

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 120
Week 01
10.01.05
Routine Phase

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		J. Valencia	1

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 01.01.05 until 07.01.05 (both dates inclusive) and covers the revolutions 271, 272 & 273.

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; GRO 1411-64 (RA 14:10:57.2; DEC -64:02:27.8); 3C273 (RA 12:29:06.7; DEC +02:03:08.0) and the Target of Opportunity V0332+43 (RA 03:34:59.9; DEC +53:10:23.5). The activities consisted of hexagonal and raster dithering observations as well as staring and GPS 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.

19 slews were missed from the Timeline during this period:

- 1 slew (CSL) was not executed due to missing update of the FDS system following a STR 1750 fault;
- 13 slews (4 OSL and 9 CSL) were not executed due to a problem on REDU station (TM frames received with wrong ERT);
- 1 slew (OSL) was not executed due to a problem on NCTRS-A machine (time-out in transmission).
- 3 slews (OSL) were not executed due to a problem on DSS16 station (transmitter failure);
- 1 slew (CSL) was not executed due to a problem on REDU station (AD service terminated).

The fuel consumption over the period between 01/01/2005 and 07/01/2005 was 0.269 kg. The remaining propellant is in the order of 164.8817 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

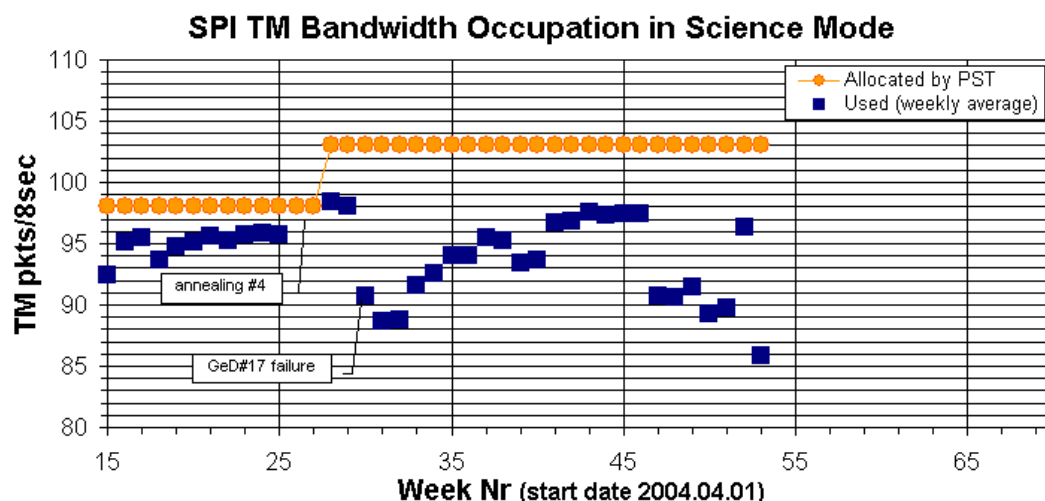
The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

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 operations at MOC. 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 85.8 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 $\pm$ 1K.

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

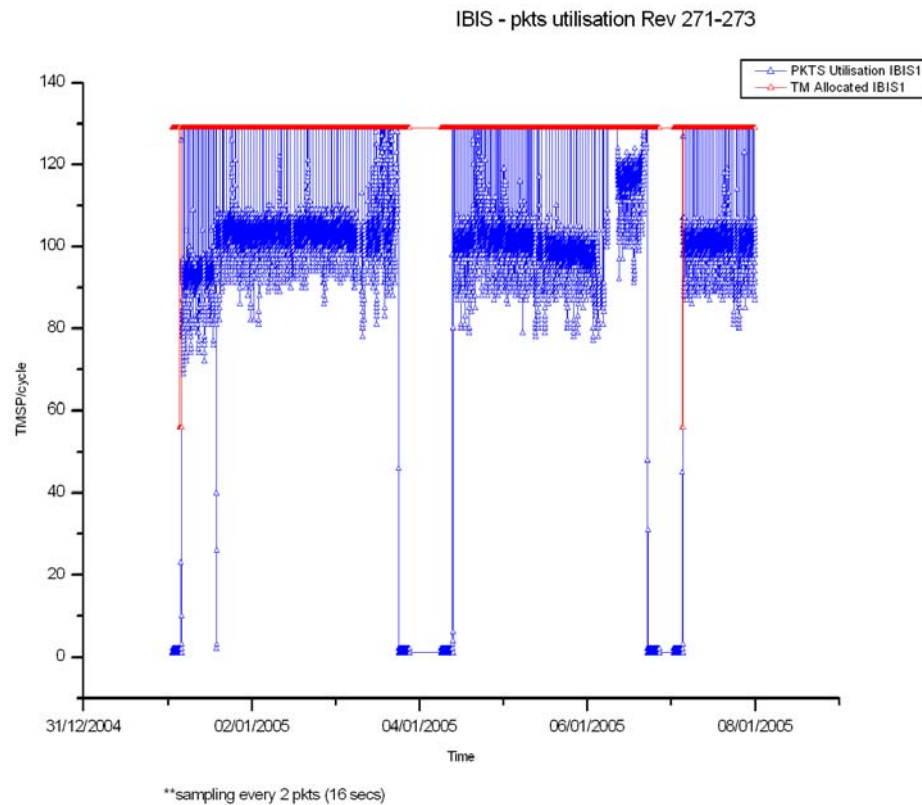
3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by low to moderate 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 104.6 TMPS/cycle, up 1.0 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 2004-01-02 and 2004-01-03 several brief occurrences of out of limits were received on the TM parameters K5119 SOFTWARE TRIGGER; K5136 BUFFER LOSS and K5317 RAD MONITOR 3 due to high background radiation conditions. However, as the value of K5119 SOFTWARE TRIGGER did not exceed the safe threshold for JEM-X1, there was no impact on the operations.

On 2004-01-04, at the start of revolution 272, the activities were interrupted due to a timing anomaly at Redu (see Anomaly Report INT-2689). Thus the activation of JEM-X1 at the start of the revolution was performed manually, with JEM-X1 entering Data Taking mode at 2004-01-04T08:51Z, i.e. 4.5 hours later than planned.

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 164 OMC pointings executed nominally, 1 was delayed, and 12 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 characterized by low to moderate solar activity. On 01 January at 00:40Z, a X2-class solar flare erupted. High radiations probably related to this event, were reported on 03 January from 15:01Z to 16:08Z.

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 fair this week, although still above the system performance requirements, a total of 15 pointings were lost and 1 delayed due to ground problems.

4.1 Mission Operations Centre

The performance of the MOC was good this week, a pointing was delayed due to nctrs problems. There were also a couple of occasions where the link to ISDC dropped.

4.2 Ground Stations & Network

The performance of the ground stations and Network was in general poor this week. 13 Slews were lost to problems with Redu, and 2 more with DSS-16. The overall performance was above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's received up to rev 292(!). TSF received up to 274.

ISOC is now starting a transitional phase where the mission planning will be performed both at ESTEC and ESAC. Before sending the products to MOC for further processing, the POSes and ICPs generated from the two centres are compared. Once they are in agreement the POS / ICP from ESTEC will be sent to MOC. This parallel processing will be performed up to the time planning of AO 3 observations will start (from rev 287). Then only planning from ESAC will be performed and the products sent from there. POSes for rev 278 and 279 have been generated in ESTEC but not sent yet pending generation in ESAC as well.

Revolutions 273 and 279 have been replanned due to the accepted ToO reported last week. Rev 274 was replanned once more on MOC request since an outage period for Redu was prolonged.

2. Observation status

No activity this week.

3. ISOC science data archive

The archive hardware has arrived in Spain after repair and shipment in ESTEC (see report week 51) and is being integrated. A new data tape from ISDC has been received but data ingestion will be performed when the archive system is up and running in ESAC.

4. ISOC system

A version 10.7 of the system is installed at the end of the week. The main new functionality is enhancement to the copying of observations, so called splitting of an observation. This version will also be installed in ESAC.

5. AO 3

The AO 3 program has been approved by D/SCI. Activity is started to inform the PI's of the outcome of the TAC process. This is done from ESAC using the INTEGRAL Helpdesk.

6. ISOC move to ESAC

The first members of the ISOC team are now in ESAC. All hardware shipped before Christmas is available in Spain and installed to support the team members there. The system and people are now available to support the parallel ISOC operations mentioned above.

7. Problems

Nothing new to report.

4.3.2 ISDC

Status of ISDC observation processing on 10/01/2005:

- Latest Standard Analysis completed: observation 02201120003 (IC443, Revolution 247-248) on 12/12/2004

- 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 001, at 12:25, all TM & TC links from nctrs-a & nctrs-b drop out due to hits on several lines. The links were restored at 12:28. There was no impact.
- At 17:36, the nctrs-a was in a yellow state, with the event-log cpu at 46%.
- On DoY 003, at 06:13, a hit on the line to Redu caused the TC AD service to drop, the link was restored at 06:14 without impact.
- At 06:39 there was an on-board Star-TRacker 1750 fault, which repeated at 08:23, the OTF was not set for pointings 02710064 and 02710066 but the pointings continued as planned.
- At 06:54, a hit on the line with Redu caused the TM and TC links to drop, there was no impact.
- On DoY 004, at 01:04, after AOS, the VC7 TM was not connecting. The problem was eventually traced to when the TMP in Redu was restarted, the wrong year was supplied by the time code generator, the timeline was rejoined at 09:11, the impact was the loss of pointings 02720001 through to 02720012.
- On DoY 005, at 12:20, there was no TM flowing to ISDC, at 12:38, the ifrd task was restarted, and at 12:39 the data was flowing, there was no impact.
- At 14:11, an AOCS command failed release, the TC link was restarted, and the commands sent at 14:18. There was no slew lost.
- On DoY 006, at 05:52, an AOCS command (A2564 'RC Star Bright TH') failed release, further commands also timed out. The nctrs was swapped to the b system. The Timeline was rejoined at 08:47, the impact was the start of pointing 02720075 was delayed by nearly 3 hours, the duration of this pointing was nominally 12 hours 49 seconds.
- At 09:10, there was a 1 minute interruption in the data flow to ISDC.
- At 17:43, the TM from DSS-16 was lost, the TM returned at 17:55, but now there was no TC. This was recovered at 18:05. The impact was a reaction

wheel bias was lost, which caused the loss of pointings 02720076 and 02720077. (These were both engineering slews, so no science data was lost)

- At 20:48, the TM from DSS-16 again dropped, and was lost for the remainder of the pass. The impact was the antenna swap at the end of the pass was lost. The corresponding DR# was G105147. The antenna swap was subsequently executed without problems at the start of the next pass.
- On DoY 007, at 00:48, network were having problems connecting to Redu. This was put down to the FEC, and quickly solved.
- At 18:10, an AOCS command failed release as the AD service with Redu had terminated, the TC returned at 18:15, the impact was pointing 02730027 was missed.
- At 19:23, the link isds-ISDC disconnected, after restarting ifrd on isds-a, the link was restored at 19:33. There was no impact.

The following new anomaly report was entered into the ARTS system.

AR id	Date Created	Subject	Segment	Status
INT-2689	05/01/2005	TMPs (1-2) problem at REDU: sent frames with incorrect ERT (2004 instead of 2005)	ESA stations	Pending

7 Future Milestones

Appendix

The appendix includes various detailed information.

7.1 Overview of Revolutions

Revolution 271

The observations in revolution 271 started with 14 pointings of a GPS lasting in total ~9.5 hours and was followed by an amalgamated raster dithering observation of GRO 1411-64 and 4U 1323-619 at (RA 14:10:57.2; DEC -64:02:27.8) for the remaining ~51.5 hours.

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.

Revolution 272

The observations in revolution 272 started with a raster dithering observation of 3C273 (RA 12:29:06.7; DEC +02:03:08.0) lasting ~29.5 hours, followed by an amalgamated raster dithering observation of GRO 1411-64 and 4U 1323-619 at (RA 14:10:57.2; DEC -64:02:27.8) lasting ~17 hours and terminated with a staring observation of the Target of Opportunity V0332+43 (RA 03:34:59.9; DEC +53:10:23.5), performed for the remaining ~8.3 hours.

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.

Revolution 273

The activities in revolution 273 began with a raster dithering observation of 3C273 (RA 12:29:6.70; DEC +02:03:08.0) lasting ~29.5 hours. This was planned to be followed by a series of hexagonal dithering observations centred at various off-axis attitudes (and 1 pattern centred on-axis) of the Target of Opportunity V0332+53 (RA 03:35:0.00; DEC +53:10:22.8). This set of observations was planned to be performed for the remaining ~30 hours of observation time. However, the first ~13 hours of this set of observations was lost due the spacecraft entering Emergency Safe Attitude Mode.

Throughout these observations all instruments were planned to be in their nominal science modes and the JEM-X2 DFEE remained off (however all instruments entered Safe mode as a result of the ESAM). 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

2004-12-26T11:05:04.000Z	165.3069	F	Automatic TM processing.
2004-12-27T12:23:39.000Z	165.2665	F	Automatic TM processing.
2004-12-28T19:42:14.000Z	165.2410	F	Automatic TM processing.

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2004-12-29T03:11:11.000Z	165.2140	F	Automatic TM processing.
2004-12-30T09:41:54.000Z	165.1870	F	Automatic TM processing.
2004-12-30T12:37:15.000Z	165.1510	F	Automatic TM processing.
2005-01-01T01:55:26.000Z	165.1227	F	Automatic TM processing.
2005-01-01T10:45:35.000Z	165.0702	F	Automatic TM processing.
2005-01-03T20:35:09.000Z	165.0353	F	Automatic TM processing.
2005-01-04T08:13:34.000Z	164.9871	F	Automatic TM processing.
2005-01-04T09:43:02.000Z	164.9617	F	Automatic TM processing.
2005-01-06T04:58:35.000Z	164.9434	F	Automatic TM processing.
2005-01-06T18:18:13.000Z	164.9281	F	Automatic TM processing.
2005-01-06T20:21:02.000Z	164.8970	F	Automatic TM processing.
2005-01-07T01:31:50.000Z	164.8817	F	Automatic TM processing.

This report was generated Fri Jan 7 08:00:24 GMT 2005

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 01/01/2005-07/01/2005

AOCS operations were executed from the Automatic Timeline.

During this period, 53 Open Loop Slews, 127 Closed Loop Slews and 9 Momentum Bias were executed. 19 slews were missed or executed manually. This is equivalent to a $\sim 9.5\%$ loss.

01/01/05 (Day of Year 001, Revolution 271)

Nothing to report.

02/01/05 (Day of Year 002, Revolution 271)

Nothing to report.

03/01/05 (Day of Year 003, Revolution 271)

STR 1750 processor fault: at 06:39:10z a STR 1750 processor fault occurred during the execution of the PID 02710064. The sequence of the events were:

06:38:00z	Closed Loop Slew End
06:39:00z	Mapping start
06:39:10z	Mapping End prematurely
06:39:10z	IMU-1 ON
06:39:10z	NewMapping start and new guide start picked
06:40:02z	Mapping End
06:49:10z	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 to 10 sec) and start of a new mapping.

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 magnitude 5.65 guide star ID 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 OTF not reached during PID 02710064.

Flickering of the Pointing-Bit at the end of open loop slew due to Roll Error: At the end of open loop slew 02710065 the error in roll with respect to the Sun-Steering-Law assumed roll angle was ~ 106 arc-seconds. This is more than the OTF threshold for roll and resulted in the flickering of the Pointing-Bit, which was not seen at BCP level. This error already existed at the start of the slew and was introduced by the attitude reconstruction after the close loop slew 02710064, during which occurred the STR 1750 fault.

STR 1750 processor fault: at 08:23:16z a STR 1750 processor fault occurred during the execution of the PID 02710066. The sequence of the events were:

08:22:11z	Closed Loop Slew End
08:23:11z	Mapping start
08:23:16z	Mapping End prematurely
08:23:16z	IMU-1 ON
08:23:16z	NewMapping start and new guide start picked
08:24:08z	Mapping End
08:33:16z	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 to 5 sec) and start of a new mapping.

The IMU was switched ON, being the problem occurred during the execution of a pointing. According to the Star Catalogue, one extended object, the open cluster Ruprecht 111 was in the STR FoV at ~ 6 arcmin from the magnitude 6.4 guide star 9007-5832. This probably, as it was in the past, could have caused the fault.

No slews were missed. The operational impacts of the fault, was the OTF not reached during PID 02710066 and in addition the FD system did fail the update of the following slew ID 02710067 (CSL), therefore the slew was manually updated and executed from the Timeline.

04/01/05 (Day of Year 004, Revolution 271-272)

Slews missed from the Timeline: Due to a problem on REDU station (TMPs sending frames with wrong ERT, see AR INT_2689), the slews from 02720001 to 02720013 (4 OSL and 9 CSL) were not executed. A manual recovery was then performed to the attitude of PID 02720013. The next slew (CSL) for PID 02720014 was manually updated and executed from the Timeline.

05/01/05 (Day of Year 005, Revolution 272)

Nothing to report.

06/01/05 (Day of Year 006, Revolution 272)

Slew missed from the Timeline: Due to a problem on NCTRS-A machine (transmission flag in time-out), the slew ID 02720075 (OSL) was not executed. A manual closed loop slew was then performed to the attitude of PID 02720075. The next slew for PID 02720076 was manually updated from the Timeline.

Slews missed from the Timeline: Due to a problem on DSS16 station (transmitter failure), the slews ID from 02720076 to 02720078 (3 OSL) were not executed. A manual recovery was then performed to the attitude of PID 02720078. The next slew (CSL) for PID 02720079 was manually updated and executed from the Timeline.

07/01/05 (Day of Year 007, Revolution 272-273)

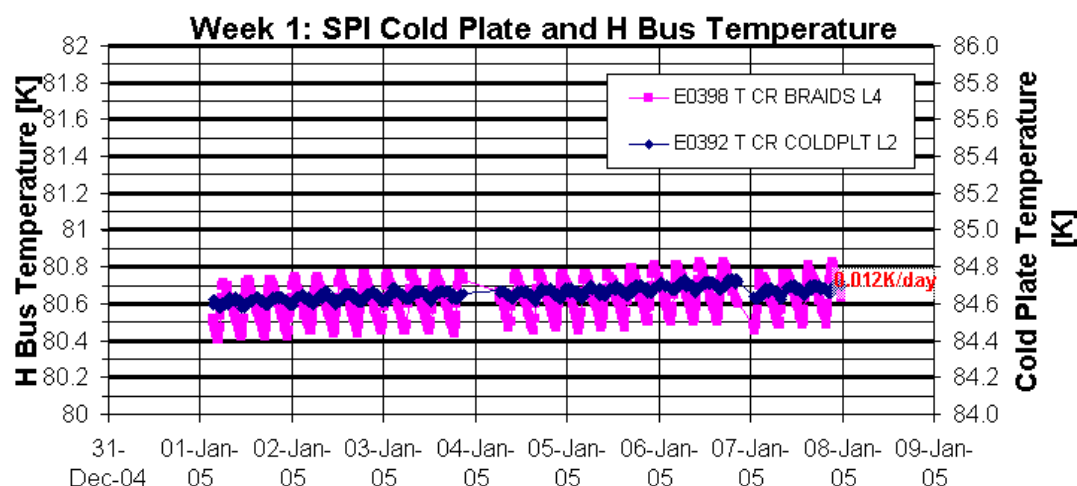
Slew missed from the Timeline: Due to a problem on station connection (AD service terminated), the slew ID 02730027 (CSL) was not executed. A manual recovery was then performed to the attitude of PID 02730027. The next slew (CSL) for PID 02730028 was manually updated and executed from the Timeline.

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.



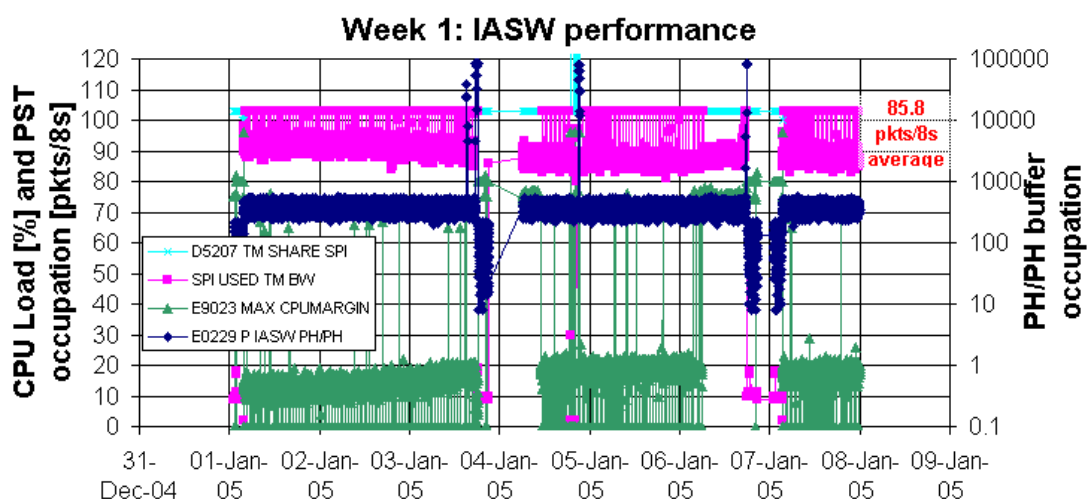
IASW/DPE:

The IASW performances are nominal. The PST TM bandwidth allocation is 103 pkts/cycle in the science windows; the actual TM bandwidth usage is:

- 103 pkts/cycle peak;

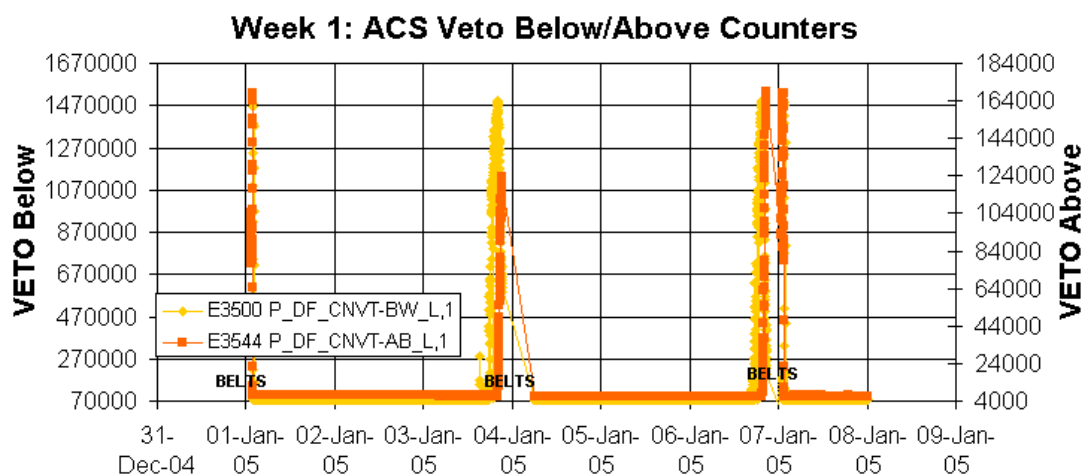
- 85.8 pkts/cycle average in science mode.

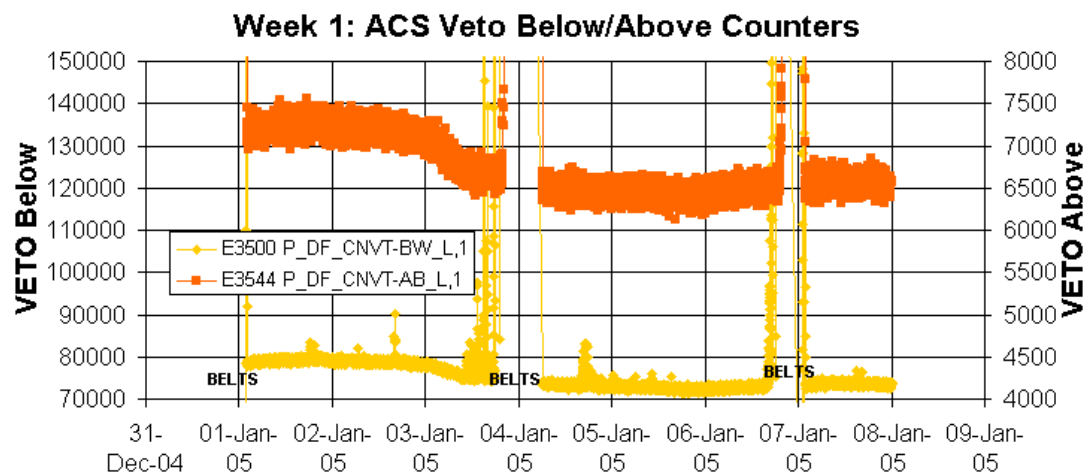
The SPI team is currently analysing the IASW code, investigating on the TM leakage anomaly INT_SC-107. A re-arrangement of the SPI TM slots in the PST, up-linked manually by the SPACON at every revolution, is temporarily used as workaround to this malfunction. The following diagram shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS:

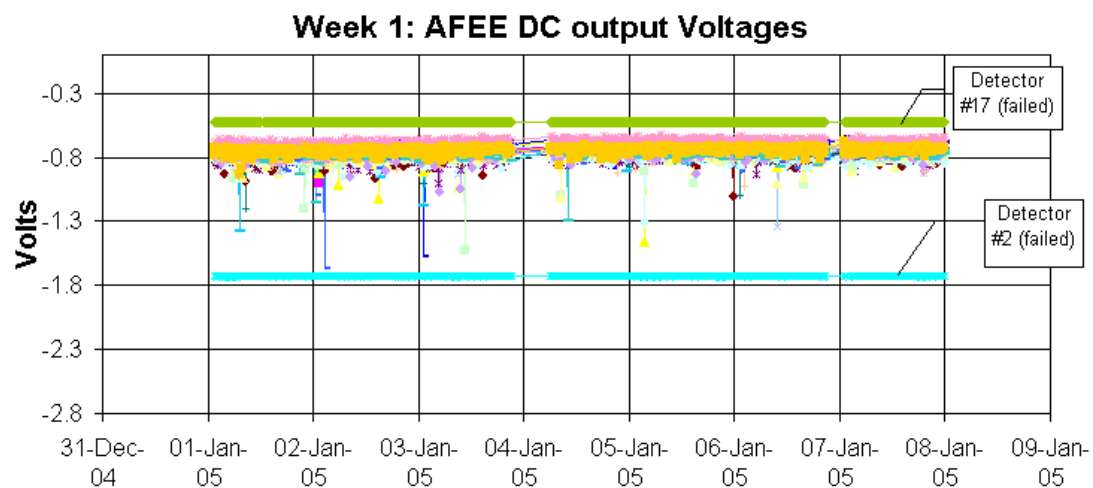
The performance of the ACS is nominal. The following plot shows the ACS overall count rate evolution during the reporting period.





AFEE:

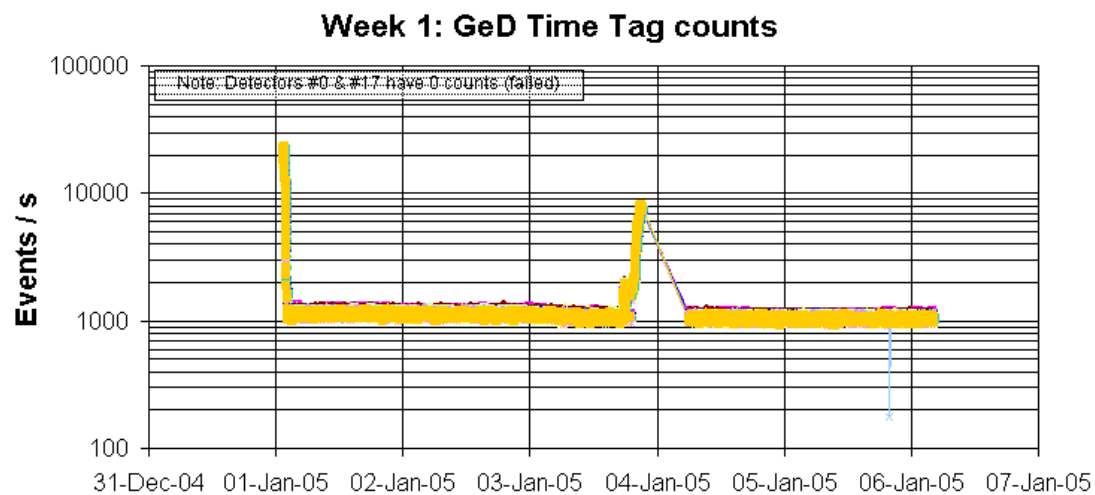
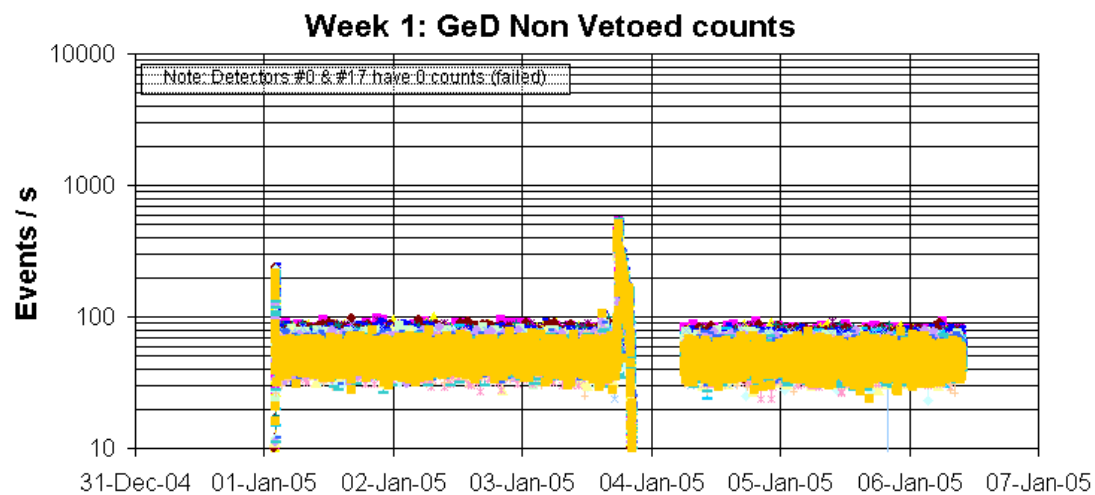
The performance of the detectors is nominal except for the detector #2, failed since 06.12.2003, and detector #17, failed since 17.07.2004. The following plot shows the AFEE dc output signals during the reporting period.



DFEE:

The performance of the unit is nominal.

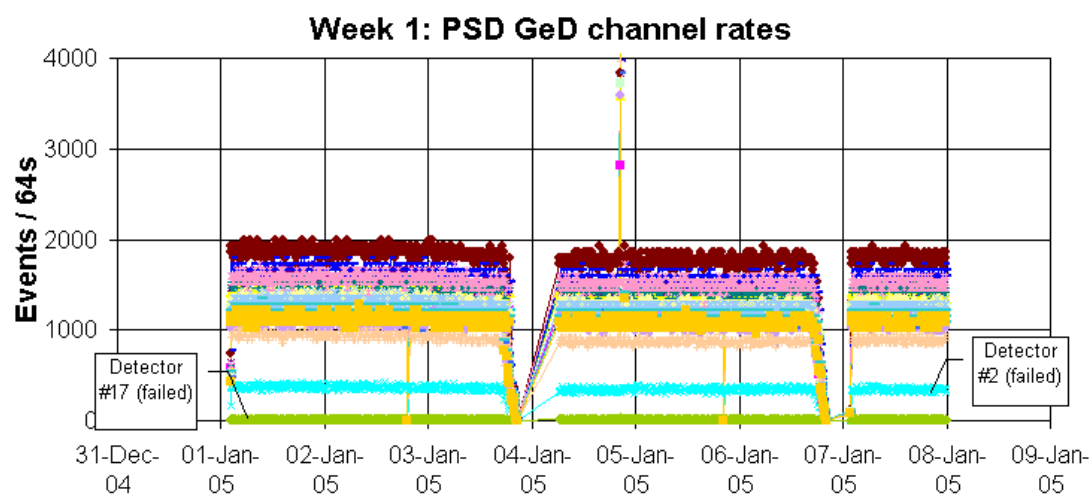
The following plot shows the Non Vetoed event rates, processed by the DFEE during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2 and #17.



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.

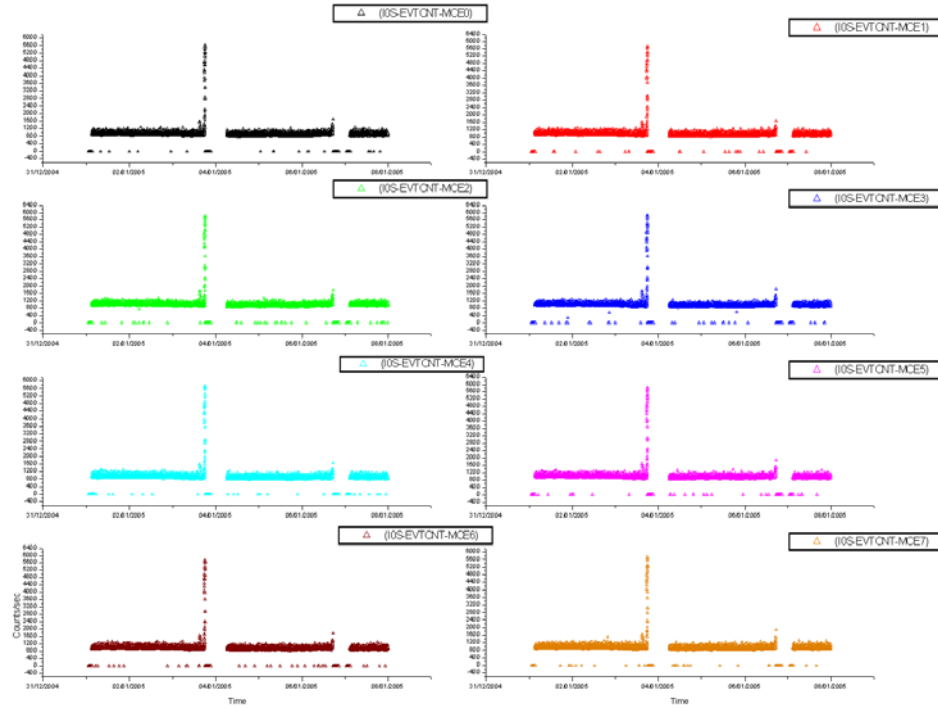


7.3.3 IBIS Operations

IBIS Event Counters Plots.

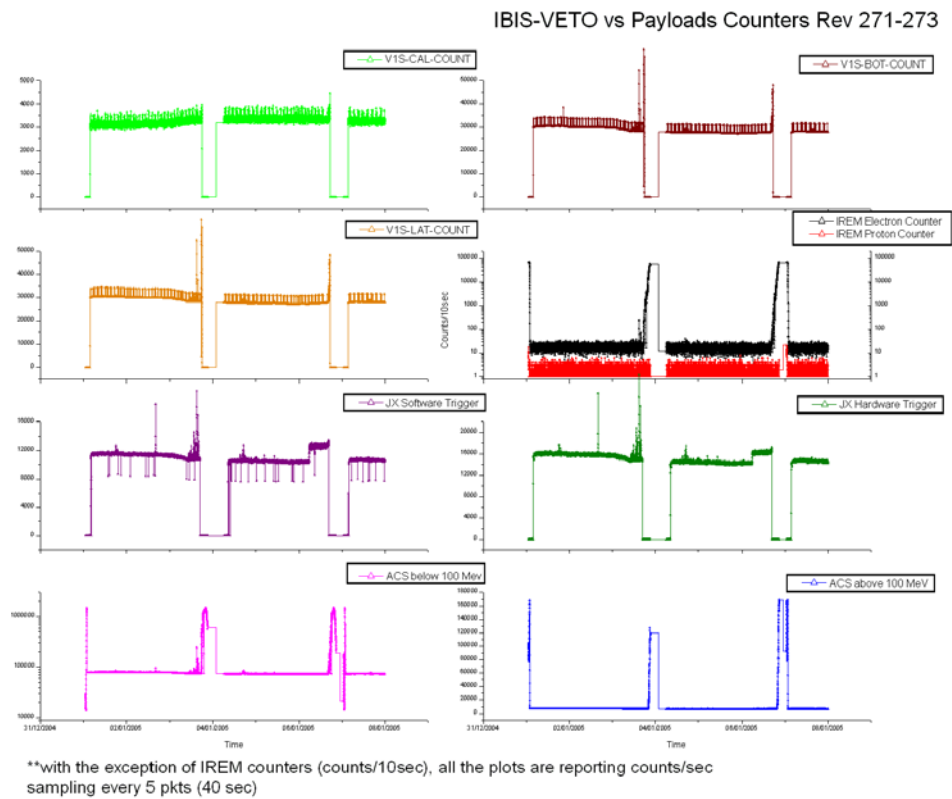
ISGRI Counters:

IBIS - ISGRI Counters Rev 271-273



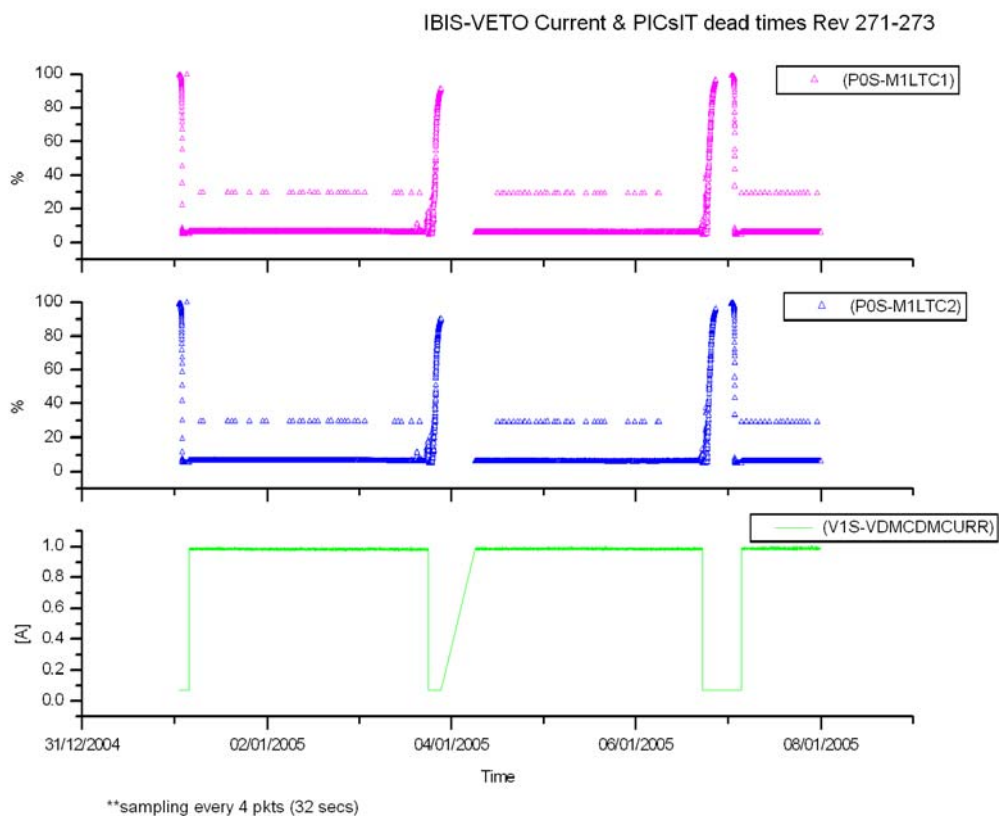
**sampling every 4 pkts (32 secs)

VETO vs Payloads Counters



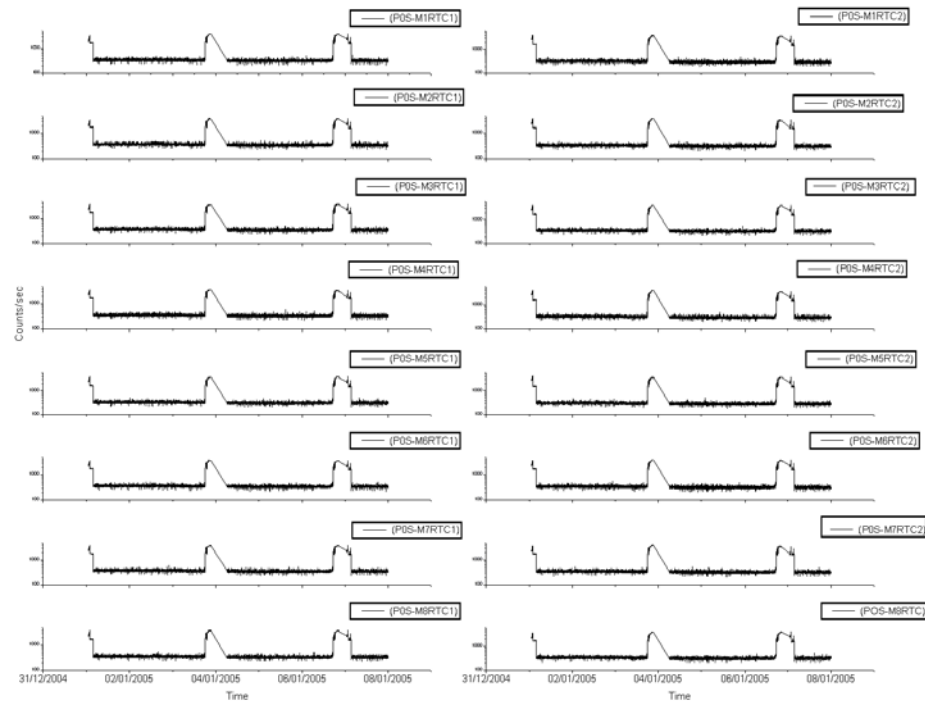
The week was characterised by low to moderate solar activity.

Veto Current:



Picsit Counters:

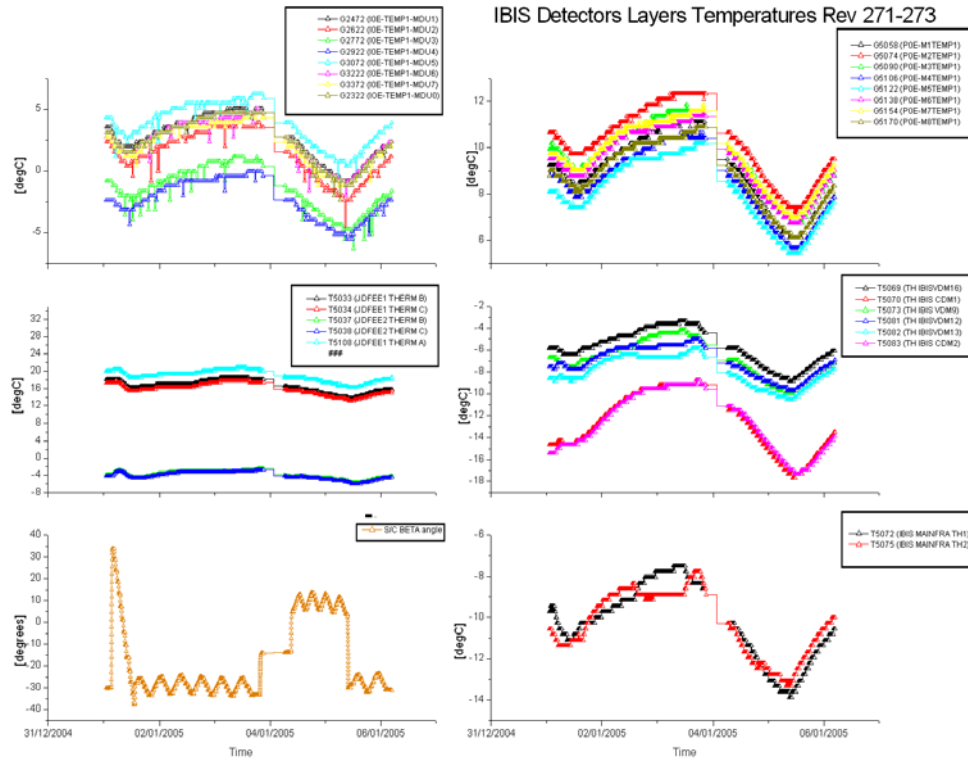
IBIS - PICsIT Counters Rev 271-273



**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures

IBIS Detectors Layers Temperatures Rev 271-273



**sampling every 8 pkts (64 secs)

IBIS daily report

DoY 003 (03/01/2005)

At 17:39Z TM G8080 (S1E-VS_HBRA-RT, valid event rate on HBRA) went OOL High. According to H-OVF-2, no action was taken.

At 18:04Z IBIS entered Stand-by mode due to radiations belts in advance compare to the BCPKT time (18:16Z).

Doy 004 (04/01/2005)

At the AOS REDU of revolution 272, a time synchronisation problem with REDU was reported. While MOC was investigated, ISGRI tables were uploaded successfully and calibrated successfully as well. This operation was controlled manually on ground.

After this, IBIS was disabled from the timeline until 09:27Z when the sequence GESTAN02 was sent. This put IBIS in Scientific Standard mode at 09:29Z.

At 10:31Z the sequence GEBENT02 (to force IBIS in Safe Configuration at next Belts entry) was sent.

At 21:51Z TM G2056 (IOE-OVFWPXADD-M4, overflow of the noisy pixel address register in MCE4) went OOL and back. According to action I-OVF-1, no action was taken.

Doy 006 (06/01/2005)

At 17:18Z IBIS entered Stand-by mode due to radiations belts in advance compare to the BCPKT time (18:03Z).

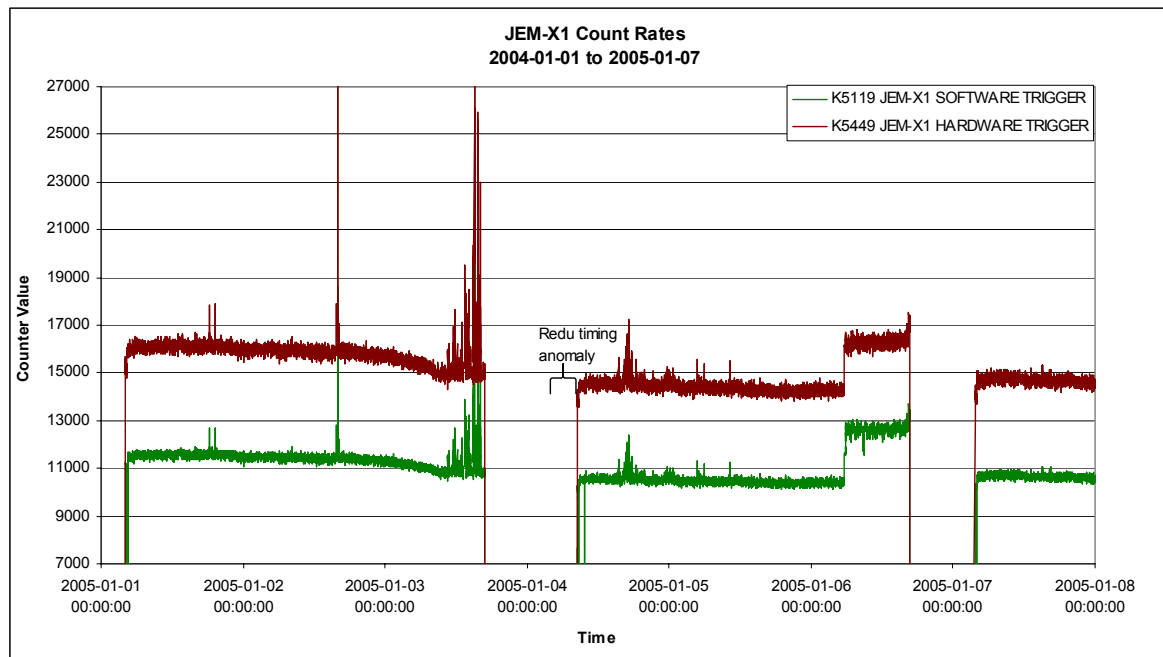
At 17:32Z CTX tables were dumped following INT_OR_0192, as requested by ISDC because the ISDC system could not processed these data during the anomaly on REDU TMP (2005.004 after AOS REDU).

7.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

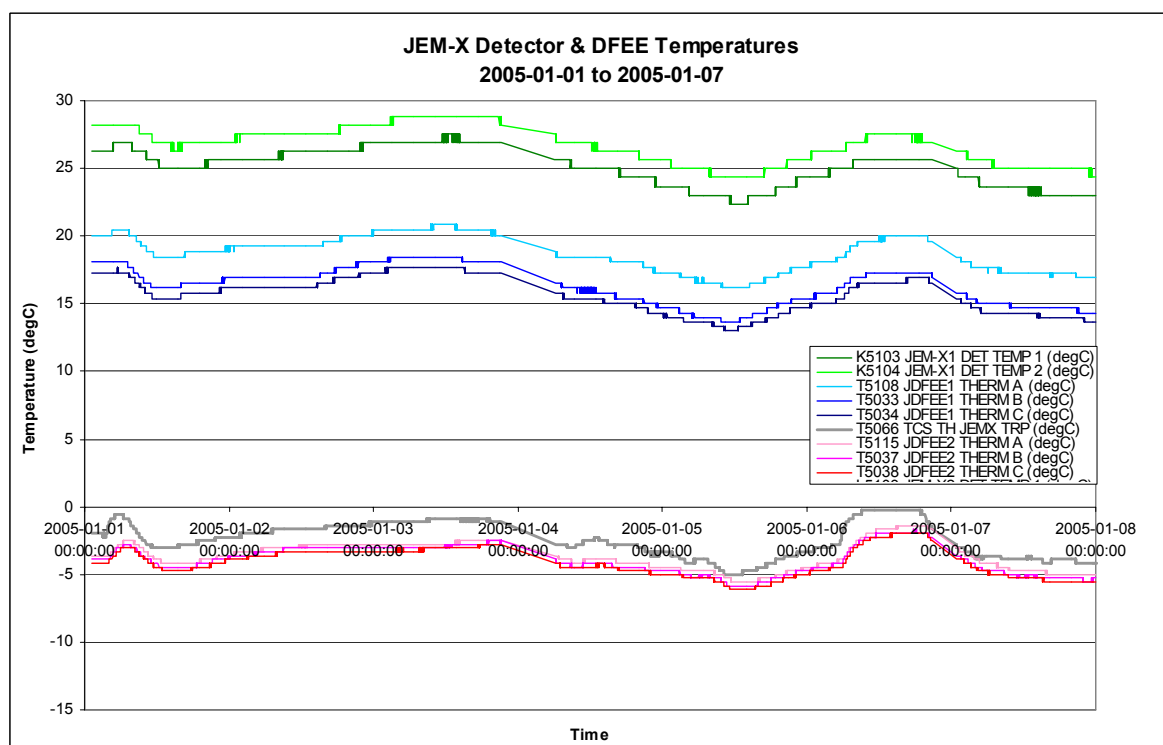
JEM-X1 count rates over the reporting period are displayed in the following graph¹.

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



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.



² Data sampled (1 frame in 8)

8.3.4.3 JEM-X Daily Report

2005-01-01 (DOY 001, Rev 270-271)

At the start of revolution 271, at 03.35.04Z, 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.

2005-01-02 (DOY 002, Rev 271)

At 16:00:48Z the TM parameter K5119 SOFTWARE TRIGGER went Out of Limits warning high (value = 21409), but returned within limits at the next TM cycle.

At 16:00:56Z the TM parameter K5136 BUFFER LOSS went Out of Limits alarm high (value = 117), but returned within limits at the next TM cycle.

2005-01-03 (DOY 003, Rev 271)

From 15:01Z to 16:08Z several out of limits were received due to high background radiation conditions, as follows:

- Between 15:01:12Z and 15:05:28Z the TM parameter K5317 RAD MONITOR 3 (Electron counter) went Out of Limits alarm high (initial value of 77, reaching a maximum of 304 at 15:03:28Z).
- At 15:02:16Z the TM parameter K5119 SOFTWARE TRIGGER went Out of Limits warning high (value = 20807) and K5136 BUFFER LOSS went Out of Limits alarm high (value = 282). Both parameters returned within limits at 15:02:40Z.
- At 15:02:56Z and 15:04:32Z there were two more occurrences of K5119 SOFTWARE TRIGGER exceeding its soft limit for 1 TM cycle.
- At 15:31:52Z K5317 RAD MONITOR 3 went Out of Limits alarm high (value = 65), returning within limits at 15:32:32Z.
- Between 15:32:00Z and 15:34:24Z there were further occurrences of K5136 BUFFER LOSS going Out of Limits alarm high (initial value of 293, reaching a maximum of 3175 at 15:34:08Z).
- At 15:34:08Z K5119 SOFTWARE TRIGGER went Out of Limits warning high (value = 21441) but returned within limits at the next TM cycle.
- Between 16:04:32Z and 16:08:16Z there were further occurrences of K5317 RAD MONITOR 3 going Out of Limits alarm high (initial value of 69, reaching a maximum of 73 at 16:08:08Z).

There was no impact of these out of limits on the JEM-X1 operations as the JEM-X1 reactions to the IREM counters are currently disabled and the value of the K5119 SOFTWARE TRIGGER remained within its safe threshold for JEM-X1.

2005-01-04 (DOY 004, Rev 271-272)

Due to a problem with the Time Server at the Redu station (see Anomaly Report INT-2689), the telemetry frames being received at the start of revolution 272 had incorrect ERTs (Earth Received Time). Specifically, the day and time were correct, but the year

was reported as 2004. Therefore, VC7 TM was continuously in drop and commanding was not possible as the TCs were failing CEV.

The automatic Timeline was stopped at 02:52Z and thus the Anode Calibration ED KEACAL01 scheduled at 03:12:50Z and the JEM-X1 Activation ED KEACT_03 scheduled at 03:43:50Z were missed, along with the ED KEDATA01 scheduled at the start of the first planned science observation.

Once the anomaly at Redu was fixed and TM and TC capability was regained, the activation of JEM-X1 was performed manually as follows:

- At 07:59Z sequence KEACAL01 was re-uplinked.
- At 08:11Z FCP_JEM1_0120 executed to disable the JEM-X1 reactions to the IREM count rates in the Broadcast Packet as per INT_OR_0189.
- At 08:17Z sequence KEACT_03 was reuplinked.
- From 08:26Z to 08:50Z the automatic Timeline was started, but with commanding to JEM-X1 disabled.
- At 08:51Z sequence KEACT_03 finished executing, with JEM-X1 entering Data Taking mode.
- At 09:10Z the Timeline was restarted, with commanding to JEM-X1 enabled.
- CCCFs were then enabled and the CCCF block starting at 09:43:11Z was executed to ensure that the instruments were in the correct configuration for the next science observation. Thus, the ED KEDATA01 was uplinked from the Timeline at 09:44:11Z.

JEM-X1 operations continued nominally.

2005-01-05 (DOY 005, Rev 272) to 2005-01-06 (DOY 006, Rev 272-273)

Nothing to report

2005-01-07 (DOY 007, Rev 273)

At the start of revolution 273, at 16:36:43Z, 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.

7.3.5 OMC Operations

On DoY 004, at 01:04, a problem with the TMP at Redu caused the loss of pointings 02720002 through to 02720012. (Pointing 02720001 was not a science pointing)

On DoY 006, at 05:52, a nctrs problem caused an AOCS command to fail. Pointing 02720075 (a staring) was scheduled to start at around 05:56 and continue for 43249 seconds (12hrs 49 secs). In the event it did not start until 08:47.

On DoY 007, at 18:10, an AOCS command failed release as the AD service had terminated, the TC returned at 18:15, the impact was pointing 02730027 was missed, it was at this time that the following pair of commands was rejected:

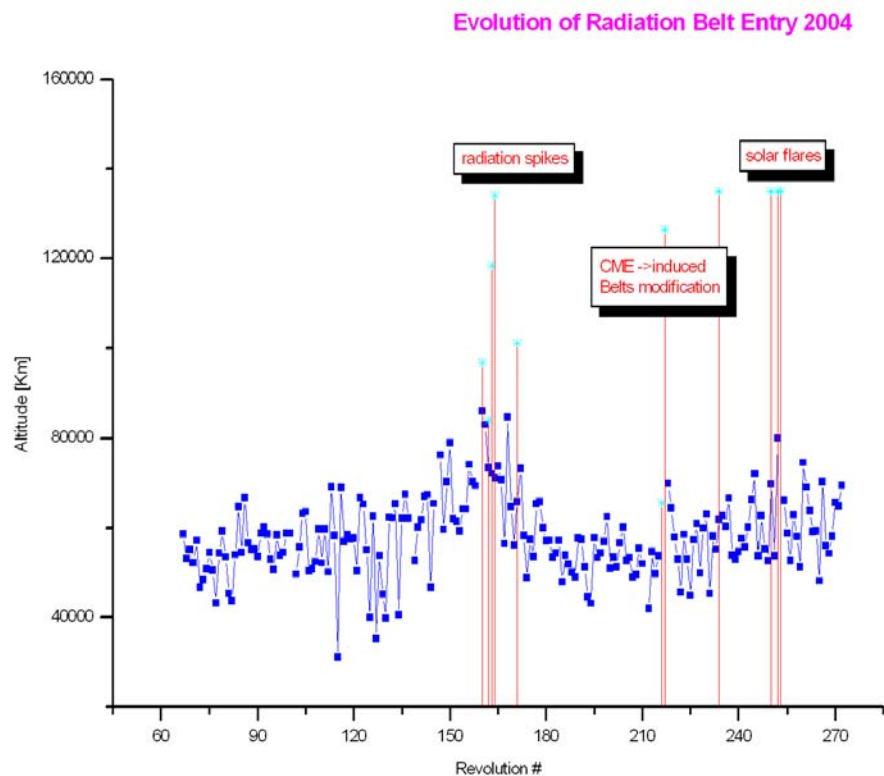
```
2005.007.18.15.11.195 2005.007.18.14.58.436 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=496
2005.007.18.15.18.226 2005.007.18.15.06.061 1792 Real Time Rejection 131
REJECTED TC1
FIX2=0 M5010=6,NORMAL M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0 M9069=497
```

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

On DoY 003 at 18:16:54 and DoY 006 at 18:04:08, 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]
271	RAD_EXIT R 2005-01-01T03:40:34Z	2005-01-01 02:07:29	24888.8	2005-01-01 02:27:26	28380.39
271	RAD_ENTR R 2005-01-03T18:16:38Z	2005-01-03 17:36:49	64873.3	2005-01-03 19:09:56	53069.73
272	RAD_EXIT R 2005-01-04T03:28:42Z	-	-	2005-01-04 02:19:56	28979.63
272	RAD_ENTR R 2005-01-06T18:03:48Z	2005-01-06 16:47:30	69478.0	2005-01-06 18:49:56	54167.71
273	RAD_EXIT R 2005-01-07T03:16:11Z	2005-01-07 01:51:22	>24893.8	2005-01-07 02:09:56	29254.73

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

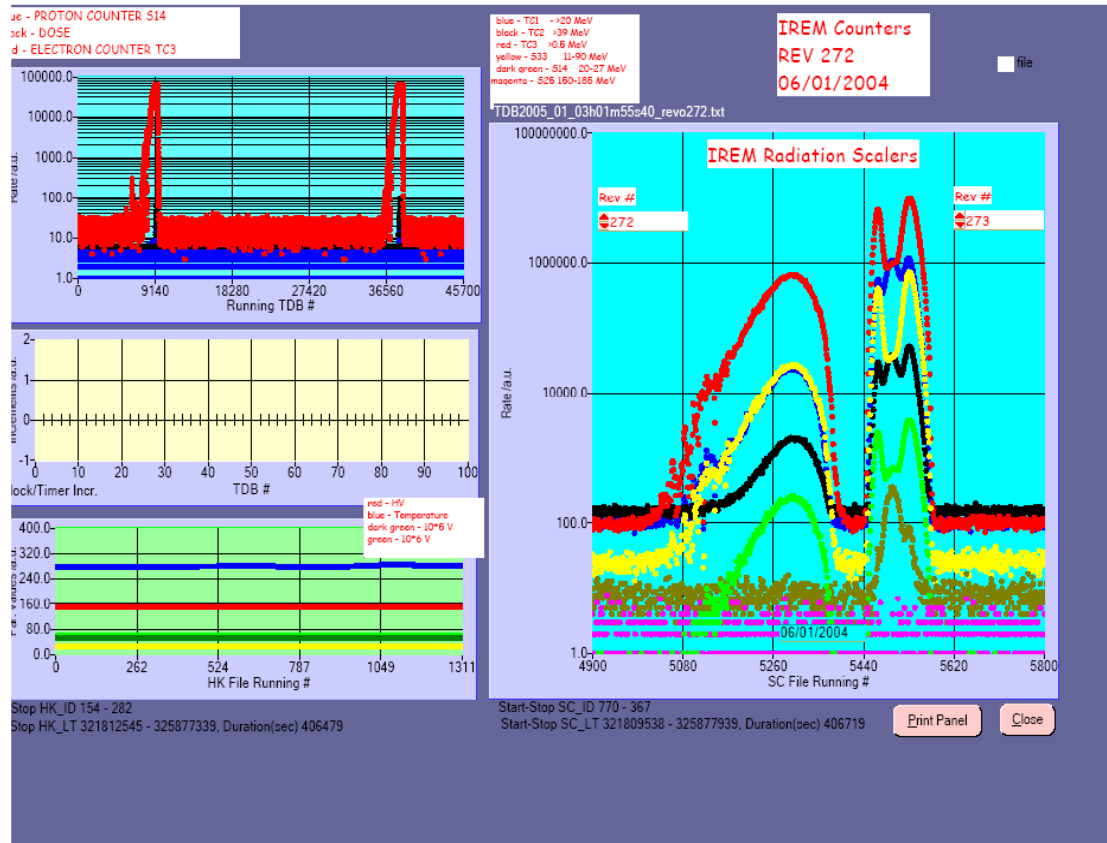
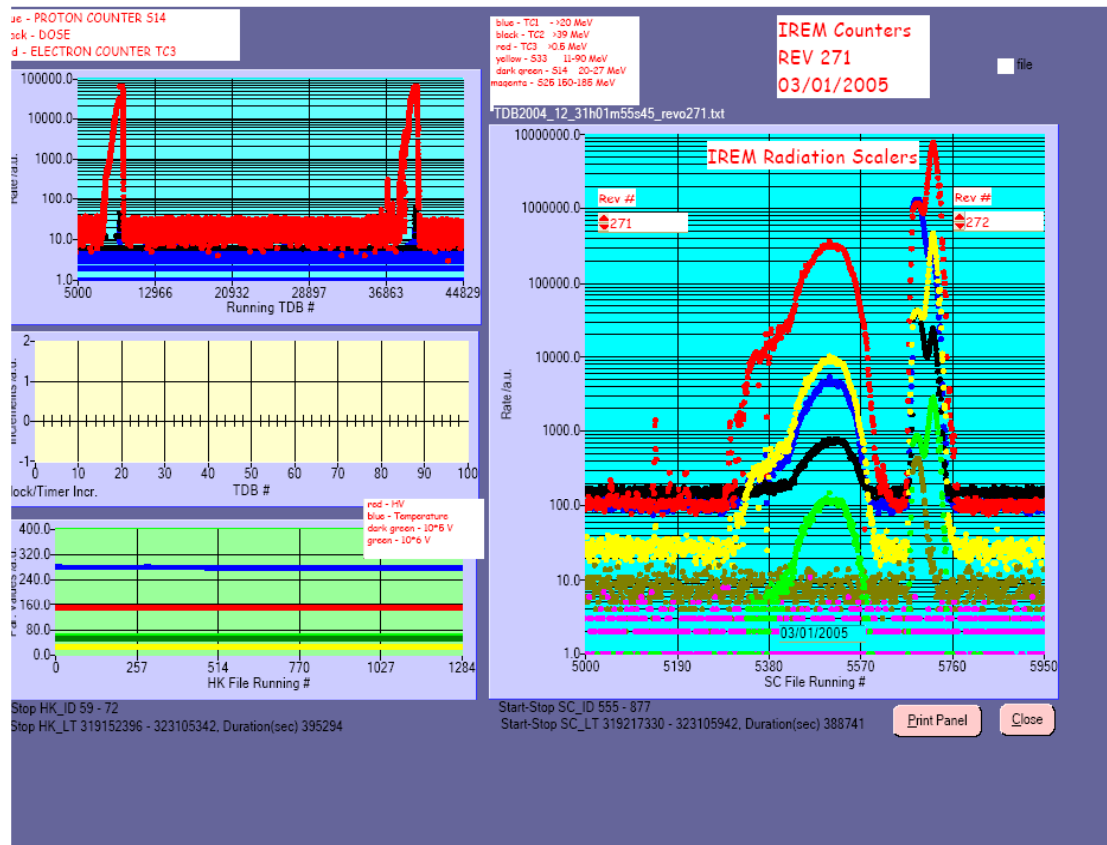
The flux of protons >8MEV computed by RadMon, did not exceed the threshold. Therefore, no predicted proton cut-off is provided for this week.

IREM daily report

On 03 January from 15:01Z to 16:08Z, high radiations were reported. Only JEM-X threshold was crossed. But as JEM-X reaction to IREM radiation monitor count rates in the BCPKT is disabled (INT_OR_189), none of the instruments went to Safe configuration.

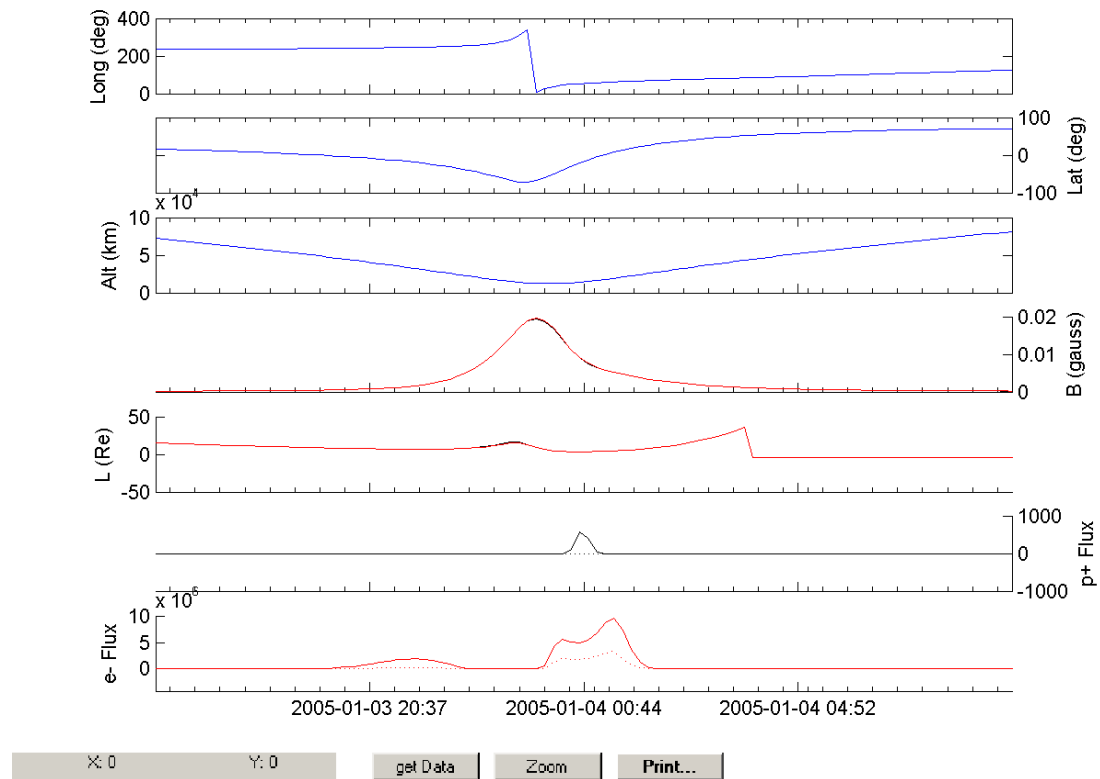
IREM radiation counters

On 04 January, due to a TMP problem at REDU no TM were archived for about 10 hours. Therefore scientific data are missing for the belt passage from revolution 271 to revolution 272.

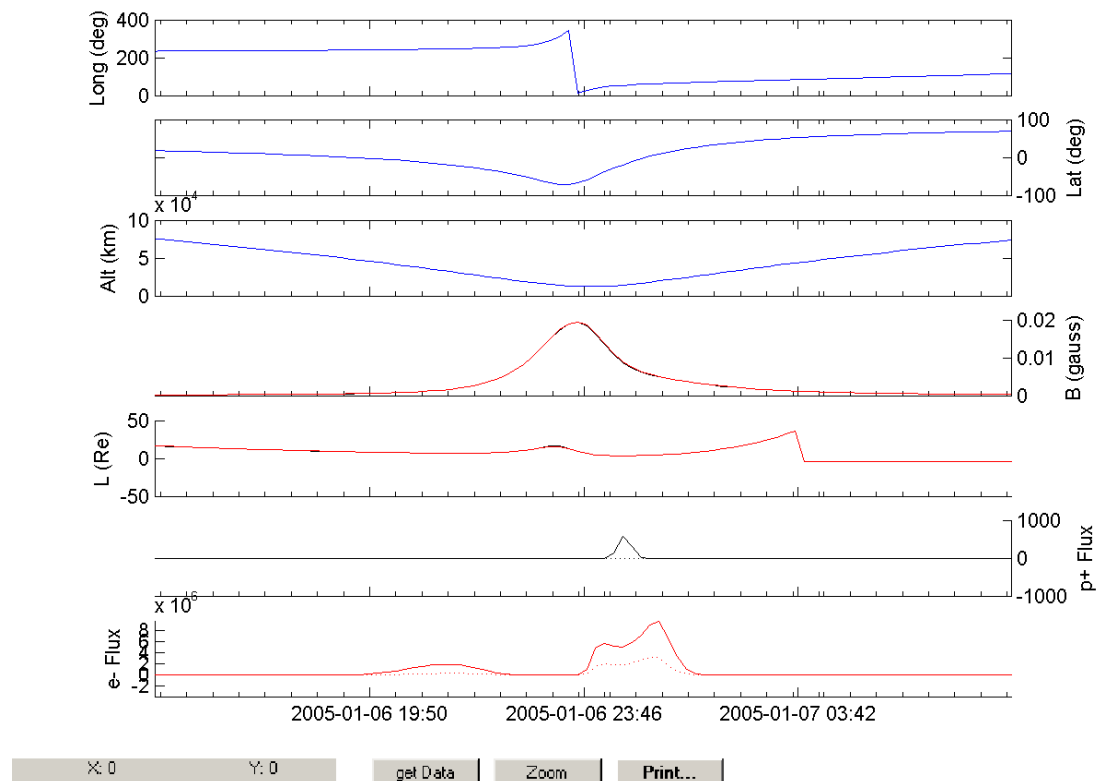


IREM Predicted Radiation Belt Passages.

Rev 271



Rev 272



SEC-GOES Observed Particles Fluxes.

