

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 125
Week 06
14.02.05
Routine Phase

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1 General

The Flight Control Team at MOC has compiled this report with some input provided by the Flight Dynamics Team, ISOC and ISDC.

It addresses the activities from 05.02.05 until 11.02.05 (both dates inclusive) and covers the revolutions 283 & 284.

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; the galactic disk l<0 (RA 16:18:32.00; DEC -50:22:26.0) and the Target of Opportunity V0332+53 (RA 03:34:59.9; DEC +53:10:23.6). The activities consisted of GPS as well as raster and hexagonal 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.

5 slews (all CSLs) were missed from the Timeline during this period due to problems within the MOC.

The fuel consumption over the period between 03/02/2005 and 10/02/2005 was 0.0883 kg. The remaining propellant is in the order of 163.2652 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.

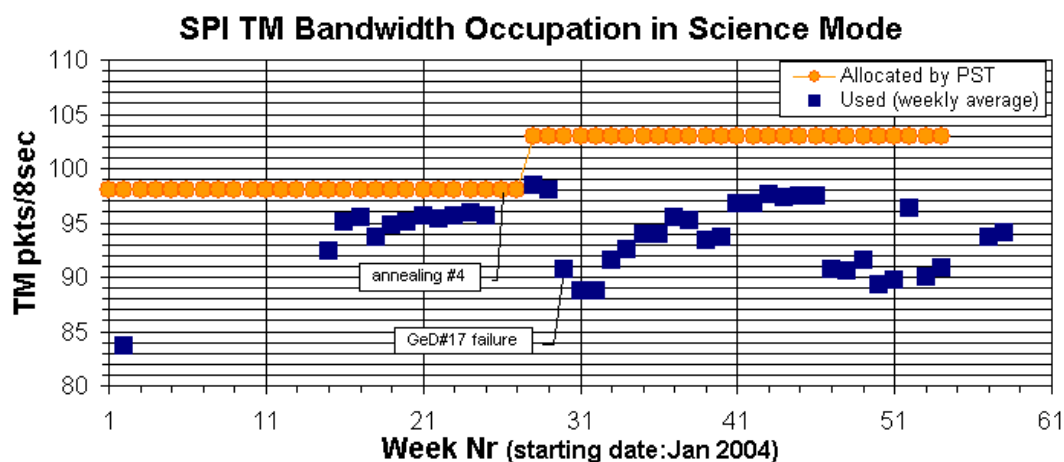
3.2 Payload

3.2.1 SPI

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

After the last annealing cycle and the following camera (on 3rd February), the PSDB channels rates blanking malfunction has not yet reappeared.

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 94.1 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.

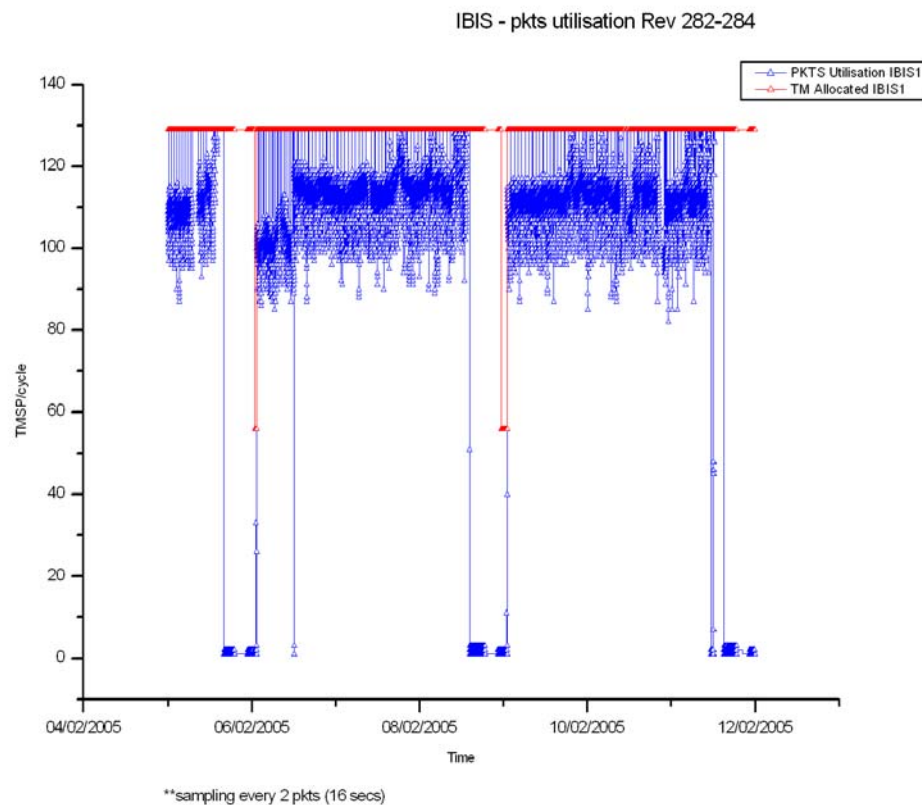
3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by moderate solar activity. The modification of the Radiation Belts entry altitudes, due to the effect of the recent high solar activity, forced in one case an earlier Safe configuration of the unit.

During the reporting period the PST allocation to IBIS was most of the time 129 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 113.05 TMPS/cycle, up 1.25 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.

Due to high background radiation levels, JEM-X1 made three autonomous transitions to Safe mode, triggered by its Software Ratemeter, as follows:

- ~50 minutes before it was due to be commanded to Safe mode before radiation belt entry of revolution 283;
- On the descending part of revolution 284, about 9.5 hours before it was due to be commanded to Safe mode before radiation belt entry. JEM-X1 was then recovered to Data Taking mode after ~2.5 hours;
- ~1hr40mins before it was due to be commanded to Safe mode before radiation belt entry of revolution 284.

In addition, some out of limits were received on the TM parameter K5136 BUFFER LOSS during the periods of high background radiation.

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 130 OMC pointings executed nominally, 1 was cut short due to an IREM crash, another cut short due to high radiation, and 5 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.

On DoY 2005.042.11.34Z during revolution 284, an automatic reset of IREM S/W (SEU#20), occurred. This impacted the instruments forcing them to Safe Configuration. After the Payload reconfiguration, the unit was successfully recovered and currently no degradation of the performances is reported.

Solar Activity

The observation period was characterised by moderate solar activity.

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 good this week, well above the system performance requirements, five pointings were lost due to ground problems.

4.1 Mission Operations Centre

The performance of the MOC was good this week, 4 pointings were lost when the wheel speeds exceeded limits and the timeline stopped as a precaution, and another due to OPSLAN maintenance and there was an error sending data to the consolidator, which cleared autonomously.

4.2 Ground Stations & Network

The performance of the ground stations and Network was excellent this week. There was an occurrence of communications problems with DSS-16, but this occurred within the belts, and there was no impact. The overall performance was nearly 100% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's received up to rev 292. Mission planning has been resumed on a normal level from ESAC. POS's generated and sent up to rev 291. There has also been re-planning of rev's 284 to 287 due to ToO. TSF files received up to rev 288.

2. Observation status

No additional ECS's received. From revolution 270 there is in ISDC a switch to so called "rev 2" data.

3. ISOC science data archive

No new data received from ISDC. There has been some first internal use of the system and the hardware in ESAC.

4. ISOC system

Version 10.7 is still used. No problems reported.

5. AO 3

The only remaining preparation task is the ToO strategy. Although there is significant progress there is still quite some work to be done before the AO 3 operations starts on 17 February. The shortage of manpower gives raise to concern.

6. Problems

The problem reported last week with unavailable science staff in ISOC is not yet resolved.

4.3.2 ISDC

Status of ISDC observation processing on 14/02/2005:

- Latest Standard Analysis completed: observation 02600010001 (Cyg X-1 Cal/11.3, Revolution 257) on 12/02/2005

- Latest products archived: observation 02201460001 (3C273, Revolution 267) on 13/02/2005

- Latest observation products sent to the observer: observation 02201050002 (Cygnus X-1, Revolution 257) on 14/02/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 036, at 04:53, the speed of wheel 3 exceeded limits. As a precaution, the timeline was stopped, and was not recovered until 08:28. The impact was pointings 02820066 through to 02820069 were lost.
- At 16:25, 16:56 & 18:39, there were short TM drops from DSS-16. These occurred inside the belts, and there was no impact.
- On DoY 041, at 14:39, due to on-going opslan maintenance, the FD update for pointing 02840037 was late. The impact was a 14 minute delay, losing the pointing.
- On DoY 042, at 06:13, there was an error sending data to the consolidator, there was no impact.
- At 11:34, there was an IREM SEU (#20), see the IREM report for details.
- At 12:35, there was no bit lock from DSS-16, problems persisted until 12:56. There was no impact, the corresponding DR# is G-105286.

The following new anomaly reports were entered into the ARTS system.

AR id	Date Created	Subject	Segment	Status
INT_SC-112	11/02/2005	IREM Anomaly: Reset of IREM_CSCI S/W #20	Payload	Open

7 Future Milestones

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 283

The activities in revolution 283 consisted of 15 pointings of a GPS lasting ~10 hours, followed by an amalgamated raster dithering observation of the galactic disk $l < 0$ (RA 16:18:32.00; DEC -50:22:26.0), performed for the remaining ~51 hours of observation time.

Revolution 284

The activities in revolution 284 consisted of a series of off-axis hexagonal dithering observations of the Target of Opportunity V0332+53 (RA 03:34:59.9; DEC +53:10:23.6) lasting a total of ~43.5 hours, followed by an amalgamated raster dithering observation of the galactic disk $l < 0$ (RA 16:18:32.00; DEC -50:22:26.0), performed for the remaining ~15.5 hours of observation time.

Throughout these observations all instruments were in their nominal science modes, except for 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.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2005-01-28T08:59:07.000Z	163.5165	F	Automatic TM processing.
2005-01-30T17:26:49.000Z	163.4986	F	Automatic TM processing.
2005-01-31T00:02:33.000Z	163.4725	F	Automatic TM processing.
2005-01-31T08:43:30.000Z	163.4559	F	Automatic TM processing.
2005-01-31T11:09:06.000Z	163.4406	F	Automatic TM processing.
2005-02-02T17:17:04.000Z	163.4254	F	Automatic TM processing.
2005-02-02T18:35:28.000Z	163.4107	F	Automatic TM processing.
2005-02-02T23:50:41.000Z	163.3792	F	Automatic TM processing.
2005-02-03T08:45:22.000Z	163.3535	F	Automatic TM processing.
2005-02-05T07:01:42.000Z	163.3430	F	Automatic TM processing.
2005-02-05T08:07:34.000Z	163.3278	F	Automatic TM processing.
2005-02-05T23:24:24.000Z	163.3191	F	Automatic TM processing.
2005-02-06T08:14:17.000Z	163.3032	F	Automatic TM processing.
2005-02-08T23:10:08.000Z	163.2791	F	Automatic TM processing.
2005-02-10T20:47:56.000Z	163.2652	F	Automatic TM processing.

This report was generated Fri Feb 11 08:00:23 GMT 2005

8.3 Detailed Satellite Information

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

8.3.1 AOCs Summary Operations Report 05/01/2005-11/02/2005

AOCS operations were executed from the Automatic Timeline.

During this period, 51 Open Loop Slews, 97 Closed Loop Slews and 8 Momentum Bias were executed. 5 slews were not executed due to problems at the MOC. This is equivalent to a $\sim 3.4\%$.

05/02/05 (Day of Year 036, Revolution 282-283)

AOCS inhibited due to wheel speed OOLs: At 04:53, the speed of wheel 3 exceeded limits. As a precaution, the AOCS commands were inhibited. To recover the Timeline, a Reaction Wheel Bias was necessary, as the tool could not perform this function with the current wheel speeds. The recovery consisted of a Change of Guide Star, a RWB, an OSL, followed by another RWB. The timeline was recovered at 08:28. As events turned out, this interruption was unnecessary, as during a slew, the AMD (Automatic Momentum Dumping) function is inhibited and the wheel speeds would have returned within limits before the end of the slew. The excess wheel speed was within the tolerance allowed for the expected accuracy of the prediction. The impact was pointings 02820066 through to 02820069 were lost.

06/02/05 (Day of Year 037, Revolution 283)

Nothing to report.

07/02/05 (Day of Year 038, Revolution 283)

Nothing to report.

08/02/05 (Day of Year 039, Revolution 283-284)

Nothing to report.

09/02/05 (Day of Year 040, Revolution 284)

Nothing to report.

10/02/05 (Day of Year 041, Revolution 284)

Pointing lost due to OPSLAN maintenance: At 14:39, during on-going OPSLAN maintenance, the TPF update for pointing 02840037 was transferred late. The slew was manually recovered, but there was a 14 minute delay, losing the pointing. The next slew (CSL) for PID 02840038 was manually updated and executed from the Timeline.

11/02/05 (Day of Year 042, Revolution 284-285)

Nothing to report.

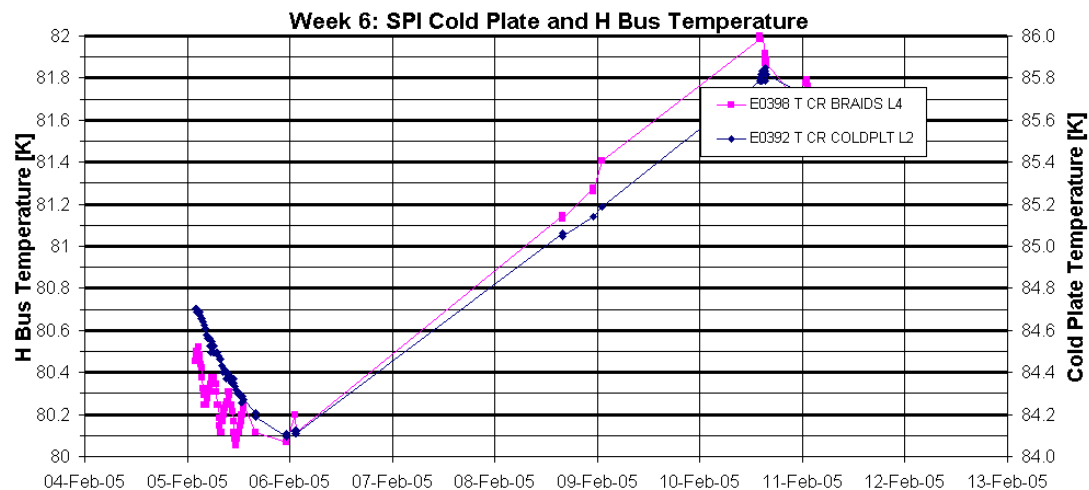
8.3.2 SPI Operations

Stirling compressors and Cryostat:

The performance of the cryo-cooler is nominal.

The cold plate temperature was maintained at 85K $\pm$ 1K over the reporting period, showing the pronounced positive drift expected after an annealing cycle. The stroke of the 4 compressors was increased by one lsb each on 14th Feb at 16:20z to 4x36dec raw.

The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period. Due to a problem in the data retrieval system, long data gaps are present.

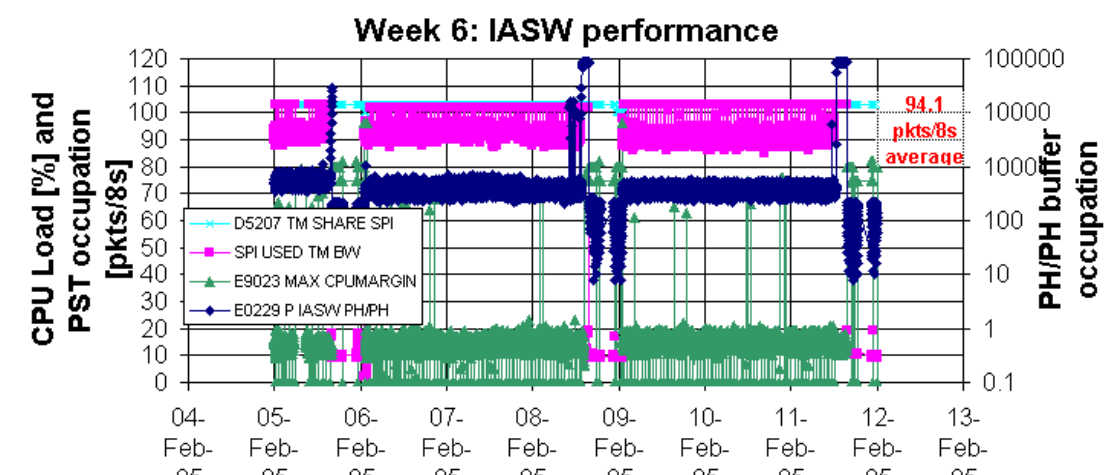


DPE & IASW:

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;
 94.1 pkts/cycle average in science mode.

The SPI team is currently analysing the IASW code, investigating the TM leakage anomaly INT_SC-107. The re-arrangement of the SPI TM slots in the PST, uplinked manually by the SPACON in every revolution, is still used as workaround to this malfunction.

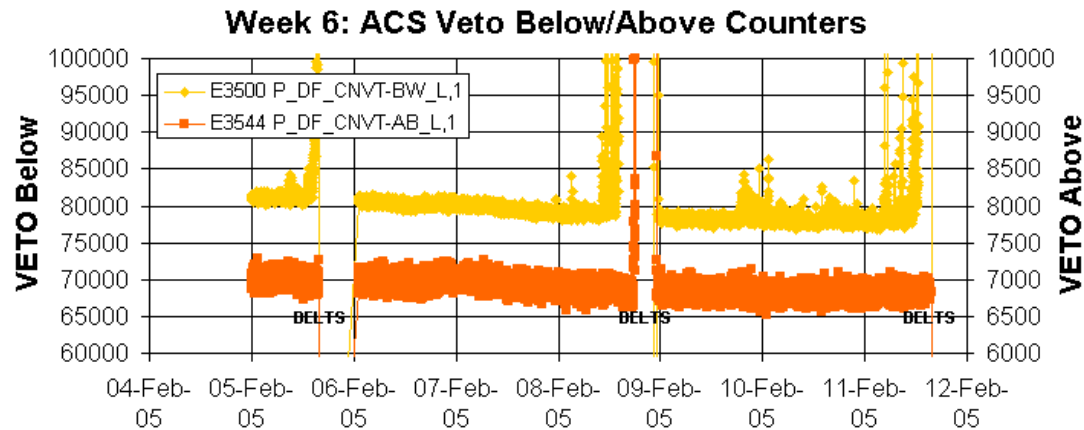
The following diagram shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS:

The performance of the ACS is nominal.

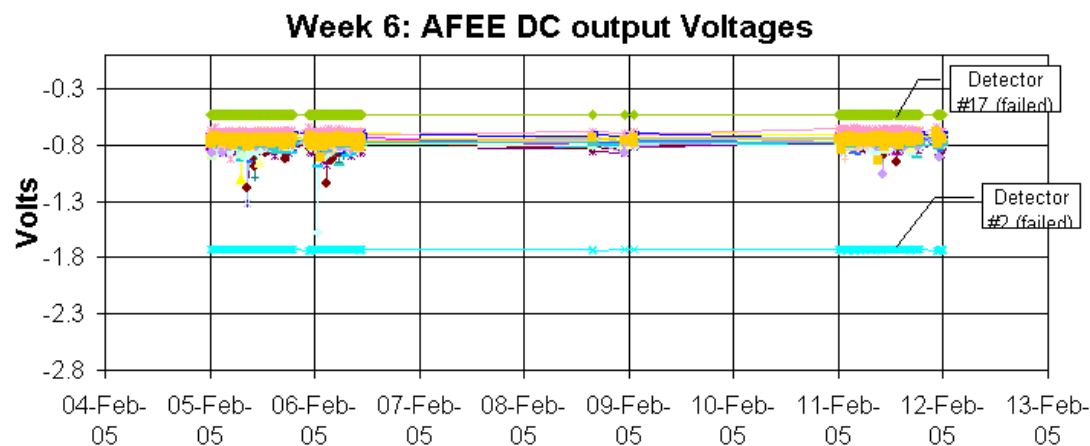
The following plot shows the ACS overall count rate evolution during the reporting period.



AFEE and Germanium Detectors:

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.

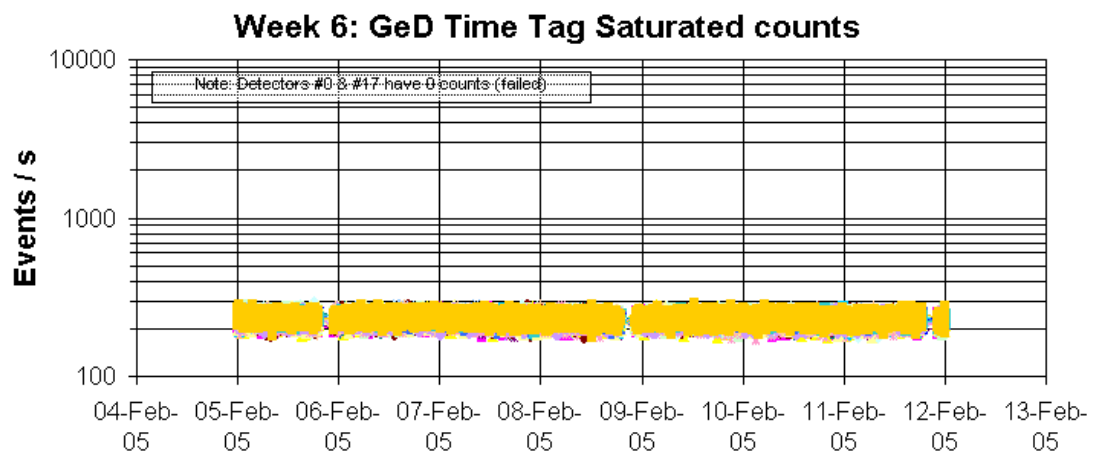
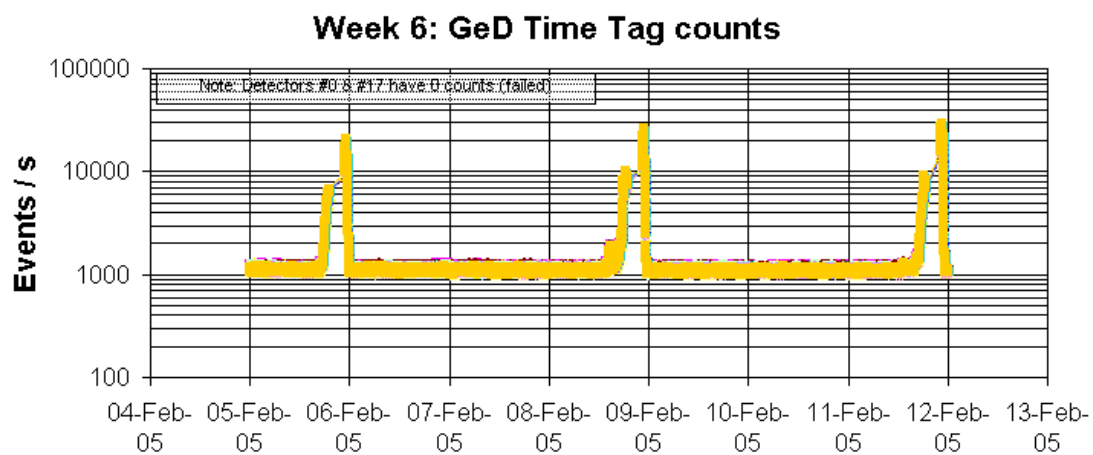
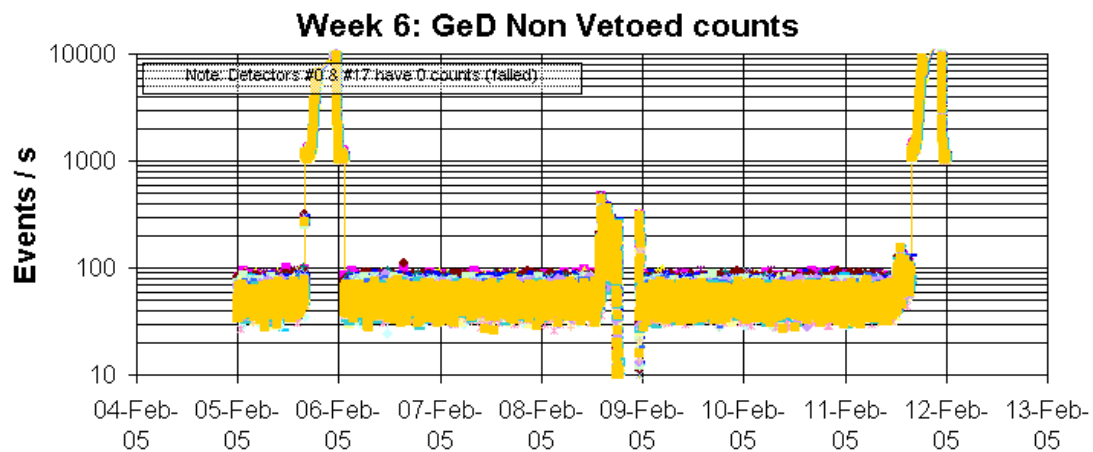
The following plot shows the AFEE dc output signals during the reporting period.



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.

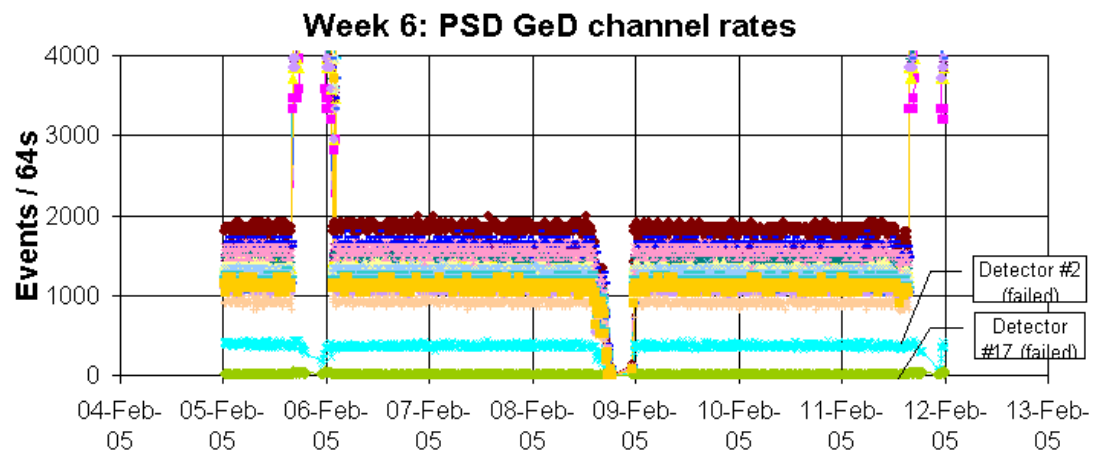


PSD:

The performance of the unit is nominal.

It seems that the malfunction of the channel rates blanking did not reproduced itself so far, since after the annealing (see AR INT_SC-90 for a detailed description of the anomaly).

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

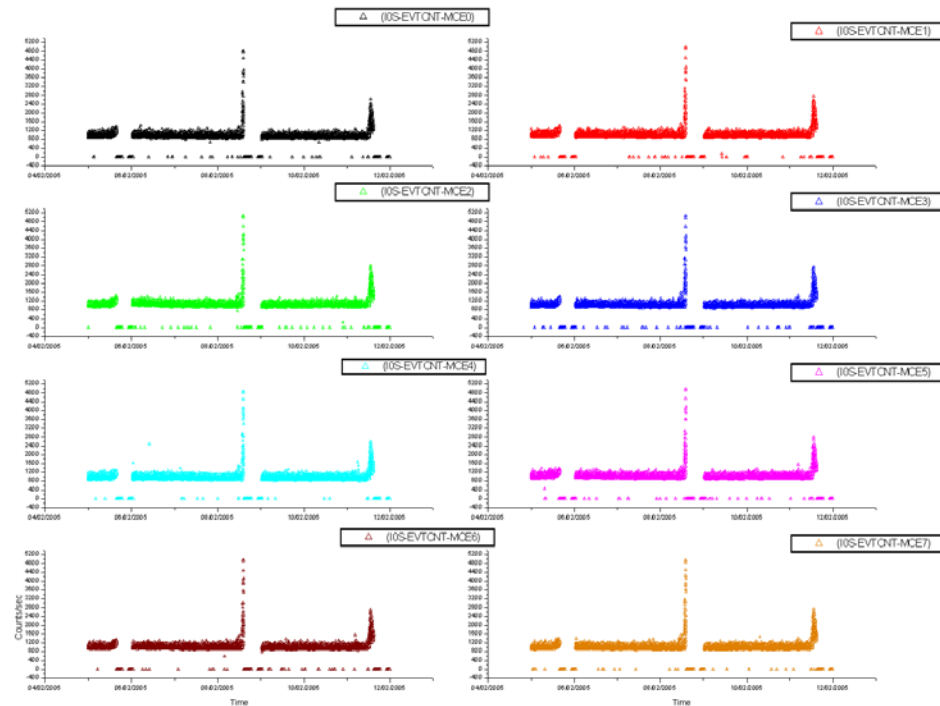


8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

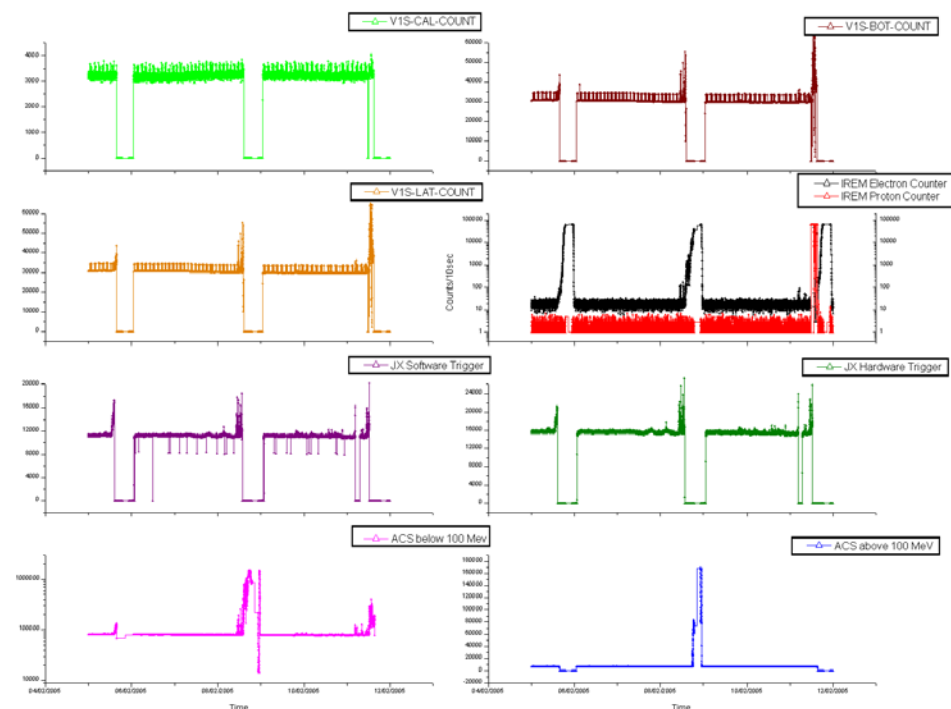
IBIS - ISGRI Counters Rev 282-284



**sampling every 4 pkts (32 secs)

VETO vs Payloads Counters

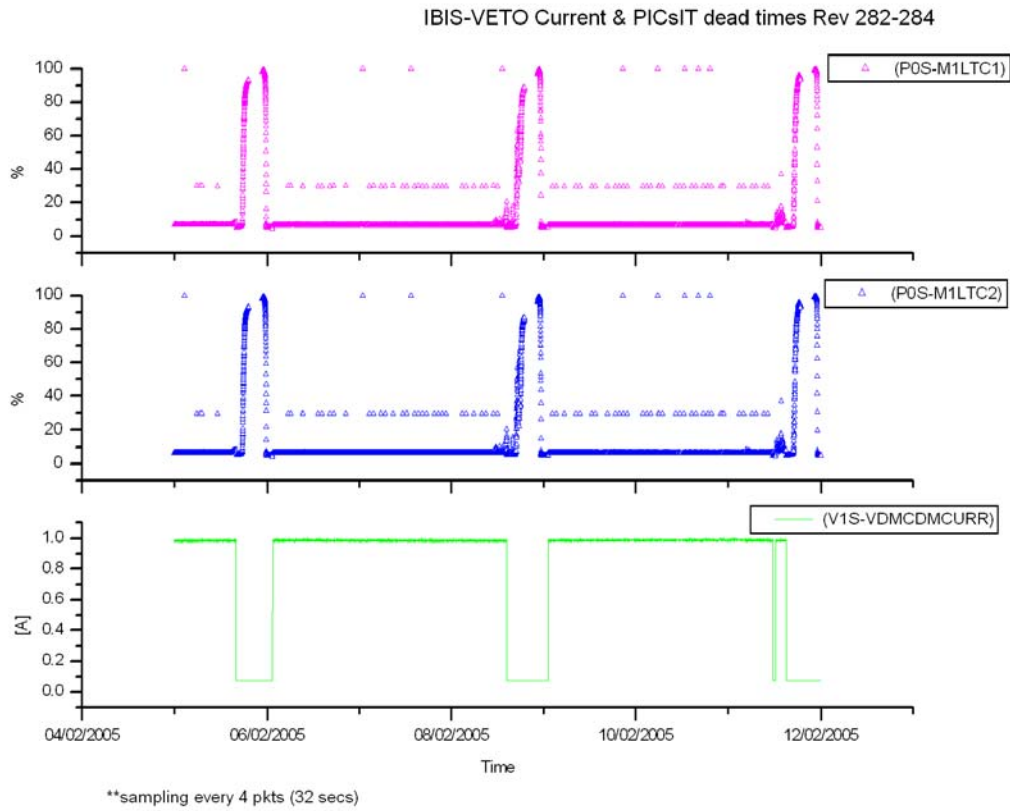
IBIS-VETO vs Payloads Counters Rev 282-284



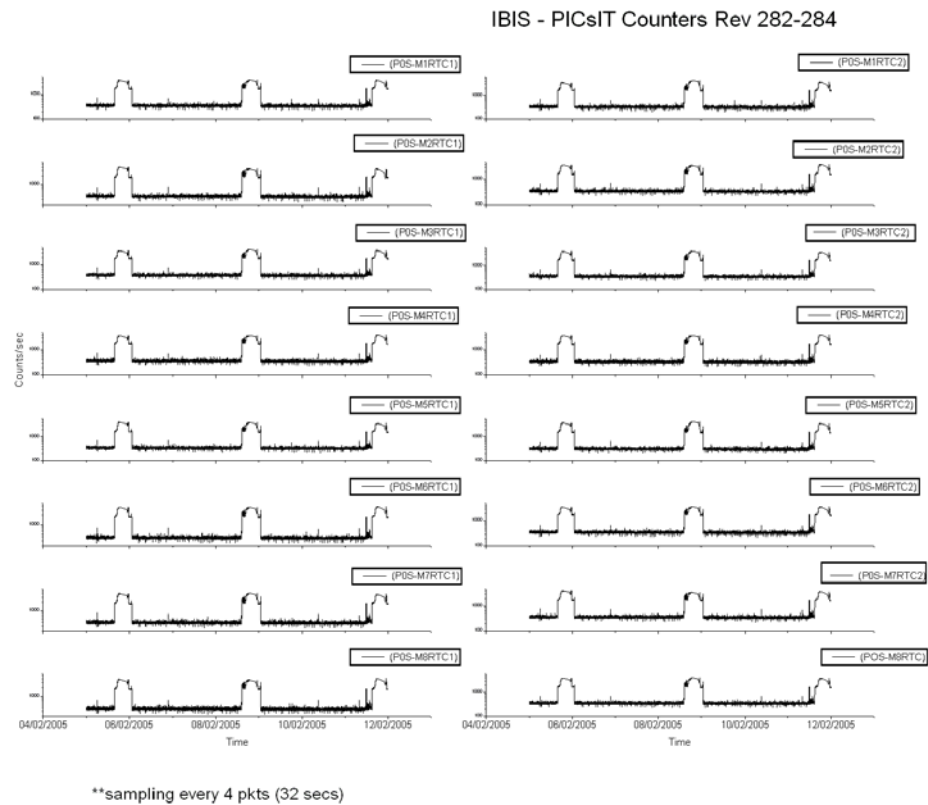
**with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec sampling every 5 pkts (40 sec)

The week was characterised by moderate solar activity.

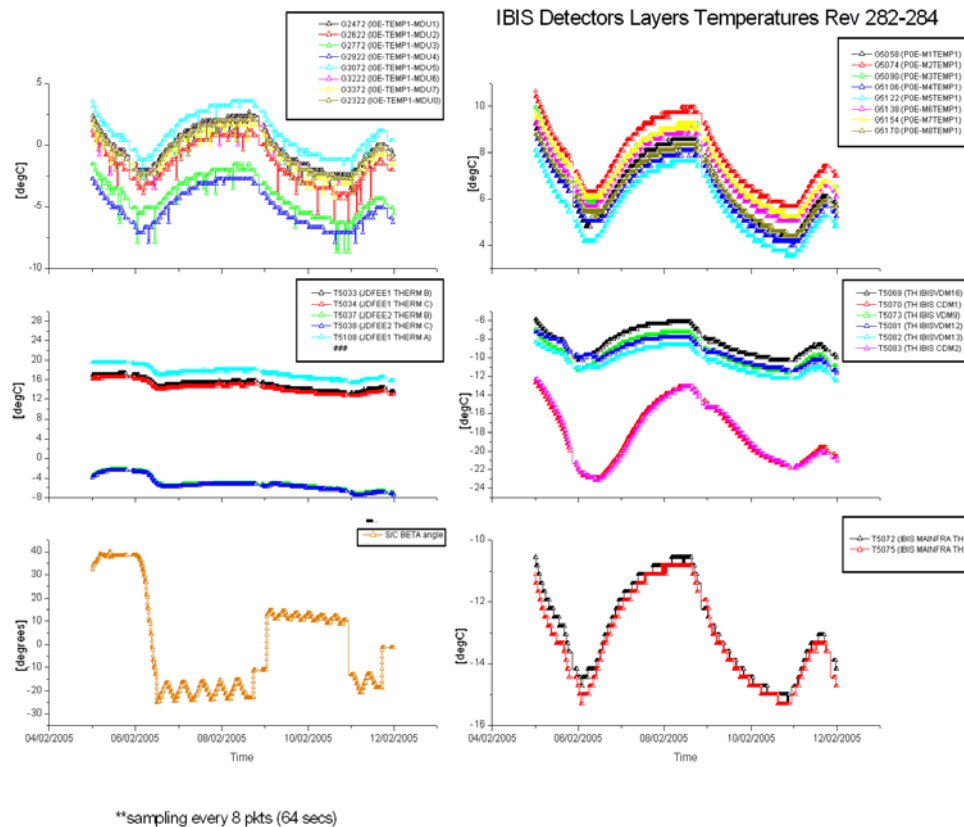
Veto Current:



Picsit Counters:



IBIS Detectors Layers Temperatures



IBIS daily report

DoY 036 (05/02/2005)

At 15:58Z TM G8015 (S1E-A2 PMT V) went OOL 'high'. According to V-VLT-1, as this happened at belt entry, no action was taken. This parameter again went OOL 'high' at 22:55Z. For the same reason no action was taken.

DoY 037 (06/02/2005)

At 10:10Z TM G2056 (overflow of noisy pixel address register MCE5) was reported OOL "SCC failure" for one TM cycle. As indicated in I-OVF-1, no action was taken.

DoY 038 (07/02/2005)

Nothing to report.

DoY 039 (08/02/2005)

At 14:22Z TM G8015 went OOL 'high'. As this happened only for few cycles, according to V-VLT-1 no action was taken.

At 14:23Z the OEM "IBIS IASW emergency switch off" was reported due to Radiation Belts entry earlier than the BCPKT time (15:46Z).

DoY 040 (09/02/2005)

Nothing to report.

DoY 041 (10/02/2005)

At 21:57.28Z the following OEM APID 1280 ID 133 CLASS 2 was reported:
"IBIS1 IASW LSL TRNASFER FAILED (LOW LEVEL)"

together with OEM APID 1280 ID 131 CLASS 2:
"IBIS1 IASW LSL TRANSFER FAIL REPORT FOR HIGH LEVEL MODULE
RESET"

These 2 OEMs were followed after few seconds by OEM APID 1280 ID 230 CLASS 3:
"IBIS1 MCE4 TIME OUT". (in OEM the numbering system starts from 0 to 7, so that physically this OEM concerns MCE5).

This anomaly had already previously: MCE 4 on 17/01/2004, MCE 6 on 27/01/2004 and MCE 4 on 01/06/2004.

IBIS incurred a timing problem on the LSL that affected the communication with the peripherals. During this time a request for HK1 was sent to MCE5 without any answer due to the drop in communication between the MCE5 and the DPE. The IASW flagged the non-generation of HK1 from MCE5 as an on-board rejection (time-out) of the internal TC indicated above (CID 254). During this time no valid HK was collected from MCE5 therefore what was reported in HK1 was simply the IASW default (i.e all 000000... raw). This was confirmed by reading some TM parameters such as the bias, operating mode and MDU temperature, all reporting raw value 0. After few TM cycles, the unit solved autonomously the internal conflict on the LSL and reported the valid HK1 for MCE5. As suggested by reaction I-REJ-1, no action was requested but just a monitoring of the unit.

The detailed description of the anomaly, for MCE4, was reported in Weekly Report #69. Moreover a closed AR has been raised in order to keep track of this anomaly INT_SC_113.

DoY 2005.042 (11/02/2005)

At 06:23Z TM G2056 (overflow of noisy pixel address register MCE5) was reported OOL "SCC failure" for one TM cycle. As indicated in I-OVF-1, no action was taken.

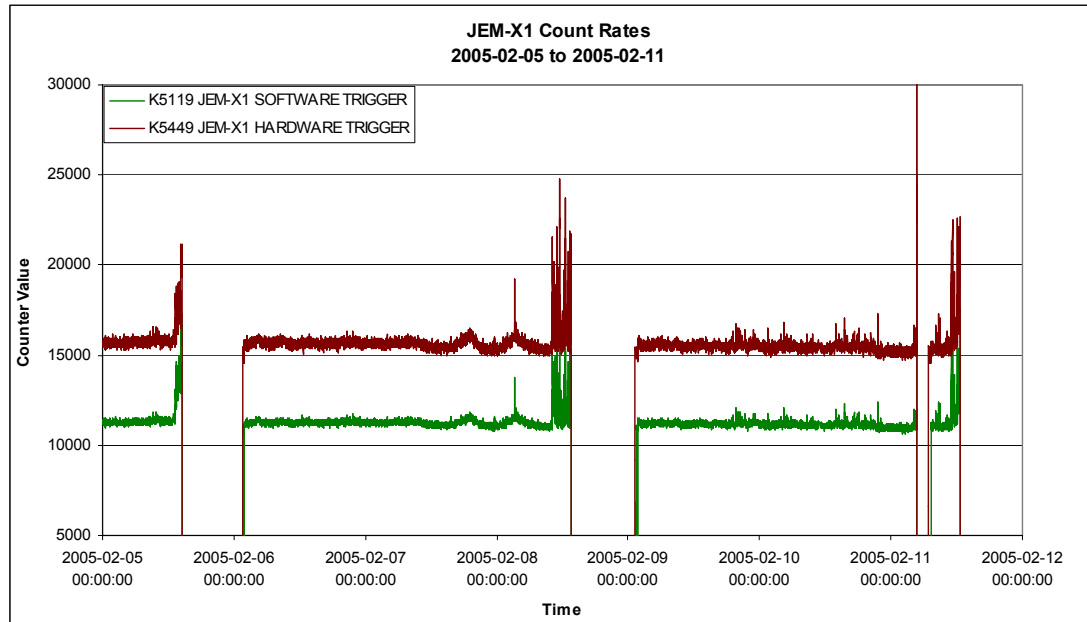
At 11:34Z an IREM SW failure (SEU #20) forced IBIS to Stand-by mode. Following procedure FCP_IBIS1_0803, IBIS exited this Safe configuration at 12:02Z and went back to Scientific Standard mode at 12:14Z thanks to TC G0129.

At 14:57Z, according to the high radiation background due to Belt approach and according to the fact that IREM was disabled in the BCPKT (still under recovery after IREM SEU # 20), IBIS was set manually to Stand-by mode (seq GS0801).

8.3.4 JEM-X Operations

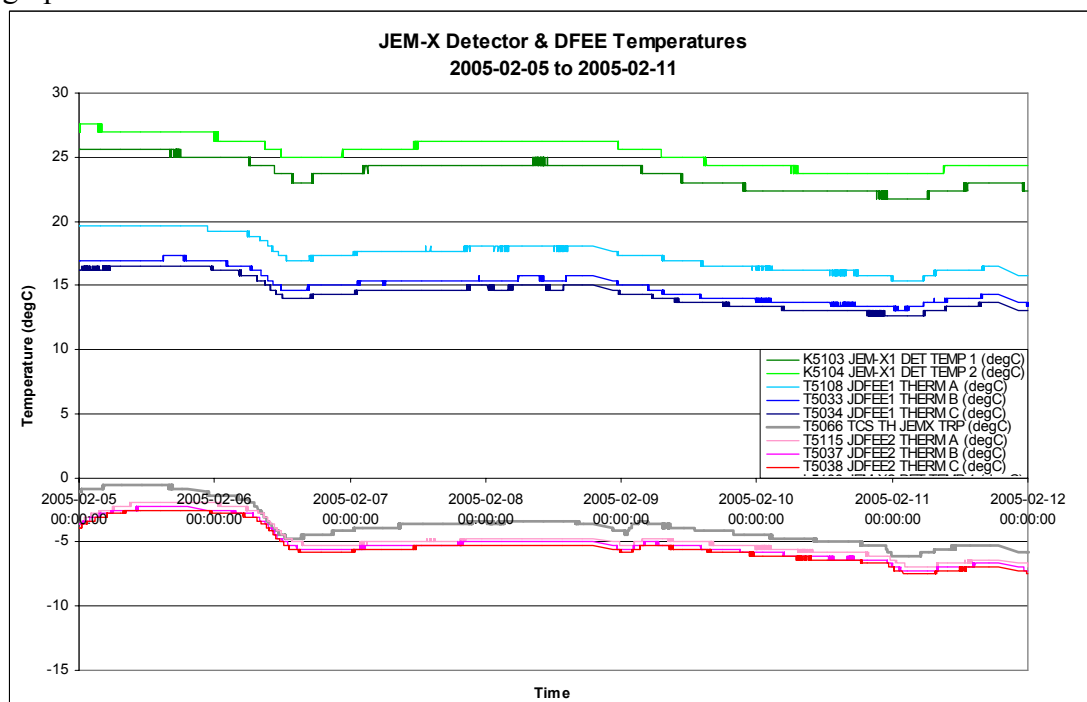
8.3.4.1 JEM-X Count Rates

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

2005-02-05 (DOY 036, Rev 282-283)

Nothing to report

2005-02-06 (DOY 037, Rev 283)

At the start of revolution 283, at 01.04.26Z, 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.

2005-02-07 (DOY 038, Rev 283)

Nothing to report

2005-02-08 (DOY 039, Rev 283-284)

Starting from 10:16:18Z the following out of limits were received:

- At 10:16:18Z K5136 BUFFER LOSS went out of limits High (value = 121), returning within limits at 10:16:42Z.
- At 10:51:46Z the IREM electron counter parameter K5317 RAD MONITOR 3 went out of limits (value = 72) and then began to fluctuate in and out limits until 11:34:02Z.
- At 11:32:10Z K5136 BUFFER LOSS went out of limits (value = 188), returning within limits at 11:32:42Z.
- At 12:33:22Z K5136 BUFFER LOSS went out of limits (value = 112), returning within limits at 12:34:26Z.
- At 12:58:02Z K5136 BUFFER LOSS went out of limits (value = 76), returning within limits at 12:58:18Z.

At 13:29:38Z K5119 SOFTWARE TRIGGER went out of limits Warning High (value = 23900) for 1 TM cycle and at 13:34:02Z it went out of limits Alarm High (value = 25000), causing JEM-X1 to make an autonomous transition to Safe mode. The TM parameter K5462 DFEE STATE IASW reported Safe on one occurrence and then began to report state Setup and thus there were two occurrences of the OEM 189 JEM-X1 PROB DFEE 9. At 14.23.29Z the ED KESAFE01, scheduled in order to put JEM-X1 in Safe mode before radiation belt entry of revolution 283, was executed from the Timeline. This set K5462 DFEE STATE IASW to Safe as well and thus the OEM 254 ERROR OFF was received at this time.

2005-02-09 (DOY 040, Rev 284)

At the start of revolution 284, at 00.51.27Z, 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.

2005-02-10 (DOY 041, Rev 284)

Nothing to report

2005-02-11 (DOY 042, Rev 284-285)

At 04:42:18Z the IREM electron counter K5317 RAD MONITOR 3 began to fluctuate in and out of limits. At 04:42:42Z the TM parameter K5136 BUFFER LOSS went out of limits High (value = 102) and returned within limits at 04:42:58Z.

At 04:43:46Z K5119 SOFTWARE TRIGGER went out of limits Alarm High (value = 24616) and at the next TM cycle exceeded the safe threshold for JEM-X1, causing JEM-X1 to transition to Safe mode autonomously. As the parameter K5462 DFEE STATE IASW transitioned to Setup (value = 5) at this time, there was an occurrence of the OEM 189 JEM-X1 PROB DFEE 9. Commanding to JEM-X1 from the Timeline was disabled at 04:48Z. At 04:54:49Z FCP_JEM1_0040 was executed to command JEM-X1 to Safe mode, thereby resetting K5462 DFEE STATE IASW to Safe as well. At this time, OEM 254 ERROR OFF was received.

The background radiation levels (IREM RMC parameters K5315- K5317) were monitored and, once it had been observed that they had remained stably within the Safe threshold for JEM-X1 for over 1 hour, JEM-X1 was reactivated as follows:

At 06:46:23Z FCP_JEM1_0041 was executed to command JEM-X1 to Setup mode.

At 06:49:55Z FCP_JEM1_1010 JEMX1 CONFIGURATION SETTING FOR SCIENCE OPS was started.

At 07:19:14Z FCP_JEM1_0044 was executed to put JEM-X1 in Data Taking mode. Commanding to JEM-X1 from the Timeline was then re-enabled at 07:20Z.

At 08:32:18Z K5317 RAD MONITOR 3 went out of limits again (value = 94) for 1 TM cycle.

At 11:34:18Z an IREM S/W reset occurred, with the IREM RMC parameters K5315-K5317 all going out of limits (value = 65535), however this did not affect JEM-X1 as the JEM-X1 reactions to the IREM counters are currently disabled.

At 12:30:42Z K5119 SOFTWARE TRIGGER went out of limits Warning High (value = 20217) for 1 TM cycle. At 12:31:22Z it went out of limits Warning High again and at the next TM cycle it exceeded its safe threshold for JEM-X1, causing JEM-X1 to perform an autonomous transition to Safe mode. As the parameter K5462 DFEE STATE IASW transitioned to Setup (value = 5) at this time, there was an occurrence of the OEM 189 JEM-X1 PROB DFEE 9. At 14:12:22Z the ED KESAFE01, scheduled in order to put JEM-X1 in Safe mode before radiation belt entry of revolution 284, was executed from the Timeline. This caused K5462 DFEE STATE IASW to also be set to Safe at this time and the OEM 254 ERROR OFF was received.

8.3.5 OMC Operations

On DoY 036, at 04:53 until 08:28, the timeline was stopped as a precaution after the wheels speeds exceeded limits. The impact was pointings 02820066 through to 02820069 were lost. It was at this time that the following commands were rejected:

```
2005.036.05.39.52.145 2005.036.05.39.39.744 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=1219
2005.036.05.39.52.222 2005.036.05.39.45.744 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=1220

2005.036.06.26.16.669 2005.036.06.26.03.621 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=1221
2005.036.06.26.16.773 2005.036.06.26.09.746 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=1222
```

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for pointings 02820066 & 02820067.

On DoY 041, at 14:39, due to on-going opslan maintenance, the FD update for pointing 02840037 was late. The impact was the pointing was lost. It was at this time that the following commands were rejected:

```
2005.041.11.29.05.138 2005.041.11.28.56.265 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=1716
2005.041.11.29.13.757 2005.041.11.29.03.015 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=1717
```

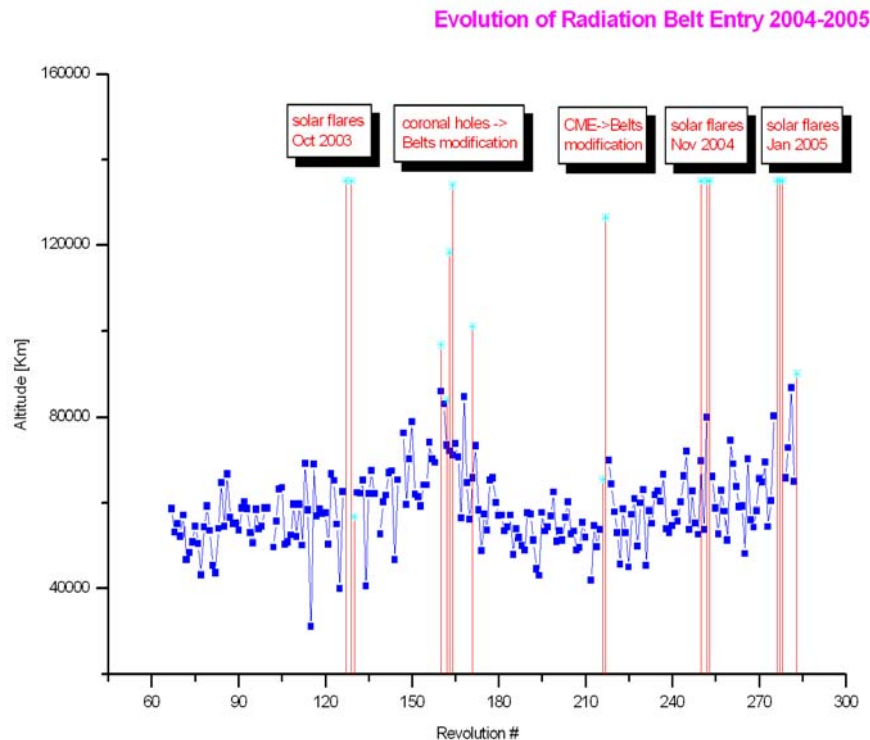
These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for that pointing.

On DoY 042, at 11:34:32, an IREM SEU (#20) caused the instrument to switch to safe mode. The unit was recovered to stand-by at 12:05:44, and was again in normal mode at 12:18:09. The impact was pointing 02840061 was interrupted after 1096 seconds, the intended duration of the pointing was 3581 seconds. At 15:00:41, before IREM had been recovered, OMC was manually put into SAFE mode for the remainder of the revolution as a precaution, since IBIS was recording high radiation. The impact was pointing 02840063 was interrupted after about 4500 seconds out of a planned 6499. This was the last OMC observation for revolution 0284.

On DoY 036 at 15:58:50 and DoY 039 at 15:46:31, OMC was switched by the Timeline to SAFE mode, at the nominal time.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

DoY 2005.042 (11/02/05)

At 11:34Z a local reset of the IREM CSCI S/W (SEU #20) was reported: as previously (see anomalies on 16/12/02, 01/01/03, 03/06/03, 11/07/03, 19/07/03, 05/08/03, 24/08/03, 26/12/03, 13/05/04, 16/05/04, 09/06/04, 12/06/04, 10/09/04, 14/09/04, 28/10/04, 06/11/04, 01/12/04, 11/12/04, 30/01/05) the status of the unit, before the occurrence, was nominal, here is a summary:

1. Temperatures nominal.
2. LCL current nominal.
3. Last HK before the anomaly HV, 5V and 6V voltages inside limits.
4. The anomaly occurred at 2005.042.11.34z at 86406.1 km and the unit performed an automatic transition to Standard Mode (ie. no block counter increasing, all the TM words= FFFF hex); just before the anomaly, radiation counters reported nominal values considering the position of the S/C along the orbit.

5. The recovery of the unit started at 11:59z, using procedure CRP_SYS_2570. The first dump of the status word after the anomaly shown a value of BCC0 HEX = 48320 DEC = 1011110011000000, ie. the unit was still reporting the status as if it was in Integral mode with counting ON, accumulation ON and checksum failure flag ON. This value of the status word is assumed to be an old one written by the S/W at the moment of the anomaly.
6. Dumping all the register bank give a status word BC80 HEX = 48256 DEC = 1011110010000000, ie. the unit is still reporting the status as if it was in Integral mode but the checksum failure flag is now OFF and the checksum counter in the register number 3 incremented of 1 unit.
7. A full memory dump was performed for future investigation.
8. The patch was performed successfully with the correct re-starting of the S/W. The operation was completed at 16:06Z.

The IREM automatic transition to Standard Mode affected the instruments as it forced them to automatically enter Safe configuration, except for SPI and JEM-X whose automatism are disabled according to PIs request.

The recovery of the payloads was performed as follows:

- IBIS re-enabled at 12:15Z
- OMC re-enabled at 12:07Z

The cause of this S/W reset is still under investigation, but it is apparently due to the unit's memory device, which is sensitive to ionising radiation.

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]
282	RAD ENTR R 2005-02-05T15:58:28Z	2005-02-05 15:17:07	65113.3	2005-02-05 16:49:59	53238.26
283	RAD EXIT R 2005-02-06T01:08:56Z	2005-02-05 23:50:27	>>24871.3	2005-02-05 23:59:59	28951.82
283	RAD ENTR R 2005-02-08T15:46:13Z	2005-02-08 10:51:47	<91868.3	2005-02-08 16:36:35	53145.92
284	RAD EXIT R 2005-02-09T00:55:47Z	2005-02-08 23:24:59	>24863.6	2005-02-08 23:46:35	29193.21
284	RAD ENTR R 2005-02-11T15:35:03Z	-	-	2005-02-11 16:26:35	52704.31
285	RAD EXIT R 2005-02-12T00:44:22Z	2005-02-11 23:15:31	>24861.4	2005-02-11 23:26:35	28090.95

Reference

Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

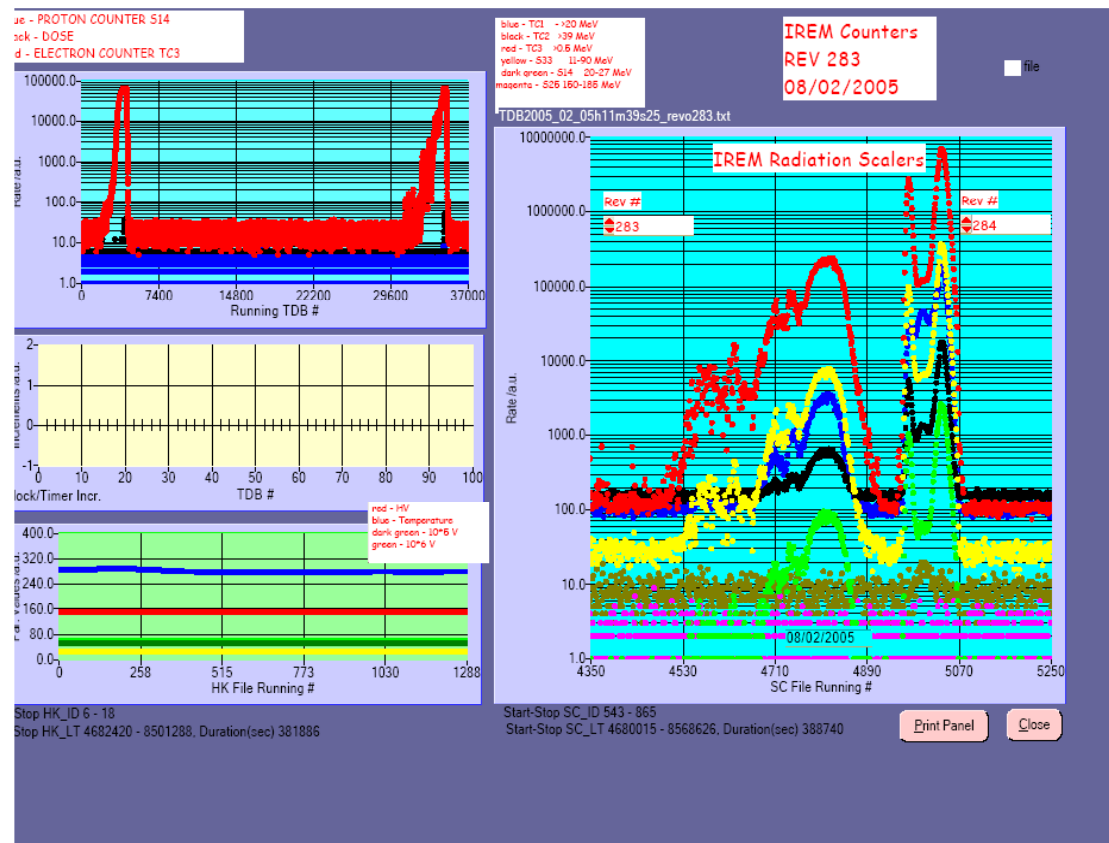
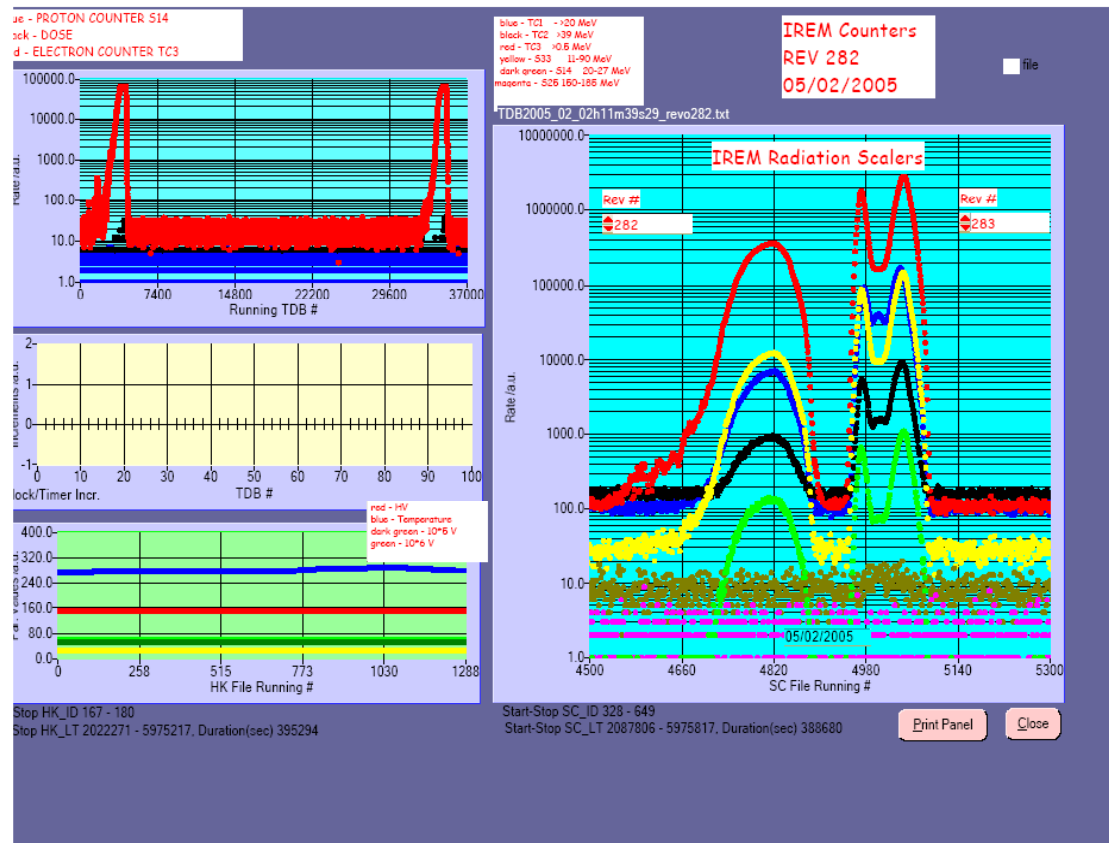
Large error vs reference (more than 30 minutes)

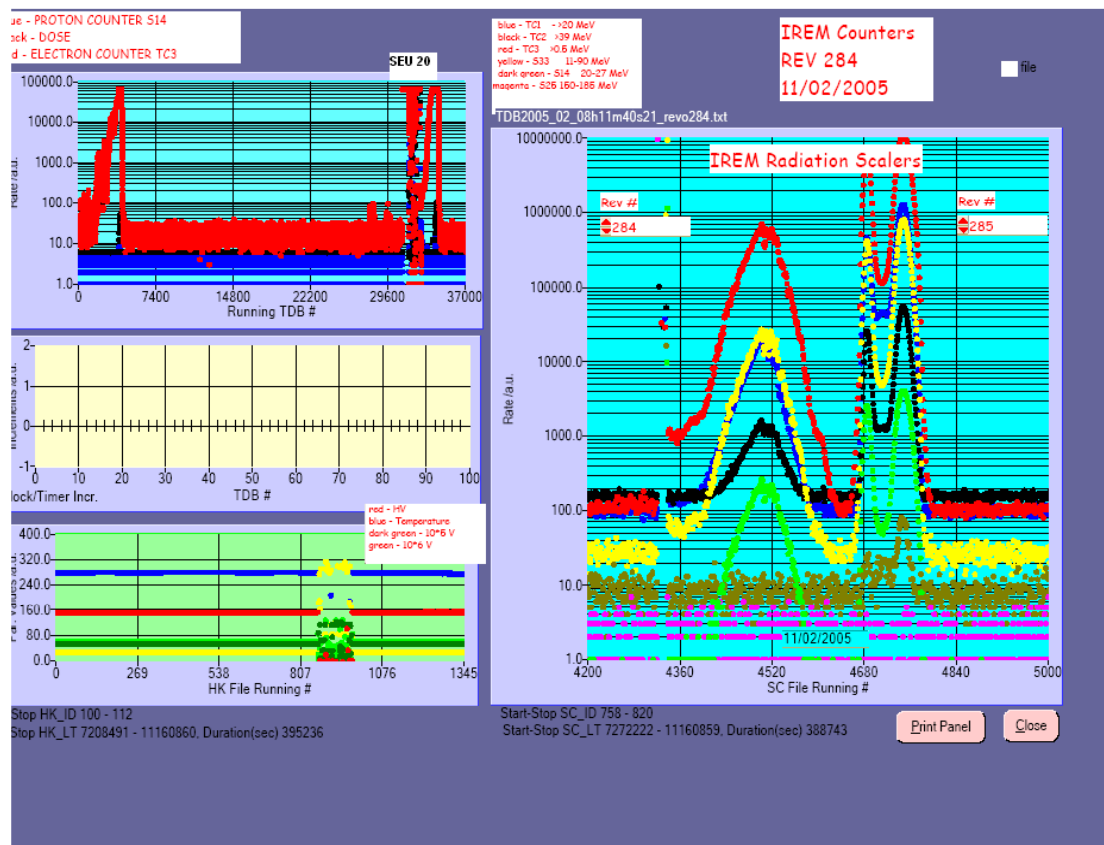
Radiation Spike

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.

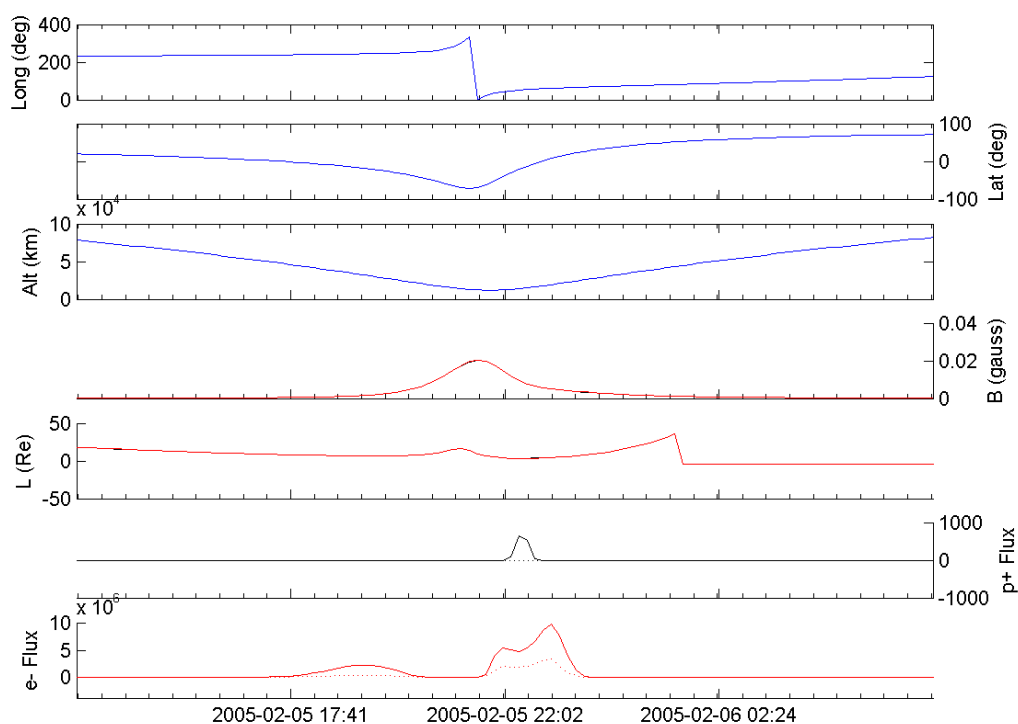
IREM radiation counters

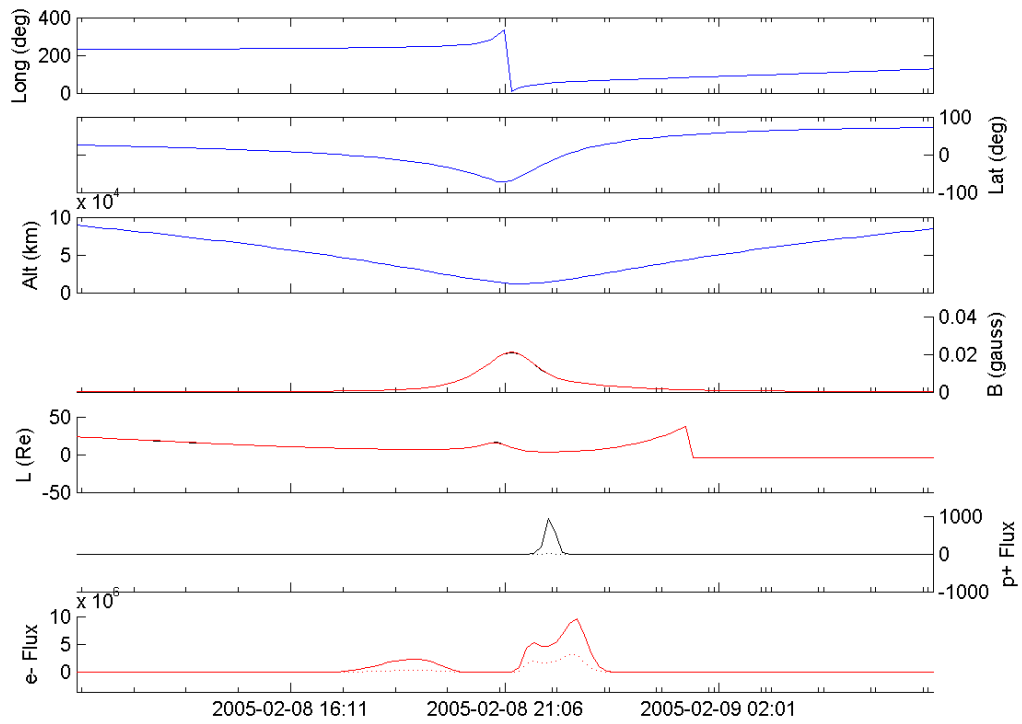




IREM Predicted Radiation Belt Passages.

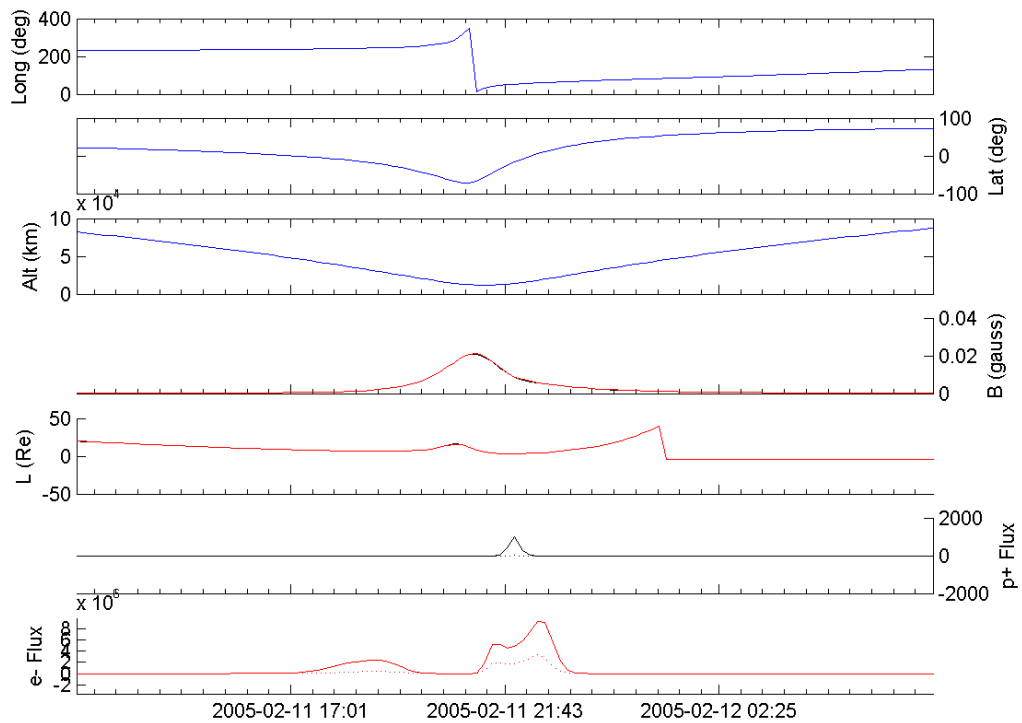
Rev 282





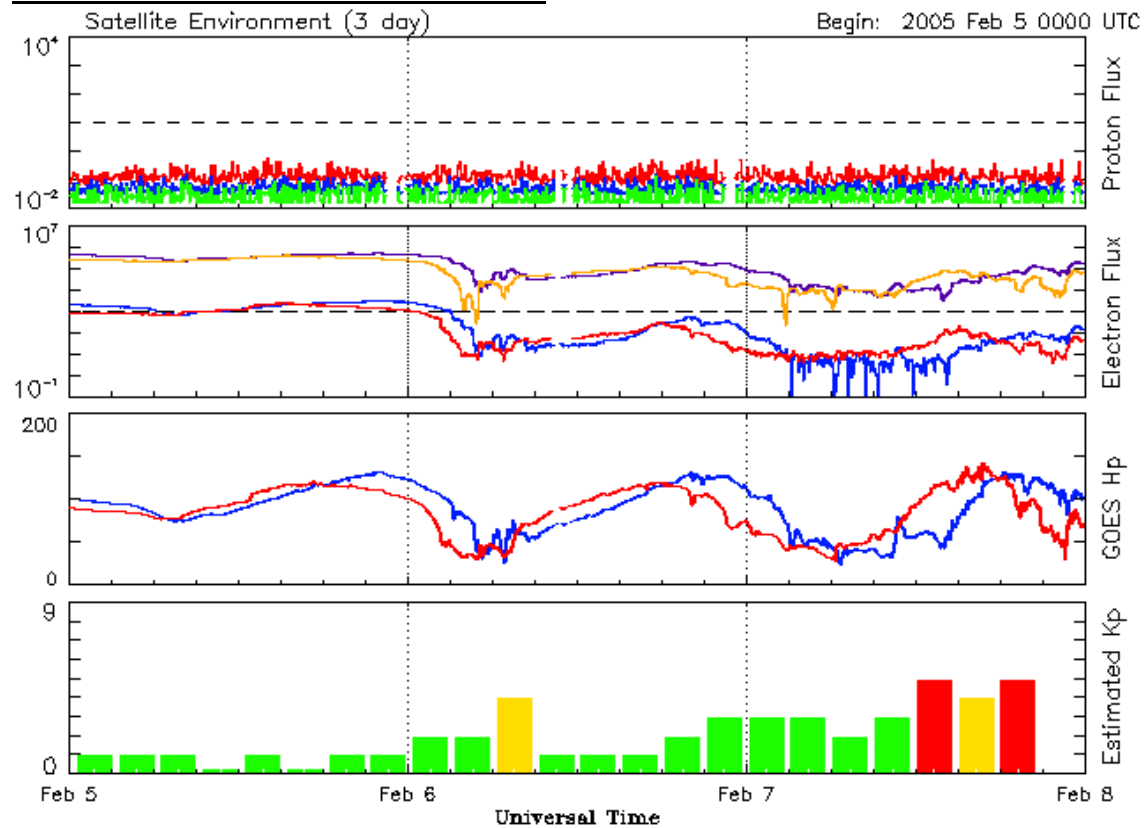
X: 0 Y: 0 get Data Zoom Print...

Rev 284



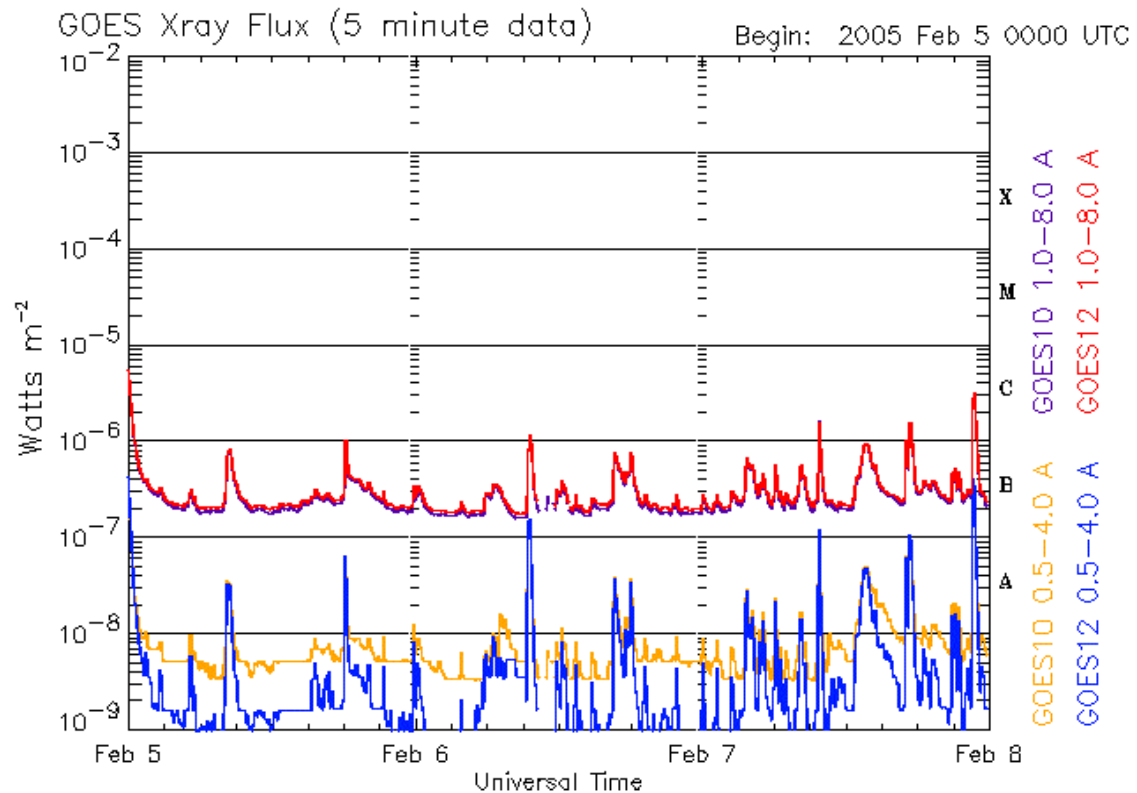
X: 0 Y: 0 get Data Zoom Print...

SEC-GOES Observed Particles Fluxes.



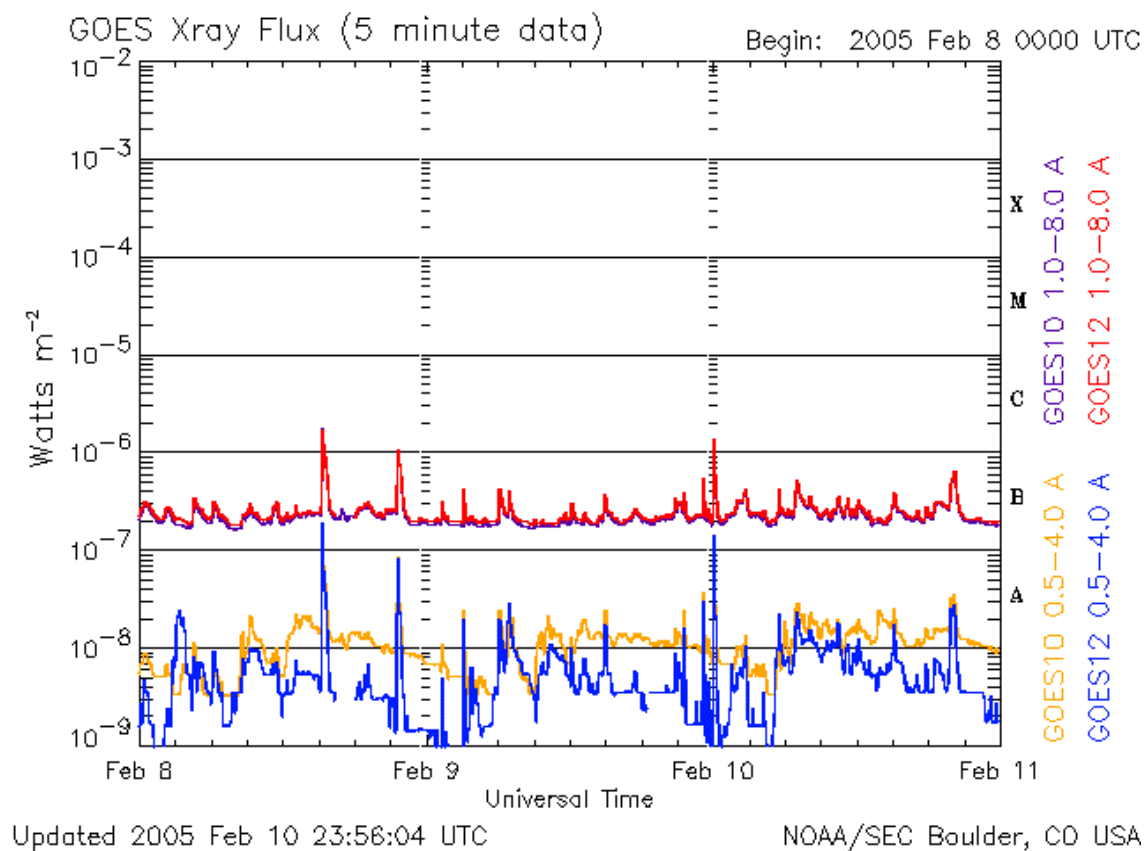
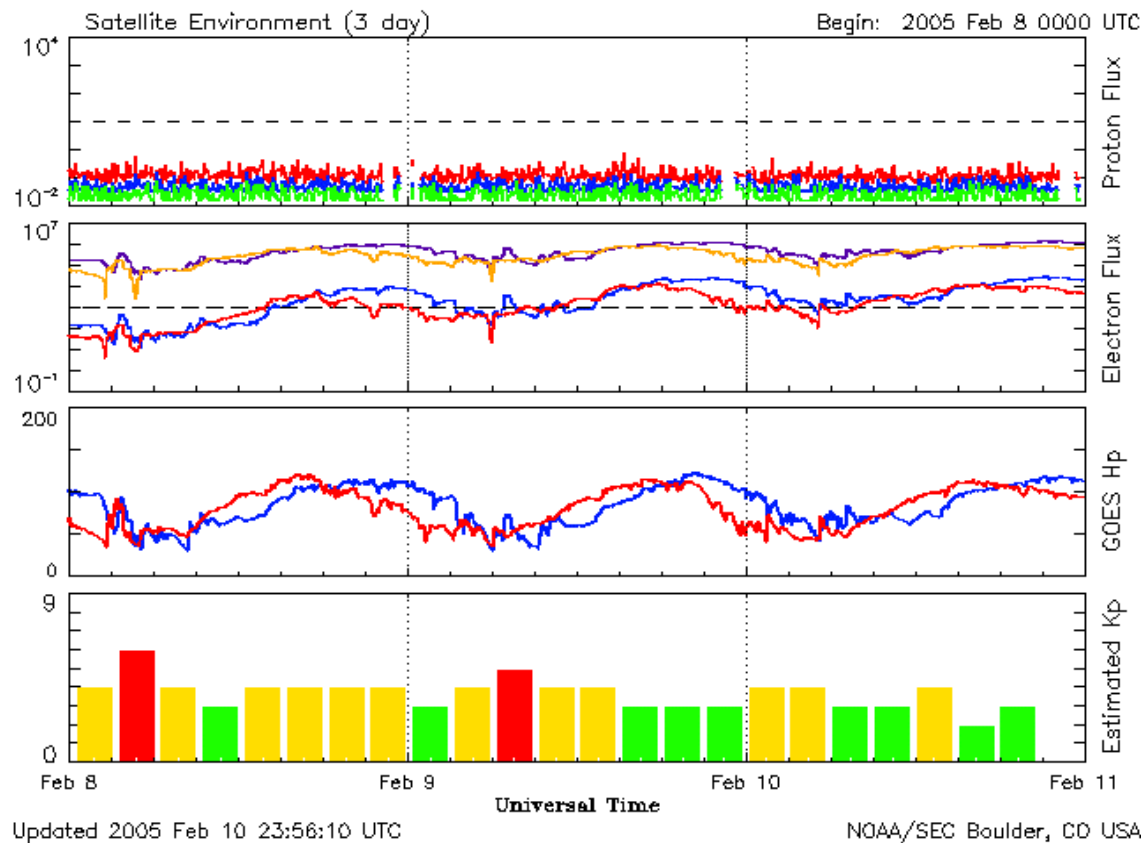
Updated 2005 Feb 7 23:56:12 UTC

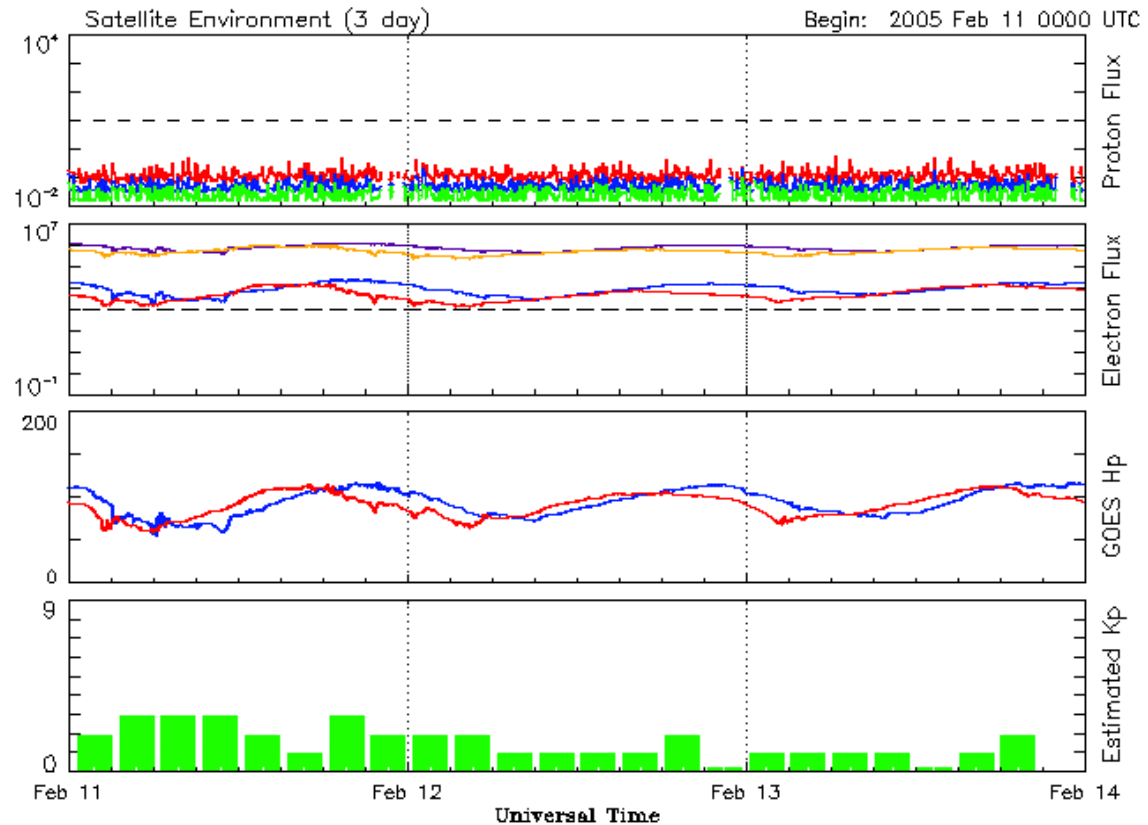
NOAA/SEC Boulder, CO USA



Updated 2005 Feb 7 23:56:04 UTC

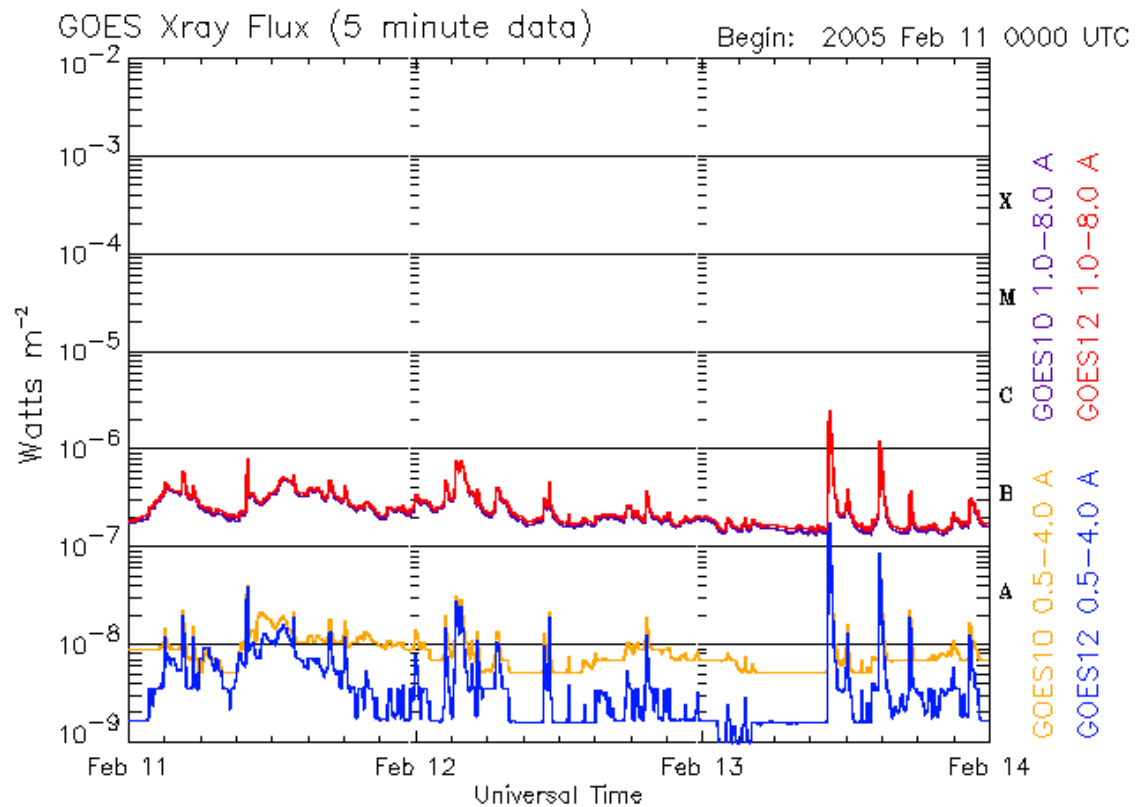
NOAA/SEC Boulder, CO USA





Updated 2005 Feb 13 23:56:12 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Feb 13 23:56:05 UTC

NOAA/SEC Boulder, CO USA