

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-TOS-OF
No. 076
Week 10
08.03.04
Routine Phase

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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	4
3.1.3	Thermal.....	4
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.....	7
4.1	Mission Operations Centre.....	7
4.2	Ground Stations & Network.....	8
4.3	Science Ground Segment.....	8
4.3.1	ISOC	8
4.3.2	ISDC.....	9
5	Special Events.....	9
6	Anomalies.....	9
7	Future Milestones	10
8	Appendix.....	10
8.1	Overview of Revolutions	10
8.2	Consumables	11
8.2.1	Detailed Fuel Book-keeping.....	11
8.3	Detailed Satellite Information	11
8.3.1	AOCS Operations	11
8.3.2	SPI Operations.....	13
8.3.3	IBIS Operations.....	15
8.3.4	JEM-X Operations.....	19
8.3.5	OMC Operations	22
8.3.6	IREM Operations	22

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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 28.02.04 until 05.03.04 (both dates inclusive) and covers the revolutions 168 & 169.

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 Galactic Centre, Algol (RA 03:08:10.13; DEC +40:57:20.3), the Crab nebula and the Galactic Plane. The activities consisted of GCDE, raster dithering, staring and GPS observations.

The IMCS version 9.1 was installed.

Upload of the new PICSIT binning table (HEPI table) was performed.

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.

Due to a bug in the part of the IMCS software, which handles the application of TPFs to the Autostack, the observations on the 29th of February had to be replaced by a 24-hour-long staring observation, therefore avoiding the need of receiving and applying slew TPFs. The change in observation plan was done at mission planning level.

There were two cases of OTF flickering due to roll errors at the end of corrective Open Loop Slews. Both were caused by attitude determinations that were based on mappings after large slews, during which the SSL was enabled. Flight Dynamics have prepared a fix to their software to overcome this problem by always taking the last mapping after the slew for attitude reconstruction. This is achieved by performing a backward search in the ACC reported events. The fix, which has not yet been implemented on the operational platform, will prevent the propagation of roll errors from large Open Loop slews to the following slews.

There were also two cases of OTF flickering, caused by undetected False Events on the STR. None of the cases were seen at BCP level.

One corrective Open Loop slew was missed, due to dropout of TM and TC links.

The fuel consumption over the period between 27/02/2004 and 05/03/2004 was 0.213 kg. The remaining propellant is in the order of 171.978 Kg on the 5th of March.

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

3.1.2 Power

The power subsystem is working as specified. The available power from the arrays is in the order of **2200W**.

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 is nominal.

During the reporting period the instrument was in photon-by-photon mode with spectra TM enabled and an assigned TM bandwidth in the science windows of 98 pkts/cycle, except during the Crab observation, where it was 89 pkts/cycle during a calibration window requested by JEMX.

The cryocooler 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 status of the unit is Nominal.

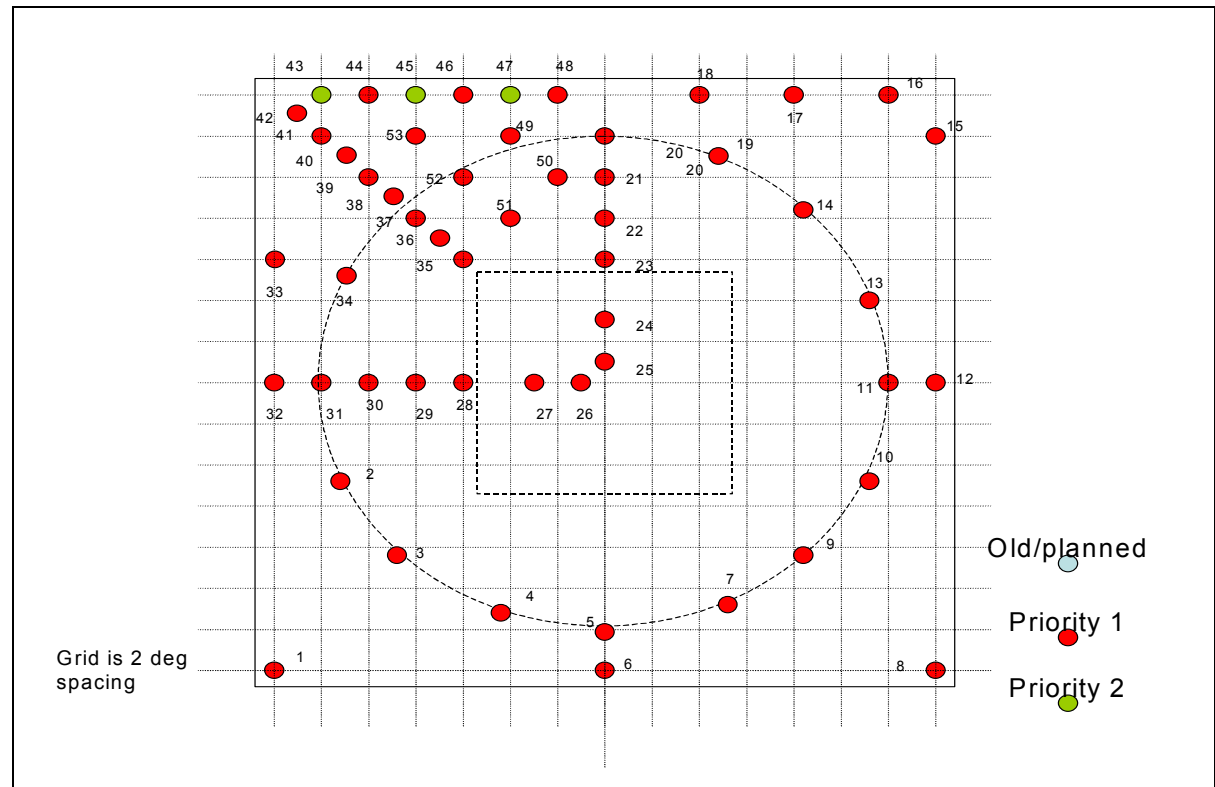
The TM bandwidth assigned to IBIS during the observation period was 134 pkts / cycle.

No occurrence of anomalous OEM generation (ID 183-184-179-180, Class 2) was reported.

Reported an autonomous switch-off triggered by the IREM electron counter and due to the internal radiation automatism.

The upload of the new PICsIT binning table (HEPI table) was performed successfully in preparation of the Crab Calibration activity.

The third Crab Calibration started on DoY 2004.065 at 02:15Z. Hereafter is an image showing the complex structure of the off-axis pointings requested (courtesy A. Bazzano).



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-X1 was dormant with a TM allocation of 1 packet/cycle until revolution 170 (2004-03-05), when it was activated by the Timeline and operated in Data Taking mode. In this revolution, during which the Crab calibration was performed, JEM-X1 had a TM allocation of 4 packets/cycle, except for the period 2004-03-05T18:56Z to 2004-03-05T23:29Z, during which it had a TM allocation of 9 packets/cycle.

JEM-X2 operations were performed by the automatic Timeline, with a TM allocation of 8 packets/cycle during science observations in revolutions 168 and 169. In revolution 170 (Crab calibration), JEM-X2 had a TM allocation of 5 packets/cycle, except for the period 2004-03-05T18:56Z to 2004-03-05T23:29Z, during which it had a TM allocation of 9 packets/cycle.

JEM-X2 made two autonomous transitions to Safe mode triggered by the IREM electron counter parameter before radiation belt entry of revolution 168, starting about 2hours 20minutes before it was planned to be put in Safe mode by the Timeline.

There were several occurrences of out of limits on the parameter L5136 Buffer Loss during the period 2004-03-03 to 2004-03-05.

On 2004-03-01 a JEM-X2 DFEE S/W dump was performed at the request of the PI, in preparation for the planned DFEE S/W patch version 5.3.

During the Crab calibration on 2004-03-05, spikes were observed in the JEM-X2 S/W and H/W Trigger rates. It was decided to monitor the situation and, as it did not deteriorate, JEM-X2 was allowed to continue in Data Taking mode for the remainder of the observations.

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 this period OMC operations were performed by the automatic Timeline, with the TM allocation to OMC of 5 packets/cycle during normal science operations.

During this period, 1 of the 207 planned science pointings for OMC was missed, due to a temporary loss of the Ground Station.

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

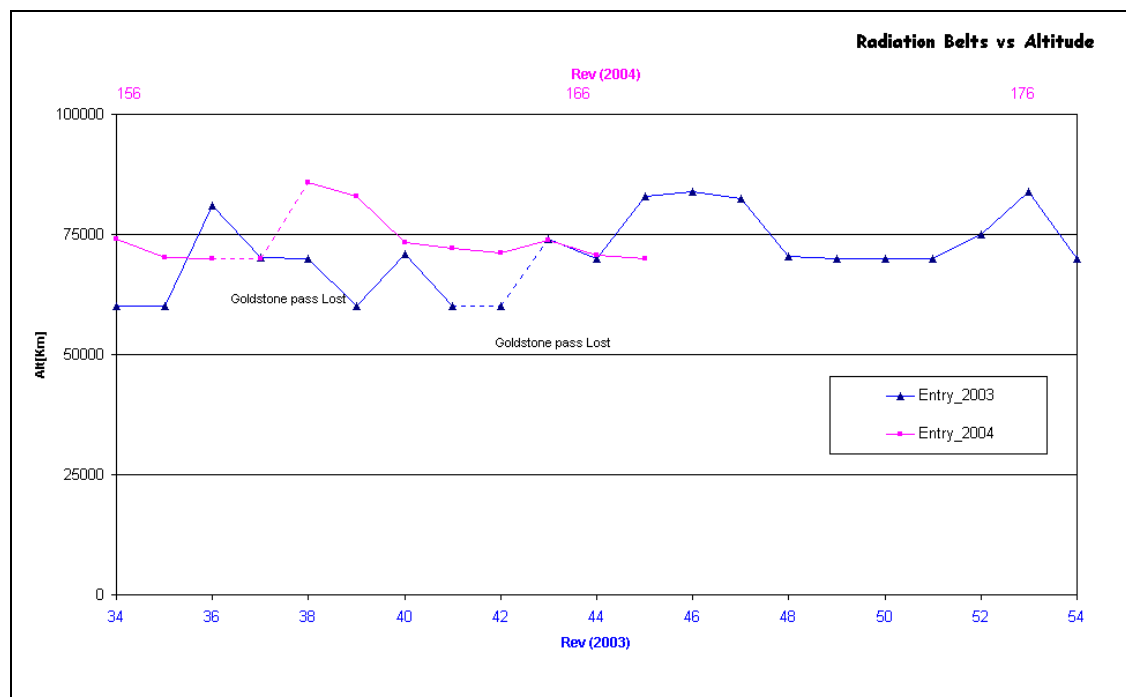
3.2.5 IREM

The overall status of the unit is Nominal.

The observation period was characterized by low solar activity but with the presence of a few single electron (<0.5 MeV) spikes, that in two cases

- 2004.052.15.42Z
- 2004.055.15.08Z

caused the transition of JEM-X2 to Safe Mode. A comparison between the Radiation Belt Entries in 2003 and 2004, for the same observation period winter->spring, shows evidence of an increase in the entry altitudes, over that observed in 2003. The Radiation Belt Entry is determined by the electron cut-off threshold (see definition below) based on JEM-X2 on-board radiation automatism.



The reported Electron Belts Entry/Exit for revs 158-->159, as defined by a cut-off flux of $3.76E+02$ e/cm²/sec ($E > 0.5$ MeV) and the predicted Proton Belts Entry/Exit, as defined by a cut-off flux of $1.25E+03$ p/cm²/sec ($E > 8$ MeV) are not available this week.

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 in general good in the reporting period. The main problems this week, are briefly described below.

4.1 Mission Operations Centre

The performance of the MOC was in general good in the reporting period, with generally only minor problems reported, see below for details.

IMCS Version 9.1 was installed on IMCS-A (3/3/2004) and IMCS-B (5/3/2004).

A more serious problem was discovered during the week concerning the 29th February. During a Rosetta 'future time' simulation it was discovered that the piece of software in the Control System which applies a TPF to the manual stack was not converting the date 29/2/2004 correctly from CCSDS format to ASD format. The date 29/2/2004 corresponds to DOY 060, however the conversion routine was returning DOY 061.

TPFs are also used by Integral in close to real time to update the slew parameters in the timeline following STR mappings, due to this bug no TPF updates would be applied on the 29/2/2004.

A fix for this bug was supplied by S2K Engineering Support, however as this routine was also called in many Integral specific add-ons in the control system, the update of the IMCS took some time, as every instance had to be checked to ensure that we did not introduce unwanted side effects.

In parallel ISOC were requested to prepare an alternative POS / ICP, which did not contain slews on 29/2/2004.

The fix was installed on the IMCS C-chain on Thursday morning and testing started, unfortunately due to the complexity of the testing (future-time simulation with FD participation on a system which had never been used in such a way before) it was impossible to conclusively prove that the system was safe to use with the originally planned activities on 29/2/2004.

The alternative POS / ICP were processed to produce a new timeline with a staring observation with no slew activity on the 29th. This timeline executed nominally.

4.2 Ground Stations & Network

There were several instances this week of RFI, and Reed-Solomon errors. On one occasion, this led to the loss of four pointings.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's: Received up to rev. 179

POS and POD generated: up to rev 172 (with correct JEM-X configuration)

TSF's: Received up to rev 172

The new procedure for switch over of a JEM-X has been successfully performed this week. The procedure includes both manual steps and running of new developed script to modify the proposal database. The only re-planning performed this week was caused by problems detected in the above new script. The whole process required a lot of effort both on MOC and ISOC side. The procedure is now included in the IFOM and the script is put under configuration control for future use. JEM-X1 is now used from revolution 171 instead of JEM-X2 that is set in dormant mode.

One TOO request was rejected.

2. Observation status

No change from last week

3. ISOC science archive

No new data received from ISDC. Discussion continues with ISDC how to speed up the data deliveries.

4. ISOC system

The ISOC system version 10.2 has been used without any problems. A new release is targeted for Mid March.

5. Problems

Two problems detected with the new script to switch the JEM-X instruments were detected and removed.

4.3.2 ISDC

On 01/03/2004, the status of ISDC observation processing is:

- Latest Standard Analysis completed: observation 01201250002 (Cassiopeia A, Revolution 144-148) on 29/02/2004
- Latest products archived: observation 01100090008 (Vela region, Revolution 138) on 27/01/2004
- Latest observation products sent to the observer: 01202070003 (X1916-053, Revolution 131-134) on 09/01/2004

5 Special Events

Nothing to report

6 Anomalies

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

- On DOY 059 starting at 00.30z GFCC had difficulties to connect VC-7 TM from REDU, the problem was eventually cured at 04.19z by restoring the original system disks on the TMPs at REDU, the disks had been previously upgraded.
- During the afternoon several problems occurred on IMCA, low swap space, IFTS_OBS and IFTS_MCS instances not working correctly, the last problem mean that the slew updates from FD were not being received on the IMCS. At 1700z operations were swapped to IMCB and IMCA applications were restarted. Operations were resumed on IMCA at 17.58z.
- On DOY 060 between 00.04z and 02.56z the communications link to REDU was lost 3 times, there was no impact on the executing timeline.
- Between 09.55z and 10.38z 28 bad frames were received from REDU.
- On DOY 063 from 08.41z to 11.20z a total of 109 bad frames were received from REDU (Reed-Solomon errors).
- From 13.15z to 16.07z operations were executed from IMCS-B, while IMCs Software version 9.1 was installed on IMCS-A.
- From 17.07z to 18.19z numerous (>1000) bad frames were received from Goldstone, on the contrary TM data from REDU were still good, when REDU had visibility at low elevation, TM from REDU was processed.
- From 21.51z to 22.36z about 300 bad frames were received from REDU (Reed-Solomon error).
- On DOY 065 at 10.15z the communication links with the ground station were interrupted, slew 01700021 was missed
- At 14.14z the TM link to ISDC was lost, the IFRD task on ISDS was restarted on ISDS, TM flow to ISDC was resumed but the PI Workstation were not receiving telemetry. As verification of the PICSIT table load was on-going it was necessary to restore TM flow to the PI Workstations also. After several hours of diagnosis the problem was traced to faulty cable connection on the network hub to which the PI Workstations are connected.

The following new anomaly reports have been entered into the Anomaly Reporting and Tracking System. Repeats of existing anomalies are not shown in this table.

AR id	Date Occurrence	Subject	Segment	Status
INT-2559	03/03/2004	Bad Frames / Servo problem in Redu	ESA Stations	Pending
INT-2558	03/03/2004	VC7 link / disk problem on TMP2 in Redu	ESA Stations	Pending

7 Future Milestones

The planned date for the JEMX2 DFEE patch has been postponed until after revolution 170.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 168

The observations in revolution 168 consisted of a GCDE performed for the first ~19.5 hours, followed by a staring observation of Algol (RA 03:08:10.13; DEC +40:57:20.3) lasting ~24 hours. The GCDE was then resumed and was performed for the remaining ~14.5 hours of observation time.

During these observations, SPI, IBIS and JEM-X2 were in their nominal science modes and JEM-X1 remained in Safe mode. OMC was in Normal Science mode for the GCDE observations and in Fast Monitoring mode for the Algol observation. The TM allocation throughout all observations was 134 IBIS, 98 SPI, 1 JEM-X1, 8 JEM-X2, 5 OMC.

Revolution 169

In revolution 169 a GCDE was performed throughout the available observation time (~62 hours).

During this observation all instruments were in their nominal science modes, except for JEM-X1 which remained in Safe mode, and the TM allocation was 134 IBIS, 98 SPI, 1 JEM-X1, 8 JEM-X2, 5 OMC.

Revolution 170

In revolution 170 several calibration observations of the Crab nebula were performed as follows:

2004-03-05T02:16Z - 2004-03-05T18:54Z: A series of 2ksec off-axis staring observations with a TM allocation of IBIS 134; SPI 98; JEM-X1 4; JEM-X2 5; OMC 5

2004-03-05T18:56Z - 2004-03-05T23:29Z: A series of off-axis staring observations with a TM allocation of IBIS 134; SPI 89; JEM-X1 9; JEM-X2 9; OMC 5

2004-03-05T23:30Z - 2004-03-06T13:58Z: A series of 2ksec off-axis staring observations with a TM allocation of IBIS 134; SPI 98; JEM-X1 4; JEM-X2 5; OMC 5

2004-03-06T14:30Z - 2004-03-07T05:39Z: Raster dithering observation of the Crab nebula centred at (RA 05:34:31.90; DEC +22:00:52.0) with a TM allocation of IBIS 125; SPI 98; JEM-X1 9; JEM-X2 9; OMC 5

Following this Crab calibration, a GPS observation was performed for the remaining ~10.5 hours of observation time, during which the TM allocation was IBIS 134; SPI 98; JEM-X1 4; JEM-X2 5; OMC 5.

All instruments were in their nominal science modes throughout all observations in this revolution.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2004-02-18T19:08:18.000Z	172.3517	F	Automatic TM processing.
2004-02-19T01:17:23.000Z	172.3153	F	Automatic TM processing.
2004-02-19T09:49:39.000Z	172.2873	F	Automatic TM processing.
2004-02-21T18:55:21.000Z	172.2701	F	Automatic TM processing.
2004-02-22T01:04:26.000Z	172.2656	F	Automatic TM processing.
2004-02-24T17:30:48.000Z	172.2463	F	Automatic TM processing.
2004-02-25T00:58:49.000Z	172.2159	F	Automatic TM processing.
2004-02-25T11:23:06.000Z	172.1911	F	Automatic TM processing.
2004-02-27T18:31:20.000Z	172.1843	F	Automatic TM processing.
2004-02-28T00:53:53.000Z	172.1020	F	Automatic TM processing.
2004-03-01T00:15:42.000Z	172.0833	F	Automatic TM processing.
2004-03-01T16:45:11.000Z	172.0666	F	Automatic TM processing.
2004-03-02T00:43:04.000Z	172.0205	F	Automatic TM processing.
2004-03-04T16:46:15.000Z	171.9986	F	Automatic TM processing.
2004-03-05T00:30:47.000Z	171.9782	F	Automatic TM processing.

This report was generated Fri Mar 5 08:00:23 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 Operations

AOCS operations were executed from the Automatic Timeline.

During this period, 127 Open Loop Slews, 101 Closed Loop Slews and 6 Momentum Bias were executed. 1 corrective slew was missed. This is equivalent to a 0.4%.

28/02/04 (Day of Year 059, Revolution 168)

Flickering of the OTF due to undetected False Events on the STR: At 16:06:36, and undetected False Event on the STR caused a jump of -44 arc-seconds in the Z position of the Guide Star. This is more than the OTF threshold for Yaw and resulted in the flickering of the OTF, which was not seen at BCP level. The magnitude 8.35 Guide Star was at CCD location [965, 5194]. Also at 17:22:03, another undetected False Event caused a jump of $+37$ arc-seconds in the Y position of the 8.15 magnitude Guide Star. This event was also not seen at BCP level. The star was located at [-12421, 10048].

29/02/04 (Day of Year 060, Revolution 168)

Staring observation performed due to a bug in the IMCS software: Due to a problem in the IMCs software in the way it handles the application of TPFs to the Autostack on 29th of February, the observations on this day were cancelled and were replaced by a 24-hour-long staring observation. This was done at mission planning level. It should be noted that a patch to fix the problem was received earlier and a future-time simulation with the actual Timeline was performed, but the tests were not conclusive. Therefore, before the start of revolution 168, it was decided not to apply the patch and to go for the staring observation option.

01/03/04 (Day of Year 061, Revolution 168-169)

Flickering of the OTF at the end of corrective Open Loop Slew, due to Roll error: At the end of corrective Open Loop Slew 01680071 (slew angle: 0.67 degrees) the error in roll with respect to the SSL assumed roll angle was -144 arc-seconds. This is more than the OTF threshold for roll and caused flickering of the OTF. The error already existed at the beginning of the slew and was introduced by the attitude determination at the end of Open Loop Slew 01680070, with 83 degrees slew angle. This attitude reconstruction was based on the mapping, during which the SSL was enabled. The OTF flicker was not seen at BCP level.

02/03/04 (Day of Year 062, Revolution 169)

Nothing to report.

03/03/04 (Day of Year 063, Revolution 169)

Nothing to report.

04/03/04 (Day of Year 064, Revolution 169-170)

Flickering of the OTF at the end of corrective Open Loop Slew, due to Roll error: At the end of corrective Open Loop Slew 01690117 (slew angle: 0.87 degrees) the error in roll with respect to the SSL assumed roll angle was -134 arc-seconds. This is more than the OTF threshold for roll and caused flickering of the OTF. The error already existed at the beginning of the slew and was introduced by the attitude determination at the end of Open Loop Slew 01680116, with 75 degrees slew angle. This attitude reconstruction was based on the mapping, during which the SSL was enabled. The OTF flicker was not seen at BCP level.

05/03/04 (Day of Year 065, Revolution 170)

Corrective Open Loop Slew missed due to dropout of TM and TC links: At 10:15, the TM and TC links suddenly dropped. The reason for this is being investigated. Corrective Open Loop Slew 01700021 was missed. The next Close Loop Slew was executed from the Timeline.

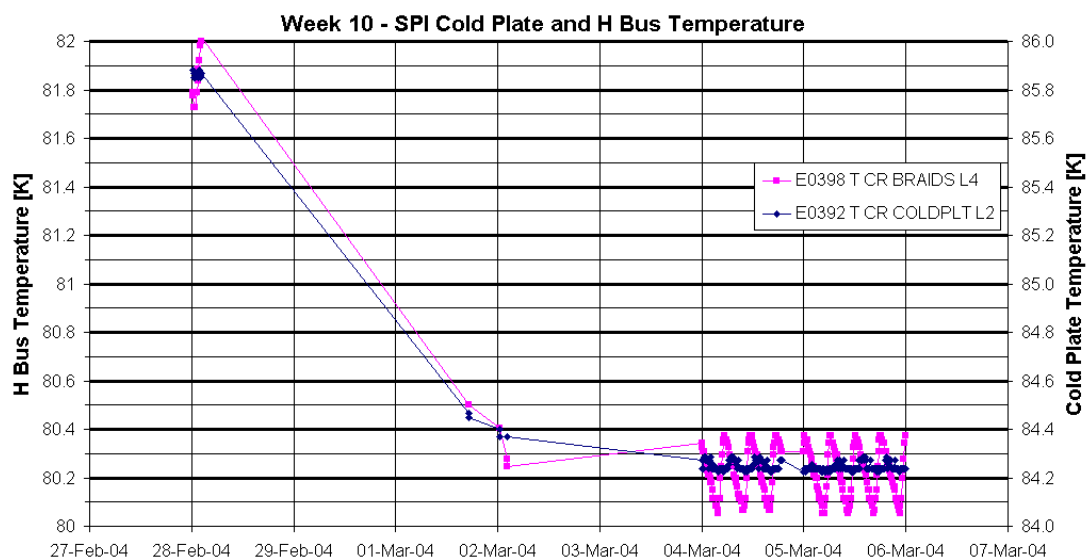
8.3.2 SPI Operations

Cryocooler / Detector Cold-Plate:

The performance of the cryocooler is nominal.

Due to the accumulated drift during the last two months, the cold-plate temperature reached the upper limit of the regulation band (i.e. 84.1-85.9K) as expected. As a consequence, the four compressor stroke amplitudes were increased by one lsb, on 28th February at 21:25z. As expected, the temperature decreased by almost 2 K and leveled off at around 84.5K.

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

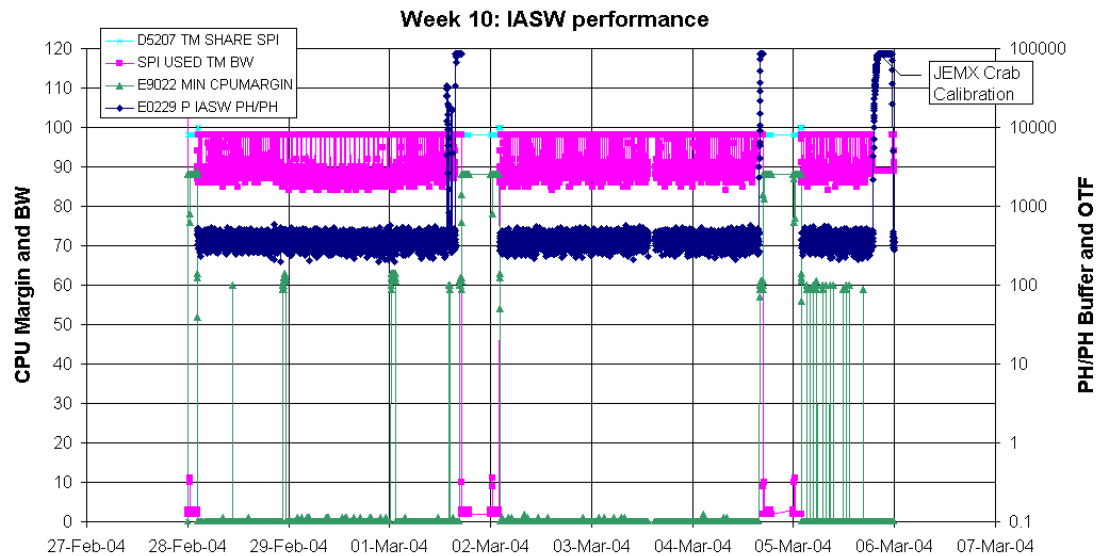


IASW/DPE:

Between 2004-03-05T18:54:12Z and 2004-03-05T23:28:46Z, the PST was re-programmed to reflect the following TM bandwidth distribution: IBIS 134; SPI 89; JEM-X1 9; JEM-X2 9; OMC 5, to accommodate the Crab Calibration of both JEMX's..

This caused the IASW to immediately saturate the allocated TM bandwidth, followed by the photon event buffer saturation in a few minutes. Operations returned nominal when the bandwidth was re-assigned to 97 pkts/cycle.

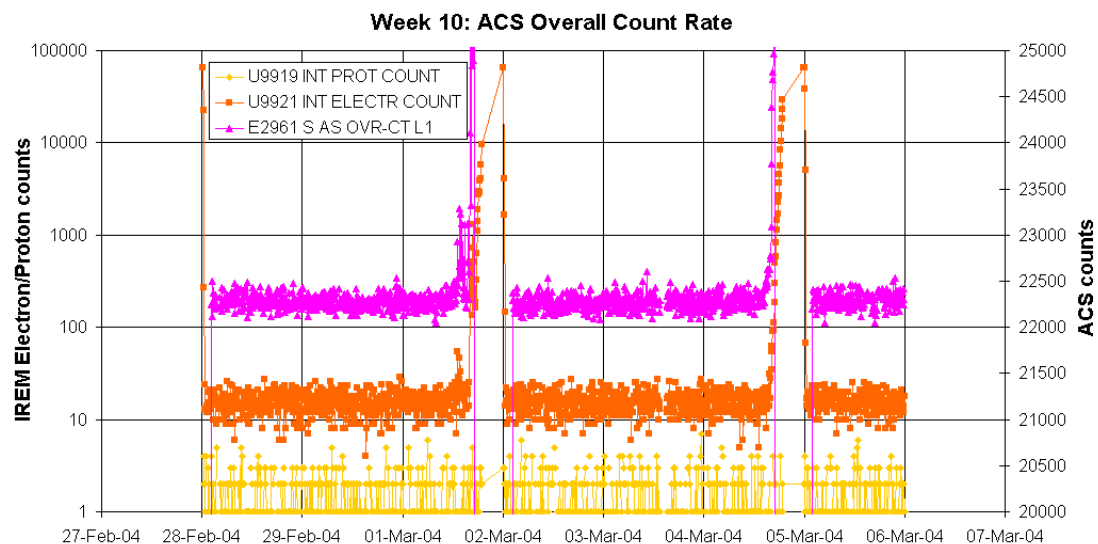
The following diagram shows the IASW performance during these two exposures:



ACS:

The performance of the ACS is nominal.

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

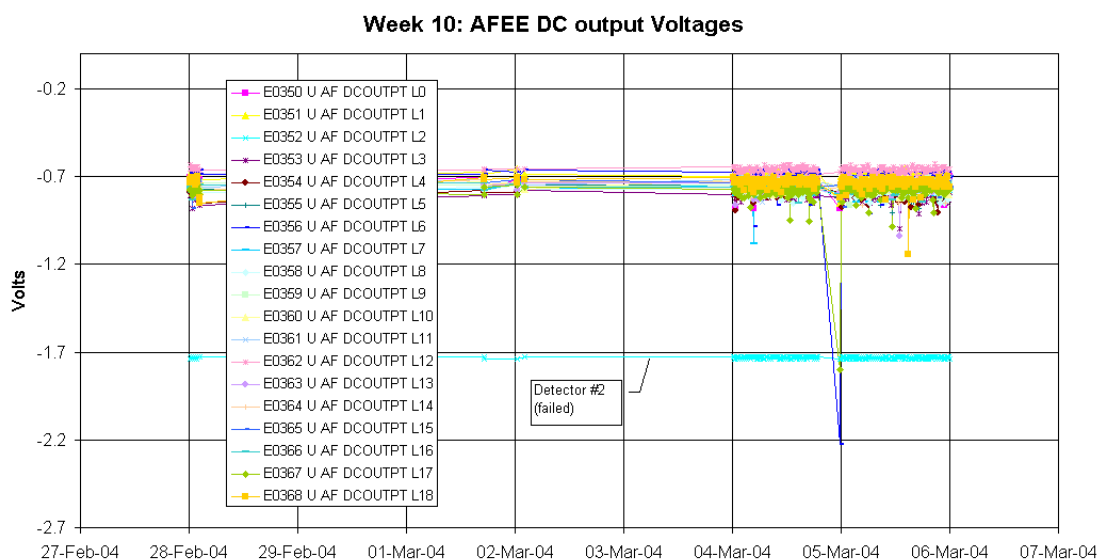


AFEE:

The performance of the detectors is nominal except for the detector #2 failed since 06.12.2003 (see anomaly report INT_SC-72).

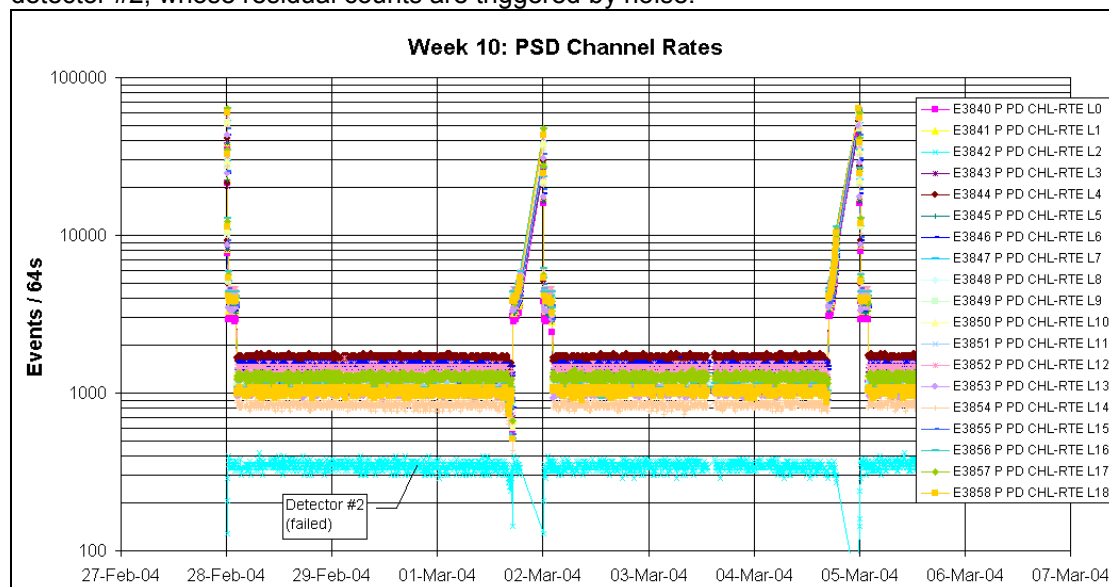
The AFEE dc output signals are here after plotted during the reporting period.

These signals represent the DC component of the current flowing through the Ge detector crystals polarised at 4kV; they provide a measure of the health status of both the detectors and the HV section.



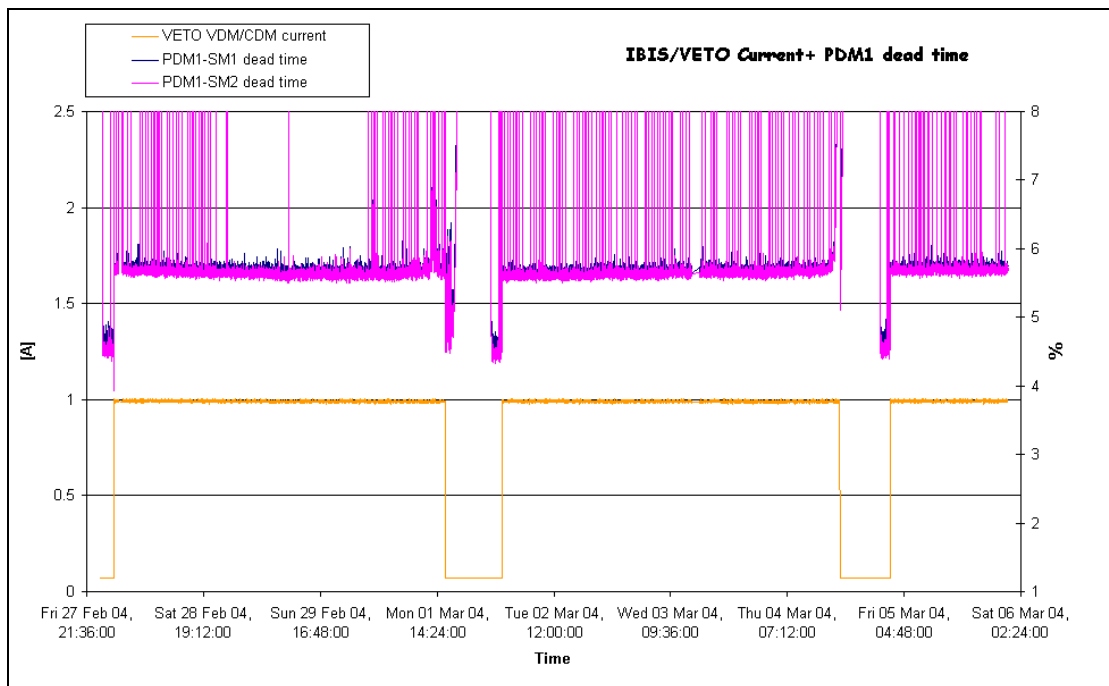
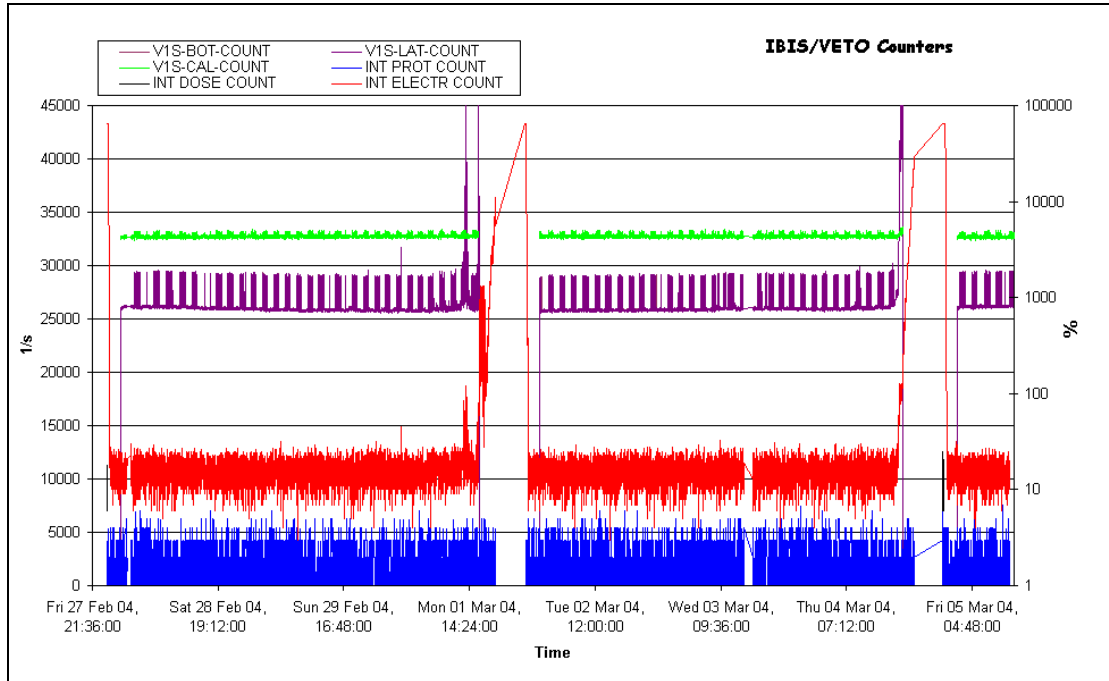
DFEE:
 Nothing to report.

PSD:
 The following plot shows the GeD channel rates detected by the PSD during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2, whose residual counts are triggered by noise.

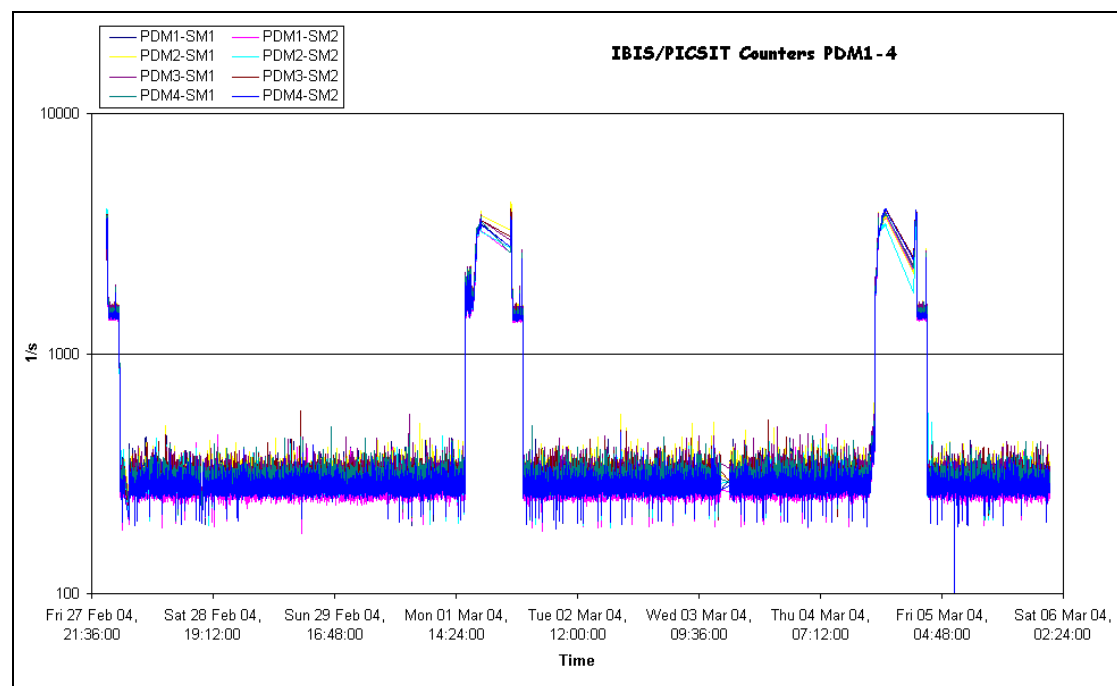
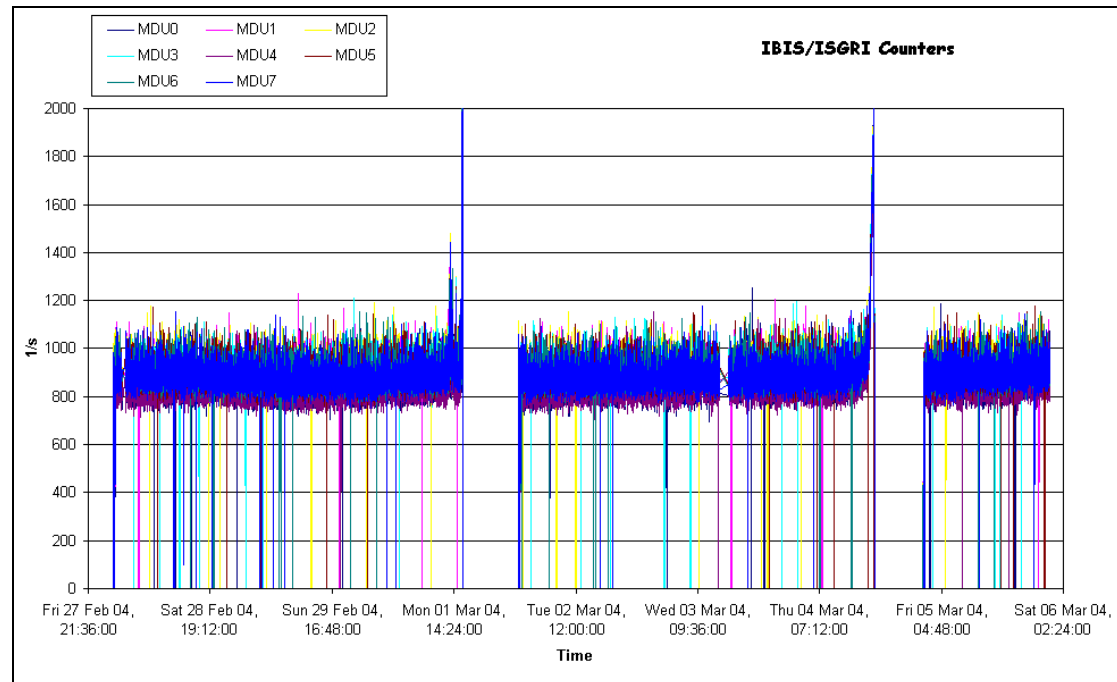


8.3.3 IBIS Operations

Plots of the VETO VDM/CDM current, the VETO bottom and lateral counter and the PICsIT PDM#1 SM1-2 dead times are shown below:



Plots of ISGRI and PICsIT counters, during the observation period are shown below.



DOY 2004.059 (28/02/04)

Reported at 1:55 and 2:19Z the OEM APID 1280 ID 169 Class 0 << HK OUT OF SYNCH>> flagging a temporary loss of synchronization between the HEPI and peripherals. Due to the isolated occurrences no further action was taken, as suggested by FDIR doc.

DOY 2004.060 (29/02/04)

Nothing to report

DOY 2004.061 (01/03/04)

Reported at 16:02Z, the automatic transition in Safe configuration (IASW In Stand-By + HVs OFF) due to the high radiation background (electron counter > 384 cts/10 sec), ~65 minutes prior the S/C broadcasted Radiation Belts entry time (see below), corresponding to an altitude of ~68500 Km.

RAD_ENTR R 2004-03-01T17:07Z D Radiation belt entry time

DOY 2004.062 (02/03/04)

Reported at 00:08Z the parameters G5007(POS-M2RTC1) in Soft High limit (went in/out limit for few TM cycles). No action was taken, as suggested by FDIR doc.

Reported (few) during the Belt passage the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the fact that the PICsIT detectors are ON without the VETO anticoincidence system, as it required by PIs.

Reported at 1:44 and 2:08Z the OEM APID 1280 ID 169 Class 0 << HK OUT OF SYNCH>> flagging a temporary loss of synchronization between the HEPI and peripherals. Due to the isolated occurrences no further action was taken, as suggested by FDIR.

DOY 2004.063 (03/03/04)

Nothing to report

DOY 2004.064 (04/03/04)

Executed at 17:06 Z the OR-INT-135 for the uploading of the New HEPI Context Table, including the new PICsIT binning table: the purpose of the change request was to optimize, for PICsIT, the number of grouped raw channels as a function of count rate. With the previous Binning Table was not possible to divide the PICsIT operative range into energy channels whose were the same (in the common energy band) for single and multiple events. The activity started after Radiation Belt Entry of rev 169 at 17:06Z and terminated successfully at 17:26.

Reported at 17:24Z the OEM APID 1280 ID 169 Class 0 << HK OUT OF SYNCH>> flagging a temporary loss of synchronization between the HEPI and peripherals. Due to the isolated occurrence no further action was taken, as suggested by FDIR.

At 18:18Z the TC G0840 (Report energy threshold for compton selection) was uplinked in order to report the IBIS on-board Compton configuration before the Crab calibration.

DOY 2004.065 (05/03/04)

Reported at 1:32Z few occurrences of the OEM APID 1280 ID 169 Class 0 << HK OUT OF SYNCH>> flagging a temporary loss of synchronization between the HEPI and peripherals. Due to the isolated occurrences no further action was taken, as suggested by FDIR.

Reported at 00:08Z the parameters G5002(POS-M1RTC1) in Soft High limit (went in/out limit for few TM cycles). The out of limit was followed after few TM cycles by the SCC fail of the parameters family G5068 (No action was taken, as suggested by FDIR doc).

Started on DoY 2004.065.02:15Z the third Crab Calibration. The first results will be presented in the next issue of the weekly report.

8.3.4 JEM-X Operations

2004-02-28 (DOY 059, Rev 168)

Nothing to report

2004-02-29 (DOY 060, Rev 168)

Nothing to report

2004-03-01 (DOY 061, Rev 168-169)

Starting at 13:25Z, about 2 hours 20 minutes before it was planned to put JEM-X2 into Safe mode before radiation belt entry of revolution 168, JEM-X2 performed a series of autonomous transitions into and out of Safe mode in response to high background radiation levels as reported by IREM as follows:

- 13:25Z: Out of Limits on parameters K5317 and L5317 RAD MONITOR 3 (Electron Counter), value = 85. JEM-X2 autonomous transition to Safe mode (issuing OEM 231 JEM-X2 AUTO EVENT 1).
- 13:35Z: JEM-X2 autonomous recovery to Setup mode (OEM 233 JEM-X2 AUTO EVENT 3) after the IREM RMCR values had remained below the JEM-X2 thresholds for exiting from Safe mode for more than 10 minutes.
- 13:40Z: Out of limits on parameters K5317 and L5317, value = 66, causing JEM-X2 to return to Safe mode (OEM 231 JEM-X2 AUTO EVENT 1).
- 14:09Z: JEM-X2 autonomous recovery to Setup mode (OEM 233 JEM-X2 AUTO EVENT 3) after IREM RMCR values had remained below the JEM-X2 thresholds for exiting from Safe mode for more than 10 minutes. As this was less than 2 hours before JEM-X2 was due to be commanded into Safe mode by the Timeline, no recovery of the unit was attempted.

At 15:45Z JEM-X2 was then commanded back to Safe mode as planned via the ED LESAFE01 in the Timeline.

At the request of the PI, a dump of the JEM-X2 DFEE S/W was performed after JEM-X2 radiation belt entry of revolution 168. The activities performed were as follows (see also Operational Request INT_OR_0134):

- 16:49Z: FCP_JEM2_0120 was executed to disable JEM-X2 autonomous reactions to the Broadcast Packet radiation monitor parameters and radiation belt entry/exit times.
- 15:51Z: FCP_JEM2_0045 was executed to put JEM-X2 in Memory mode, followed by procedure FCP_JEM2_0051 to dump the DFEE image.
- 16:01Z: FCP_JEM2_0040 was executed to put JEM-X2 back in Safe mode, followed by procedure FCP_JEM2_0041 to command JEM-X2 to Setup mode in preparation for the report of the DFEE S/W Integer and Float parameters.
- 16:04Z: FCP_JEM2_0071 was executed to report the DFEE S/W Integer parameters.
- 16:12Z: FCP_JEM2_0081 was executed to report the DFEE S/W Float parameters.
- 16:13Z: JEM-X2 was commanded back to Safe mode by procedure FCP_JEM2_0040 and procedure FCP_JEM2_0120 was then executed to re-enable all the JEM-X2 autonomous reactions to the Broadcast Packet.

2004-03-02 (DOY 062, Rev 169)

Nothing to report

2004-03-03 (DOY 063, Rev 169)

The TM parameter L5136 BUFFER LOSS went out of limit as follows:

Time	Value
2004-03-03T18:22:17Z	109

2004-03-04 (DOY 064, Rev 169-170)

The TM parameter L5136 BUFFER LOSS went out of limit as follows:

Time	Value
2004-03-04T11:33:29Z	160
2004-03-04T11:40:01Z	788
2004-03-04T11:49:13Z	571
2004-03-04T11:57:53Z	272
2004-03-04T12:30:41Z	462

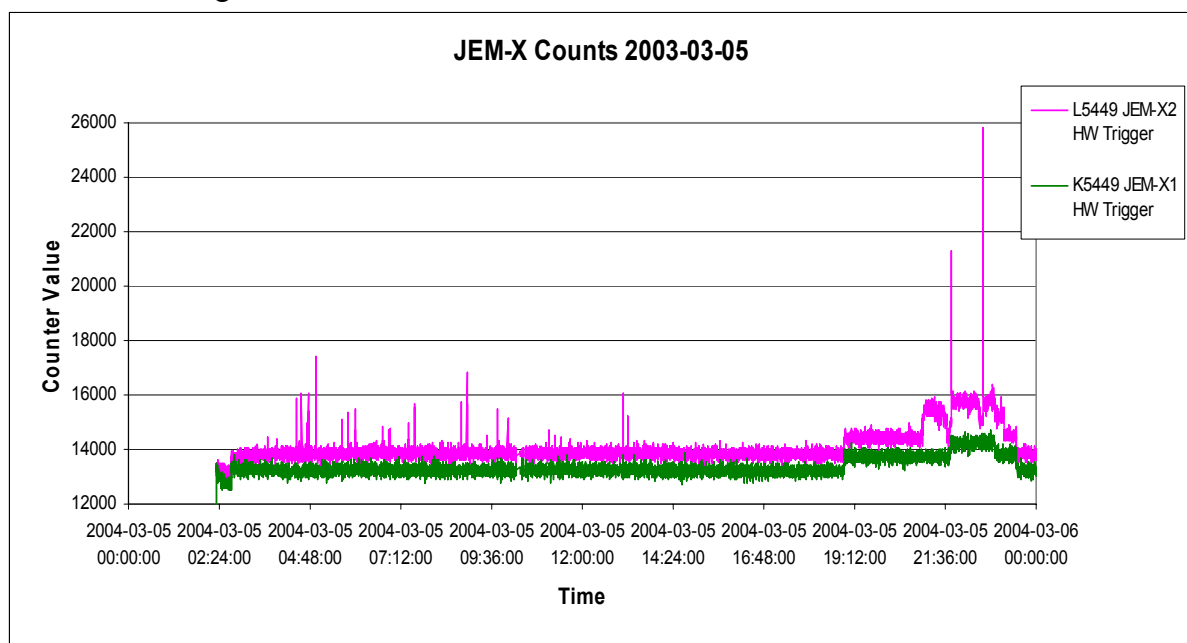
2004-03-05 (DOY 065, Rev 170)

The TM parameter L5136 BUFFER LOSS went out of limit as follows:

Time	Value
2004-03-05T03:56:01Z	320
2004-03-05T04:25:29Z	563
2004-03-05T04:34:41Z	117
2004-03-05T04:44:25Z	216
2004-03-05T04:57:13Z	751
2004-03-05T07:32:33Z	734
2004-03-05T07:32:57Z	173
2004-03-05T08:47:21Z	204
2004-03-05T08:57:53Z	233

2004-03-05T10:01:13Z	467
2004-03-05T11:07:13Z	279
2004-03-05T11:16:49Z	146
2004-03-05T13:04:25Z	716
2004-03-05T15:39:05Z	213
2004-03-05T21:46:01Z	510
2004-03-05T22:36:25Z	1306

At approximately 16:00Z, MOC was notified of a potential problem with the JEM-X2 detector, the symptoms of which were spikes observed in the H/W and S/W Trigger rates (parameters L5449 and L5119 respectively). The spikes in the H/W Trigger can be clearly seen in the following plot, where it is also clear that the same phenomenon was not occurring on the JEM-X1 unit:

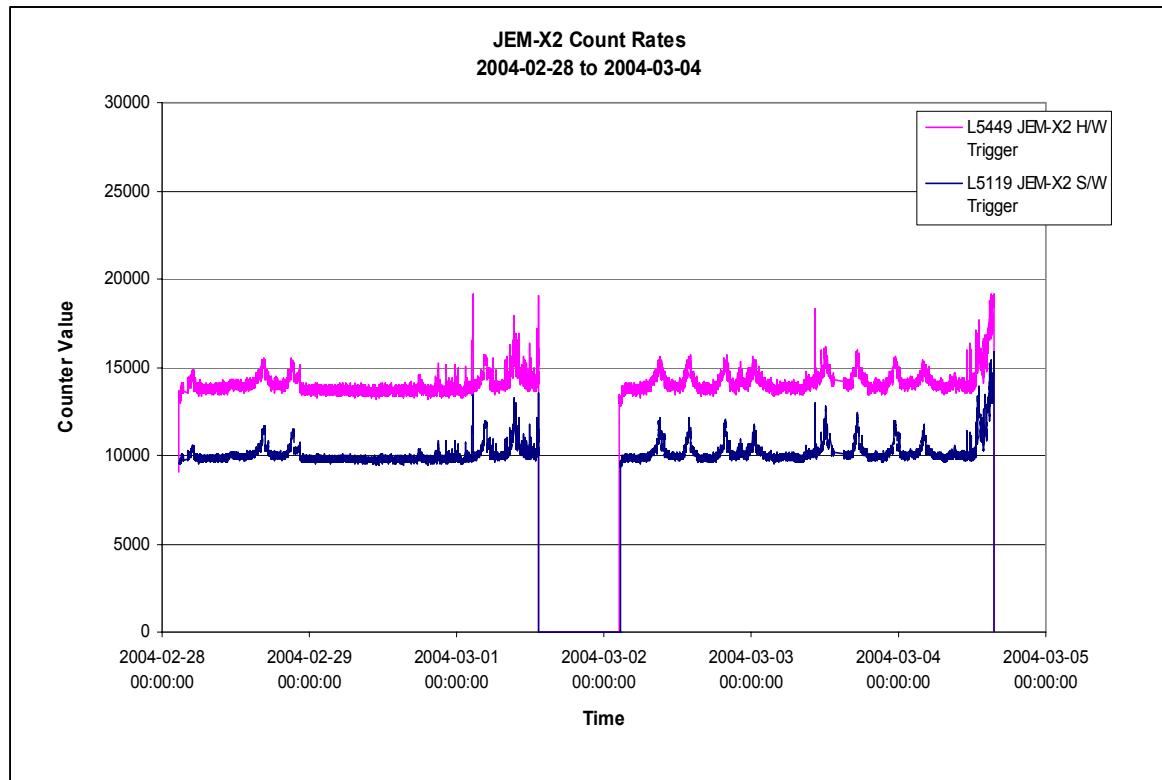


In consultation with the PI, it was decided to monitor the situation and if spikes of amplitude greater than ~2000counts were observed at a frequency of 6 spikes per 2 hour period, to inform the PI if this was during the period where the Crab nebula was in the JEM-X field of view (2004-03-05T18:56Z to 2004-03-05T23:29Z) and otherwise to command the unit to Safe mode. This did not occur and thus JEM-X2 remained in Data Taking mode as planned for the remainder of the day.

8.3.4.1 JEM-X2 Count Rates

JEM-X2 count rates over the period 2004-02-28 to 2004-03-04 are displayed in the following graph¹. For a plot of JEM-X1 and JEM-X2 count rates on 2004-03-05, see the report of that day in Section 8.3.4.

¹ Data sampled (1 frame in 3) and smoothed to remove spikes in S/W Trigger due to flushing of buffer during slews.



8.3.5 OMC Operations

2004-02-28 (DOY 059, Rev 168) to 2004-03-04 (DOY 064, Rev 169-170)

Nothing to report

2004-03-05 (DOY 065, Rev 170)

Pointing 01700021 missed

Due to the loss of the Ground Station, the Timeline was stopped at 10:15Z, and slew ID 01700021, along with the OMC imaging EDs for pointing ID 01700021, were missed.

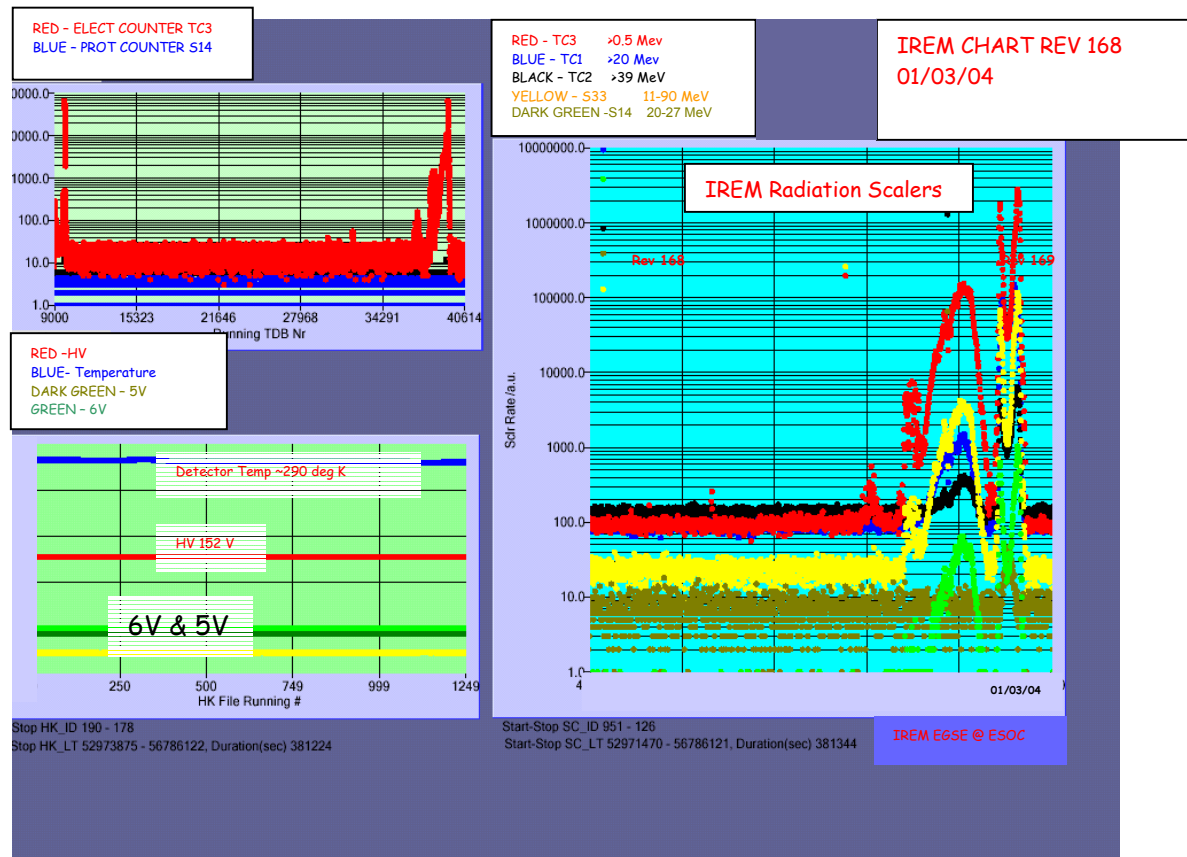
After the recovery of the Ground Station, Timeline operations were resumed at 10:46Z. The next slew, ID 01700022, along with the OMC imaging EDs for pointing 01700022, were executed from the Timeline and OMC operations continued nominally.

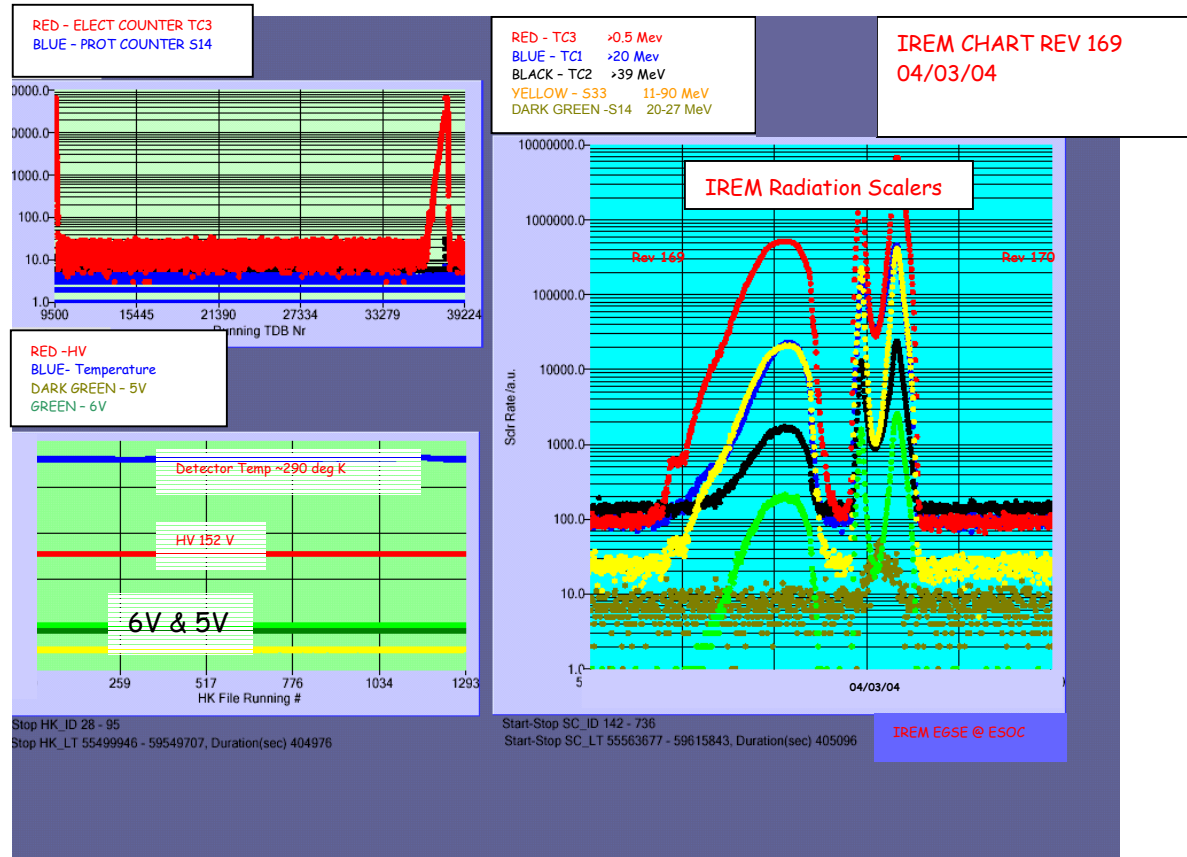
8.3.6 IREM Operations

DOY 2004.064 (04/03/04)

Reported at 18:26Z the fail of the CEV (Command Execution Verifictaion) for the TC U4921 (INT GROUND LINK OFF) due to a late TM verification. After verification of the correct value from the TM no further action was taken.

Hereafter is reported the evolution of the IREM counters for rev168 and 169





and the corresponding predicted Belts passages (as calculated with AP8Max and AE8Max models by using the RADMON tool), including the passages for rev 166 and 167 as not reported in the previous weekly report

