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

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-TOS-OF
No. 078
Week 12
22.03.04
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 13.03.04 until 19.03.04 (both dates inclusive) and covers the revolutions 173 & 174.

2 Summary of Activities

The operations were performed according to the planning inputs from ISOC combined with some manual commanding by MOC.

The target of these revolutions was the Galactic Centre. The activities consisted of GCDE and raster dithering 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.

Several slews were missed because of different reasons, including:

- Short drops in TM link.
- Commands failing uplink because the CLCW was not reset after restart of the TMPs.
- Late delivery of the slew update TPF to the IMCS.
- Drop of the DSS-16 (Goldstone) coverage near the end of revolution 174.

There were a few cases of Pitch and Yaw error, caused by undetected False Events on the STR while tracking dim guide stars.

The fuel consumption over the period between 12/03/2004 and 19/03/2004 was 0.090 kg. The remaining propellant is in the order of 171.765 Kg on the 19th 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.

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 during the observation period was 134 pkts/cycle.

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

Since DoY 2004.64 the unit is working with the updated PICsIT binning table (HEPI table).

There were many occurrences of the count-rate of the calibration Unit #1 in Hard low limit (in/out limit for few TM cycles). This is probably due to the decaying of the on-board radioactive (0.4 mCi of Na²², half life=2.58 years) calibration source.

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 from the Automatic Timeline.

During the reporting period JEM-X1 was active with 8 TM packets/cycle and JEM-X2 was dormant with only 1 TM packet/cycle, except for the time during which the JEM-X2 DFEE was being patched.

Two JEM-X1 change requests were implemented to increase the accepted range of anode signals and to update the on-board safety limit for dV high voltage level. Also, the DFEE S/W of JEM-X2 was updated to version 5.3.

Near the end of revolution 172, JEM-X1 made an automatic transition to SAFE Mode due to a high level of the S/W Trigger Rate. This was short before the planned SAFE TC in the Timeline.

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 182 OMC pointings executed nominally, 2 partially lost 13 totally lost.

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

3.2.5 IREM

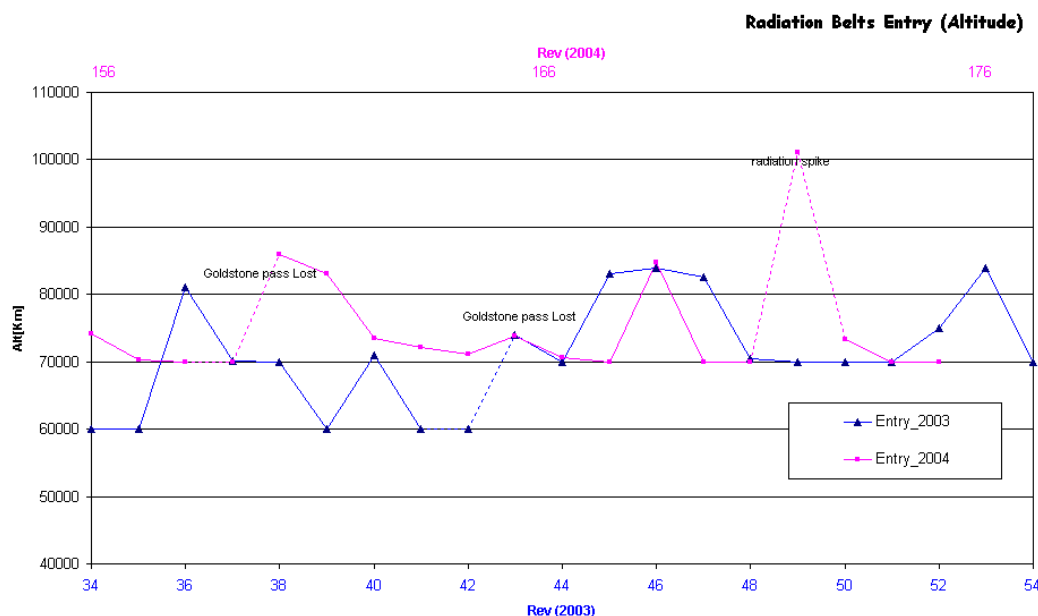
The overall status of the unit is Nominal.

The observation period was characterized by low solar activity with a few occurrences of single electron (<0.5 MeV) spikes that in one cases

- 2004.073.14.26Z (rev 172)

triggered the transition of JEM-X to Safe Mode, and the IBIS/ISGRI and VETO counters out of limits.

A comparison between the Radiation Belt Entries in 2003 and 2004, along the same observation period winter->spring is shown below:



The Radiation Belts Entry is determined by the electron cut-off threshold (see definition below) based on JEM-X on-board radiation automatism.

The reported Electron Belts Entry/Exit for revs 162-->173, as defined by a cut-off flux of 3.76×10^2 e/cm²/sec ($E > 0.5$ MeV) and the predicted Proton Belts Entry/Exit, as defined by a cut-off flux of 1.25×10^3 p/cm²/sec ($E > 8$ MeV) are shown below:

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Electron CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
172	RAD_ENTR R 2004-03-13T16:14	Sat 13 Mar 04, 14:43:54	13-Mar-2004 16:54	54667
173	RAD_EXIT R 2004-03-14T01:15	Sat 13 Mar 04, 23:27:06	13-Mar-2004 23:54	26517
173	RAD_ENTR R 2004-03-16T16:01	Tue 16 Mar 04, 16:11:22	16-Mar-2004 16:37	55165
174	RAD_EXIT R 2004-03-17T01:02	Tue 16 Mar 04, 23:20:50	16-Mar-2004 23:37	25984

174	RAD_ENTR R 2004-03-19T15:51	Fri 19 Mar 04, 17:09:06	19-Mar-2004 16:27	55001
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Reference

Small error vs reference

Large error vs reference

Radiation Spike

Proton Belts

REV	S/C BCPKT (proton)	Proton CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
172	PROTON_RAD_ENTR	13-Mar-2004 22:14	11461
172	PROTON_RAD_EXIT	13-Mar-2004 22:44	14846
173	PROTON_RAD_ENTR	16-Mar-2004 21:57	11134
173	PROTON_RAD_EXIT	16-Mar-2004 22:27	14332
174	PROTON_RAD_ENTR	19-Mar-2004 21:47	11166
174	PROTON_RAD_EXIT	19-Mar-2004 22:17	14505

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

4 Ground Facilities

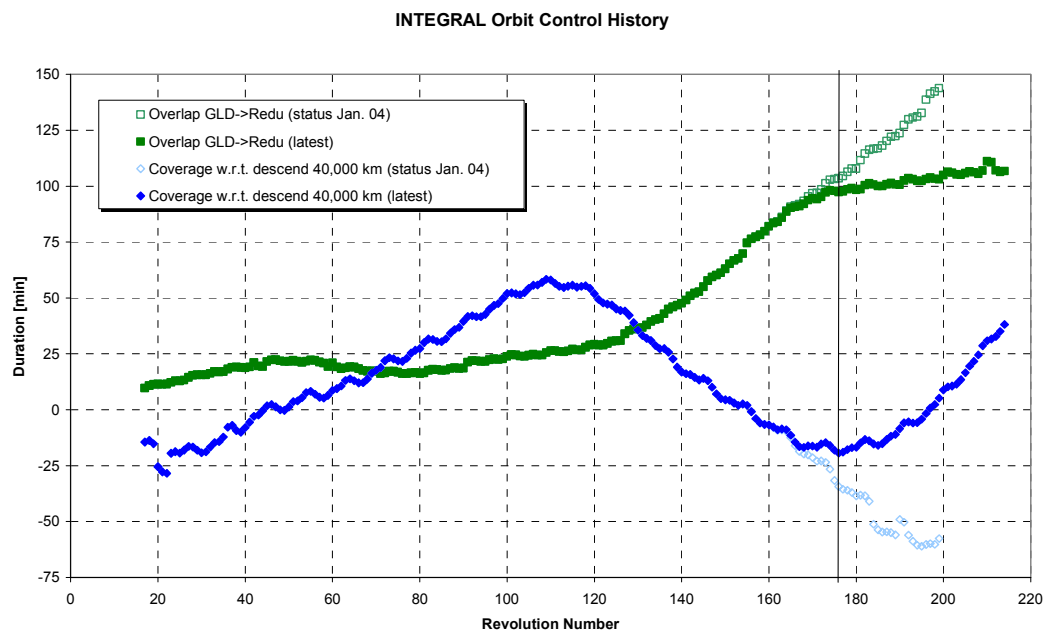
The performance of the Operational Ground Segment was marginal with respect to the system requirements. The Operational ground facilities were impacted during the reporting period by a seven-hour loss of VC7 TM from Redu, and by station handover problems.

4.1 Mission Operations Centre

The performance of the MOC was in general good in the reporting period.

The new release (9.1) of the IMCS is working properly.

The modified strategy of the orbit control is working as envisaged, which is shown in the following diagram.



4.2 Ground Stations & Network

There were occasional instances this week of RFI, and Reed-Solomon errors, but the main problems were the loss of scientific data at Redu, and handover difficulties between Redu and Goldstone.

A test pass using Perth was performed successfully. However, there was a significant time delay between command transmission, and verification by the IMCS, which could impact the execution of some specific command sequences. Investigations are on-going.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's: Received up to rev. 185

POS and POD generated: up to rev 182

TSF's: Received up to rev 179

Revolutions 175 and 176 were replanned to accommodate an accepted TOO request. Revolution 179 was planned and replanned several times internally in ISOC to accommodate an OMC flat field calibration in parallel to JEM-X 2 switch on for a short period. To accommodate this the POS / ICP had to be manually edited and some OCR requesting manual actions in MOC had to be raised. This is a far too complicated operation that will have to be simplified for the next JEM-X 2 switch on. Two TOO requests were rejected and one is accepted.

2. Observation status

ECS for revolutions 155 and 157 just received. No OCS's sent yet.

3. ISOC science archive

A new data tape was received from ISDC. This contains data up to revolution 138. The use of FTP to obtain data products faster is waiting for implementation on ISDC side.

4. ISOC system

The ISOC system version 10.3 has been introduced in operations this week. This system includes a couple of major enhancements, e.g. GCDE bookkeeping capability and suppression of blocking of an observation due to SPIBIS effects. A couple of problems detected could be quickly removed.

5. Problems

None

4.3.2 ISDC

On 22/03/2004, the status of ISDC observation processing is:

- Latest Standard Analysis completed: observation 01100090006 (Vela region, Revolutions 137-141) on 15/03/2004
- Latest products archived: observation 01200230006 (3C 273, Revolution 148-149) on 12/03/2004
- Latest observation products sent to the observer: observation 01200230006 (3C 273, Revolution 148-149) on 17/03/2004

5 Special Events

The main event was the overflow of the TMP file at the Redu station, which caused an interruption of the recording of science data. Since this implication was not identified quickly approximately 7.5 hours of science data were lost.

6 Anomalies

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

- On DoY 073, at 11:14, there was a late station handover to DSS-24 due to the 520 kW transmitter 'tripping' off, the corresponding DR# is G104154, there was no impact.
- On DoY 073, the TC link to DSS-24 was lost, it was recovered at 12:05, without loss.
- On DoY 074, at 01:25, the TM and TC from Redu dropped, at 01:28, the timeline was stopped, the impact was slews 01730002 and 01730003 were lost.

- On DoY 074, at 19:20, the bad frame counter reached 138, and by 19:29 it had climbed to 152. At 22:22, the TMPs at Redu were stopped and started, and the counter reset back to zero.
- On DoY 074, at 23:10, due to a commanding problem caused when the CLCW was not reset when the TMPs were swapped, a pointing was missed. The broadcast packet was also skipped, and the Timeline was recovered before next pointing. The effect was that pointing 01730032 was extended, 01730033 missed, and 01730034 executed nominally.
- On DoY 075 at 08:38, bad frames were received from Redu, and at 09:05, there were more data gaps on the VC0 TM link from Redu.
- On DoY 075, at 10:24, there was a brief TM drop due to a test connecting 2 VC7 links, one on each NCTRS.
- Later, at 13:24, there was a late handover from Redu to DSS-24, the corresponding DR# is G104172.
- On DoY 076, at 01:19, the VC7 TM dropped, this was not noticed until 01:54, as no alarm was raised, the link was stopped and started, without success, this was repeated at 02:00, the status remains 'DROP', but confirmation of reception of VC7 frames was noted. At 02:03, an attempt was made to use TMP2, at 02:07 GFCC attempted to use NCTRS-B from TMP1, both of which also failed. At 03:51, GFCC attempted to recycle VC7 link again. Finally at 08:40, the VC7 links were restored when the TMPs were restarted. The cause of the problem was determined to be that the TMPs were not restarted during the previous Goldstone pass, the impact was no VC7 TM was stored from 01:19 to 08:40, meaning pointing 01730057 was truncated, pointings 01730058 to 01730063 were lost, and pointing 01730064 has the first 15 minutes missing.
- Later at 10:50, there was an error sending data to ISDC, at 11:15, according to the procedure CCC restarted IFRD & ISDS, on isdsa, and at 11:18, the TM was flowing again, there was no impact.
- At 12:25, there was a drop in VC0 & VC7 TM from DSS16, a minute later at 12:26, the TC dropped. The TM links were restored at 12:33, and the TC links at 12:36, without impact. The corresponding DR# is G104182.
- At 12:26, the link ISDS – ISDC disconnected.
- At 13:08, insufficient swap space on IMCA was reported. CCC restarted the MMI curing the problem.
- At 14:21, 2 bad frames were received from DSS-16.
- At 16:42, there was a one second drop in VC7 TM.
- At 23:22, there was a single event of an invalid packet checksum, no impact.
- On DoY 077, at 14:28, a drop in TM from Redu caused a slew to be aborted. The impact was the loss of slew 01740026. Slew 01740027 was executed manually on schedule.
- On DoY 078, at 06:54, a short TM drop from Redu, caused an AOCs command to fail PTV, aborting the slew. The impact was the loss of pointing 01740057.
- Later, at 10:54, due to the late arrival of an AOCs TPF, pointings 01740064 and 01740065 were missed.
- At 22:27, there was an error sending data to ISDC, first the IFRD task, then ISDS on isds-a were restarted, then the isds-a was rebooted, then the firewall, without success. At 00:08, the ISDS & IFRD tasks were again restarted, then isds-a was again rebooted, then ISDC were asked to swap to the 'b' machine, finally at 01:00 a swap back to the 'a' machine, restored the link.
- On DoY 079, at 16:20, a TM drop from DSS-16, during slew 01740116, caused the loss of slew 01740117, and the RWB. The corresponding DR# is G104196.

There were no new anomalies entered into the Anomaly Reporting and Tracking System this week.

7 Future Milestones

The implementation of the SPI change request to move some data from the VC 7 to the VC 0 data stream is ongoing. It is foreseen to apply the new scheme operationally from mid April.

The preparation of the 1st battery reconditioning, which is planned from mid April to mid May, is ongoing.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 173

The observations in revolution 173 consisted of a GCDE** (grid 3-4) performed for ~10 hours, followed by a raster dithering observation of the Galactic Center (Galactic Centre Ultra Deep Exposure) at (RA 17:45:40.00; DEC -29:00:28.0), which was performed for the remaining ~51 hours of observation time.

Revolution 174

The observations in revolution 174 consisted of GCDE** (grid 1-5-6) performed for the total observation time.

** The Galactic Centre Deep Exposure consists of deep exposures of the central Galactic radian (+/- 30 deg in longitude, +/- 20 deg in latitude, centred on (l, b) = (0, 0). Individual pointings (30 min exposure each) on a regular pointing grid with 2.4 and 1.2 deg spacing, respectively.

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

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

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.
2004-03-06T10:44:27.000Z	171.9542	F	Automatic TM processing.
2004-03-08T00:20:39.000Z	171.9219	F	Automatic TM processing.
2004-03-10T13:19:18.000Z	171.9008	F	Automatic TM processing.
2004-03-11T00:13:11.000Z	171.8557	F	Automatic TM processing.
2004-03-13T17:26:54.000Z	171.8492	F	Automatic TM processing.

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2004-03-13T23:48:23.000Z	171.8481	F	Automatic TM processing.
2004-03-15T09:38:34.000Z	171.8288	F	Automatic TM processing.
2004-03-16T16:00:37.000Z	171.8088	F	Automatic TM processing.
2004-03-16T23:38:46.000Z	171.7653	F	Automatic TM processing.

This report was generated Fri Mar 19 08:00:14 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, 111 Open Loop Slews, 94 Closed Loop Slews and 6 Momentum Bias were executed. 11 slews were missed or executed manually. This is equivalent to a 5.4%.

13/03/04 (Day of Year 073, Revolution 172-173)

Nothing to report.

14/03/04 (Day of Year 074, Revolution 173)

Slews missed due to drop of TM/TC links (Redu): Both TM and TC links dropped at 01:25, causing the stopping of the Timeline. Slews 01730002 and 01730003 were missed. After re-establishment of the links a manual Open Loop Slew was performed to the attitude of PID 01730004. This attitude was reached before the planned time in the timeline. Slew 01730005 was executed from the Timeline.

Slew Missed due to failure of on-board reception verification (CLCW): At 23:10, an AOCS command from the Close Loop Slew sequence failed CLCW verification and the AOCS commanding from the Timeline was stopped, interrupting execution of slew 01730033. The reason for this CLCW failure was that after a stop and restart of the TMPs the CLCW was not reset. Slew 01730033 was performed manually and the next slew was executed from the Timeline after being manually updated.

15/03/04 (Day of Year 075, Revolution 173)

Flickering of the Pointing-Bit due to Pitch and Yaw errors: After Open Loop Slew 01730048, the ACC picked an 8.4 magnitude Guide Star, located at [1828, 2326]. The catalogue number of this star is 7391-01097-1. At 15:49:24 there was a jump of 58.8 arc-seconds in the Y position of this star, causing the flickering of the Pointing-Bit and the generation of the Pitch Error OEM by the ACC. Also after Open Loop Slew 01730051, the ACC picked an 8.45 magnitude Guide Star, located at [-6699, 1593]. The catalogue number of this star is 7376-00453-1. At 19:49:29 there was a jump of -

130.8'' and -152.6'' in the Y and Z positions of this star, causing the flickering of the Pointing-Bit and the generation of the Pitch and Yaw Error OEMs by the ACC. Probably undetected False Events on the CCD caused the jumps in the location of the Guide Star, in both cases. None of the above events were seen at BCP level.

16/03/04 (Day of Year 076, Revolution 173-174)

Manual Update of the slew parameters: After restart of the TMPs at 08:40, the CLCW was not reset, which caused a command from the mapping sequence fail verification and the AOCS commanding to stop. The mapping was therefore interrupted and the automatic update of parameters of slew 01730065 failed. The TC link was then restarted and a manual mapping was performed, which was used to manually update the slew parameters.

Flickering of the Pointing-Bit due to Pitch and Yaw errors: After Open Loop Slew 01730069, the ACC picked an 8.45 magnitude Guide Star, located at [-18132, -3373]. The catalogue number of this star is 6840-01069-1. At 15:25:49 there was a jump of +140'' and -42'' in the Y and Z positions of this star, causing the flickering of the Pointing-Bit and the generation of the Pitch and Yaw Error OEMs by the ACC. Undetected False Events on the CCD probably caused the jump in the location of the Guide Star. The event was not seen at BCP level.

17/03/04 (Day of Year 077, Revolution 174)

Slew missed due to drop in TM link: A drop in the TM link at 14:28 interrupted the execution of slew 01740026. After re-establishment of the link, a manual slew was performed to the attitude of PID 01740027. The attitude was reached at 14:53:34, before the originally planned time in the Timeline. The next slew was executed from the Timeline.

18/03/04 (Day of Year 078, Revolution 174)

Slew missed due to short drop in Telemetry: A short drop in Telemetry at 06:54 interrupted the execution of slew 01740057. A manual Open Loop Slew was then performed to the attitude of PID 01740058. This attitude was reached at 07:17:55, before the originally planned time in the Timeline.

Slew missed because of late arrival of slew update TPF: The TPF to update the parameters of slew 01740064 arrived at the IMCS later than the execution time of the respective ED. The AOCS commanding from the Timeline was disabled and slew 01740064 was missed. A manual Close Loop Slew was then performed to the attitude of PID 01740065.

The sequence of events, related to the generation and reception of the TPF, were as follows:

- 10:45:56 End of slew 01740063
- 10:45:56 Start of the STR mapping that was used in the attitude determination
- 10:46:48 End of the STR mapping that was used in the attitude determination

- 10:50:17 Start of the attitude determination program (according to the attitude log file)
- 10:52:54 Start of execution of sequence (ED) for slew 01740064
- 10:54:14 Arrival of the slew update TPF (0174-0064) to the control system

Normally the TPF is arrived at the IMCS between 4 and 5 minutes after the end of the mapping. Although the currently used window between two successive slews covers this time, in a few occasions it has happened that the TPF is arrived at the IMCS later than the slew execution time. This problem will be looked into to find out the source of this delay. If necessary, the minimum time between two successive slews should be increased.

19/03/04 (Day of Year 079, Revolution 174-175)

Last slew and RWB of revolution 174 missed due to loss of TM link (Goldstone DSS-16): Because of the drop of the TM link from DSS-16, corrective close loop slew 01740117 and the RWB maneuver were missed. The attitude and wheel speeds were safe for entering the perigee. It was therefore decided not to take any action.

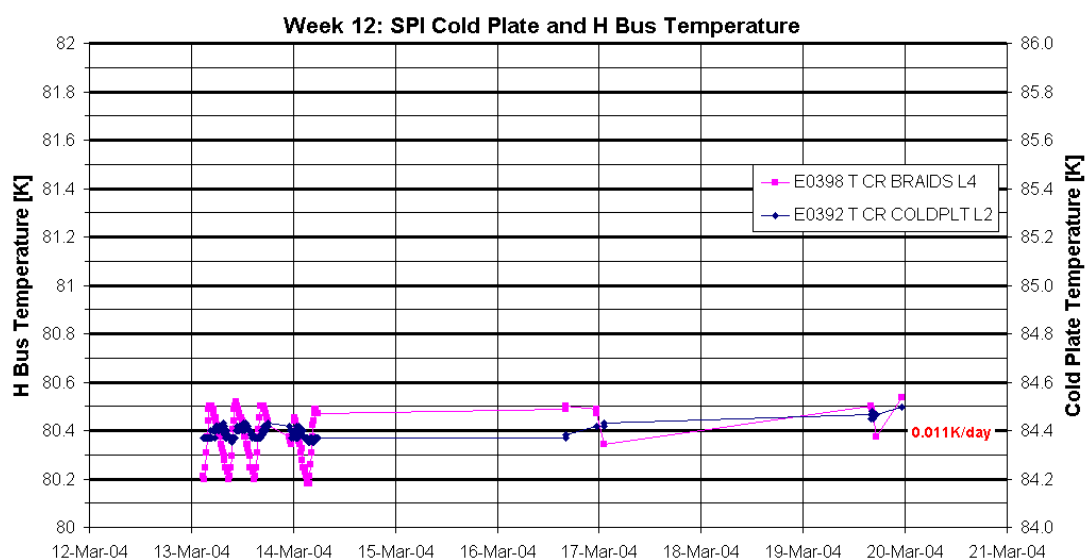
8.3.2 SPI Operations

Cryocooler / Detector Cold-Plate:

The performance of the cryocooler is nominal.

The cold plate temperature is leveled off at around 80.4K with a small positive drift of 0.011K/day, which is within the expected range.

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 CR to change the APID of the 5 science housekeeping packets in order to transmit them through VC0 instead of VC7 has been processed. The EGSE database

import into the Mission Control System database is completed. The new commands and sequences to deal with the change have been created. A first in-flight test is scheduled on 31st March at 15:03z, at critical altitude entry (<60000km).

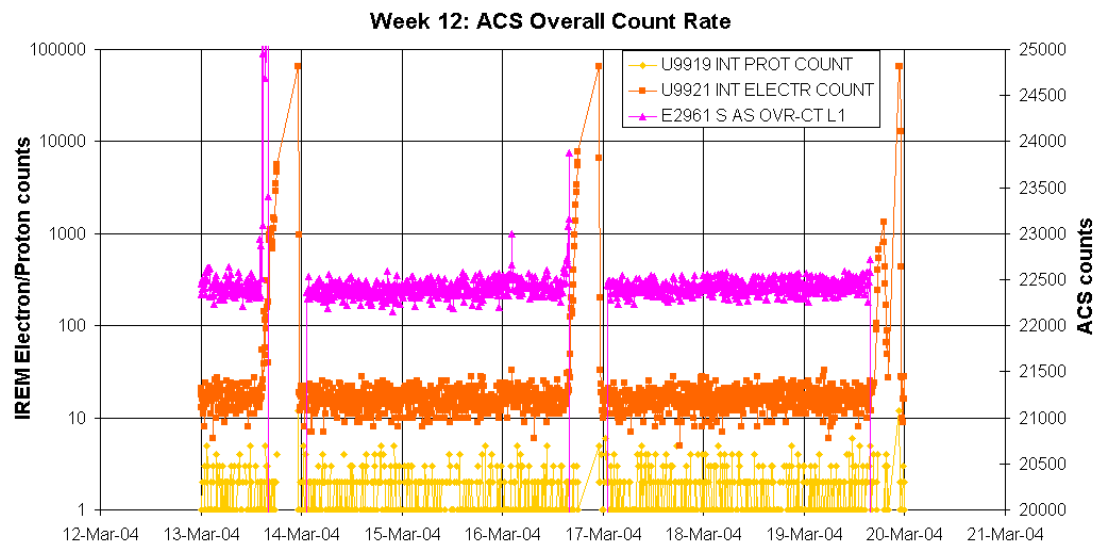
The following diagram shows the IASW performance in TM bandwidth terms and event buffer occupation:



ACS:

The performance of the ACS is nominal.

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

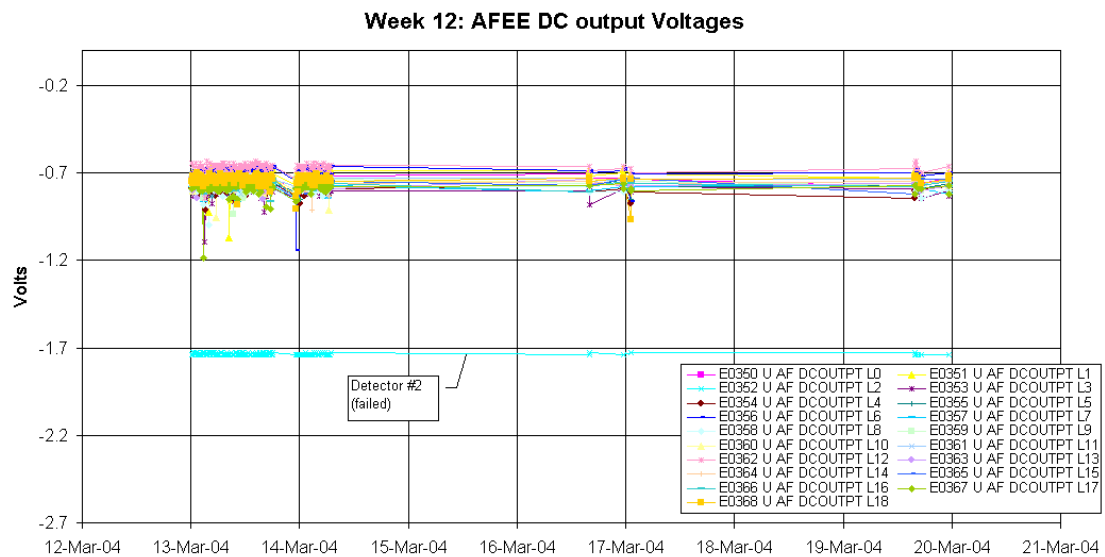


AFEE:

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.

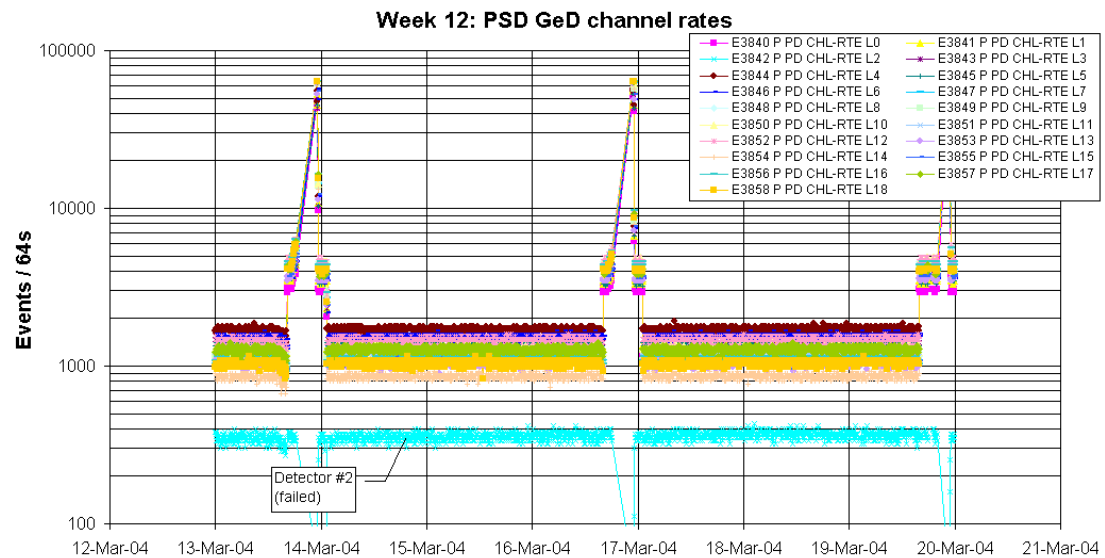


DFEE:

Nothing to report.

PSD:

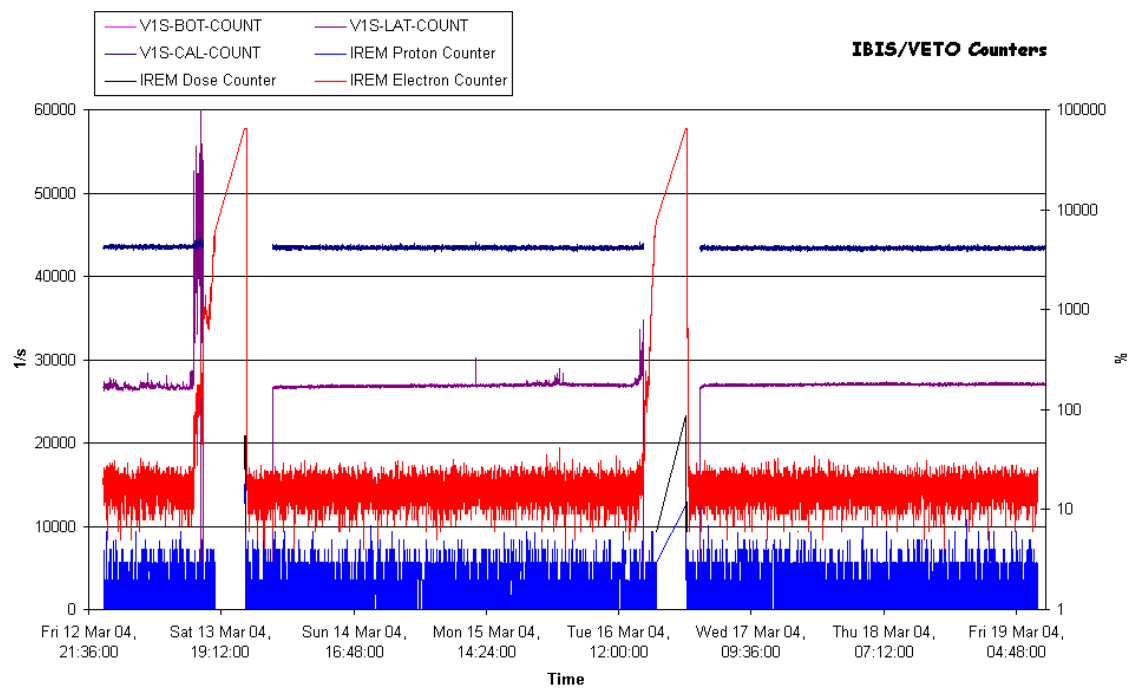
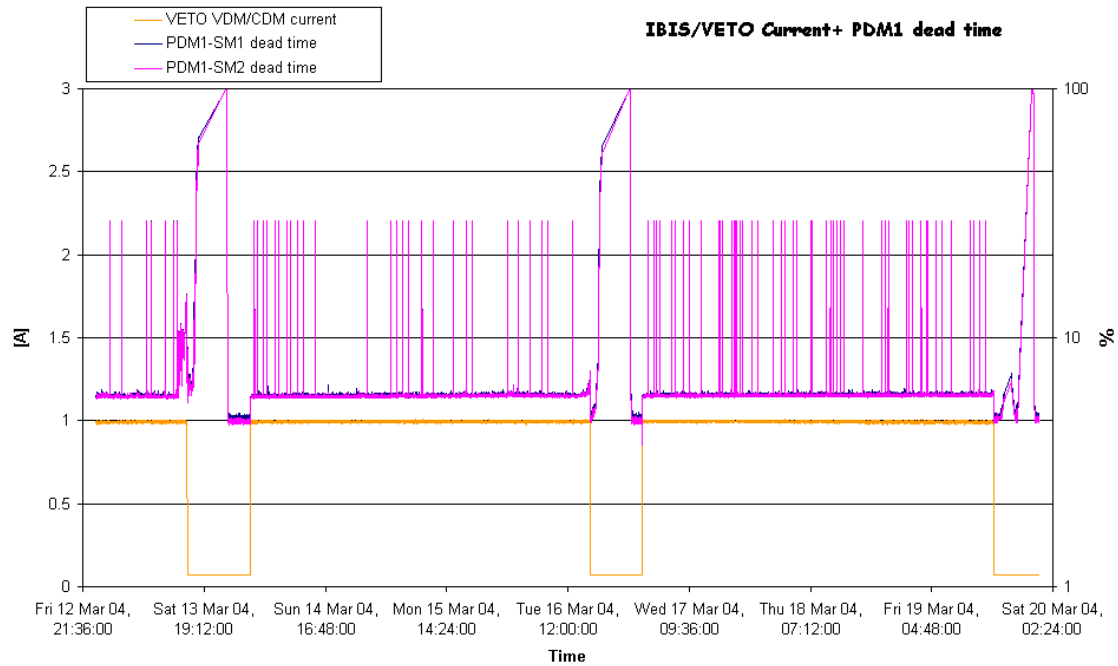
The following plot shows the GeD channel rates detected by the PSD during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2, whose residual counts are triggered by noise.



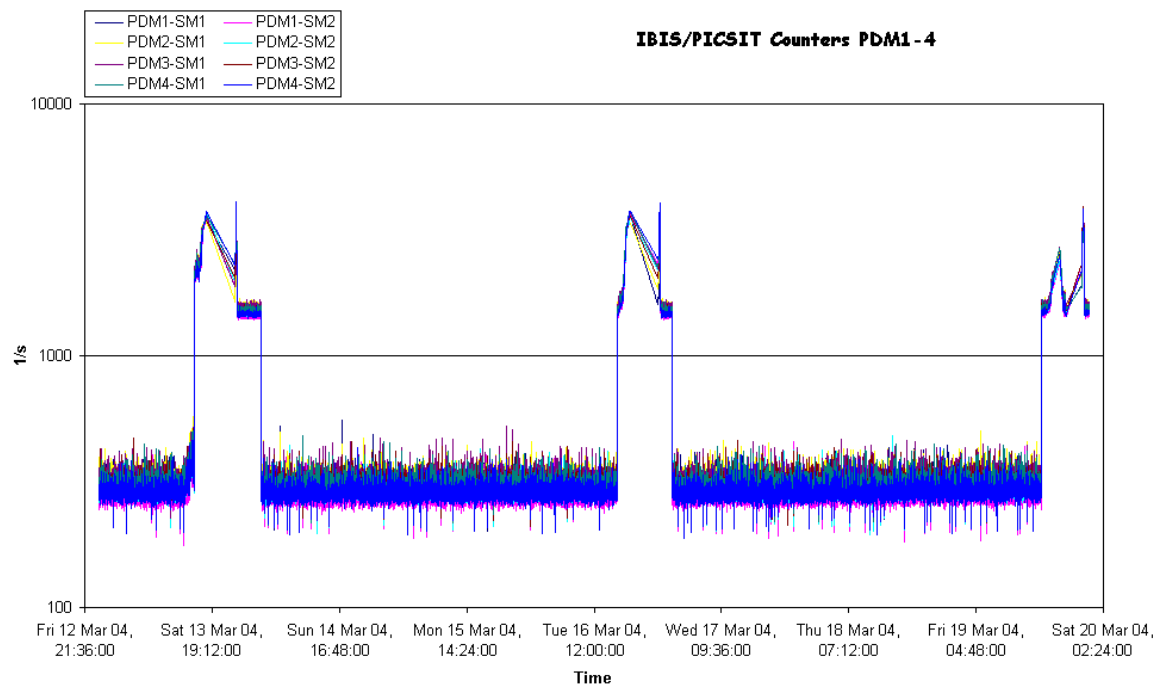
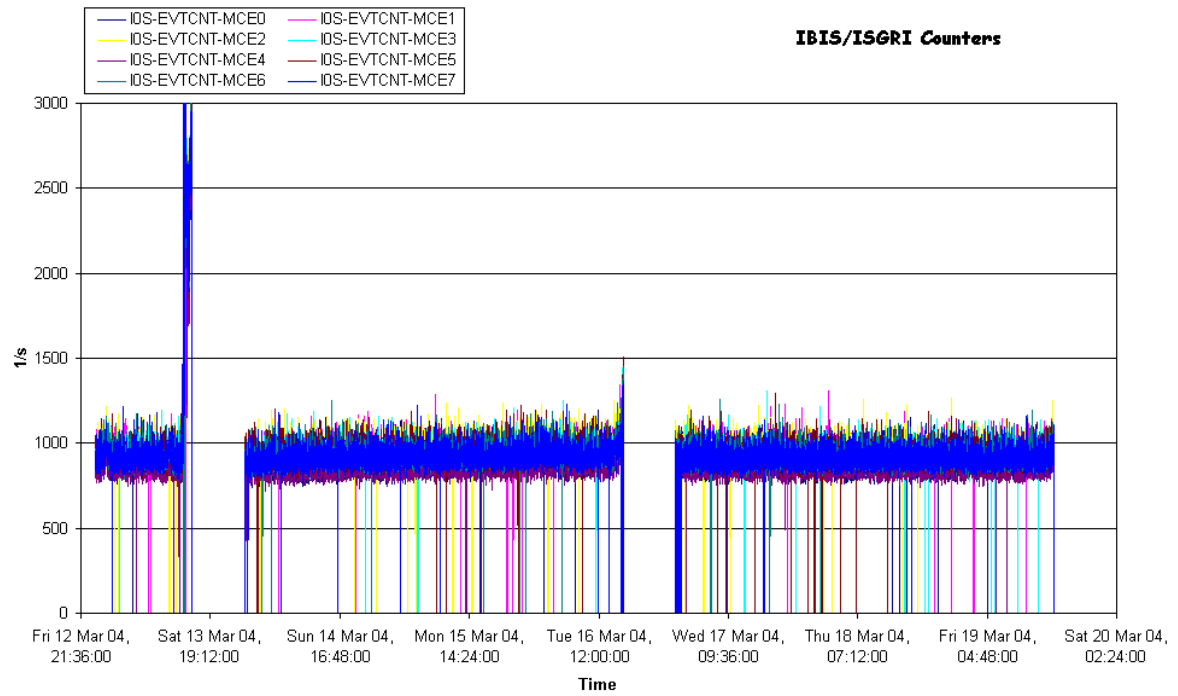
8.3.3 IBIS Operations

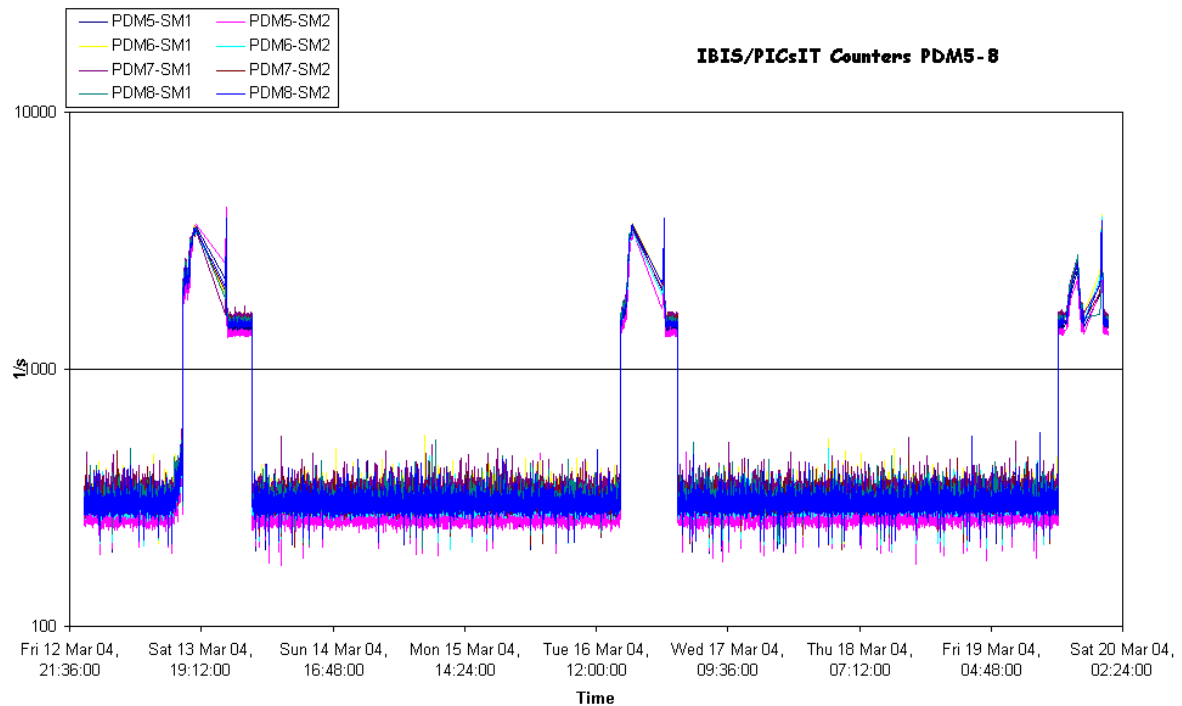
IBIS event counters plot

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



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





IBIS daily report

DOY 2004.073 (13/03/04)

At 14:46Z the parameter family G2013 reported in and out of limit SOFT HIGH. The parameters went in/out limits every ~10 minutes until 16:11Z. The reason is due to an earlier Radiation Belt Entry that determined also the transition to Safe Mode of the JEM-X1 unit. No further action was taken but the parameters were under constant monitoring until the Belt Entry at 16:20Z.

DOY 2004.074 (14/03/04)

There were two occurrences reported during the day of the parameters G6061(VIS-CAL-COUNT) in Hard low limit (went in/out limit for few TM cycles). This parameter is reporting the count-rate of the calibration Unit #1 and this low limit is probably due to the decaying of the on-board radioactive the source (0.4 mCi of Na²²). No further action was taken but it requests an update of the parameter limits in agreement with the reduced source activity.

DOY 2004.075 through to 079 (15/03/04) – (19/03/04)

There were three occurrences Reported during the day of the parameters G6061(VIS-CAL-COUNT) in Hard low limit (went in/out limit for few TM cycles).

8.3.4 JEM-X Operations

13/03/04 (Day of Year 073, Revolution 172-173)

At 08:40, the execution of OR 137 was started to modify the JEM-X1 S/W Integer Parameters according to the following OCRs:

- OCR # 169: Increase of Accepted Range of Anode Signals
- OCR #170: Update of on-board safety limit for dV high voltage level

The operation consisted of commanding the unit to SETUP Mode, making the required modifications to the S/W Integer parameters and putting it back into DATA TAKING Mode. This was done in the period between the end of exposure 01720006 and the start of exposure 01720007.

At 14:26, JEM-X1 went to SAFE mode when the S/W Trigger Rate exceeded the HV Switch Off threshold. This was about 30 minutes before the planned SAFE command in the Timeline and therefore no recovery action was taken.

14/03/04 (Day of Year 074, Revolution 173)

At 01:28, the TM/TC lines dropped and the execution of the Timeline was stopped. This was after the Anode Calibration of JEM-X1. After re-establishment of the links, manual activation of JEM-X1 was performed, by first commanding it to SAFE Mode and then starting the HV activation. The unit was commanded to DATA TAKING mode at 03:37:23.

15/03/04 (Day of Year 075, Revolution 173)

Nothing to report.

16/03/04 (Day of Year 076, Revolution 173-174)

At 14:46, after JEM-X1 was commanded to SAFE from the Timeline, execution of OCR 138 was started to patch the JEM-X2 DFEE S/W version 5.3 (ref: INTGSCCR-45 and INTGSCCR-46). The operation included:

- Manually loading a PST to allocated 8 TM windows to JEM-X2 and setting the BCP accordingly.
- Disabling reaction to BCP RMC and RADBELT E/E flags, internal to the unit.
- Patching the DFEE S/W version 5.3.
- Putting the unit in SAFE and re-enabling the reaction to BCP flags.
- Resetting the PST to the nominal one.

The manual operation was completed by 15:37.

17/03/04 (Day of Year 077, Revolution 174)

Nothing to report.

Doc. Title : INTEGRAL Mission Report # 76
Doc. Ref. : INT-MOC-SYS-RP-1001-TOS-OF
Date : 08/03/04

Issue : 1
Rev. : 0
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18/03/04 (Day of Year 078, Revolution 174)

Nothing to report.

19/03/04 (Day of Year 079, Revolution 174-175)

Nothing to report.

8.3.5 OMC Operations

On DoY 076, due to a problem with the TMPs at Redu, pointing 01730057 was truncated, pointings 01730058 to 01730063 were lost, and pointing 01730064 has the first 15 minutes missing.

On DoY 074, at 01:25, the TM and TC from Redu dropped, causing the loss of pointings 01730002 and 01730003.

On DoY 074, at 23:10, a commanding problem caused the loss of a pointing. The impact was that pointing 01730032 was extended, 01730033 missed, and 01730034 executed nominally

On DoY 077 at 14:28, a short TM drop caused the loss of pointing 01740027. The following commands corresponding to the M1130 (RESET IM) and MU1310 (IMAGING-A) were rejected:

```
2004.077.14.30.40.635 2004.077.14.30.29.233 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=387
2004.077.14.30.30.195 2004.077.14.30.23.108 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=386
```

On DoY 078 at 06:55, an ACC command failed PTV owing to a short TM drop, this caused the loss of pointing 01740057. The following commands corresponding to the M1130 (RESET IM) and MU1310 (IMAGING-A) were rejected:

```
2004.078.06.55.59.365 2004.078.06.55.48.515 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=534
2004.078.06.55.51.344 2004.078.06.55.42.140 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=533
```

On DoY 078, at 10:54, a late arrival of a TPF caused slew 01740064 to be lost, the subsequent pointing 01740065 was also lost as OMC had been left in science mode, and at 11:28, the commands corresponding to the M1130 (RESET IM) and MU1310 (IMAGING-A) were rejected:

```
2004.078.11.28.55.622 2004.078.11.28.49.176 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=566
2004.078.11.28.55.522 2004.078.11.28.43.398 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=565

On DoY 073 at 16:14:51, DoY 076 at 16:02:19 and DoY 079 at 15:51:55, OMC was switched by the Timeline to SAFE mode, at the nominal times.

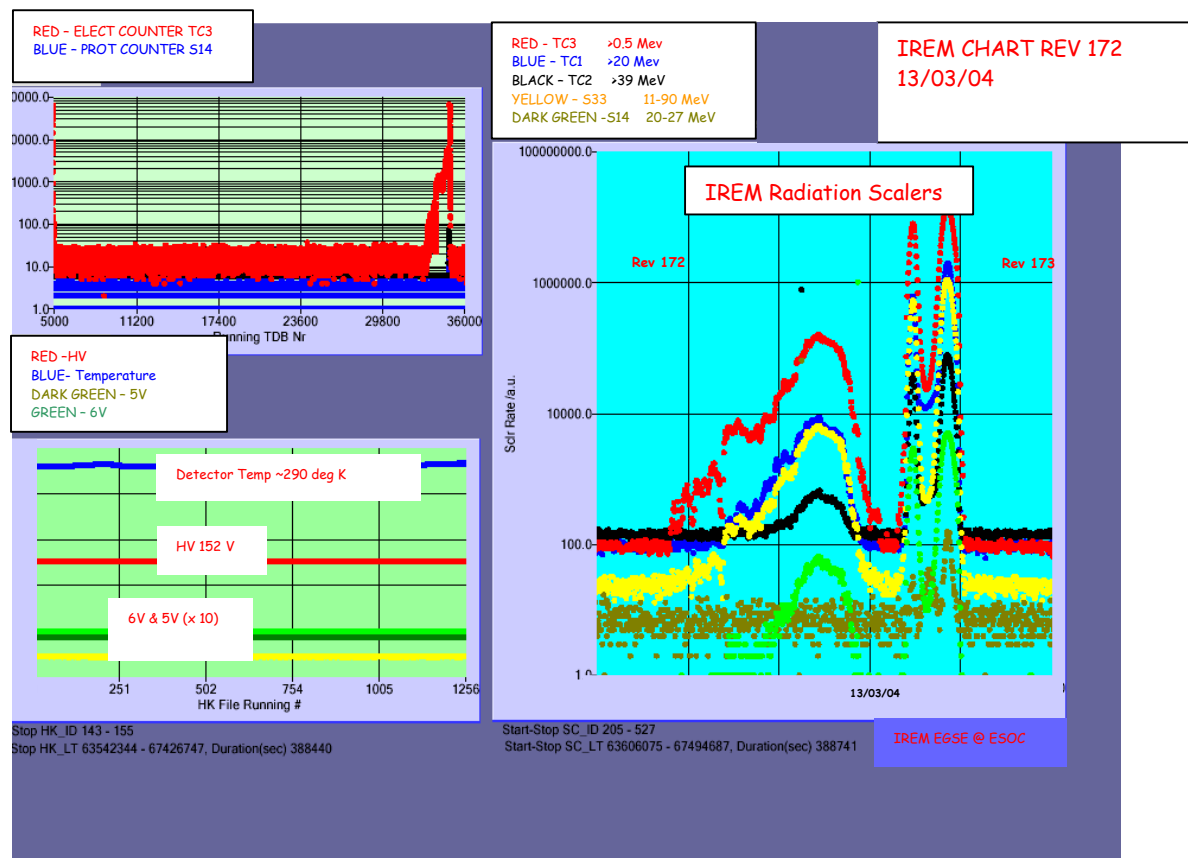
8.3.6 IREM Operations

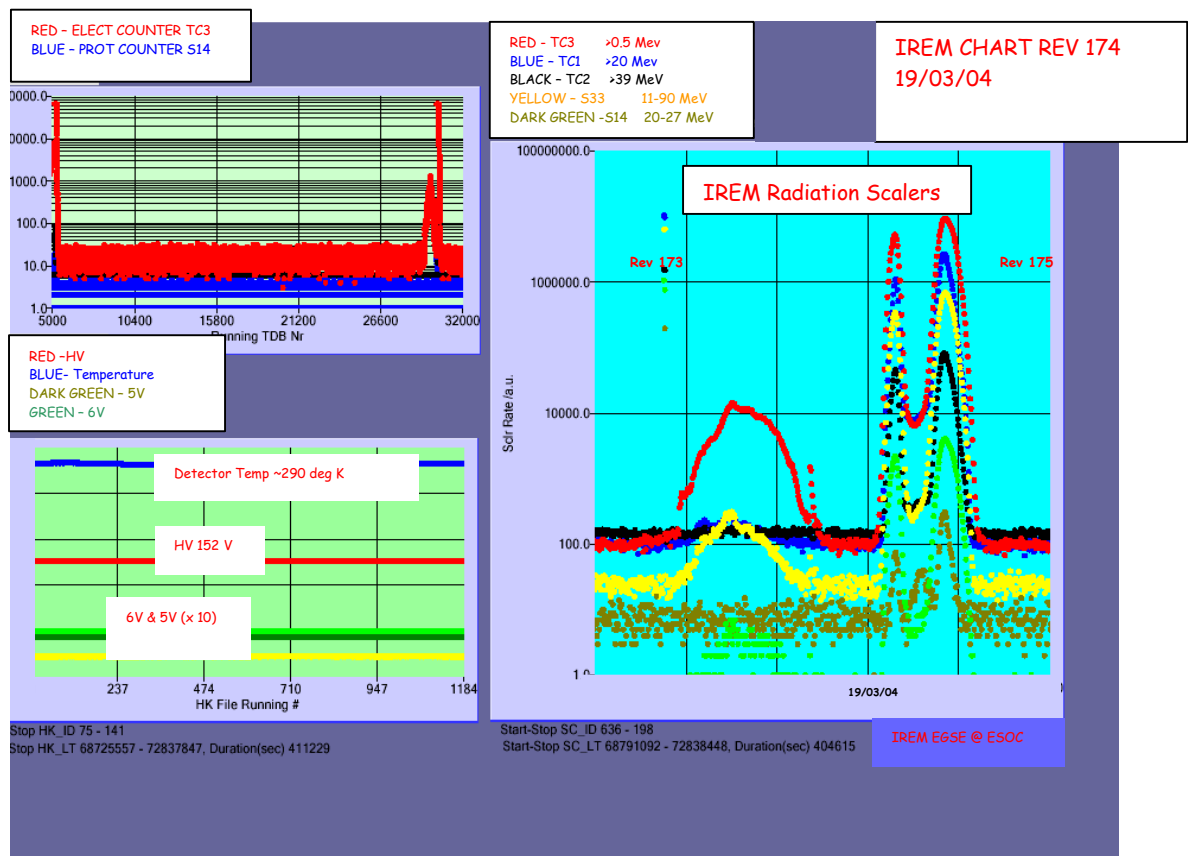
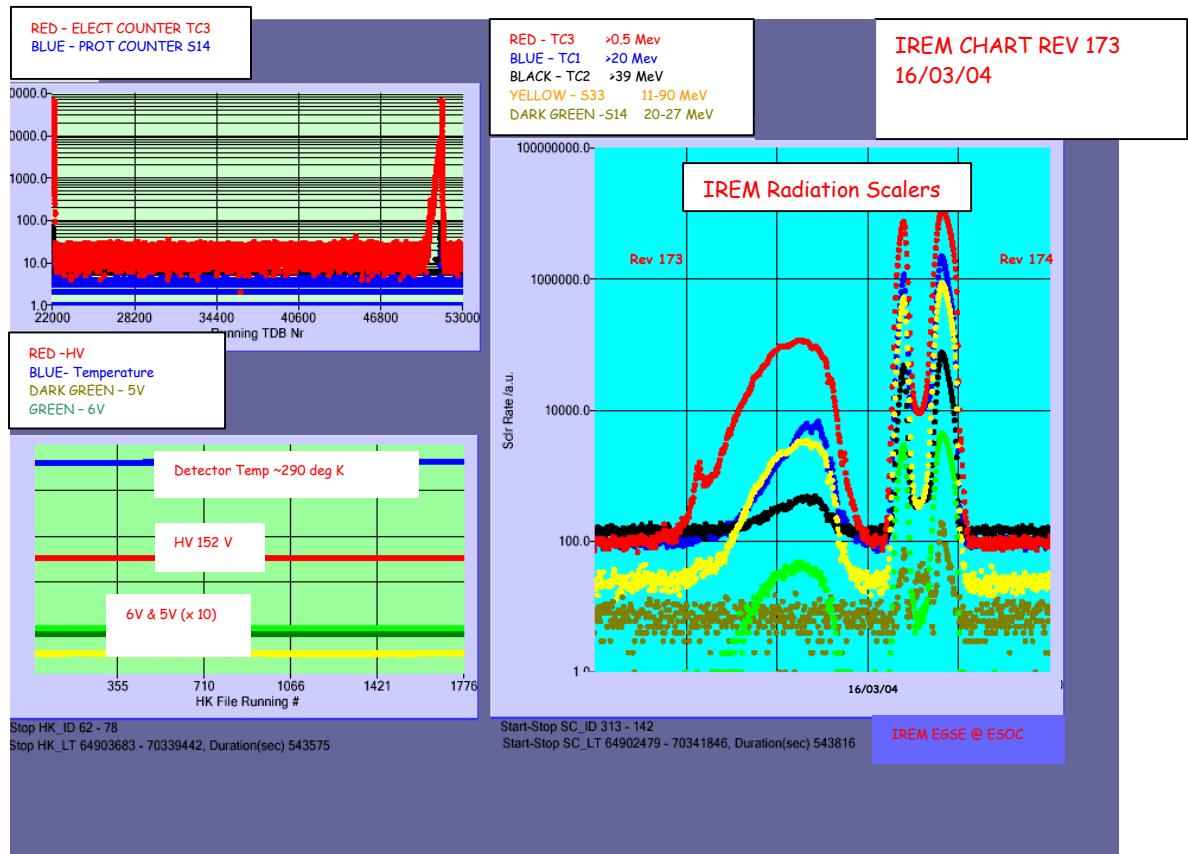
IREM daily report

Nothing to report.

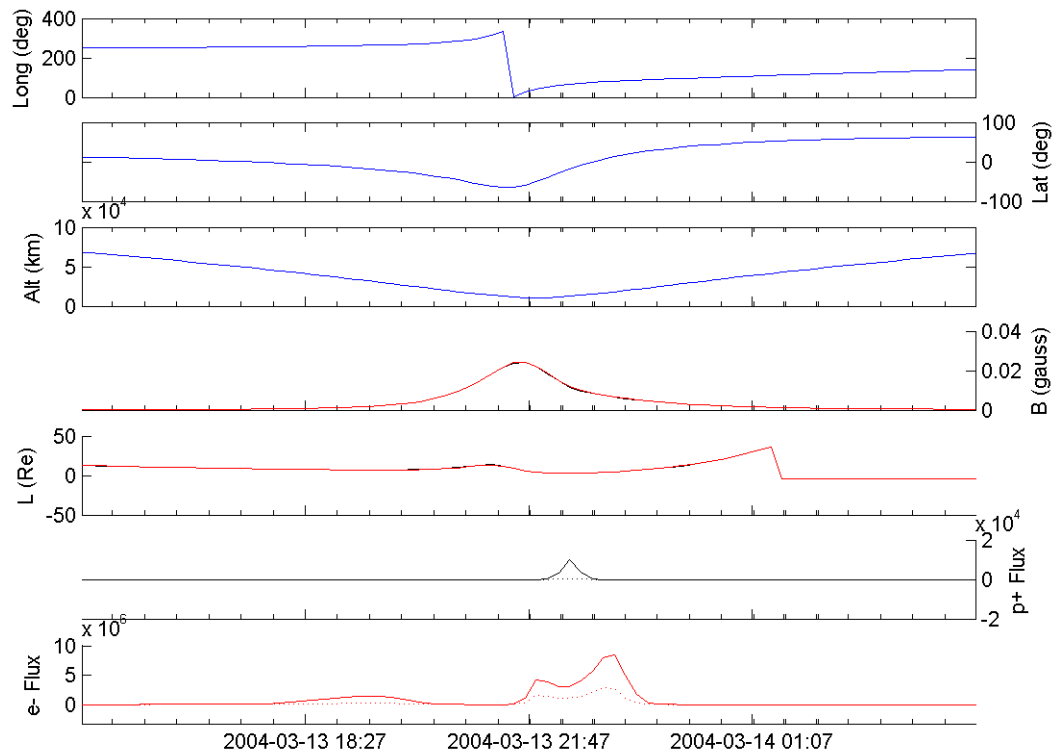
IREM radiation counters plot

Plots of the evolution of the IREM counters from rev 172-174 are shown below:

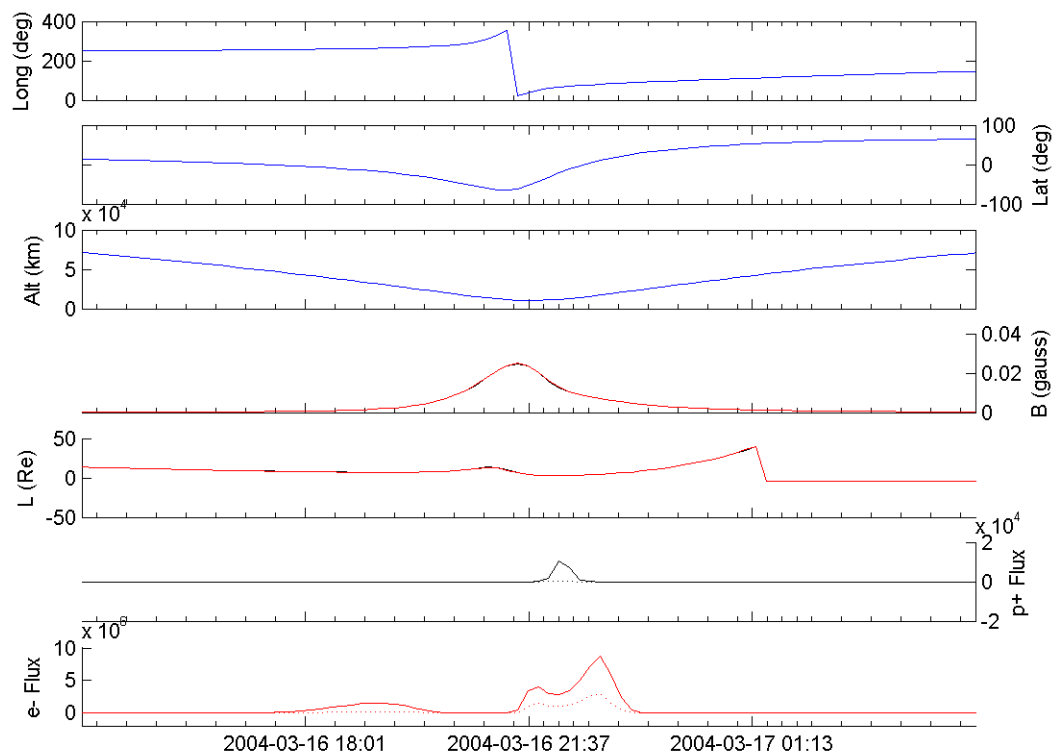




The corresponding predictions for the Belts passages (as calculated with AP8Max and AE8Max models by using the RADMON tool) are:



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



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

