EUROPEAN SPACE AGENCY
DIRECTORATE OF TECHNICAL & OPERATIONAL SUPPORT
MISSION OPERATIONS DEPARTMENT

INTEGRAL
Mission Report

INT-MOC-SYS-RP-1001-OPS-OF

No. 095
Week 29

19.07.04

Routine Phase

Prepared by: M. Walker (OPS-OFO)

LIST OF CONTENTS

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		G. La Rosa – IBIS	1
		S. Brandt – JEM X	1
		E. De Miguel - OMC	1
		W. Hajdas – IREM	1
		JPL / Goldstone	
		D. Holmes	1
		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 10.07.04 until 16.07.04 (both dates inclusive) and covers the revolutions 213 & 214.

2 Summary of Activities

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

The target of these revolutions was the galactic plane, Cygnus X (RA 20:33:10.00; DEC +41:12:00.0) and an OMC Flat Field target (RA 19:19:12.00; DEC +61:54:00.0). The activities consisted of GPS, raster dithering and staring observations. In addition, OMC Flat Field and Dark Current Calibrations and an IBIS VETO CDM01 Calibration were performed (these were on 2004-07-17, therefore details to be reported in instrument sections of next weekly report). The JEM-X2 DFEE was switched off at the end of revolution 213. The details will be reported next week.

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.

Three slews were missed from the Timeline due to problems at the station.

The fuel consumption over the period between 09/07/2004 and 16/07/2004 was 0.1471 kg. The remaining propellant is in the order of 169.430 Kg on the 16th of July.

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

3.1.2 Power

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

3.1.3 Thermal

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

3.1.4 OBDH

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

3.1.5 RFS

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

3.2 Payload

3.2.1 SPI

The overall status of the instrument is nominal.

During the reporting period the instrument was in photon-by-photon mode with spectra TM enabled, an assigned TM bandwidth in the science windows of 103 pkts/cycle and an actual average occupation of 98 pkts/cycle (about –0.4 pkts w.r.t. the values recorded last week).

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.

During the reporting period the PST Allocation to IBIS was 129 TMSP / Cycle, the mean IBIS Bandwidth usage was 105.3 TMSP / Cycle, down 0.3 TMSP on last week.

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 and JEM-X2 was dormant with a TM allocation of 1 packet/cycle.

Further information on the JEM-X operations can be found in the Appendix Section 8.3.4.

3.2.4 OMC

The status of OMC is nominal.

During the reporting period OMC operations were performed by the automatic timeline, with the TM allocation to OMC of 5 packets/cycle.

There were 142 OMC pointings executed nominally, 3 were lost, and one had a ten minute delay in the start of the observation..

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 moderate solar activity with X-ray events exceeding in some occasions the class X1

Note: Some more information concerning the IREM operations is provided in the Appendix Section 8.3.6.

4 Ground Facilities

The performance of the Operational ground facilities was very good this week, well above the system performance requirements, 3 pointings were lost, and one delayed.

4.1 Mission Operations Centre

The performance of the MOC was in general good in the reporting period, there was an incident where the nctrs-b died. In another incident, the CMD multiplexer crashed taking with it the auto and manual stack tasks, fortunately this occurred at a quiet time, and no pointings were lost.

4.2 Ground Stations & Network

The performance of the ground stations and Network was in general good this week. There was a problem with a handover to from Redu to DSS-16 which caused the loss of a pointing, there were also problems with hits on the line to Redu which delayed the start of a pointing, and repeated problems with the links to DSS-16 causing the loss of two further pointings. The overall performance though was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning
PSFs: no new PSFs received this week.
POS and POD: generated up to rev 222.
TSFs: received up to rev 216.

No ToO request received. Revolution 220 was replanned, in order to change a dither pattern. Its POS/POD/ICP are now version 5.

2. Observation status
No new ECSs received this week. However, some previously received ECSs were belatedly processed into OCSs. This was for revolutions 168, 189, 197 and 200.

An ISOC/ISDC telecon was held on July 15th, to review the OCSs. No extra time was credited to any observation.

3. ISOC science archive
No new data received this week, although it is believed that the next science-window tape is on its way.

4. ISOC system
The ISOC system version 10.4 patch 5 is still in use.

5. Problems
No new problem.

4.3.2 ISDC

Status of ISDC observation processing on 19/07/2004:

- Latest Standard Analysis completed: observation 02201400001 (Algol, Revolution 168) on 17/07/2004

- Latest products archived: observation 01202520005 (GRS 1915+105, Revolution 193) on 19/07/2004

- Latest observation products sent to the observer: observation 01201570003 (Cygnus X, Revolution 190-191) on 17/06/200

5 Special Events

6 Anomalies

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

- On DoY 193 at 02:49 a late handover from Redu to DSS-16 caused the loss of pointing 02120058.
- On DoY 193 at 14:10, U4920 failed completion, there was no impact.
- On DoY 195, from 01:49 to 01:50, there were errors sending data to the isds.
- At 09:31, there was a nctrs-b crash.
- At 10:40, there was a hit on the line to Redu, knocking out TM & TC. IMCA/IDDa also could not connect to nctrs-a. At 10:46, nctrs-a was back on-line, and all links re-connected. The impact was that the star mapping was lost, and the manoeuvre could not be updated.
- At 12:37, there was another hit on the line to Redu, TM & TC were lost. The impact was a 10 minute delay to the start of pointing 02130051.
- At 21:50, there was a drop in the default VC7 link from DSS-16.
- At 21:51, there were errors sending data to the consolidator, possibly related to the above link problems.
- At 22:09 and 22:32, there were further drops in the default VC7 link. At 22:34, the default link was changed.
- At 22:43 there was a drop in the VC0 link from DSS-16.

- At 23:36, both TM links dropped for about 1 minute.
- At 23:45 there was another drop in the VC7 link from DSS-16. The corresponding DR# for these problems is N102223.
- On DoY 196, there were further link drops at 00:13, 00:29, 00:31, 00:32, 01:11, 01:12, 01:15, 01:18, 01:23
- On DoY 196, at 02:48:28, an AOCS command failed release due to a VC0 TM drop, the impact was the loss of pointing 02130065.
- On DoY 197, at 13:15, the nctrs-a had to be restarted due to a stuck link, there was no impact.
- On DoY 198, at 04:47 sun128 crashed, the machine was rebooted, but remained in a red state. Sun128 was eventually restored to a green state at 05:30, when the IFTS was re-started.
- At 05:58, the autostack and manual stacks both crashed on sun122. The CMD multiplexer was observed to have died. The MMI for imca was restarted, then the multiplexer, but was still unable to restart the command stacks. At 06:10 the imca was re-booted. The system was eventually back on-line at 06:50, after the handover to DSS-16. No pointings were lost!!
- At 07:45, the TC from DSS-16 dropped causing the loss of pointing 02140040, the TC wasn't restored until 08:51. The DR# is G104631.
- At 12:17, the applications on isds-a had to be stopped and restarted after an opslan firewall reboot, there was no impact.

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

AR id	Date Occurrence	Subject	Segment	Status
INT-2615	12/07/2004	DoY 193 Late H/O From Redu to Goldstone	NASA Station	Pending
INT-2616	13/07/2004	No notification of missing storage on LTA idda.	IMCS	Pending
INT-2617	15/07/2004	TMP Task on IMCS returns spurious data for the period of a GS outage	IMCS	Pending
INT-2618	15/07/2004	EVTLOG of NCTRS-A using 50% CPU	NCTRS	Pending
INT-2619	15/07/2004	Crash of NCTRS-B in GFCC	NCTRS	Pending

7 Future Milestones

An exercise is planned for 20/07/2004 starting at 02:00:00, to test the necessary upgrade to TCP/IP connections between Redu and the MOC. Portable Satellite Simulator data will be used.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 213

The observations in revolution 213 consisted of 16 pointings of a GPS lasting ~11 hours, followed by an amalgamated raster dithering observation of Cygnus X (RA

20:33:10.00; DEC +41:12:00.0), which was performed for the remaining ~48 hours of observation time.

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

Revolution 214
The observations in revolution 214 consisted of the following:

- An amalgamated raster dithering observation of Cygnus X (RA 20:33:10.00; DEC +41:12:00.0) lasting about ~57 hours. During this observation all instruments were in their nominal science modes, except for JEM-X2, which was in Safe mode, and the TM allocation was IBIS 129; SPI 103; JEM-X1 8; JEM-X2 1; OMC 5.
- A staring observation at an OMC Flat Field target (RA 19:19:12.00; DEC +61:54:00.0), performed for the remaining ~3.5 hours of observation time. During this observation SPI and JEM-X1 were in their nominal science modes; OMC Flat Field and Dark Current Calibrations were performed (OMC was in FFCalibration followed by DCCalibration modes) and an IBIS VETO CDM01 Calibration was performed, during which IBIS was in Standby mode. The JEM-X2 DFEE was switched off at the start of this observation and remained off for the rest of the revolution, with the thermal effect on IBIS being monitored. The TM allocation during this observation was IBIS 90; SPI 84; JEM-X1 8; JEM-X2 1; OMC 63.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2004-06-30T17:48:25.000Z     169.7141    F   Automatic TM processing.
2004-07-02T09:35:49.000Z     169.7009    F   Automatic TM processing.
2004-07-02T14:54:37.000Z     169.6618    F   Automatic TM processing.
2004-07-02T23:38:06.000Z     169.6487    F   Automatic TM processing.
2004-07-04T01:33:05.000Z     169.6237    F   Automatic TM processing.
2004-07-05T09:22:52.000Z     169.5980    F   Automatic TM processing.
2004-07-07T00:41:36.000Z     169.5929    F   Automatic TM processing.
2004-07-08T14:26:20.000Z     169.5773    F   Automatic TM processing.
2004-07-10T00:30:24.000Z     169.5563    F   Automatic TM processing.
2004-07-11T14:17:48.000Z     169.5321    F   Automatic TM processing.
2004-07-11T23:03:09.000Z     169.5189    F   Automatic TM processing.
2004-07-12T03:30:54.000Z     169.4823    F   Automatic TM processing.
2004-07-13T00:22:48.000Z     169.4737    F   Automatic TM processing.
2004-07-14T14:53:56.000Z     169.4535    F   Automatic TM processing.
2004-07-16T00:05:27.000Z     169.4302    F   Automatic TM processing.

This report was generated  Fri Jul 16 08:00:16 GMT 2004
```

8.3 Detailed Satellite Information

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

8.3.1 AOCS Summary Operations Report 10/07/2004-16/07/2004

AOCS operations were executed from the Automatic Timeline.

During this period, 61 Open Loop Slews, 93 Closed Loop Slews and 7 Momentum Bias were executed. 3 slews were missed or executed manually. This is equivalent to a 1.9%.

10/07/04 (Day of Year 192, Revolution 212)

Nothing to report.

11/07/04 (Day of Year 193, Revolution 212-213)

Slew missed due to late station handover (Goldstone, DSS-16): Slew 02120058 was missed from the Timeline due to a delay in the station handover from Redu to Goldstone DSS-16. After completion of the handover, a manual Close Loop Slew was performed to the attitude of PID 02120058. The next slew executed from the Timeline.

12/07/04 (Day of Year 194, Revolution 213)

Nothing to report.

13/07/04 (Day of Year 195, Revolution 213)

Flickering of the Pointing Bit due to Yaw error: After Open Loop Slew 0213 the 8.4Mi ACC-picked Guide Star was located on CCD location [-3208, -18831]. According to the star catalogue two nearby stars 3152-701, 8.83Mi, and 3152-711, 8.96Mi, were located on CCD locations [-3240, -18705] and [-3163, -19000], respectively. These stars are 1.8 arc-minutes apart. This combination resulted in some instability in the Guide Star position and exceeding of the OTF threshold on Yaw several times during the pointing. These Pointing Bit Flickers were not seen at BCP level and the pointing was not affected.

14/07/04 (Day of Year 196, Revolution 213-214)

Slew missed due to short drop in TM (Goldstone DSS-16): A short drop in TM from DSS-16 at 02:43 interrupted the execution of slew 02130065. After reestablishment of TM, a manual Open Loop slew was performed to the attitude of PID 02130066. Pointing 02130065 was lost.

15/07/04 (Day of Year 197, Revolution 214)

Nothing to report.

16/07/04 (Day of Year 198, Revolution 214)

Slew missed because of a TC link drop from the station (Goldstone, DSS-16): At 07:45 the TC link from the DSS-16 station dropped out (DR# G104631). The problem

could not be solved before 08:31 and slew 02140040 was missed from the Timeline. After station handover to Redu, a manual Open loop slew was performed to the attitude of PID 02140041. Pointing 41 was not affected.

8.3.2 SPI Operations

Cryo-cooler / Detector Cold-Plate:

The performance of the cryo-cooler is nominal.

The cold plate temperature is leveled off and maintained at 85K+/-1K. Within this range the temperature showed a notable positive drift, which was expected after the annealing operations. Within the reporting period the stroke amplitude was adjusted from 4x35dec to 4x36dec.

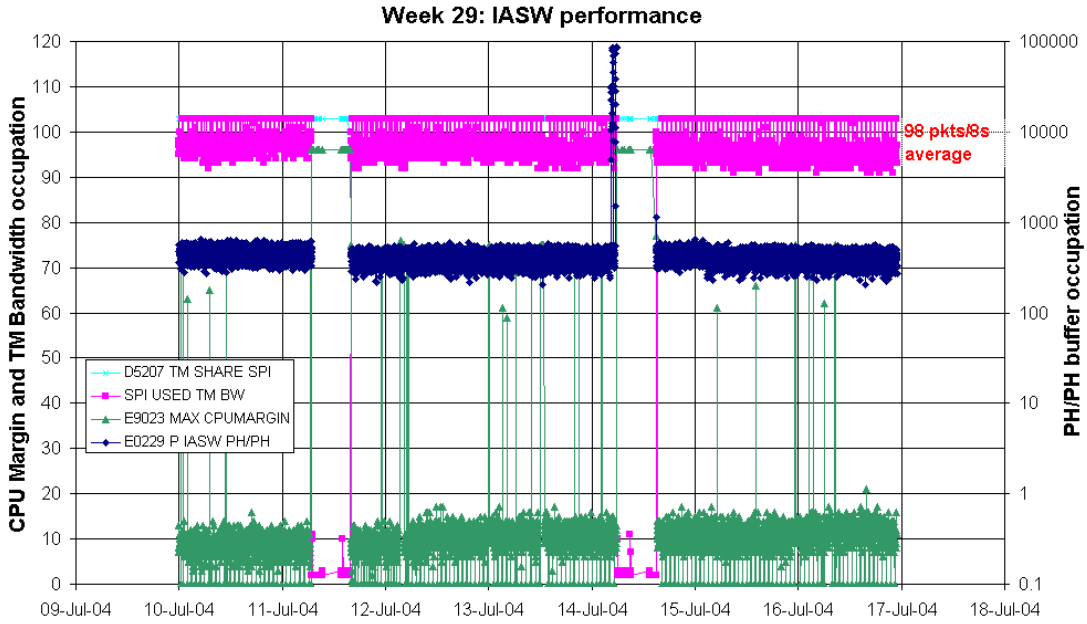
Due to data retrieval problems the plot showing the evolution of the cold-plate and H bus temperatures during the reporting period could not be produced

IASW/DPE:

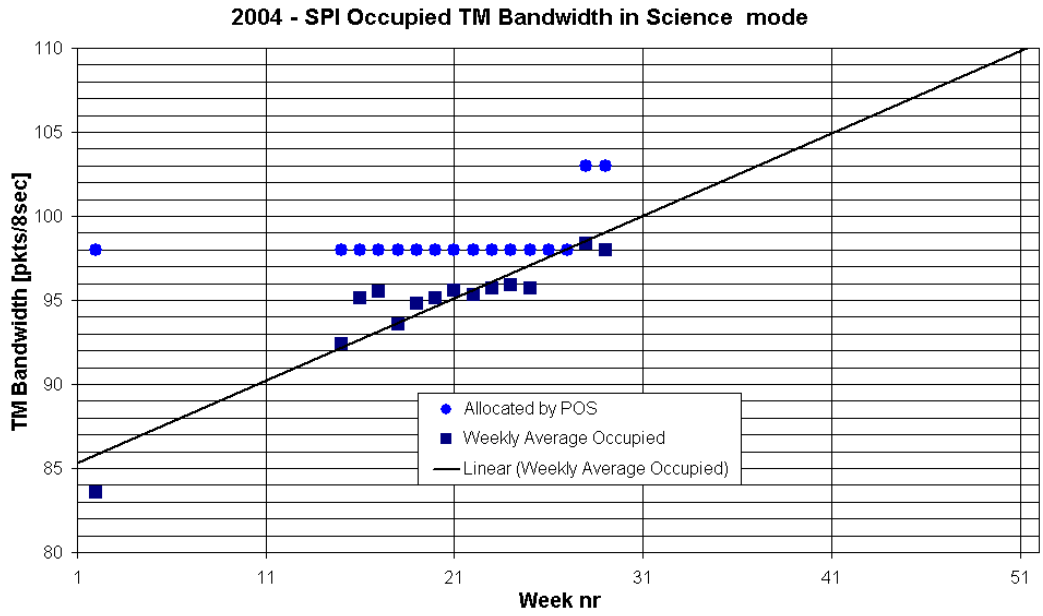
The performance of the IASW/DPE is nominal.

The average TM bandwidth occupation was 98 pkts/cycle in the science windows. This figure is about 0.4 pkts/cycle less than the value recorded last week.

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



The following plot shows the trend of the occupied bandwidth, since beginning of 2004.



ACS:

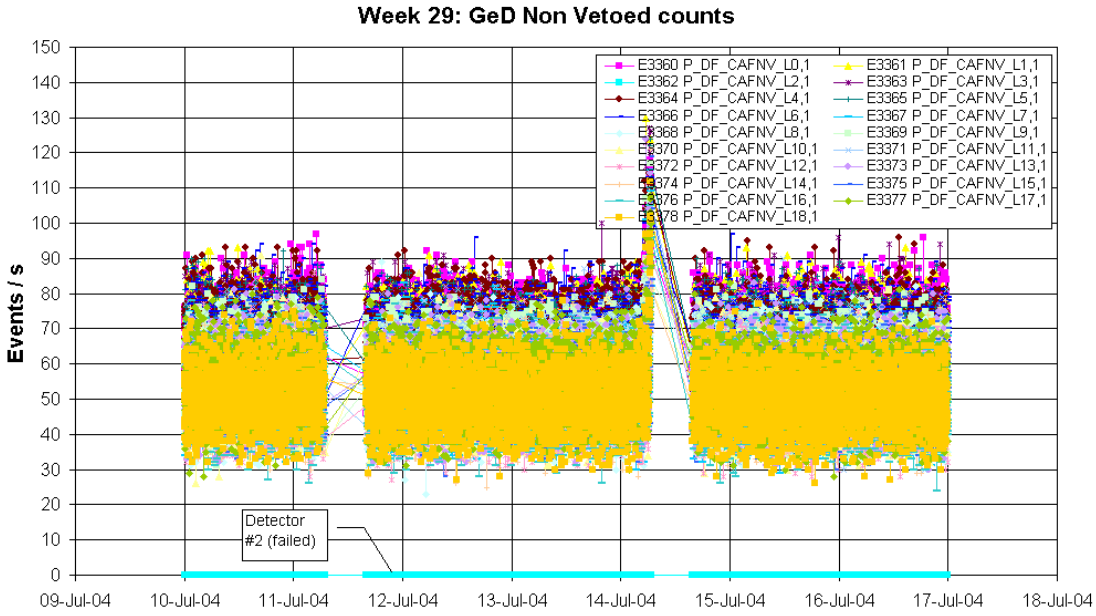
The performance of the ACS is nominal.
The plot showing the ACS overall count rate evolution during the reporting could not be produced.

AFEE:

The performance of the detectors is nominal except for the detector #2 failed since 06.12.2003 (see anomaly report INT_SC-72).
The plot showing the AFEE dc output signals could not be produced.

DFEE:

The performance of the unit is nominal.
The following plot shows the GeD 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.

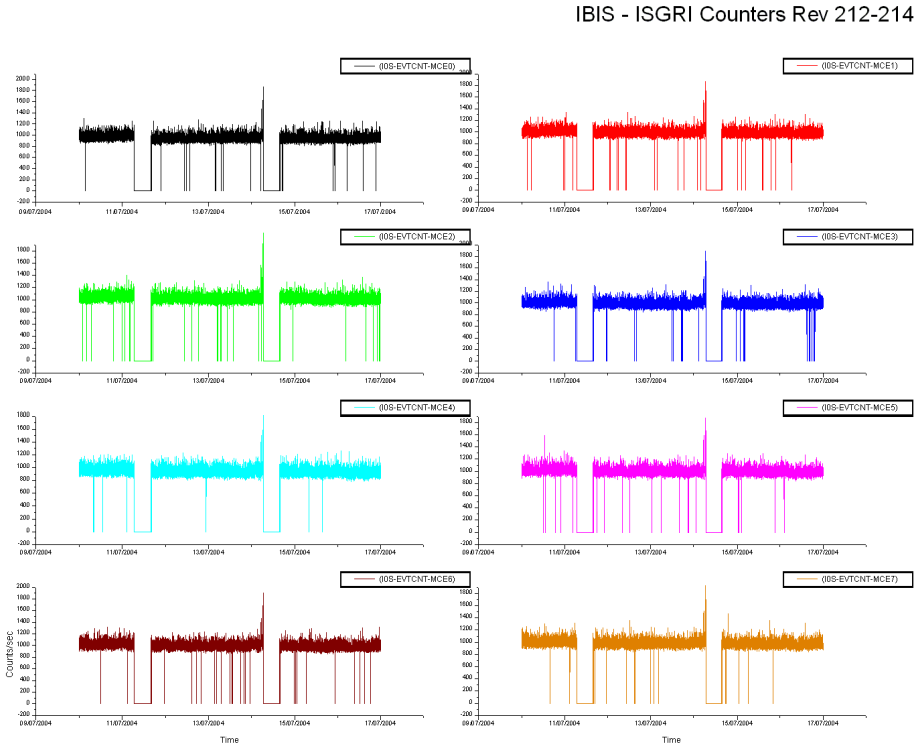


PSD:
The performance of the unit is nominal.
Nothing to report.

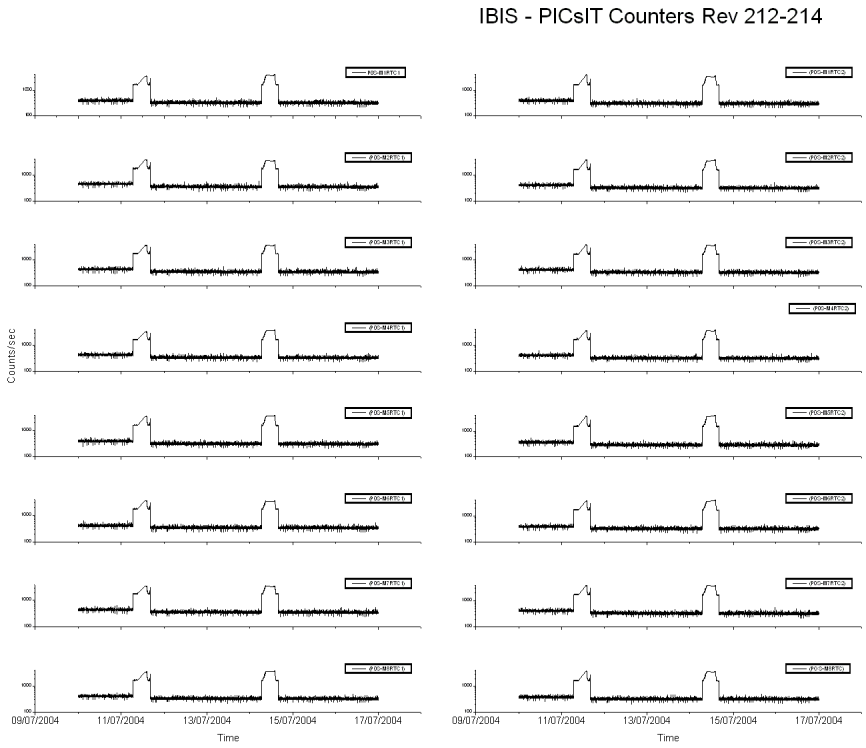
8.3.3 IBIS Operations

IBIS Event Counters Plots.

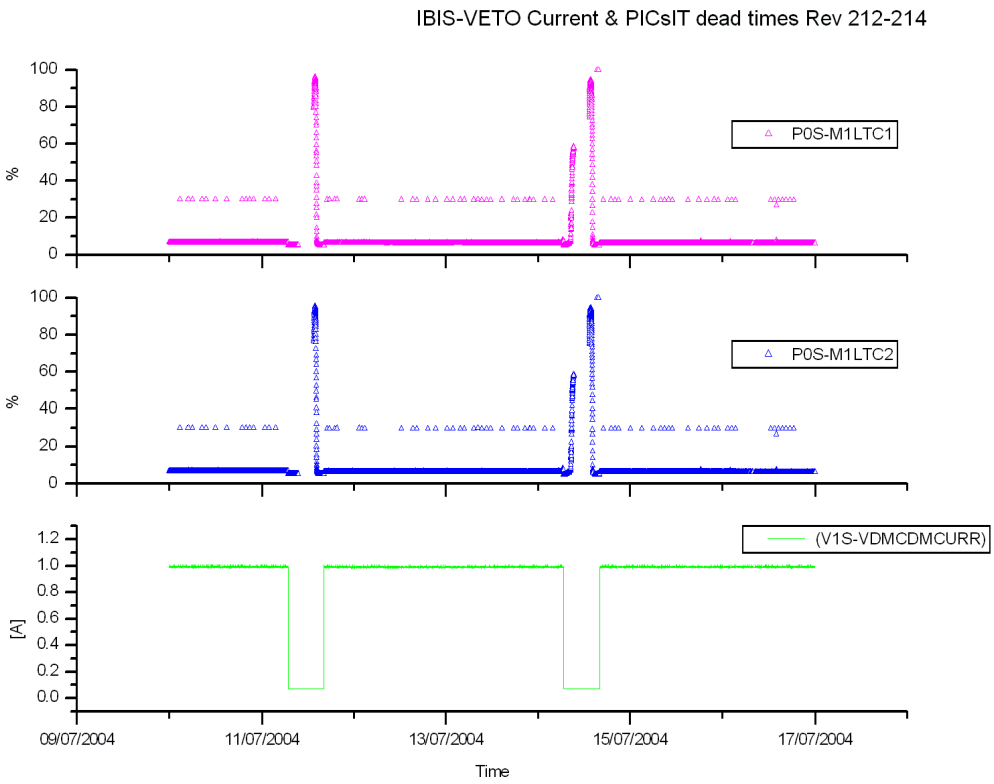
ISGRI Counters:



Picsit Counters:



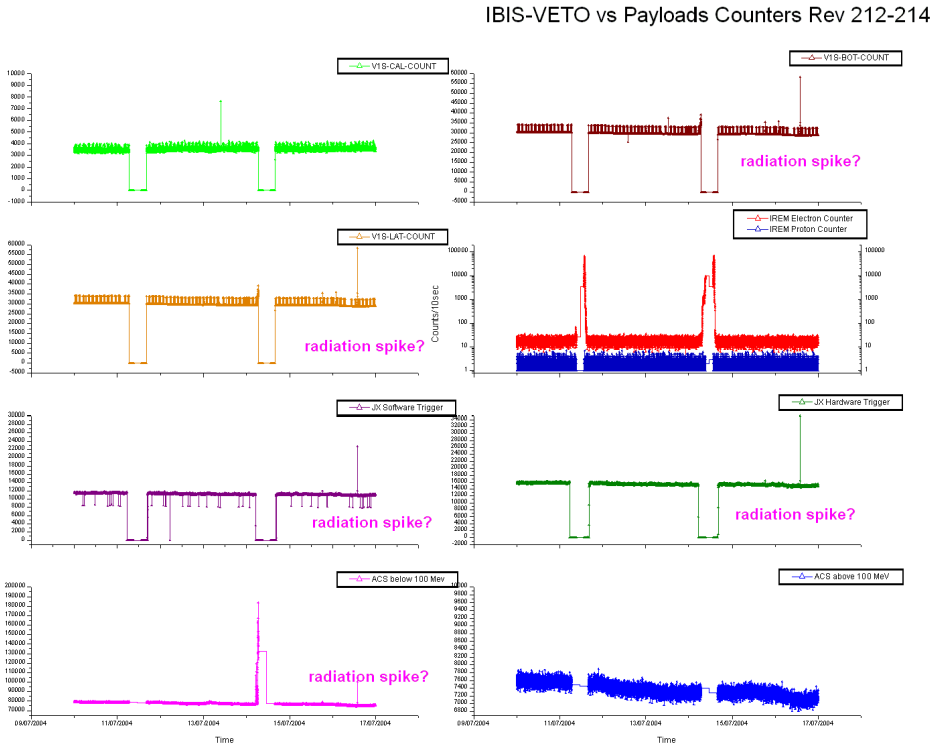
Veto Current:



VETO vs Payloads Counters

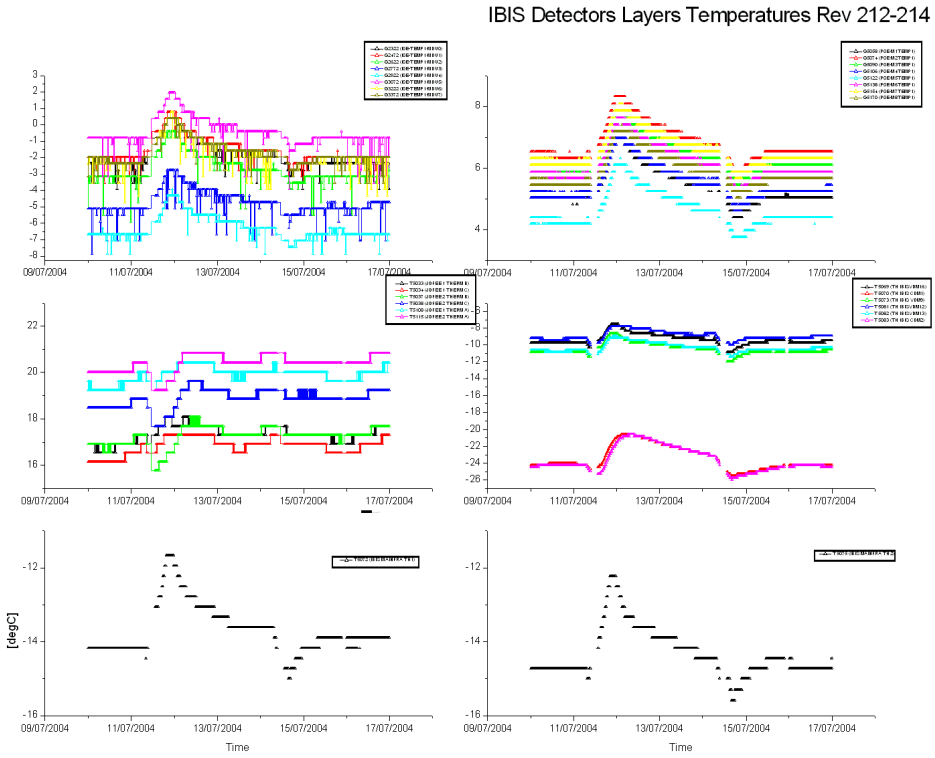
The comparison between the count-rates reported by VETO, the SPI-ACS, the IREM counters and JEM-X hardware/software triggers, gives in general an indication of fluctuation of the environmental background (protons and heavy ions) across the rev 212-214: this is shown by the following plot, in which all the on-board sources mentioned are considered.

On 16/07/04 a spike on most of the on-board anticoincidence system has been reported except for IREM , ISGRI+PICsIT and the SPI ACS above 100Mev. This allows the identification of the event to be in the low energy area and outside the FOV of the instruments.



**with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec

IBIS Detectors Layers Temperatures



IBIS daily report

DoY 2004.192 (10/07/04)

Nothing to report.

DoY 2004.193 (11/07/04)

There were a few reports during the Belt passage the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as required by the PIs.

DoY 2004.194 (12/07/04)

Nothing to report.

DoY 2004.195 (13/07/04)

Nothing to report.

DoY 2004.196 (14/07/04)

There were a few reports during the Belt passage the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as required by the PIs.

At 16:04Z several issues of OEMs APID 1280 CLASS 0 ID 131 <<IBIS IASW HEPI DATA INCLUDES TIME OVERRUN>> were reported. The rate of the OEMs was >1/sec. The operator following the Payloads Recovery Document verified the nominal status of the unit and that the scientific files were received by ISDC. This OEM is flagging a lost of synch in the event tagging: the time of a certain event resulted larger than the time of the following ones.
The problem likely was due to a lost synch between the HEPI and peripherals through the I/F HBRA-RT.
At the same time the TM parameter G8081 went in OOL (value=198/sec), flagging an anomalous condition for the number of invalid event at HBRA-RT I/F, higher than expected.
At 16:04:39 the OEM APID 1280 CLASS 0 ID 132 << IBIS IASW HEPI RESYNCH>> was generated, reporting an on-board autonomous synchronization between the HEPI and the peripherals. No further action was taken considering that the system was able to recover autonomously.

DoY 2004.197 (15/07/04)

Nothing to report.

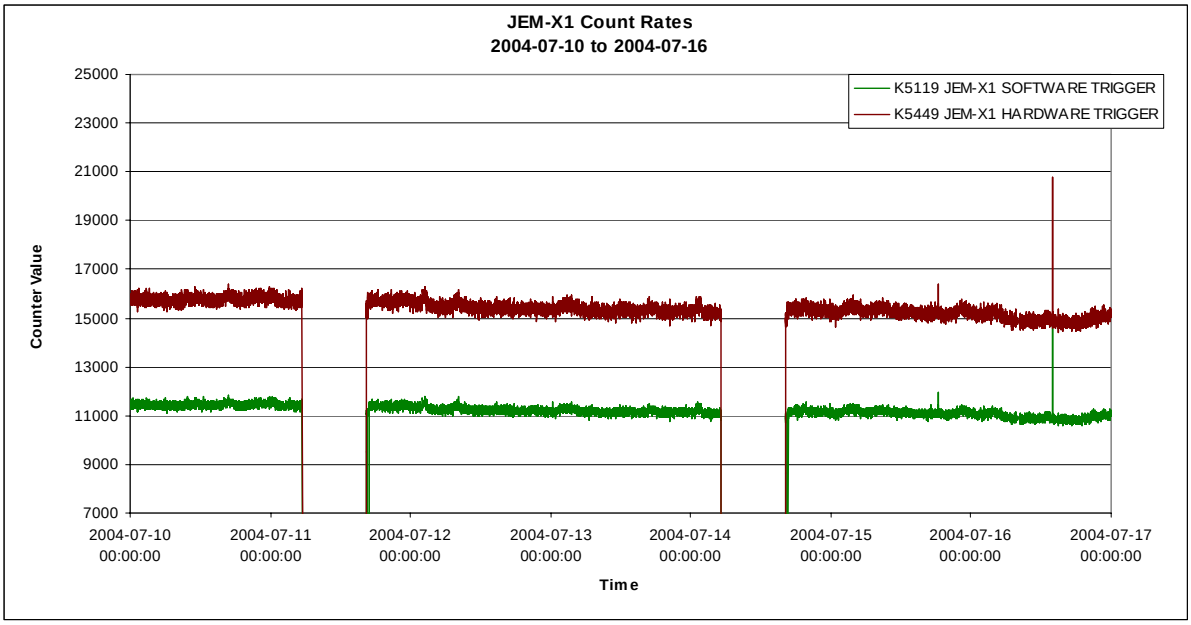
DoY 2004.198 (16/07/04)

Nothing to report

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

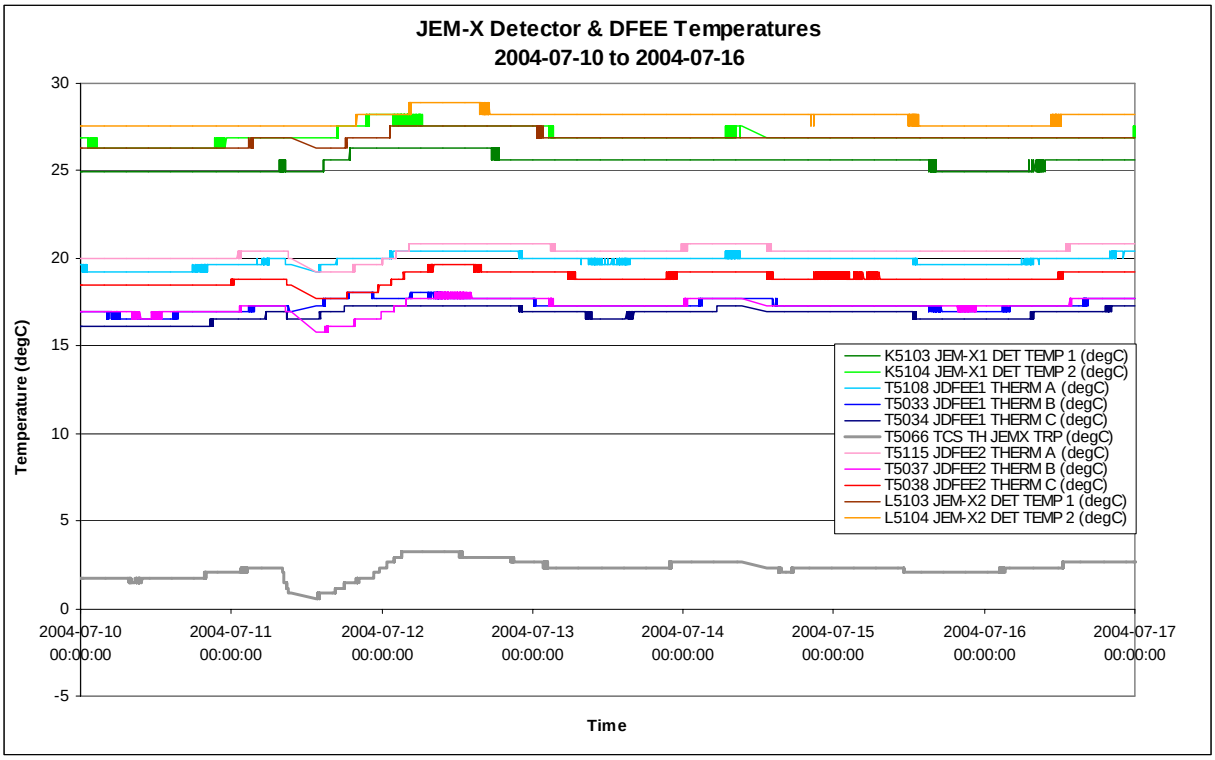
JEM-X count rates over the reporting period are displayed in the following graph[1].



8.3.4.2 JEM-X Temperatures

The JEM-X1 and JEM-X2 detector temperatures over the reporting period are displayed in the following graph, along with the temperatures at a selection of DFEE locations and on the detector bench between the two units[2].

[1] JEM-X1 Data sampled (1 frame in 4) and data for both units 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

2004-07-10 (DoY 192, Rev 212) to 2004-07-16 (DoY 198, Rev 214)

Nothing to report.

8.3.5 OMC Operations

On DoY 193, at 02:49 a late handover from Redu to DSS-16 caused the loss of pointing 02120058.

On DoY 195, at 12:37, a hit on the line to Redu, caused the links to drop. The impact was a 10 minute delay to the start of pointing 02130051.

On DoY 196, at 02:48:28, an AOCS command failed release due to a VC0 drop, the impact was the loss of pointing 02130065, it was at this time that the following pair of commands were rejected:

```
2004.196.02.48.37.442 2004.196.02.48.29.339   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=1162
2004.196.02.48.28.429 2004.196.02.48.22.964   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=1161
```

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

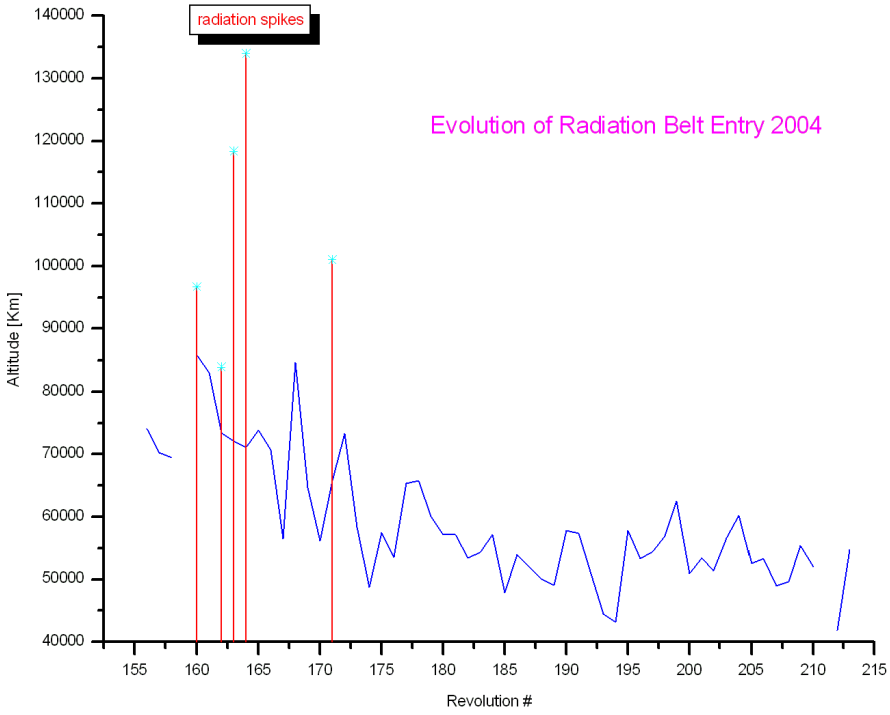
On DoY 196, at 12:41:06, during the perigee passage from Rev 213 to 214, there was a non-critical SECL OEM, when temperature detected in the middle of the lens barrel (parameter T5016, OMC LENS TEMP1) went below the limit of -10ºC. The automous on-board monitoring routine SECL turned on heater 39 (ref: OMC LNSA ON in SECL nominal heater table) to control the situation.

On DoY 198, at 07:45, pointing 02140040 was lost due to a tele-commanding link problem with DSS-16.

On DoY 193 at 06:53:05 and DoY 196 at 06:39:14, OMC was switched by the Timeline to SAFE mode, at the nominal times.

8.3.6 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]
212	RAD_ENTR R 2004-07-11T06:52:45Z	11/07/2004 09:02:09	41933	11-Jul-2004 07:39	53775
213	RAD_EXIT R 2004-07-11T16:00:03Z	11/07/2004 14:54:49	>24851	11-Jul-2004 14:39	26931
213	RAD_ENTR R 2004-07-14T06:38:55Z	14/07/2004 07:16:33	54700	14-Jul-2004 07:25	53669
214	RAD_EXIT R 2004-07-14T15:46:41Z	14/07/2004 14:21:13	>24853	14-Jul-2004 14:25	26997

Reference
Small error vs reference
Large error vs reference
Radiation Spike

Proton Belts

REV		Proton CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
212	PROTON_RAD_ENTR	11-Jul-2004 13:09	13314
212	PROTON_RAD_EXIT	11-Jul-2004 13:19	14425
213	PROTON_RAD_ENTR	14-Jul-2004 12:55	13424
213	PROTON_RAD_EXIT	14-Jul-2004 13:05	14534

(Values for Rev 211 will be provided next week)

IREM daily report

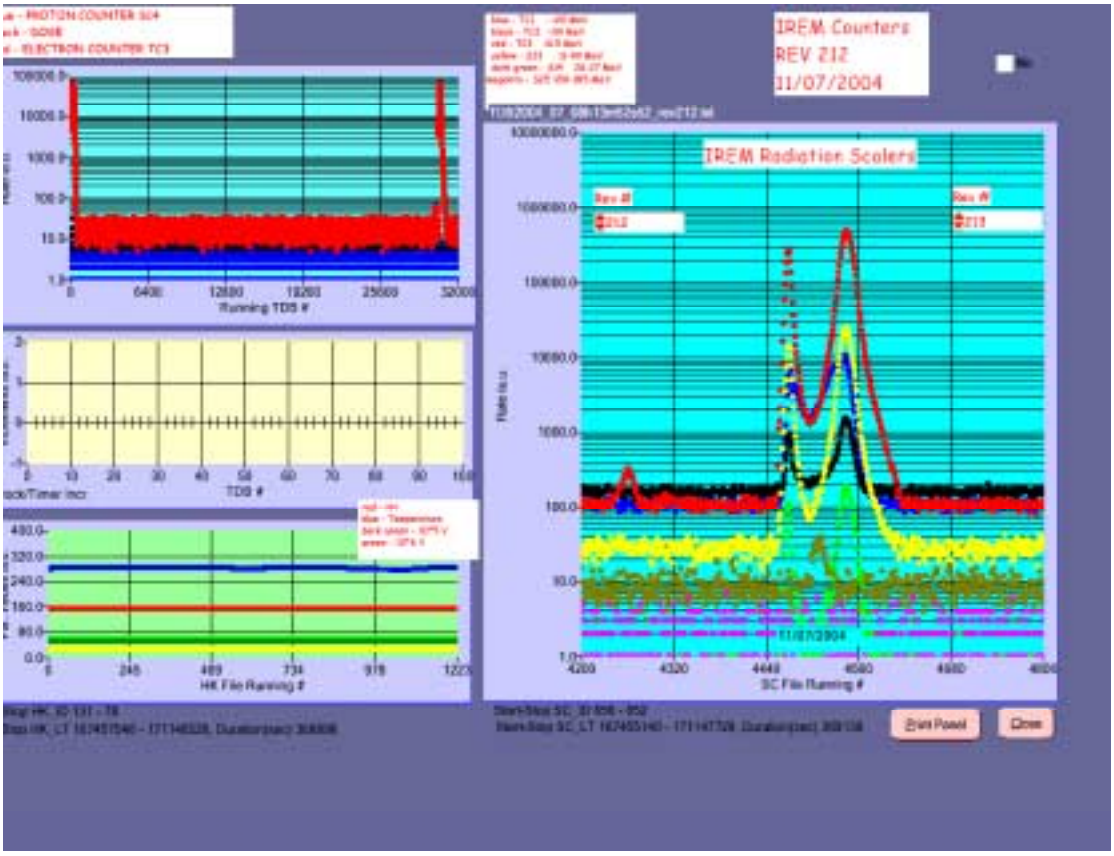
DoY 2004.193 (11/07/04)

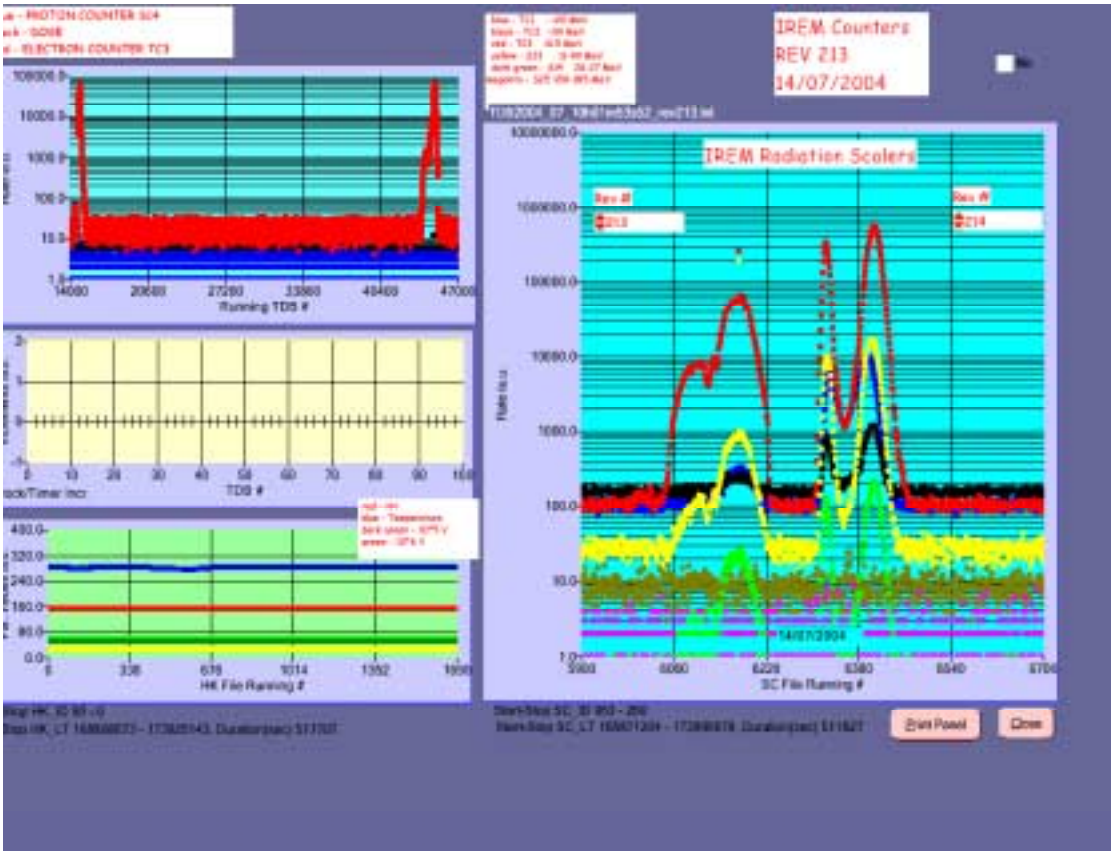
At 14:10Z the CEV (Command Execution Verification) for the TC U4920 (INT GND LINK ON) failed, due to late update of the Command Verifier task. The execution of the TC was verified against the relevant TM parameter using the monitoring task and no further action was taken.

DoY 2004.196 (14/07/04)

At 13:57Z the CEV (Command Execution Verification) for the TC U4920 (INT GND LINK ON) failed, due to lost TC link. The TC was resent manually at 14:08Z.

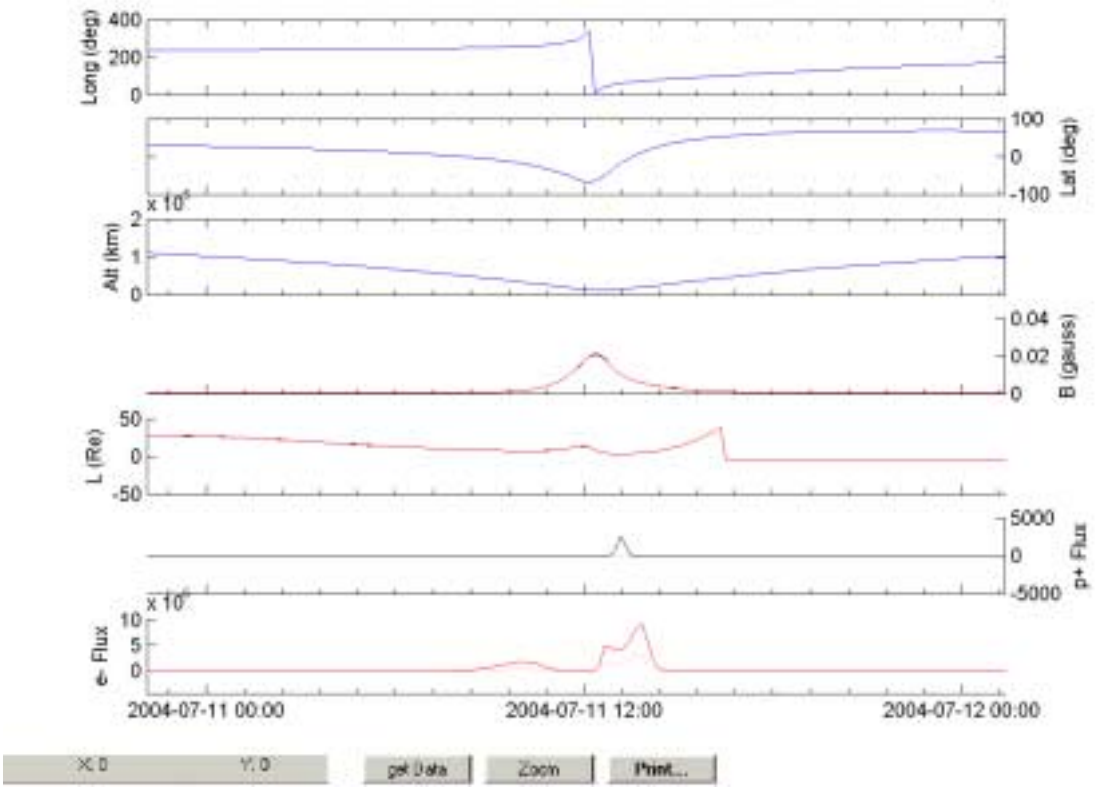
IREM radiation counters



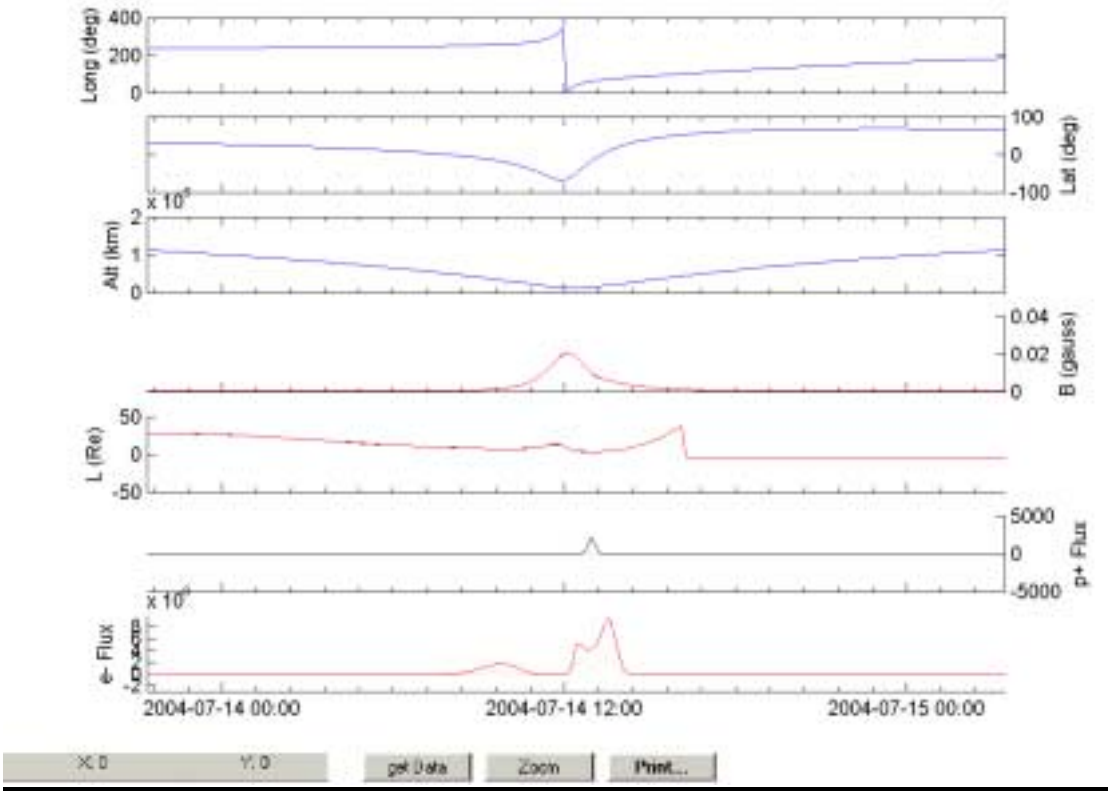


IREM Predicted Radiation Belt Passages.

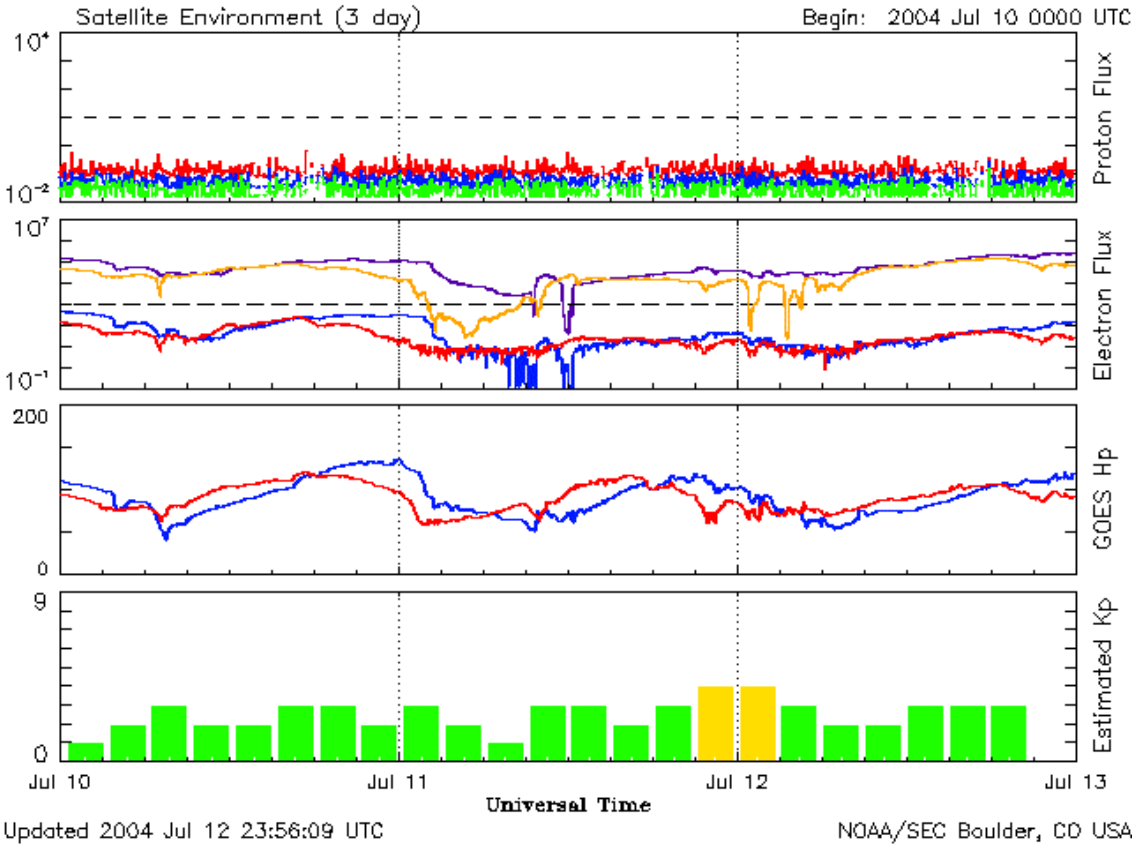
Rev 212

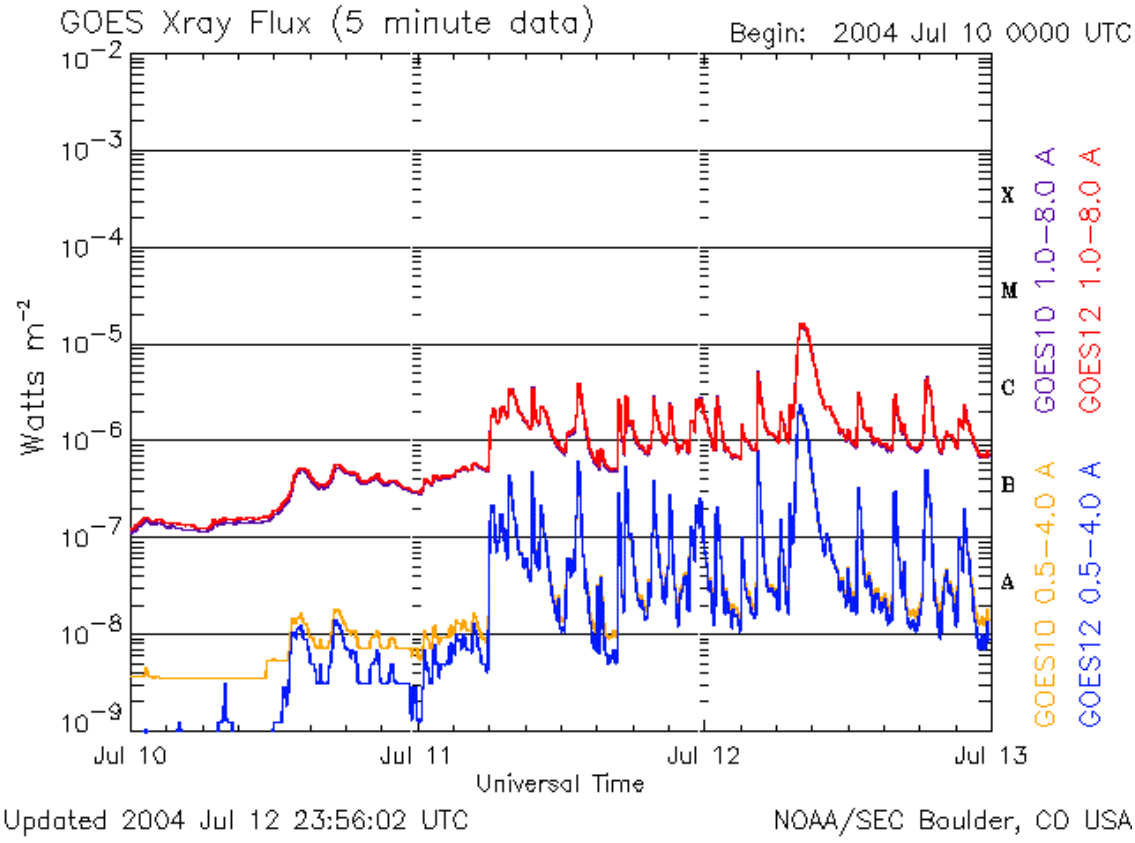


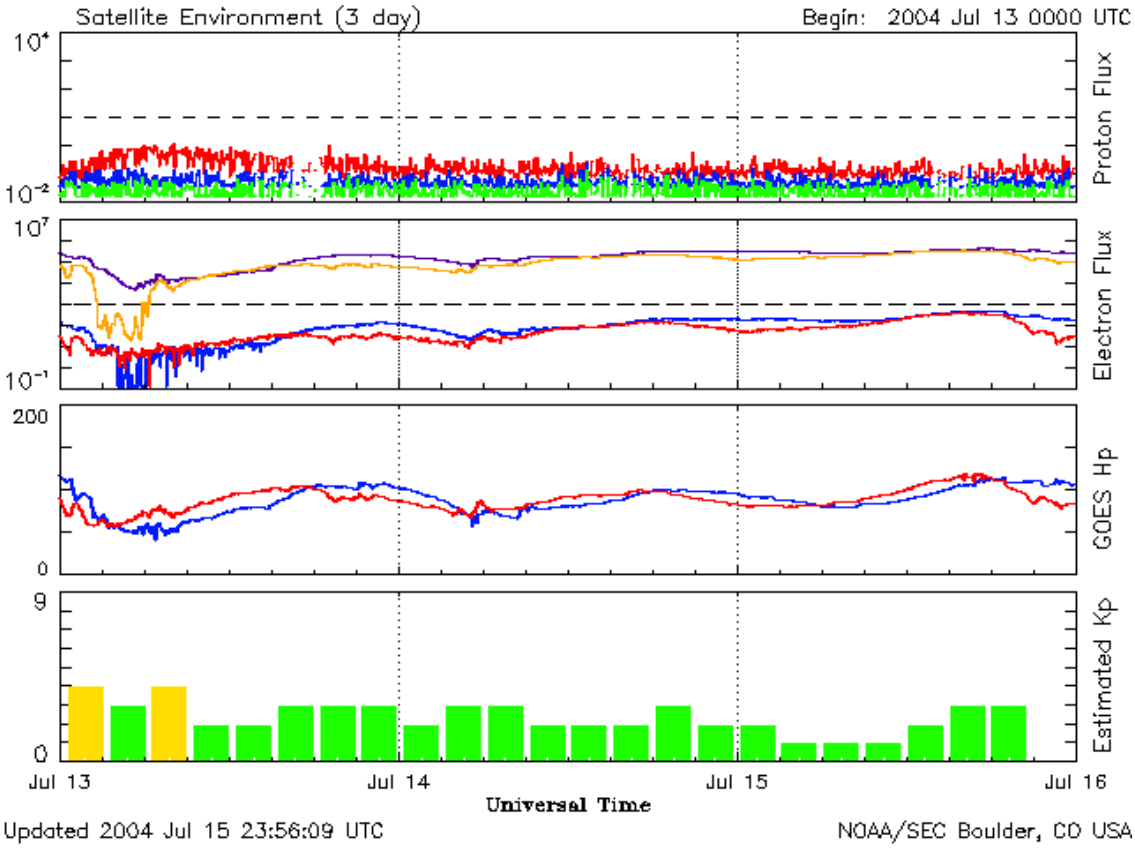
Rev 213

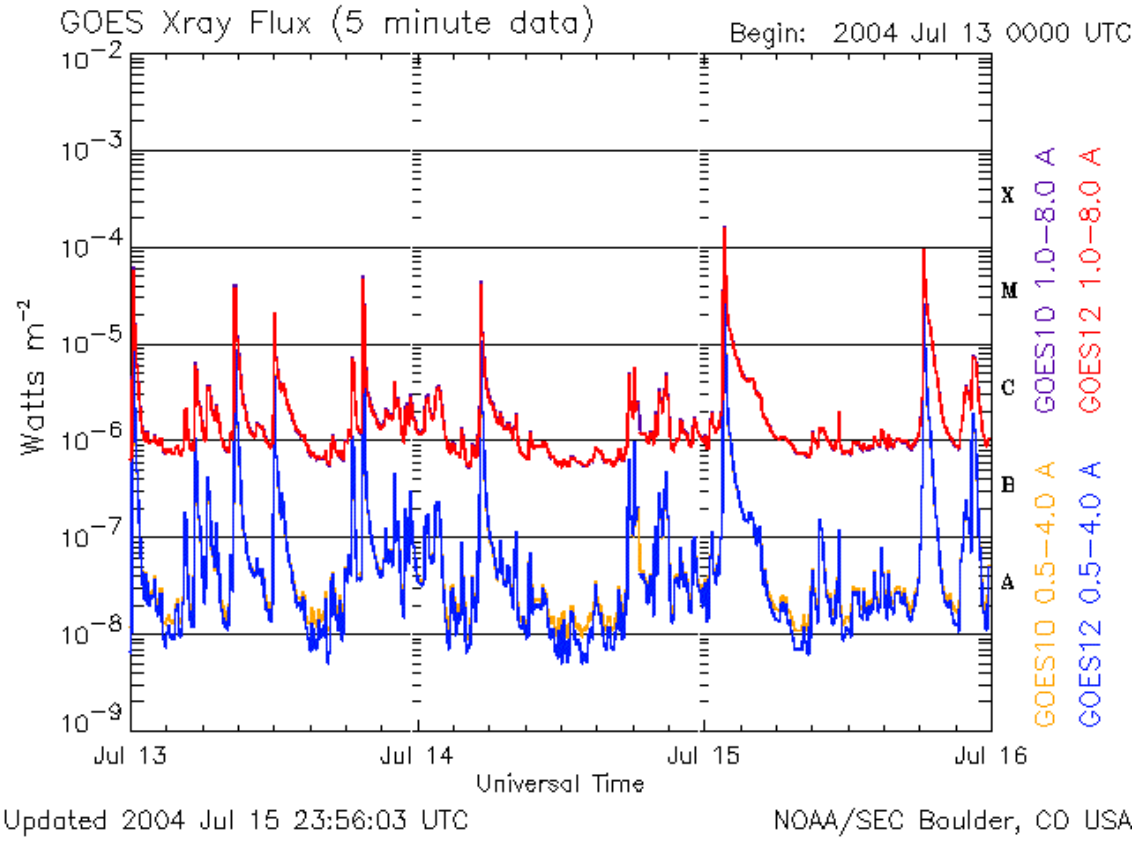


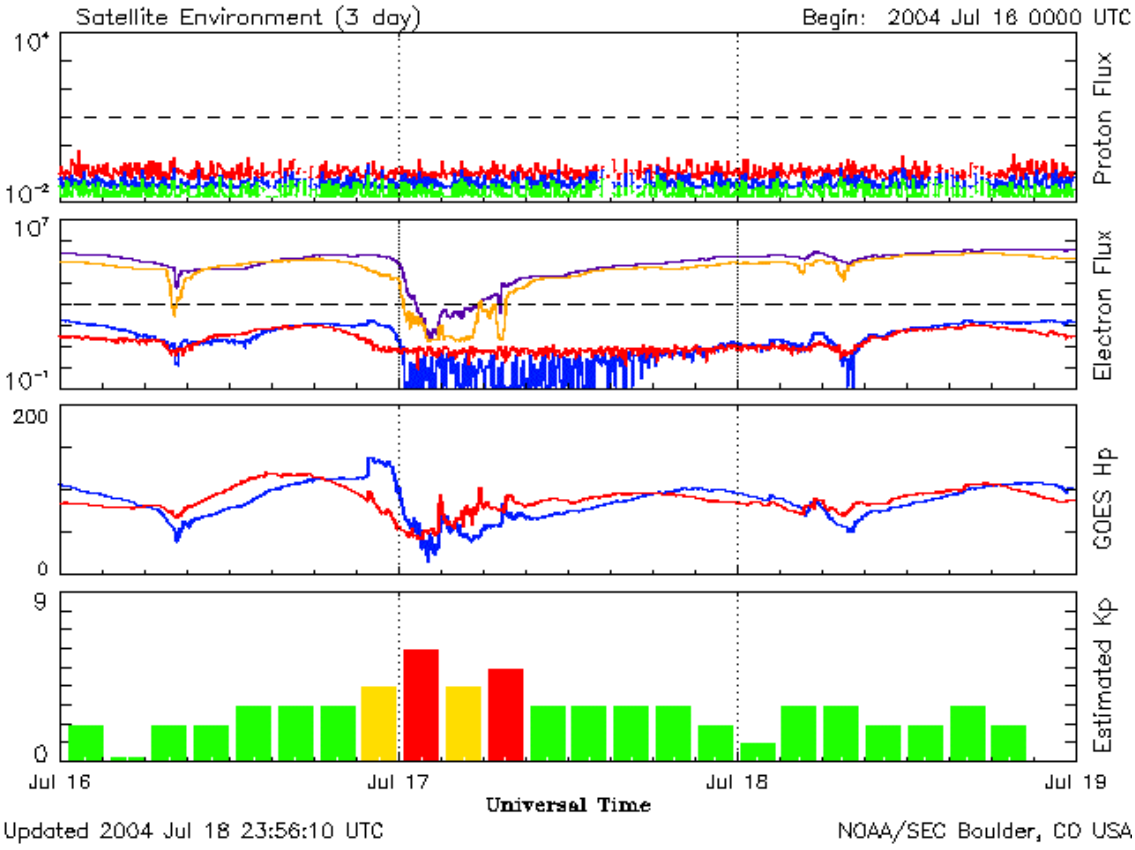
SEC-GOES Observed Particles Fluxes.

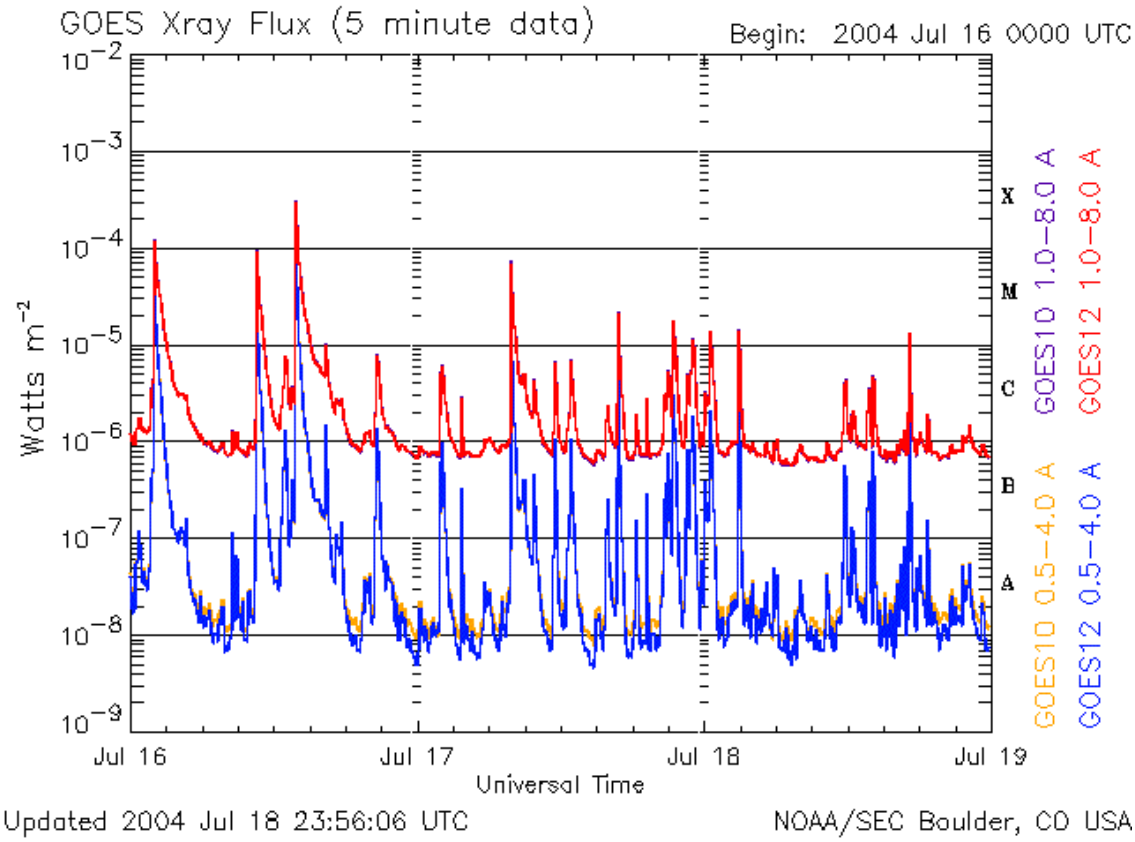

Satellite Environment (3 day)
Begin: 2004 Jul 10 0000 UTC
Proton Flux
Electron Flux
GOES Hp
Estimated Kp
Jul 10
Jul 11
Jul 12
Jul 13
Universal Time
Updated 2004 Jul 12 23:56:09 UTC
NOAA/SEC Boulder, CO USA


GOES Xray Flux (5 minute data)
Begin: 2004 Jul 10 0000 UTC
Watts m-2
X
M
C
B
A
GOES10 1.0–8.0 A
GOES12 1.0–8.0 A
GOES10 0.5–4.0 A
GOES12 0.5–4.0 A
Jul 10
Jul 11
Jul 12
Jul 13
Universal Time
Updated 2004 Jul 12 23:56:02 UTC
NOAA/SEC Boulder, CO USA


Satellite Environment (3 day)
Begin: 2004 Jul 13 0000 UTC
Proton Flux
Electron Flux
GOES Hp
Estimated Kp
Jul 13
Jul 14
Jul 15
Jul 16
Universal Time
Updated 2004 Jul 15 23:56:09 UTC
NOAA/SEC Boulder, CO USA


GOES Xray Flux (5 minute data)
Begin: 2004 Jul 13 0000 UTC
Watts m-2
X
M
C
B
A
GOES10 1.0-8.0 A
GOES12 1.0-8.0 A
GOES10 0.5-4.0 A
GOES12 0.5-4.0 A
Jul 13
Jul 14
Jul 15
Jul 16
Universal Time
Updated 2004 Jul 15 23:56:03 UTC
NOAA/SEC Boulder, CO USA


Satellite Environment (3 day)
Begin: 2004 Jul 16 0000 UTC
Proton Flux
Electron Flux
GOES Hp
Estimated Kp
Jul 16
Jul 17
Jul 18
Jul 19
Universal Time
Updated 2004 Jul 18 23:56:10 UTC
NOAA/SEC Boulder, CO USA


GOES Xray Flux (5 minute data)
Begin: 2004 Jul 16 0000 UTC
Watts m-2
GOES10 0.5-4.0 A
GOES10 1.0-8.0 A
GOES12 0.5-4.0 A
GOES12 1.0-8.0 A
X
M
C
B
A
Jul 16
Jul 17
Jul 18
Jul 19
Universal Time
Updated 2004 Jul 18 23:56:06 UTC
NOAA/SEC Boulder, CO USA