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

INTEGRAL
Mission Report

INT-MOC-SYS-RP-1001-TOS-OF

No. 073
Week 07

16.02.04

Routine Phase

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1 General

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

It addresses the activities from 07.02.04 until 13.02.04 (both dates inclusive) and covers the revolutions 161, 162 & 163.

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 Plane; Cassiopeia A (RA 23:51:43.00; DEC +62:03:55.0); an amalgamated observation of Cas A/Tycho (RA 23:51:39.60; DEC +61:41:40.5); Centaurus A (RA 13:25:27.60; DEC -43:01:08.8) and the Galactic Centre. The activities consisted of raster dithering, GPS and GCDE observations.

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.

There were two cases of loss of Guide Star. In one case the ACC picked a dim (8.5 Mi) star after an Open Loop Slew. This star was later lost. The second case was caused by False Events detected by the STR during a perigee passage.

Jitters caused by the engagement of the Sun Steering Law after Open Loop slew 01620003 resulted in OOL warning on the speed of Reaction Wheel 3. However, the wheel speed and torque demands, remained well within the defined safety margins (with respect to AMD and torque saturation thresholds).

The attitude determination after Open Loop slew 01630001, which was based on a mapping during which the SSL was enabled, resulted in roll error and flickering of the

OTF at the end of corrective slew 01630002. This was not during the science observation window.

The fuel consumption over the period between 06/02/2004 and 13/02/2004 was 0.253 kg. The remaining propellant is in the order of 172.453 Kg on the 13th of February.

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.

The cryocooler is working well, keeping the Ge detector cold plate 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 was 134 pkts/cycle.

No occurrence of the anomalous OEM generation (ID 183-184-179-180, Class 2) was reported. The VETO S/W patch version3.2 (VETO counter rescaling factors) was successfully installed. The new dynamic VETO Bottom and Lateral counters are being monitored to fine-tune the counter limits.

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.

During this period JEM-X1 was dormant with a TM allocation of 1 packet/cycle. JEM-X2 operations were performed by the automatic Timeline, with a TM allocation of 8 packets/cycle during science observations.

JEM-X2 made three autonomous transitions to Safe mode during this reporting period. The first was ~12 hours after radiation belt exit in revolution 161 and was triggered by the unit's Software Ratemeter. JEM-X2 was recovered to Data Taking mode after about 1 hour 30 minutes. The other two autonomous transitions to Safe mode were before radiation belt entry of revolutions 161 (~2 hours before it was due to be commanded into Safe mode by the Timeline) and 162 (~30 minutes before it was due to be commanded into Safe mode). Both of these instances were triggered by the IREM radiation monitor counters.

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 during normal science operations.

There were 154 OMC pointings executed nominally, none were lost.

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

3.2.5 IREM

The overall status of the unit is Nominal.

The observation period was characterized by low solar activity but with the presence of several high radiation spikes along the orbit.

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Electron CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
161	RAD_EXIT R 2004-02-07T03:34:29Z	Sat 07 Feb 04, 01:49:	07-Feb-2004 02:15:09	27193.74
161	RAD_ENTR R 2004-02-09T18:21:17Z	Mon 09 Feb 04, 15:00:0(Mon 09 Feb 04, 18	09-Feb-2004 18:56:22	54965.0
162	RAD_EXIT R 2004-02-10T03:22:54Z	Tue 10 Feb 04, 01	10-Feb-2004 01:56:22	26095.99
162	RAD_ENTR R 2004-02-12T18:09:55Z	Thu 12 Feb 04, 15	12-Feb-2004 18:46:22	54786.52
163	RAD_EXIT R 2004-02-13T03:11:45Z	Fri 13 Feb 04, 01	13-Feb-2004 01:46:22	26298.69

Reference
Small error vs reference
Large error vs reference

Proton Belts

REV	S/C BCPKT (proton)	Proton CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
161	PROTON_RAD_ENTR	7-Feb-2004 00:35:09	11918.73
161	PROTON_RAD_EXIT	07-Feb-2004 01:05:09	15514.48
162	PROTON_RAD_ENTR	10-Feb-2004 00:16:22	11343.49
162	PROTON_RAD_EXIT	10-Feb-2004 00:46:22	14535.74
163	PROTON_RAD_ENTR	13-Feb-2004 00:06:22	11448.99

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 good in the reporting period, with only minor problems reported, see chapter 6 for details.

4.2 Ground Stations & Network

The performance of the Ground Stations and the network was good in the reporting period, with only a few minor incidents to report (see chapter 6).

4.3 Science Ground Segment

The external attack on the PI workstations located at MOC has ceased since the installation of anti-virus software on the affected machines.

4.3.1 ISOC

1. Mission planning
PSF's: Received up to rev. 172
POS and POD generated: up to rev 169
TSF's: Received up to rev 164

Lots of replanning has been done this week. Essentially rev's 16,166 and 167 has been replanned several times. The reason is to accommodate the OMC FF calibration and the parallel JEM- X operations at an optimal time for everybody. In addition one observation that was supposed to be coordinated with XMM-Newton had to be rescheduled due to XMM-Newton.

2. Observation status
ECS's received up to rev 150 including the previously missing 140. However 149 is missing. Corresponding OCS's sent to ISDC. No extra time credited.

3. ISOC science archive
Data received last week ingested into archive. Some difficulties experienced when browsing this new data. Updated ingest software downloaded from ISDC. Will be installed shortly.

4. ISOC system
A version 10.2 was introduced operationally late this week. This system has been used throughout without any major problems.

5. Problems
Flight Dynamics are now delivering truncated Orbit files. This has significantly improved the performance of the ISOC system.

6. AO 3 preparation
Detailed planning for this AO available is now internally consolidated.

7. Miscellaneous
Additional procedures to handle the switch over from JEM-X2 to JEM-X1 from revolution 171 are established. The critical period is during the execution of rev 169, i.e. 1 to 3 March. For these days detailed activities are imposed. This will aim at minimizing the impact in case of TOO replanning during this period.

4.3.2 ISDC

On 16/02/2004, the status of ISDC observation processing is:

- Latest Standard Analysis completed: amalgamated observation 01202140004 (MR 2251-178, Revolution 134-135) on 14/02/2004

- 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 small problems related to the ground segment that impacted the operations:

- On DoY 038, at 06:07, there were continuous messages IDDA HFARetri CCOMhfaSide::getDataRequest:: cannot get data, these were triggered by the on-going CD burning activity, and were ignored.
- On DoY 040, at 06:12, there was a brief drop on VC0 from Redu, and at 06:13, there was a brief drop on the Bad-Frame link, no impact.
- At 15:04, a message MONTMdsk sun122 Error Software classMDISplayDefGraph appeared.
- On DoY 041, at 01:09, shortly after Redu AOS, several bad TM frames were received, there was no impact.
- At 02:27, the Autostack on sun122 crashed, the bcpkt changes for the on-going slew (#1) were not uplinked, but there appears not to have been any impact.
- At 03:27, TC A3085 (RC sun steer) remained unverified in the TC history.
- From 17:28 to 21:55 there were occasional Reed-Solomon errors from Redu, which resulted in bad frames. There was no impact.
- On DoY 042 at 00:15, Network reported a ghost link, NCTRS-A was restarted.
- On DoY 043 at 07:19, both TC & TM were interrupted due to a drop on the X-25 line.

There were no new anomalies entered into the ARTS system this week.

7 Future Milestones

Planned for the end of February and beginning of March are JEMX 1 & 2 patches to update the on-board background rejection criteria and the HV safety limits.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 161
The observations in revolution 161 began with 15 pointings of a GPS lasting ~10 hours. This was followed by a raster dithering observation of Cassiopeia A centred at (RA 23:51:43.00; DEC +62:03:55.0), which was performed for ~1 hour. An amalgamated raster dithering observation of Cas A/Tycho centred at (RA 23:51:39.60; DEC +61:41:40.5) was then performed for the remaining ~48 hours of observation time.

Revolution 162
The observations in revolution 162 began with 19 pointings of a GPS lasting ~13 hours. This was followed by an amalgamated raster dithering observation of Cas A/Tycho centred at (RA 23:51:39.60; DEC +61:41:40.5), which was performed for the remaining ~48 hours of observation time.

Revolution 163
The observations in revolution 163 consisted of a raster dithering observation of Centaurus A (RA 13:25:27.60; DEC -43:01:08.8) lasting ~44 hours, followed by a GCDE which was performed for the remaining ~16.5 hours of observation time.

During these revolutions 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.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2004-01-29T02:32:06.000Z     172.7768    F   Automatic TM processing.
2004-01-31T19:49:57.000Z     172.7586    F   Automatic TM processing.
2004-02-01T02:26:54.000Z     172.7320    F   Automatic TM processing.
2004-02-04T02:55:49.000Z     172.7150    F   Manual 0160_0501_M.RWB
2004-02-05T12:25:28.000Z     172.7059    F   Automatic TM processing.
2004-02-06T19:31:23.000Z     172.6315    F   Automatic TM processing.
2004-02-07T01:59:24.000Z     172.6214    F   Automatic TM processing.
2004-02-07T11:03:49.000Z     172.5672    F   Automatic TM processing.
2004-02-08T12:12:47.000Z     172.5561    F   Automatic TM processing.
2004-02-09T19:02:19.000Z     172.5385    F   Automatic TM processing.
2004-02-10T01:49:55.000Z     172.5167    F   Automatic TM processing.
2004-02-10T10:47:24.000Z     172.5000    F   Automatic TM processing.
2004-02-11T11:42:47.000Z     172.4853    F   Automatic TM processing.
2004-02-12T19:02:26.000Z     172.4617    F   Automatic TM processing.
2004-02-13T01:36:19.000Z     172.4529    F   Automatic TM processing.
```

```
This report was generated  Fri Feb 13 08:00:09 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, 72 Open Loop Slews, 98 Closed Loop Slews and 9 Momentum Bias were executed. No slews were missed or executed manually.

07/02/04 (Day of Year 038, Revolution 161)

Nothing to report.

08/02/04 (Day of Year 039, Revolution 161)

Nothing to report.

09/02/04 (Day of Year 040, Revolution 161-162)

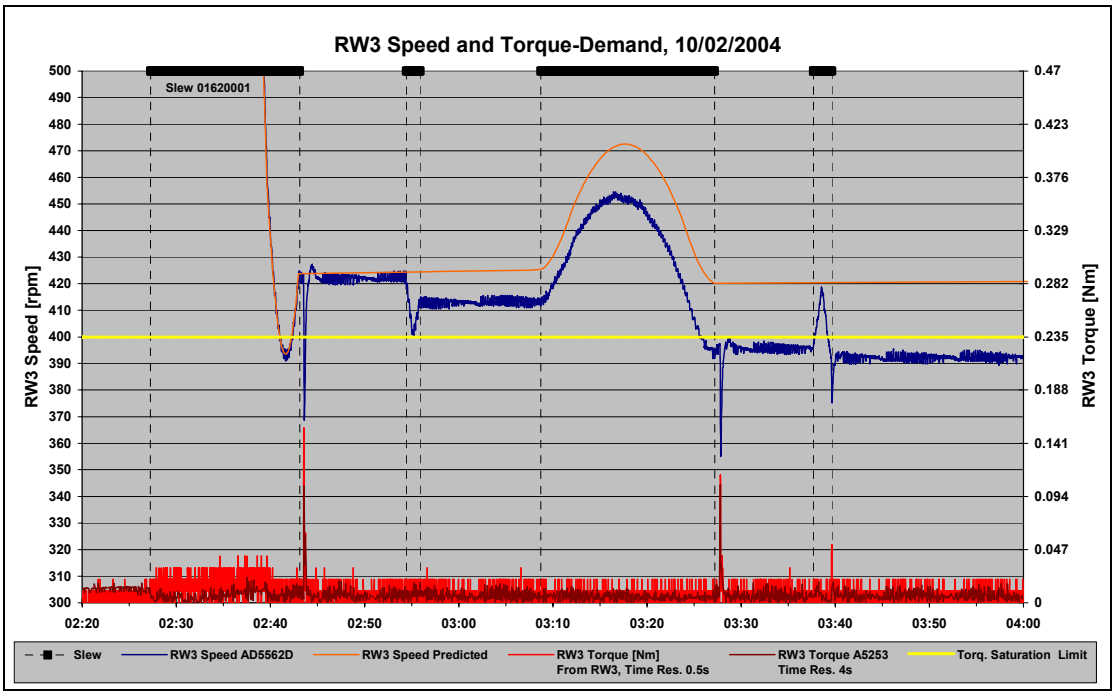
Nothing to report.

10/02/04 (Day of Year 041, Revolution 162)

Out-of-Limit warning on the speed of RW3 after enabling of the SSL: At 03:27:44, when the Sun Steering Law was enabled after Open Loop Slew 01620003, the speed of RW3 exceeded the ODB lower warning limit.

As can be seen in the following plot, the speed of RW3 exceeded the lower soft limit of 370 rpm after engagement of the SSL at the end of slews 1 and 3 (the alpha error - difference between the SSL assumed alpha and the FSS reading - was about 110 arc-seconds after slew 01620003). Both these slews had amplitudes in the order of 50 degrees. With this amplitude, the FDS assigns a margin (with respect to the AMD threshold) of 200 rpm plus a headroom of 0 rpm in the planning of the wheel speed profile. The ~45 rpm kicks in the speed of RW3 after enabling of the SSL, although caused violations of the DB limits, were still well within the defined margin. The lower non-eclipse AMD threshold for RW3 is 216 rpm. Also looking into the torque demands, both from telemetry (4 sec time resolution) and calculated from the super-commuted wheel speed (0.5 sec time resolution), it can be seen that the torque demand did not get anywhere close to the saturation level of 0.235 Nm.

The ~10 rpm discrepancy between the actual wheel speed and the predicted one was introduced after the corrective open loop slew 01620002 (0.13 deg amplitude) and further increased after the corrective open loop slew 4. These corrective slews are not accounted for in the predicted wheel-speed profile.



Loss of Guide Star: At 13:23:19, the magnitude 8.5 Guide Star was lost. This dim Guide Star was picked by the ACC after Open Loop Slew 01620017 and at the time its loss, was located at CCD [7391, 9313]. A mapping was commanded by the ACC and a new Guide Star was found: [3183, -104], 8.2 Mi. The OTF remained low during the rest of PID 01620017.

11/02/04 (Day of Year 042, Revolution 162)

Nothing to report.

12/02/04 (Day of Year 043, Revolution 162-163)

Nothing to report.

13/02/04 (Day of Year 044, Revolution 163)

Release of Guide Star during the perigee passage, caused by False Events: At 00:48:47, during the perigee passage, the Guide Star was released when the number of detected False Events on the STR exceeded the SEU Filter Threshold of the ACC. At LOS the 6.3 Mi Guide Star was at CCD [-1761, 11874]. At AOS the new 7.55 Mi Guide Star was at CCD location [4759, 6238].

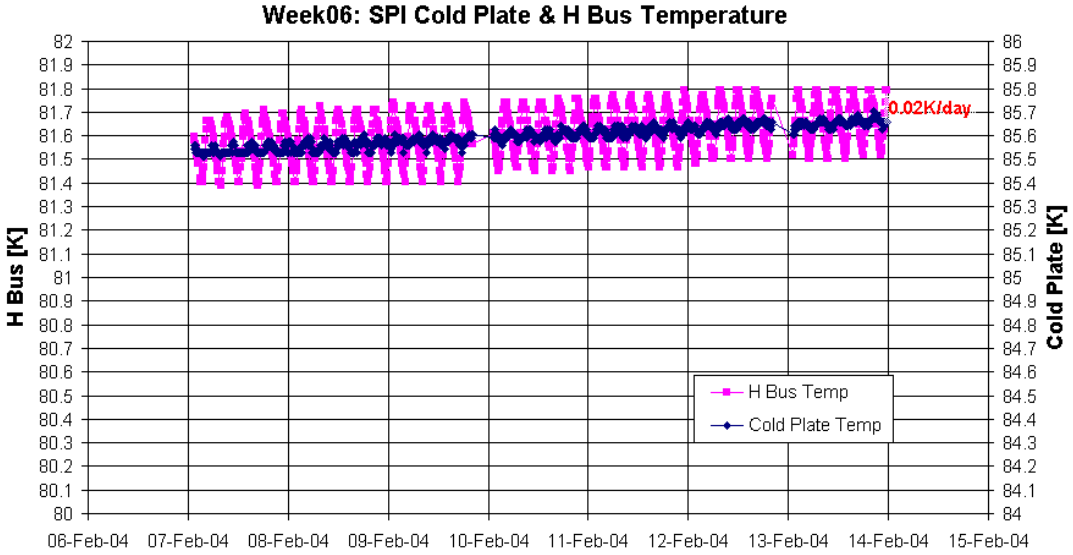
Roll error at the end of corrective Open Loop Slew: At the end of corrective Open Loop Slew 01630002, with 0.7 degrees amplitude, the error in roll with respect to the

SSL assumed roll angle was –204 arc-seconds. The error caused flickering of the OTF. However, this was not during the science observation window:

- At the end of Open Loop Slew 01630001, with 160° amplitude, the error in roll with respect to the SSL assumed roll angle was +169 arc-seconds. Errors of this order of magnitude are currently inherent to almost all large Open Loop Slews of INTEGRAL. These errors, however, do not cause the jittering of the OTF because after large slews the SSL is enabled via a ground command.
- The SSL was enabled during the mapping that was used by the FDS to determine the attitude after slew 01630001 and to update the parameters of slew 01630002. The jitters caused by the enabling of the SSL resulted in an erroneous assumption of the roll angle at the slew end. A roll error of –452 arc-seconds is reported in the attitude reconstruction log file 0163_0002.attd_log.
- This error was in turn introduced into corrective Open Loop Slew 01630002 and resulted in a roll error of –204 arc-seconds at the end of the slew.

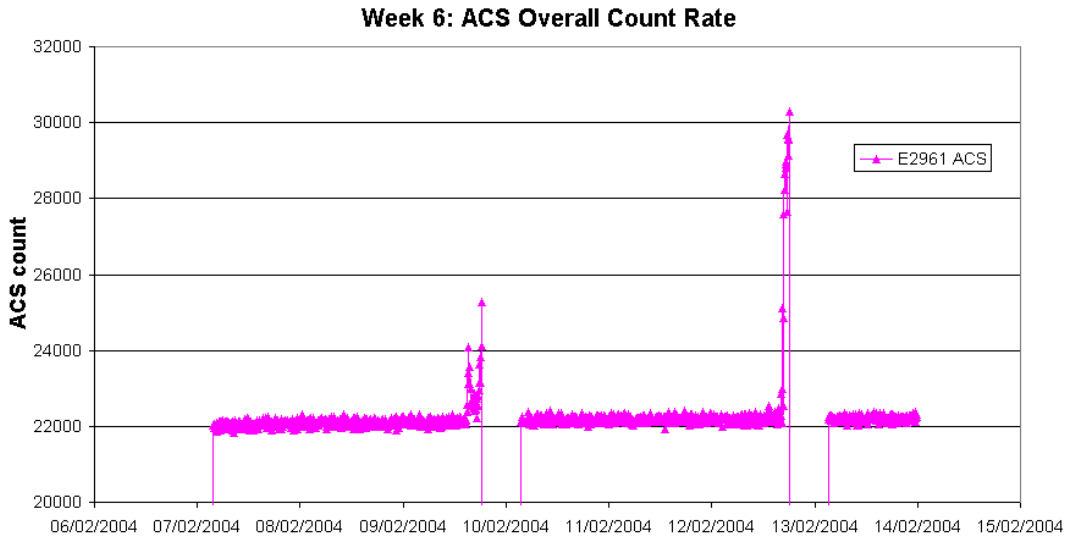
8.3.2 SPI Operations

Cryocooler / Cold-plate:
The temperature is leveled at around 85.6K with a positive drift of 0.02K/day, within the expected range. The performance of the four compressors is nominal.



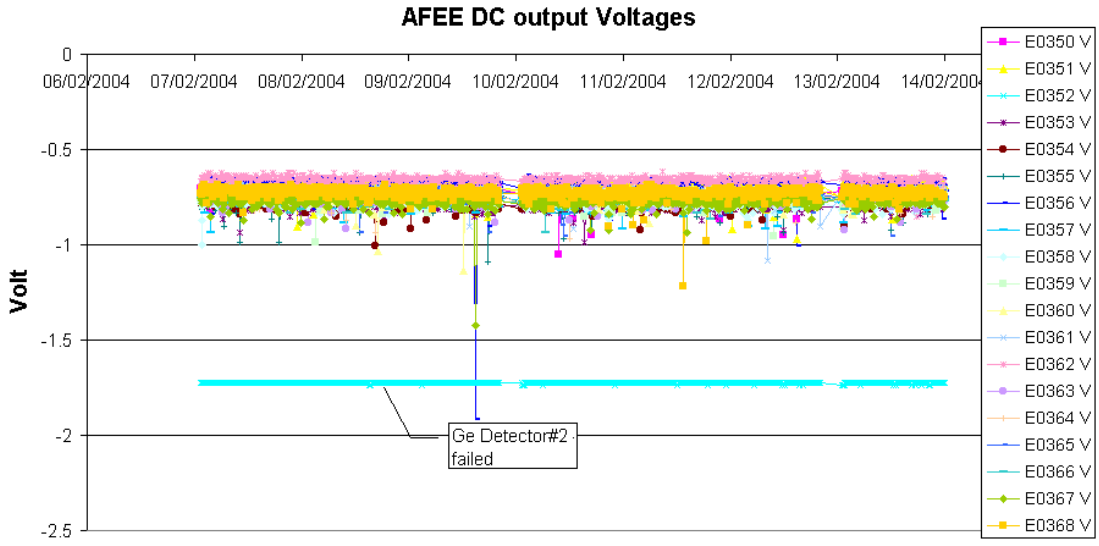
IASW/DPE:
Nothing to report.

ACS:
The next figure is the plot of the ACS overall count rate during the reporting period. The performance of the subassembly is nominal.



AFEE:

The following plot shows the DC output voltage, measuring the dc offset of the detector signal, providing a measure of the health status of both the Ge detectors and the High Voltage section. The detector #2 is failed since 06.12.2003 (see anomaly report INT_SC-72).

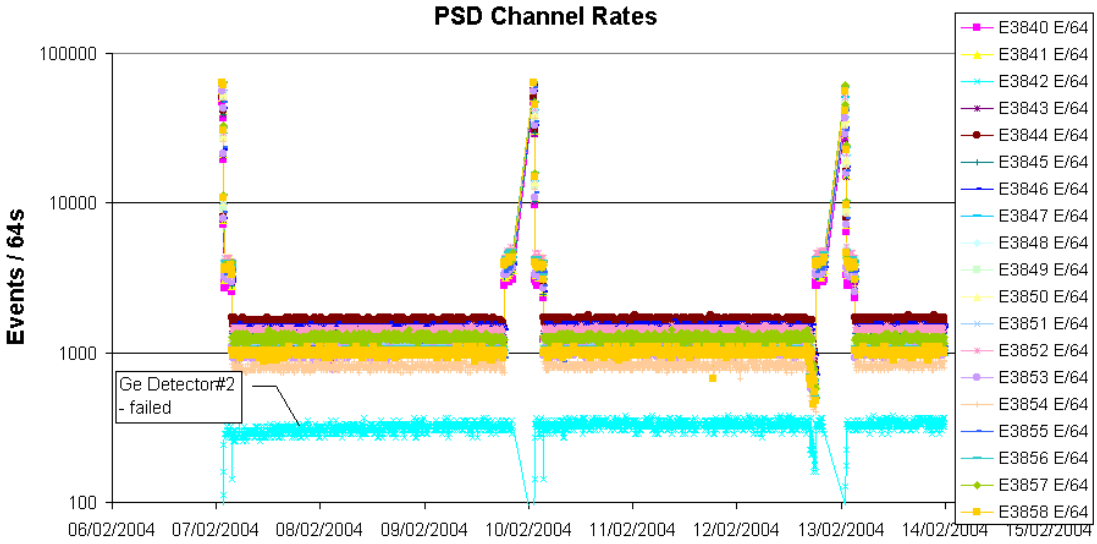


DFEE:

Nothing to report.

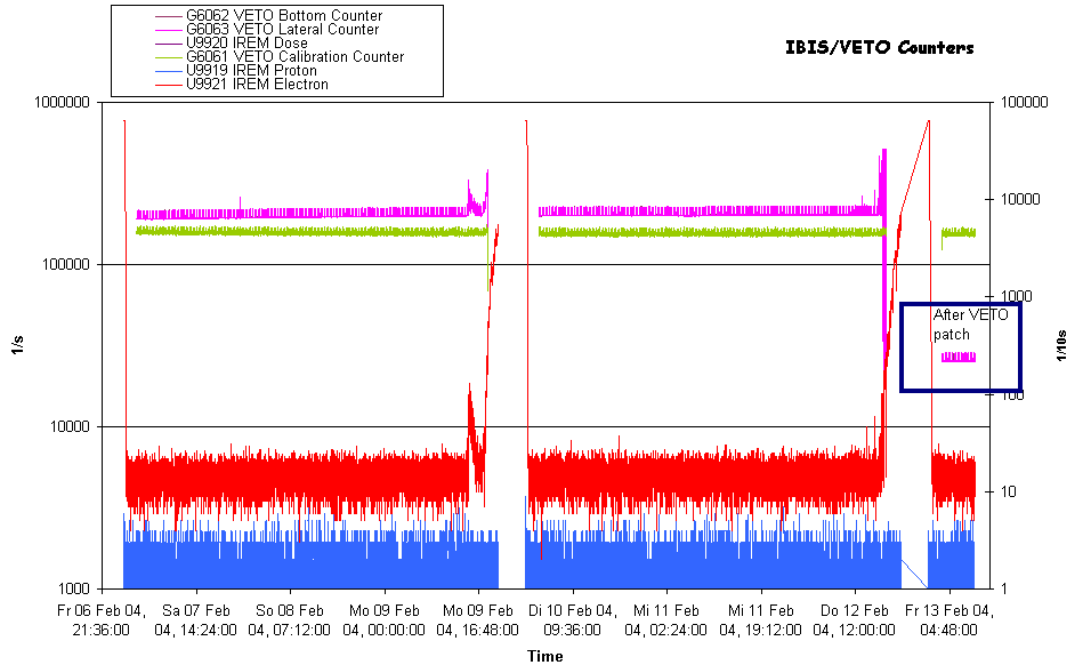
PSD:

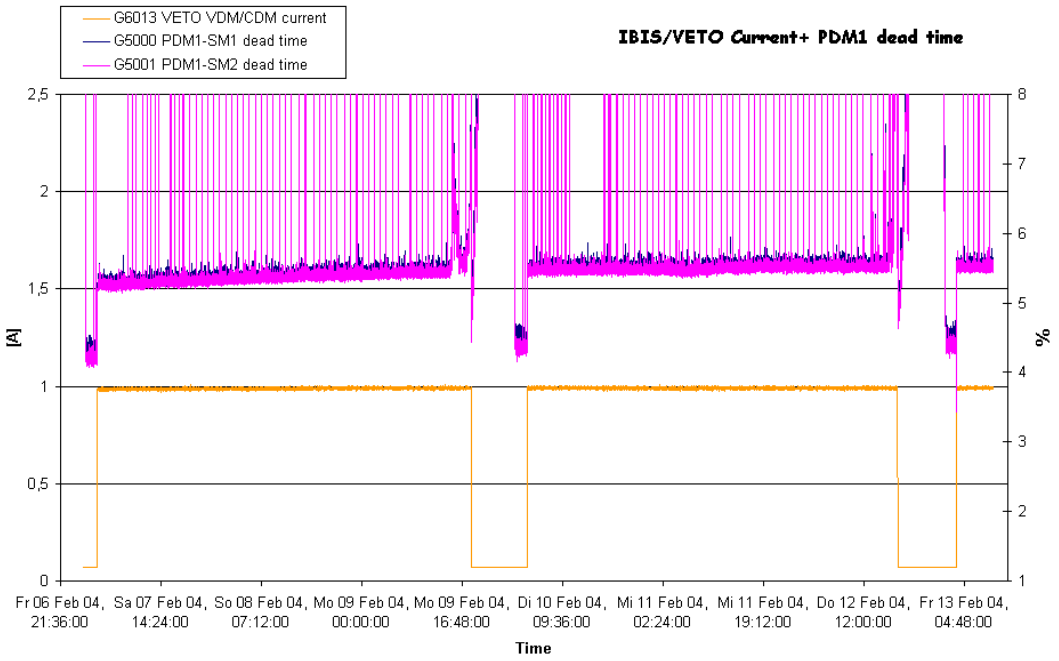
The following plot shows the Ge Detector count rates measured by the PSD channels. The rate of GeD#2 is due to the noise in the measuring channel.



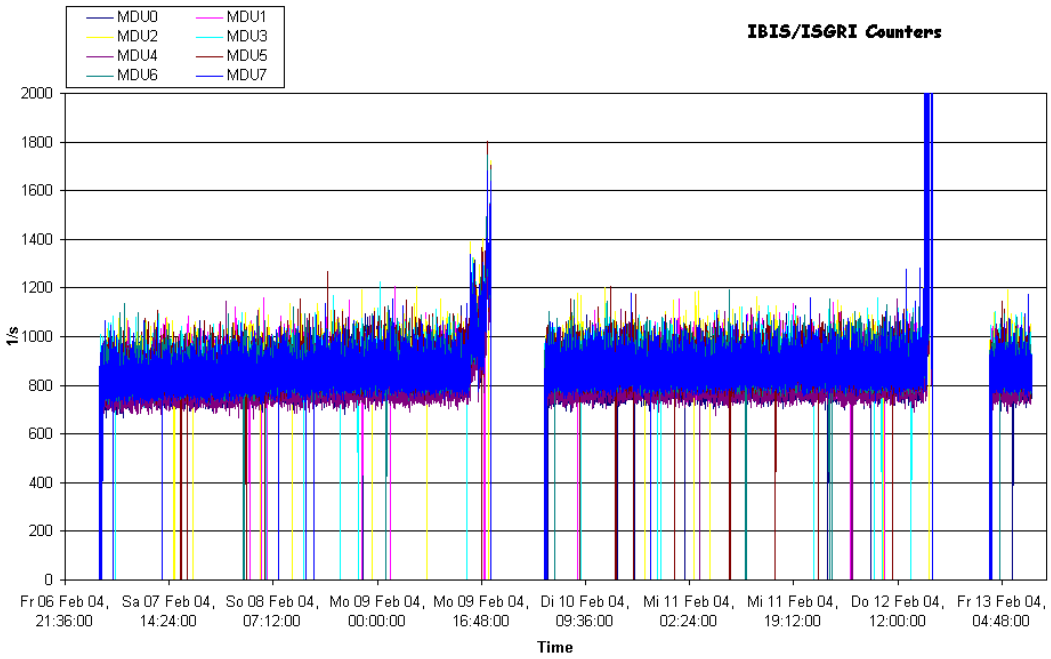
8.3.3 IBIS Operations

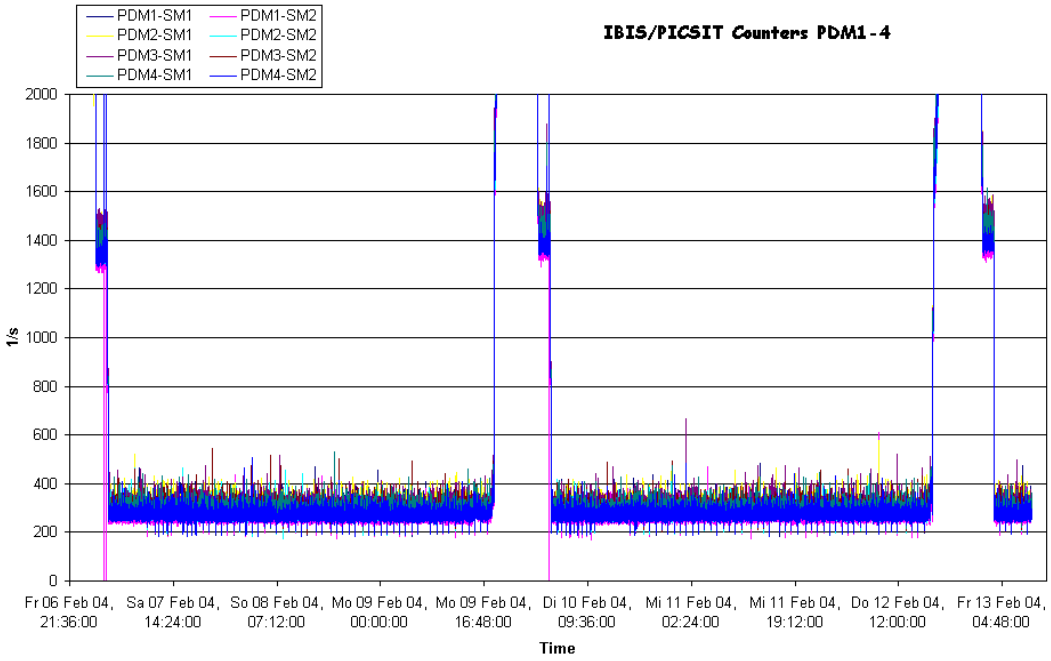
Plots of the VETO VDM/CDM current, the VETO bottom and lateral counters and the PICsIT PDM#1 SM1-2 dead times are shown below. The reduction in the nominal values of the VETO Bottom and Lateral count rates due to the final implementation of the VETO S/W patch on days 12-13 Feb can be clearly seen.

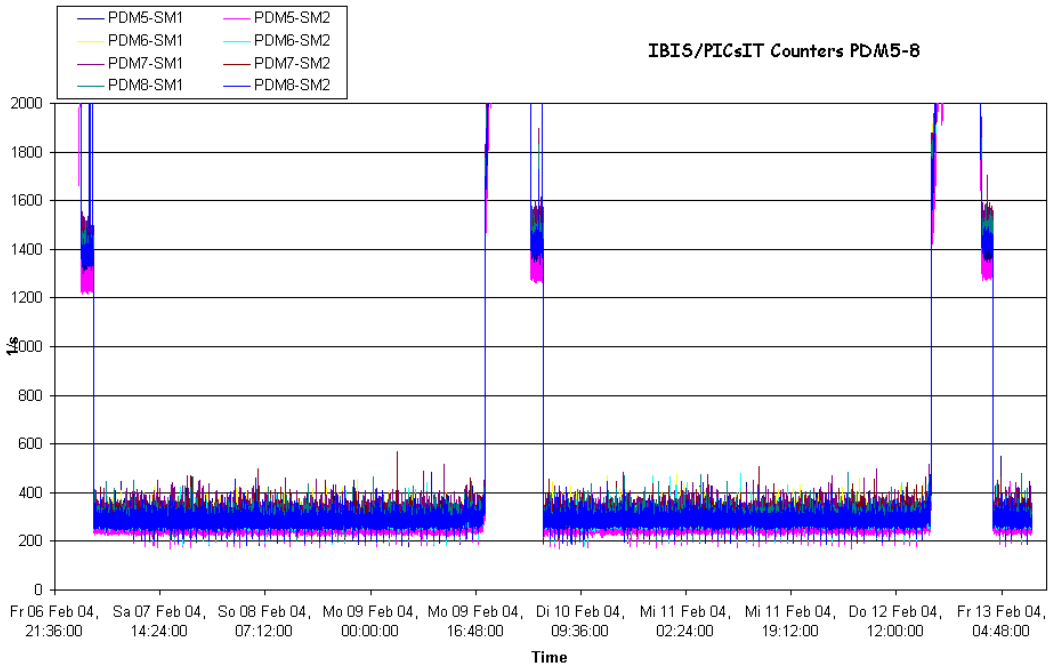




Plots of ISGRI and PICsIT counters, during the observation period are shown below.







DOY 2004.038 (07/02/04) rev 161

Nothing to report.

DOY 2004.039 (08/02/04) rev 161

Nothing to report.

DOY 2004.040 (09/02/04) rev 161

At 15:02Z the parameters G6062-63 reported OOL SOFT High. The parameters went in/out limits from 15:02Z until 18:21Z due to a fluctuation of the Radiation Belts Entry. No further action was taken.

DOY 2004.041 (10/02/04) rev 162

Nothing to report.

DOY 2004.042 (11/02/04) rev 162

Nothing to report.

DOY 2004.043 (12/02/04) rev 162

At 16:07Z the parameters G6062-63 and G8080 reported OOL SOFT High. The parameters went in/out limits from 15:02 until 17:29Z due to a fluctuation of the Radiation Belts Entry. No further action was taken.

At 18:24Z the patch of the VETO S/W version 3.2 (VETO counters rescaling factors), INT-OR-131 was performed.
The parameters G6062 and G6063 corresponding to VETO BOTTOM and LATERAL counters were subject to a recycling effect when the count rate was greater than 65535. The Lateral and Bottom counters of VETO come in HK1 packets in 16 bits format. They have no calibration curve as inside the VEB they are accumulated for 8 seconds in 24 bit counters and then divided by 8 to give values that are directly in counts/sec. Only the last significant 16 bits are passed to the DPE to be sent to ground inside the HK1 packets.
Even if the typical count rate was in the range 20K to 30K counts/sec, it was easy to go in the past beyond 65535 in proximity of the Radiation Belts or during solar flares. Under these conditions it was impossible to set a realistic alarm limit under potentially dangerous background environment. To correct this misleading behaviour the counters were divided by 64, so that the counters could reach more than 500K counts/sec without recycle.
New calibration curve have been defined in the ODB for the parameters G6062 (VETO Bottom counter) and G6063 (VETO Lateral counter) and the definition of the SOFT and HARD limits have been updated accordingly to take into account the new dynamics of the counters.
The VETO unit was reactivated on DoY 2004.044 at 03:23Z showing values of the counters in agreement with the average values observed since the beginning of the year.

DOY 2004.043 (12/02/04) rev 163

There were a few reports during the Belt passage 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.

8.3.4 JEM-X Operations

2004-02-07 (DOY 038, Rev 160-161)

At 15:18Z, about 12 hours after radiation belts exit of revolution 161, the parameter L5119 SOFTWARE TRIGGER went out of limits (value = 24516) and then reached its safe threshold (value = 25000), causing the autonomous transition of JEM-X2 to Safe mode. At this time, the OEM189 JEM-X2 PROB DFEE 9 was received, as the parameter L5462 DFEE STATE IASW was reporting state Setup.

Timeline commanding to JEM-X2 was disabled at 16:07Z and at 16:11Z the procedure FCP_JEM2_0041 was executed to bring JEM-X2 up to Setup mode. At this time OEM 254 ERROR OFF was received, as the parameters L5022 DFEE STATUS and L5462 DFEE STATE IASW were now both reporting the same state.

At 16:16Z the procedure FCP_JEM2_1010 (JEM-X2 Configuration Setting for Science Ops) was executed and at 16:45Z JEM-X2 was commanded back to Data Taking mode by the procedure FCP_JEM2_0044, with the observation parameters as planned in the Timeline for this observation.

At 16:46Z commanding to JEM-X2 by the automatic Timeline was re-enabled and JEM-X2 operations continued nominally.

2004-02-08 (DOY 039, Rev 161)

Nothing to report

2004-02-09 (DOY 040, Rev 161)

At 14:59Z the following radiation monitoring parameters from IREM went Out of Limits:

K5317 RAD MONITOR 3 (Electron Counter), value = 101
L5317 RAD MONITOR 3 (Electron Counter), value = 101,

causing a JEM-X2 transition to Safe mode autonomously (issuing OEM 231 JEM-X2 AUTO EVENT 1).

Timeline commanding to JEM-X2 was disabled at 15:29Z.

At 16:08Z JEM-X2 performed an autonomous recovery to Setup mode (issuing 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.

As this was less than 1 hour before JEM-X2 was due to be commanded into Safe mode from the Timeline (at 16:59:57Z), no attempt at recovering the unit was made. At 16:54Z commanding to JEM-X2 from the autostack was enabled to allow the ED LESAFE01 to be executed from the Timeline to put JEM-X2 into Safe mode before radiation belts entry.

2004-02-10 (DOY 041, Rev 161-162)

Nothing to report

2004-02-11 (DOY 042, Rev 162)

Nothing to report

2004-02-12 (DOY 043, Rev 162)

At 14:35Z the following radiation monitoring parameters from IREM went Out of Limits:

K5317 RAD MONITOR 3 (Electron Counter), value = 64
L5317 RAD MONITOR 3 (Electron Counter), value = 64,

but returned within limits by the following TM cycle.

At 16:15Z the above parameters went out of limits again (value = 71). In this instance, the parameters remained out of limits for two TM cycles, causing JEM-X2 to transition to Safe mode autonomously at this time (issuing OEM 231 JEM-X2 AUTO EVENT 1). This was approximately 30 minutes before JEM-X2 was due to be commanded to Safe mode by the Timeline before radiation belt entry.

At 16:28Z JEM-X2 performed an autonomous recovery to Setup mode (issuing 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.

However, at 16:40Z the parameters K5317 and L5317 went out of limits again (value = 90) and JEM-X2 returned to Safe mode (issuing OEM 231 JEM-X2 AUTO EVENT 1). Commanding to JEM-X2 from the automatic Timeline had not been disabled, allowing the ED LESAFE01 to be executed from the Timeline at 16:48:33Z, such that JEM-X2 would remain in Safe mode as planned for the remainder of the revolution. At this time another OEM 231 JEM-X2 AUTO EVENT 1 was received.

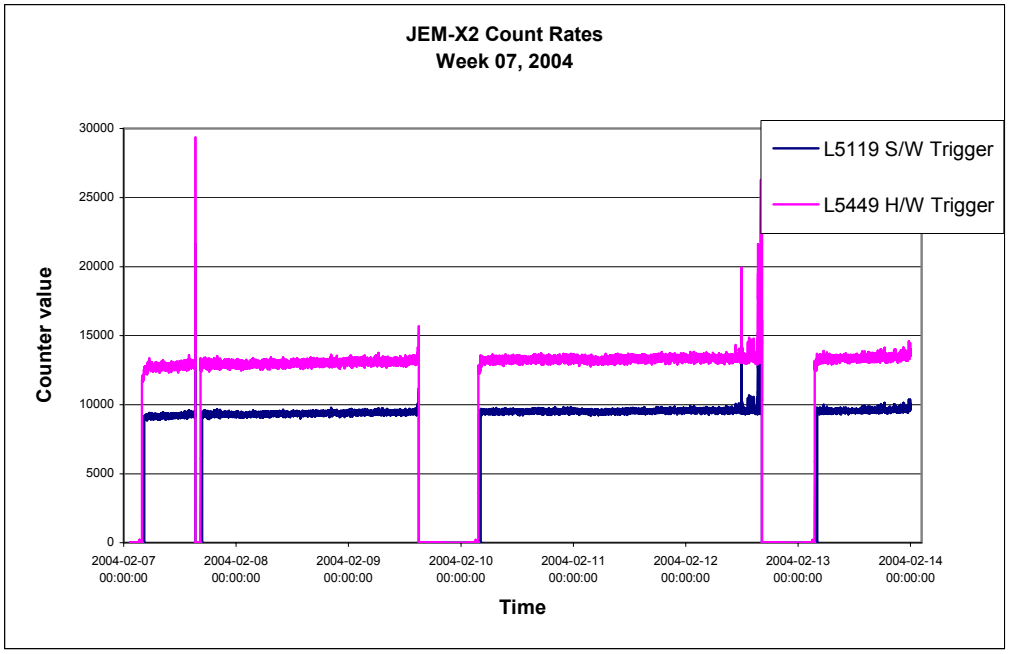
2004-02-13 (DOY 044, Rev 162-163)

Nothing to report

8.3.4.1 JEM-X2 Count Rates

JEM-X2 count rates over the reporting period are displayed in the following graph[1].

[1] Data sampled to smooth spikes in S/W Trigger due to flushing of buffer during slews.



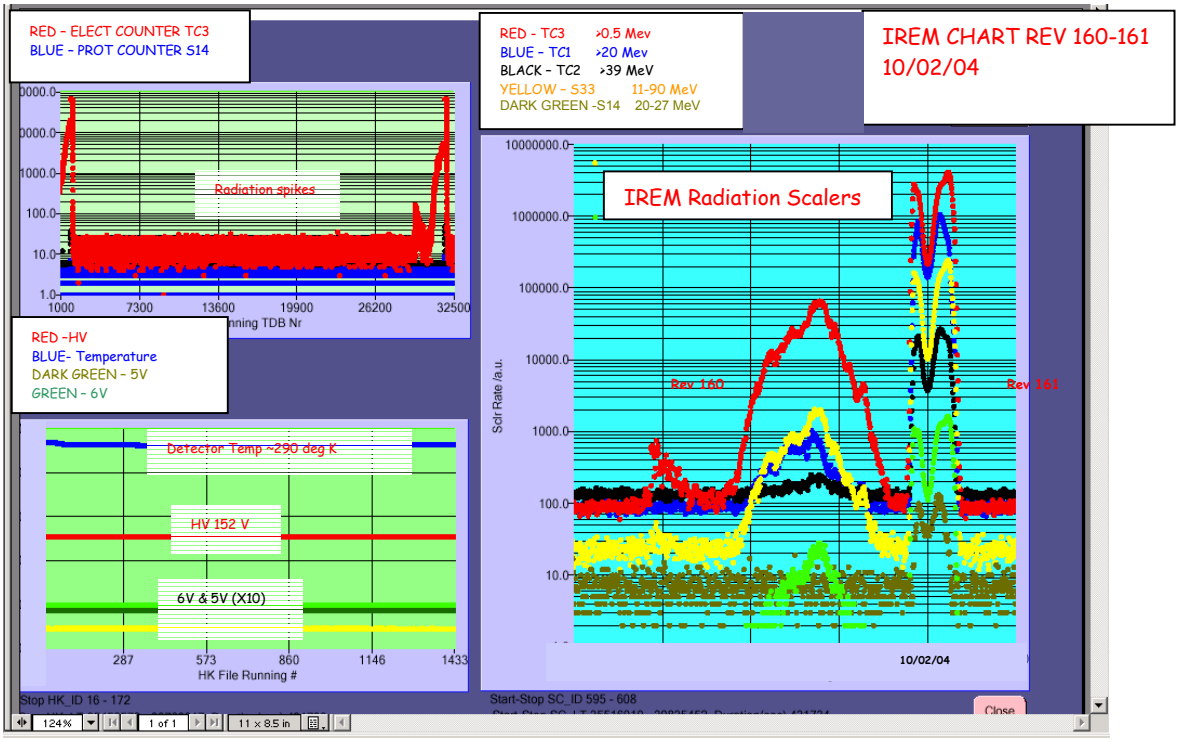
8.3.5 OMC Operations

On DoY 034 at 14:12, the DSS-16 stations had problems causing the pass to be interrupted. It was not recovered until 01:44 the following day, the impact was pointings 01590092 to 01590098 were lost.

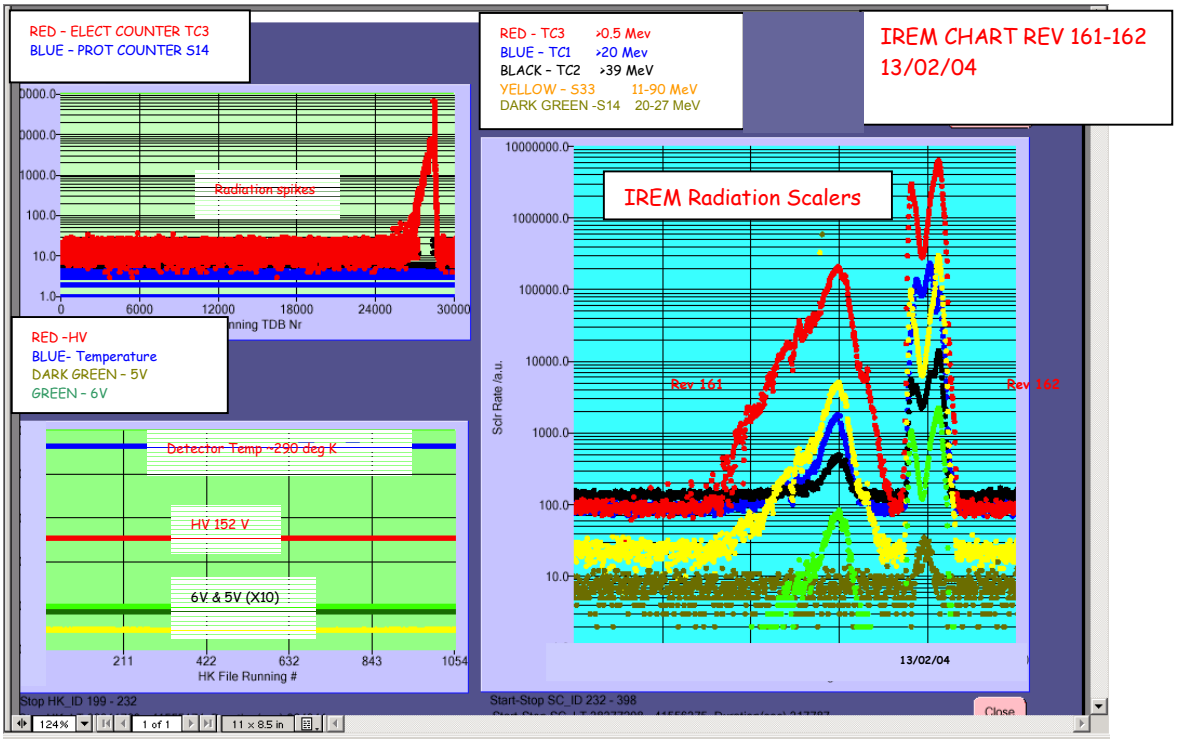
On DoY 040, at 18:21:38, and again on DoY 043, at 18:10:13, OMC was switched by the Timeline to SAFE mode, at the nominal time.

8.3.6 IREM Operations

Plots of the evolution of the IREM counters from rev 160-161 are shown below:



and rev 161-162



and the corresponding predictions for the Belts passages (as calculated with AP8Max and AE8Max models by using the RADMON tool).

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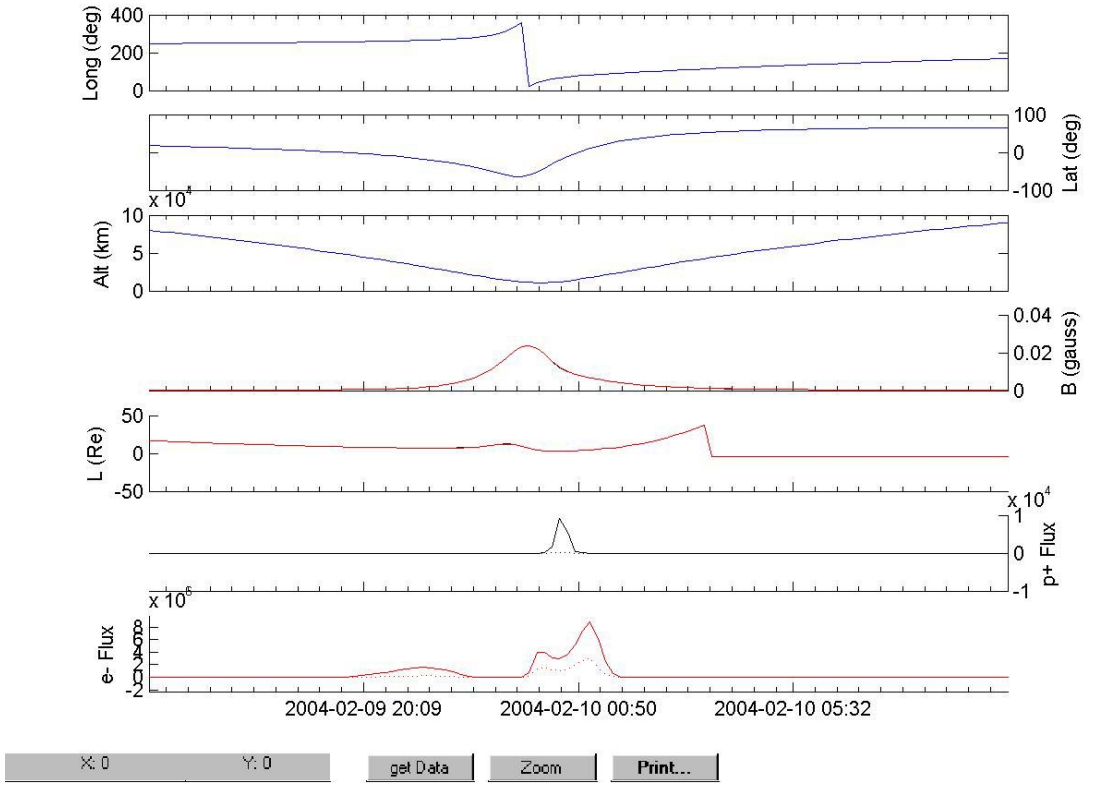
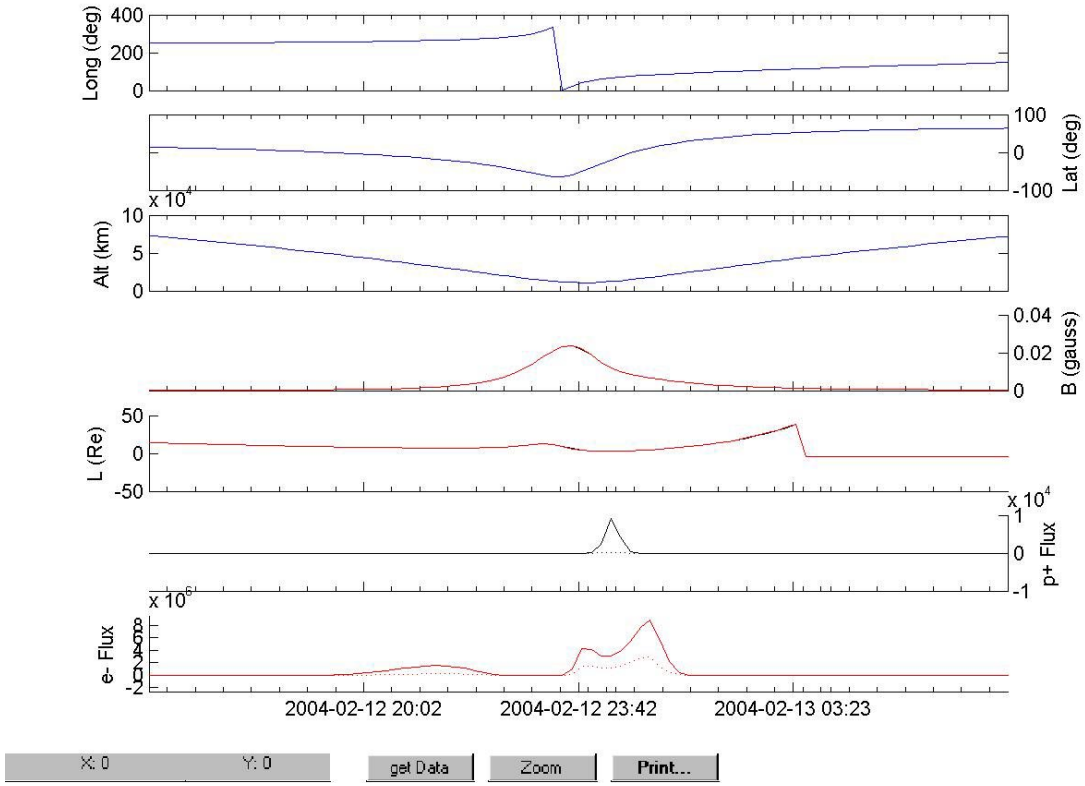

Long (deg)
400
200
0
100
0
-100
Lat (deg)
x 10^4
Alt (km)
10
5
0
0.04
0.02
0
B (gauss)
L (Re)
50
0
-50
x 10^4
1
0
-1
p+ Flux
x 10^5
e- Flux
2004-02-09 20:09
2004-02-10 00:50
2004-02-10 05:32
X: 0
Y: 0
get Data
Zoom
Print...

rev 162


Long (deg)
400
200
0
100
0
-100
Lat (deg)
x 10^4
Alt (km)
10
5
0
0.04
0.02
0
B (gauss)
L (Re)
50
0
-50
x 10^4
1
0
-1
p+ Flux
x 10^6
e- Flux
8
6
4
2
0
-2
2004-02-12 20:02
2004-02-12 23:42
2004-02-13 03:23
X: 0
Y: 0
get Data
Zoom
Print...