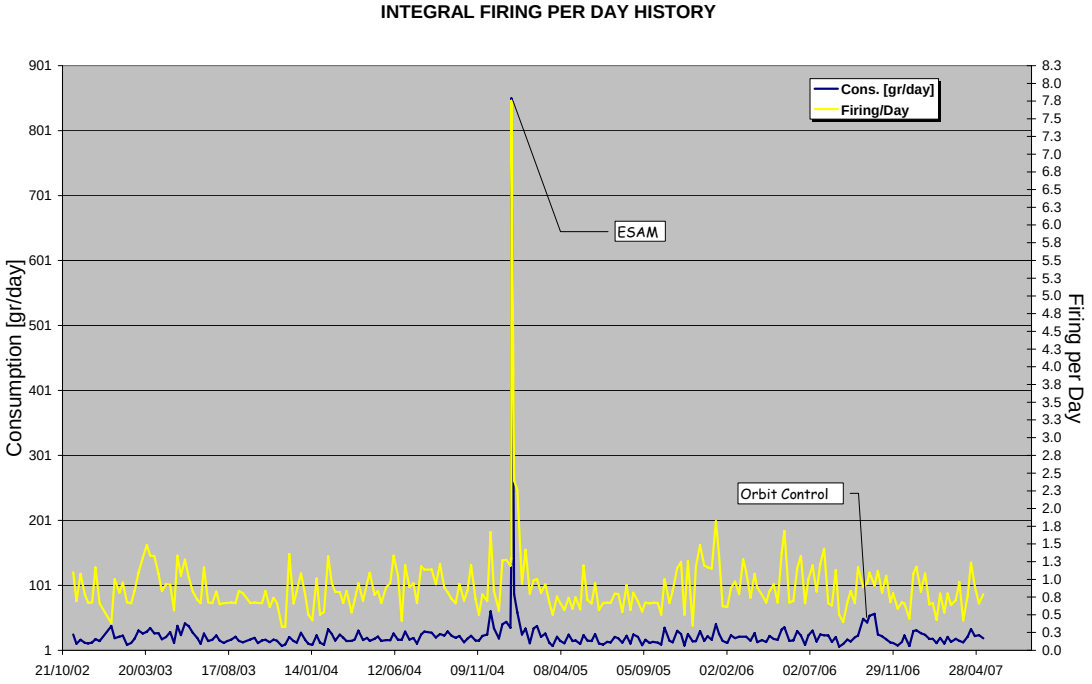
No update.

Fuel consumption

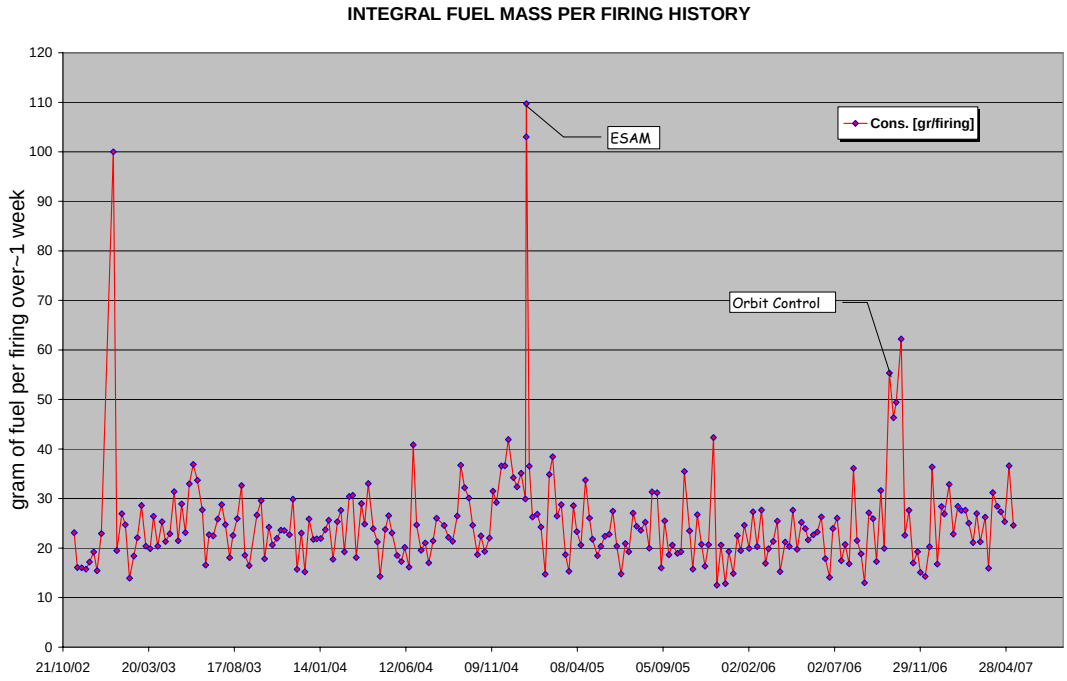
The fuel consumption (total, grams per day) over the period between 01/11/2002 and 10/05/2007 is shown in the plot below.



The firing per day over the period between 01/11/2002 and 10/05/2007 is shown in the plot below.

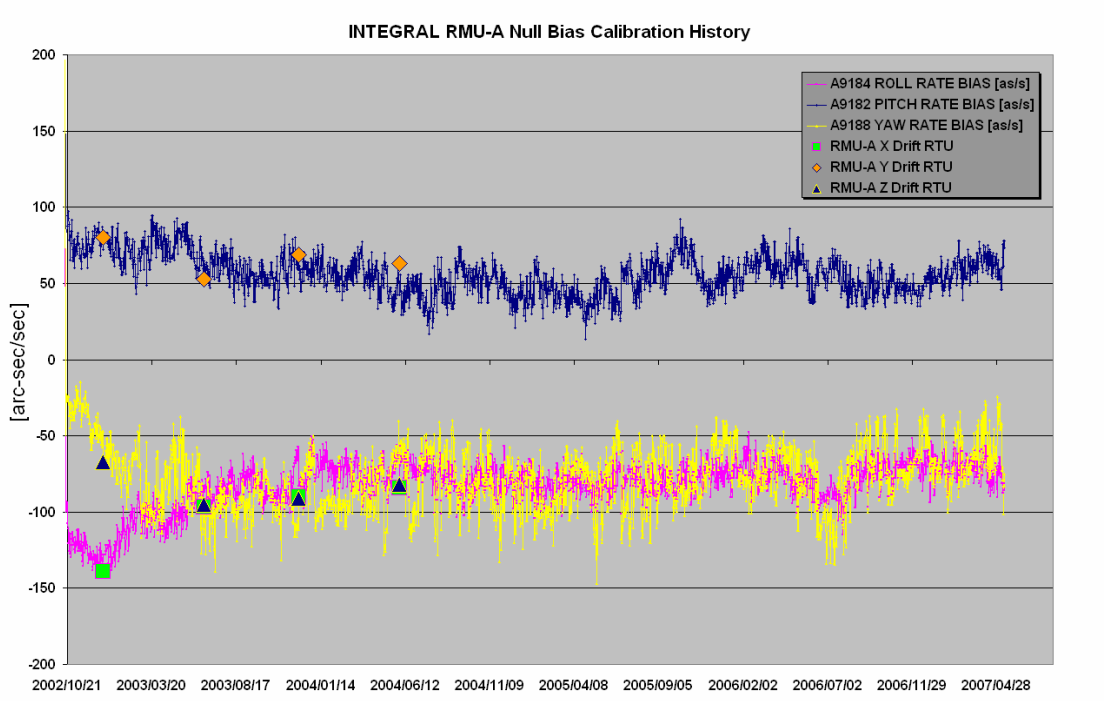


The fuel per firing over the period between 01/11/2002 and 10/05/2007 is shown in the plot below.

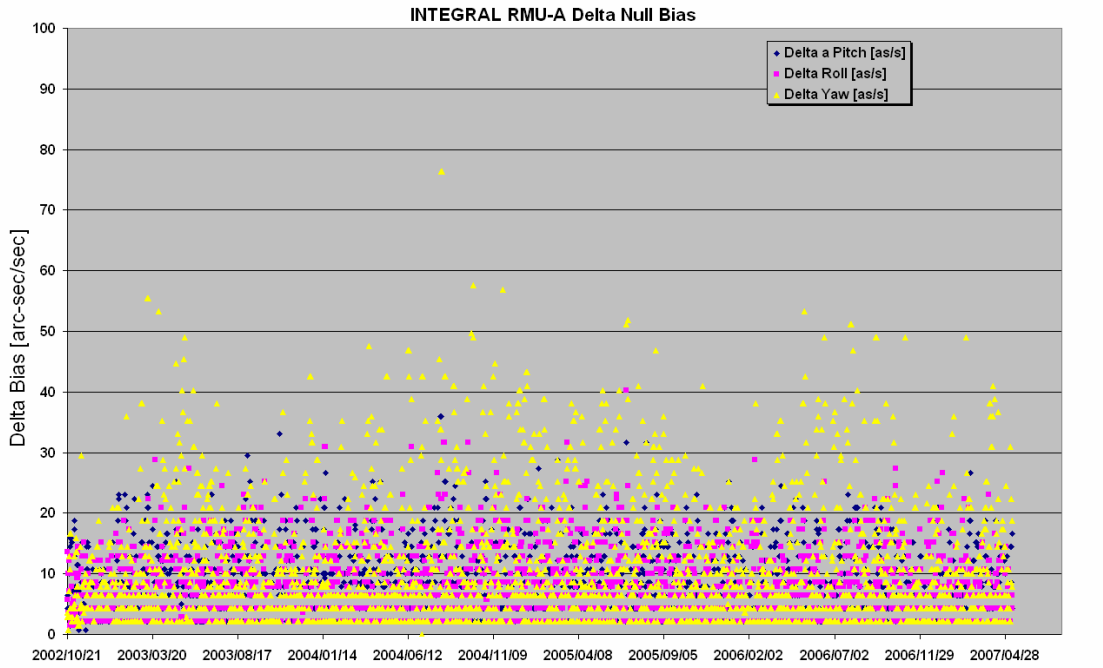


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 11/05/2007 is shown 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 11/05/2007 is shown in the plot below



05/05/2007 (Day of Year 125, Revolution 556)

Nothing to report.

06/05/2007 (Day of Year 126, Revolution 556-557)

The 7th eclipse operations were nominal from the AOCS point of view. A summary of the eclipse passage during rev 556 is given below:

AOCS ECLIPSE MONITORING
Summer 2007

Revolution:	**556**		
Date:	**06/05/2007**		
DoY:	**126**		

Penumbra Start:	06/05/2007 02:50:51	**LOS:**	06/05/2007 02:33:00	antenna swap
Umbra Start:	06/05/2007 02:52:48	**AOS:**	06/05/2007 06:40:00	
Umbra End:	06/05/2007 03:36:14			
Penumbra End:	06/05/2007 03:37:48			
Eclipse Duration:	0:46:57			
Eclipse Duration [sec]:	2817			

IMU Health Check Start	05/05/2007 23:26:38
Eclipse Imminent Flag	06/05/2007 01:51:11
ACC IMU AutoCal Start	06/05/2007 02:05:37
ACC IMU AutoCal End	06/05/2007 02:25:37

Sun out of FSS FoV	06/05/2007 02:52:22
Sun back in FSS FoV	06/05/2007 03:36:31

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	06/05/2007 02:32:41	-1090.00	06/05/2007 02:32:46	-1085.00	**-1064**	
FDE Eclipse Start	06/05/2007 02:41:36	-555.00			**-404**	**176**
FCE Eclipse Start	06/05/2007 02:42:20	-511.00			**-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	06/05/2007 03:41:12	204			**360**	**176**
FDE Eclipse End	06/05/2007 03:41:12	204			**360**	**176**
ACC Eclipse End	06/05/2007 03:46:59	551	06/05/2007 03:47:04	556.00	**578**	

IMU	**Uplink**	**Execution**	**WRT Penumbra End [sec]**
IMU Auto Off Enable	03/05/2007 07:49:17	06/05/2007 03:49:17	689
IMU On	05/05/2007 23:30:18	**IMU H/C Noise Roll [as/s]**	0.1030
IMU Off	06/05/2007 03:49:18	**IMU H/C Drift Roll [as/s]**	0.2083
IMU On Time	4:19:00	**IMU Auto Cal Drift Roll [as/s]**	0.2181

STR SEU threshold exceeded: at 06:40:16z, the ACC STR SEU threshold was exceeded due to false event and the IMU1 was automatically switched ON by the ACC.

The guide star at the occurrence of the event was Mi 8.05 @ CCD location [19663, -7821].

A new mapping was automatic initiated by the ACC and a new guide star Mi 8.25 @ CCD location [-725, -6322], found.

The new guide star was checked wrt the coming RWB activity and no further recovery performed.

No impact on TL.

STR guide star lost: at 17:57:52z, the guide star was lost and the IMU1 was automatically switched ON by the ACC.

The guide star at the occurrence of the event was Mi 6.45 @ CCD location [-25324, -20516].

A new mapping was automatic initiated by the ACC and a new guide star Mi 8.0 @ CCD location [9527, -325], found.

The next slew ID 05570012 was manually updated at 18:04z.

No impact on TL except that the OTF was not reached during PID 05570011.

07/05/2007 (Day of Year 127, Revolution 557)

Nothing to report.

08/05/2007 (Day of Year 128, Revolution 557)

STR guide star lost: at 11:54:35z, the guide star was lost and the IMU1 was automatically switched ON by the ACC.

The guide star at the occurrence of the event was Mi 7.95 @ CCD location [13081, 22034].

A new mapping was automatic initiated by the ACC and a new guide star Mi 8.15 @ CCD location [9153, 4043], found.

The next slew ID 05570069 was manually updated at 12:07z.

The reason of the loss of guide star is likely due the pixel position (111, 281) closer to a blemish one.

No impact on TL except that the OTF was not reached during PID 05570068.

09/05/2007 (Day of Year 129, Revolution 557-558)

The 8th eclipse operations were nominal from the AOCS point of view. A summary of the eclipse passage during rev 557 is given below:

AOCS ECLIPSE MONITORING
Summer 2007

Revolution: 557
Date: 09/05/2007
DoY: 129

Penumbra Start:	09/05/2007 02:52:52	**LOS:**	09/05/2007 02:20:00	antenna swap
Umbra Start:	09/05/2007 02:55:37	**AOS:**	09/05/2007 06:28:00	
Umbra End:	09/05/2007 03:22:06			
Penumbra End:	09/05/2007 03:24:28			
Eclipse Duration:	0:31:36			
Eclipse Duration [sec]:	1896			

IMU Health Check Start	08/05/2007 23:14:00
Eclipse Imminent Flag	09/05/2007 01:53:12
ACC IMU AutoCal Start	09/05/2007 02:07:38
ACC IMU AutoCal End	09/05/2007 02:27:38

Sun out of FSS FoV	09/05/2007 02:54:55
Sun back in FSS FoV	09/05/2007 03:22:38

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	09/05/2007 02:35:11	-1061.00	09/05/2007 02:35:15	-1057.00	**-1064**	
FDE Eclipse Start	09/05/2007 02:44:40	-492.00			**-404**	**176**
FCE Eclipse Start	09/05/2007 02:45:24	-448.00			**-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	09/05/2007 03:28:52	264			**360**	**176**
FDE Eclipse End	09/05/2007 03:28:52	264			**360**	**176**
ACC Eclipse End	09/05/2007 03:34:09	581	09/05/2007 03:34:14	586.00	**578**	

IMU	**Uplink**	**Execution**	**WRT Penumbra End [sec]**
IMU Auto Off Enable	06/05/2007 07:46:03	09/05/2007 03:36:26	718
IMU On	08/05/2007 23:16:29	**IMU H/C Noise Roll [as/s]**	0.2027
IMU Off	09/05/2007 03:36:27	**IMU H/C Drift Roll [as/s]**	0.1677
IMU On Time	4:19:58	**IMU Auto Cal Drift Roll [as/s]**	0.1846

10/05/2007 (Day of Year 130, Revolution 558)

Reconfiguration of the AOCS after the eclipse season: With the end of the summer 2007 eclipse season, the AMD thresholds were set back to their non-eclipse season values.

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						
Sunlight Season:								
	Subset 1		Subset 2					
WSMAX	39		35.9					
WSMIN	2.2		4.8					
WSMAX	To Uplink:					In rpm:		
	X1		X2			X1	X2	
RW#1:	406.250000	rd/s	373.958333	rd/s		3879	3571	
RW#2:	399.387606	rd/s	367.641411	rd/s		3814	3511	
RW#3:	400.938401	rd/s	369.068939	rd/s		3829	3524	
RW#4:	399.388015	rd/s	367.641788	rd/s		3814	3511	
WSMIN	To Uplink:					In rpm:		
	X1		X2			X1	X2	
RW#1:	22.916667	rd/s	50.000000	rd/s		219	477	
RW#2:	22.529557	rd/s	49.155398	rd/s		215	469	
RW#3:	22.617038	rd/s	49.346265	rd/s		216	471	
RW#4:	22.529580	rd/s	49.155448	rd/s		215	469	

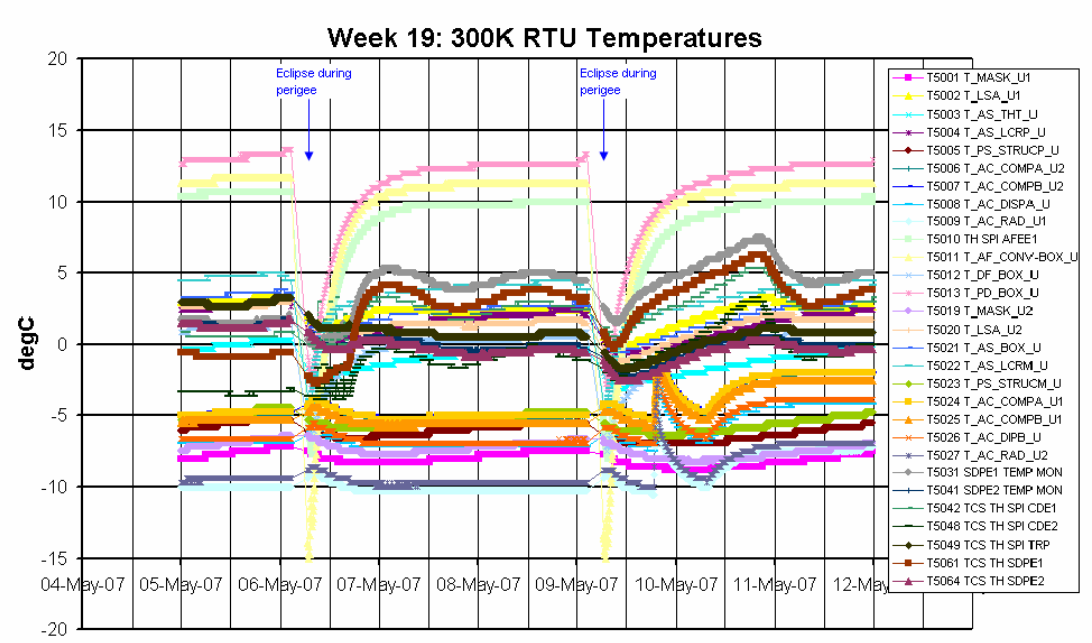
In the same time frame the ACC/FDE/FCE Eclipse Timers were stopped to reconfigure permanently the S/C in sunlight, at 08:49z.

11/05/2007 (Day of Year 131, Revolution 558)

Nothing to report.

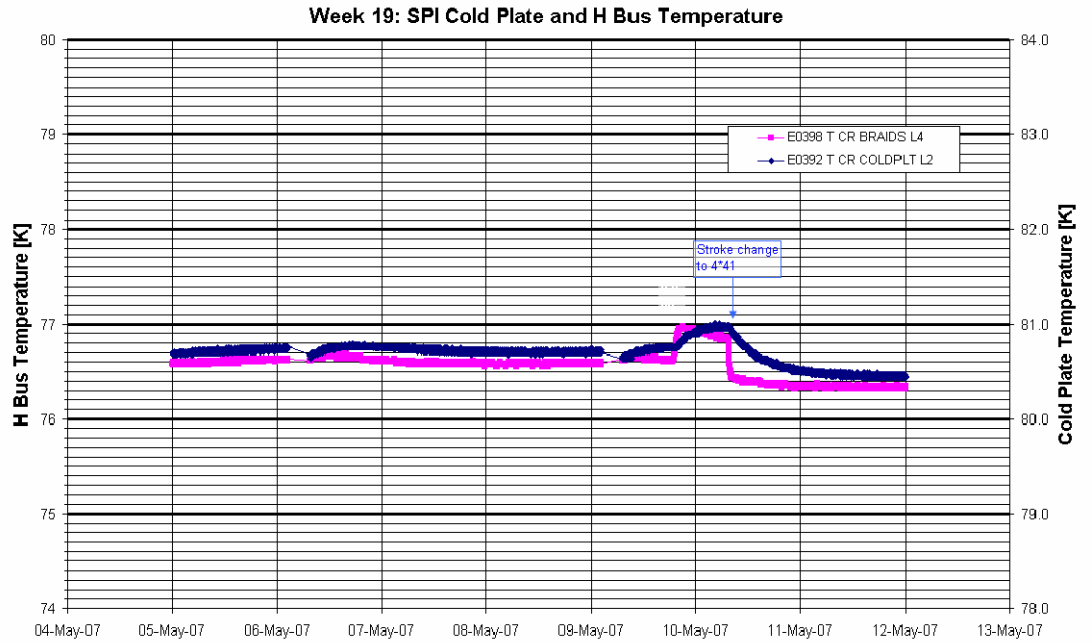
8.3.2 SPI Operations

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.

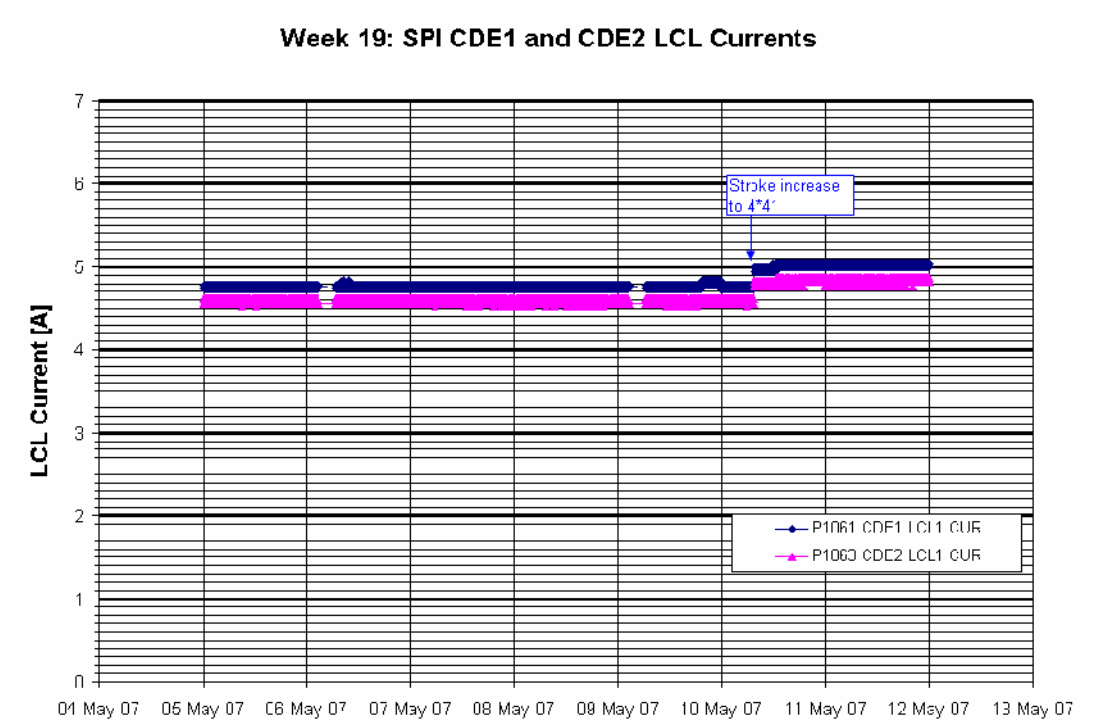


The stroke of all four compressors was 40 until 2007-05-10 at 07:33Z, when it was increased to 41, as the Cold plate temperature TM parameter E0392 had been toggling in and out of limits high since 2007-05-09 at 23:49:34Z.

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

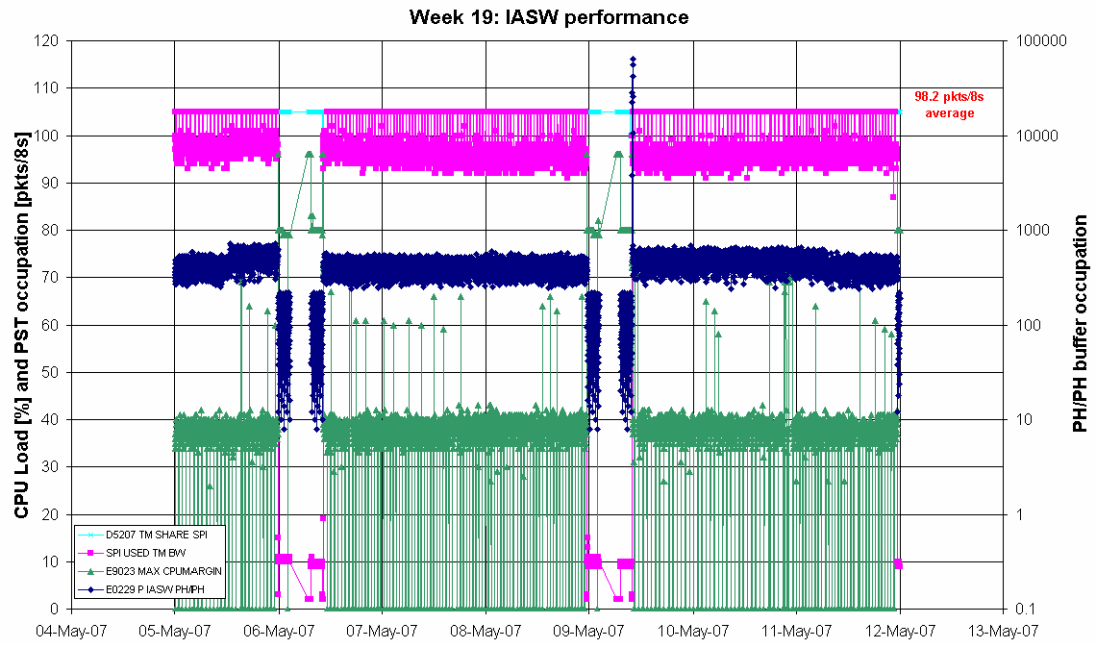
- Average CDE1 LCL Current = 4.82A
- Average CDE2 LCL Current = 4.63A

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



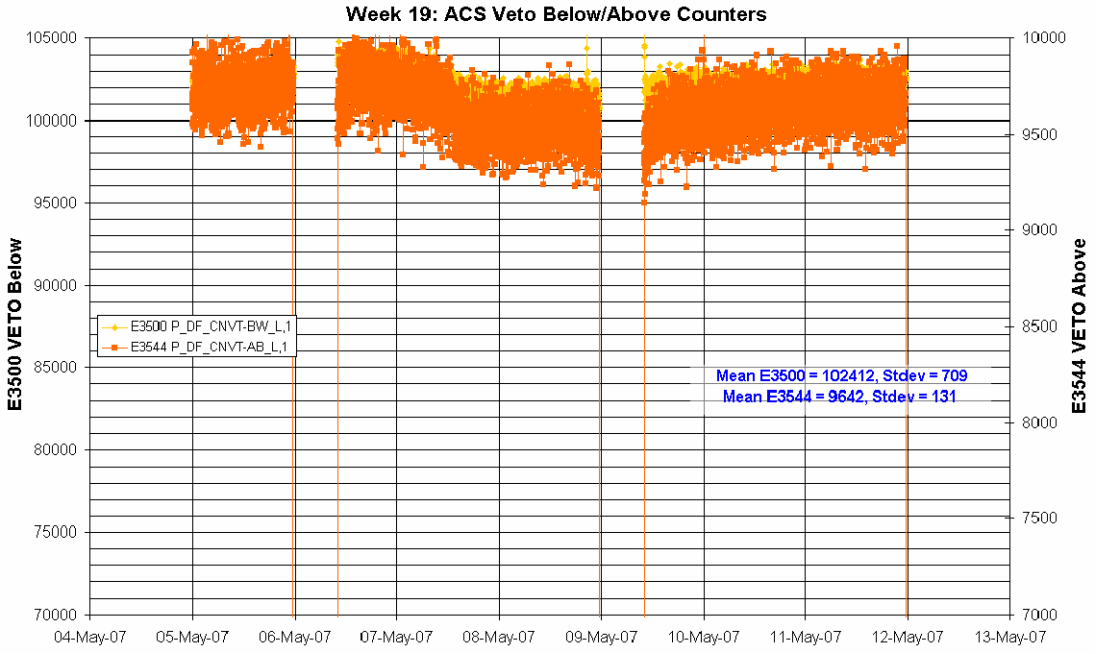
DPE & IASW: The DPE health and IASW performance is nominal. The IASW version installed is v433 patch #1. The spectra scaling factor was set to 9/19 SE throughout the week (being reset manually after each radiation belt exit following eclipse in line with INT_OPS_0286).

The average TM bandwidth occupation of SPI was 98.2 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).

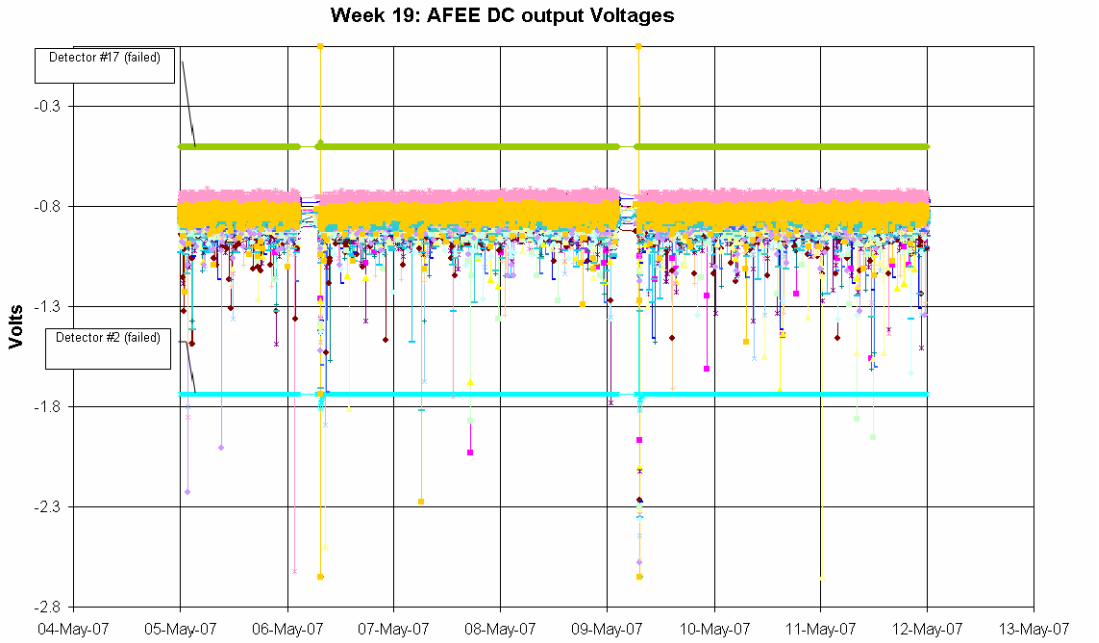
The following plot shows the ACS overall count rate evolution during the reporting period:



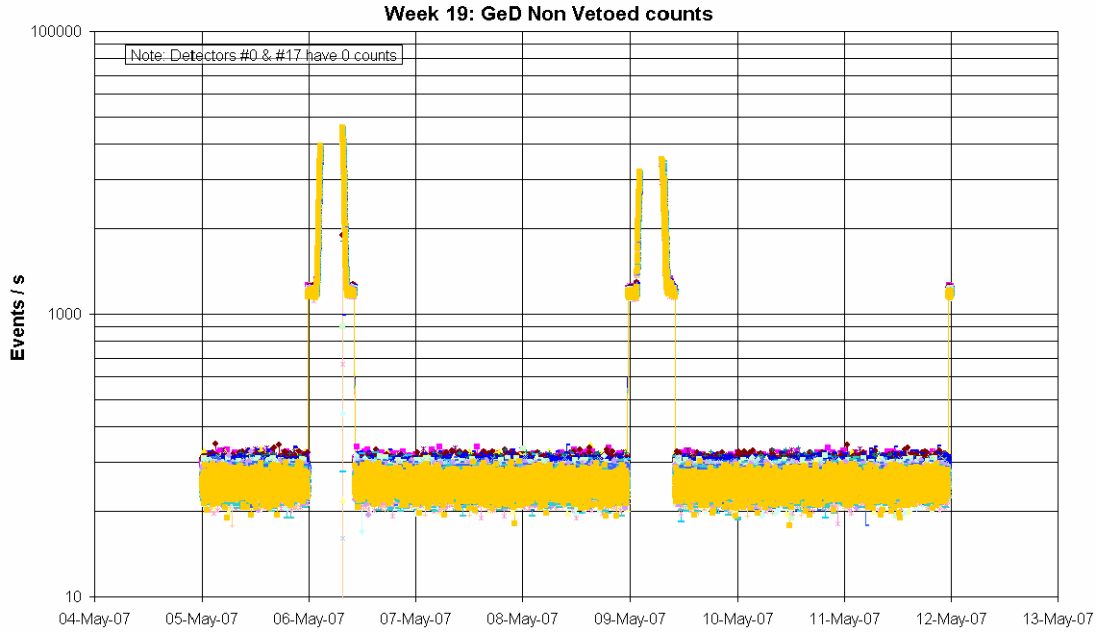
AFEE: The health of the AFEE is nominal. The performance of the AFEE and the detectors is nominal, except for the Ge detector #12 which is showing a slightly degraded energy resolution. The energy resolution of GeD#4 was recovered with the last annealing.

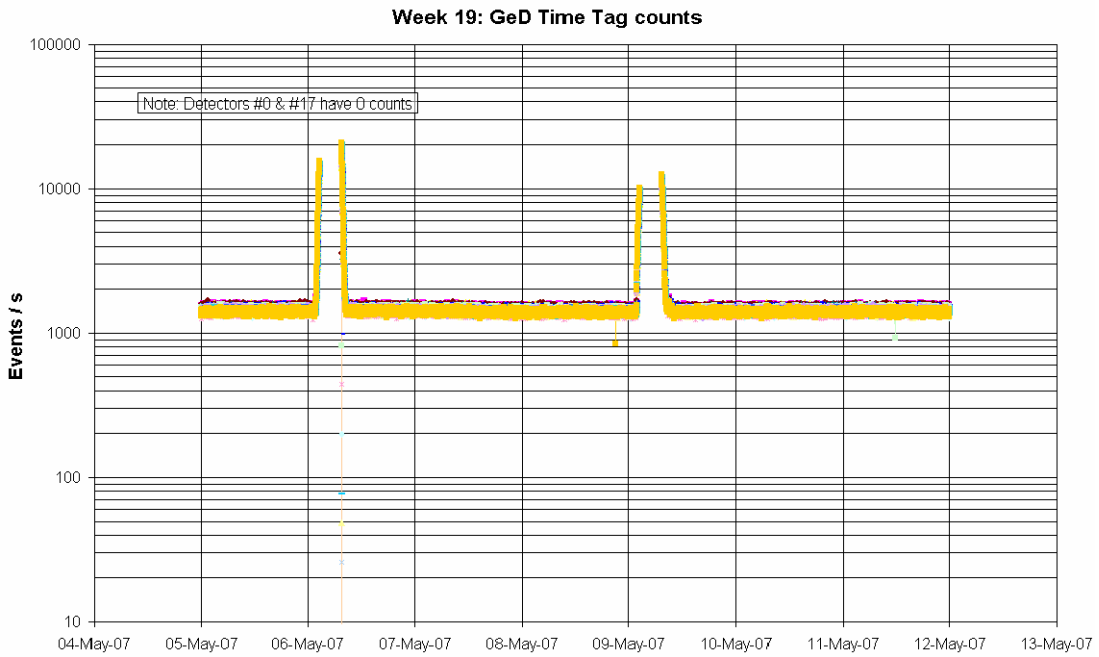
The GeD#12 HV remained at 3.5kV throughout the reporting period.

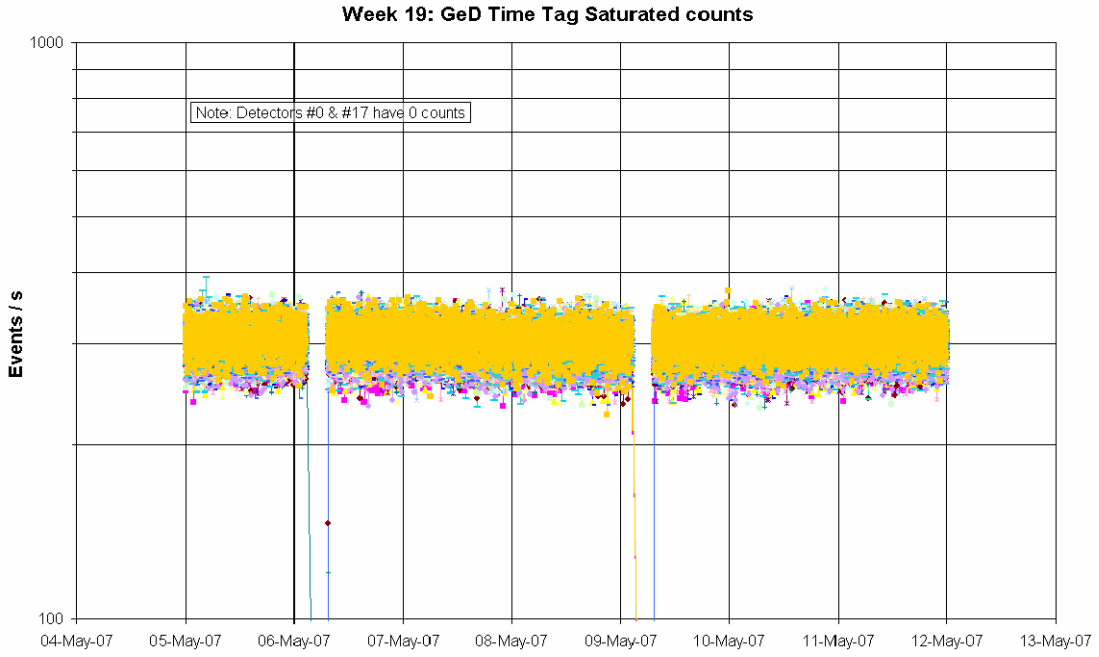
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004.



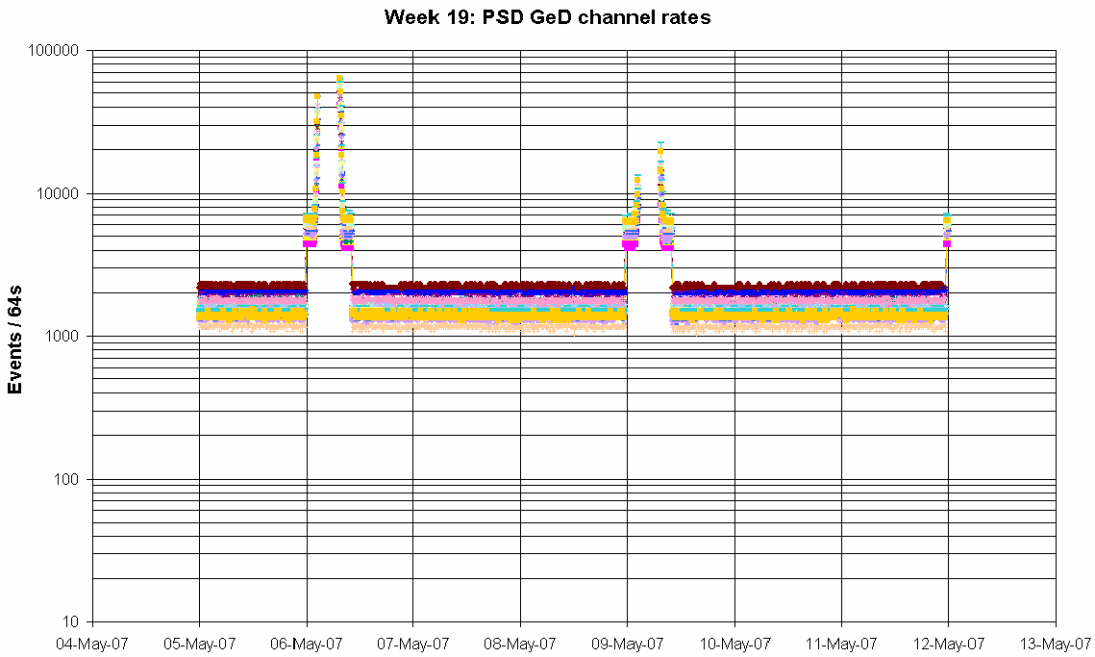
DFEE: The performance of the unit is nominal. The following plots show the Non Vetoed, Time Tag and Time Tag Saturated Event Count Rates during the reporting period.







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:

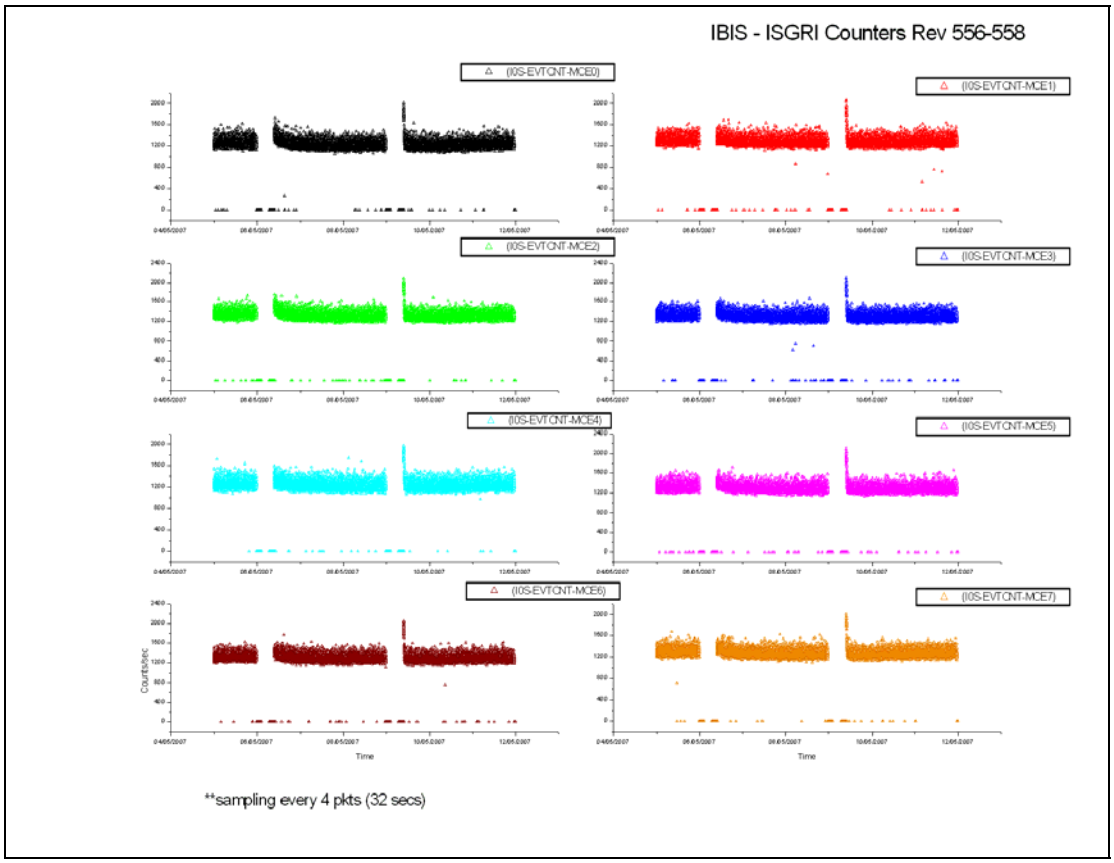
- On 2007-05-05 at 23:48:29Z and on 2007-05-08 at 23:36:08Z TM parameters E3981- E3984, E3986, E3988, E3991, E3992, E3995, E3996 went OOL Alarm (value = 0). This was ~5 minutes after execution of the ED EENTRY02 before radiation belt entry of revolutions 556 and 557. These TM parameters retuned within limits after a few minutes in each case. This is currently being investigated.
- On 2007-05-06 at 07:03:59Z one occurrence of OEM APID 1024 ID 1 EXCEPTION SPI1 FIXED POINT OVERFLOW was received. This was during the AOS_CHK window of revolution 557, when the time verification TC was sent. This OEM is sometimes received when this TC is sent and no action was taken.
- On 2007-05-06 at 07:29:52Z the TM parameter E4009 S DF HSLERR L went OOL High for a couple of TM cycles, indicating an error on the HSL. This was a few minutes after the end of the execution of the post-eclipse activation ED EECLEX02 from the Timeline at the start of revolution 557.
- On 2007-05-06 at 09:20:54Z OEM APID 1024 ID 145 EXCEPTION SPI1 LSL ERROR was received with E9759 LSL ERROR TYPE = NACK; E9760 LSL CHANNEL = PSD and E9762 TYPE OF COMMAND = K, indicating a negative acknowledgement on the LSL for a HK acquisition request from the PSD. As this was a single occurrence, no action was taken.
- On 2007-05-06 at 12:11:37Z TM parameter E2115 Plastic scintillator temperature started fluctuating in and out of limits Warning Low (value approx. -15.4degC). It returned stably within limits at 15:44:57Z. This occurred again on 2007-05-10 at 14:07:21Z, with E2115 returning stably within limits on this day at 15:34:18Z.

- On 2007-05-11 at 12:40:48Z OEM APID 1024 ID 243 EVENT SPI1 SPECTRA BUILDING NOT COMPLETED was received. As this was a single occurrence, the spectra scaling factor has not been adjusted.
- The TM parameter E2116 Plastic scintillator temperature went OOL Low several times within the reporting period. This is a known problem due to a faulty thermistor. As the Low limits are currently as low as possible (soft low at -70degC, hard low at -72degC), the low limits for this parameter will be removed in the next IODB release.

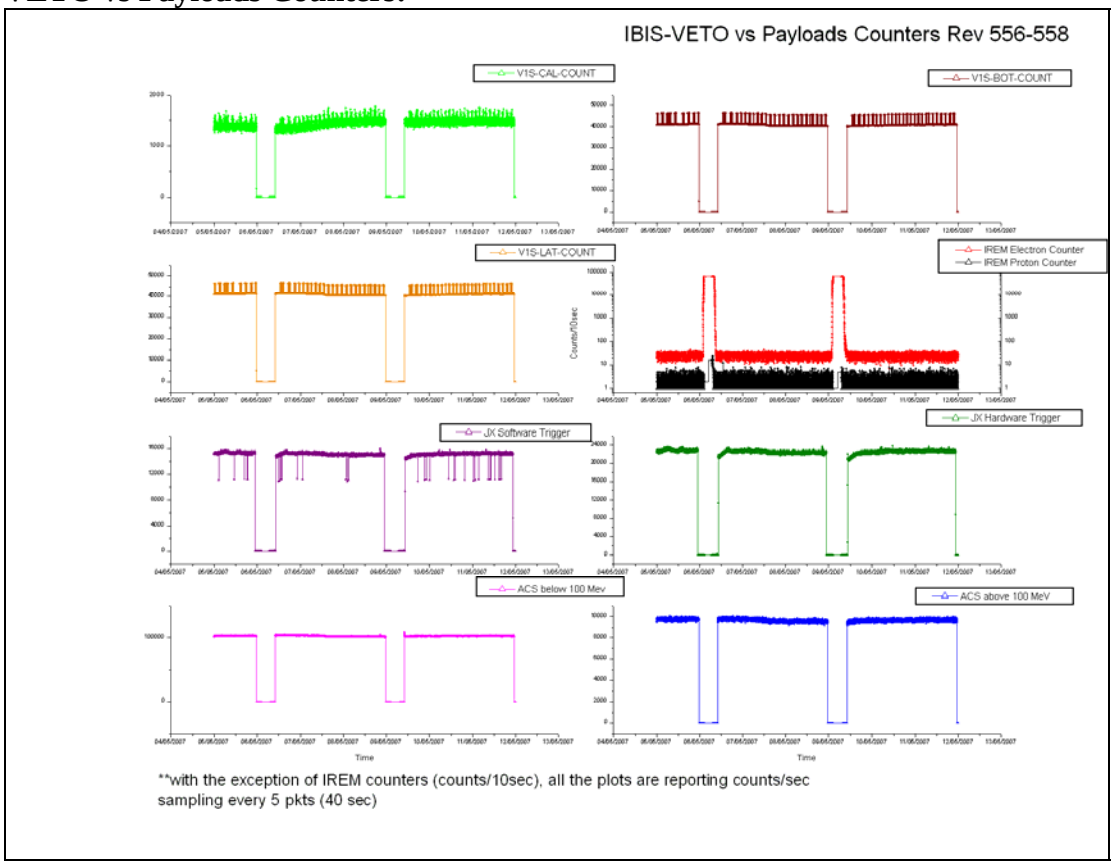
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

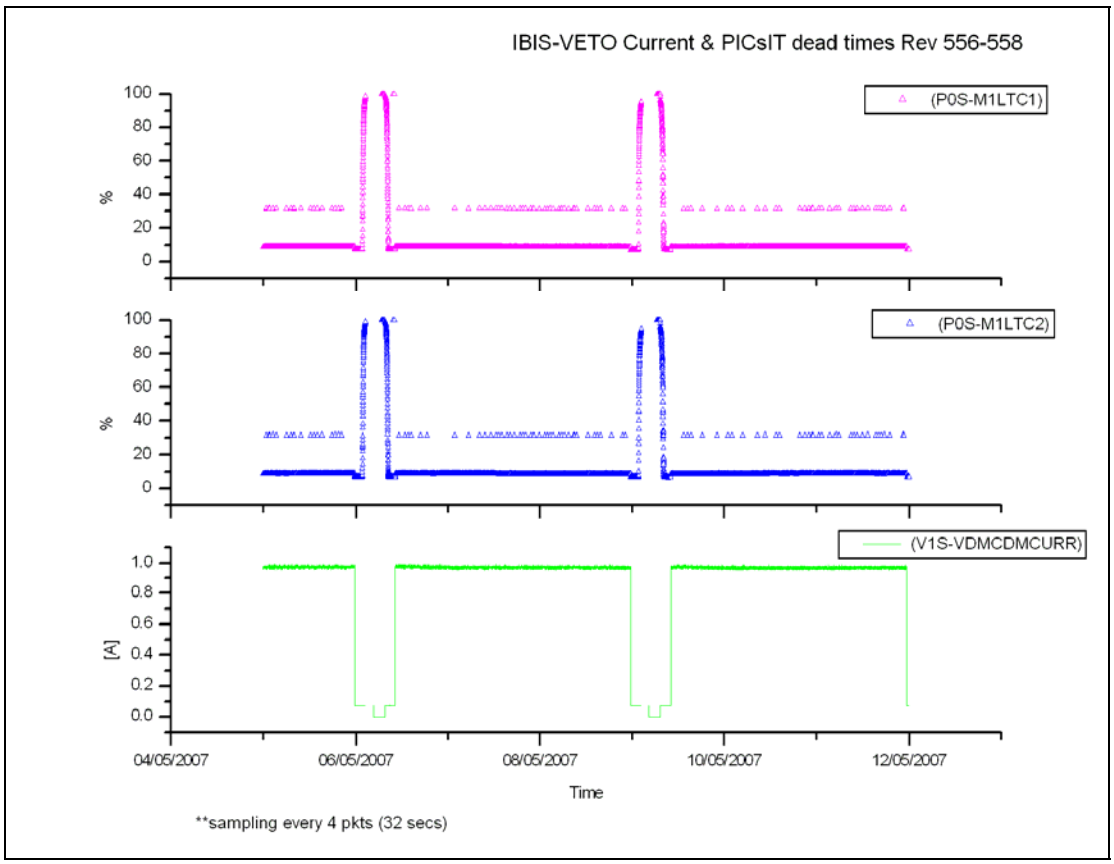


VETO vs Payloads Counters:

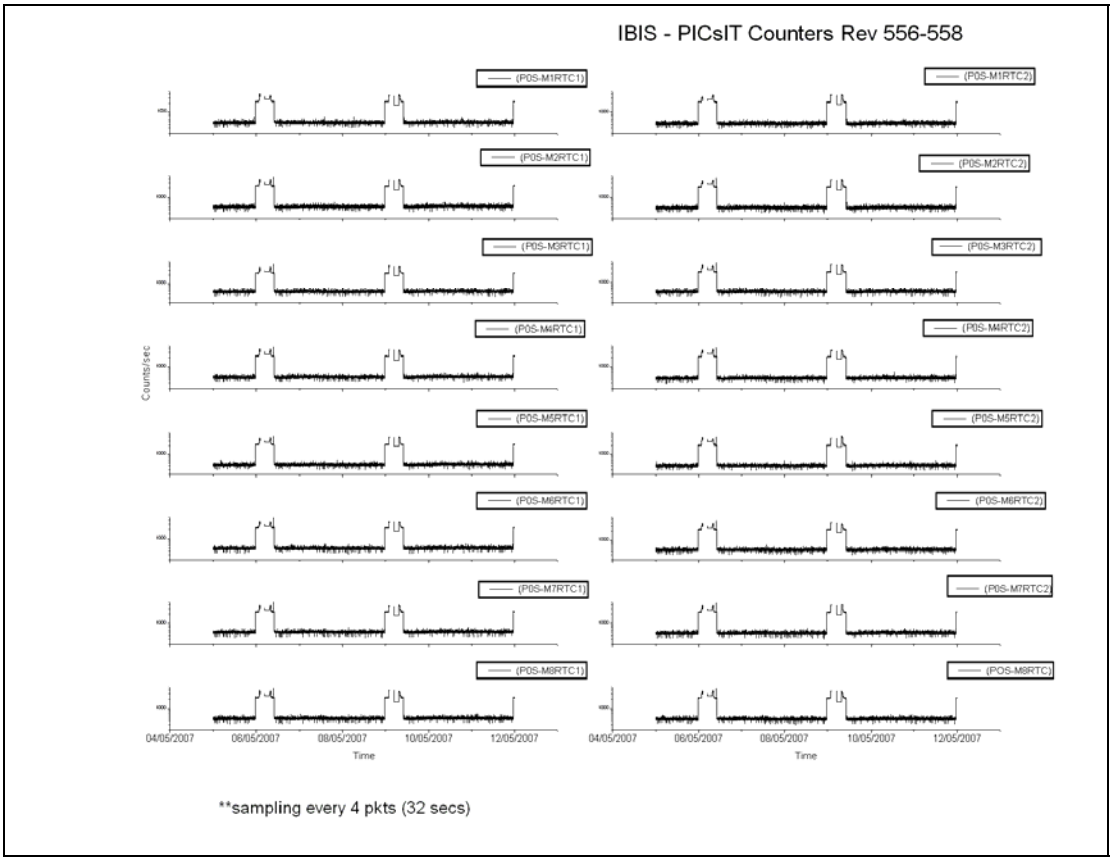


The week was characterised by low radiation.

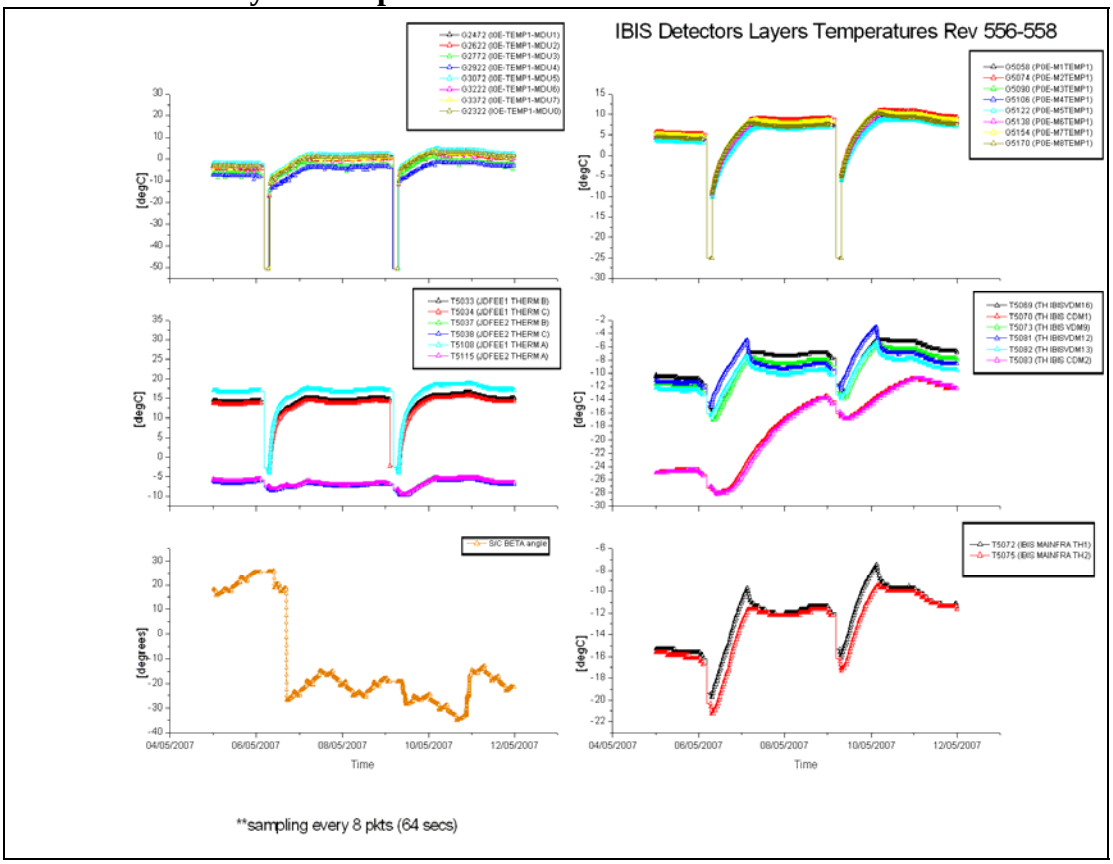
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report:

The usual Out Of Limits on TM parameter G8015 (S1E-A2_PMT_V), families G5002 (P0S-Mi_RTC1) and G5003 (P0S-Mi_RTC2), families G2014 (I0E-OVFWPXADD-Mi) were reported at Radiation Belts passage.

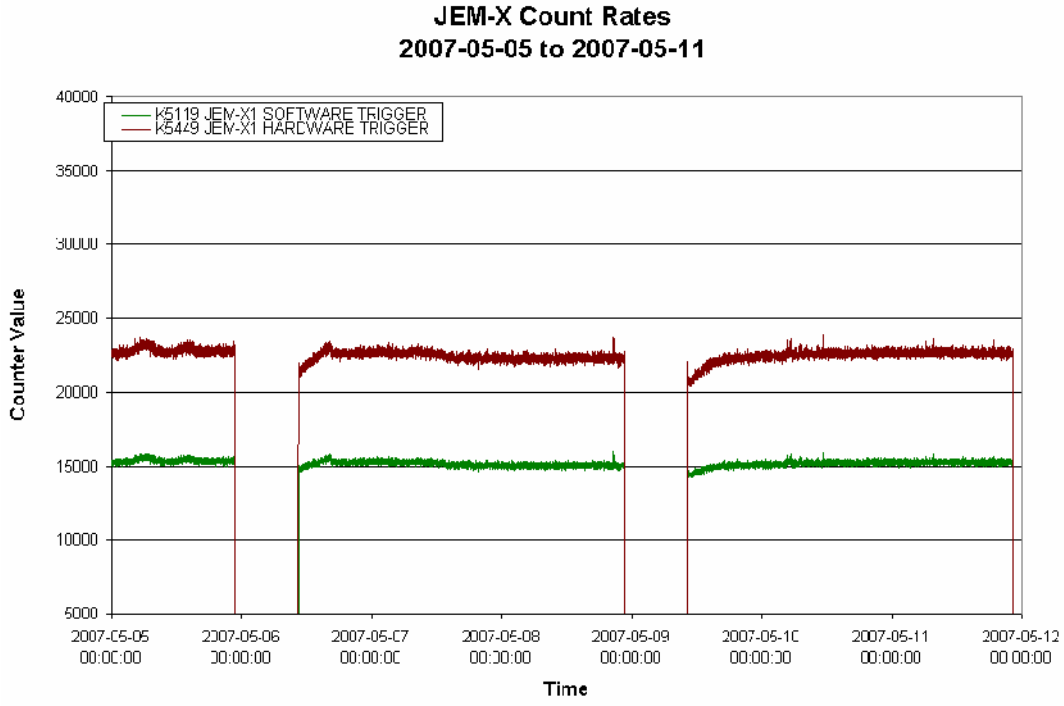
DoY 2007.125 (05/05/2007):

At 07:01Z, TM parameter X7500 was reported OOL flagging a problem with Histograms downloading. Following the FDIR, the operator waited to see if the Histograms automatism would restart after the next slew, but it did not happen. Therefore the "read remaining histograms" procedure (FCP_IBIS1_0312) was uplinked at 08:08Z and IBIS was back to Scientific standard at 08:22Z. At the next long pointing, the histograms restarted accumulation and then downlinking.

8.3.4 JEM-X Operations

JEM-X Count Rates

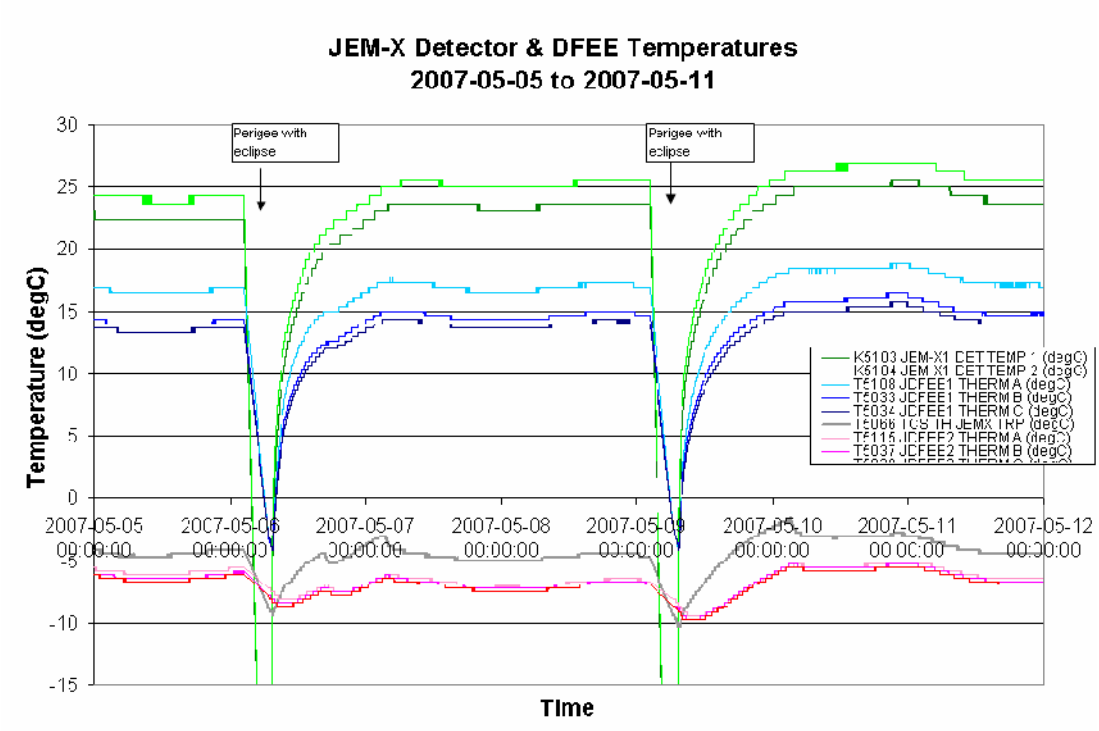
JEM-X count rates over the reporting period are displayed in the following graph[1].



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].

[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

2007-05-05 (DOY 125, Rev 556) to 2007-05-11 (DOY 131, Rev 558)

JEM-X1 operations executed nominally.

8.3.5 OMC Operations

2007-05-05 (DOY 125, Rev 556) to 2007-05-09 (DOY 129, Rev 558)

Nothing to report.

2007-05-10 (DOY 130, Rev 558)

At 02:01:18, the following OEMs were received:

```
2007.130.02.01.18.018   2007.130.02.01.26.756   1792   RealTime   7       EXCEPTION
OMC CONSTRAINT D                                         0       0    65535   PR    N
E   E
2007.130.02.01.18.018   2007.130.02.01.26.760   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.

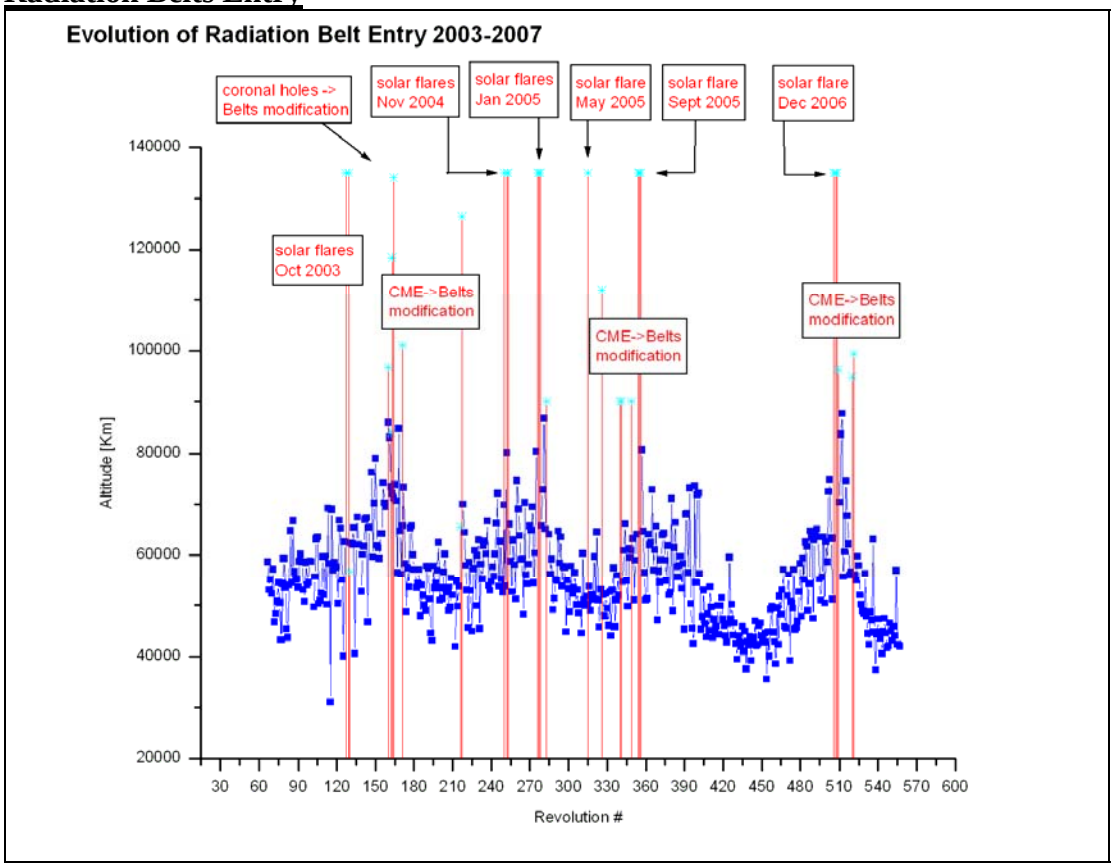
2007-05-11 (DOY 131, Rev 558)

Nothing to report.

On DoY 125 at 23:48:06, DoY 128 at 23:37:58 and DoY 131 at 23:26:54 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]
556	RAD_ENTR R 2007-05-05T23:48:00Z	2007-05-06 01:22:19	42339.1	2007-05-06 00:57:34	47205
557	RAD_EXIT R 2007-05-06T10:03:52Z	2007-05-06 08:22:51	37620.4	2007-05-06 08:57:34	42944
557	RAD_ENTR R 2007-05-08T23:37:54Z	2007-05-09 01:22:19	41985.7	2007-05-09 00:51:50	46412
558	RAD_EXIT R 2007-05-09T09:53:18Z	2007-05-09 09:10:35	<<49629.1	2007-05-09 08:41:50	42327

Reference

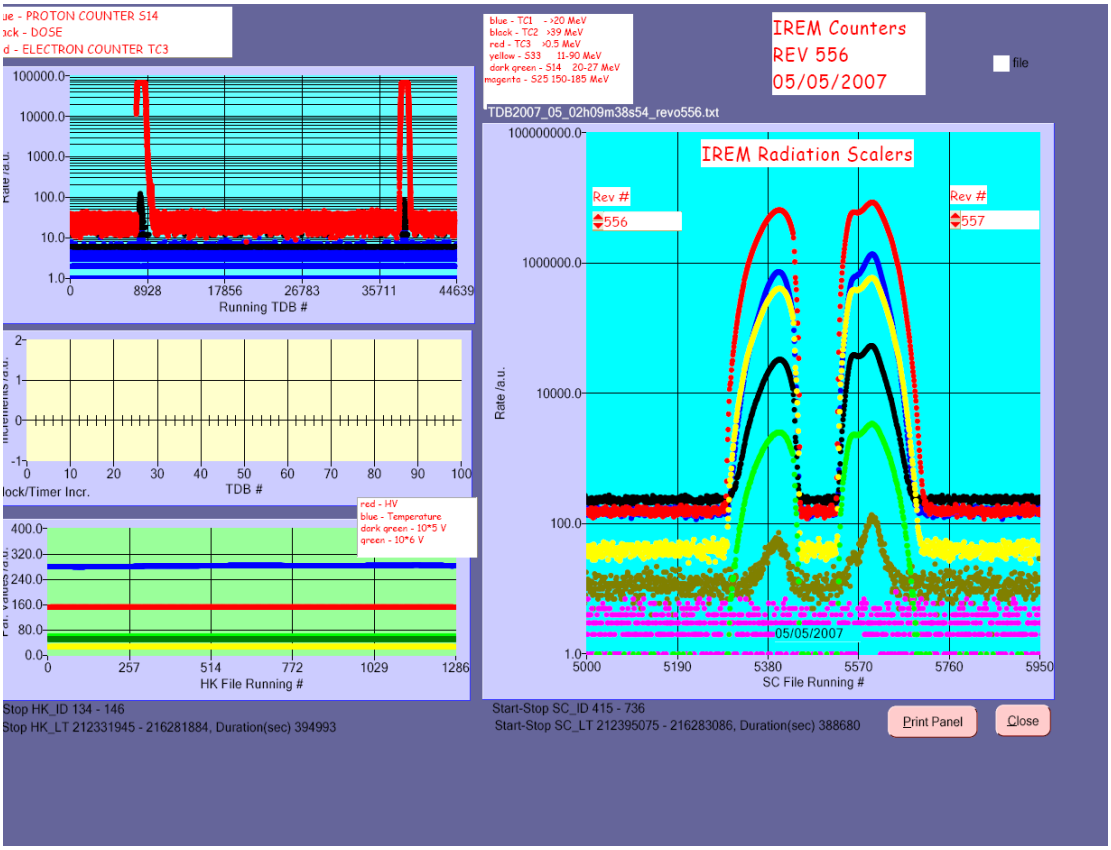
High radiation

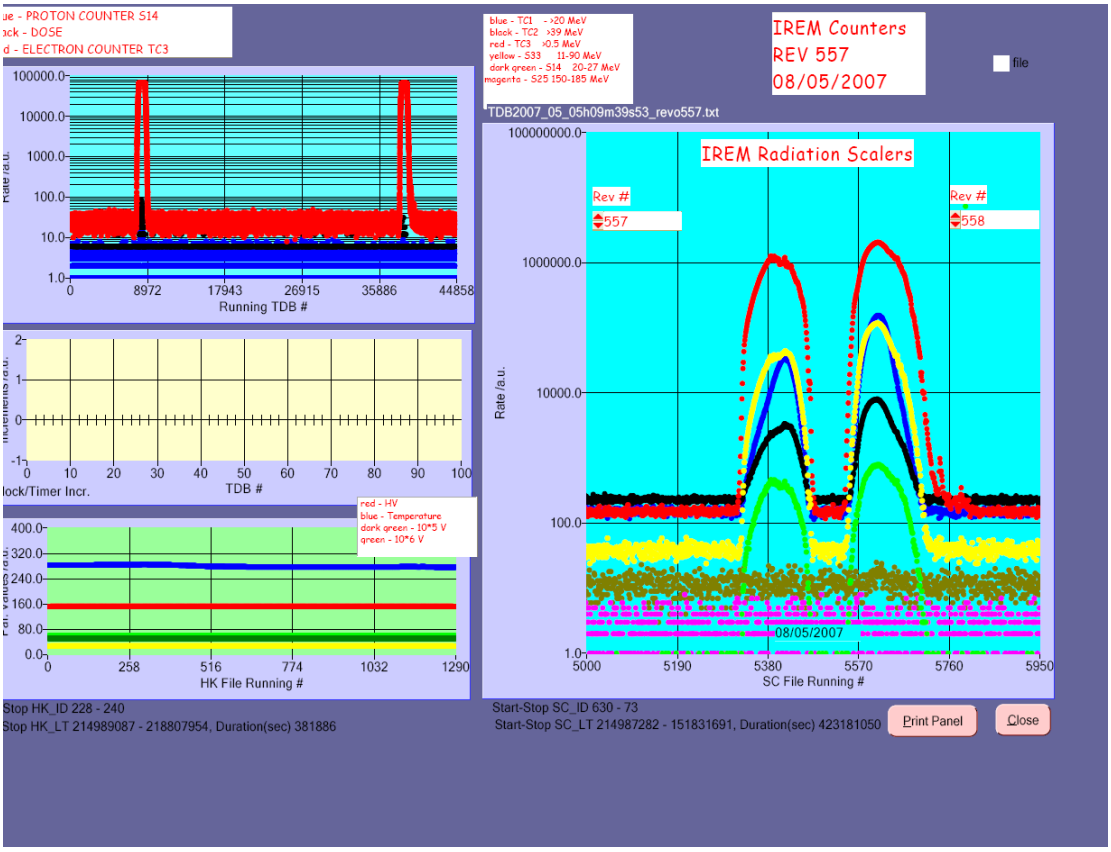
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

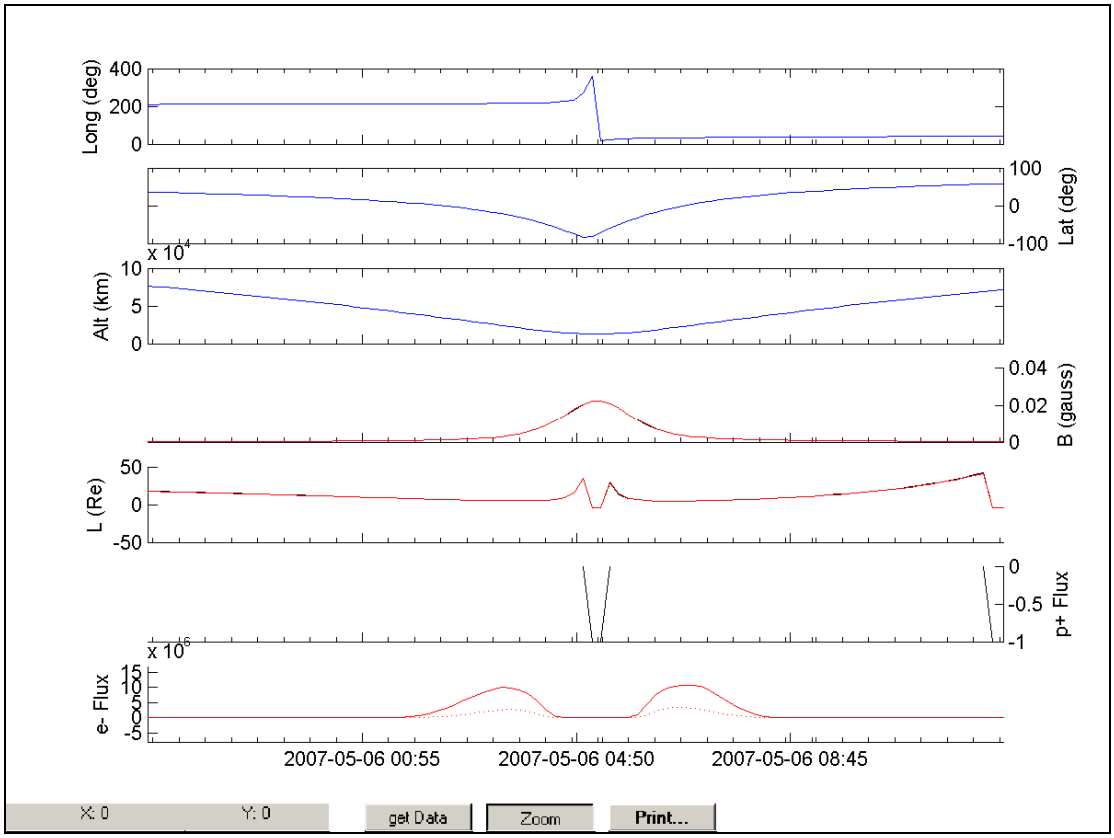
IREM radiation counters:



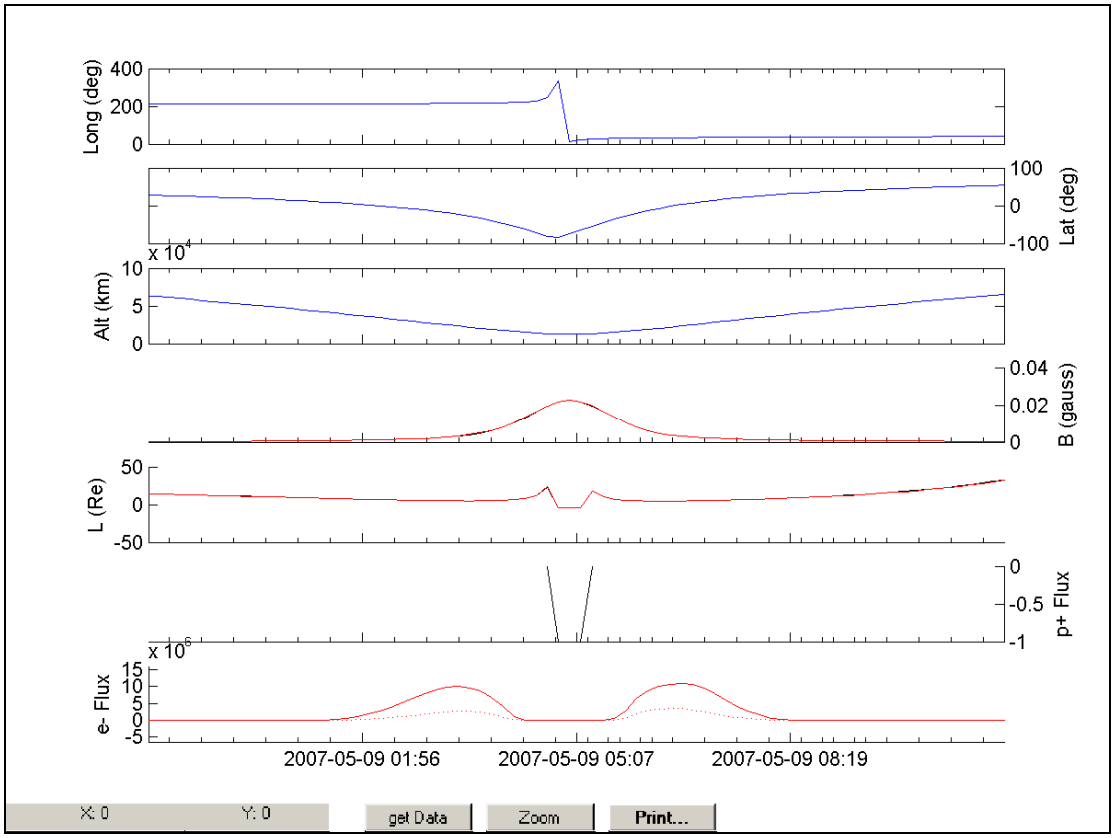


IREM Predicted Radiation Belt Passages

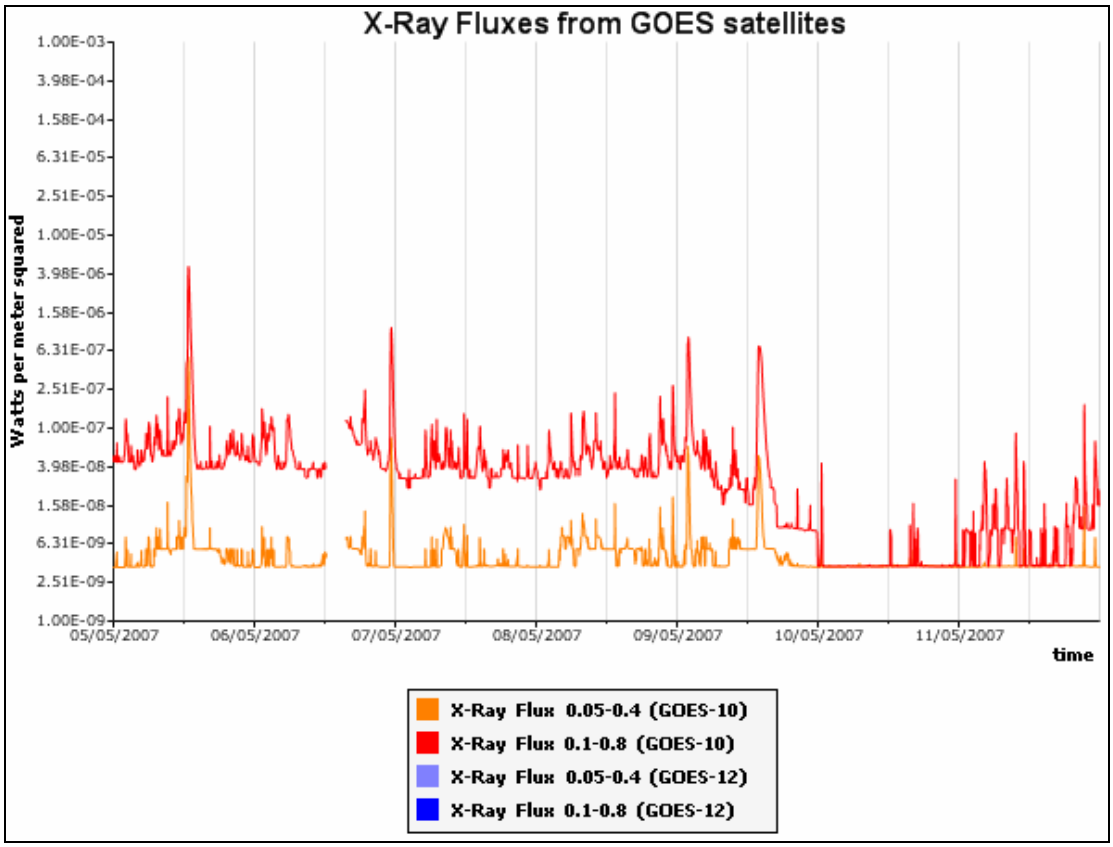
Rev 556



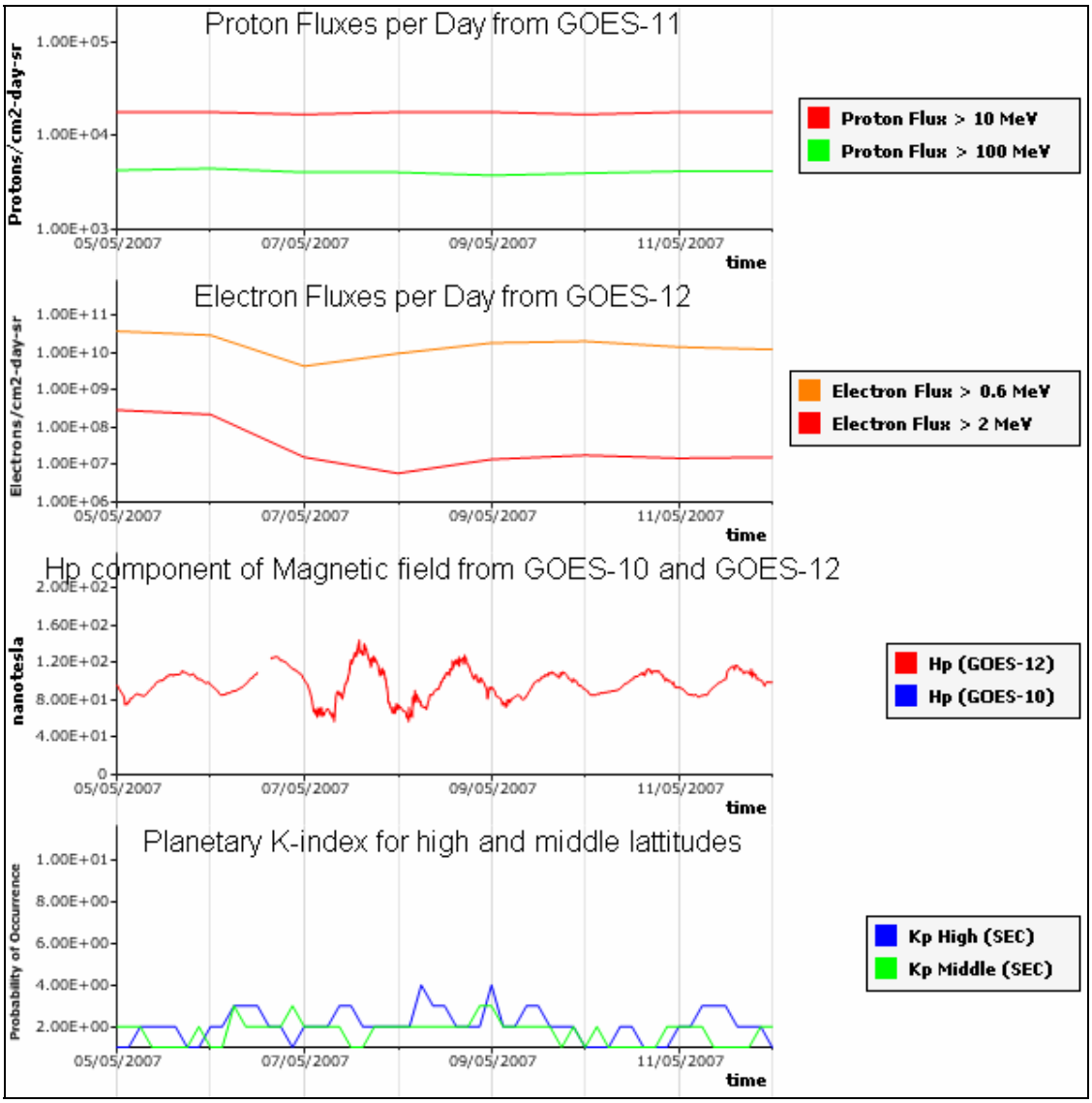
Rev 557



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.