

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 106
Week 40
04.10.04
Routine Phase

Prepared by: M. Walker (OPS-OFO)

LIST OF CONTENTS

1	General.....	3
2	Summary of Activities.....	3
3	Satellite Status.....	3
3.1	Platform	3
3.1.1	AOCS	3
3.1.2	Power	3
3.1.3	Thermal.....	3
3.1.4	OBDH.....	4
3.1.5	RFS	4
3.2	Payload	4
3.2.1	SPI	4
3.2.2	IBIS	4
3.2.3	JEM-X	5
3.2.4	OMC.....	6
3.2.5	IREM	6
4	Ground Facilities.....	6
4.1	Mission Operations Centre.....	6
4.2	Ground Stations & Network.....	6
4.3	Science Ground Segment.....	6
4.3.1	ISOC	6
4.3.2	ISDC.....	7
5	Special Events.....	7
6	Anomalies.....	7
7	Future Milestones	8
8	Appendix.....	9
8.1	Overview of Revolutions	9
8.2	Consumables	10
8.2.1	Detailed Fuel Book-keeping.....	10
8.3	Detailed Satellite Information	10
8.3.1	AOCS Summary Operations Report 25/09/2004-01/10/2004	10
8.3.2	SPI Operations.....	11
8.3.3	IBIS Operations.....	14
8.3.4	JEM-X Operations.....	18
8.3.5	OMC Operations	21
8.3.6	IREM Operations	23

DISTRIBUTION LIST

Addressees	Copy	Addressees	Copy
D/OPS		ESA HQ	
G. Winters D/OPS	1	D. Southwood D/SCI	1
W. Frank OPS-O	1		
A. Smith OPS-OF	1	ESTEC	
J. F. Kaufeler OPS-G	1	J. Louet SCI-P	1
N. Bobrinsky OPS-ON	1	A. Gimenez-Canete SCI-S	1
R. Münch OPS-GF	1		
		ESTEC / PG	
M. Schmidt	1	G. Sarri	1
R. Southworth	1		
F. Di Marco	1		
F. Cordero	1		
M. Walker	1		
M. Rezazad	1		
P. Lippi	1	ESTEC/RSSD	
R. Lemme	1	M. Kessler SCI-SD	1
S. Fahmy	1	C. Winkler	1
SPACONs	1	A. Parmar	1
O. Bergogne	1	R. Much	1
I. Bayliss	1	L. Hansson	1
G. Di Girolamo	1	E. Kuulkers	1
F. Dreger	1		
G. Gienger	1	ESTEC/SCI-A	
S. Pallaschke	1	Nicola Rando	1
W. Hell	1		
K. Capelle	1	ISDC	
M. Butkovic	1	T. Courvoisier	1
D. Heinzer	1	R. Walter	1
G. Servoz	1	N. Mowlavi	1
Shift - Coord	1	ISDC Shift Team	1
Scheduling Office	1	D. Texier	1
T. Beck	1		
B. Smeds		ALENIA	
S. Scaglioni	1	M. Montagna	1
J. Wardill	1	F. Ravera	1
Redu		PI / Instrument Teams	
B. Demellenne	1	J. P. Roques – SPI	1
		G. La Rosa – IBIS	1
		S. Brandt – JEM X	1
		E. De Miguel - OMC	1
		W. Hajdas – IREM	1
		JPL / Goldstone	
		D. Holmes	1
		J. Valencia	1

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 25.09.04 until 01.10.04 (both dates inclusive) and covers the revolutions 239 & 240.

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 were the Crab Nebula (RA 05:34:31.97; DEC +22:00:52.1); an OMC Flat Field target (RA 08:03:60.00; DEC +41:54:00.0) and the Galactic Center. The activities consisted of staring, raster dithering and GCDE observations, as well as special observation types specific for the Crab calibration.

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.

A few close loop slews were missed because of problems with the commanded guide stars. Two cases were caused by commanding a star which has a dim neighbour that probably caused the failure of the search and track process to pick the star.

The fuel consumption over the period between 24/09/2004 and 01/10/2004 was 0.151 kg. The remaining propellant is in the order of 167.591 Kg on the 1st of October.

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 was identified.

3.1.5 RFS

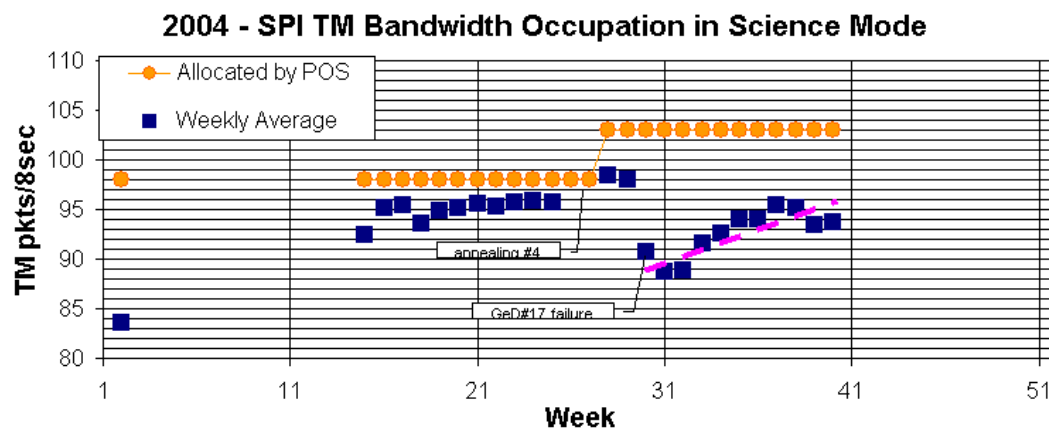
The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

3.2 Payload

3.2.1 SPI

The overall status of the instrument in this week is nominal, though the PSD (Pulse Shape Discriminator) still continues to randomly reproduce the malfunction of channel rates transitory blanking.

The instrument was kept in photon-by-photon mode with spectra TM enabled, an assigned TM bandwidth in the science observation windows of 103 pkts/cycle and an actual average occupation of 93.7 pkts/cycle. The following plot shows the occupied bandwidth, since beginning of 2004.



The cryo-cooler is working well, maintaining the temperature within 85+/-1K.

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

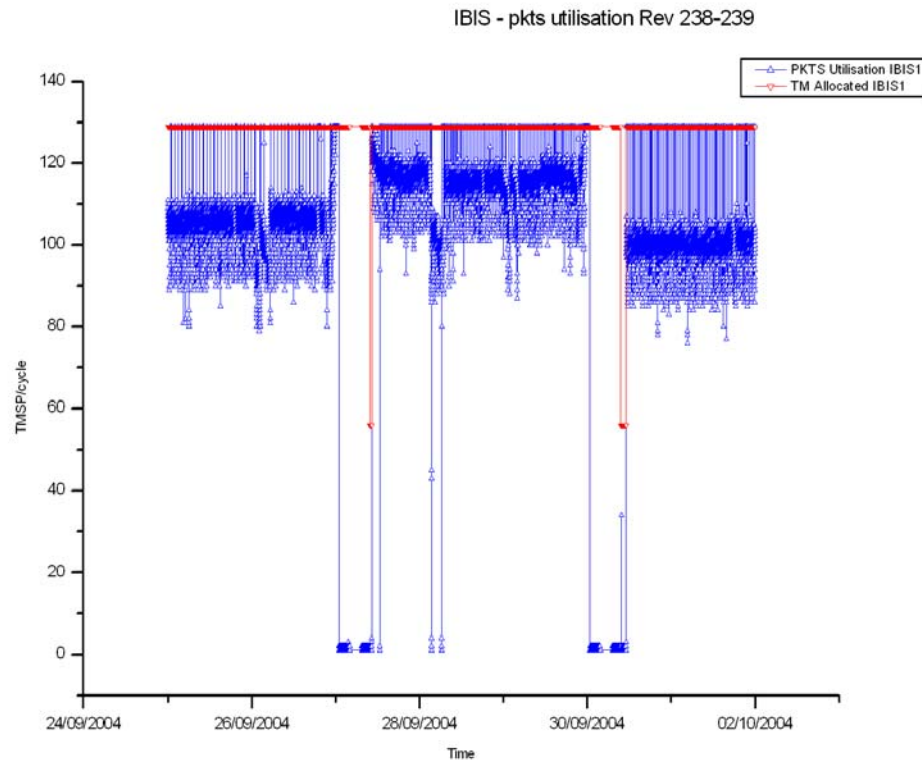
3.2.2 IBIS

The overall status of the unit is Nominal.

During the reporting period the PST Allocation to IBIS was 129 TMSP / Cycle. The mean IBIS Bandwidth usage was 108.9 TMSP / Cycle, down 3.6 TMSP from last week.

Started the 4th Crab Calibration during rev239. Executed the patch of the IASW setting the IBIS/ISGRI rise-time low threshold to 1 during the Crab on-axis staring. After the first 8 Ksec of the Crab on-axis staring the rise time low threshold was set back to nominal value(7).

A plot of the 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 during science observations, with a TM allocation of 8 packets/cycle during science observations in revolution 238 and 240 and a TM allocation of 5 packets/cycle during the observations in revolution 239 (Crab calibration).

In revolution 238 JEM-X2 was in Safe mode, with a TM allocation of 1 packet/cycle. During revolution 239, in which Crab calibration observations were performed, JEM-X2 was operated in Data Taking mode with a TM allocation of 5 packets/cycle. The JEM-X2 DFFE was then switched off after radiation belt entry of revolution 239 (at 2004-09-30T01:03Z) and JEM-X2 was dormant (DFFE OFF) with a TM allocation of 1 packet/cycle in revolution 240.

In line with OCR-178, the micro-strip gas gain voltage of JEM-X1 was reduced by 1 step to 79 RAW during revolution 239, at 2004-09-28T06:31Z, after the principal JEM-X Crab calibration observation. It remained at this value for the rest of

revolution 239 but was then set back to the default nominal High Voltage of 80 RAW when JEM-X1 was activated at the start of revolution 240.

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.

During the reporting period OMC operations were performed by the automatic timeline, with the TM allocation to OMC of 5 packets/cycle, except on DoY 272 from 03:36:19, until 06:44:20, during the Flat-Field and Dark-Current calibration, when the allocation was 63 packets/cycle.

There were 205 OMC pointings executed nominally, 1 was delayed by 5 minutes and 4 were lost due to guide star and other AOCS related problems.

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 characterized by low solar activity. No major events were reported.

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

4 Ground Facilities

The performance of the Operational ground facilities was excellent this week, way above the system performance requirements.

4.1 Mission Operations Centre

The most notable problem this week was with the connection between the IMCS and ISDC, for three days the link played up, and for reasons unknown now is working nominally.

4.2 Ground Stations & Network

The performance of the ground stations and Network was excellent this week. There was only one reported incidence of a bad TM frame from Redu, the overall performance was nearly 100%.

4.3 Science Ground Segment

4.3.1 ISOC

1. AO-3

No proposals received yet.

2. Mission planning

PSFs: complete up to revolution 245, with a fresh version of 241 as well.

POS and POD: revolutions 241...245 have been (re-)planned.

TSFs: complete up to revolution 241.

3. Observation status

New ECSs have been received for revolutions 227/228/229. (226 is still missing.)

OCS generation followed normally. 18 OCSs sent.

4. ISOC science data archive

Nothing new to report.

5. ISOC system

Version 10.6.0 is still operational.

6. Problems

A problem has been found by MOC, which will require re-planning by ISOC for revolution 242, although a formal request has not yet been received at ISOC.

4.3.2 ISDC

Status of ISDC observation processing on 04/10/2004:

- Latest Standard Analysis completed: observation 02201400003 (Algol, Revolution 220) on 18/09/2004

- Latest products archived: observation 02201450003 (Mkn 590, Revolution 208) on 31/08/2004

- Latest observation products sent to the observer: observation 02297000010 (Abell 2256, Revolution 205-206) on 11/09/2004

5 Special Events

6 Anomalies

There were a number of problems related to the ground segment that impacted the operations:

- On DoY 270, at 18:56, there was a bad TM frame from Redu, no impact.
- On DoY 272, at 23:35, the idda was showing a yellow warning state, due to disk space being now only 5.9Gb. There was also a warning that the 1hfa partition did not exist or was ambiguous.
- On DoY 273, at 16:53, there was an error sending data to ISDC, at 17:00, the status was TM flow. At 17:43, there was another error sending data to the

ISDC. At 17:50, CCC stopped and restarted the IFRD and ISDS tasks, restoring the TM flow at 17:55.

- On DoY 274, at 11:18, 14:15, and 14:22, the link ISDS – ISDC became disconnected, reconnecting itself each time. At 14:30, CCC stopped and restarted the IFRD task. At 14:40, the link disconnected again. At 14:43 CCC stopped and restarted IFRD and ISDS. At 15:12, and 15:50, the link disconnected again. At 15:55, CCC rebooted the ISDS-A server. At 16:05, the system was running again, but at 17:41, the link dropped again. At 18:00 the IFRD and ISDS tasks were again rebooted. At 19:50, 20:41, 21:03, 22:03 and 23:10, the link dropped, each time tasks were rebooted, to no avail. The following day at 07:28 and 13:34, the links dropped again, but after that no further problems were reported.

The following new anomaly reports were entered into the ARTS system for last week.

AR id	Date Raised	Subject	Segment	Status
INT_SC-95	29/09/2004	IBIS-VETO Lateral and Bottom counters wrap around during high radiation	Payload	Open
INT-2652	04/10/2004	JEM-X2 Erroneously Planned to be Activated in POS for Revolution 242	ISOC	Pending
INT-2653	04/10/2004	Error sending data to ISDC - DOY 273, 274, 275	IMCS	Pending
INT-2654	04/10/2004	Lost TC, no RF lock at DSS-16	NASA Stations	Pending

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 239

In revolution 239 the following calibration observations were performed:

- On-axis staring observation of the Crab (RA 05:34:31.97; DEC +22:00:52.1) lasting ~2 hours. During this time the IBIS/ISGRI rise-time selection was modified via a S/W patch. Apart from the mode changes of IBIS during these patch operations, all instruments were in their nominal science modes for this observation and the TM allocation was IBIS 129; SPI 103; JEM-X1 5; JEM-X2 5; OMC 4.
- On-axis raster dithering observation of the Crab (RA 05:34:31.92; DEC +22:00:50.4) with 40 arcminutes spacing between the pointings. This observation lasted ~14.5 hours. During this observation all instruments were in their nominal science modes and the TM allocation was IBIS 129; SPI 103; JEM-X1 5; JEM-X2 5; OMC 4.
- Staring observation of an OMC Flat Field target (RA 08:03:60.00; DEC +41:54:00.0) lasting ~3.5 hours, during which OMC Flat Field and Dark Current calibrations were performed. For this, OMC was in FFCalibration and DCCalibration modes respectively and the other instruments were in their nominal science modes. The TM allocation during this observation was IBIS 129; SPI 44; JEM-X1 5; JEM-X2 5; OMC 63.
- 180 degree arc of the Crab at 4 degrees off-axis (RA 05:51:47.52; DEC +22:06:57.6), with 4 degrees spacing between the pointings along the arc. This observation lasted ~27.5 hours. During this observation all instruments were in their nominal science modes and the TM allocation was IBIS 129; SPI 103; JEM-X1 5; JEM-X2 5; OMC 4.
- Raster dithering observation of the Crab (RA 05:34:31.92; DEC +22:00:50.4) with a spacing of 2 degrees between the pointings. This observation was performed for the remaining ~13.5 hours of observation time. During this observation all instruments were in their nominal science modes and the TM allocation was IBIS 129; SPI 103; JEM-X1 5; JEM-X2 5; OMC 4.

Revolution 240

In revolution 240 a GCDE observation was performed throughout the available observation time (~61 hours).

Throughout this observation all instruments were in their nominal science modes, except JEM-X2 for which the DFEE remained off, and the TM allocation was IBIS 129; SPI 103; JEM-X1 8; JEM-X2 1; OMC 5.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2004-09-10T19:47:44.000Z	168.0146	F	Automatic TM processing.
2004-09-12T09:19:24.000Z	168.0073	F	Automatic TM processing.
2004-09-12T18:16:45.000Z	167.9609	F	Automatic TM processing.
2004-09-15T09:06:43.000Z	167.9450	F	Automatic TM processing.
2004-09-15T21:27:48.000Z	167.9025	F	Automatic TM processing.
2004-09-18T08:52:42.000Z	167.8896	F	Automatic TM processing.
2004-09-19T19:08:30.000Z	167.8696	F	Automatic TM processing.
2004-09-20T19:32:24.000Z	167.8305	F	Automatic TM processing.
2004-09-21T08:41:46.000Z	167.7697	F	Automatic TM processing.
2004-09-22T19:08:05.000Z	167.7416	F	Automatic TM processing.
2004-09-24T08:27:13.000Z	167.7095	F	Automatic TM processing.
2004-09-25T19:30:53.000Z	167.6784	F	Automatic TM processing.
2004-09-27T08:13:54.000Z	167.6629	F	Automatic TM processing.
2004-09-28T18:34:21.000Z	167.6535	F	Automatic TM processing.
2004-09-30T08:07:45.000Z	167.5911	F	Automatic TM processing.

This report was generated Fri Oct 1 08:00:18 GMT 2004

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 25/09/2004-01/10/2004

AOCS operations were executed from the Automatic Timeline.

During this period, 76 Open Loop Slews, 144 Closed Loop Slews and 4 Momentum Bias were executed. 6 slews were missed or executed manually. This is equivalent to a 2.7%.

25/09/04 (Day of Year 269, Revolution 238)

Nothing to report.

26/09/04 (Day of Year 270, Revolution 238)

Slew missed from the Timeline: The FD system failed to generate the update for slew 02380042. Apparently no suitable star could be found to perform the close loop slew. One reason could be that the only available star for this slew would pass over a blemish pixel at the start, during or at the end of the slew. The FD blemish table is not checked when planning close loop slews at POS generation level. To rejoin the Timeline, a close loop slew was performed to the attitude of PID 02380043. Slew 02380043 was executed from the Timeline, after being manually updated, as a corrective slew to the same attitude. PID 02380042 was affected.

Loss of Guide Star: At 19:11:12 the guide star was lost as it was very close to the edge of the STR FoV: [29859, 6016]. The magnitude 8.5 star was picked by the ACC

after an open loop slew. The OTF dropped and remained low for the rest of PID 02380057.

27/09/04 (Day of Year 271, Revolution 238-239)

Nothing to report.

28/09/04 (Day of Year 272, Revolution 239)

Nothing to report.

29/09/04 (Day of Year 273, Revolution 239)

Slew missed from the Timeline: At 14:20, the sequence for close loop slew 02390084 was interrupted because the STR failed to track on the commanded guide star in the search and track process. The commanded star was 1310-02544-1 with instrumental magnitude 7.8. The Timeline Recovery Tool was then used to generate a manual slew to the attitude of PID 02390084. As expected, the tool generated a close loop slew with the same star. This time however the search and track process was successful and the slew executed. PID 02390084 was affected and slew 02390085 was executed from the Timeline.

30/09/04 (Day of Year 274, Revolution 239-240)

Slew missed from the Timeline: At 18:08 the sequence for close loop slew 02400017 was interrupted because the STR failed to track on the commanded guide star in the search and track process. The commanded star was 6846-00066 with instrumental magnitude 7.3. The Timeline recovery tool was then used to perform a manual open loop slew to the attitude of PID 02400018. The next slew was executed from the Timeline.

01/10/04 (Day of Year 275, Revolution 240)

Slews missed from the Timeline: At 21:13 the sequence for close loop slew 02400068 was interrupted because the STR failed to track on the commanded guide star in the search and track process. The commanded star was 6846-00066 with instrumental magnitude 7.3. The Timeline recovery tool was then used to perform a manual open loop slew to the attitude of PID 02400068 and another manual open loop slew to the attitude of PID 02400069. Slew 02400070 was executed from the Timeline.

Star 6846-00066 has a dim neighbour at 1.8 arc-minutes: 6846-00213 with magnitude 9.8. This could be the reason for the search and track process failing to track this star. FD has been asked to look into this, and if they come to the same conclusion then the star will be excluded in the system to avoid it being selected for slews.

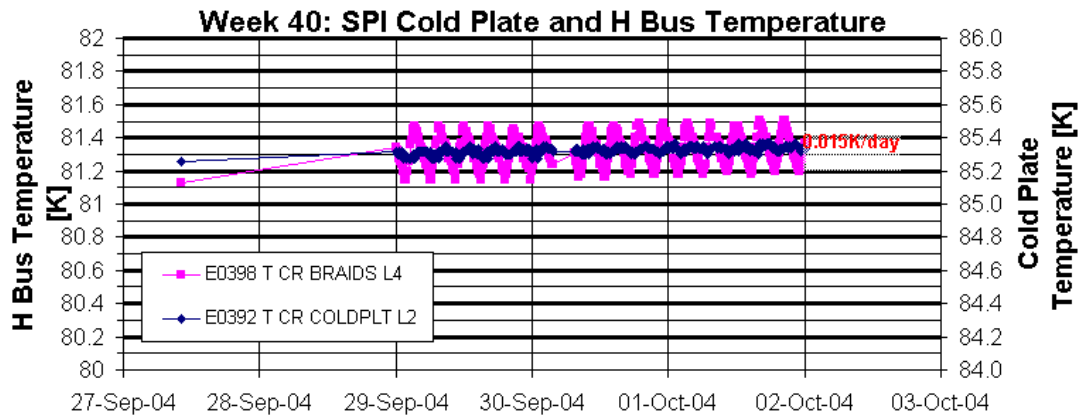
8.3.2 SPI Operations

Cryo-cooler / Detector Cold-Plate:

The performance of the cryo-cooler is nominal.

The cold plate temperature was maintained at 85K $\pm$ 1K with the expected small positive drift.

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

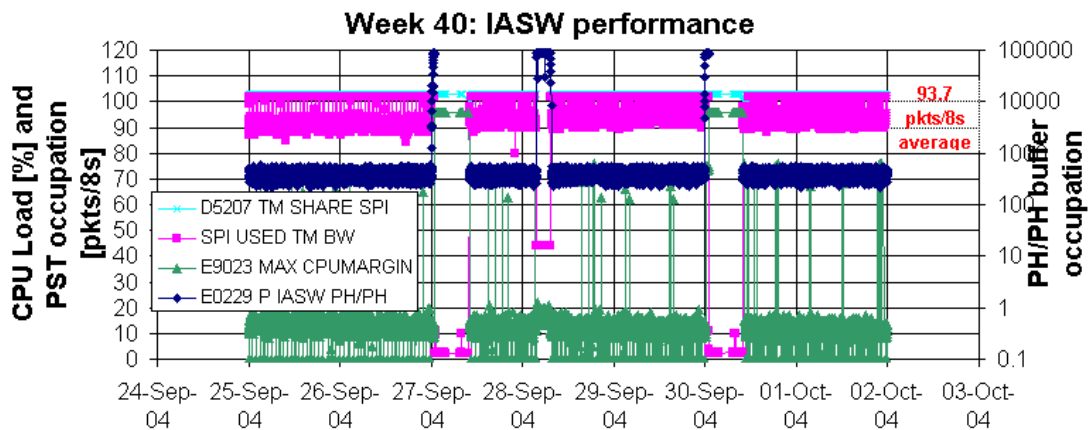


IASW/DPE:

The performance of the IASW/DPE is nominal.

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

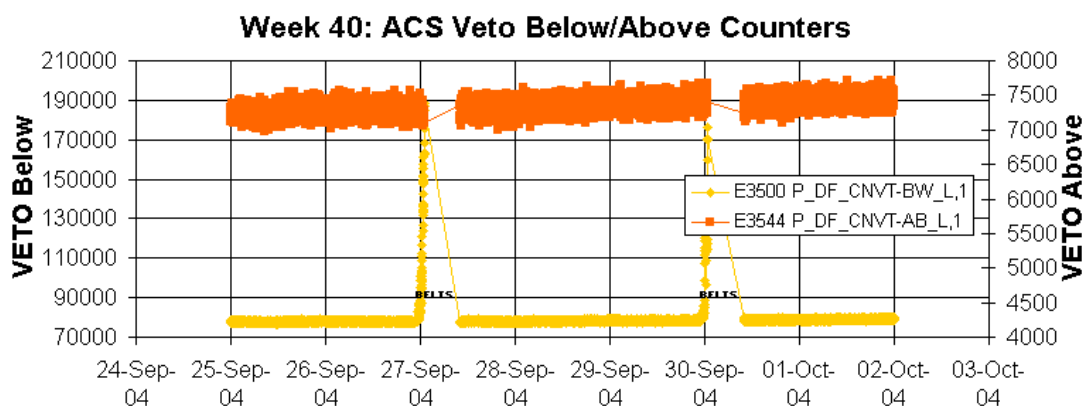
The saturation of the buffer on 28th September is due to OMC Flat Field calibration, which required a reduction of the SPI allocated TM bandwidth to 44 pkts/cycle for a few hours.



ACS:

The performance of the ACS is nominal.

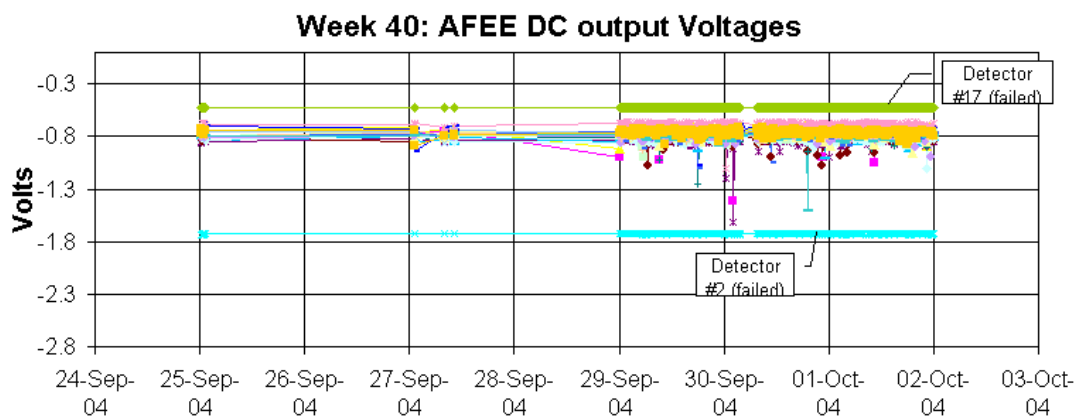
The following plot shows the ACS overall count rate evolution during the reporting period. The peak on 19th – 20th September is due to background following increased solar activity.



AFEE:

The performance of the detectors is nominal except for the detector #2, failed since 06.12.2003, and detector #17, failed since 17.07.2004.

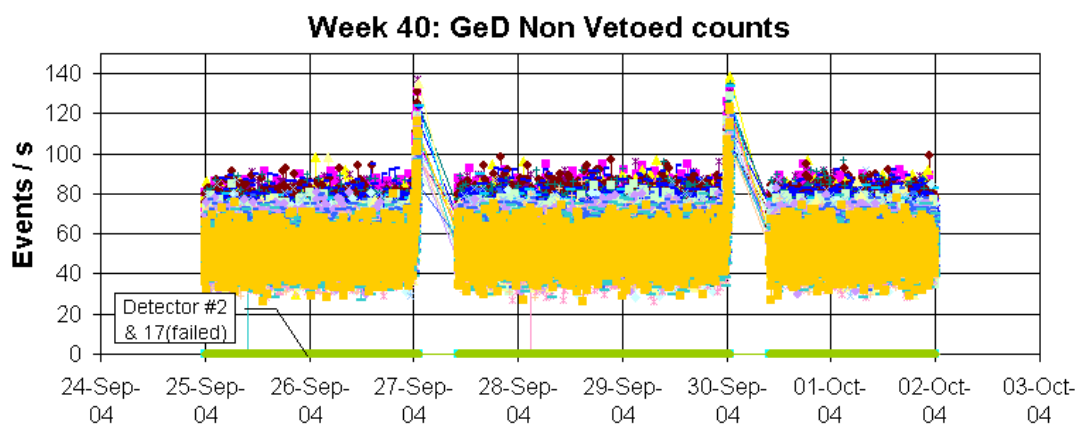
The following plot shows the AFEE dc output signals during the reporting period.



DFEE:

The performance of the unit is nominal.

The following plot shows the Non Vetoed event rates - i.e. the rate of the events acquired and transmitted to ground through the science telemetry - processed by the DFEE during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2 and #17.

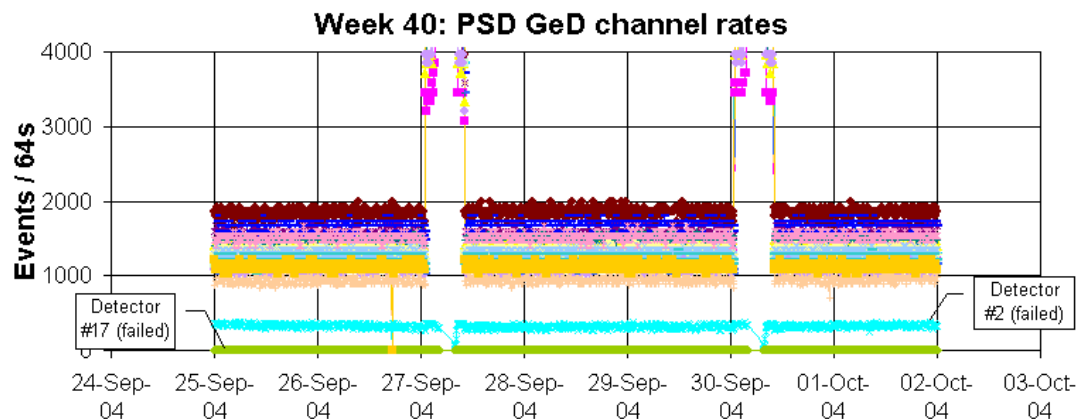


PSD:

The performance of the unit is nominal, though the malfunction of the channel rates transitory blanking reproduced itself this week (see AR INT_SC-90 for a detailed description of the anomaly).

An IASW patch is under development at Cesr to allow the Sci HK TM downlink inside the radiation belts. This would allow the deletion of the Out-Of-Limit currently defined on the PSD channel rates, thus removing the false alarms associated to the malfunction.

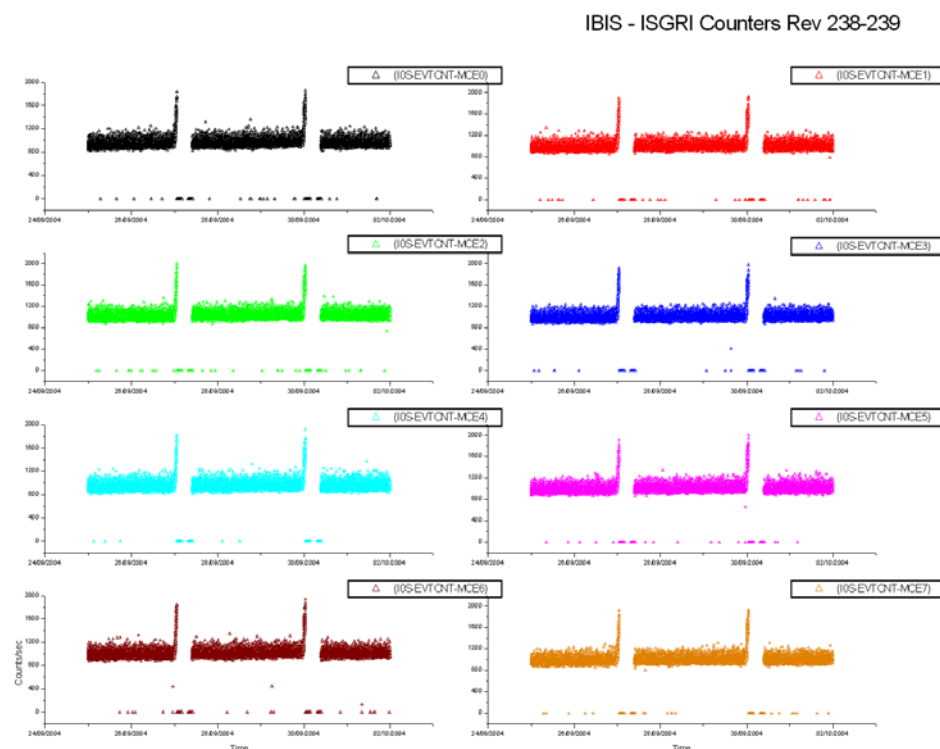
The following plot shows the PSD channel rates during the reporting period.



8.3.3 IBIS Operations

IBIS Event Counters Plots.

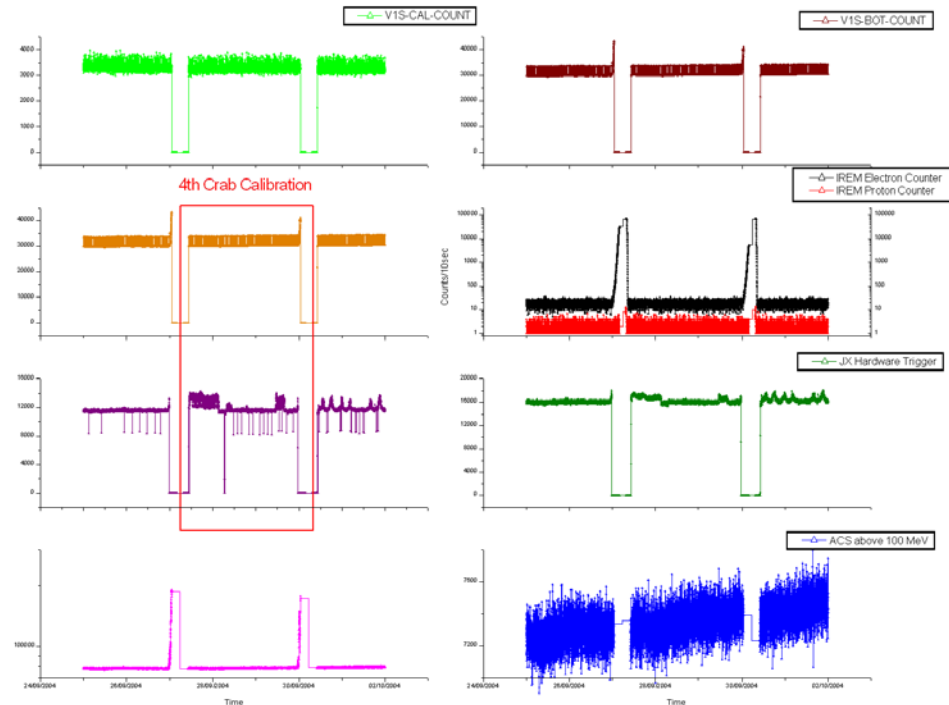
ISGRI Counters:



VETO vs Payloads Counters:

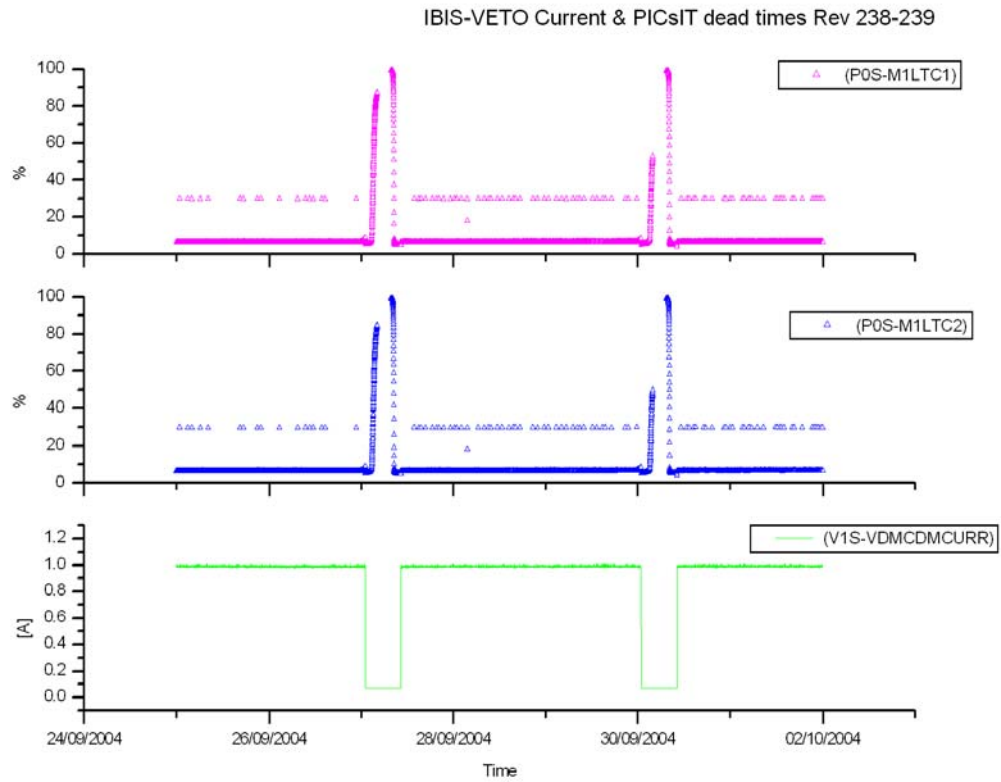
The week was characterised by low solar activity. The high count-rates reported by some payloads during the revolution 239 are due to the on-going 4th Crab Calibration during revolution 239.

IBIS-VETO vs Payloads Counters Rev 238-239

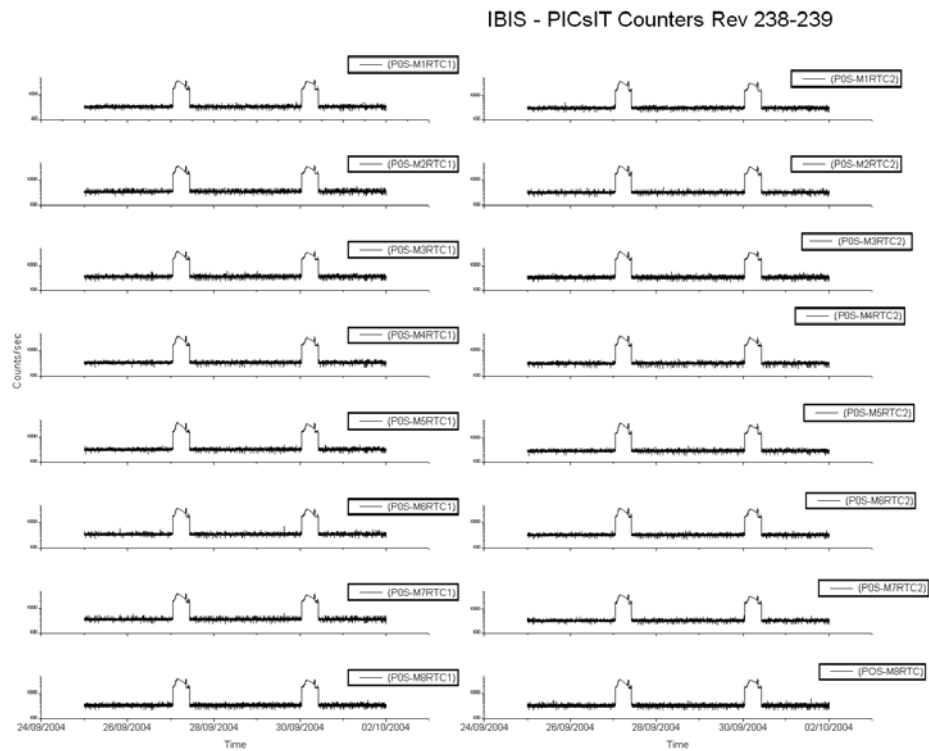


**with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec

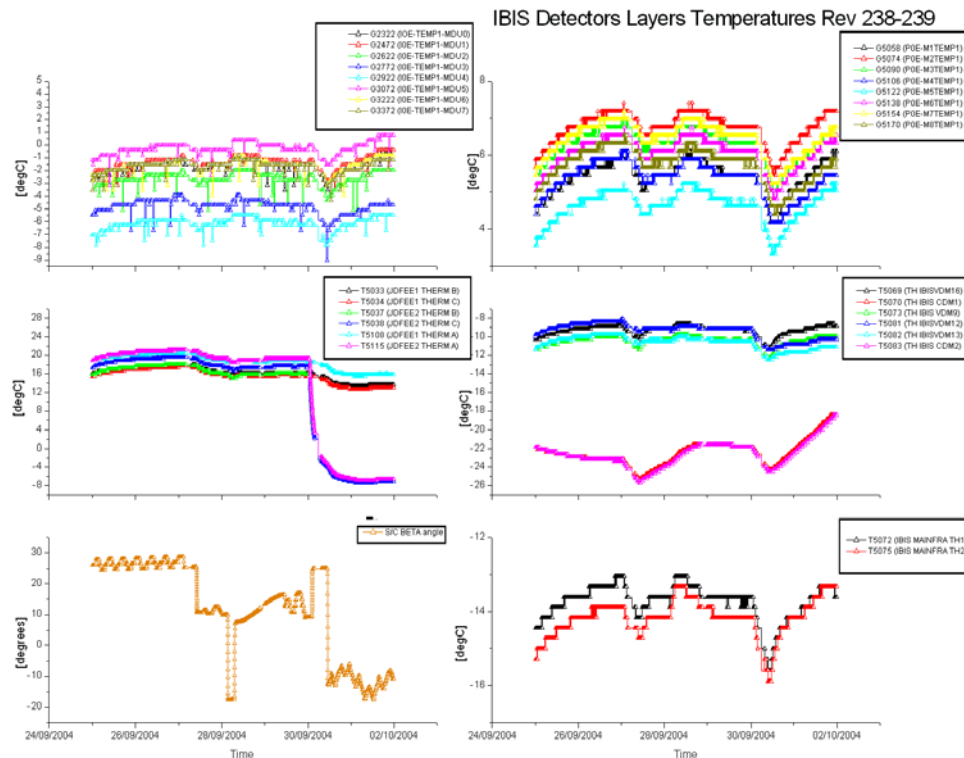
Veto Current:



Picsit Counters



IBIS Detectors Layers Temperatures



IBIS daily report

DOY 2004.269 (25/09/04)

Nothing to report.

DOY 2004.270 (26/09/04)

Nothing to report.

DOY 2004.271 (27/09/04)

At 01:48Z, inside the Radiation Belts, an occurrence of the VETO PMT 28V as read by IASW occurred, the parameter G8015 (S1E-A2 PMT V) was in OOL for few TM cycles. This value is acquired by the IASW and not by through the payloads PPDU or VETO power interface. The parameter toggled out/in limits reaching the limit value 29.4 V, enough to trigger the warning condition. During the event the VETO PMTs were OFF as it is nominally inside Radiation Belts, no further action was taken.

At 03:49Z, during the Belt passage, there were many occurrences of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as required by the PIs.

At 03:49Z, inside Radiation Belts, the PDM5 counter semi-module #2 (parameter G5023) in out of limit (warning High) was observed, due to the PICsIT detectors being ON without the VETO anticoincidence system, as it required by PIs.

At 10:25Z the 4th Crab Calibration was started. A shadow-gram acquired during the first 8 Ksec staring on-axis by the IBIS s/s will be provided next week.

At 08:50Z the INT-OR-173 the value of the IBIS/ISGRI rise time low threshold was reset to 1 from the nominal value of 7. The reason for this special configuration was to verify the ISGRI Low Threshold Rise Time with respect to the current background and TM condition: in the first part of the mission, due to the high background and reduced TM allocation, this parameter was fixed to 7 (CRAB calibration on February 2003).

A test was performed at the beginning of the Crab Calibration (rev 239) by setting the Rise-Time low threshold =1 and than set it back (Rise-Time low threshold = 7) at the end of the Crab on-axis staring (8 ksec). The ISGRI Rise-Time low threshold is written in the IASW code memory area (patch 021212). To change the value one TC was required to patch one word in the correct memory address by using a not-standard patch procedure. A plot showing the increasing of event when coming back from the rise time =1 to the nominal value 7 at 12.39Z will also be provided next week.

DOY 2004.272 (28/09/04)

Nothing to report.

DOY 2004.273 (29/09/04)

Nothing to report.

DOY 2004.274 (30/09/04)

Nothing to report.

DOY 2004.275 (01/10/04)

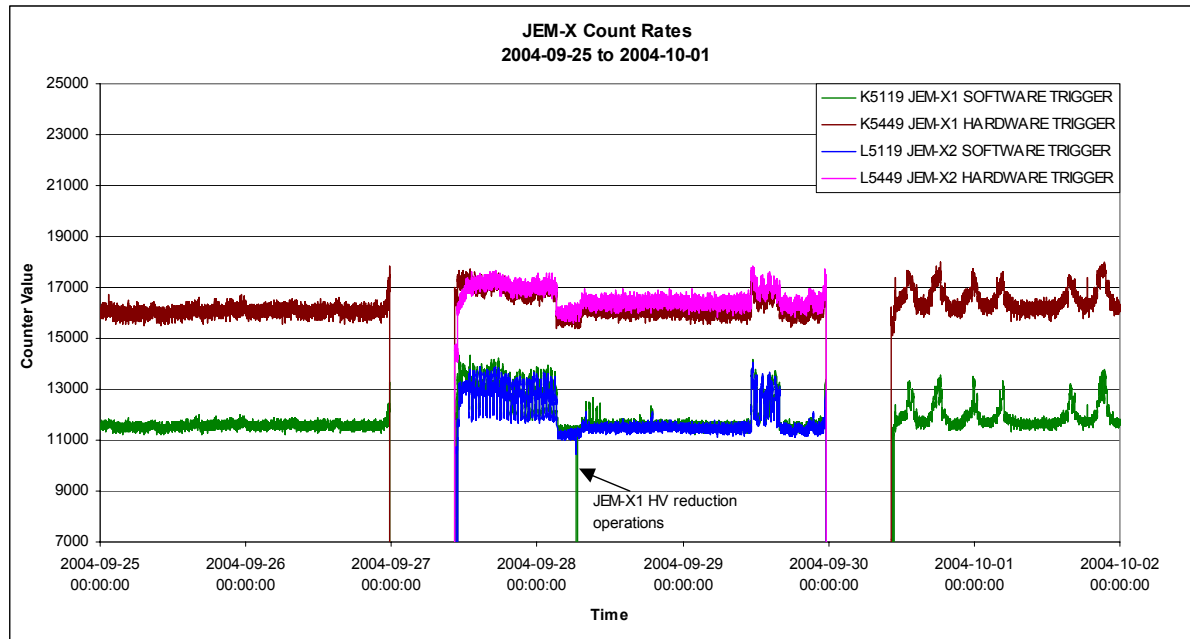
Nothing to report.

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

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

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

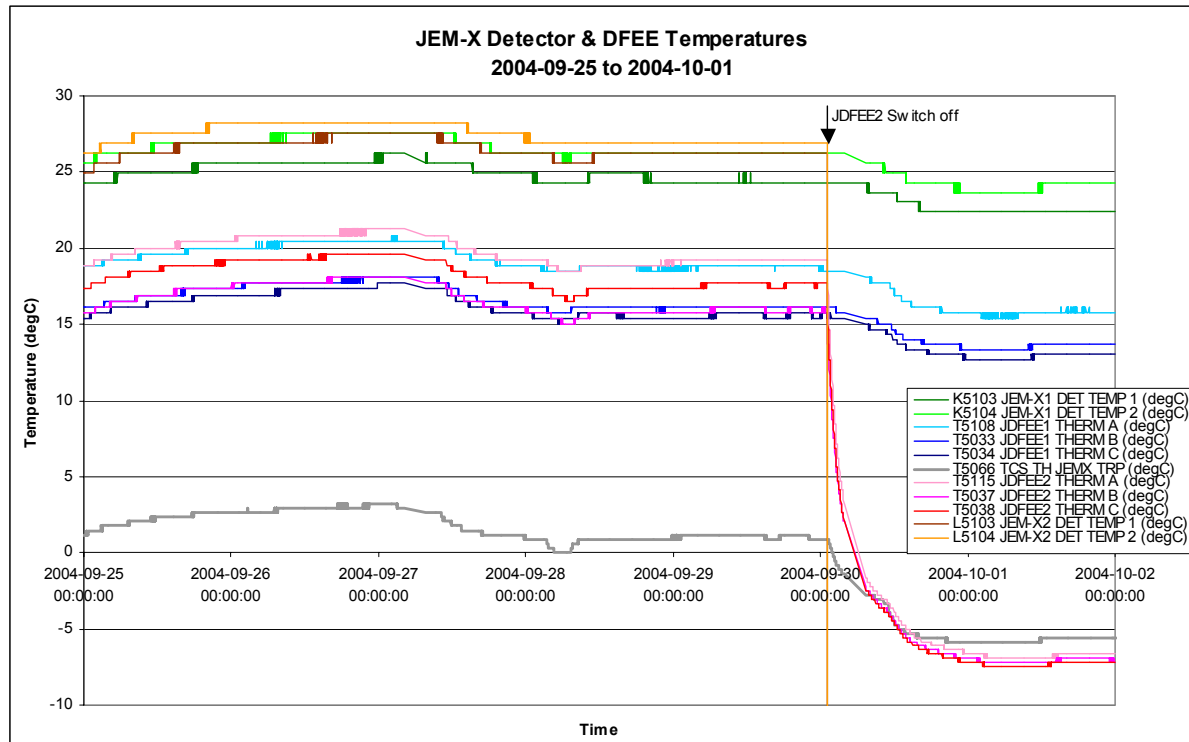


8.3.4.2 JEM-X Temperatures

JEM-X Detector and DFEE temperatures over the reporting period are displayed in the following graph, along with the temperature on the detector bench between the two units².

The effect of switching off the JEM-X2 DFEE at 2004-09-30T01:03Z can be clearly seen. Overall, the JEM-X1 DFEE and Detector temperatures decreased by ~3degC and those of the JEM-X2 DFEE by ~25degC.

² Data sampled (1 frame in 8)



8.3.4.3 JEM-X Daily Report

2004-09-25 (DOY 269, Rev 238) to 2004-09-27 (DOY 271, Rev 238-239)

Nothing to report

2004-09-28 (DOY 272, Rev 239)

In line with OCR-178, the High Voltage of JEM-X1 was reduced by 1 step during the OMC Dark Current Calibration in revolution 239, after the main JEM-X Crab calibration observation.

The reduction of the HV was performed without going through Safe mode, to avoid powering off the detector during the sequence of calibration observations. The activities were performed according to INT_OR_0172, with the main steps being as follows:

- 06:30Z Procedure FCP_JEM1_0041 JEMX1 TRANSITION TO SETUP executed.
- 06:31Z Procedure FCP_JEM1_0032 JEMX1 SETTING OF MICROSTRIP GAS GAIN VOLTAGE (dV) executed to set the JEM-X1 High Voltage to 79 RAW.
- 06:35Z JEM-X1 commanded back to Data Taking mode by procedure FCP_JEM1_0044 JEMX1 DATA TAKING.

JEM-X1 was operated in Data Taking with the reduced micro-strip gas gain voltage of 79 RAW for the remainder of the observations in revolution 239.

2004-09-29 (DOY 273, Rev 239)

Nothing to report

2004-09-30 (DOY 274, Rev 239-240)

In line with OCR-180, the JEM-X2 DFEE was switched off after radiation belt entry of revolution 239 (JEM-X2 having been activated in revolution 239 for the Crab calibration).

The activities were performed according to INT_OR_0174, with the main points in the procedure as follows:

- 00:55Z Procedure FCP_JEM2_9010 JEM-X2 DFEE SWITCH OFF started. As this switch-off was done inside the radiation belts, the first step in the procedure was to execute procedure FCP_JEM2_0120 to disable JEM-X2 reactions to IREM Radiation Monitor Counters and Broadcast Packet radiation belt entry/exit times.
- 01:03Z JEM-X2 DFEE switched off.
- 01:05Z Procedure FCP_JEM2_9010 JEM-X2 DFEE SWITCH OFF completed, with JEM-X2 reactions to IREM Radiation Monitor Counters and Broadcast Packet radiation belt entry/exit times re-enabled.

The JEM-X2 DFEE will now remain off until further notice.

At the start of revolution 240, JEM-X1 was activated as normal by the Timeline with the current default micro-strip gas gain voltage of 80 RAW.

2004-10-01 (DOY 275, Rev 240)

Nothing to report

8.3.5 OMC Operations

On DoY 270, at 02:30:57, due to AOCS problems, the following commands for pointing 02380042 were rejected:

```
2004.270.02.30.57.661 2004.270.02.30.49.676 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0
M9069=1982
2004.270.02.30.49.203 2004.270.02.30.43.301 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=1981
```

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

On DoY 272, from 03:36:19, to 04:03:46, a Flat Field calibration was performed. A second Flat Field calibration was executed between 04:05:46 and 06:26:26. This was spilt into 5 parts, with brief periods in STAND-BY mode between each section. A Dark Current calibration followed, starting at 06:28:01, and terminating at 06:44:20. It

Doc. Title : INTEGRAL Mission Report #106
Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OF
Date : 04/10/04

Issue : 1
Rev. : 0
Page : 22

has subsequently been determined that this calibration was performed incorrectly, and will have to be redone manually next week.

On DoY 273, at 14:23:54, after an AOCS problem with a guide star, the following commands for pointing 02390084 were rejected:

```
2004.273.14.23.54.155 2004.273.14.23.42.609 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0
M9069=2420
2004.273.14.23.45.596 2004.273.14.23.35.984 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=2419
```

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for that pointing, which was lost. In addition to this an erroneous TRIGGER command was also sent. The pointing was lost.

On DoY 274, at 18:11:53, due to a lack of a guide star in the Star Tracker Field-of-View, the slew to the attitude for pointing 02400017 failed, it was at this time the commands for that pointing, which was lost, were rejected:

```
2004.274.18.11.53.639 2004.274.18.11.47.292 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0 M9069=332
2004.274.18.11.53.585 2004.274.18.11.41.292 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=331
```

On DoY 275, at 21:16:43, due to a lack of a guide star in the Star Tracker Field-of-View, the slew to the attitude for pointing 02400067 failed, it was at this time the commands for that pointing, which was lost, were rejected:

```
2004.275.21.16.43.015 2004.275.21.16.32.719 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0 M9069=579
2004.275.21.16.34.848 2004.275.21.16.25.969 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=578
```

The pointing 02400068 was performed nominally, but at 22:20:34, due to problems updating the slew, the commands for 02400069 were again rejected:

```
2004.275.22.20.34.115 2004.275.22.20.24.221 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0 M9069=586
2004.275.22.20.27.663 2004.275.22.20.18.346 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=585
```

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for that pointing. At 22:25:07, the commands were sent manually recovering the observation.

On DoY 271 at 01:03:03 and DoY 274 at 00:52:13, OMC was switched by the Timeline to SAFE mode, at the nominal times.

8.3.6 IREM Operations

Radiation Belts Entry

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]
235 (*)	RAD_ENTR R 2004-09-18T01:40Z	18/09/2004 00:59Z	65184	18-Sep-2004 02:24	54102
238	RAD_EXIT R 2004-09-24T10:18Z	24/09/2004 08:45Z	< 25080	24-Sep-2004 08:59	27205
238	RAD_ENTR R 2004-09-27T01:02Z	27/09/2004 00:43Z	>62690	27-Sep-2004 01:47	53894
239	RAD_EXIT R 2004-09-27T10:07Z	27/09/2004 08:41Z	>>23142	27-Sep-2004 08:47	27076
239	RAD_ENTR R 2004-09-30T00:51Z	30/09/2004 01:28Z	> 55512	30-Sep-2004 01:43	52941

Reference

Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

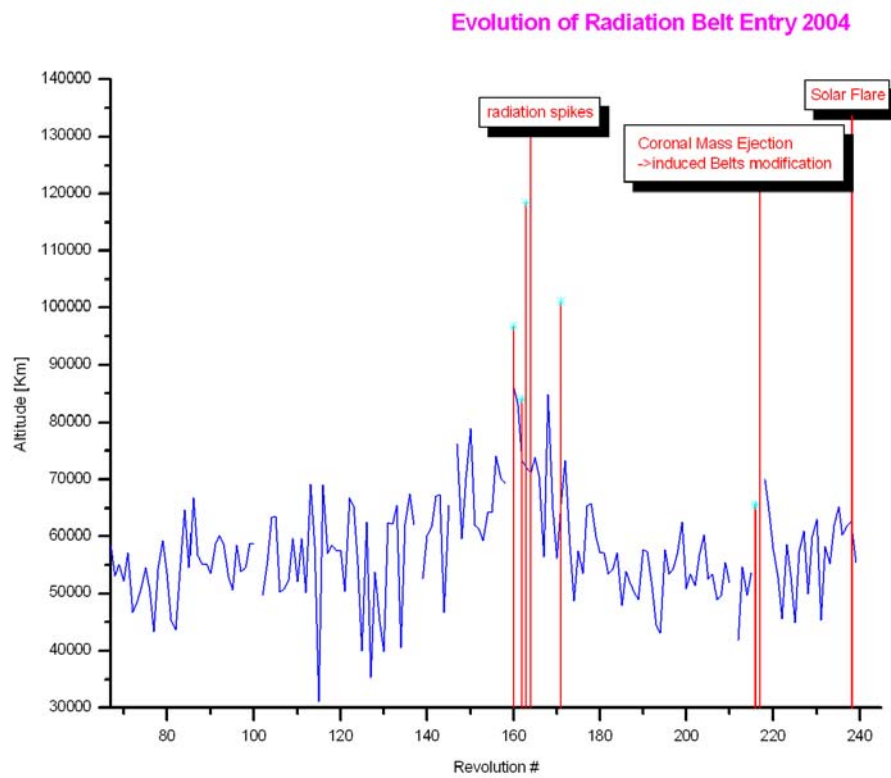
Large error vs reference (more than 30 minutes)

Radiation Spike

(*) missing in the previous WR

Proton Belts

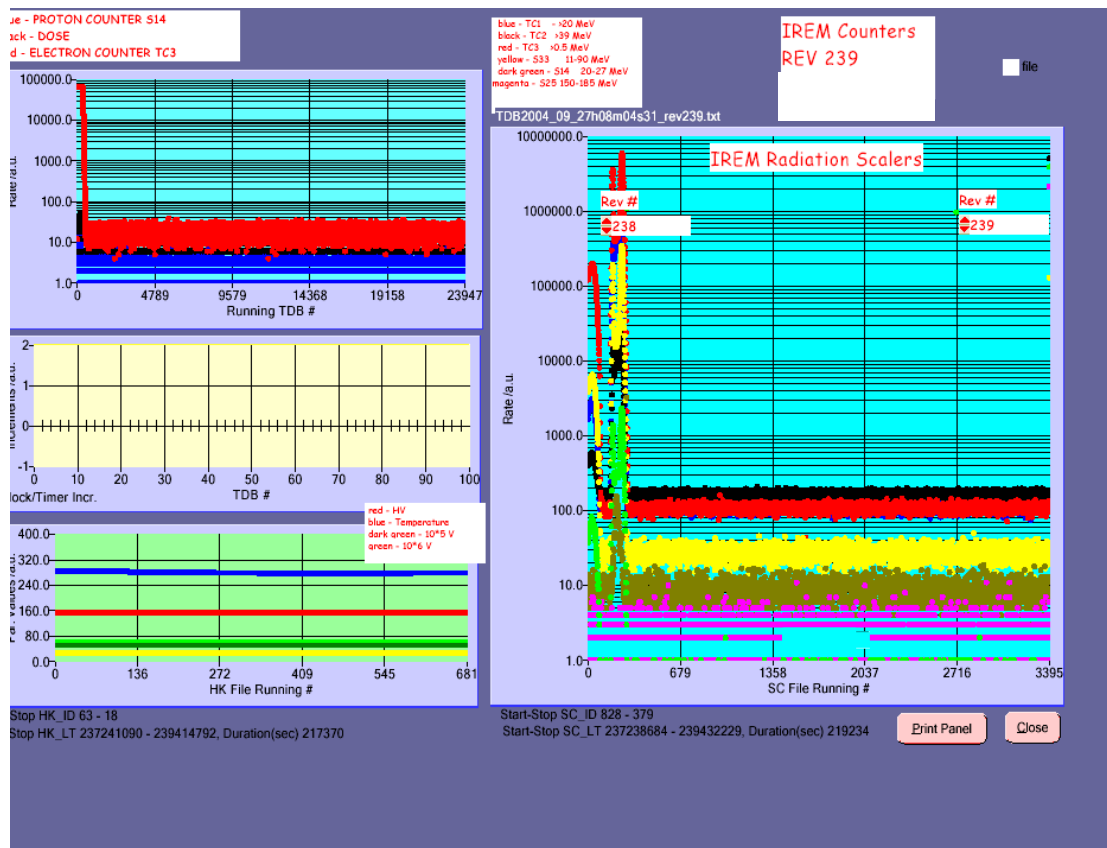
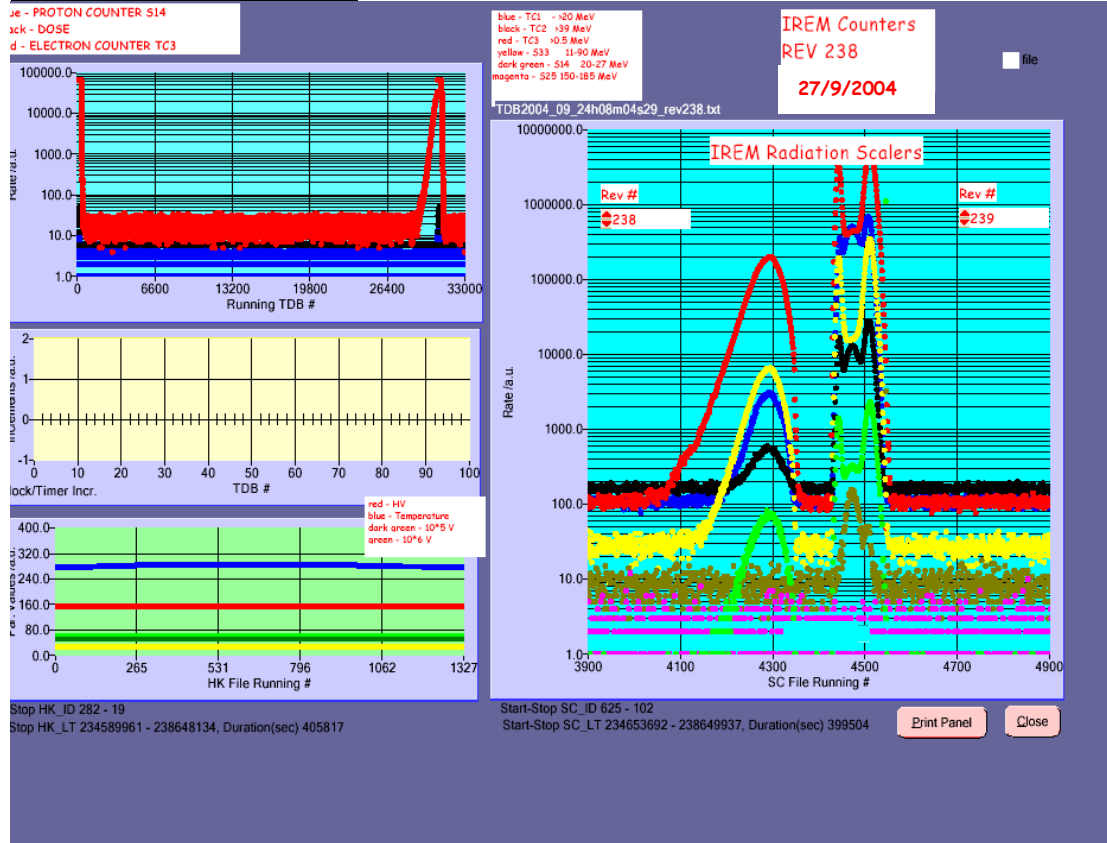
REV		Proton CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
238	PROTON RAD ENTR	27-Sep-2004 07:17Z	13085
238	PROTON RAD EXT	27-Sep-2004 07:37Z	15607
239	PROTON RAD ENTR	30-Sep-2004 07:03Z	12822
239	PROTON RAD EXT	30-Sep-2004 07:23Z	15182



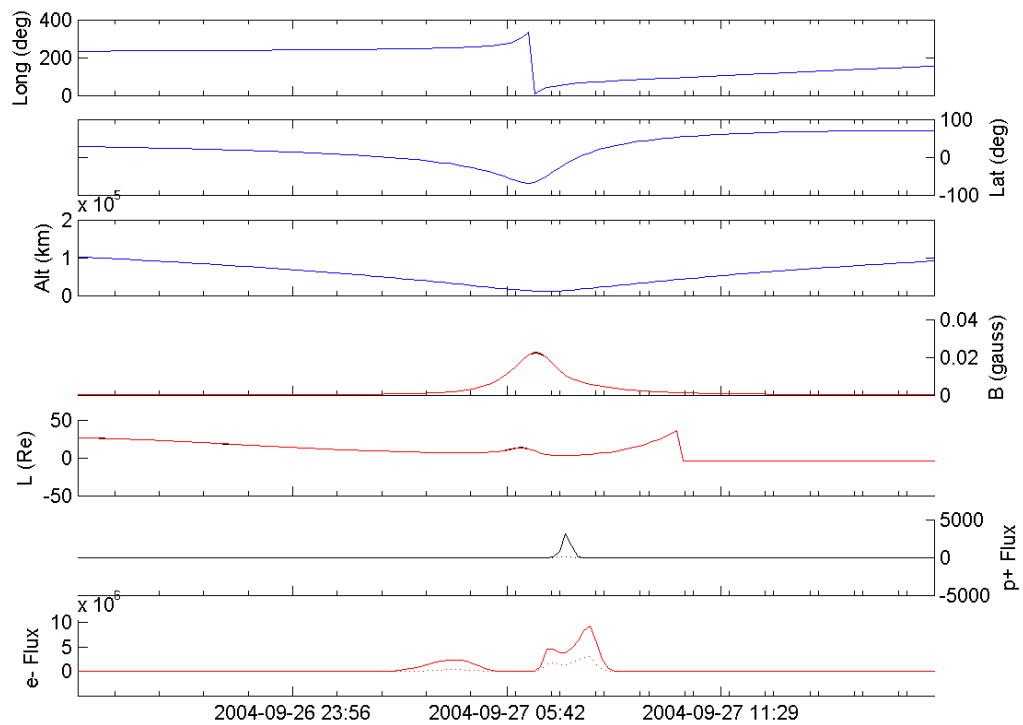
IREM daily report

Nothing to report.

IREM radiation counters

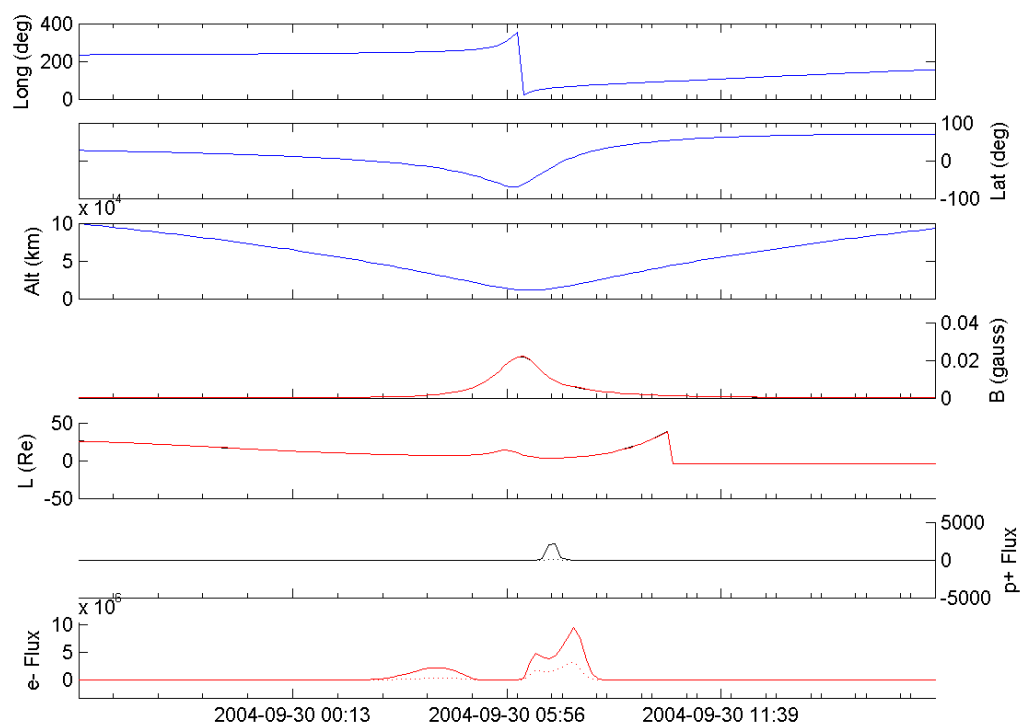


IREM Predicted Radiation Belt Passages.Rev 238



X: 0 Y: 0 [get Data](#) [Zoom](#) [Print...](#)

Rev 239



X: 0 Y: 0 [get Data](#) [Zoom](#) [Print...](#)

SEC-GOES Observed Particles Fluxes.

