

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-TOS-OF
No. 070
Week 04
26.01.04
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 17.01.04 until 23.01.04 (both dates inclusive) and covers the revolutions 154, 155 & 156.

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, an OMC Flat Field attitude (RA 04:10:0.00; DEC -68:35:60.0), GRO J0332-87 (RA 03:31:60.00; DEC -86:43:00.0), Cygnus X (RA 21:13:12.00; DEC +41:15:58.0) and SN1006 (RA 15:02:55.00; DEC -41:57:00.0). The activities consisted of raster dithering, GPS and staring observations. In addition, OMC Flat Field and Dark Current calibrations were 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.

Several Slews/Pointings were missed due to a problem with the NCTRS-A, which causes delays in the release of Telecommands after being submitted by the IMCS. This forced a switchover to NCTRS-B. The problem is being investigated. For more detail please refer to the related sections of this report and the relevant anomaly reports.

The results of the RW/Inertia calibration were uplinked at the end of revolution 155, after closure of the Science Window.

Selection of a multiple star system as the Guide Star by the ACC after an Open Loop Slew caused jitters in the Guide Star position and flickering of the Pointing Bit. The OTF remained low during PID 01540054, rendering this pointing invalid.

The fuel consumption over the period between 16/01/2003 and 23/01/2004 was 0.190 kg. The remaining propellant is in the order of 172.854 Kg on the 23rd of January.

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

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

3.2.2 IBIS

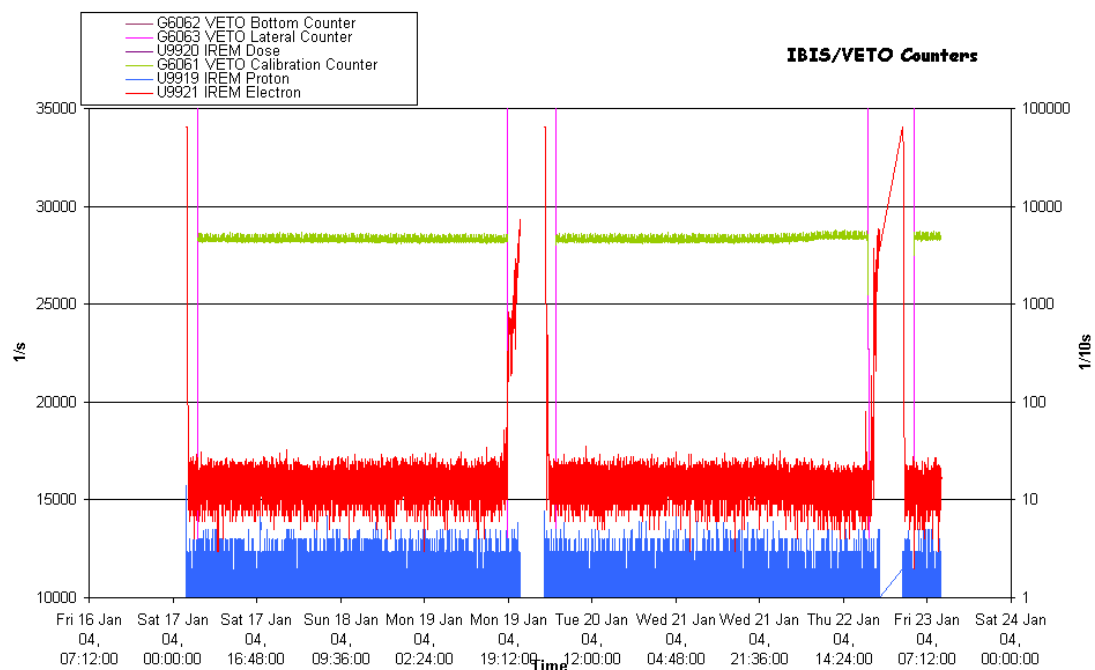
The status of the unit is Nominal.

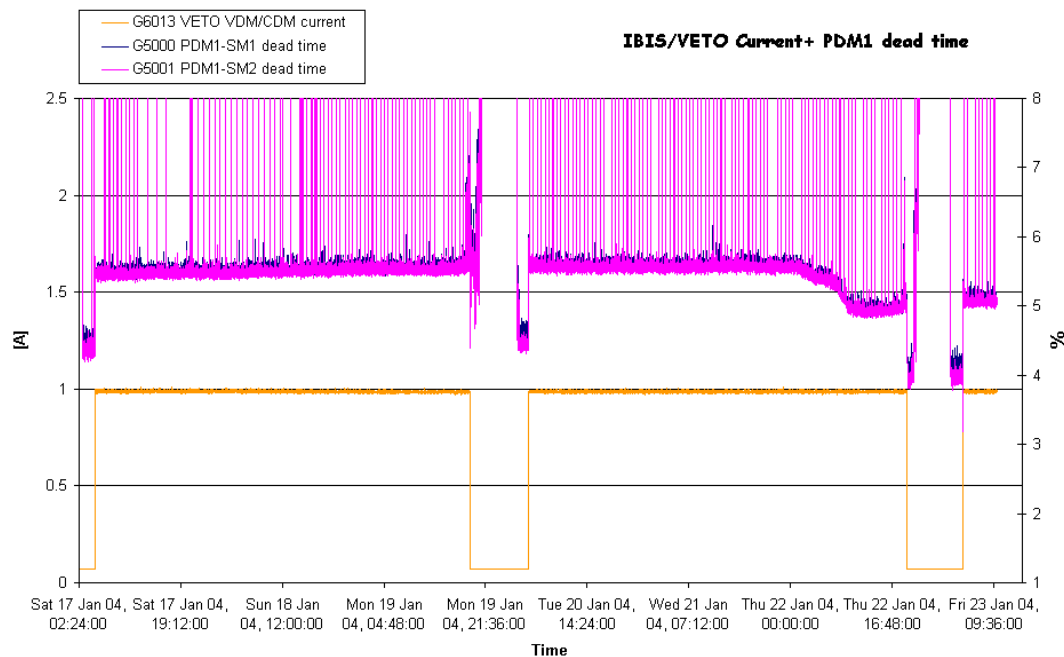
The TM bandwidth assigned to IBIS was:

From	To	IBIS TM allocation pkts/cycle
2004-01-17T05:21:36	2004-01-17T16:45:42	134
2004-01-17T16:45:42	2004-01-17T21:09:47 (OMC Flat Field Calibration)	90
2004-01-17T21:09:47	end of revolution 155	134

No occurrence of anomalous OEM generation (ID 183-184-179-180, Class 2) was reported after the VETO S/W patch.

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





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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

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.

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 188 OMC pointings executed nominally, 8 were lost, and 1 started late.

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.

The Electron Belts Entry/Exit for revs 154-->155, 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 shown below:

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT - OFF Observed Entry/Exit	Electron CUT - OFF Predicted Entry/Exit	ALT[Km] predicted
154	RAD_EXIT R 2004-01-17T04:48:11	Sat 17 Jan 04, 02:57:59	17-Jan-2004 03:29:35	27244.99
154	RAD_ENTR R 2004-01-19T19:32:26	Mon 19 Jan 04, 19:01:03	19-Jan-2004 20:13:22	54501.92
155	RAD_EXIT R 2004-01-20T04:35:38	Tue 20 Jan 04, 03:12:55	20-Jan-2004 03:13:22	26454.63
155	RAD_ENTR R 2004-01-22T19:21:53	Thu 22 Jan 04, 18:52:07	22-Jan-2004 20:03:22	54687.37
156	RAD_EXIT R 2004-01-23T04:24:19	Fri 23 Jan 04, 02:33:59	23-Jan-2004 03:03:22	26293.67

Reference

Small error vs reference

Large error vs reference

Proton Belts

REV	S/C BCPKT (electron)	Proton CUT - OFF Predicted Entry/Exit	ALT[Km] predicted
154	RAD_EXIT R 2004-01-17T04:48:11	17-Jan-2004 02:09:35	14233.56
154	RAD_ENTR R 2004-01-19T19:32:26	20-Jan-2004 01:33:22	11749.17
155	RAD_EXIT R 2004-01-20T04:35:38	20-Jan-2004 02:03:22	15004.88
155	RAD_ENTR R 2004-01-22T19:21:53	23-Jan-2004 01:23:22	11599.03
156	RAD_EXIT R 2004-01-23T04:24:19	23-Jan-2004 01:53:22	14816.62

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, there were serious problems however with the NCTRS-A which caused delayed transmission of TCs, this in turn caused subsequent Interlocked commands to fail release.

In 3 cases this caused interruption of a slew ED.

DoY 017 at 03.28.57

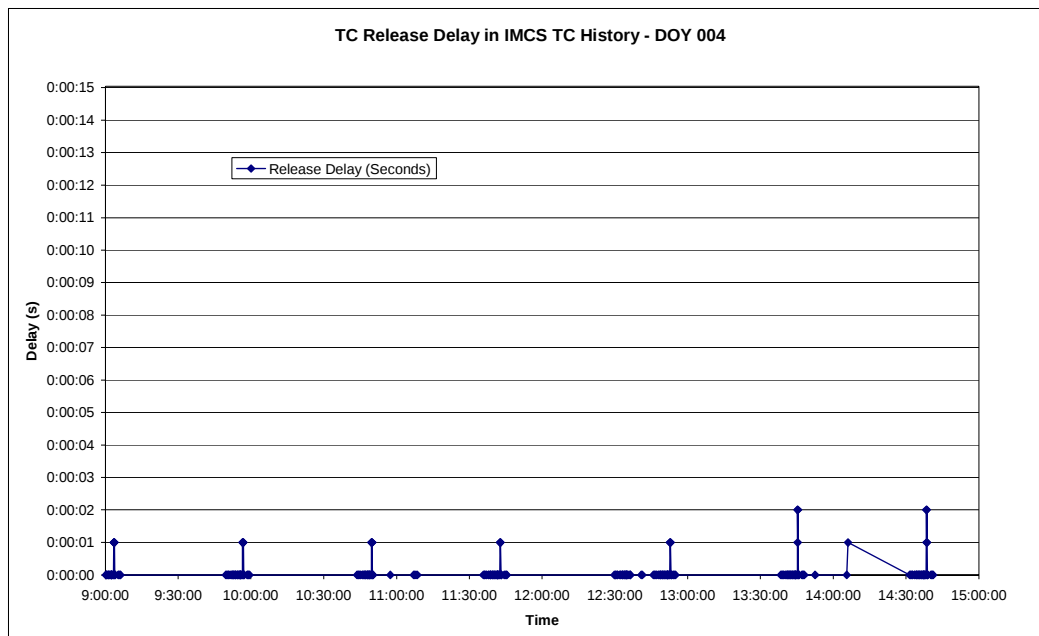
DoY 017 at 13:44:34

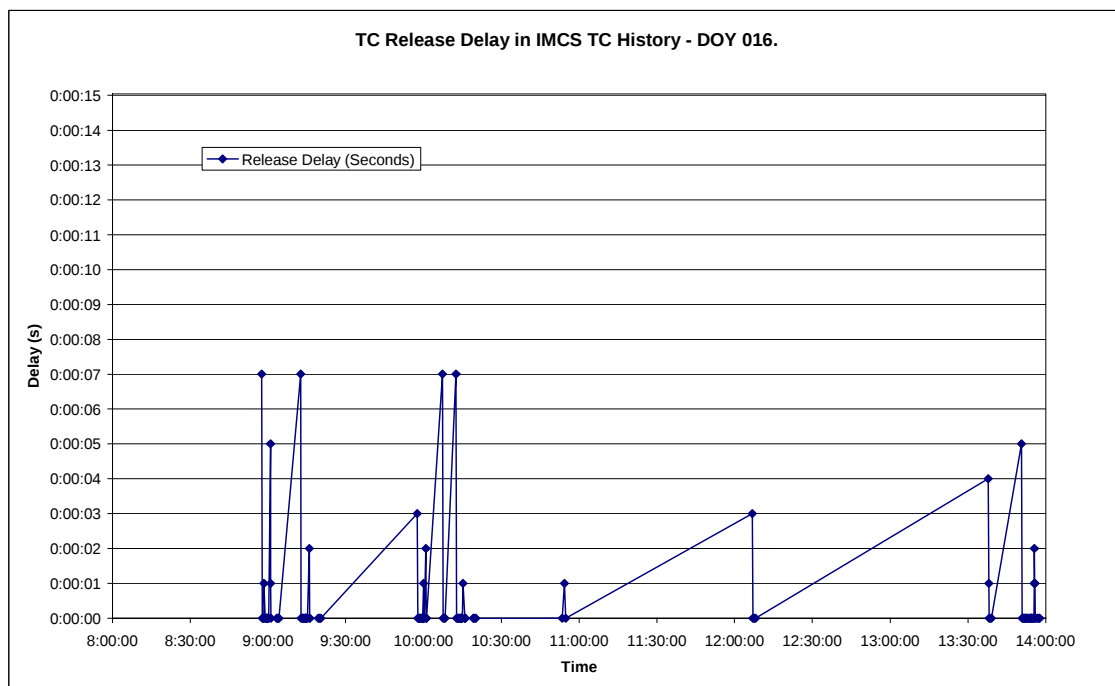
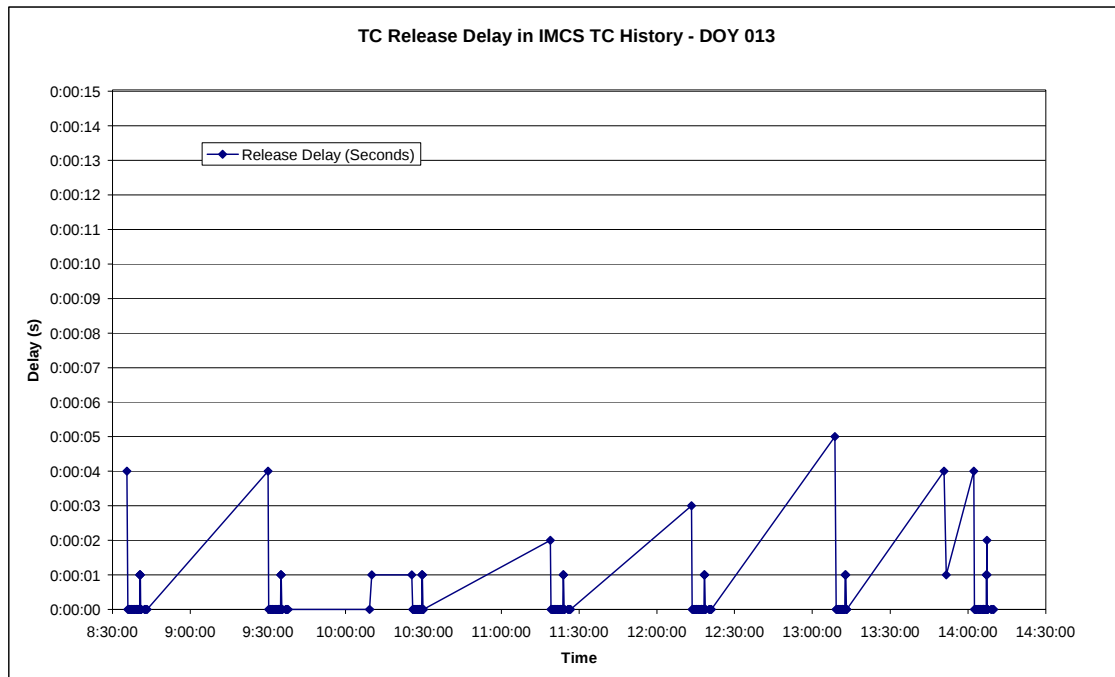
DoY 019 at 11:54.13

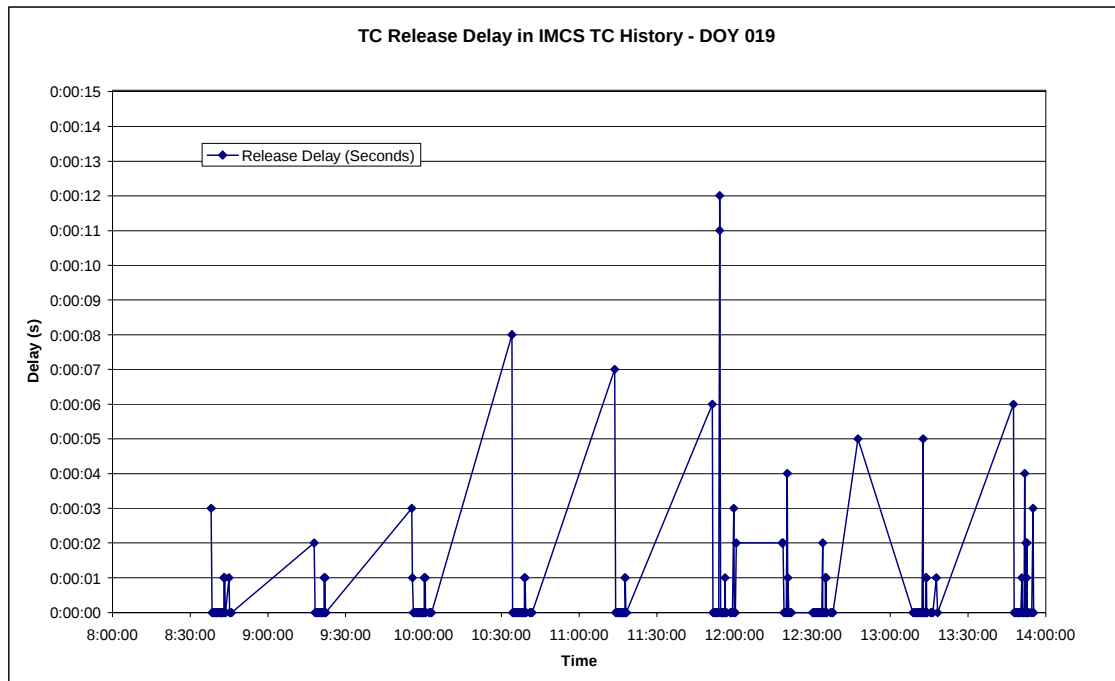
Normally 15 seconds are allowed between commands which are interlocked at CLCW level, in these 2 cases the TC failed release because the CLCW update was 17, 19 and 15 seconds respectively after the release time of the previous TC from the ASTACK.

An investigation has also been carried out to check the evolution of the delay in Release time and execution time in the IMCS TC History, which is the time between sending the command to the NCTRS and receiving the Transmission verification report from the NCTRS.

The following plots show the evolution of the command transmission verification delay during the last 3 weeks. It can be seen that delays have become much longer and more frequent.







On DoY 021 at 09:35 operations were switched to NCTRS-B.

The hard disc on the idda machine was upgraded recently, and unfortunately some data was deleted from the disk, which had not been backed up to CD. The lost data was still stored at Redu and Goldstone. The data at Redu has been copied to DVD, whereas at Goldstone, where there are no storage capability constraints, this has not been done. Work on replaying and consolidating the missing data onto idda has begun.

4.2 Ground Stations & Network

There was one potentially major incident with the ground station this week:

On DoY 021 at 01.29.27 a TC frame was reported rejected by Decoder 1 (D9020 = 6 = DISCARD N/V) due to a mismatch between the ground assigned AD counter and the on-board next expected AD command counter.

Further investigation reported reception of 2 Frames at the Decoder, one of which was rejected. However, from ground only one command was sent. This was probably caused by an erroneous command retransmission by the TCE REDU. This was the first command up-linked from the ASTACK following the TMP swap about 25 minutes earlier. Possibly there is a connection here.

There were also a few minor incidents with Reed-Solomon errors from Redu. See below for details.

4.3 Science Ground Segment

4.3.1 ISOC

No ISOC input was provided this week, a double report will be included next week.

4.3.2 ISDC

On 26/01/2004, the status of ISDC observation processing is:

- Latest Standard Analysis completed: observation 01100090008 (Vela region, Revolution 138) on 25/01/2004
- Latest products archived: observation 01202070003 (X1916-053, Revolution 131-134) on 08/01/2004
- Latest observation products sent to the observer: 01202070003 (X1916-053, Revolution 131-134) on 09/01/2004.

5 Special Events

6 Anomalies

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

- On DoY 017, at 03:28:57, 1 AOCS command failed release due to static PTV failure. (See section 4.1) The Timeline had to be stopped, and was not recovered before 06:58. The impact was pointings 01540004, 01540005 and 01540006 were lost.
- Later at 13:44, the sun steering law command failed release also due to late verification of a previous command. The impact was pointings 01540016 & 01540017 were missed.
- At 18:29, IMCB was showing yellow due to low swap space. At 21:31, after an Application Launcher restart, IMCB returned to 'Green', no impact
- At 23:18 and 23:30, there were bad frames from Redu, at 01:55 the following day, the TMPs were restarted as a precaution, there was no impact.
- On DoY 018, at 14:18, there were 5 bad frames from Redu, and at 14:38, a total of 6 bad frames were received, no impact.
- On DoY 019, at 11:54, a command failed release, causing the loss of pointing 01540083. (see section 4.1)
- On DoY 020, at 02:49, an IEM command failed the command execution verification, due to a late update of the relevant TM parameter in the CMD verifier task, there was no impact.
- On DoY 021 at 01:29, a command failed release due to the on-board reception of the previous command being unverified, causing the AOCS to be disabled in the Timeline. The impact was pointings 01550034 and 01550035 were lost. The Timeline was rejoined at 02:27.
- At 03:40, the TM & TC with Redu were lost, due to a hit on the line. At 03:42 using the ISDN line the TM was back, and at 03:44 the TC.

- From 22:48 until 05:45 the following day, there were repeated short drops in the TM due to the ongoing playback.
- On DoY 023 at 11:06, several commands timed out, and another failed release due to the interlock. The impact was that OMC pointing 01560011 was uplinked late at 11:15.
- At 23:23, there was a brief TM drop due to the on-going playback, there was no impact.

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-2543	19/01/2004	IMCA Server Restarted by mistake, lost control of S/L	IMCS	Pending
INT-2544	19/01/2004	Disk "C0T0D0S6" on NCTRSA having only 2% of free space.	NCTRS	Pending
INT-2545	20/01/2004	No TC at DSS16	Nasa Station	Pending
INT-2547	20/01/2004	Message prompting for a confirmation if the operator wanted to restart all...	IMCS	Pending
INT-2548	20/01/2004	CMDreleaser using 45% of CPU	IMCS	Pending
INT-2549	21/01/2004	AD TC Frame Rejected at Decoder Level due to N(s), V(R) mismatch	ESA Stations	Open
INT-2550	23/01/2004	IDDA Consolidator/hfiles is not back up / Lost TM files for CDs.		Pending

7 Future Milestones

Planned for the beginning of February is a Veto patch to rescale the counter factor.

There is also an upcoming JEMX patch to update the on-board background rejection criteria and the HV safety limits. The precise date for this change has yet to be set.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 154

The observations in revolution 154 consisted of the following:

- 15 pointings of a GPS lasting ~10 hours;
- Staring at the OMC Flat Field attitude (RA 04:10:0.00; DEC -68:35:60.0) for 4 hours, during which OMC Flat Field and Dark Current Calibrations were performed;
- Raster dithering observation of GRO J0332-87 (RA 03:31:60.00; DEC -86:43:00.0) lasting ~14 hours;
- 2 pointings of a GPS lasting ~1 hour;
- Raster dithering observation of Cygnus X (RA 21:13:12.00; DEC +41:15:58.0) performed for the remaining ~28 hours of observation time.

Throughout these observations SPI, IBIS and JEM-X2 were in their nominal science modes and JEM-X1 remained in Safe mode. During the OMC Flat Field observation, OMC was in FF Calibration and then DC Calibration modes and the TM allocation was 90 IBIS, 87 SPI, 1 JEM-X1, 8 JEM-X2, 60 OMC. For the other observations, OMC was in Science Normal mode and the TM allocation was 134 IBIS, 98 SPI, 1 JEM-X1, 8 JEM-X2, 5 OMC.

Revolution 155

In revolution 155 a raster dithering observation of SN1006 (RA 15:02:55.00; DEC -41:57:00.0) 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 156

In revolution 156 a raster dithering observation of SN1006 (RA 15:02:55.00; DEC -41:57:00.0) 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.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2004-01-02T05:02:58.000Z	173.1746	F	Automatic TM processing.
2004-01-02T08:57:15.000Z	173.1410	F	Automatic TM processing.

2004-01-05T04:37:07.000Z	173.1205	F	Automatic TM processing.
2004-01-08T03:43:54.000Z	173.1090	F	Automatic TM processing.
2004-01-11T03:32:41.000Z	173.0878	F	Automatic TM processing.
2004-01-14T03:23:53.000Z	173.0643	F	Automatic TM processing.
2004-01-15T05:43:08.000Z	173.0432	F	Automatic TM processing.
2004-01-16T15:33:35.000Z	173.0218	F	Automatic TM processing.
2004-01-17T03:11:20.000Z	173.0117	F	Automatic TM processing.
2004-01-17T12:07:45.000Z	173.0006	F	Automatic TM processing.
2004-01-17T15:54:33.000Z	172.9794	F	Automatic TM processing.
2004-01-18T13:31:40.000Z	172.9126	F	Automatic TM processing.
2004-01-20T02:55:03.000Z	172.8937	F	Automatic TM processing.
2004-01-21T13:16:11.000Z	172.8745	F	Automatic TM processing.
2004-01-23T02:47:03.000Z	172.8537	F	Automatic TM processing.

This report was generated Fri Jan 23 08:00:12 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, 59 Open Loop Slews, 147 Closed Loop Slews and 7 Momentum Bias were executed. 13 slews were missed or executed manually. This is equivalent to a 6.3%.

17/01/04 (Day of Year 017, Revolution 153-154)

Slews missed at the beginning of the revolution due to late TC release (Redu – INCTRS-A): At 03:29:22, the AOCS command to initialize the Sun-Steering Law failed release because its PTV was pending CLCW verification of the previous AOCS TC. Later investigation into this problem revealed a deteriorating performance of the NCTRS in the sense that it occasionally introduces delays in the release of the submitted commands. For further detail regarding this problem please refer to INTEGRAL ARTS entry INT-2542.

This problem happened after the first Reaction Wheel Bias of the revolution and before the first Open Loop Slew. Slews 01540001 to and including 01540006 were missed from the Timeline. The Timeline was rejoined at slew 01540007 by performing two manual Open Loop Slews and one Close Loop Slew.

Slews missed due to late CLCW verification caused by delay in release of Telecommand: At 13:44 the AOCS command to initialize the SSL failed release because the PTV was pending CLCW verification of the previous TC. The reason for this failure was also the delay introduced in the release of the command by the NCTRS (ARTS INT-2542). Slews 01540016 and 01540017 were missed from the

Timeline. A manual slew was then performed to the attitude of PID 01540017. The next slew was executed from the Timeline.

18/01/04 (Day of Year 018, Revolution 154)

Pitch and Yaw Errors and flickering of the Pointing Bit throughout PID 01540054: After Open Loop Slew 01540054, the ACC-picked Guide Star had CCD coordinates [15289, 16757] and magnitude 8.2. This was in fact the barycenter of the CCD images of a multiple star system, the two brightest stars of which have GSC# 3181-05374-2 and 3181-05363-1 with 8.38 Mi and 8.66 Mi, respectively. These stars are 1.72 arc-minutes apart. This resulted in a very unstable Guide Star position and starting at 16:41:51, the jitters in the star position caused continuous generation of Pitch and Yaw errors and flickering of the Pointing Bit. This continued throughout the pointing until 17:36:38, when the Guide Star was changed for the upcoming Close Loop Slew. The OTF was low during PID 01540054.

19/01/04 (Day of Year 019, Revolution 154)

Slows missed due to late CEV verification: At 11:54:38 an AOCS command failed release. The reason was late Execution Completion Verification of the previous TC due to a delay in reception of the TM packet. AOCS commanding from the Timeline was disabled and slows 01540083 and 01540084 were missed. A manual Open Loop Slew was then performed to the attitude of PID 01540085.

20/01/04 (Day of Year 020, Revolution 154-155)

Nothing to report.

21/01/04 (Day of Year 021, Revolution 155)

Slew missed due to unverified CLCW verification): At 01:29:04 and AOCS command failed release because the on-board reception of the preceding interlocked command was unverified. In fact this CLCW verification was not received at all and the verification stage remained pending. The reason for this problem is being investigated. For more detail please refer to ARTS Entry INT-2549. This resulted in the missing of slew 01550034. A manual slew was then performed to the attitude of PID 01550035 and the next slew was performed from the Timeline.

22/01/04 (Day of Year 022, Revolution 155)

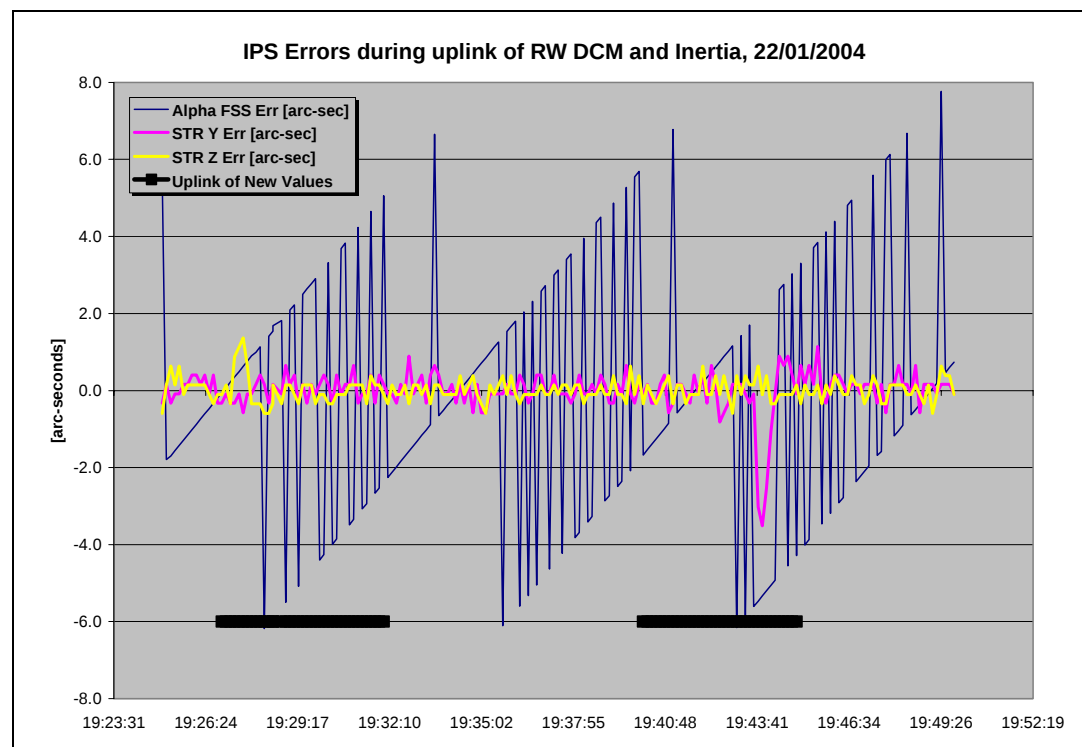
Uplink of the results of the RW/Inertia calibration that was performed during revolution 153: After closure of the Science Window near the end revolution 155, the results of the RW/Inertia calibrations were uplinked. The uplink was planned at this time to prevent any impact on science as the result of expected disturbances caused by new onboard settings of the Reaction Wheel DCMs and Inertia:

18:37 – Uplink of updated Spacecraft Inertia Matrix

19:26 – Uplink of updated RW DCM

19:40 – Uplink of updated RW Inertia

The disturbances caused by the new on-board settings were limited to a few arc-seconds in the worst case:



23/01/04 (Day of Year 023, Revolution 155-156)

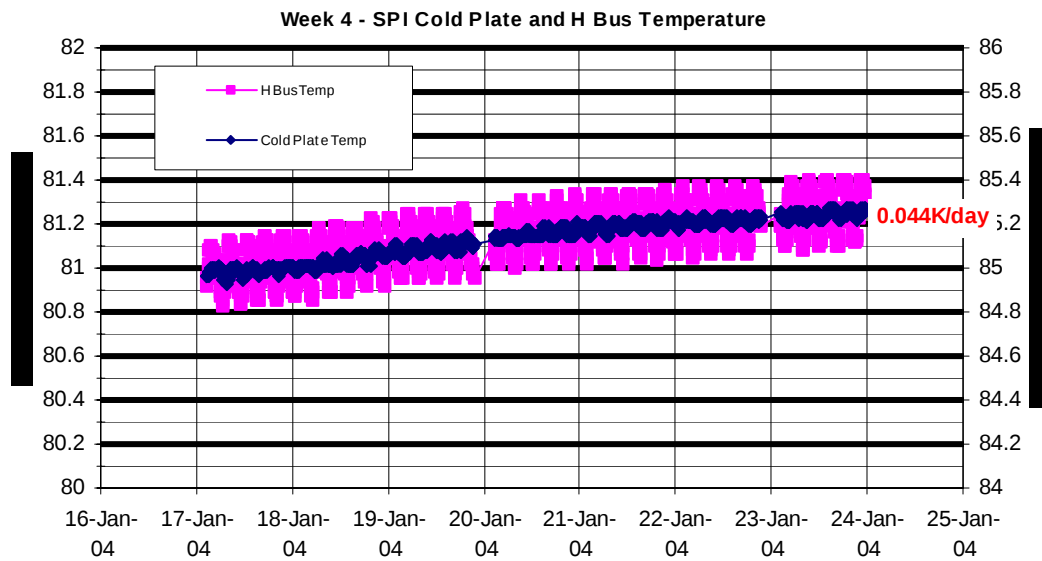
Nothing to report.

8.3.2 SPI Operations

Cryocooler / GeD cold-plate:

The cold-plate temperature is leveled at around 85.1K with a small positive drift of 0.044K/day, which is a little bit higher than the expected one. This figure is being evaluated with the help of the PI.

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



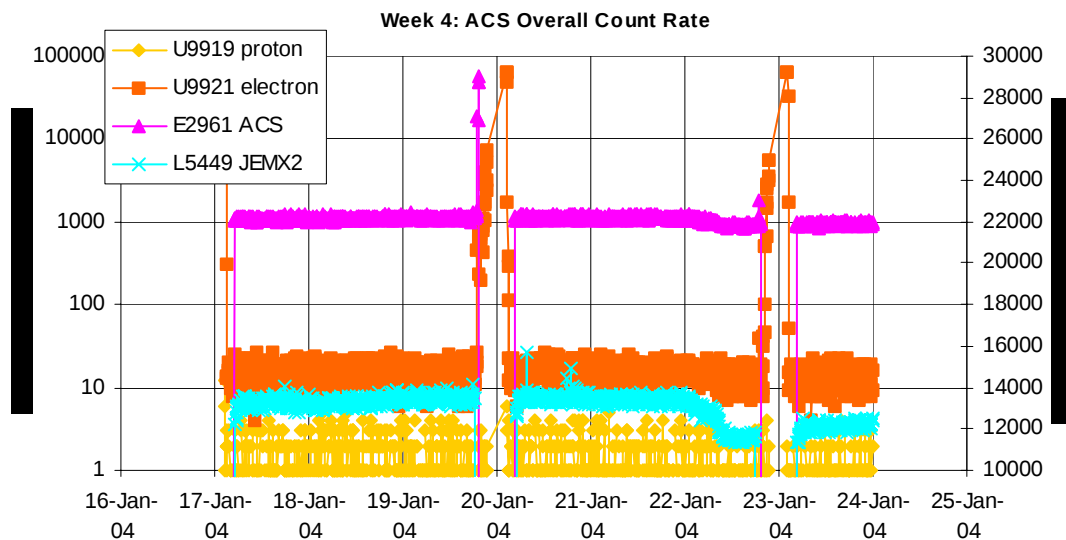
IASW/DPE:

Nothing to report.

ACS:

Nothing to report.

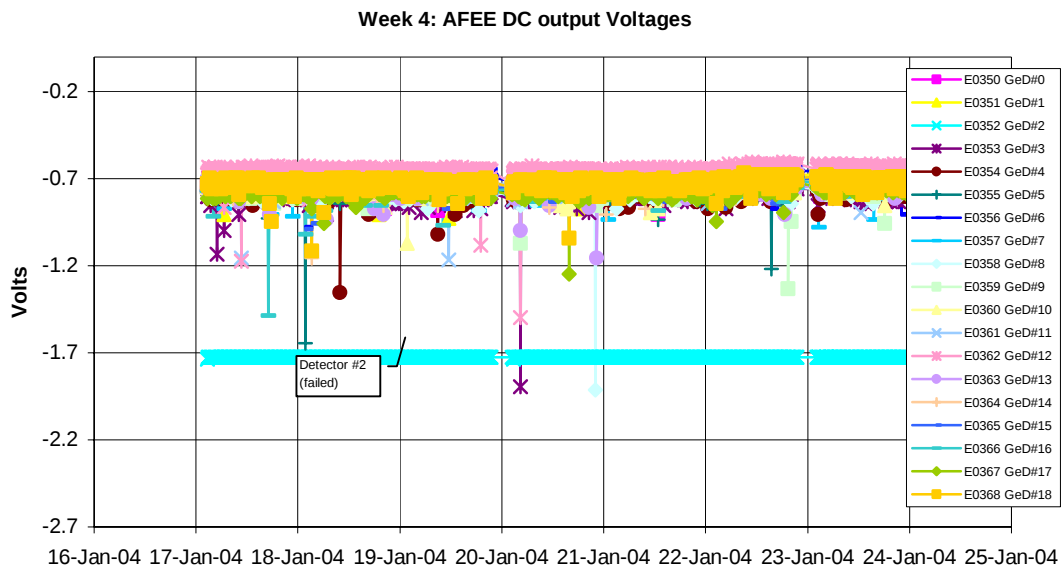
The following plot shows the ACS overall count rate evolution during the reporting period.



AFEE:

Nothing to report.

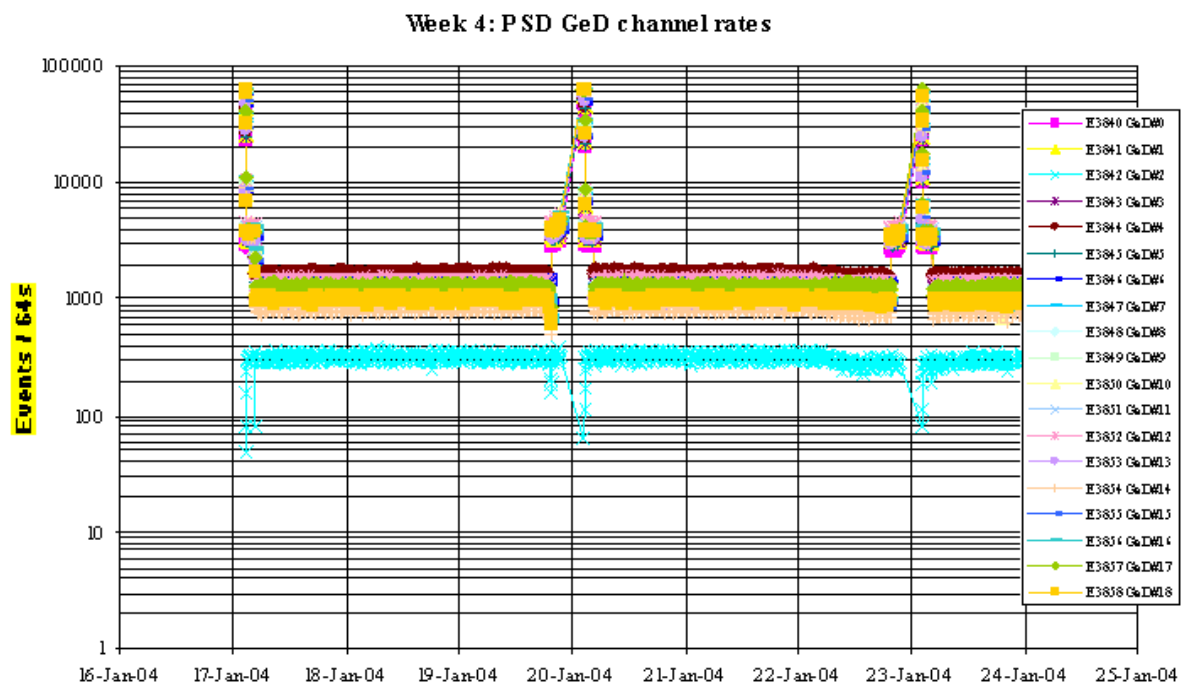
The expected AFEE dc output signals are here after plotted during the reporting period. These signals are the HV power supply control errors and provide a measure of the health status of the Ge detectors HV section. The Ge detector #2 is not working, see anomaly report INT_SC-72.



DFEE:
 Nothing to report.

PSD:
 Nothing to report.

The following plot shows the GeD channel rates as detected by the PSD during the reporting period. The rate of the failed detector #2 is due to noise.



8.3.3 IBIS Operations

DOY 2004.017 (17/01/04)

There were a few reports during the Belt passage of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as it required by the PIs.

At 02.50, the parameters of the G5002 family reported Alarm HIGH, due to the PICsIT detectors being ON, as required by the IBIS PIs, during the Radiation Belts passage . No further action was taken.

At 05.35.08 the following OEM APID 1280 ID 133 CLASS 2 was reported

<< IBIS1 IASW LSL TRANSFER FAILED (LOW LEVEL)>>

together with OEM APID 1280 ID 131 CLASS 2

**<<IBIS1 IASW LSL TRANSFER FAIL REPORT FOR HIGH-LEVEL
MODULE RESET>>**

These two OEMs were followed after few seconds by OEM APID 1280 ID 222 CLASS 3

<< IBIS1 MCE3 TIME OUT>>.

The description of this anomaly was reported in WR #69.

DOY 2004.018 (18/01/04)

Nothing to report.

DOY 2004.019 (19/01/04)

Nothing to report.

DOY 2004.020 (20/01/04)

There were a few reports, during the Belt passage of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as it required by the PIs.

DOY 2004.021 (21/01/04)

Nothing to report.

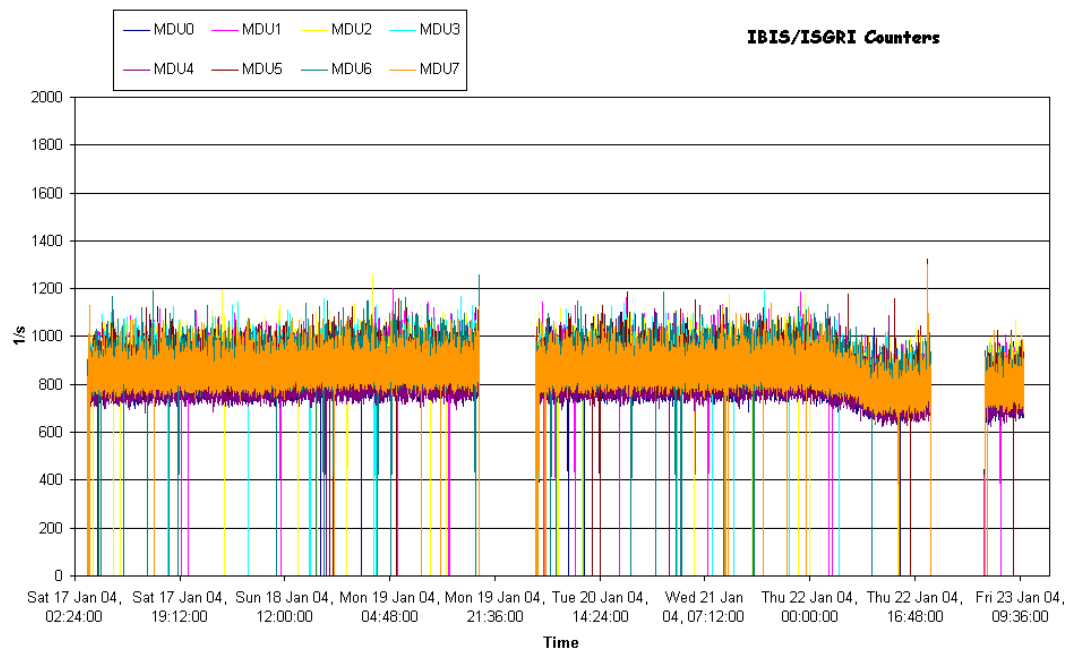
DOY 2004.022 (22/01/04)

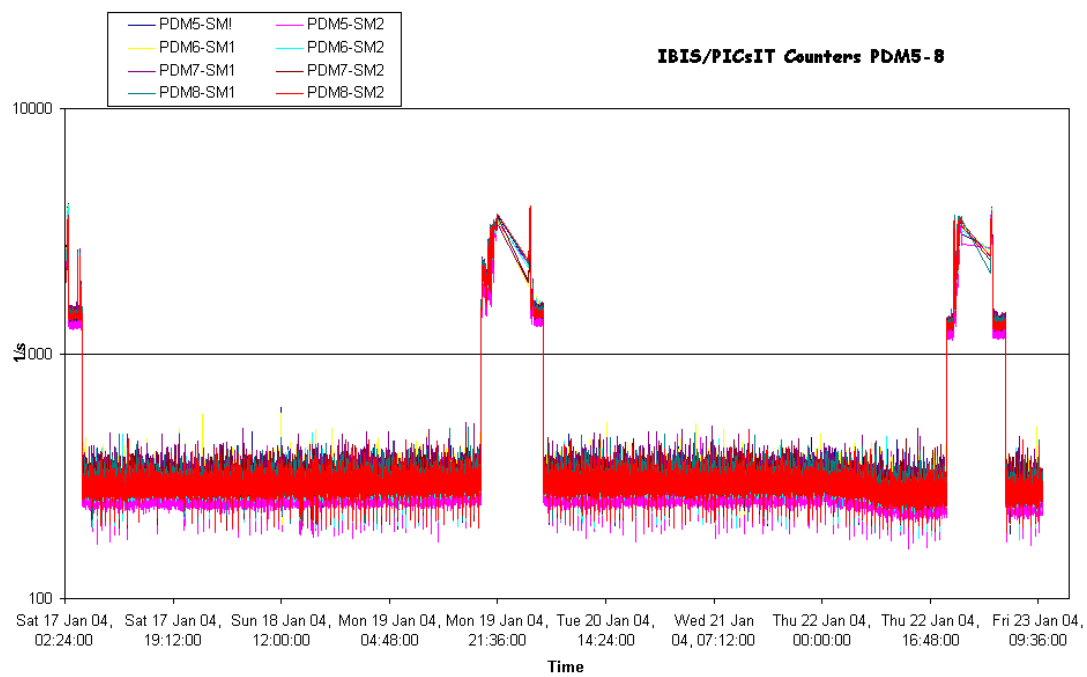
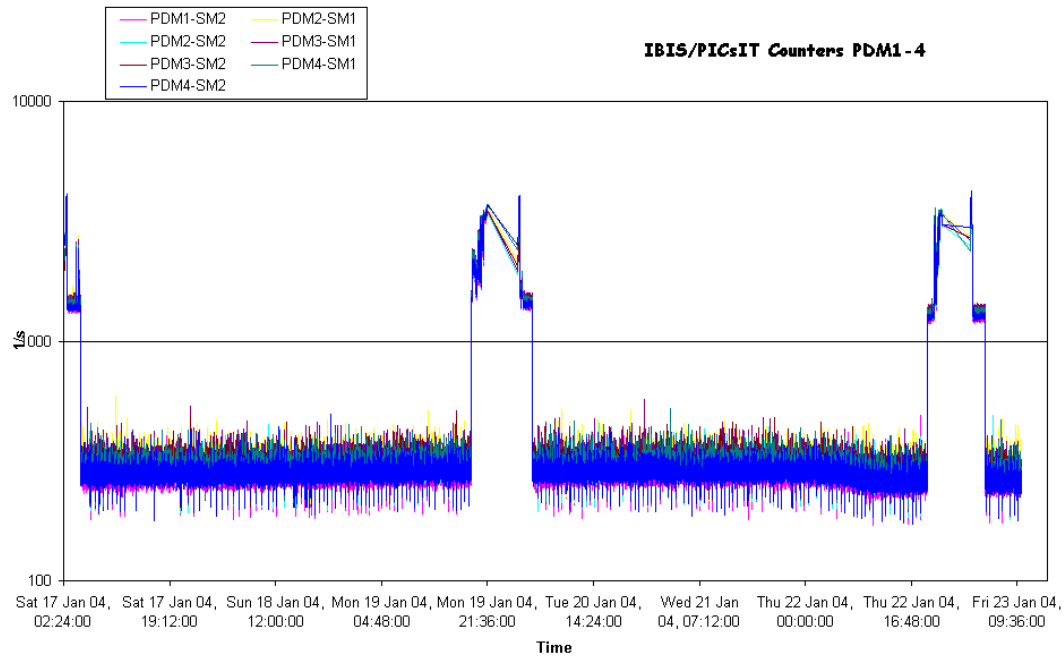
Nothing to report.

DOY 2004.023 (23/01/04)

There were a few reports, during the Belt passage of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as it required by the PIs.

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





8.3.4 JEM-X Operations

2004-01-17 (DOY 017, Rev 153-154)

Nothing to report

2004-01-18 (DOY 018, Rev 154)

At 14:01:19Z the TM parameter L5136 Buffer Loss went out of limits (value = 101) and remained out of limits for 6 TM cycles, reaching a maximum value of 1548 at 14:01:51Z.

At 14:02:15Z the TM parameter L5119 S/W Trigger also went out of limits (value = 20930) and remained out of limits until 14:03:27Z. It reached a maximum value of 24735 at 14:02:39Z, i.e. remaining below the threshold for an autonomous transition of JEM-X2 to Safe mode.

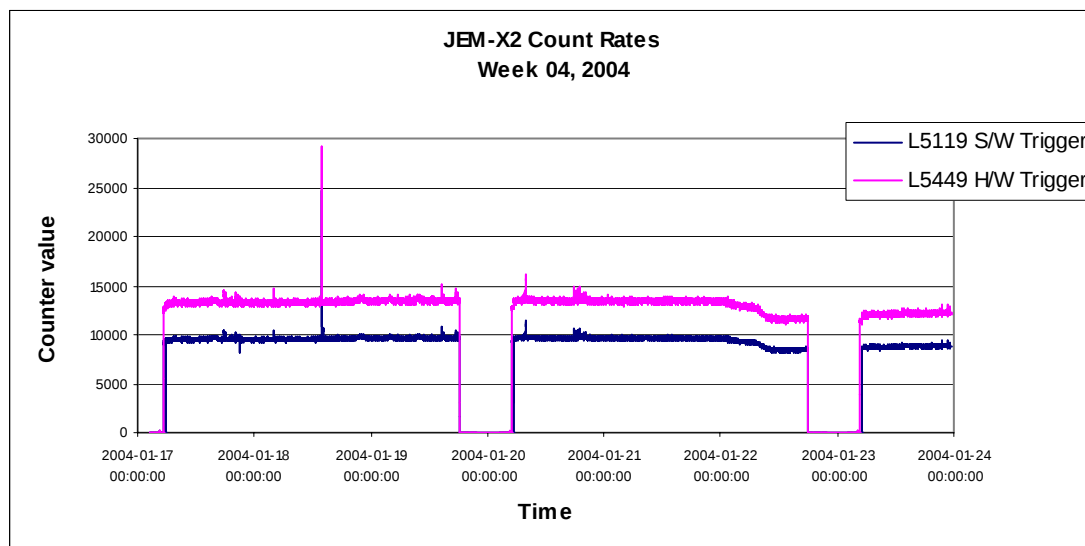
These out of limits were at the start of a long slew between two observations (GPS and Cygnus X).

2004-01-19 (DOY 019, Rev 154) to 2004-01-23 (DOY 023, Rev 155-156)

Nothing to report

8.3.4.1 JEM-X2 Count Rates

JEM-X2 count rates over the reporting period are displayed in the following graph¹.



8.3.5 OMC Operations

On DoY 017 at 03:28:57, an AOCS command failed release, causing the Timeline to be stopped. It was not recovered until 06:58. The impact was slews 01540004, 01540005, and 01540006 were lost.

On DoY 017 at 13:44, an AOCS command failed release, this caused the loss of pointings 01540016 & 01540017.

On DoY 019 at 11:54, an AOCS command failed release, this caused the loss of pointing 01540083.

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

On DoY 021 at 01:29, an AOCS command failed release, this caused the loss of pointings 01550034 & 01550035

On DoY 023, at 11:06, a set of OMC commands timed out, causing a late start for point 01560011 loss of pointing. The TC link was taken down, and brought up again, and the commands resent at 11:15.

Rejected Commands:

On DoY 017 at 13:48, 2 commands were rejected.

```
2004.017.13.48.44.083 2004.017.13.48.33.313 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=311
2004.017.13.48.36.163 2004.017.13.48.27.313 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=310
```

On DoY 019 at 11:56, 2 commands were rejected.

```
2004.019.11.56.28.354 2004.019.11.56.21.400 1792 Real Time
Rejection 131 REJECTED TC1
FIX2=0 M5010=7,FAST M M9079=3 M9080=131 M5001=60,IM A M9068=1
FIX2=0 M9069=558
2004.019.11.56.21.153 2004.019.11.56.15.025 1792 Real Time
Rejection 131 REJECTED TC1
FIX2=0 M5010=7,FAST M M9079=3 M9080=131 M5001=130,RESET IM
M9068=1 FIX2=0 M9069=557
```

These correspond to the M1130 (Reset IM), and MU1310 (Imaging A) commands from the lost pointings of 01540016 and 01540083 respectively.

On DoY 019, at 19:32:44, and again on DoY 22, at 19:22:12, OMC was switched by the Timeline to SAFE mode, at the nominal time.

8.3.6 IREM Operations

DOY 2004.020 (20/01/04)

At 02.49 the IREM TC U4920 (Ground Link ON) failed the CEV due to a late update of the relevant TM parameter in the CMD verifier task. No further action was taken after positive verification of the status ON of the Ground Link.

Plots of the evolution of the IREM counters from revs 154-->155 and the predicted Belts passages (as calculated with AP8Max and AE8Max models by using the RADMON tool), are shown below:

