

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 162
Week 43
31.10.05
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 22.10.05 until 28.10.05 (both dates inclusive) and covers the revolutions 369, 370 & 371.

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 GX 17+2 (RA 18:16:1.40; DEC -14:02:11.0); an OMC Flat Field target (RA 19:19:12.00; DEC +61:54:00.0); the Galactic Bulge region (RA 17:45:36.00; DEC -28:55:60.0); the Galactic Plane and HETE J1900.1-2455 (RA 19:00:13.00; DEC -24:54:44.0). The activities consisted of raster and hexagonal dithering; staring and GPS observations. In addition, OMC Flat Field and Dark Current calibrations and a JEM-X reduced HV engineering session 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.

As part of the periodic AOCS calibrations and in preparation for the winter eclipse season an IMU 1-2 calibration and health-check was performed on 25/10/2005. In parallel RMU-B was switched on and its overall status was checked. The health checks show that the IMU 1-2 as well as the redundant RMU are healthy. The ACC IMU drift corrections, as resulted from the calibration, were uplinked on 28/10/2005.

3 slews (1 CSL, 2 OSL) were lost from the Timeline during this period due to problem on IMCS and FDS.

The fuel consumption over the period between 01/09/2005 and 27/10/2005 was 0.0786 kg. The remaining propellant is in the order of 158.6966 Kg.

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

3.1.2 Power

The EPS is working nominally, available power from the arrays is of the order of 2100W.

3.1.3 Thermal

The thermal control of the satellite is working well. The temperatures are currently all within the specified operational limits.

3.1.4 OBDH

The OBDH subsystem is working flawlessly. No on-board communications problem was identified.

3.1.5 RFS

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

3.2 Payload

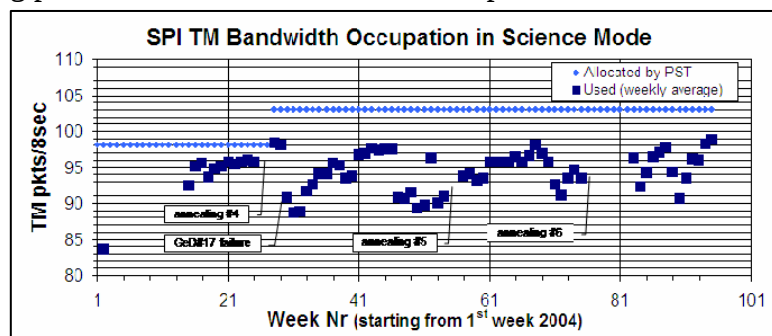
3.2.1 SPI

The overall status of the instrument is nominal.

During science operations, the instrument was kept in photon-by-photon mode, with spectra TM enabled, an assigned TM bandwidth in the science observation windows of 103 pkts/cycle and an average occupation of 98.8 pkts/cycle.

The Stirling compressors are working well, maintaining the detector cold-plate temperature within 85+/-1K.

The following plot shows the TM bandwidth occupation information.



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

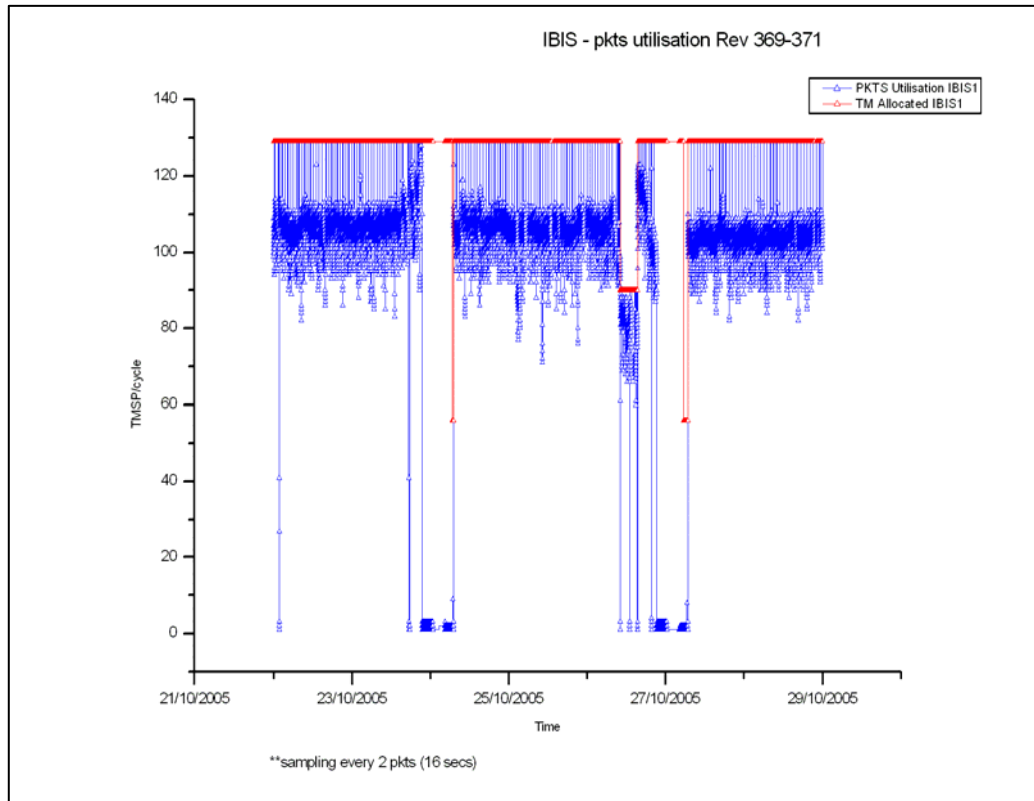
3.2.2 IBIS

The Overall status of the unit is Nominal.

During the reporting period, the PST allocation to IBIS was most of the time 129 TMPS/cycle. However, on DoY 2005.299 (26/10/2005) between 10:18:13Z and

15:32:27Z, due to OMC FFC, it was 90 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 106.0 TMPS/cycle, down 1.43 on last week.

A plot of the IBIS TM utilisation during the observation period is shown below:



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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline combined with some manual commanding.

JEM-X1 was operated in Data Taking mode during science observations with a TM allocation of 8 packets/cycle, except for the period 2005-10-26T10:17:30Z - 2005-10-26T15:31:44Z (Reduced HV Engineering Session), for which it had 10 packets/cycle.

The JEM-X2 configuration throughout the reporting period was as follows:

- Start of reporting period - 2005-10-24T06:40:45Z: Safe mode with a TM allocation of 1 packet/cycle
- 2005-10-24T06:40:45Z - 2005-10-24T07:27:57Z: Nominal activation by the automatic Timeline
- 2005-10-24T07:27:57Z - 2005-10-26T10:22:42Z: Setup mode with HV on (dV = nominal -9) and TM allocation of 1 packet/cycle

- 2005-10-26T10:22:42Z - 2005-10-26T12:51:08Z: Data Taking with TM allocation of 10 packets/cycle (Reduced HV Engineering Session)
- 2005-10-26T12:51:08Z - 2005-10-26T21:42:04Z: Safe mode (TM allocation still 10 packets/cycle until 2005-10-26T15:31:44Z, after which TM allocation reverted to 1 packet/cycle)
- 2005-10-26T21:42:04Z – end of reporting period: DFEE OFF with a TM allocation of 1 packet/cycle

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.

OMC operations were performed by the automatic Timeline. OMC was operated in Science Normal mode during science observations, with a TM allocation of 5 packets/cycle, except for the period 2005-10-26T10:17:30Z - 2005-10-26T15:31:44Z (OMC Flat Field Calibration), when it had a TM allocation of 63 packets/cycle.

During this reporting period, 157 of the 159 planned science pointings for OMC were executed nominally. 1 pointing (3690065) was lost due problems with the command verifier and 1 pointing (3710045) was lost due to problems with the PDS task of the IMCS.

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

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by low solar activity.

The sun was very quiet this week, blank during most of observation period.

Reference: www.spaceweather.com

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 very good this week. Only 2 science pointings were lost. Several drops in TM were reported in REDU and VILSPA. The overall performance was well above the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was good this week. Two pointings were lost due to problems at the MOC with first the Command Verifier Task and later with the PDS segmentation server. The overall performance was well above the 95% requirement.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. 4 gaps in TM were reported in REDU and VILSPA. But none of these had any impact on science operations. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

No PSF's have been received this week. Hence no planning has been performed. No ToO request or any other replanning has been performed.

The TSF for revolution 372 and 373 were received.

2. Observation status

No ECS's received this week.

3. ISOC science data archive

Preparation for the next major steps, i.e. inclusion of the 2nd ISGRI catalogue into the archive has started by internal review of the User Requirements. First step is still planned to be included before end of this year. Some benefits from the recent installation of the additional disk arrays have been observed.

4. ISOC system

The version 11.2 has been in use this week without problems. A patch to version 11.2.1 was introduced to overcome some initially detected minor problems.

5. Problems

No new problems, however the previously reported problem related to the difference in ISOC and MOC/FD constraint checks is still not resolved.

4.3.2 ISDC

Status of ISDC observation processing on 31/10/2005:

- Latest Standard Analysis completed: observation 03200260001 (Cen A, Revolution 348-349) on 30/10/2005

- Latest products archived: observation 03201090028 (Galactic Bulge, Revolution 355) on 11/10/2005

- Latest observation products sent to the observer: observation 02297000020 (galactic disk $l < 0$, Revolution 347) on 03/10/2005.

5 Special Events

None.

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 296 at 16:33Z, both TC and TM links were lost from REDU due to a hit on the line. They were back at 16:35Z. No operational impact.
- On DoY 296 at 17:10Z, "Time correlator couple not valid" was reported in the Event Logger.
- On DoY 296 at 17:29Z, imca command verifier lost connection with the TM cache and died. This caused Event Designators for IBIS, JEMX and OMC not being automatically uplinked from the timeline. At 17:31Z, the command verifier task was restarted and this fixed the problem. At 17:36Z, the Spacon uplinked manually the 3 EDs missed. At 17:54Z slew 03690066 was updated manually and no slew were lost. However pointing 03690065 was missed for OMC and partially missed for other instruments.
- On DoY 297 at 13:54Z, both TC and TM links dropped from VILSPA due to a hit on the line. They were back at 13:57Z.
- On DoY 298 at 08:51Z, TPF update for slew 03700032 failed to be produced on FDS because there were not enough stars detected to perform a closed loop slew. Therefore, on guidance of Flight Dynamics, the slew was manually performed as open loop slew, which was hence not considered as lost. And, slew 03700033 was updated manually and executed from the timeline.
- On DoY 298 at 13:03Z, ISDC swapped the connectivity with MOC to the redundant link (iddb - isdsb) due to required maintenance on idda. At 13:10Z, idda was down; at 13:36Z the maintenance was complete. Idda was rebooted and back running at 13:55Z. ISDC swapped back its connectivity with MOC on the main link (idda - isdsa) at 13:59Z. TM gaps caused by this activity were consolidated by a TM playback later on.
- On DoY 298 at 17:57Z, TM data gap was reported from REDU due to Red Solomon Error.
- On DoY 300 at 04:25Z, Network reported problem with NCTRS-A which needed to be restarted. This was performed and NCTRS-A was back up at 04:28Z.
- On DoY 300 at 07:43Z "idda, Software, Error sending data to ISDS" was reported in the Event Logger. At 07:55Z, CCC restarted IFRD on isdsa, this did not cure the problem. At 07:57Z, both IFRD and ISDS were restarted on isdsa, which this time fixed the problem since at 07:59Z "link MADDS-ISDS TM flow" was reported in the Event Logger.
- On DoY 301 at 09:55Z, "Error sending Data to ISDS" was reported in the Event logger but immediately followed by "link MADDS-ISDS connected (TM flow)". This happened again at 10:00Z and 10:05Z.
- On DoY 301 at 11:43Z data gap on VC0 Online Timely was reported from REDU.
- On DoY 301 at 21:25Z, "PDSserTM, Error in writing TM record" was reported in Event Logger revealing problem with the PDS segmentation server. At 21:31Z, it was tried to restart PDS TM task on imca, but unsuccessfully. Then the task died on all clients of the A-chain, the SODA server died as well on FDS. At 21:33Z CCC tried to restart all applications on imca, as this was unsuccessful, operations were moved to B-chain at 21:58Z. At 22:54Z due to no update for slew 03710045, the AOCS was disabled and the pointing lost. Finally at 23:30Z FDS was back up and running, and imca

rebooted; operations returned to A-chain. At 23:54Z AOCS recovery was performed to rejoin the timeline for slew 03710046 with a manual update.

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

7 Future Milestones

A patch of the IMCS is planned for November, which should fix a couple of problems.

DSS-16 is to be decommissioned, and replaced by DSS-27, initial testing of DSS-27 was performed in October. A final test including ISDC will take place during November.

The next eclipse season starts on November 11th.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 370

The observations in revolution 370 began with a raster dithering observation of GX 17+2 (RA 18:16:1.40; DEC -14:02:11.0) lasting ~49 hours, followed by a staring observation at an OMC Flat Field target (RA 19:19:12.00; DEC +61:54:00.0) lasting ~3.5 hours, during which OMC Flat Field and Dark Current Calibrations and a JEM-X reduced HV engineering session (OCR-201) were performed. A hexagonal dithering observation of the Galactic Bulge region (RA 17:45:36.00; DEC -28:55:60.0) was then performed for ~4 hours, followed by a GPS performed for the remaining ~1 hour of observation time.

During the OMC Flat Field observation, SPI and IBIS were in their nominal science modes, JEM-X1 and JEM-X2 were in Data Taking (TEST) mode, with various different High Voltages as described in OCR-201 and OMC was in FFCalibration followed by DCCalibration mode. The TM allocation during this observation was IBIS 90; SPI 73; JEM-X1 10; JEM-X2 10; OMC 63. For the other observations all instruments were in their nominal science modes, except for JEM-X2 which was in Safe mode, and the TM allocation was IBIS 129; SPI 103; JEM-X1 8; JEM-X2 1; OMC 5.

Revolution 371

In revolution 371 a Target of Opportunity hexagonal dithering observation of HETE J1900.1-2455 (RA 19:00:13.00; DEC -24:54:44.0) was performed throughout the available observation time (~62 hours).

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

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2005-10-09T01:22:44.000Z	159.0533	F	Automatic TM processing.
2005-10-09T06:21:08.000Z	158.9711	F	Automatic TM processing.
2005-10-11T23:17:55.000Z	158.9196	F	Automatic TM processing.
2005-10-12T06:04:36.000Z	158.9160	F	Automatic TM processing.
2005-10-15T00:45:23.000Z	158.9081	F	Automatic TM processing.
2005-10-15T05:58:44.000Z	158.8679	F	Automatic TM processing.
2005-10-18T00:32:50.000Z	158.8544	F	Automatic TM processing.
2005-10-18T05:39:55.000Z	158.8311	F	Automatic TM processing.
2005-10-21T00:32:50.000Z	158.8189	F	Automatic TM processing.
2005-10-21T05:28:10.000Z	158.7752	F	Automatic TM processing.
2005-10-24T05:11:46.000Z	158.7535	F	Automatic TM processing.
2005-10-26T13:49:44.000Z	158.7324	F	Automatic TM processing.
2005-10-26T22:48:00.000Z	158.7211	F	Automatic TM processing.
2005-10-27T00:04:49.000Z	158.6991	F	Automatic TM processing.
2005-10-27T04:53:37.000Z	158.6966	F	Automatic TM processing.

This report was generated Fri Oct 28 08:00:25 GMT 2005

8.3 Detailed Satellite Information

This section contains some detailed information concerning the various subsystems of the satellite and instruments.

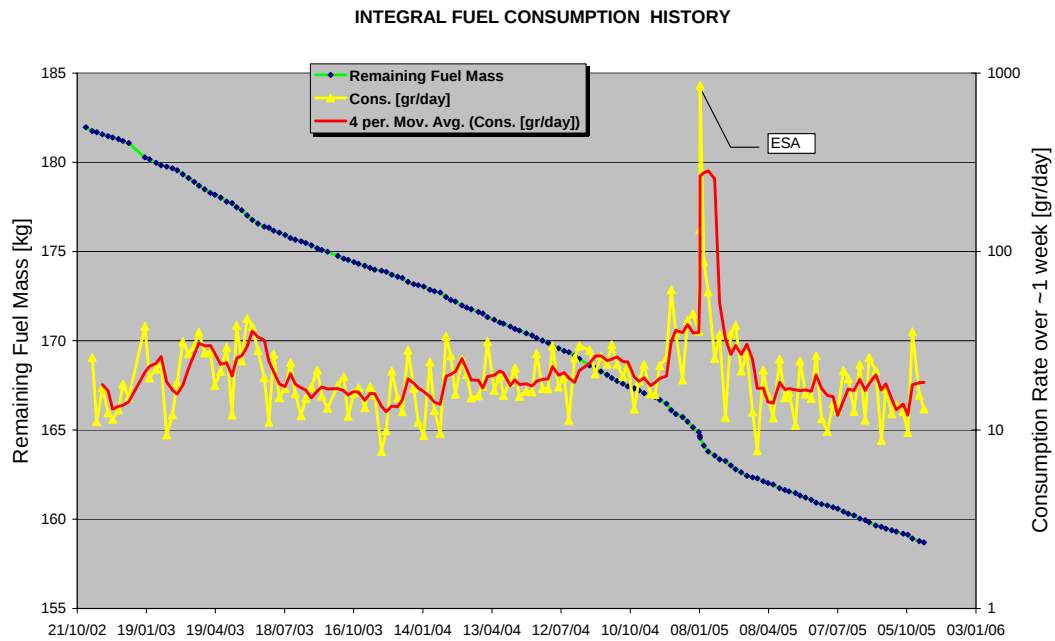
8.3.1 AOCS SUMMARY OPERATIONS REPORT, 22/10/2005 – 28/10/2005

AOCS operations were executed from the Automatic Timeline.

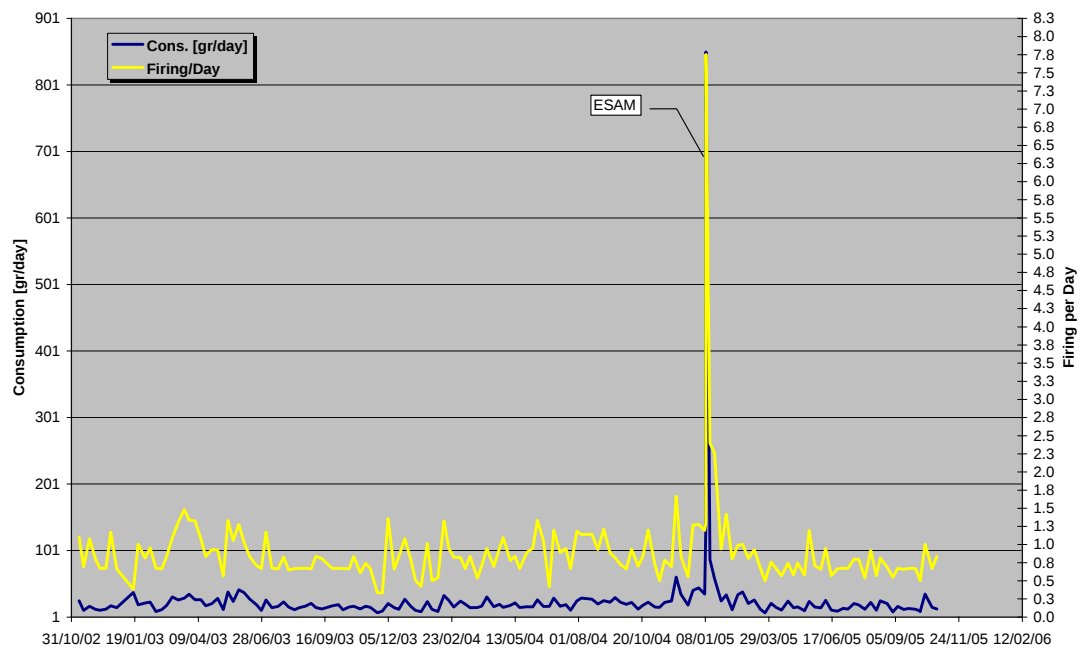
During this period, 88 Open Loop Slews, 92 Closed Loop Slews and 6 Momentum Bias were executed (TL + manual recovery). 3 slews (1 CSL, 2 OSL) were lost from the Timeline during this period due to problem on IMCS and FDS

This is equivalent to a 1.7 % of the total number of slews planned (181).

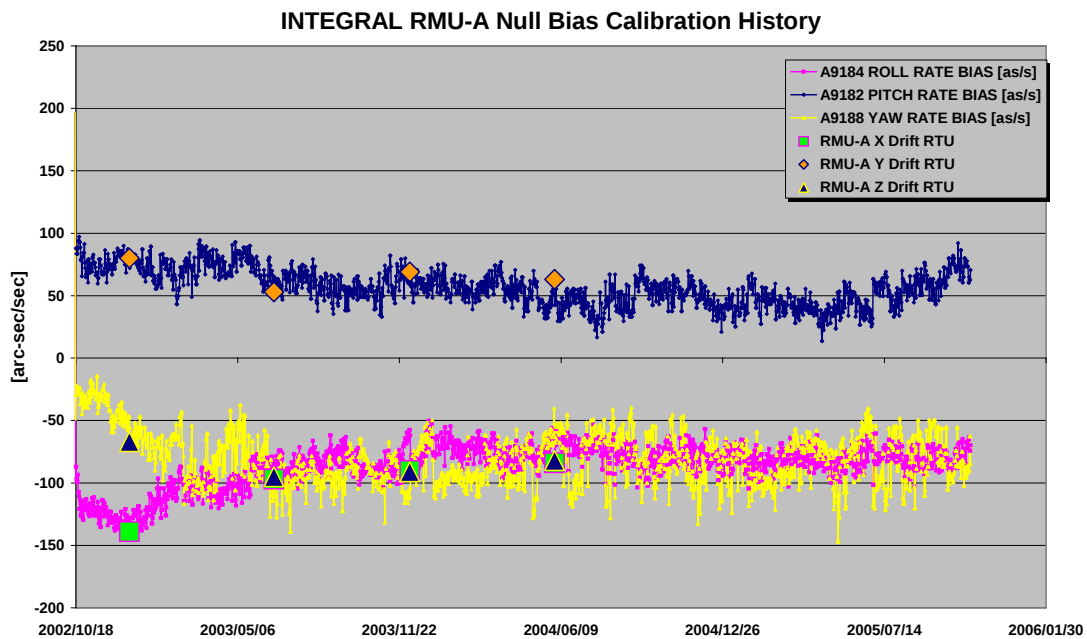
The fuel consumption (total, grams/day) over the period between 01/11/2002 and 27/10/2005 is reported in the plot below.



The fuel consumption (grams\day) over the period between 01/11/2002 and 27/10/2005 is reported in the plot below.



The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 27/10/2005 is reported in the plot below.



22/10/05 (Day of Year 295, Revolution 369)

Nothing to report.

23/10/05 (Day of Year 296, Revolution 369)

ACC Yaw and Pitch Errors: reported at 02:32z, after the execution of slew ID 03690048 (OSL) several occurrences of OEMs APID 640 ID 50 <<ACC YAW ERR>> and ID 49 <<ACC PITCH ERR>>. A neighbour star,

Mi 8.01 at CCD location [3434, 10597]

as reported from the FDS star catalogue and attitude log file, was observed at $\sim$ the position of the picked STR guide star Mi 7.6 [3174, -10268] and likely this caused the generation of the OEMs. The STR could not determine the barycentre of the system of the two stars with the expected accuracy and this caused the generation of the OEMs above and the flickering of the ACC pointing bit, not seen anyway at OTF level. As example, the inaccuracy in Y position resulted in <350 ccd units ~ 86 arcsec ~ 2 pixels. The situation was cleared at the execution of the following CSL (ID 03690049).

No impact on TL reported.

24/10/05 (Day of Year 297, Revolution 369-370)

Nothing to report.

25/10/05 (Day of Year 298, Revolution 370)

OTF low during PID 03700027: Due to star lost on STR when the guide star was Mi 5.3 at CCD location [-14338, -22203], the OTF went low and the pointing not reached. The reason of the star lost is likely due a false event and to the position of the guide star, at the edge of the STR FOV.

The next slew (CSL) for PID 03700028 was manually updated and executed from the Timeline.

No impact on TL

IMU 1-2 calibration/health-check and RMU-B health-check: In preparation for the winter eclipse season and as part of the periodic AOCS calibrations, a calibration and health-check of IMU 1-2 units was performed. In parallel, RMU-B was switched on and its overall status was checked. The checks showed that all the IMUs as well as the redundant RMU are healthy. The timeline of this operation as well as the obtained drift and noise levels of the selected IMU channels are presented in the following table:

Time z	IMU1 IMU2 Health-Check / Calibration and RMU-B Health Check 25/10/2005 (DoY 298, rev 370)		
07:05	Disable ACC Autonomous IMU Switch Off, FCP-AOC-1051	Step 1, IMU1 PID 03700029 Start at 07:02:30 End at 07:52:30	
07:18:00 07:20:36	IMU1 Switch On, FCP-AOC-1600 RMU-B switch On, FCP-AOC-1902		
07:27 07:36	Set IMU Selection ACC: IMU1 on Roll, IMU1 on Yaw, FCP-AOC-1050 FDE: IMU1-X on Roll, IMU1-Z on Yaw, FCP-AOC-1218		
	IMU warm-up time (>30 minutes)		
08:04:05 08:07:17	Reset IAAD Accumulators, FCP-AOC-1210 Reset FCE RMU Integrators, FCP-AOC-1254 Perform IMU-1 Drift and Noise evaluation, FCP-AOC-0523 step 8	PID 03700030 Start at 07:54:26 End at 08:44:26	
08:04:05 to 08:43:00	~39 minutes of data collection From TM: IMU1 Noise Roll = 0.2554as/s IMU1 Drift Roll = 0.1633 as/s IMU1 Noise Yaw = 0.1237 as/s IMU1 Drift Yaw = 0.1867 as/s	Calculated by FD: => 0.1604 as/s => 0.2021 as/s	Stable pointing: PID 03700030 Start of Slew 03700031: 08:44:26
09:03	Deselect IMU1 from ACC Word B, FCP-AOC-1050	PID 03700031 Start at 08:46:22 End at 09:36:22	
09:09	Deselect IMU1 from FDE, FCP-AOC-1218		
09:11:18	Switch Off IMU1, FCP-AOC-1601		

09:17	Re-enable ACC Autonomous IMU Switch Off, FCP-AOC-0526	
09:21:29	RMU-B switch Off, FCP-AOC-1903	
Thermal stabilisation after IMU1 Switch Off (> 2 hours) PID 03700032-PID 03700033 09:05:00 – 11:22:03		
11:29	Disable ACC Autonomous IMU Switch Off, FCP-AOC-1051	Step 2, IMU2 PID 03700034 Start at 11:22:03 End at 12:12:03
11:48:08	IMU2 Switch On, FCP-AOC-1602	
11:54:01 11:59:00	Set IMU Selection ACC: IMU2 on Roll, IMU2 on Yaw, FCP-AOC-1050 FDE: IMU2-X on Roll, IMU2-Z on Yaw, FCP-AOC-1218	
	IMU warm-up time (>30 minutes)	
12:22:23	Reset IAAD Accumulators, FCP-AOC-1210 Perform IMU-2 Drift and Noise evaluation, FCP-AOC-1635 step 8	PID 03700035 Start at 12:13:59 End at 13:03:59
12:22:23 to 13:02:00	~39 minutes of data collection From TM: IMU2 Noise Roll = 0.3094 as/s IMU2 Drift Roll = 0.1517 as/s IMU2 Noise Yaw = 0.0435 as/s IMU2 Drift Yaw = -0.0348 as/s Calculated by FD: => 0.1487 as/s => -0.0357 as/s	Stable pointing: PID 03700035 Start of Slew 03700036: 13:03:59
13:15	Deselect IMU2 from ACC Word B, FCP-AOC-1050	PID 03700036 Start at 13:05:55 End at 13:55:55
13:19	Deselect IMU2 from FDE, FCP-AOC-1218	
13:23:05	Switch Off IMU2, FCP-AOC-1603	
13:27	Re-enable ACC Autonomous IMU Switch Off, FCP-AOC-0526	

FDS failed slew update: at 08:51z the FDS failed to generate the update for slew ID 03700032. Not enough stars were detected to perform a close loop slew at the moment of the attitude reconstruction process.

A manual recovery was then performed to the attitude of PID 03700032 by generating an OSL. The next slew (CSL) for PID 03700033 was manually updated and executed from the Timeline.

The following slews were not executed from TL while recovering the AOCS s/s: 03700032 (CSL)

STR 1750 processor fault: at 23:05:48z a STR 1750 processor faults occurred during the execution of the PID 03700047. The sequence of the events was:

23:04:25z Close Loop Slew End for PID 03700047
23:05:37z Mapping start
23:05:48z Mapping End prematurely (aborted)
23:05:48z IMU1 ON
23:05:48z New automatic mapping commanded by the ACC. The acquired guide star was Mi 8.4 at CCD location [-952 , -323]
23:15:48z IMU1 OFF

The fault, which occurred after the end of the close loop slews, resulted in the abortion of the on-going commanded mapping (duration shortened to few sec), IMU switch ON, and start of a new mapping. The guide star at the moment of the fault was

Mi 5.3 at CCD location [12515, -15373]

The guide star picked after the new mapping was

Mi 8.4 at CCD location [-952, -323]

Likely a bright object, in the STR FoV, located at the same CCD detectors column of the used guide star, caused the fault and the abortion of the mapping.

The next slew (CSL) for PID 03700048 was manually updated and executed from the Timeline. No slews were missed. The operational impact of the fault was the OTF not reached during PID 03700047.

26/10/05 (Day of Year 299, Revolution 370)

Nothing to report.

27/10/05 (Day of Year 300, Revolution 370-371)

Nothing to report.

28/10/05 (Day of Year 301, Revolution 371)

Update of the ACC IMU drift corrections: Starting at 08:25z, the on-board ACC IMU drift corrections were updated with the results of the IMU1-2 calibration, which was performed on 25/10/2005. The uplinked values are shown below:

AEDRA_00 S
M F 12
2005-10-28T13:00:00Z
2005-10-28T13:00:00Z
AAAA1
IMU1_R_1 R 0.7777236E-06 r/s D IMU 1 roll 1
IMU1_R_2 R 0.7777236E-06 r/s D IMU 1 roll 2
IMU1_Y_1 R 0.9797260E-06 r/s D IMU 1 yaw 1
IMU1_Y_2 R 0.9797260E-06 r/s D IMU 1 yaw 2

IMU2_R_1 R 0.7209470E-06 r/s D IMU 2 roll 1
 IMU2_R_2 R 0.7209470E-06 r/s D IMU 2 roll 2
 IMU2_Y_1 R -0.1731754E-06 r/s D IMU 2 yaw 1
 IMU2_Y_2 R -0.1731754E-06 r/s D IMU 2 yaw 2
 IMU3_Y_1 R -0.3133351E-06 r/s D IMU 3 yaw 1
 IMU3_Y_2 R -0.3133351E-06 r/s D IMU 3 yaw
 IMU4_R_1 R -0.4720631E-06 r/s D IMU 4 roll 1
 IMU4_R_2 R -0.4720631E-06 r/s D IMU 4 roll 2

Slews missed from the Timeline: Due to a problem on IMCS-A chain (PDS task and SODA server on FDS not running), was required to move the operations to the IMCS-B chain. The slew ID 03710044 was then executed from B-chain.

The AOCS s/s was disabled in TL at 22:54z due to the failing of the slew update in FDS.

At 23:42z the operations were moved back on the IMCS-A chain.

A manual recovery was attempted from attitude of PID 03710044 to the attitude of PID 03710046. The next slew (CSL) for PID 03710047 was manually updated and executed from the Timeline.

The AOCS s/s was re-enabled in TL on DoY 302 at 00:22z.

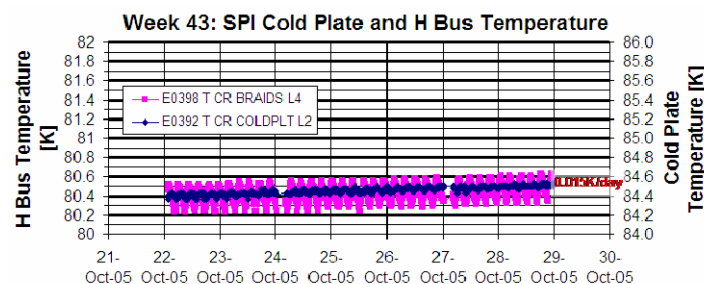
The following slews were not executed from TL while recovering the AOCS s/s: 03710045(OSL)-46(OSL).

8.3.2 SPI Operations

Stirling compressors and Cryostat:

The performance of the compressors is nominal. The cold plate temperature was maintained at 85K+/-1K showing the usual positive drift with the expected slope (+0.005K/day).

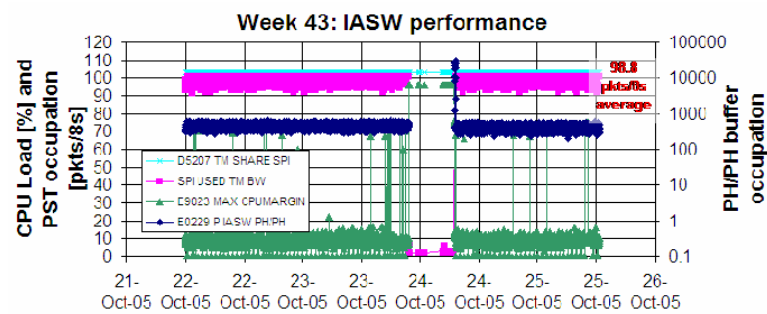
The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period.



DPE & IASW:

The IASW performance is nominal.

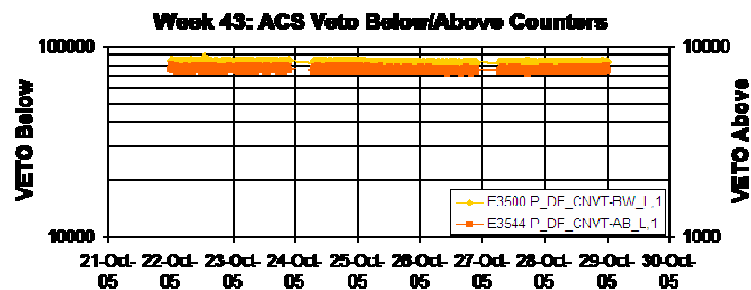
The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS:

The performance of the ACS is nominal.

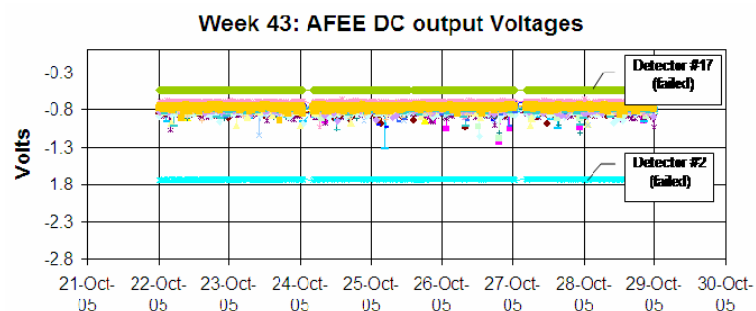
The following plot shows the ACS overall count rate evolution during the reporting period.



AFEE:

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

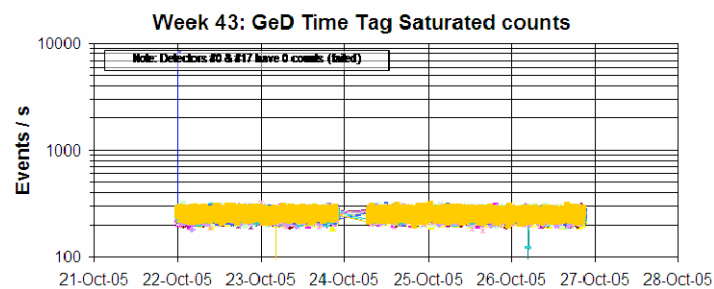
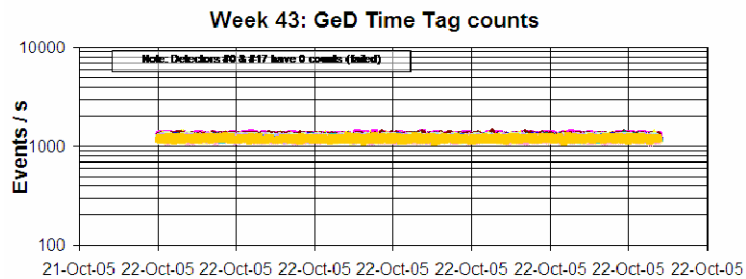
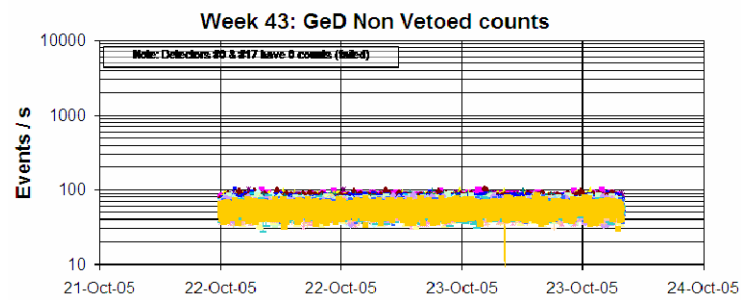
The following plot shows the dc voltage offset of the detector channels during the reporting period.



DFEE:

The performance of the unit is nominal.

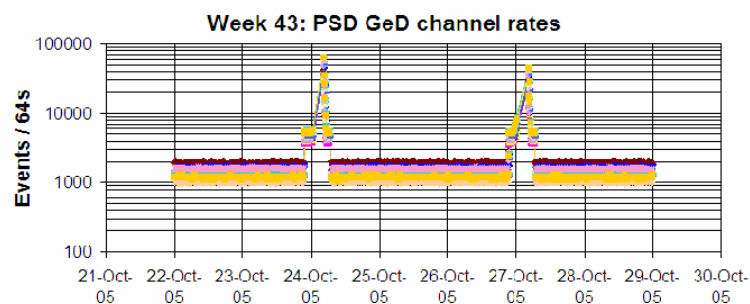
The following plots show the count rates of the detectors during the reporting period (due to problems in the data retrieval tool, some gaps could be present).



PSD:

The performance of the unit is nominal.

The following plots show the PSD channel rates during the reporting period.



SPI EVENTS LOG

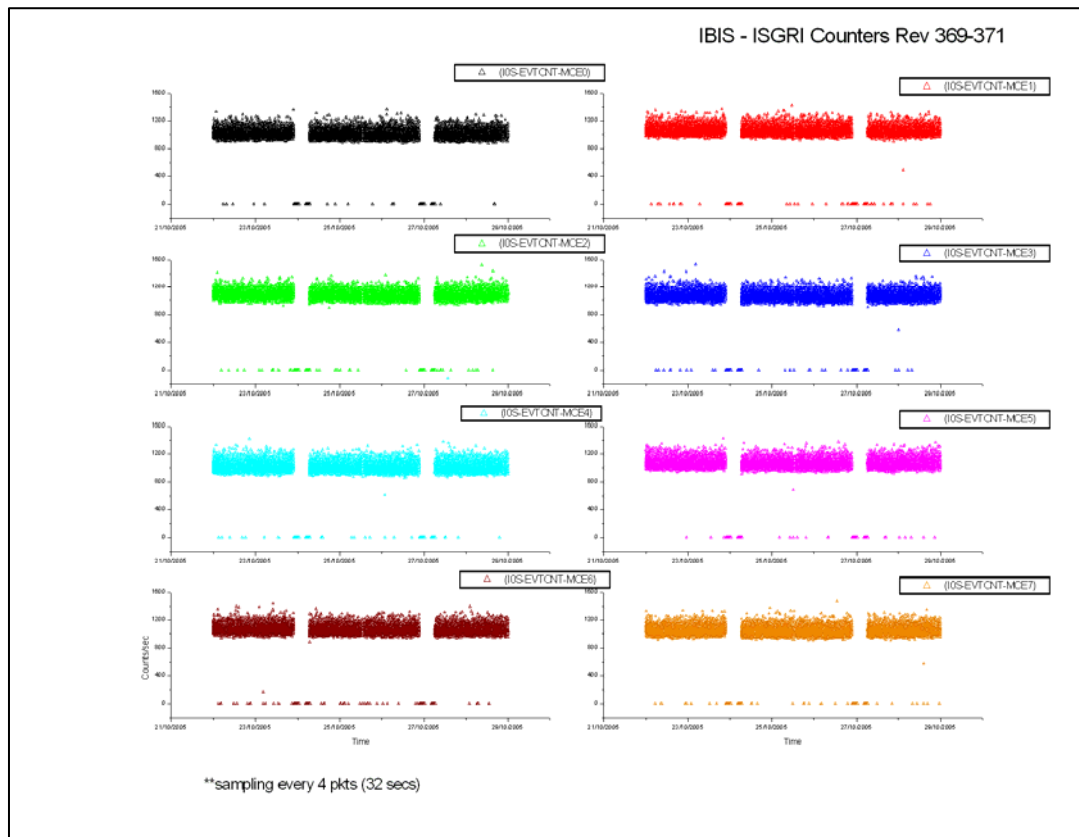
NOTE: The events log is extracted from the revolution pass summaries (courtesy of the Integral Analysts).

No special events to report.

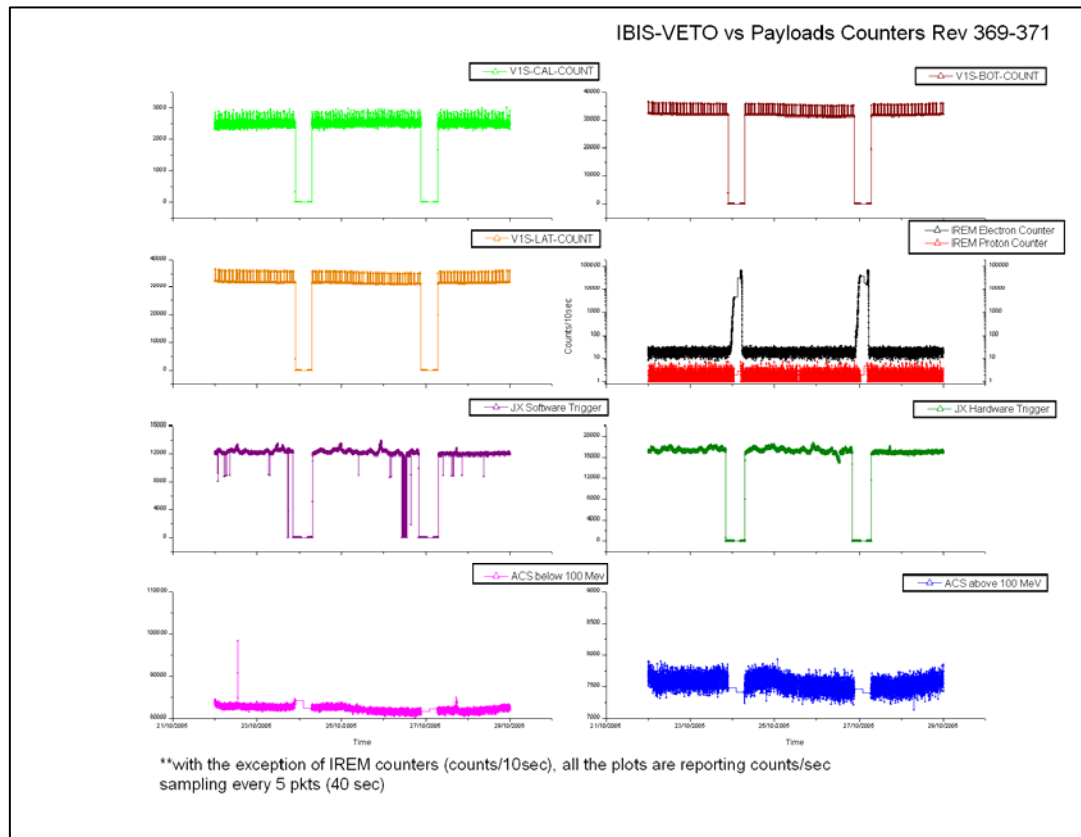
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

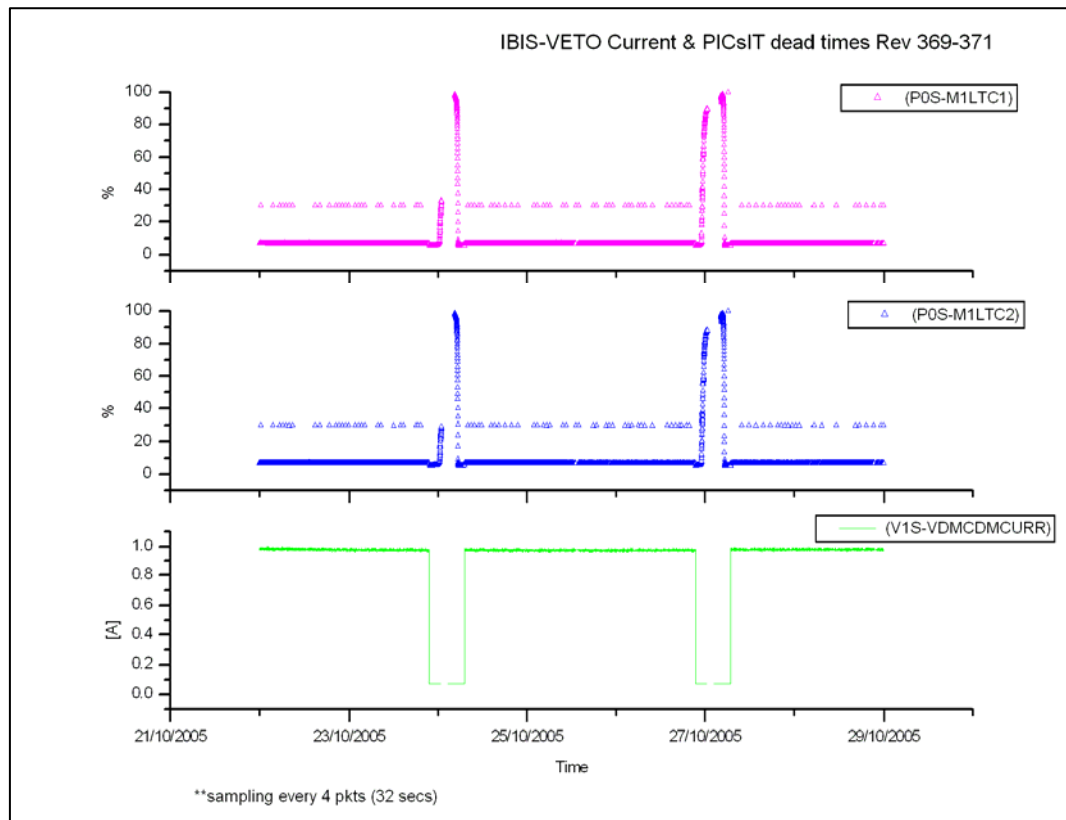


VETO vs Payloads Counters:

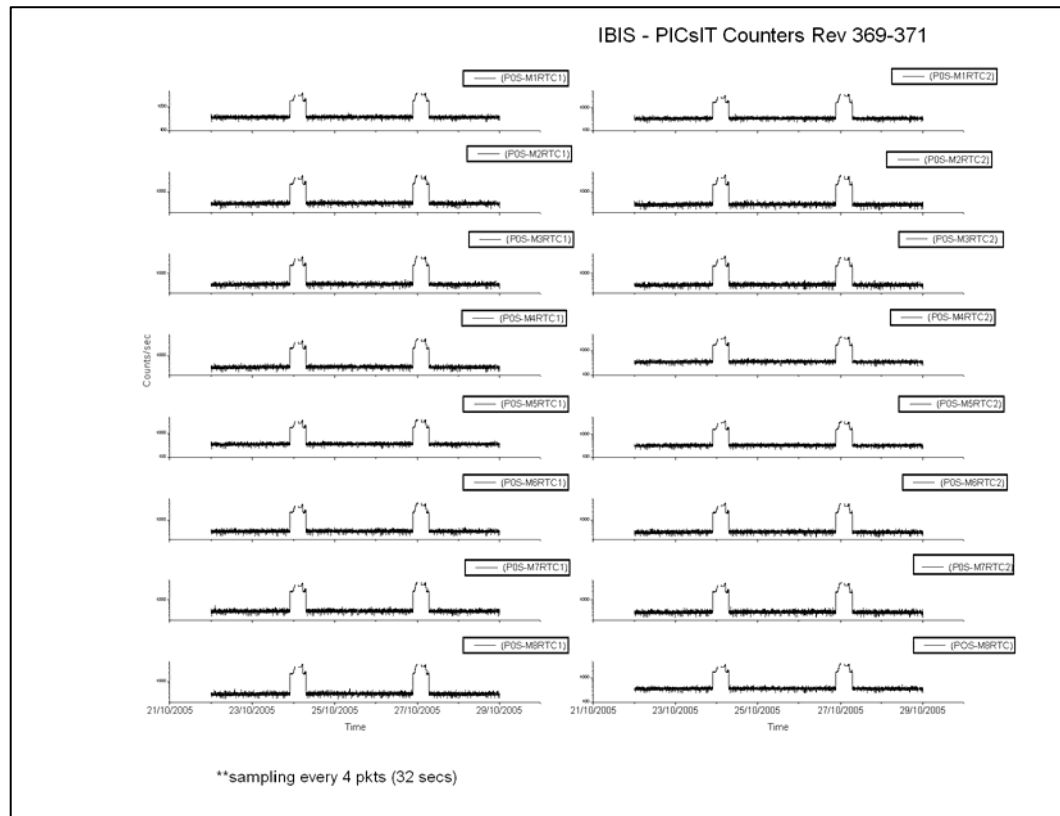


The week was characterised by low radiation.

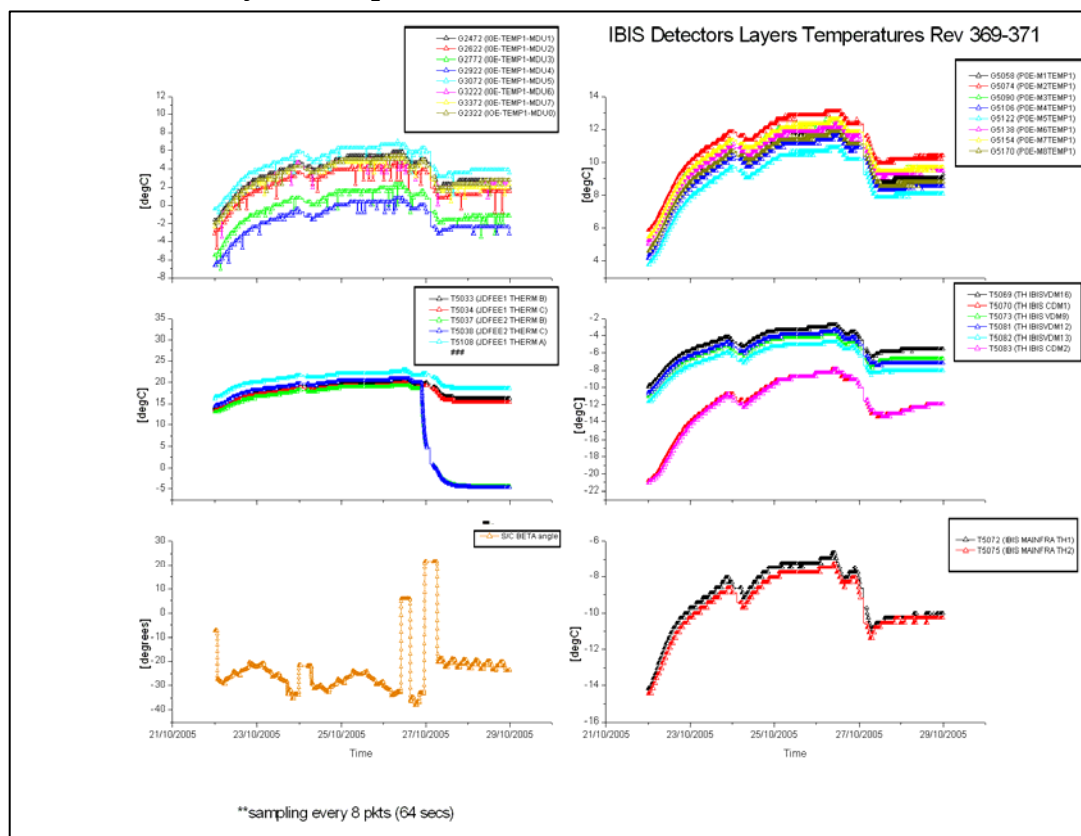
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



It can be noted on the temperature plot that T5038 (JDFEE 2 thermistor C) features a step down on the 26th. Actually this is because JEM-X2 DFEE was switched OFF again.

IBIS daily report:

DoY 2005.296 (23/10/2005):

At 17:29Z, the imca command verifier died and therefore ED GESTAN02 was not uplinked from the timeline. It was instead uplinked at 17:36Z manually.

At 21:38Z TM parameter G8015 (28V PMT set by IASW) went OOL High with the value 29.4V. It went back inside limits on DoY 297 at 7:08Z. As this happened inside the radiation belts, according to V-VLT-1 no action was taken.

DoY 2005.297 (24/10/2005):

At 00:54Z, TM parameter G5079 (P0S-M2ASICLINE) went OOL high and back. According to P-VLT-2, as this happened only for one cycle, no action was taken.

At 04:58Z, TM parameters G5028 (P0S M6 RTC2), G5023 (P0S M5 RTC2), G5013 (P0S M3 RTC2) and G5037 (P0S M8 RTC1) were toggling OOL high until 05:14Z. According to P-CNT-1, no action was taken.

At 06:35Z, TM parameter G2014 (I0E-OVDWPXADD-M1) failed SCC and back. At 06:47Z, TM parameter G2070 (I0E-OVDWPXADD-M5) failed SCC and back. According to I-OVF-1 no action was taken.

DoY 2005.299 (26/10/2005):

At 21:24Z TM parameter G8015 (28V PMT set by IASW) went OOL High with the value 29.4V. It went back inside limits on DoY 300 at 6:53Z. As this happened inside the radiation belts, according to V-VLT-1 no action was taken.

At 23:44Z, TM parameters G5027 (P0S M6 RTC1), G5028 (P0S M6 RTC2), G5017 (P0S M4 RTC1) and G5032 (P0S M7 RTC1) were toggling OOL high until DoY 300 at 00:37Z (LOS). According to P-CNT-1, no action was taken.

DoY 2005.300 (27/10/2005):

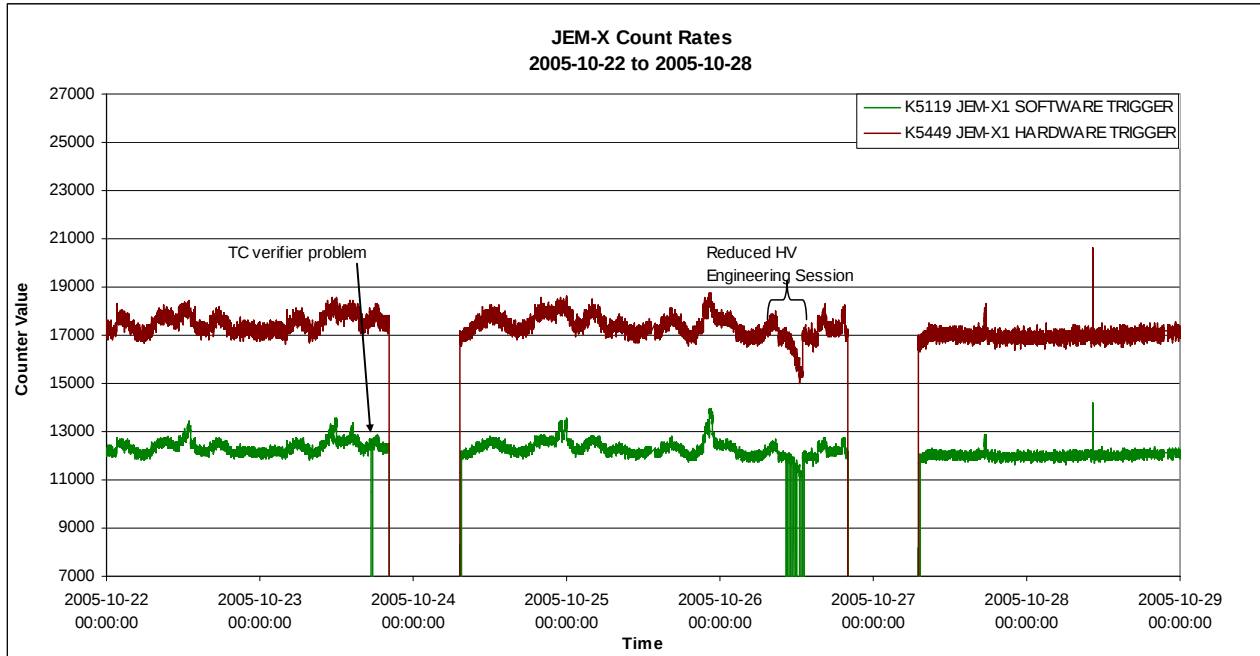
At 06:29Z, TM parameter G2014 (I0E-OVDWPXADD-M1) failed SCC and back. According to I-OVF-1 no action was taken.

At 13:47Z, TM parameter G2056 (I0E-OVDWPXADD-M4) failed SCC and back. This occurred again on DoY 301 at 04:38Z and 05:48Z. According to I-OVF-1 no action was taken.

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

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



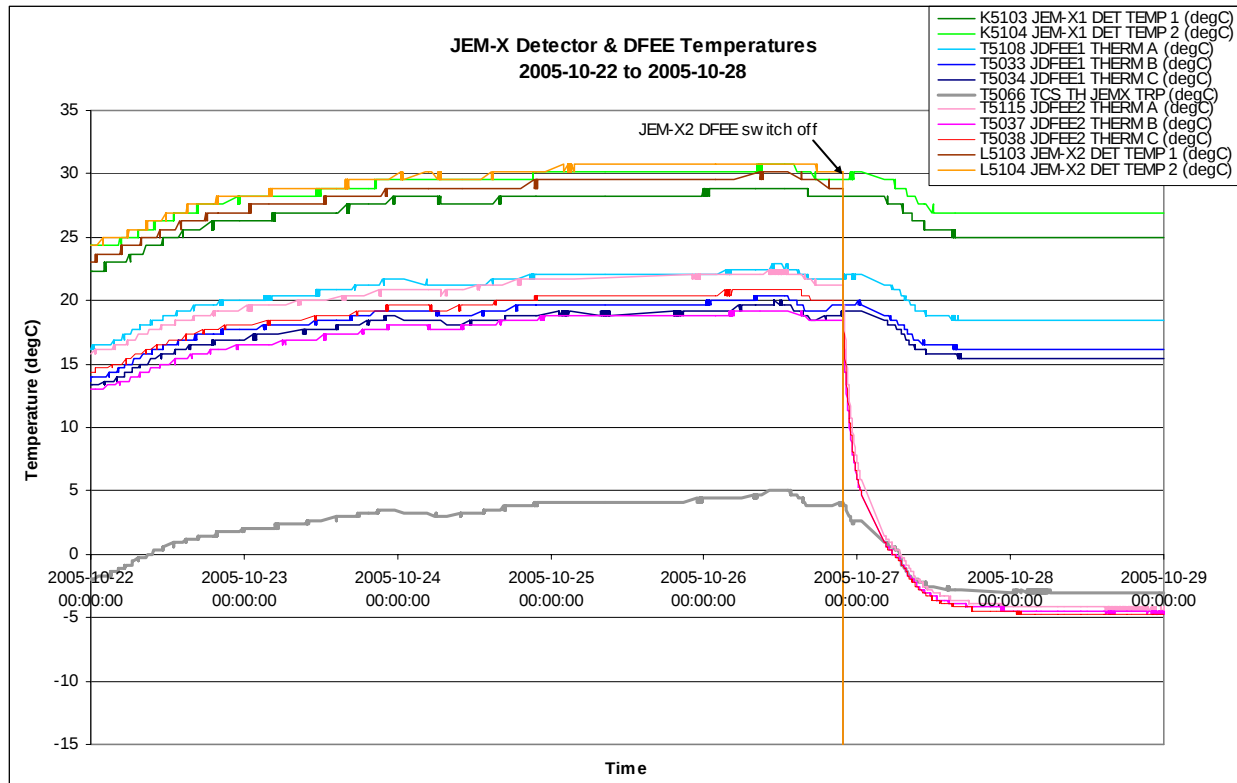
8.3.4.2 JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph².

The effect of the switch-off of the JEM-X2 DFEE on 2005-10-26 is evident. The JEM-X1 temperatures decreased by ~3 degC and those of JEM-X2 by ~25 degC.

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

² Data sampled (1 frame in 8)



8.3.4.3 JEM-X Daily Report 2005-10-22 (DOY 295, Rev 369)

Nothing to report

2005-10-23 (DOY 296, Rev 369)

Due to a problem with the command verifier task of the IMCS, the ED KEDATA02 scheduled at 17:29:00Z failed to execute after the TC K0009, thus JEM-X1 was left in Setup mode. Once the verifier was reconnected, the rest of the ED was resent manually starting at 17:39:49Z and JEM-X1 was returned to Data Taking mode at 17:43:55Z. JEM-X1 operations then continued nominally.

2005-10-24 (DOY 297, Rev 369-370)

In line with OCR-201 and INT_OR_0223, the JEM-X2 anode calibration and HV activation was completed via Timeline (JEM-X2 microstrip gas gain voltage (dV) set to nominal minus 9 steps, i.e. 65RAW) at the start of revolution 370 in preparation for the upcoming reduced HV engineering session. Once this was completed, at 07:27:57Z, FCP_JEM2_0041 was executed to put JEM-X2 in Setup mode. This was in order to prevent saturation of the buffer while the TM allocation to JEM-X2 was 1 packet/cycle. JEM-X2 remained in Setup mode with the high voltage on for the rest of the day. (JEM-X1 operations were nominal.)

2005-10-25 (DOY 298, Rev 370)

JEM-X2 remained in Setup mode with the high voltage on (dV = nominal – 9 steps) throughout the day. (JEM-X1 operations were nominal.)

2005-10-26 (DOY 299, Rev 370)

In line with OCR-201 (Special JEM-X1 and 2 reduced HV engineering session during October 05 OMC Flat Field) and INT_OR_0223, the following operations were performed:

- 09:58Z: commanding to JEM-X1 and JEM-X2 from the Timeline was disabled.
- 10:19:42Z (start of OMC Flat Field Calibration): JEM-X1 commanded to Setup mode (FCP_JEM1_0041) and then DFEE Integer parameter #64 set to 1023 RAW DEC for both JEM-X1 and JEM-X2 (FCP_JEM1/2_0070)
- **10:22:42Z - 10:39:22Z (Observation 1):** JEM-X1 and JEM-X2 in Data Taking (TEST) with JEM-X1 dV = 76RAW and JEM-X2 dV = 65RAW (FCP_JEM1/2_0044)
- 10:39:53Z: JEM-X1 and JEM-X2 microstrip gas gain voltage (dV) reduced by 1 step (FCP_JEM1/2_0041 & FCP_JEM1/2_0032)
- **10:43:23Z - 11:00:03Z (Observation 2):** JEM-X1 and JEM-X2 in Data Taking (TEST) with JEM-X1 dV = 75RAW and JEM-X2 dV = 64RAW (FCP_JEM1/2_0044)
- 11:00:33Z: JEM-X1 and JEM-X2 microstrip gas gain voltage (dV) reduced by 1 step (FCP_JEM1/2_0041 & FCP_JEM1/2_0032)
- **11:04:04Z - 11:20:44Z (Observation 3):** JEM-X1 and JEM-X2 in Data Taking (TEST) with JEM-X1 dV = 74RAW and JEM-X2 dV = 63RAW (FCP_JEM1/2_0044)
- 11:21:14Z: JEM-X1 and JEM-X2 microstrip gas gain voltage (dV) reduced by 1 step (FCP_JEM1/2_0041 & FCP_JEM1/2_0032)
- **11:24:44Z - 11:41:25Z (Observation 4):** JEM-X1 and JEM-X2 in Data Taking (TEST) with JEM-X1 dV = 73RAW and JEM-X2 dV = 62RAW (FCP_JEM1/2_0044)
- 11:41:55Z: JEM-X1 and JEM-X2 microstrip gas gain voltage (dV) reduced by 1 step (FCP_JEM1/2_0041 & FCP_JEM1/2_0032)
- **11:45:25Z - 12:02:06Z (Observation 5):** JEM-X1 and JEM-X2 in Data Taking (TEST) with JEM-X1 dV = 72RAW and JEM-X2 dV = 61RAW (FCP_JEM1/2_0044)
- 12:02:36Z: JEM-X1 and JEM-X2 microstrip gas gain voltage (dV) reduced by 1 step (FCP_JEM1/2_0041 & FCP_JEM1/2_0032)
- **12:06:06Z - 12:22:46Z (Observation 6):** JEM-X1 and JEM-X2 in Data Taking (TEST) with JEM-X1 dV = 71RAW and JEM-X2 dV = 60RAW (FCP_JEM1/2_0044)
- 12:23:16Z: JEM-X1 and JEM-X2 microstrip gas gain voltage (dV) reduced by 1 step (FCP_JEM1/2_0041 & FCP_JEM1/2_0032)
- **12:26:47Z - 12:43:27Z (Observation 7):** JEM-X1 and JEM-X2 in Data Taking (TEST) with JEM-X1 dV = 70RAW and JEM-X2 dV = 59RAW (FCP_JEM1/2_0044)
- 12:49:15Z: JEM-X1 DFEE Integer parameter #64 set to 760 RAW DEC (FCP_JEM1_0041, FCP_JEM1_0070)

- 12:50:09Z: JEM-X2 DFEE Integer parameter #64 set to 776 RAW DEC (FCP_JEM2_0070)
- 12:51:08Z: JEM-X2 commanded to Safe mode (FCP_JEM2_0040)
- 12:51:57Z: JEM-X1 microstrip gas gain voltage (dV) set back to nominal (76RAW) (FCP_JEM1_0032)
- 13:00:32Z: JEM-X1 commanded back to Data Taking (FULL IMAGING) via FCP_JEM1_0044
- 13:09Z Commanding to JEM-X1 from the Timeline re-enabled
- 13:46Z Commanding to JEM-X2 from the Timeline re-enabled

At 21:42:04Z, after radiation belt entry of revolution 370, the JEM-X2 DFEE was switched off via FCP_JEM2_9010.

2005-10-27 (DOY 300, Rev 370-371) to 2005-10-28 (DOY 301, Rev 371)

Nothing to report

8.3.5 OMC Operations

2005-10-22 (DOY 295, Rev 369)

Nothing to report

2005-10-23 (DOY 296, Rev 369)

Due to a problem with the command verifier task of the IMCS, the Star Tracker mapping, part of the OMC Imaging EDs for pointing ID 3690065 and the ED DEBPFU00 to unmask the OTF at the start of the pointing were missed from the Timeline. Thus OMC was left in Standby mode. Once the verifier was reconnected, the Imaging EDs for this pointing were re-uplinked manually starting at 17:35:57Z. However, as the OTF was still low (masked) OMC remained in Standby until 18:06:58Z, with pointing ID 3690066, when the missed ED DEBPFU00 was re-uplinked. OMC operations then continued nominally.

2005-10-24 (DOY 297, Rev 369-370) to 2005-10-25 (DOY 298, Rev 370)

Nothing to report

2005-10-26 (DOY 299, Rev 370)

From 10:19:10Z to 13:42:15Z OMC Flat Field and Dark Current calibrations were performed, consisting of 6 Flat Field shots and 1 Dark Current shot, all of which were executed nominally.

2005-10-27 (DOY 300, Rev 370-371)

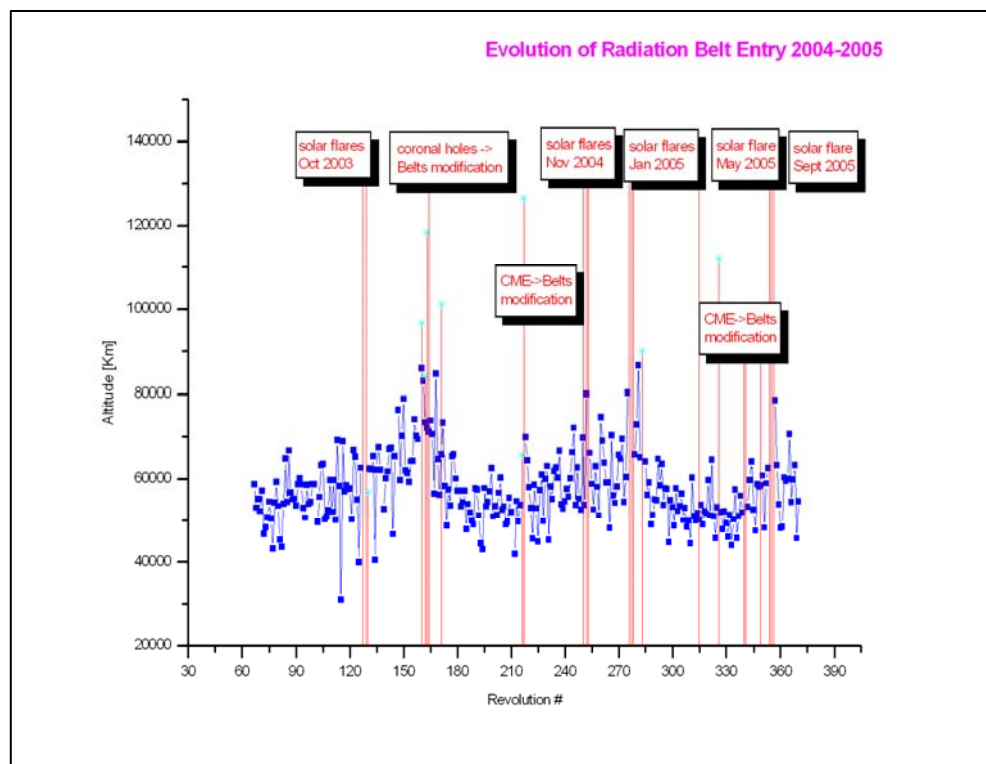
Nothing to report

2005-10-28 (DOY 301, Rev 371)

Due to problems with the IMCS (PDS task), slew ID 3710045 was missed from the Timeline. OMC continued in Science Normal mode until 23:59:23Z, when it transitioned to Standby during the manual slew from pointing ID 3710044 to 3710046 (performed slightly earlier than planned in the Timeline). OMC operations resumed nominally from PID 3710046.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

On DoY 2005.300 at 00:23Z, TC U4921 (INT GND LINK OFF) failed CEV due to a late update of the Command Verifier task. The execution of this TC was verified against the relevant TM parameter (U9903) using the monitoring task, and no further action was taken.

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
369	RAD_ENTR R 2005-10-23T21:38:44Z	2005-10-23 23:29:37	45708.0	2005-10-23 22:35:39	52288
370	RAD_EXIT R 2005-10-24T06:55:31Z	2005-10-24 05:44:49	>>24948.7	2005-10-24 05:55:39	31026
370	RAD_ENTR R 2005-10-26T21:24:11Z	2005-10-26 22:06:01	54632.9	2005-10-26 22:20:22	52562
371	RAD_EXIT R 2005-10-27T06:40:54Z	2005-10-27 05:34:49	<30437.9	2005-10-27 05:40:22	30728

Reference

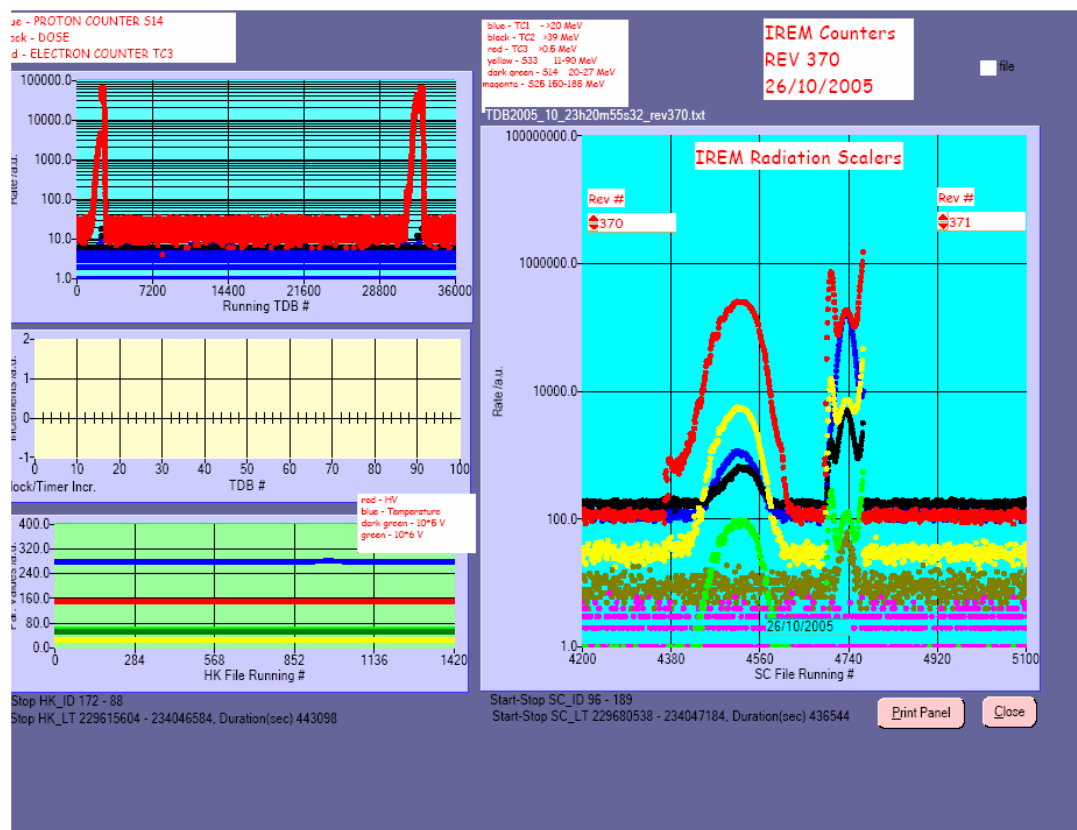
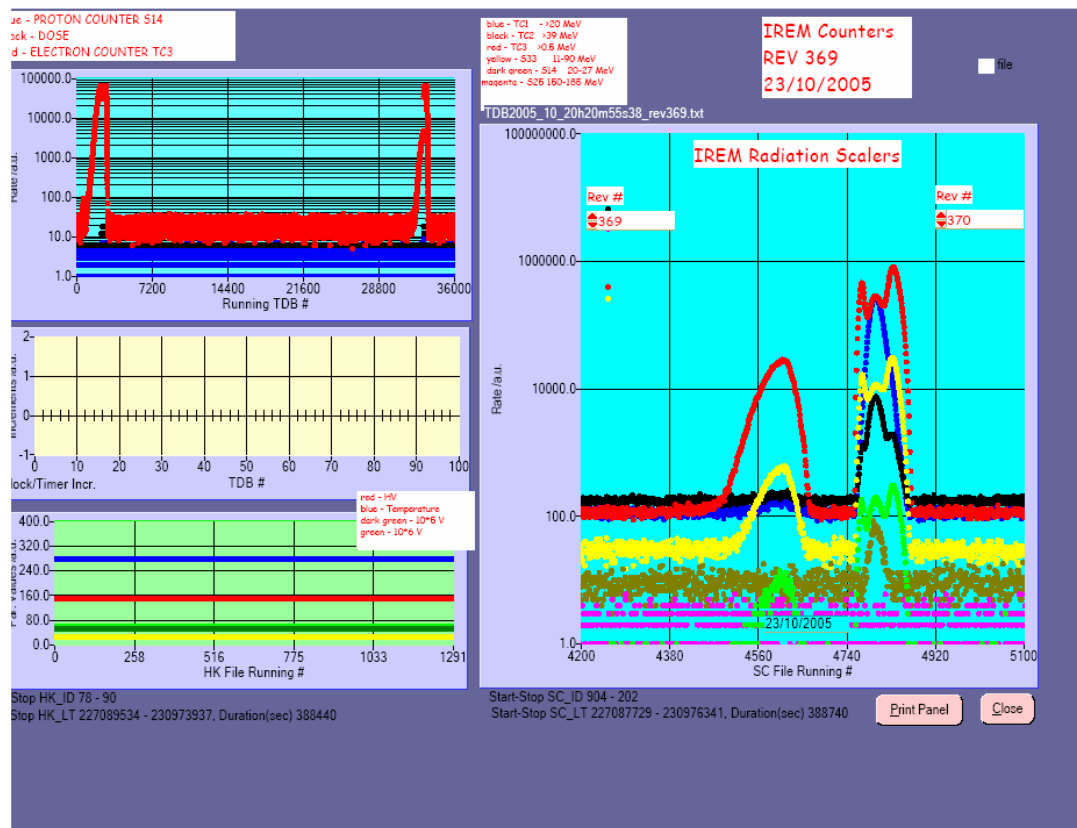
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

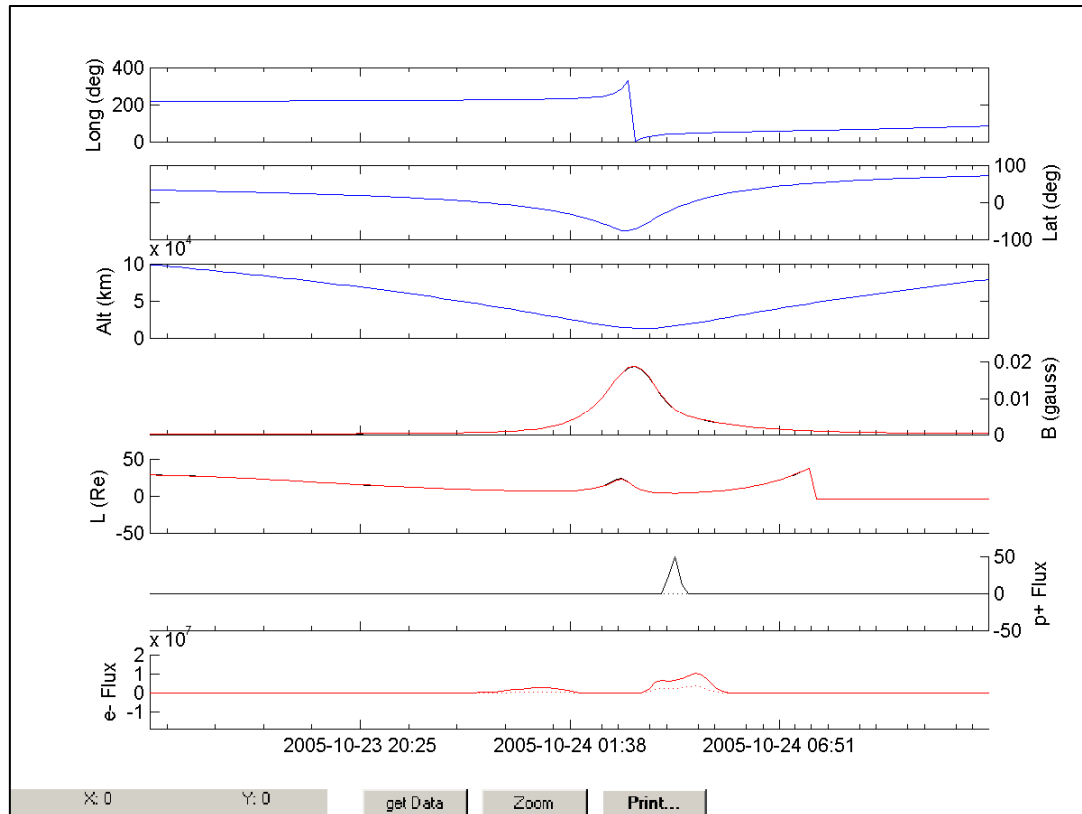
High Radiation

IREM radiation counters:

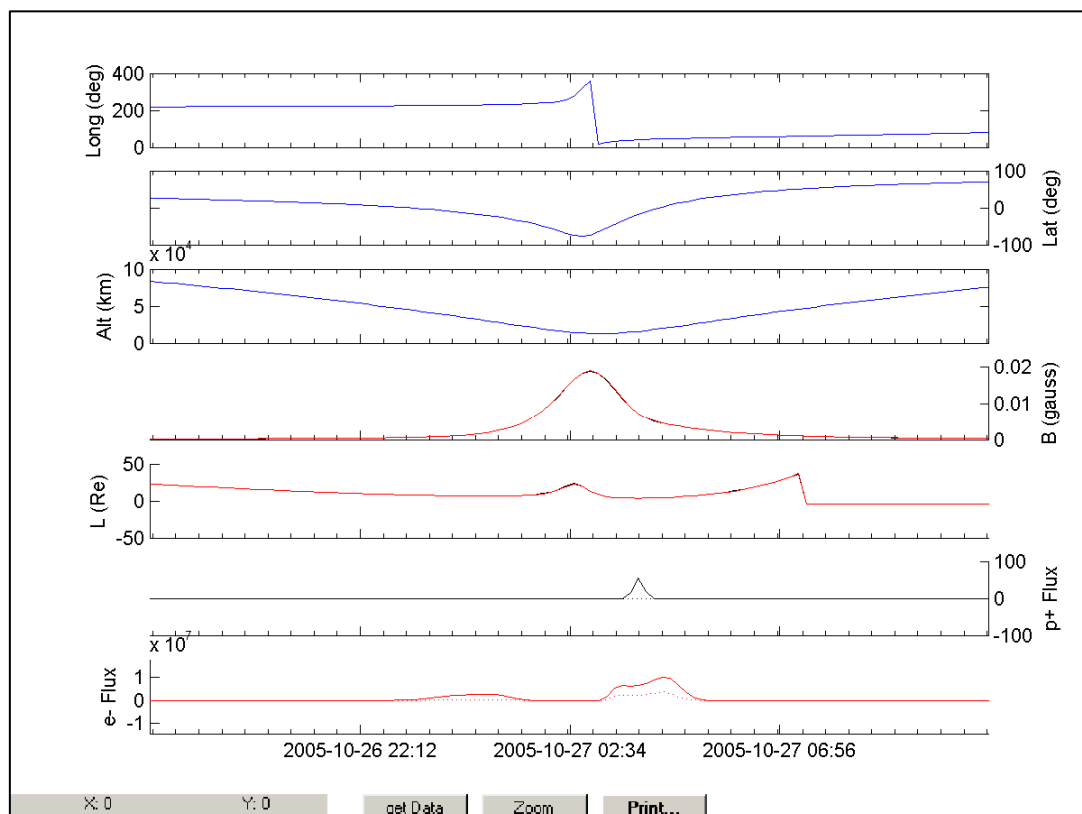


IREM Predicted Radiation Belt Passages:

Rev 369:



Rev 370



SEC-GOES Observed Particles Fluxes:

