

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 119
Week 53
03.01.05
Routine Phase

Prepared by: M. Walker (OPS-OFO)

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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 25.12.04 until 31.12.04 (both dates inclusive) and covers the revolutions 269 & 270.

2 Summary of Activities

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

The targets of these revolutions were the Galactic Plane; Cassiopeia A (RA 23:51:39.60; DEC +61:41:40.5); 3C273 (RA 12:29:06.7; DEC +02:03:08.0) and an amalgamated observation of GRO 1411-64 and 4U 1323-619 at (RA 14:10:57.2; DEC -64:02:27.8). The activities consisted of GPS 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.

As part of the AOCS periodic calibrations, after the end of the eclipse season, the FSS/STR Misalignment calibration was performed during week 52. These data have been processed along week 53. From a preliminary analysis, differences have been found, and the assessment of the data is progressing.

11 slews were missed from the Timeline during this period:

- 2 slews (CSL) were missed in revolution 268 due to problem on DSS24 station;
- 2 slews (CSL) were missed in revolution 269 due to problem to pick the selected guide star during the execution of an closed loop slew;
- 7 slews (3 OSL and 4 CSL) were missed in revolution 269 due to problem on DSS16 station.

The fuel consumption over the period between 23/12/2004 and 30/12/2004 was 0.271 kg. The remaining propellant is in the order of 165.1956 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.

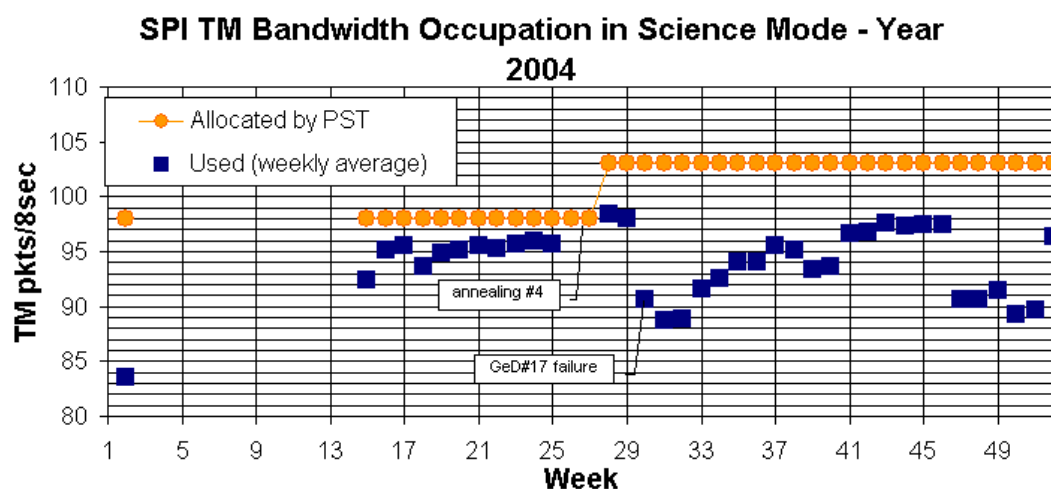
3.2 Payload

3.2.1 SPI

The overall status of the instrument in this week is nominal.

Following the patch of SPIASW431, the PSD channels blocking malfunction, though still continues to randomly reproduce itself, is no longer affecting the operations at MOC. After the patch the known IASW TM leakage anomaly became slightly worse than expected. Its effects were however fully mitigated, at least on-temporary basis, following the definition of a new PST distribution of the SPI slots (OCR#188).

The instrument was kept in photon-by-photon mode for the whole period, with spectra TM enabled, an assigned TM bandwidth in the science observation windows of 103 pkts/cycle and an actual occupation of 96.8 pkts/cycle average. The following plot shows the evolution of the occupied bandwidth, since beginning of 2004.



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.

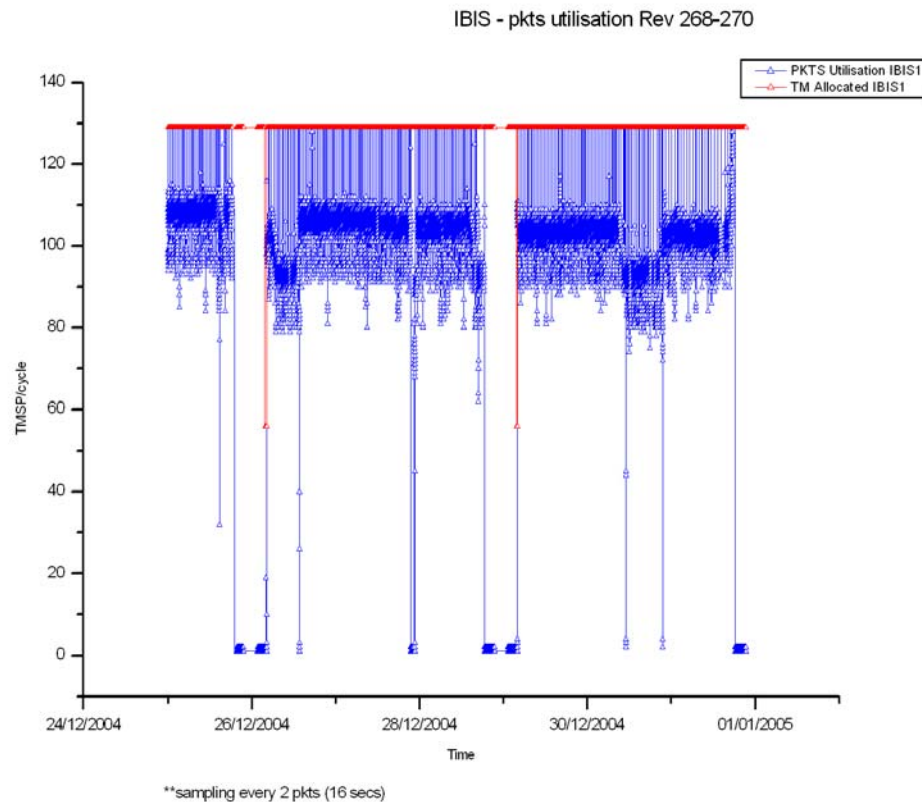
3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by moderate to high solar activity.

During the reporting period the PST allocation to IBIS was 129 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 104.9 TMPS/cycle, down 0.7 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.

JEM-X1 was operated in Data Taking mode during science observations, with a TM allocation of 8 packets/cycle. JEM-X2 remained dormant (DFEE OFF) with a TM allocation of 1 packet/cycle.

INT_OR_0189 was executed at the start of each revolution to reset the JEM-X1 Broadcast Packet override flags for IREM to DISABLED following the anode calibration ED KEACAL01 in the Timeline.

On 2004-12-28, due to a temporary outage of DSS-16, JEM-X1 was commanded to Safe mode about 1 hour later than planned before radiation belt entry of revolution 269.

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.

There were 225 OMC pointings executed nominally, 10 were lost.

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

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by moderate to high solar activity. On 27 December, at 21:30Z, high radiation was reported by the IREM counters, which caused IBIS to switch to STAND-BY mode.

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 above the system performance requirements, despite several problems. A total of 10 pointings were lost due to ground problems.

4.1 Mission Operations Centre

The performance of the MOC was good this week, 1 pointing were lost due to an AOCS command failing release.

4.2 Ground Stations & Network

The performance of the ground stations and Network was not so good this week. There were some problems with DSS-24 that led to the loss of 2 pointings, and further problems with DSS-16 occurring at an unfortunate time that led to the loss of 7 pointings. The overall performance was still above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF status unchanged, nothing received this week.

POS/TSF - no activity, other than the re-planning for revolution 272. This was in response to a ToO reported by Marc Tuerler on December 27th - V0332+53. More details on this ToO are in an e-mail circulated from the Integral Helpdesk on January 3rd.

2. Observation status

No activity this week.

3. ISOC science data archive

Nothing to report.

4. ISOC system

No change.

5. Problems

Nothing new to report.

4.3.2 ISDC

Status of ISDC observation processing on 03/01/2005:

- Latest Standard Analysis completed: observation 02201330003 (Gal.Center field, Revolution 236-237 and 244-246) on 26/12/2004
- Latest products archived: observation 02200940001 (X0115+63, Revolution 238) on 01/12/2004
- Latest observation products sent to the observer: observation 02297000016 (IGR J16320-4751, Revolutions 226) on 08/12/2004

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 360, at 17:58, the TM from DSS-24 dropped, it returned again at 18:04. The impact was the loss of pointing 02680105, the corresponding DR# is G105099.

- At 18:30, a power failure at DSS-24 caused the TM and TC to drop, the TM returned at 19:41, but there was no further TC available before the EOT. The impact was the loss of pointing 02680106, see AOCS report for details.
- On DoY 362, at 22:51, an AOCS command failed release, the impact was the loss of pointing 02690077.
- On DoY 363, at 16:19, the VC0 & VC7 TM from DSS-16 dropped. This caused an AOCS command to fail release, the TM returned at 16:22, but there was now no TC. At 18:00, the TM was lost as the antenna had been moved to the stow position. At 18:20 the TM returned, and at 18:23 the TC was back. The impact was the loss of pointings 02690110, 02690111 & 0269112. The corresponding DR# is G105119. Due to the ongoing recovery over-running, a Reaction Wheel Bias was missed, which meant the further loss of pointings 02690113 through to 02690116.
- On DoY 364, at 11:53, two bad TM frames were received from Redu, there was no impact.
- On DoY 365, at 10:01, nctrs-b MMI occasionally goes yellow with the event log consuming a lot of cpu.
- At 22:20, 17 bad TM frames were received from Redu, there was no impact.
- On DoY 366, at 15:21, there was a brief drop on the VC7 TM link from DSS-16, there was no impact.

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

7 Future Milestones

Appendix

The appendix includes various detailed information.

7.1 Overview of Revolutions

Revolution 269

The observations in revolution 269 consisted of 13 pointings of a GPS lasting in total ~9 hours, followed by an amalgamated raster dithering observation of Cassiopeia A (RA 23:51:39.6; DEC +61:41:40.5), performed for the remaining ~ 52.5 hours of observation time.

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

Revolution 270

The observations in revolution 270 started with a raster dithering observation of the point source 3C273 (RA 12:29:06.7; DEC +02:03:08.0) lasting ~29.5 hours, followed by 14 pointings of a GPS lasting in total ~10 hours. An amalgamated raster dithering observation of GRO 1411-64 and 4U 1323-619 at (RA 14:10:57.2; DEC -64:02:27.8) was then performed for the remaining ~20 hours of observation time.

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

7.2 Consumables

7.2.1 Detailed Fuel Book-keeping

2004-12-17T12:19:13.000Z	165.7128	F	Automatic TM processing.
2004-12-18T13:12:44.000Z	165.6562	F	Automatic TM processing.
2004-12-19T18:49:35.000Z	165.6296	F	Automatic TM processing.
2004-12-19T20:19:59.000Z	165.5971	F	Automatic TM processing.
2004-12-19T21:35:43.000Z	165.5701	F	Automatic TM processing.
2004-12-20T02:39:36.000Z	165.5370	F	Automatic TM processing.
2004-12-23T02:28:47.000Z	165.5158	F	Automatic TM processing.
2004-12-23T11:21:20.000Z	165.4668	F	Automatic TM processing.
2004-12-24T12:33:47.000Z	165.4446	F	Automatic TM processing.
2004-12-24T21:16:44.000Z	165.3913	F	Automatic TM processing.
2004-12-26T02:21:11.000Z	165.3303	F	Automatic TM processing.
2004-12-26T11:05:04.000Z	165.3069	F	Automatic TM processing.
2004-12-27T12:23:39.000Z	165.2665	F	Automatic TM processing.
2004-12-30T09:41:54.000Z	165.2347	F	Automatic TM processing.
2004-12-30T12:37:15.000Z	165.1956	F	Automatic TM processing.

This report was generated Fri Dec 31 08:00:18 GMT 2004

7.3 Detailed Satellite Information

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

7.3.1 AOCS Summary Operations Report 25/12/2004-31/12/2004

AOCS operations were executed from the Automatic Timeline.

During this period, 65 Open Loop Slews, 175 Closed Loop Slews and 7 Momentum Bias were scheduled. 11 slews were missed or executed manually. This is equivalent to a ~4.5 %.

25/12/04 (Day of Year 360, Revolution 268)

Slews missed from the Timeline: Due to a problem on DSS24 station (outage not planned), the slews 02680105(CSL), 0106(CSL) were not executed. A manual close loop slew was then performed to the attitude of PID 02680105. The next slew (CSL) for PID 02680106 was manually updated but not executed from the Timeline due to a subsequent problem on DSS24 not allowing the establishment of a TC link until the EOT (End of Track). The Wheels Bias, planned in the timeline before the end of revolution, was not executed and recovered at the beginning of rev 269.

26/12/04 (Day of Year 361, Revolution 268-269)

Nothing to report.

27/12/04 (Day of Year 362, Revolution 269)

Slews missed from the Timeline: At 22:51:20z due to a problem to pick the selected magnitude 7.1 guide star at CCD location [15794, -13784], the slews ID 02690077(CSL) and 0078(CSL) were not executed. A manual close loop slew was then performed to the attitude of PID 02690078 (CSL). The next slew (CSL) for PID 02690079 was manually updated and executed from the Timeline.

28/12/04 (Day of Year 363, Revolution 269)

Slews missed from the Timeline: Due to a problem on DSS16 station (outage not planned due to antenna transmitter problem), the slews 02690110(CSL), 0111(CSL), 112(CSL), 113(OSL), 114(OSL), 115(OSL) and 116(CSL) were not executed. A manual open loop slew and a manual corrective closed loop slew were then performed to the attitude of PID 02690114 (RA: 11:33:18.02, DEC:+12:11:42.6) to reach a valid (until 2005-01-01 00:03:19Z) attitude before the planned EOT. The scheduled Wheels Bias was therefore not executed and recovered at the beginning of rev 270.

29/12/04 (Day of Year 364, Revolution 269-270)

Performed at the beginning of the revolution 270 the recovery of the missed activities during the end of revolution 269. No impact for the scheduled activities was reported.

30/12/04 (Day of Year 365, Revolution 270)

Guide star released by the STR SEU Filter: At 18:28:12z, the SEU Filter threshold of the ACC was exceeded (5 times after the end of slew ID 02700065) and the guide star released. The magnitude 8.4 guide star was located at CCD location [19530, -15587]. A new guide star was picked in the first automatic mapping, which was commanded afterwards: the new guide star magnitude 6.9, was located at CCD location [-9843, 434]. The release of the guide star determined the flickering of the pointing bit. This was seen at BCP level.

31/12/04 (Day of Year 366, Revolution 270)

STR 1750 processor fault: at 14:14:12z a STR 1750 processor fault occurred during the execution of the PID 02700089. The sequence of the events were:

14:12:44z	Closed Loop Slew End
14:13:44z	Mapping start
14:14:12z	Mapping End prematurely
14:14:12z	IMU-1 ON
14:14:12z	NewMapping start and new guide start picked
14:15:03z	Mapping End
14:24:12z	IMU-1OFF

The fault, which occurred after the end of the closed loop slew resulted in the abortion of the on-going mapping (duration shortened) and start of a new mapping. The fault was reported in HK Telemetry as star rejection flag ON and star not valid flag ON, in the TM cycle when the false was detected.

The IMU was switched ON, being the problem occurred during the execution of a pointing. According to the Star Catalogue, two extended objects, the open clusters Loden 1373 and Loden 1375 were in the STR FoV at ~25 arcmin from the guide star 9011-5652: this probably as it was in the past could have caused the fault.

No slews were missed. The operational impact of the fault, was the reduced duration of PID 02700089.

Flickering of the pointing-bit due to pitch error: From 15:18:27z until 16:05:19z many occurrences of undetected false events on the star tracker caused a jump (in average ~40 arcsec) in the position of the CCD image of the guide star. The error in pitch was more than the OTF threshold for this axis and resulted in the flickering of the pointing-bit. This was seen at BCP level. The magnitude 7.8 guide star was picked by the ACC after an open loop slew at CCD location [7891, -2400].

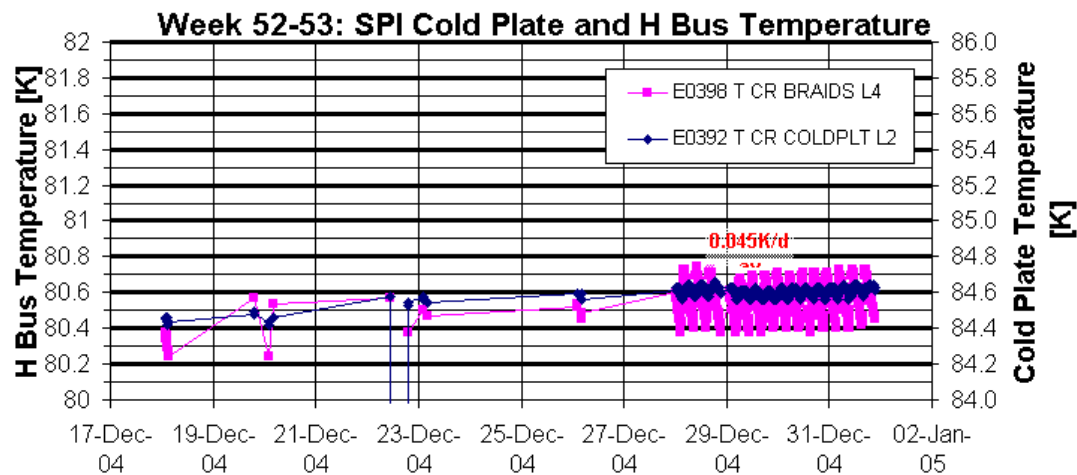
Flickering of the pointing-bit due to yaw error: At 15:36:27z an undetected false events on the star tracker caused a jump (~127 arcsec) in the position of the CCD image of the guide star. The error in yaw was more than the OTF threshold for this axis and resulted in the flickering of the pointing-bit. This was not seen at BCP level. The magnitude 7.8 guide star was picked by the ACC after an open loop slew at CCD location [7891, -2400].

7.3.2 SPI Operations

Cryo-cooler / Detector Cold-Plate

The performance of the cryo-cooler is nominal.

The cold plate temperature was maintained at 85K $\pm$ 1K over the reporting period, showing the expected small positive drift. The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period.



IASW/DPE:

An Operational Change Request (OCR#188) was submitted by the SPI team and partially executed by MOC to investigate and try some recovery action on the SPI TM leakage anomaly.

The anomaly manifests itself by not fully exploiting the assigned TM resource. In details, the CDMU PST allocates 103 fixed length TM packets to SPI every 8s TM cycle; SPI is able to produce more than this TM rate but, due to this anomaly, is not able to transmit at a rate greater than 97 packets every 8s. (see AR INT_SC-107 for further details).

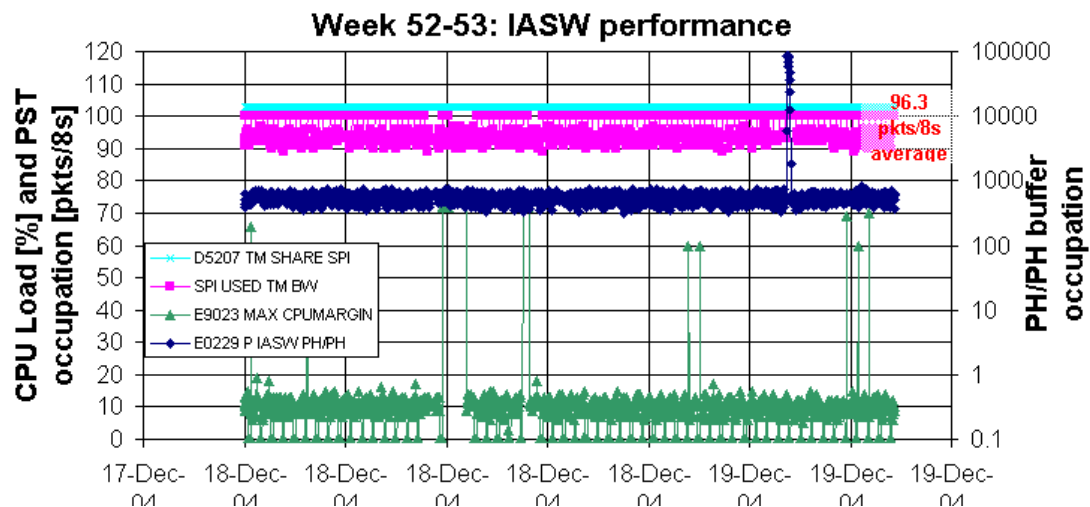
Between 21st and 22nd December, the new DPE SPIASW431 was subject to the following troubleshooting tests/recovery attempts, according to OCR#188:

- 1) Try to perform a Photon/Conf/Photon empty transition (i.e. w/o changing the SPI configuration) after belts exit, in three different conditions: while spectra accumulation, while compression and while transmission is executing. RESULTS: Nothing changes in the TM bandwidth use.
- 2) Perform an empty boot of the DPE, i.e. power reset of the DPE keeping the memory powered, to avoid losing the loaded S/W 431. RESULTS: Nothing changes in the TM bandwidth use.
- 3) If none of the above works, try to find out a different distribution of the PST SPI slots such that at least only 1 pkt is lost. Use this distribution as the nominal PST for future observation, at least on temporary basis until the problem has been solved. RESULTS: A PST distribution which allows the exploitation of all 103 pkts allocated was found and is currently applied (MOC OR#190)

The SPI team is currently analysing the IASW code, focusing on the downlink limitation mechanisms/ IASW-CSSW task priorities.

Further tests/recovery attempts are under development together the SPI team, to support such analysis.

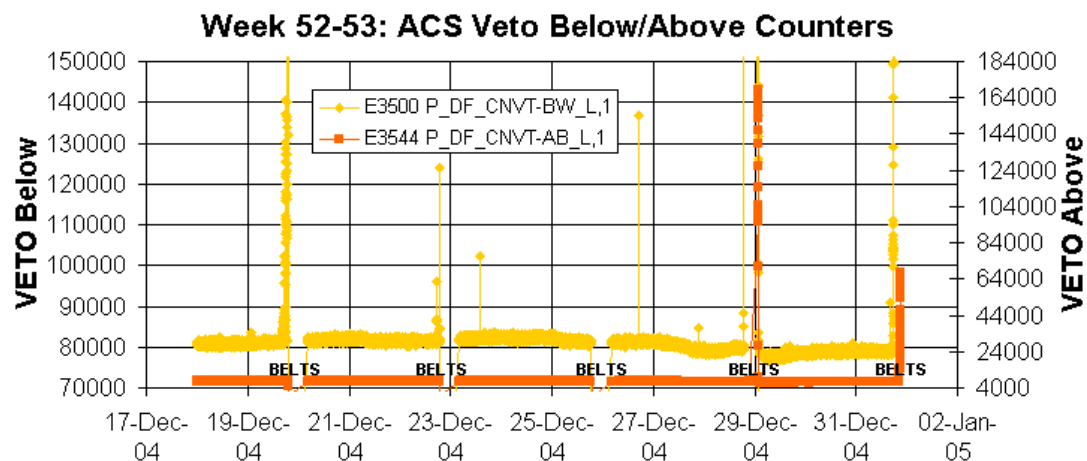
The following diagram shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS:

The performance of the ACS is nominal.

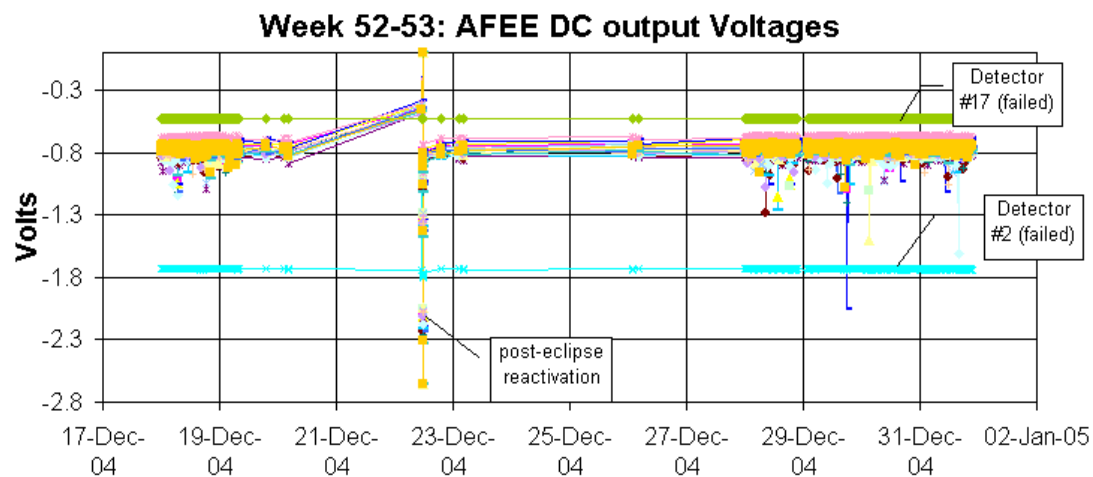
The following plot shows the ACS overall count rate evolution during the reporting period.



AFEE:

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

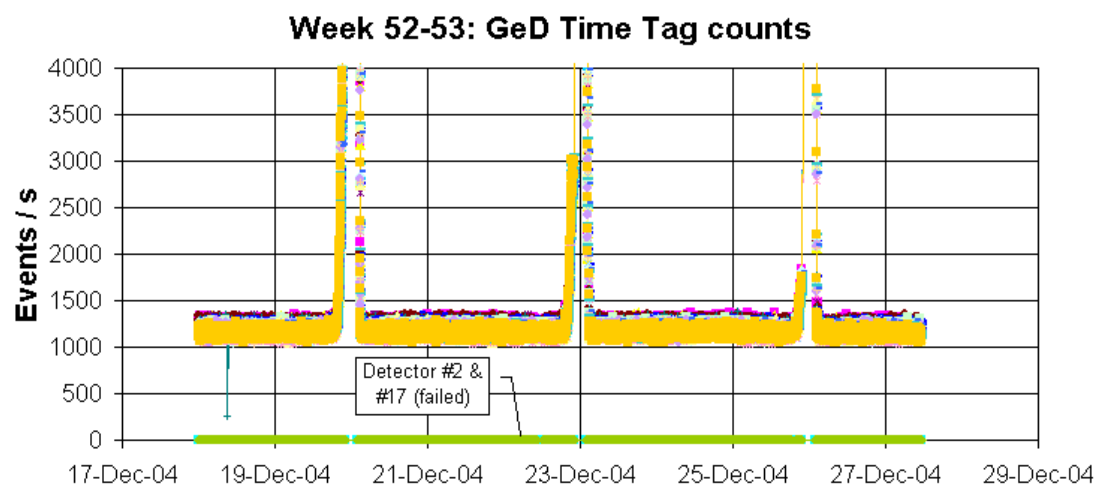
The following plot shows the AFEE dc output signals during the reporting period.



DFEE:

The performance of the unit is nominal.

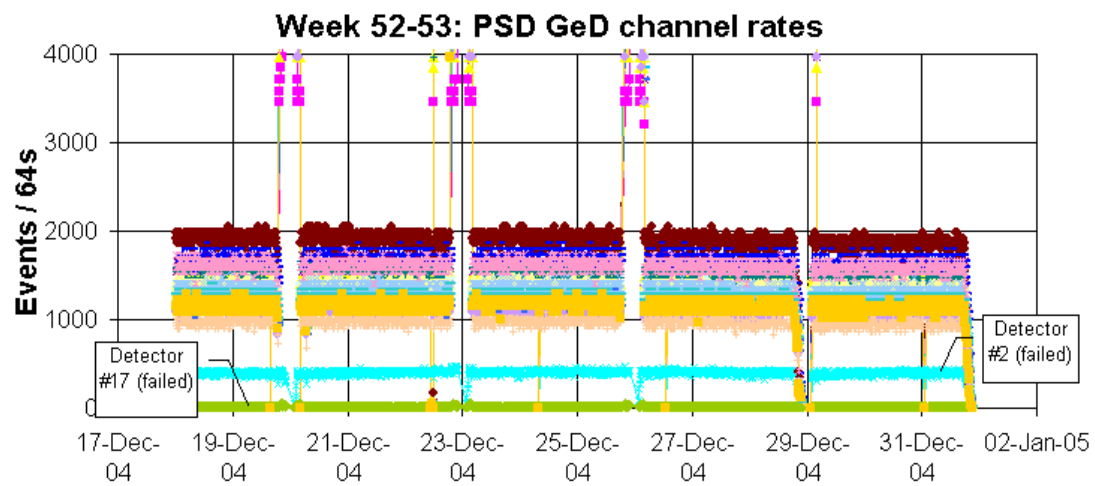
The following plot shows the Non Vetoed event rates, processed by the DFEE during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2 and #17.



PSD:

The performance of the unit is nominal although the malfunction of the channel rates blanking reproduced itself also this week (see AR INT_SC-90 for a detailed description of the anomaly).

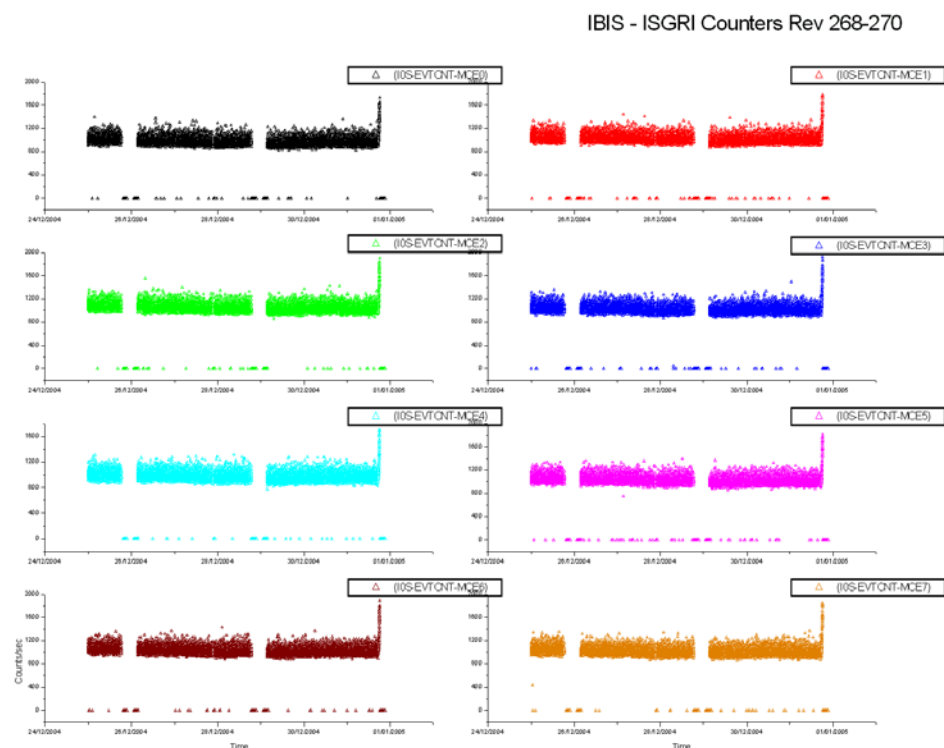
The following plot shows the PSD channel rates during the reporting period.



7.3.3 IBIS Operations

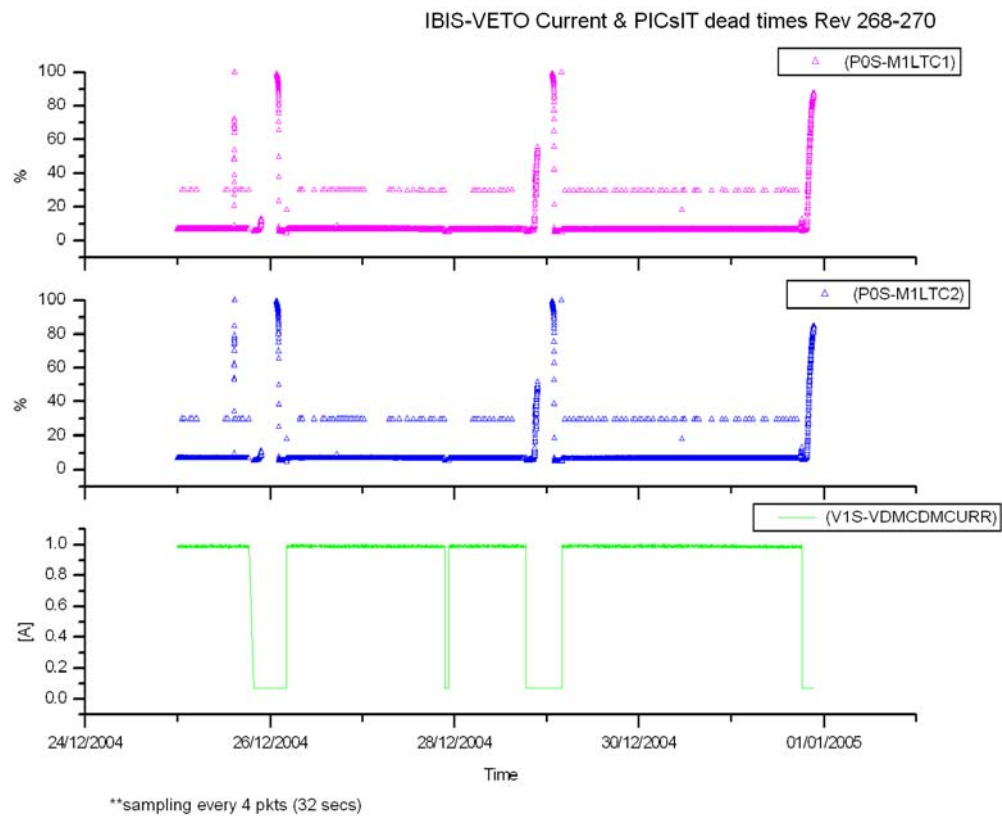
IBIS Event Counters Plots.

ISGRI Counters:

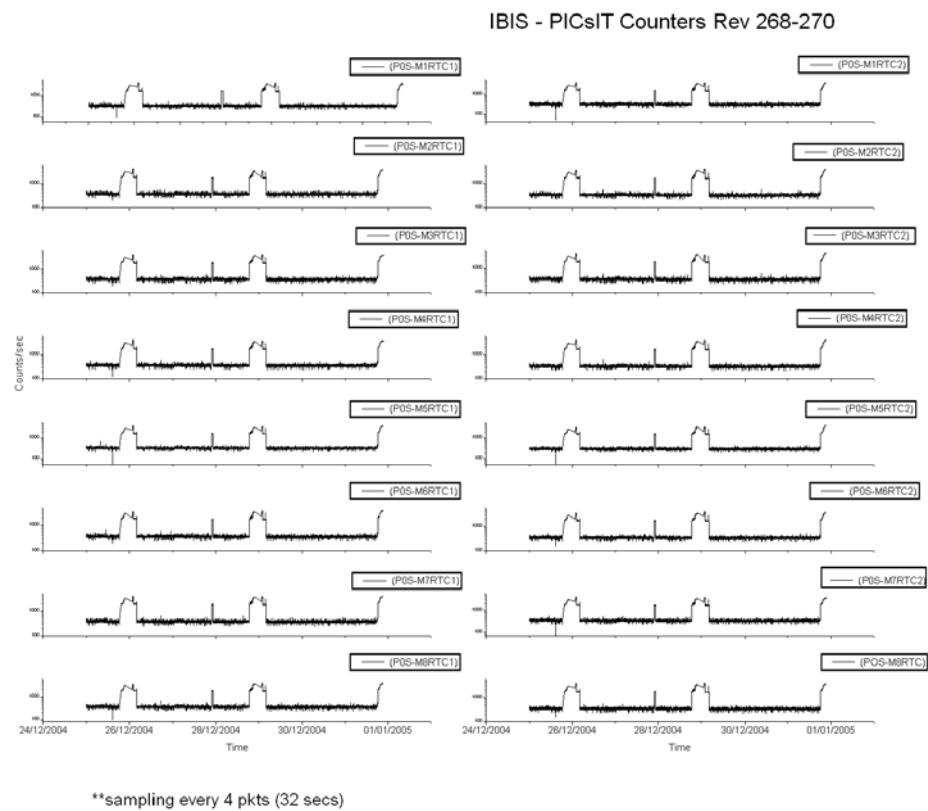


**sampling every 4 pkts (32 secs)

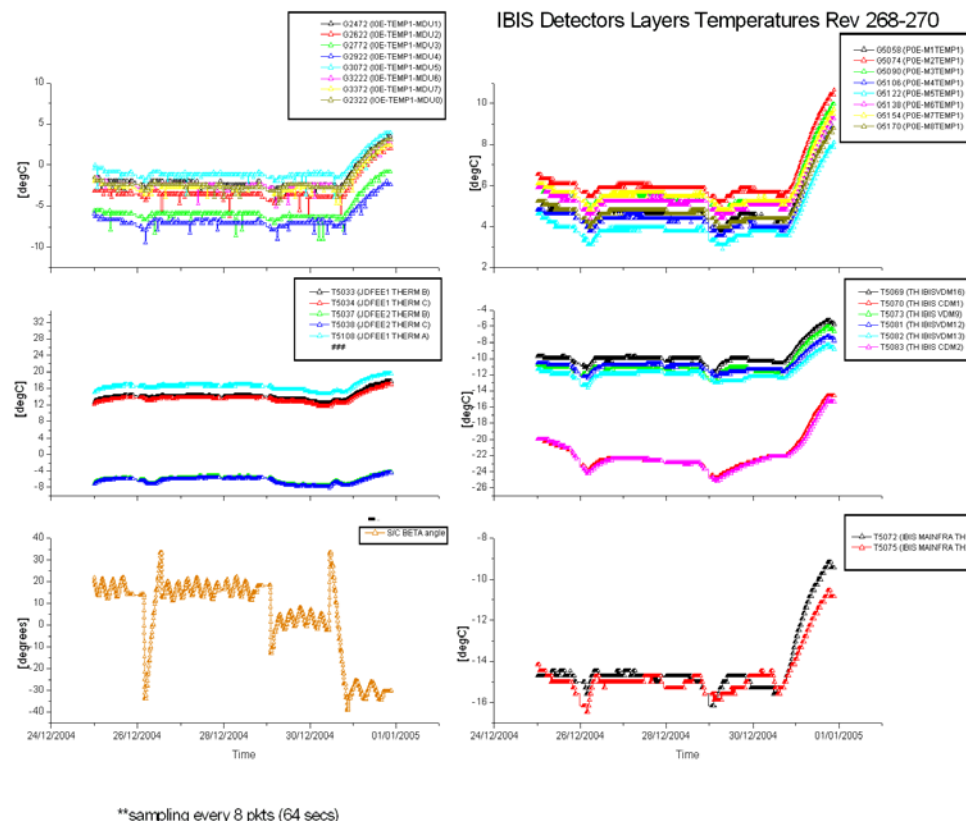
Veto Current:



Picsit Counters:



IBIS Detectors Layers Temperatures



IBIS daily report

DoY 360 (25/12/2004)

At 14:37Z G5068 family and G5072 family (PDMi: Semimodule #1 and #2 FIFO Error Flag) went OOL "SCC fail". They went back after a couple of minutes. Therefore, according to action P-FIF-1, no action was taken.

At 14:45Z G5002 family went OOL low-low and back. No action was taken.

At 14:48Z the OEM "IBIS1 IASW HEPI resynchronised" was received. As no other OEM was received, no action was taken.

DoY 362 (27/12/2004)

At 21:31Z high radiation was reported by the IREM counters, which put IBIS into Stand-by mode. Following procedure FCP_IBIS1_0803 IBIS exited safe configuration at 21:36Z. At 22:43Z TC GESTAN02 was sent and at 22:45Z IBIS was back into Scientific Standard mode.

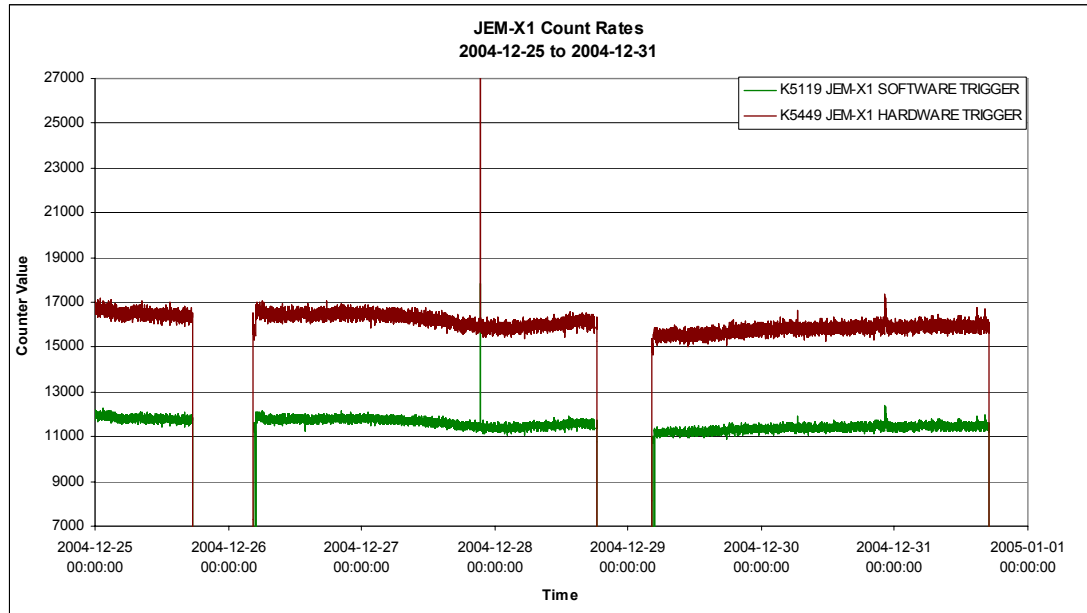
DoY 366 (31/12/2004)

At 18:15Z IBIS entered Stand-by mode due to the radiation belts ahead of the BCPKT time (18:28Z).

7.3.4 JEM-X Operations

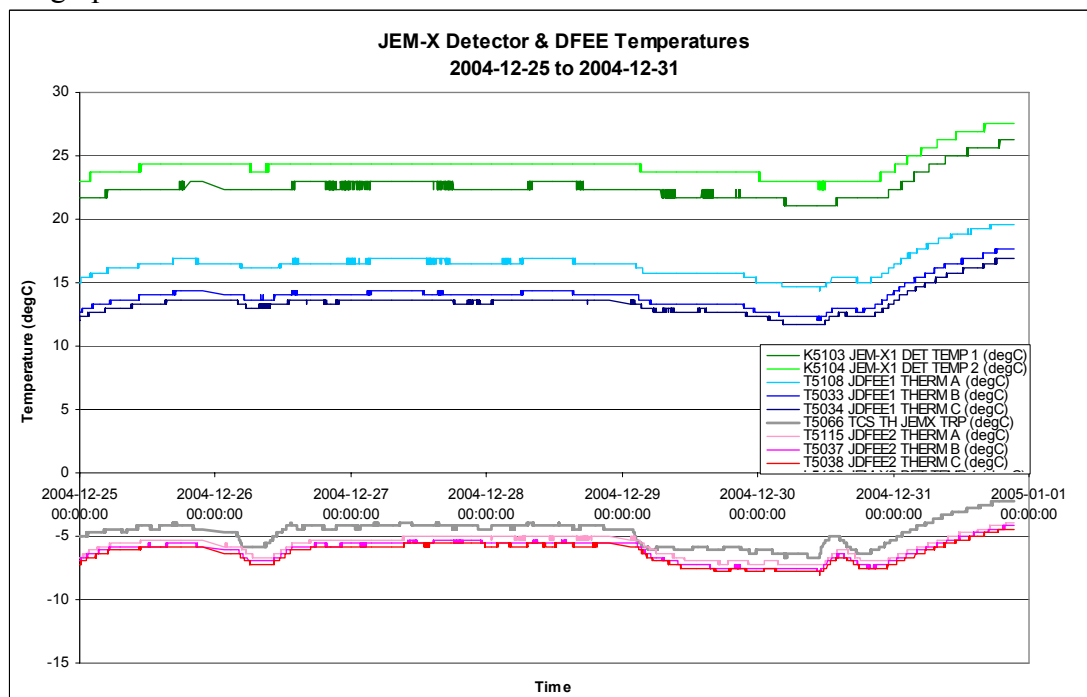
8.3.4.1 JEM-X Count Rates

JEM-X1 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.



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

2004-12-25 (DOY 360, Rev 268)

Nothing to report

2004-12-26 (DOY 361, Rev 268-269)

At the start of revolution 269, at 06:08:18Z, FCP_JEM1_0120 was executed to disable the JEM-X1 reactions to the IREM count rates in the Broadcast Packet as per INT_OR_0189.

2004-12-27 (DOY 362, Rev 269)

Nothing to report

2004-12-28 (DOY 363, Rev 269)

Due to a loss of coverage from DSS-16 (see Anomaly Report INT-2691), the Timeline was stopped at 16:43Z and the ED KESAFE01 scheduled in the Timeline at 17:17:13Z to put JEM-X1 into Safe mode before radiation belt entry of revolution 269 was missed. Once TM/TC capability from DSS-16 was regained, the ED KESAFE01 was re-uplinked manually at 18:24:37Z.

2004-12-29 (DOY 364, Rev 269-270)

At the start of revolution 270, at 03:46:17Z, FCP_JEM1_0120 was executed to disable the JEM-X1 reactions to the IREM count rates in the Broadcast Packet as per INT_OR_0189.

2004-12-30 (DOY 365, Rev 270) to 2004-12-31 (DOY 366, Rev 270)

Nothing to report

7.3.5 OMC Operations

On DoY 360, at 17:58, a drop in TM caused the loss of pointing 02680105, it was at this time that the following pair of commands was rejected:

```
2004.360.18.05.33.647 2004.360.18.05.22.173 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=905
2004.360.18.05.27.184 2004.360.18.05.15.423 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=904
```

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands that pointing.

At 18:30, a power failure at the ground station caused the TM and TC to drop. The impact was the loss of pointing 02680106, also the instrument was not observed to enter SAFE mode at the end of the orbit due to the lack of TM.

On DoY 362, at 22:51, an AOCS command failed release, the impact was the loss of pointing 02690077, it was at this time that the following pair of commands was rejected:

```
2004.362.22.54.45.828 2004.362.22.54.33.534 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=1275
2004.362.22.54.45.899 2004.362.22.54.40.284 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=1276
```

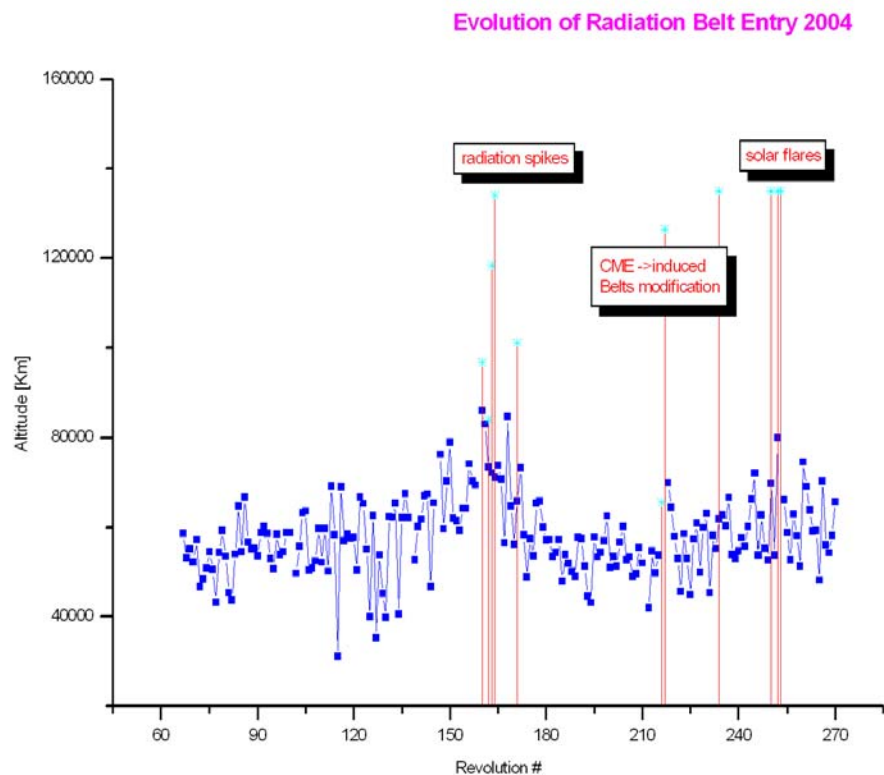
These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands that pointing.

On DoY 363, at 16:19, the TM dropped. This started a chain of events that caused the loss of pointings 02690110 through to 02690116, see AOCS section for details.

On DoY 363 at 18:40:48 and DoY 366 at 18:28:53, OMC was switched by the Timeline to SAFE mode, at the nominal times.

7.3.6 IREM Operations

Radiation Belts Entry



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]
268	RAD_ENTR R 2004-12-25T18:52:51Z	2004-12-25 19:41:05	<54271.7	2004-12-25 19:38:16	54058.05
269	RAD_EXIT R 2004-12-26T04:05:25Z	2004-12-26 02:41:29	>>24895.4	2004-12-26 02:58:16	29348.72
269	RAD_ENTR R 2004-12-28T18:40:26Z	2004-12-28 18:56:57	58207.5	2004-12-28 19:33:51	53064.17
270	RAD_EXIT R 2004-12-29T03:52:49Z	2004-12-29 02:01:29	>21661.6	2004-12-29 02:43:51	28954.92
270	RAD_ENTR R 2004-12-31T18:28:34Z	2004-12-31 17:39:45	>65712.4	2004-12-31 19:23:51	53223.32

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)

Radiation Spike

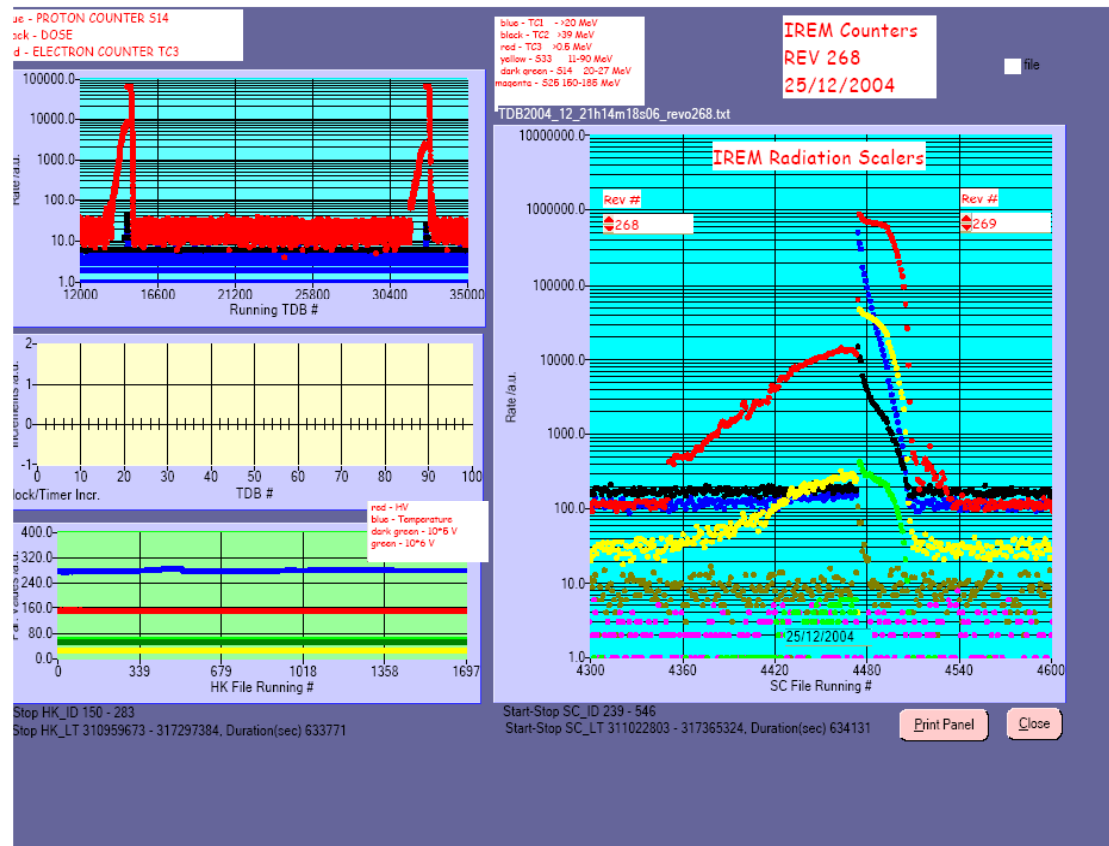
Proton Belts

The flux of protons >8MEV computed by RadMon, did not exceed the threshold. Therefore, no predicted proton cut-off is provided for this week.

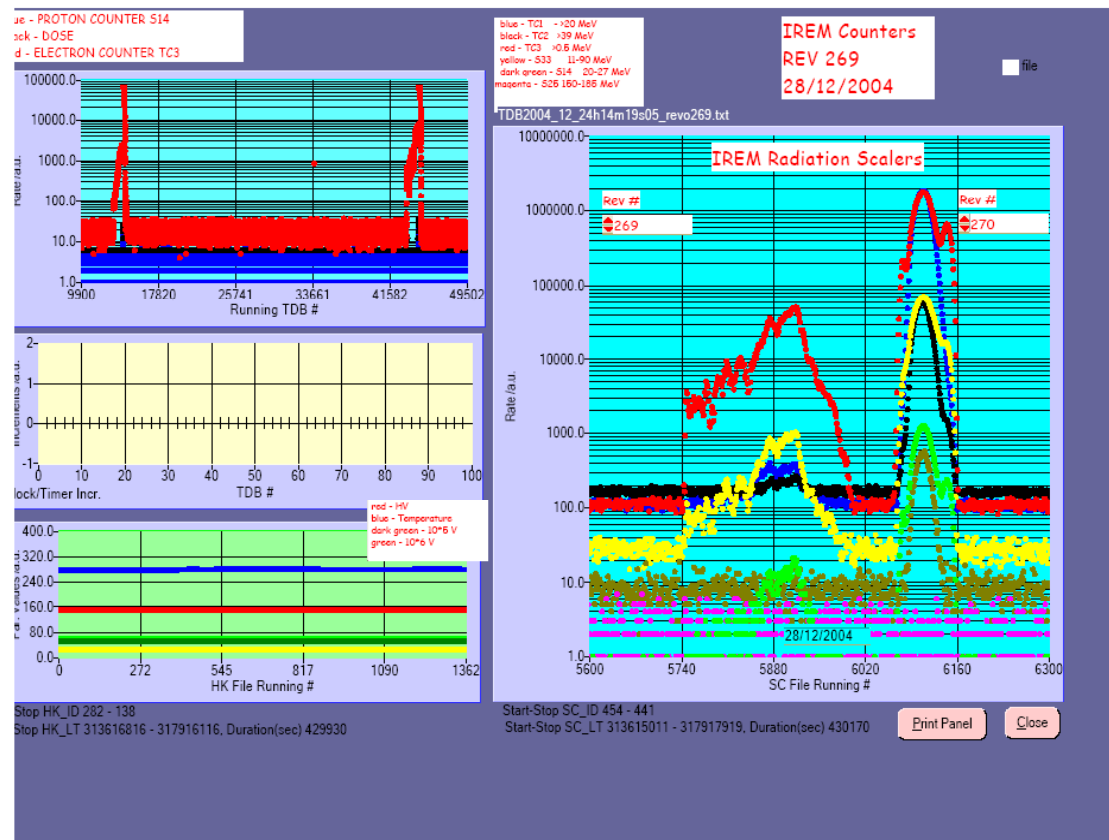
IREM daily report

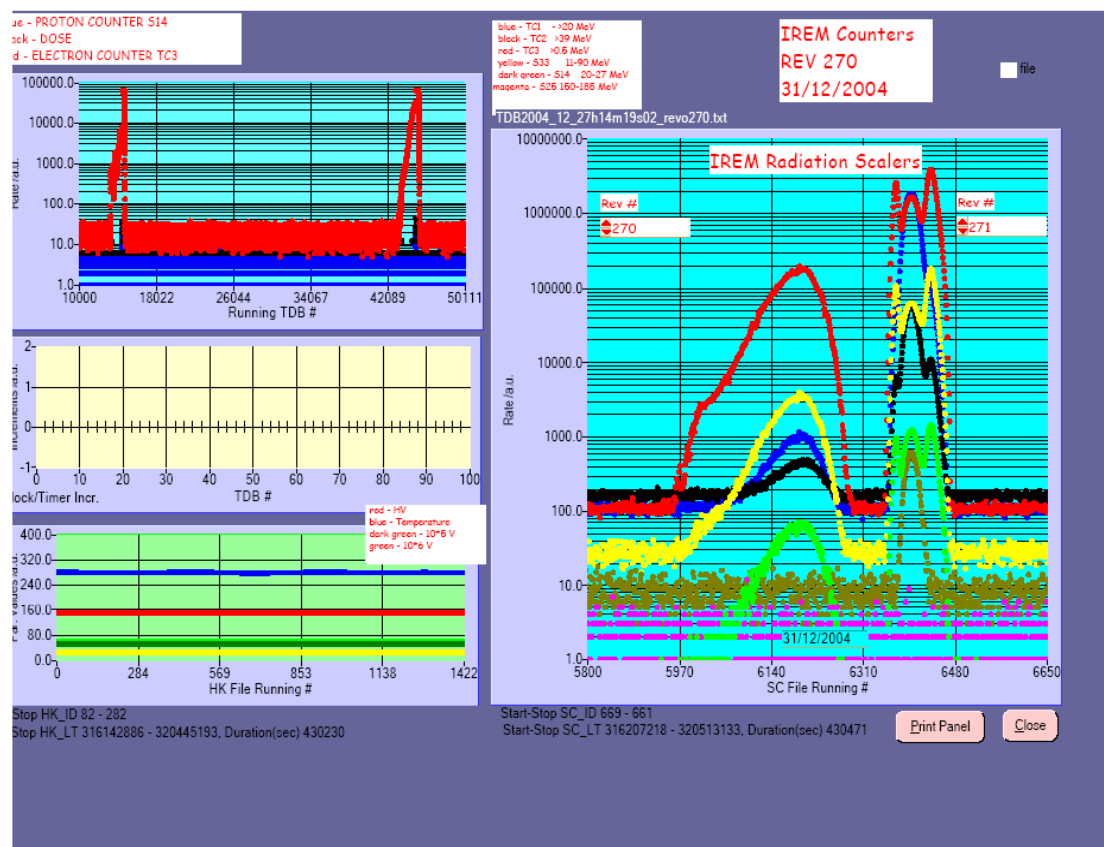
Nothing to report.

IREM radiation counters



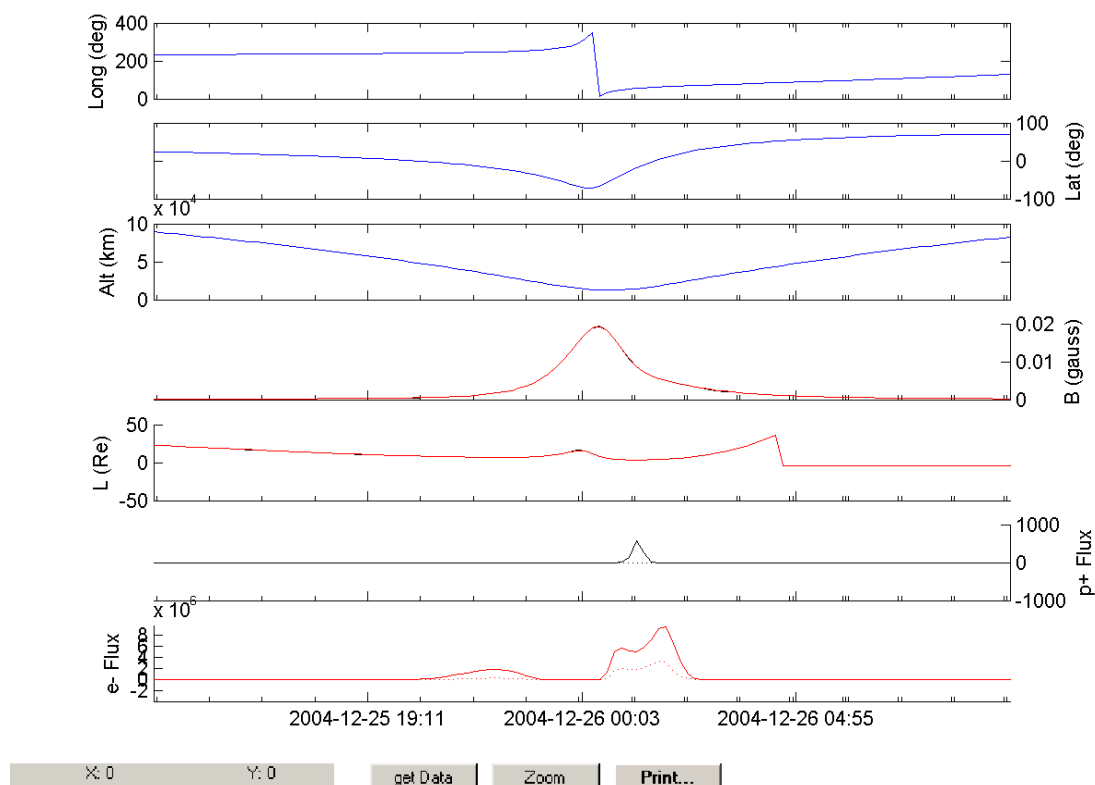
Due to connection problems, IREM radiation counters data, acquired by IREM ECOE, are not completely available for the perigee passages of revolution 268.



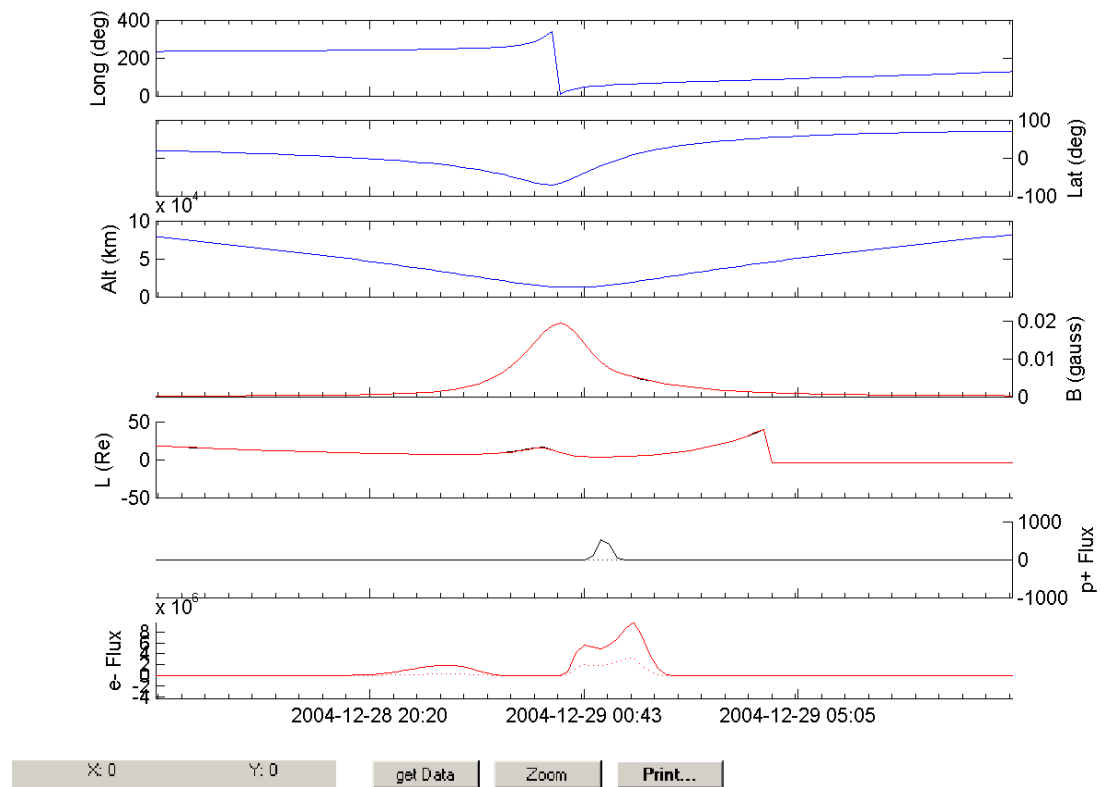


IREM Predicted Radiation Belt Passages.

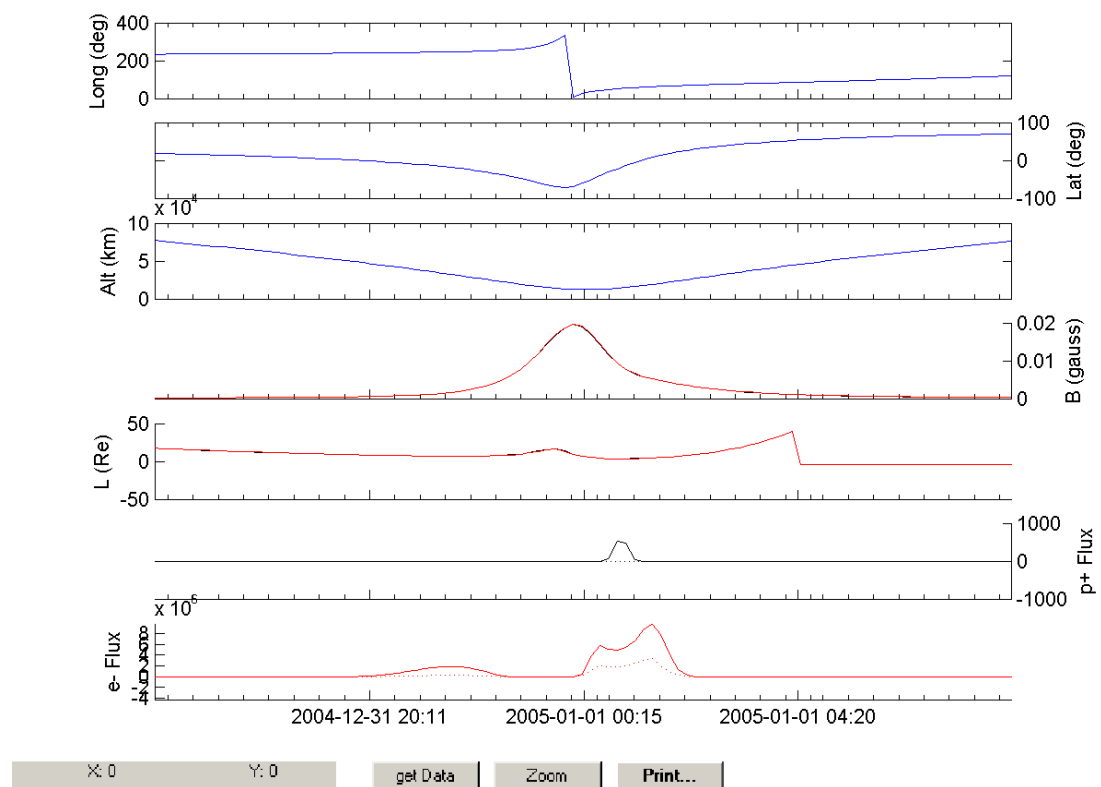
Rev 268



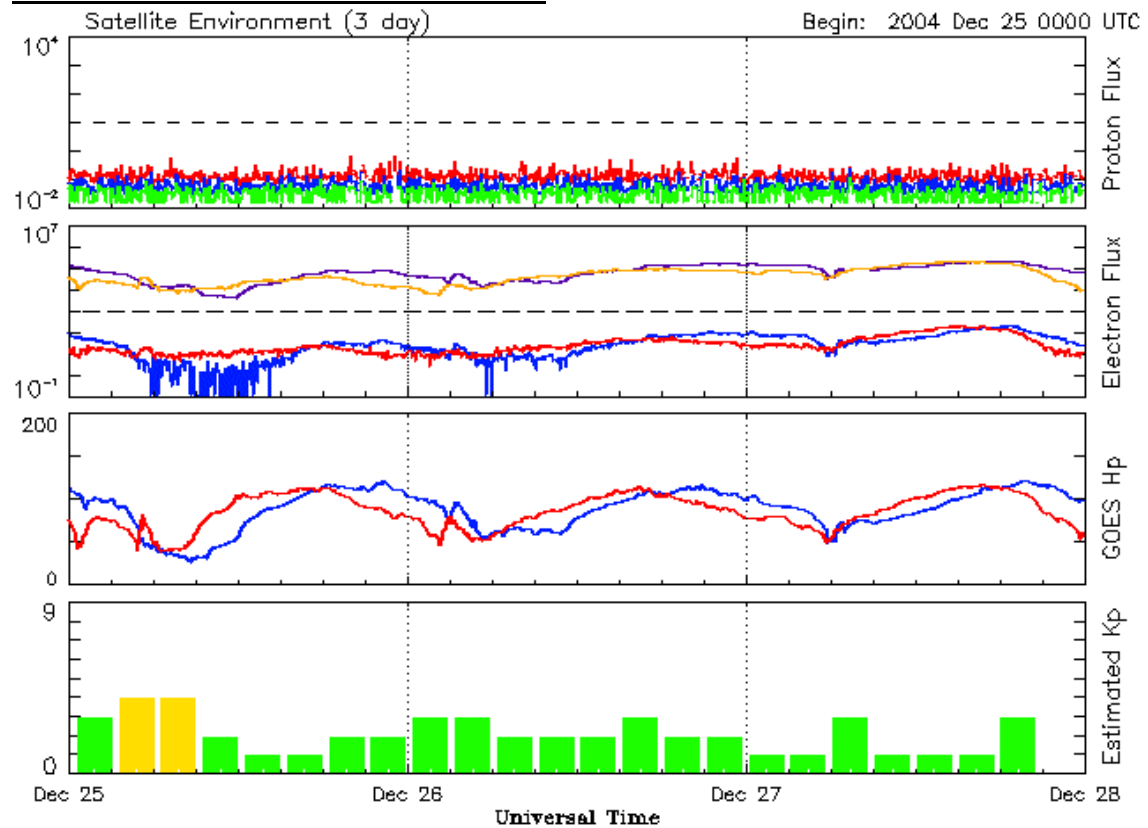
Rev 269



Rev 270

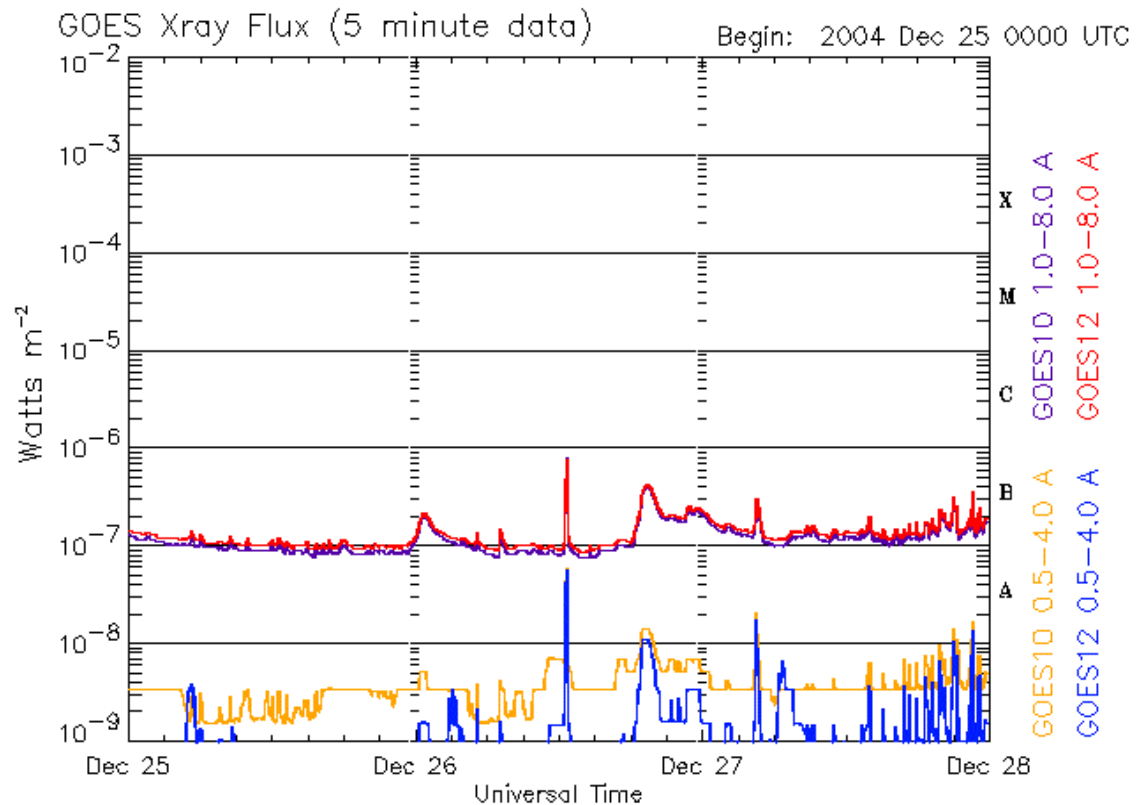


SEC-GOES Observed Particles Fluxes.



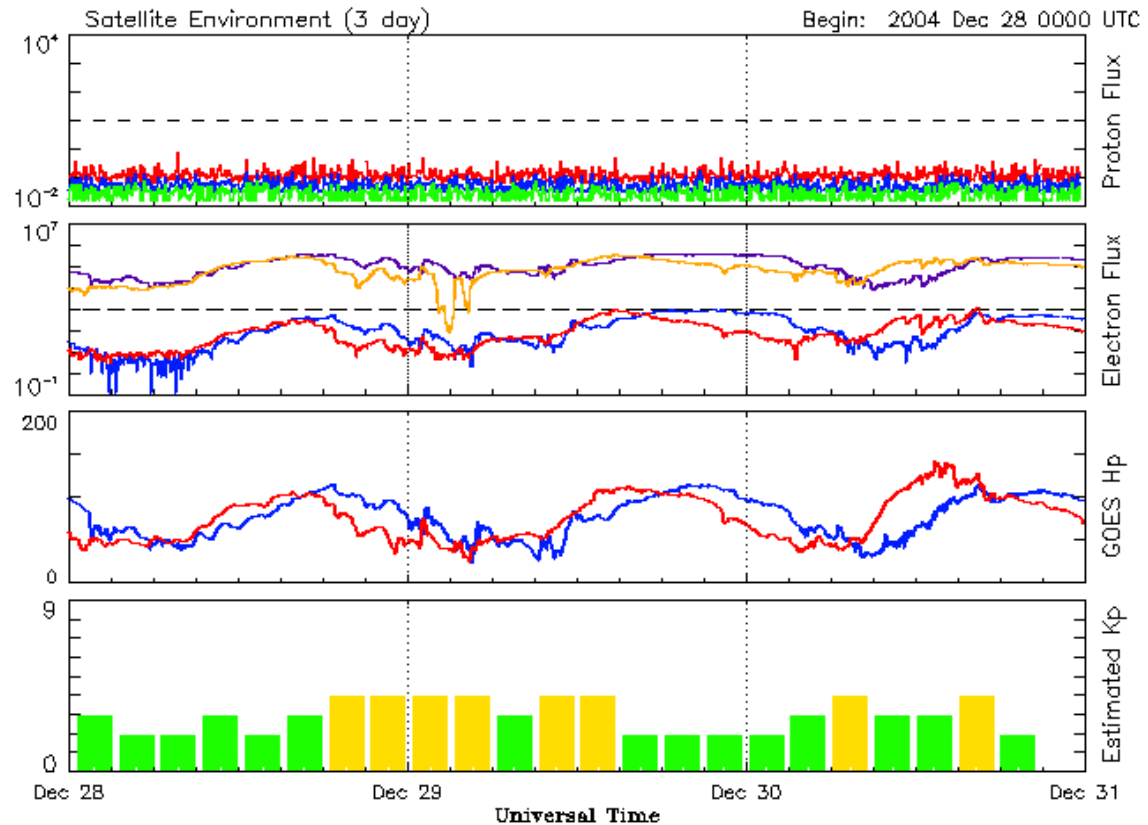
Updated 2004 Dec 27 23:56:11 UTC

NOAA/SEC Boulder, CO USA



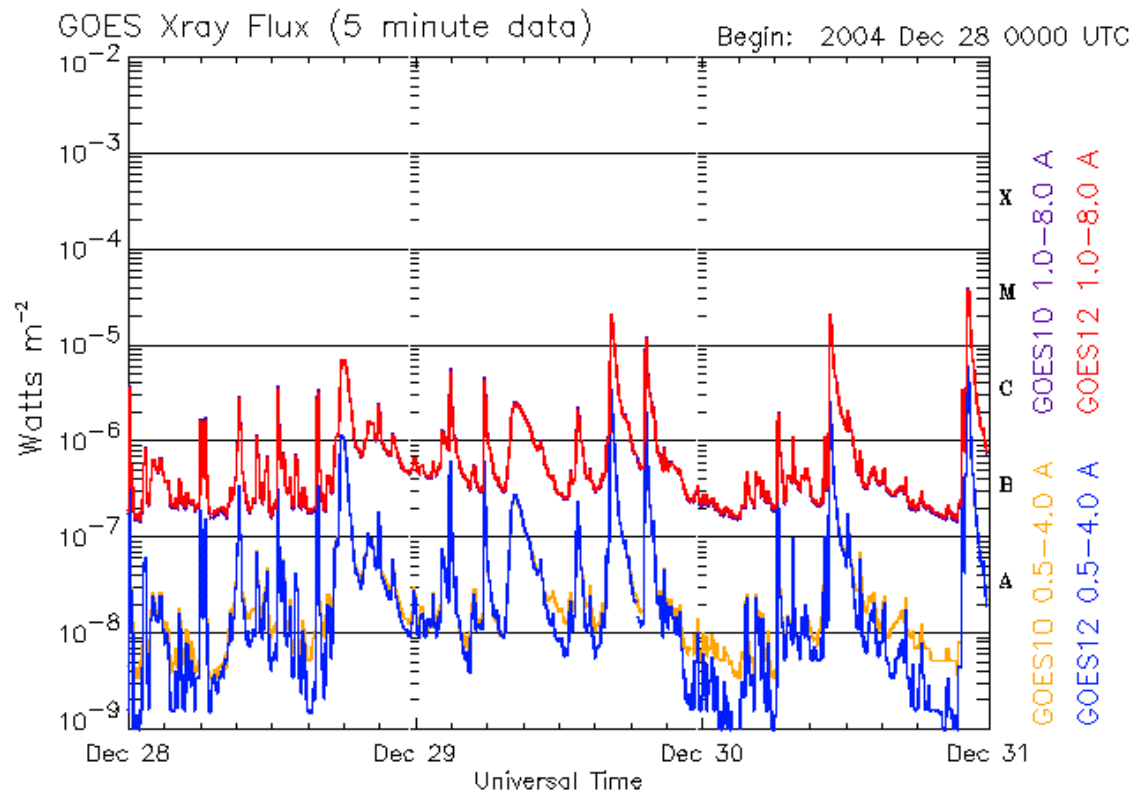
Updated 2004 Dec 27 23:56:04 UTC

NOAA/SEC Boulder, CO USA



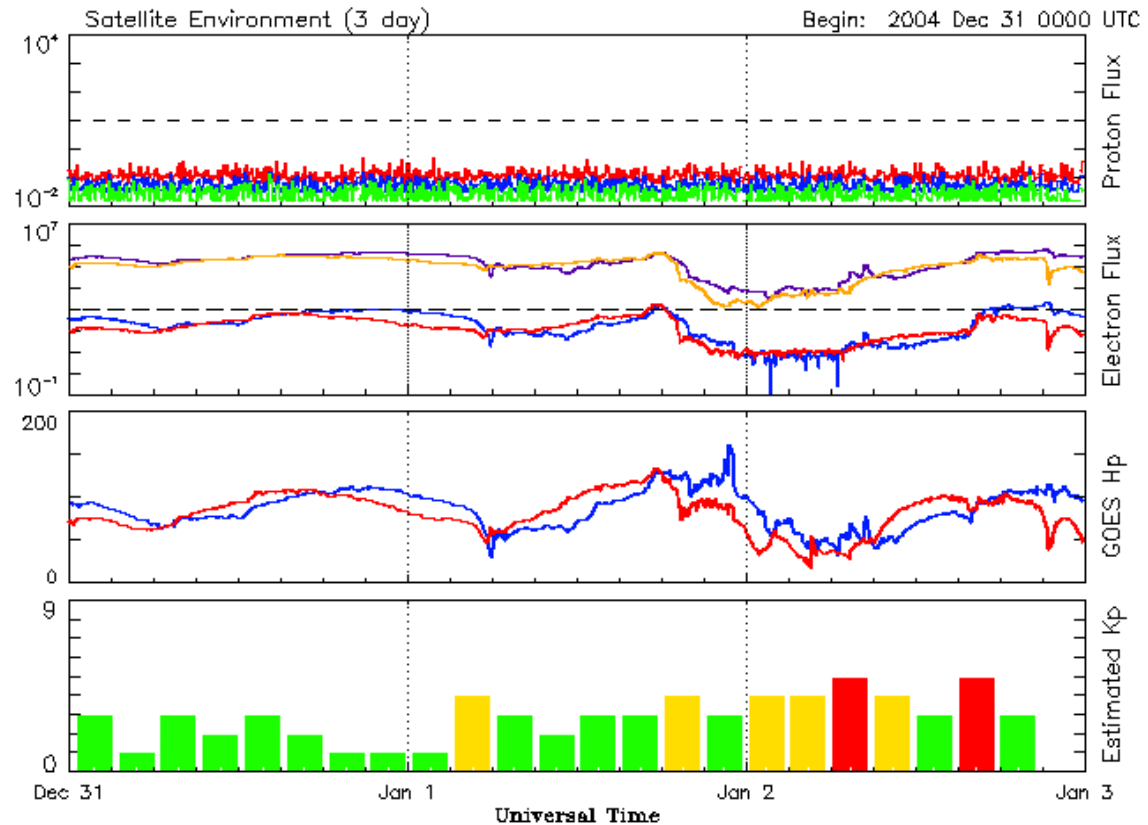
Updated 2004 Dec 30 23:56:11 UTC

NOAA/SEC Boulder, CO USA



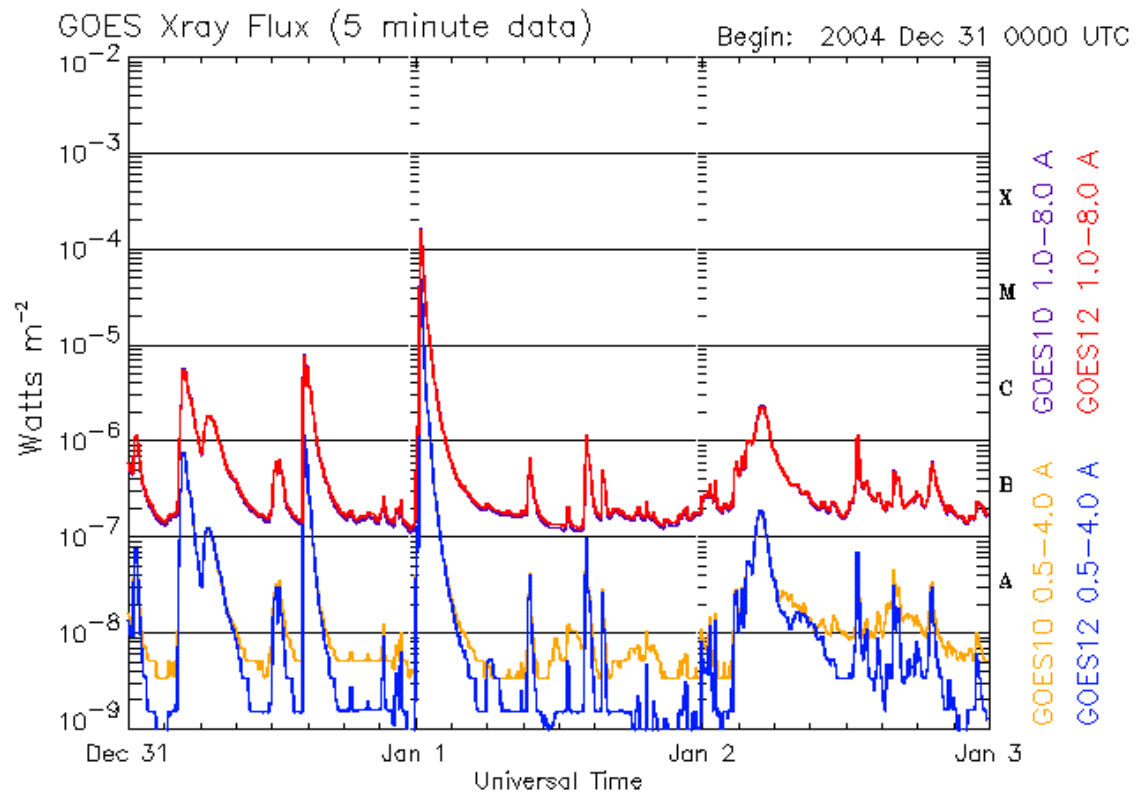
Updated 2004 Dec 30 23:56:04 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Jan 2 23:56:12 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Jan 2 23:56:05 UTC

NOAA/SEC Boulder, CO USA