

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-TOS-OF
No. 081
Week 15
12.04.04
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 03.03.04 until 09.04.04 (both dates inclusive) and covers the revolutions 180, 181 & 182.

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 S5 0716+71 (RA 07:21:53.40; DEC +71:20:36.0); the Galactic Plane; the Galactic Center (RA 17:45:40.00; DEC -29:00:28.0) and IC443 (RA 06:18:4.00; DEC +22:27:28.0). The activities consisted of GPS and GCDE observations, as well hexagonal 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.

During the EPOS generation for revolutions 180 and 181, the Timeline update jobs were not scheduled in the Flight Dynamics system. The first three Open loop Slews of revolution 180 were executed with the Timeline default values and without being updated. The fourth slew, which was a Close Loop one, failed execution because the commanded star for the slew could not be located in the Search-and-Track process. The missing jobs of this revolution were then scheduled as part of the recovery actions. At the beginning of revolution 181 it was also realized that the Timeline update jobs are missing. This time the AOCS commanding was stopped and the first five slews were missed from the Timeline. As before, the missing jobs were scheduled as part of the recovery actions.

There was a flickering of the OTF at the end of Open Loop Slew 01810057, due to a roll error. The error was introduced by a poor roll estimation during the attitude determination process. The attitude determination was based on the mapping after Close Loop Slew 01810056, in which only four stars could be matched for the attitude reconstruction.

The fuel consumption over the period between 02/04/2004 and 09/04/2004 was 0.198 kg. The remaining propellant is in the order of 171.323 Kg on the 9th of April.

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, an assigned TM bandwidth in the science windows of 98 pkts/cycle and an actual average occupation of 92.4 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.

There was a High Voltage break-down of the VETO VDM # 15 reported during revolution 180, (the second since Dec 2003): the unit was recovered successfully and is under constant monitoring. No occurrence of anomalous OEM generation (ID 183-184-179-180, Class 2) was observed.

Since the beginning of March the unit is working with an updated version of the PICsIT binning table (HEPI table).

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

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.

JEM-X1 was operated in Data Taking mode during science observations, with a TM allocation of 8 packets/cycle. JEM-X2 was dormant 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.

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 136 OMC pointings executed nominally, 2 were lost, and one started about 5 minutes 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 characterised by low solar activity and few isolated low radiation spikes were reported.

A detailed analysis regarding the evolution of the Radiation Belt entry is provided in the Appendix.

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 this week, well above the system performance requirements. However there were again problems related to the ground stations but their impacts were limited.

4.1 Mission Operations Centre

The performance of the MOC was good in the reporting period, there were however, repeated problems with FTP file transfers from the FD system.

4.2 Ground Stations & Network

The performance of the ground stations and Network was in general good this week. There were a few problems with links to the ground stations and station handovers, for details see chapter 6.

4.3 Science Ground Segment

There were still some problems with the planning inputs from ISOC, these were corrected manually.

4.3.1 ISOC

1. Mission planning

PSF's: Received up to rev. 188 (no change)

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POS and POD generated: up to rev 188 (no change)
TSF's: Received up to rev 183 (no change)

This week has again seen a lot of replanning and interactions between MOC and ISOC. Revolution 184 was replanned on request of the observer. The observation was changed to staring mode instead of hexagonal dither. Revolutions 183, 185 and 186 had wrong JEM-X configurations and associated TM allocation problem in GCDE observations.

2. Observation status

ECS for revolution 169 received. Then ECS's up to revolution 170 except 168 are available. Corresponding OCS's sent to ISDC.

3. ISOC science archive

No new data tape received. The data transfer from ISDC to ISOC using Internet is now set up and is running. Some transfer of data, for ISOC scientist use, have been performed the using electronic transfer. Reported to work rather well.

4. ISOC system

The ISOC system version 10.3 has been in use this week. The system has been patched to overcome the problem reported last week related to missing keywords in a POS from the PSF.

5. Problems

MOC detected problems with JEM-X configurations in some revolutions with GCDE observations. They are all related to wrong settings in the observations that were scheduled. The reason for this is under investigation. It could be either procedural or software problem.

4.3.2 ISDC

On 12/04/2004, the status of ISDC observation processing is:

- Latest Standard Analysis completed: observation 01200360001 (GRO J0332-87, Revolution 152-154) on 12/04/2004
- Latest products archived: observation 01200470001 (NGC 4945, Revolution 149-150) on 12/03/2004
- Latest observation products sent to the observer: observation 01201250002 (Cassiopeia A, Revolution 144-148) on 19/03/2004

5 Special Events

Nothing to report

6 Anomalies

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

- On DoY 094, from the start of the pass at 09:30 until EOT at 16:41 not a single TM frame was lost from DSS-16!! The DR# is.....
- On DoY 094, at 23:34, no TPF file transfer occurred, computer were asked to restart the IFTS-MCS and IFTS-FDS, without success. At 00:15, the AOCS sub-system was disabled, and at 00:25 FD were called, the problem on the FD machines was corrected, and at 00:27, the commands for pointing 01800004 were manually uplinked about 10 minutes late.
- On DoY 097, at 03:50, the free swap space on sun128 was down to 48MB, this problem continued throughout the week was later tracked down to 'ghost' processes, software support have been informed.
- Later, at 11:59, there was a 2 minute TM drop from DSS-16, Data Control at the ground station saw no interruption, there was no impact.
- At 14:14, the TM, and then at 14:20 the TC was lost from DSS-16. The ground station reported the antenna 'stopped', the links returned at 14:21 and 14:22 respectively, there was no impact. The DR# is G104272.
- At the start of Revolution 181, at 22:30, there was no TPF update from the FD system, FD were called, and the timeline was eventually recovered at 01:06, the impact was slews 01810001 through to 01810004 were lost, 01810005 was performed late.
- On DoY 098 at 01:08, GFCC restarted the IFMS1 at Redu in an attempt to fix a problem processing ranging data, the commanding link was unavailable until 01:16, there was no impact.
- At 22:50, again there was no TPF at the intended time from FD, the RMU calibration was performed manually. It was noted that the TM cache for the TMD on sun122 crashes during TLM retrieval. The daemon was restarted.
- On DoY 099 at 16:18, bad frames were received from Redu, there was also a brief data gap in VC0 TM at this time.

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

AR id	Date Occurrence	Subject	Segment	Status
INT-2582	08/04/2004	Flight Dynamics automatic jobs for Timeline were missing, Rev. 0181	FDS	Pending
INT-2580	07/04/2004	JEM-X1 planned in Data Taking mode with TM allocation of 1 packet/cycle.	ISOC	Pending
INT-2579	07/04/2004	TC link dropped at DSS-16	NASA station	Pending
INT-2578	07/04/2004	TC/TM lost on both NCTRS to Redu.	ESA station	Pending
INT-2577	07/04/2004	TCP1 failed at DSS-16	NASA station	Pending
INT-2576	07/04/2004	TM VC0/7 drop at DSS-16	NASA station	Pending
INT-2575	07/04/2004	TC/TM drop at DSS-16	NASA station	Pending
INT-2574	07/04/2004	Late AOS at DSS-16	NASA station	Pending
INT-2573	07/04/2004	DSS-24 unable to supply VC0 data	NASA station	Pending
INT-2572	07/04/2004	VC7 link to drop due to maximum reached file size	GFCC	Pending
INT-2571	07/04/2004	Mis-configuration after TMP swap	GFCC	Pending

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7 Future Milestones

The new SPI configuration related to the packet distribution over the Virtual Channels will be used operationally from 15 April.

The battery reconditioning will start mid April.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 180

In revolution 180 a raster dithering observation of the blazar S5 0716+71 (RA 07:21:53.40; DEC +71:20:36.0) was performed throughout the available observation time (~60 hours). This was a Target of Opportunity observation.

Revolution 181

The observations in revolution 181 consisted of a GPS lasting ~22 hours, followed by a GCDE lasting ~5 hours and then a raster dithering observation of the Galactic Center field (RA 17:45:40.00; DEC -29:00:28.0), which was performed for the remaining ~31 hours of observation time.

Revolution 182

In revolution 182 a hexagonal dithering observation of the supernova remnant IC443 (RA 06:18:4.00; DEC +22:27:28.0) was performed throughout the available observation time (~61 hours).

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

2004-03-19T23:27:25.000Z	171.7437	F	Automatic TM processing.
2004-03-22T23:17:17.000Z	171.7353	F	Automatic TM processing.
2004-03-25T15:12:52.000Z	171.6783	F	Automatic TM processing.
2004-03-25T23:12:13.000Z	171.6485	F	Automatic TM processing.
2004-03-26T07:37:33.000Z	171.6204	F	Automatic TM processing.
2004-03-26T14:43:42.000Z	171.5861	F	Automatic TM processing.
2004-03-28T16:29:15.000Z	171.5737	F	Automatic TM processing.
2004-03-28T22:58:36.000Z	171.5479	F	Automatic TM processing.
2004-03-31T22:46:52.000Z	171.5211	F	Automatic TM processing.
2004-04-03T13:45:39.000Z	171.5063	F	Automatic TM processing.
2004-04-03T22:25:24.000Z	171.4710	F	Automatic TM processing.
2004-04-05T08:12:07.000Z	171.4565	F	Automatic TM processing.
2004-04-06T13:19:14.000Z	171.4222	F	Automatic TM processing.
2004-04-06T22:14:43.000Z	171.3640	F	Automatic TM processing.
2004-04-07T07:00:44.000Z	171.3230	F	Automatic TM processing.

This report was generated Fri Apr 9 08:00:19 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, 67 Open Loop Slews, 90 Closed Loop Slews and 9 Momentum Bias were executed. 6 slews were missed or executed manually. This is equivalent to a 3.8%.

03/04/04 (Day of Year 094, Revolution 179-180)

Slew missed at the beginning of revolution 180 because the FD slew update jobs were not scheduled: During the generation of the EPOS for revolution 180, the Timeline update jobs were not scheduled in the Flight Dynamics System. Therefore no slew update TPFs were being generated/delivered to the IMCS. The SPACON followed the recovery procedure for the problem of not receiving slew update TPFs and requested a restart of the File Transfer System task. This of course did not cure the problem. The AOCS commanding from the Timeline should have been stopped at this stage, but this was not done and Open Loop Slews 01800001, 01800002 and 01800003 were executed without being updated and with the Timeline default parameters. The sequence for Close Loop Slew 01800004 also started without being updated. However, due to the accumulated errors in the attitude, the STR could not locate the commanded star for the slew and the execution of the slew was terminated. At this stage the Flight Dynamics support was called in and the missing jobs were scheduled. To rejoin the Timeline, a manual close loop slew was performed to the attitude of PID 01800004. The next slew was executed from the Timeline after being manually updated.

04/04/04 (Day of Year 095, Revolution 180)

Nothing to report.

05/04/04 (Day of Year 096, Revolution 180)

Nothing to report.

06/04/04 (Day of Year 097, Revolution 180-181)

Slews missed at the beginning of revolution 181 because the FD slew update jobs were not scheduled: Once more, during the generation of the EPOS for revolution 181, the Timeline update jobs were not scheduled in the Flight Dynamics System.

When for the first slew of the revolution no slew update TPF was generated, the AOCS commanding from the Autostack was disabled and slew 01810001 was missed from the Timeline. In the presence of FD support the Timeline was rejoined by performing:

- Manual Open Loop Slew to the attitude of PID 01810001
- Manual Open Loop Slew to the attitude of PID 01810005
- Manual corrective Close Loop Slew to the attitude of PID 01810005
- Manual update of slew 01810006

Slews 01810001 to 01810005, inclusive, were missed from the Timeline.

As part of the recovery actions, all the missing slew jobs were scheduled. Later in the revolution it was found out that the RMU calibration jobs were also missing. These missing jobs were also scheduled after manually performing one of the RMU calibrations. The issue is being followed at the mission planning level with the aim of implementing means to prevent the problem from happening again.

07/04/04 (Day of Year 098, Revolution 181)

Nothing to report.

08/04/04 (Day of Year 099, Revolution 181)

Flickering of the Pointing-Bit due to Roll error at the end of Open Loop Slew: At the end of Open Loop Slew 01810057 the error in roll with respect to the Sun Steering Law assumed roll angle was -143 arc-seconds. This is more than the OTF threshold for roll (120 arc-seconds) and resulted in the flickering of the Pointing-Bit after the SSL was enabled at the end of the slew, the amplitude of which was about 2 degrees. The OTF flickering was not seen at BCP level. The error in roll was introduced by the mapping after Close Loop Slew 01810056. During this mapping only 5 stars in full accuracy could be seen in TM, four of which could be used in the FDS for attitude determination. The CCD images of the four matched stars were not near each other, however three of them were spread on a straight line. This could have been the reason for a poor estimation of the roll angle during the attitude determination process (TBC by FD). The roll error reported in the attitude determination log (0181_0058.attd_log) is +141.5 arc-seconds.

09/04/04 (Day of Year 100, Revolution 181-182)

Nothing to report.

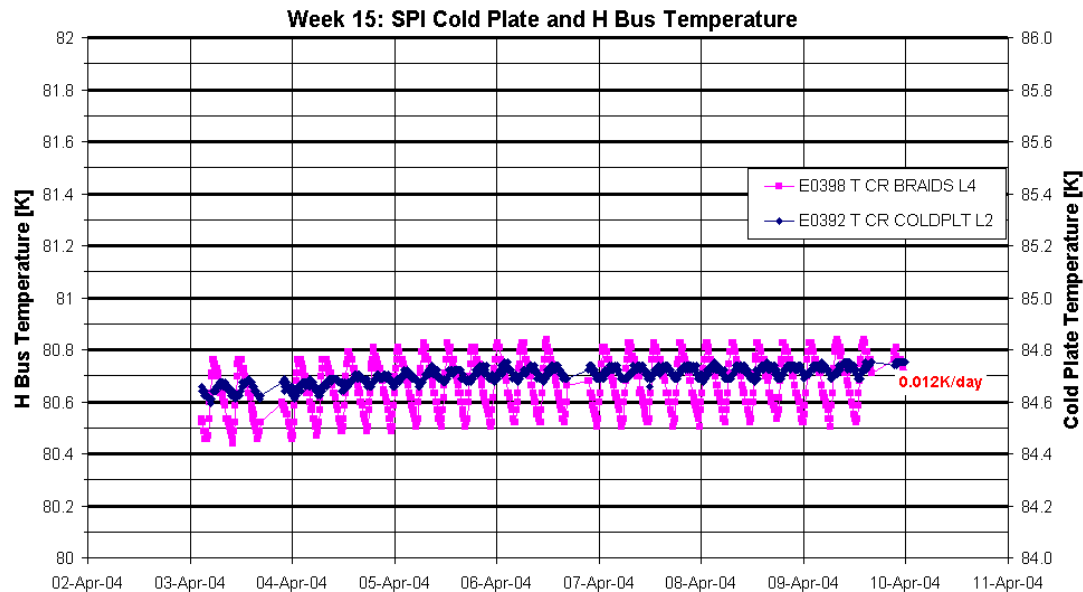
8.3.2 SPI Operations

Cryo-cooler / Detector Cold-Plate:

The performance of the cryo-cooler is nominal.

The cold plate temperature is leveled off at around 80.7K with a small positive drift of 0.014K/day, which is within the expected range.

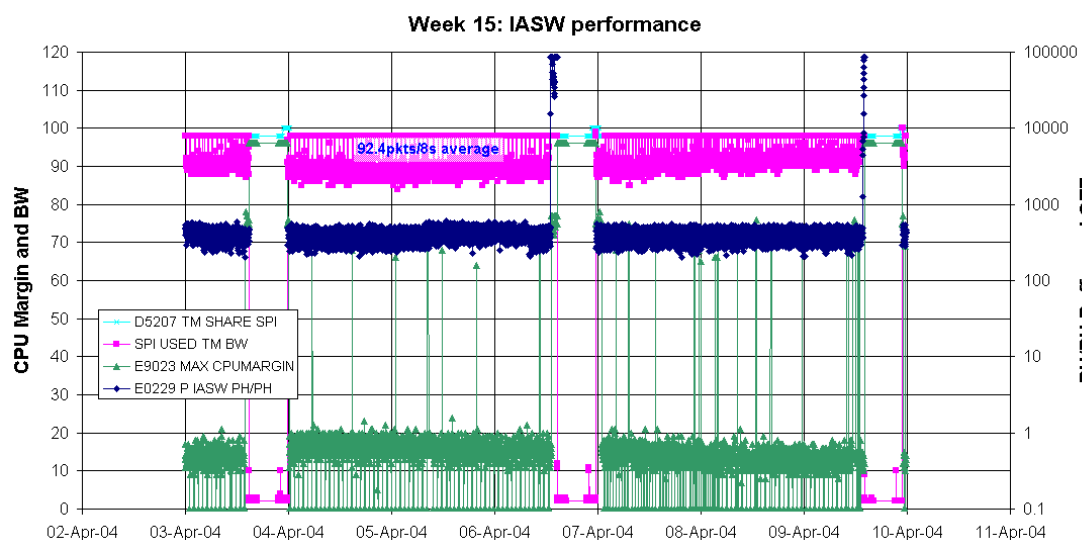
The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period.



IASW/DPE:

The performance of the IASW/DPE is nominal. The average TM bandwidth occupation was 92.4 pkts/cycle.

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



ACS:

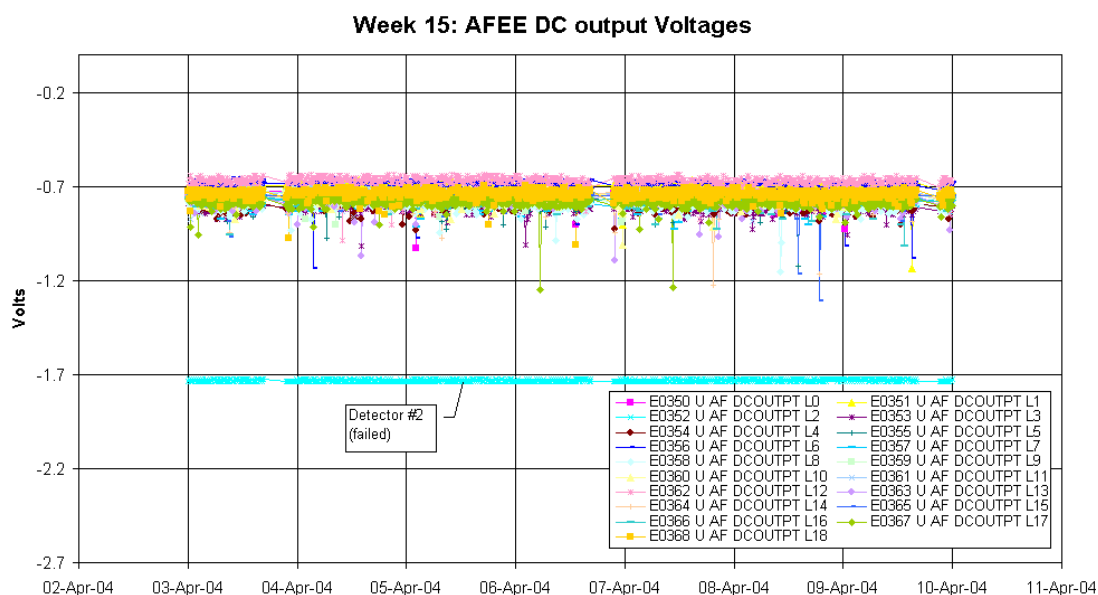
The performance of the ACS is nominal.
 Nothing to report.

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.



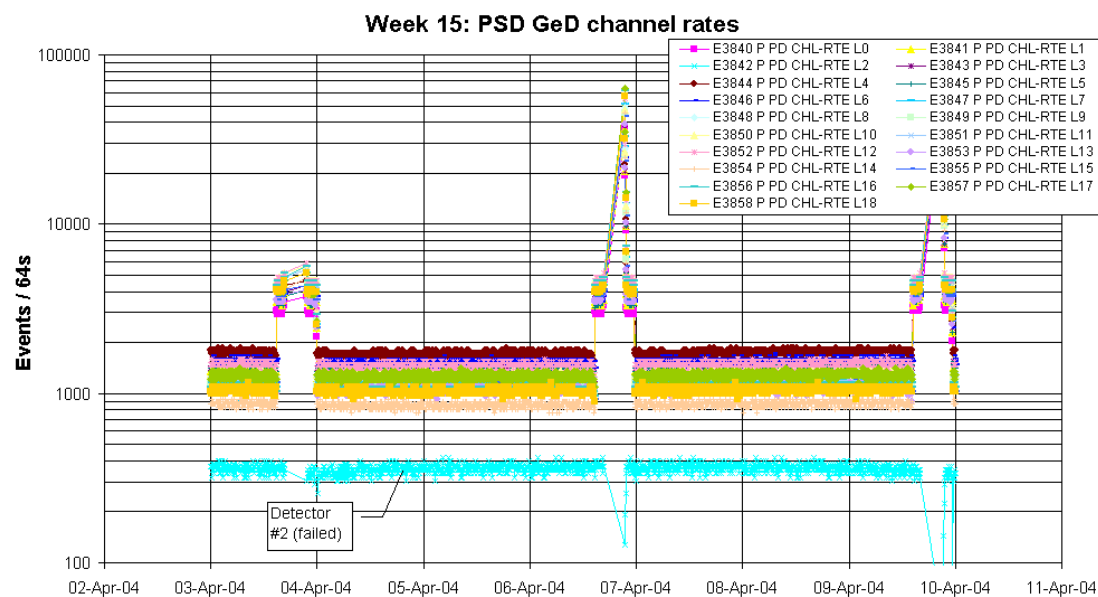
DFEE:

The performance of the unit is nominal.

Nothing to report.

PSD:

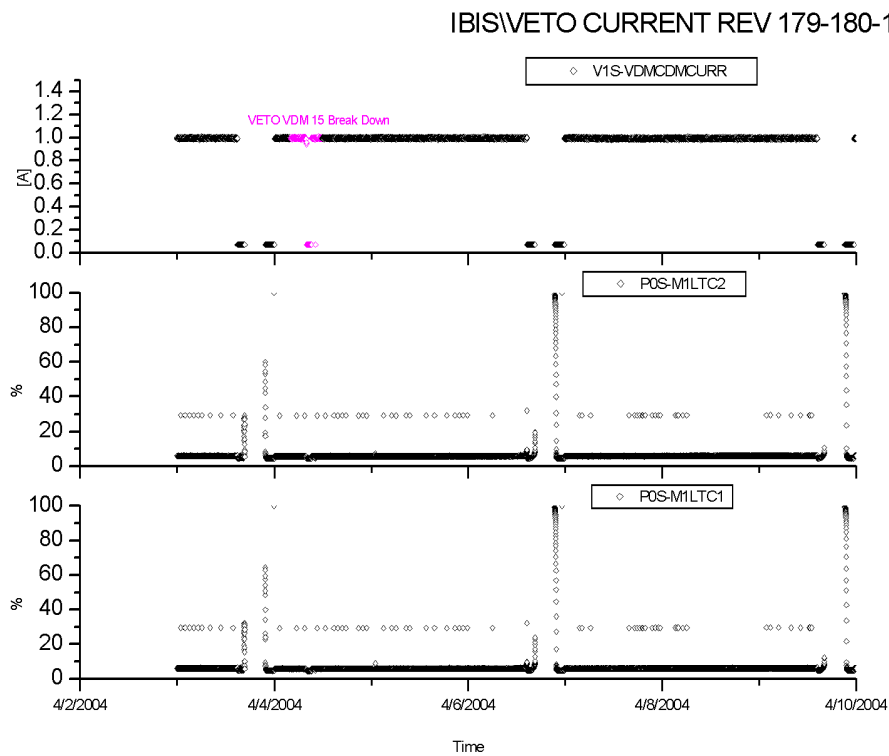
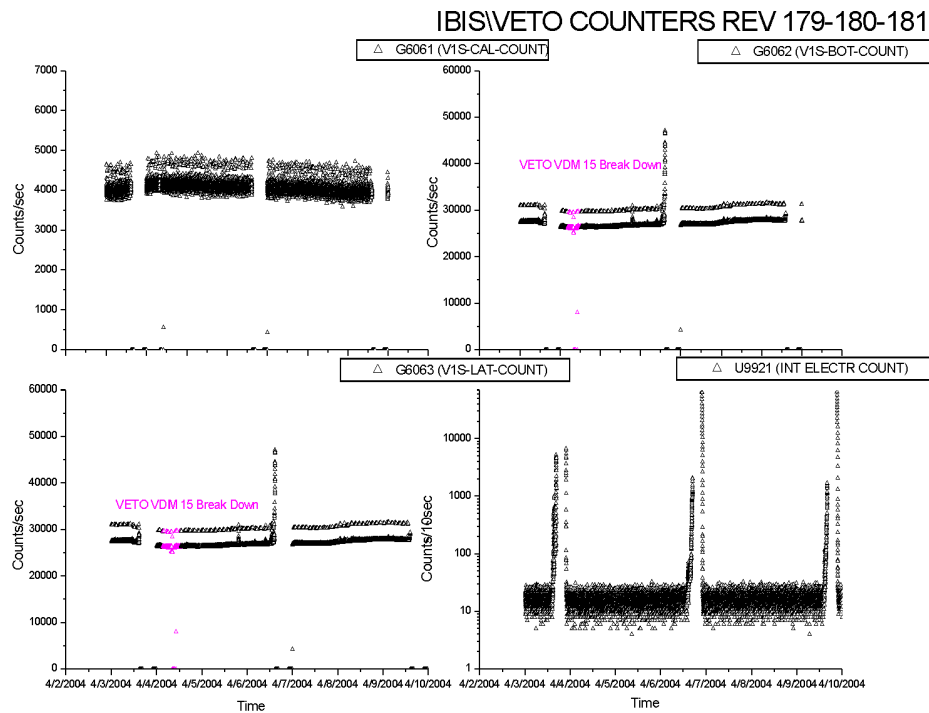
The following plot shows the GeD channel rates detected by the PSD during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2, whose residual counts are triggered by noise.



8.3.3 IBIS Operations

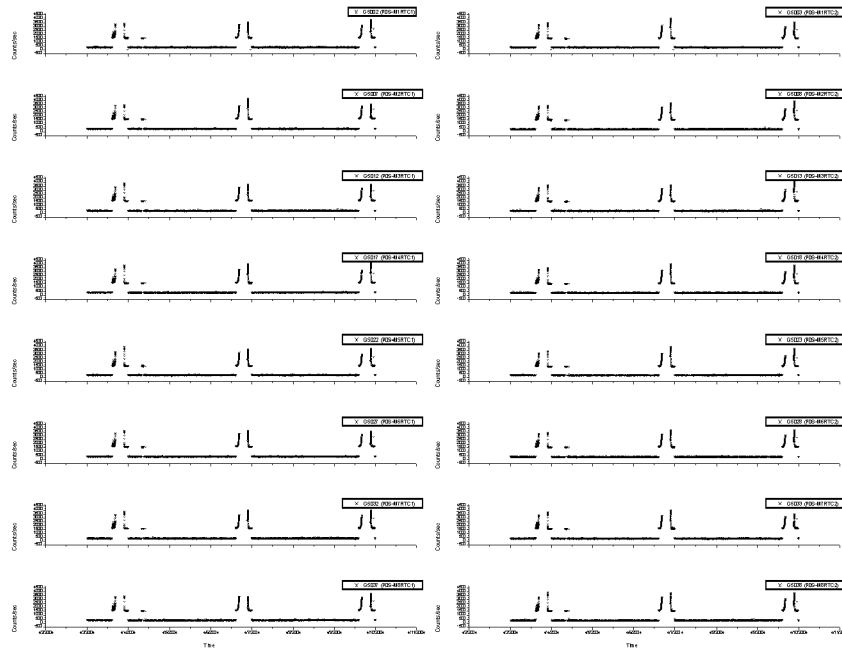
IBIS event counters plot

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:

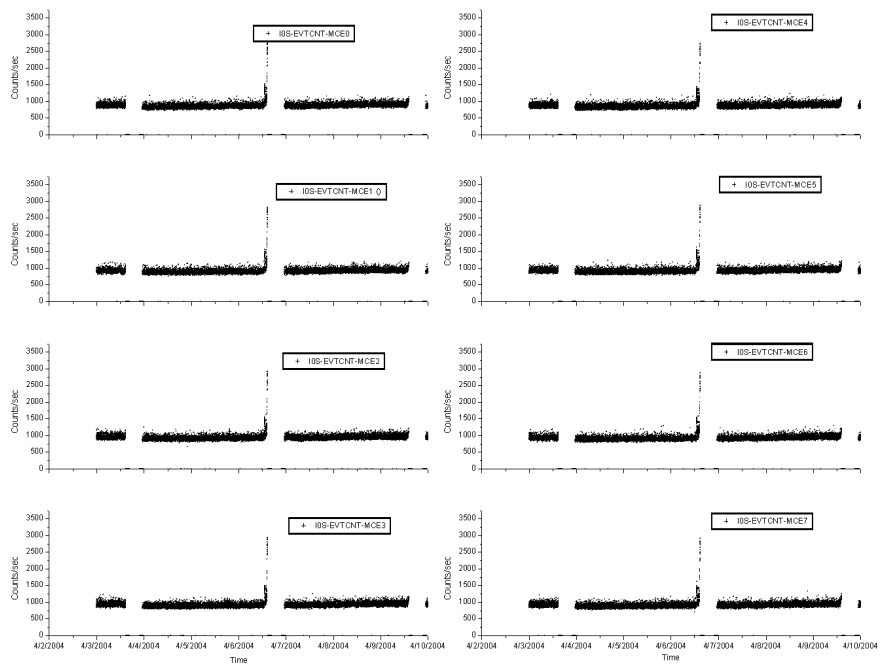


Plots of the ISGRI and PICsIT counters, during the observation period, are shown below:

IBIS\PICsIT REV 179-180-181



IBIS\ISGRI REV 179-180-181



IBIS daily report

DOY 2004.094 (03/04/04)

Nothing to report.

DOY 2004.095 (04/04/04)

At 07:51:14Z, the parameter G6049 (VDM 15 HV) reported out of limits ALARM LOW, the value displayed was -55.80 V. The VDM 15 temperatures were within limits and consistent with those from the others VDMs. The S/C altitude was far above the Belts, approaching apogee and no coincident high radiation event was reported by the on-board radiation monitoring unit.

The VETO lateral and bottom count rate dropped down from ~26000 cts/s to 25000 cts/s. The VETO current was 1.55 A against a nominal value of 1.6 Amps and the VDM/CDM current dropped to 0.95 Amps against a nominal value of 0.99 Amps;

At 07:51:27Z the IASW generated the OEM ID 186 Class 2 << IBIS1 VETO PMTXX IS ON AND CORRESPONDING HV MONIT IS ABOUT ZERO>> reporting the discrepancy between the status of the VDM#15 (ON) and the relevant high voltage (0 V);

Following the reaction (V-HV-1) reported in the Payloads Recovery Document the operator performed, at 07:57:00Z , the following actions:

- FCP_IBIS1_0313 IBIS Transition To Stand-By (TC G0125)
- FCP_IBIS1_0203 VETO Transition To Stand-By (TC G0601)

setting VETO in Stand-By Mode with all the HVs OFF.

At 09:13 Z the recovery of the VDM 15 was commenced, by applying the OR 0018 (VETO HVs break down). The VETO was set back in Maintenance Mode and left in monitoring for >60 minutes. The value of the HV reported during the monitoring period was nominal and the anomaly did not occur again.

VETO was set back in Nominal and IBIS in SCI Standard Mode at 10:22Z. The VDM 15 had HV = 990.72 V (nominal) and the VETO counters reported both ~26000 cts/sec (nominal).

DOY 2004.096 (05/04/04)

At 00:56Z, the TM parameter family G5068 (PDMx: Semimod 1 FIFO Error Flag) reported out of limits (Status Consistency Fail). At 00:58Z the parameters returned within limits. No action was taken, as suggested by the Payload Recovery Document.

At 10:36Z the following two OEMs were reported:

OEM APID 1280 ID 131 CLASS 2 <<IBIS IASW LSL TRANSFER FAIL REPORT FOR HIGH LEVEL MODULE>>

OEM APID 1280 ID 133 CLASS 2 <<IBIS IASW LSL TRANSFER FAILED (LOW LEVEL) >>

flagging a problem on the communication between the DPE and the detector modules via the Low Speed Line (TC/HK), which was automatically fixed by the unit. No action was taken as suggested by the Payload Recovery Document.

DOY 2004.097 (06/04/04)

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 required by the PIs.

DOY 2004.098 (07/04/04)

Nothing to report.

DOY 2004.099 (08/04/04)

Nothing to report.

DOY 2004.100 (09/04/04)

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 required by the PIs.

At 21:26Z the parameters G5013(PDM3: counter semimodule #2.) and G5017 (PDM4: counter semimodule #1.) reported out of Soft High limits due to the PICsIT detectors being ON without the VETO anticoincidence system, as required by the PIs, during the Radiation Belt passage.

8.3.4 JEM-X Operations

2004-04-03 (DOY 094, Rev 179-180)

Nothing to report

2004-04-04 (DOY 095, Rev 180)

Nothing to report

2004-04-05 (DOY 096, Rev 180)

Nothing to report

2004-04-06 (DOY 097, Rev 180-181)

At 12:58:42Z the parameter K5119 SOFTWARE TRIGGER went soft out of limits (value = 15443) and then at 12:59:38Z it went hard out of limits (value = 19255). JEM-X1 did not transition to Safe mode as the on-board threshold for HV switch off in response to the JEM-X1 S/W Trigger is 25000 (this was increased from 20000 in the DFEE S/W patch version 5.3). The next IODB release, planned for the perigee passage between revolution 183 and 184, will contain updated monitoring checks for parameter K5119 to reflect the current on-board safety limit.

The value of parameter K5119 reached a maximum of 23684 at 13:00:10Z and then returned within soft limits at 13:03:14Z (value = 18974). It then exceeded the hard limit again at 13:06:10Z (value = 19408) and remained hard out of limits until 13:13:39Z, when JEM-X1 was commanded into Safe mode as planned by the automatic Timeline.

2004-04-07 (DOY 098, Rev 181)

Nothing to report

2004-04-08 (DOY 099, Rev 181)

Nothing to report

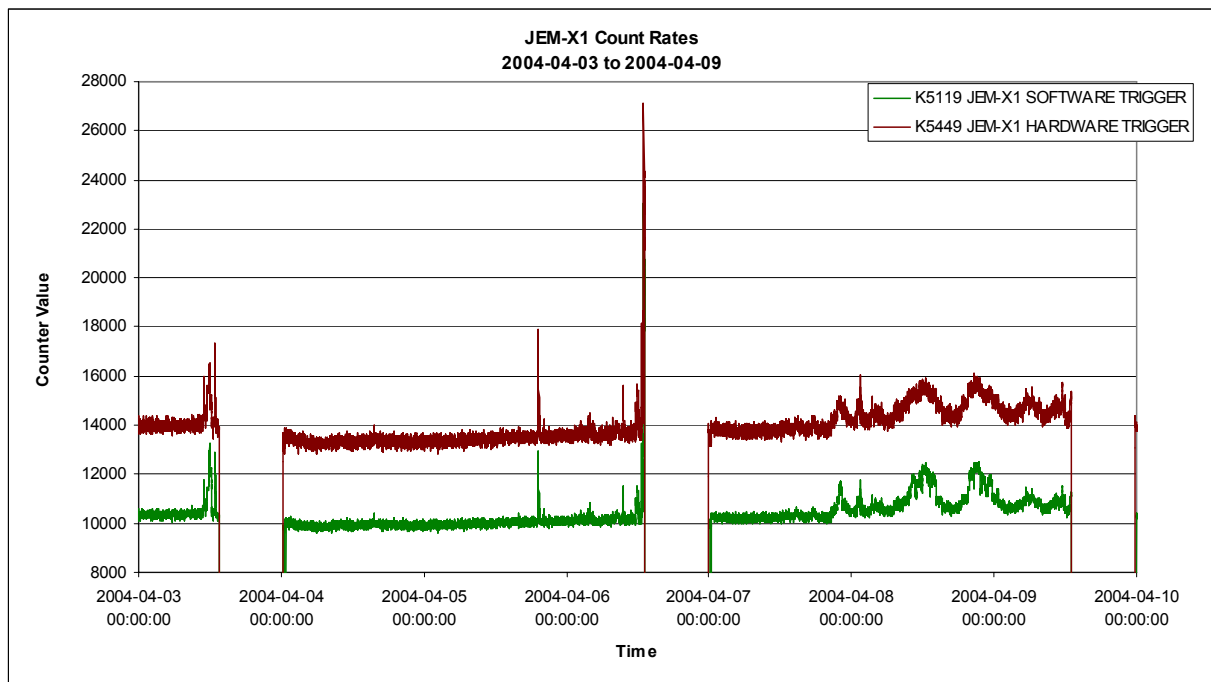
2004-04-09 (DOY 100, Rev 181-182)

Nothing to report

8.3.4.1 JEM-X Count Rates

JEM-X1 count rates over the reporting period are displayed in the following graph¹.

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



8.3.5 OMC Operations

No Commands were rejected this week.

On DoY 095, at 00:14, due to file transfer problems, the slew to attitude 01800004 was performed about 10 minutes late. The OMC struggled a bit to recover from this with repeated centering cycles, which continued until 00:54. The impact was pointing was 01800004 was severely degraded.

On DoY 097, due to problems with FD file transfers pointing 01810004 was lost, and 01810005 performed about 5 minutes late.

On DoY 094 at 14:49:08, DoY 097 at 14:35:16 and DoY 100 at 14:20:13, OMC was switched by the Timeline to SAFE mode, at the nominal times.

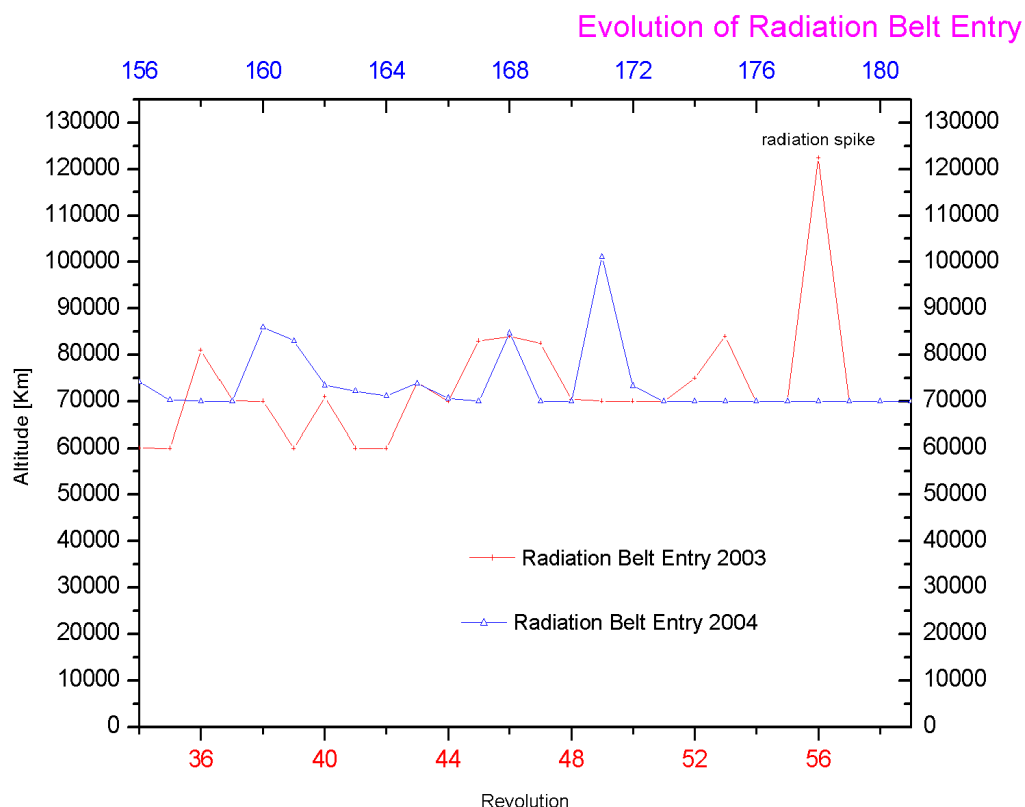
8.3.6 IREM Operations

IREM daily report

Nothing to report.

Radiation Belt Entry Analysis

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 179-->181, 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
179	RAD_ENTR R 2004-04-03T14:48	03/04/2004	03-Apr-2004 15:32	54407
180	RAD_EXIT R 2004-04-03T23:49	03/04/2004	03-Apr-2004 22:32	26905
180	RAD_ENTR R 2004-04-06T14:35	06/04/2004	06-Apr-2004 15:16	54702
181	RAD_EXIT R 2004-04-06T23:36	06/04/2004	06-Apr-2004 22:16	26455
181	RAD_ENTR R 2004-04-09T14:19	09/04/2004	09-Apr-2004 14:56	55250

Reference

Small error vs reference

Large error vs reference

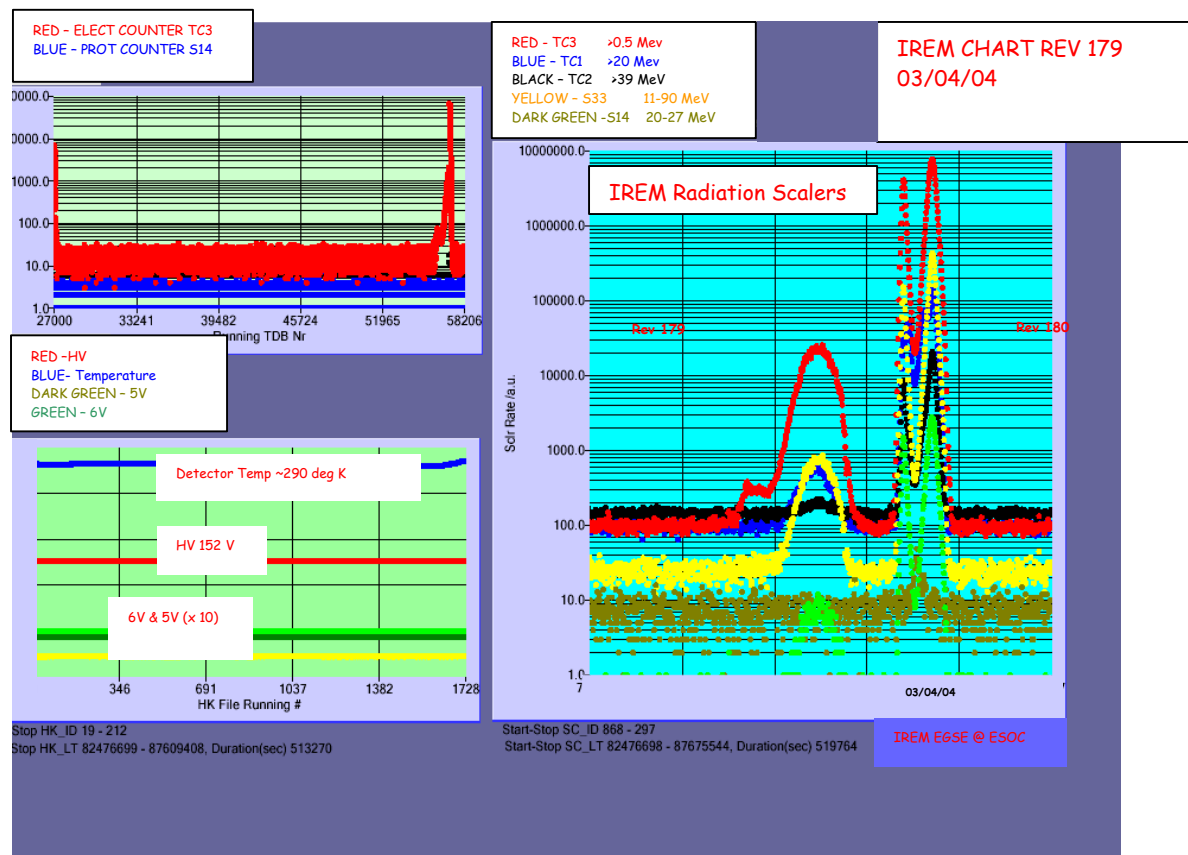
Radiation Spike

Proton Belts

REV	S/C BCPKT (proton)	Proton CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
179	PROTON_RAD_ENTR	03-Apr-2004 20:52	11561
179	PROTON_RAD_EXIT	03-Apr-2004 21:22	15124
180	PROTON_RAD_ENTR	06-Apr-2004 20:36	11444
180	PROTON_RAD_EXIT	06-Apr-2004 21:06	14801

IREM radiation counters plot

Plots of the evolution of the IREM counters from rev 179 (no data available for rev 180 and 181) are shown below:



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

