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

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 149
Week 30
01.08.05
Routine Phase

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LIST OF CONTENTS

1	General.....	3
2	Summary of Activities.....	3
3	Satellite Status.....	3
3.1	Platform	3
3.1.1	AOCS	3
3.1.2	Power	3
3.1.3	Thermal.....	3
3.1.4	OBDH.....	4
3.1.5	RFS	4
3.2	Payload	4
3.2.1	SPI	4
3.2.2	IBIS	4
3.2.3	JEM-X	5
3.2.4	OMC.....	5
3.2.5	IREM	6
4	Ground Facilities.....	6
4.1	Mission Operations Centre.....	6
4.1.1	Upgrade of IMCS.	6
4.2	Ground Stations & Network.....	7
4.3	Science Ground Segment.....	7
4.3.1	ISOC	7
4.3.2	ISDC.....	7
5	Special Events.....	8
6	Anomalies.....	8
7	Future Milestones	9
8	Appendix.....	10
8.1	Overview of Revolutions	10
8.2	Consumables	10
8.2.1	Detailed Fuel Book-keeping.....	10
8.3	Detailed Satellite Information	11
8.3.1	AOCS SUMMARY OPERATIONS REPORT, 23/07/2005 – 29/07/2005	11
8.3.2	SPI Operations.....	14
8.3.3	IBIS Operations.....	15
8.3.4	JEM-X Operations.....	19
8.3.5	OMC Operations	21
8.3.6	IREM Operations	23

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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 23.07.05 until 29.07.05 (both dates inclusive) and covers the revolutions 339, 340 and 341.

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 Her X-1 (RA 16:57:49.83; DEC +35:20:32.6); the galactic plane, Field_8 (RA 01:01:15.00; DEC +32:40:34.0) and the XMM LSS field (RA 02:17:60.00; DEC -07:00:00.0). The activities consisted of GPS and raster dithering observations.

Note: Some further information concerning the activities is provided in the Appendix.

3 Satellite Status

3.1 Platform

The performance of the platform was good. No new unexpected behaviour / malfunction was identified.

3.1.1 AOCS

The AOCS operations were performed from the timeline during this period.

11 slew (5 CSL, 6 OSL) were not executed from the Timeline during this period, due to problems with the planning process (star not found during S\T) and divergence of measured speed of RW#4 wrt the predicted value.

The fuel consumption over the period between 20/07/2005 and 28/07/2005 was 0.0943 kg. The remaining propellant is in the order of 160.2103 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 is nominal.

During the reporting period, the instrument has been kept in photon-by-photon mode, with spectra TM enabled, an assigned TM bandwidth in the science observation windows of 103 pkts/cycle. The Stirling compressors are working well, maintaining the detector cold-plate temperature within 85 $\pm$ 1K.

One PSAC temperature is out of range since 24th May. This is a permanent failure of the sensor and the measurement has been removed from the automatic ground monitoring list.

Due to a problem in the off-line data retrieval system (TDRS), the TM bandwidth occupation information is not available this week.

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

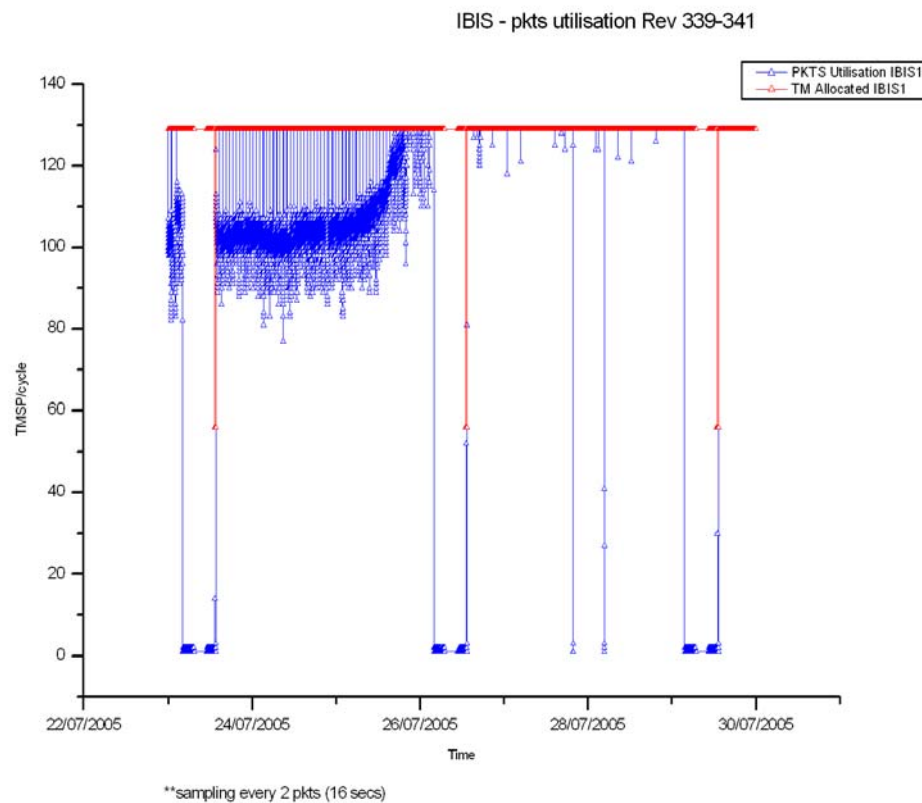
3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by moderate to high solar activity.

During the reporting period, the PST allocation to IBIS was most of the time 129 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 119.17 TMPS/cycle, up 6.15 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 and JEM-X2 was dormant (DFEE OFF) with a TM allocation of 1 packet/cycle.

Due to high background radiation conditions, several out of limits were received on the IREM RMC TM parameter K5317 RAD MONITOR 3 (Electron counter) starting at 2005-07-26T23:32Z. The value of this parameter continued to fluctuate around the safe threshold for JEM-X1 until 2005-07-27T22:58Z, when it began to remain steadily above the safe limit. JEM-X1 was commanded to Safe mode on 2005-07-28 at 00:15:57Z and remained in Safe mode for the rest of the reporting period (except during the Anode Calibration at the start of revolution 341).

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.

OMC operations were performed by the automatic Timeline. OMC was operated in Science Normal mode during science observations, with a TM allocation of 5 packets/cycle.

During this reporting period, 95 of the 149 planned science pointings for OMC were executed nominally, 2 were lost to problems at the MOC, with 1 interrupted by, and 51 lost to high solar radiation forcing the instrument to SAFE mode.

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

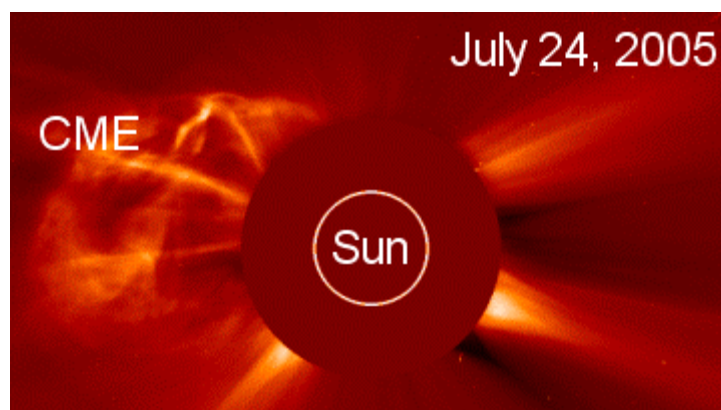
3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by moderate to high solar activity.

During the whole observation period the Sun was nearly blank. However on the far side of the Sun, something was exploding and throwing coronal mass ejection (see picture from SOHO). This was posing threat of solar flares for the end of the week.



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 very good this week, 153 slews were executed correctly, 11 were lost, there were minor problems with hits on the lines, and errors sending data to the isds, but nonthing which impacted the mission. Most of those slews tat were lost occurred during a period of high Solar radiation, when OMC & JEM-X were in safe mode anyway.

4.1 Mission Operations Centre

The performance of the MOC was average this week, 7 pointings were lost when FD files failed to arrive. There were other minor problems with disk space on the idda, which did not impact science return.

4.1.1 Upgrade of IMCS.

Next week, the upgrade to the B-chain is planned.

4.2 Ground Stations & Network

The performance of the ground stations and Network was also excellent this week. There were minor problems with hits on the lines, and errors sending data to the isds, but nothing which impacted the mission. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's for revolutions 343-349 have been received, based on the reworked JEM-X startup sequence. Revolutions 343-345 have been re-planned based on the new PSFs and the planning files sent.

No ToO has been performed but the decision on a possible ToO in revolution 345 is still pending.

Revolution 346 is expected to contain a coordinated observation with Suzaku (Astro-E2). Planning is currently waiting for further inputs from the Suzaku team before continuing with this revolution and the following ones.

The TSF for revolution 342 was received.

2. Observation status

ECS's received up to revolution 323. No extra time has been credited.

3. ISOC science data archive

Since the archive was opened to the community on 11 July 2005 it has been accessed on 85 occasions with 16 requests for data being made. The total volume of data requested was 15 Gbytes.

4. ISOC system

Still working with ISOC version 11.0.0, various improvements are in the works.

5. Problems

Internet access from ESAC remains somewhat shaky, which is a problem for the ISDA.

4.3.2 ISDC

Status of ISDC observation processing on 01/08/2005:

- Latest Standard Analysis completed: observation 02201540001 (Coma Cluster, Revolution 315-319) on 26/07/2005

- Latest products archived: observation 02201540001 (Coma Cluster, Revolution 315-319) on 26/07/2005

- Latest observation products sent to the observer: observation 02201540001 (Coma Cluster, Revolution 315-319) on 28/07/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 204, at 04:50, the idda (consolidator) machine went yellow on the global mmi, with 5GB available space left on the disk. At the same time sun121 went yellow, with 46% of the cpu being used by the desktop TM task. There was no impact.
- At 05:21, the following event log messages were seen: EV: TMDSmain, idda, Error, Software, Error sending data to ISDS, followed by EV: Link MADDISDS connected, there was no impact.
- On DoY 205, from 01:29 to 01:31, all links with Redu dropped due to a 'hit on the line', there was no impact.
- On DoY 206, at 07:12, the following message appeared in the event log: Data gap on TM link VC-0, idle gap size 1. There was no impact.
- At 16:20, the idda (consolidator) machine went yellow on the global mmi, with 3.2GB available space left on the disk, a message appeared 15 minutes later indicating the problem had cleared itself.
- At 17:51, the following message appeared in the event log: CPD is TM, idda, warning, system, FIFO buffer full, losing 999 packets.
- On DoY 207, at 04:31, the TC link from DSS-24 dropped. At 04:40, the TM link also dropped, the links returned at 04:43 without impact.
- At 10:50, the expected AOS is delayed until 11:18, the impact was the Reaction Wheel Bias was missed, FD deemed the bias unnecessary, and it was skipped, the TPF for the first slew failed due to the missing RWB, and was sent manually, there was no further impact.
- At 12:39, difficulties were experienced connecting VC-0 to the nctrb. These problems were cleared at 13:07 after the nctrb was shut-down and re-started.
- On DoY 208, at 02:01, an AOCS command failed release from the Autostack. At 02:24, the manual recover also failed release from the Autostack. The timeline was finally recovered at 03:21. The impact was the loss of pointings 03400015 and 03400016.
- At 06:48, the message Data gap on VC-0 online TM from Redu was seen in the event log. The same message was also seen at 07:39, when 11 bad frames were received.
- At 20:44, the FD system failed to generate the IPF for slew 03400036. The Timeline was recovered at 23:31, after a manual RWB was performed. The impact was the loss of pointings 03400036, 03400037 & 03400038.

- On DoY 209, at 03:12, again the FD system failed to generate the IPF. The Timeline was eventually recovered at 06:26. The impact was pointings 03400045 through to 03400048 were missed.
- At 06:50, it was observed that there was no available disk space at all on the idda machine. It had been in this state since 05:54, there was no apparent impact.
- On DoY 210, at 11:19, there was an error sending data to the isds, there was no impact.
- From 16:43 to 16:46 the links with Redu dropped due to a hit on the line. There was no impact.
- At 18:44 there was an error sending data to the isds. There was no impact.

The following anomaly report was entered into the ARTS system this week:

AR id	Date Created	Subject	Segment	Status
INT-2272	26/07/2005	IFRD GENERATING CORRUPTED TM PACKETS	IMCS	Open
INT_SC-123	30/07/2005	IREM Anomaly: reset of IREM_CSCI S/W #25, 30/07/2005	Payload	Open

7 Future Milestones

Upgrade of the NCTRS (Network Controller and Telemetry Router System) for Integral to release 9.1.4. This will cure some known problems with the current release and is also compatible with TCP IP communications to ESA Stations as well as X25. The upgrade has been delayed due to configuration problems encountered during testing, it will be made after completion of the IMCS upgrade.

Upgrade of the IMCS, to use S2K release 3.1. A major update of the MCS is currently in progress, see section 4.1.1.

Change of communication protocol to ESA Station from X25 to TCP IP, testing of this change will start once the IMCS-C is available again. It will be used operationally only once testing is complete and the operational machines have been upgraded with the latest versions of the NCTRS and MCS.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 339

In revolution 339 a raster dithering observation of Her X-1 (RA 16:57:49.83; DEC +35:20:32.6) was performed throughout the available observation time (~61.5 hours).

Revolution 340

The observations in revolution 340 began with a raster dithering observation of Her X-1 (RA 16:57:49.83; DEC +35:20:32.6) performed for ~30 hours, followed by 12 pointings of a GPS, lasting ~8.5 hours. A raster dithering observation of the field known as Field_8 (RA 01:01:15.00; DEC +32:40:34.0), one of the fields identified as not having been probed by Integral so far, was then performed for the remaining ~22.5 hours of observation time.

Revolution 341

The observations in revolution 341 consisted of a raster dithering observation of the XMM LSS field (RA 02:17:60.00; DEC -07:00:00.0) lasting ~28 hours, followed by a raster dithering observation of Her X-1 (RA 16:57:49.83; DEC +35:20:32.6), performed for the remaining ~30.5 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

2005-07-08T12:41:28.000Z	160.5864	F	Automatic TM processing.
2005-07-09T09:19:14.000Z	160.5380	F	Automatic TM processing.
2005-07-09T22:48:35.000Z	160.4976	F	Automatic TM processing.
2005-07-11T12:30:07.000Z	160.4870	F	Automatic TM processing.
2005-07-11T20:40:40.000Z	160.4372	F	Automatic TM processing.
2005-07-14T12:18:38.000Z	160.4266	F	Automatic TM processing.
2005-07-15T23:04:02.000Z	160.3830	F	Automatic TM processing.
2005-07-17T12:48:22.000Z	160.3747	F	Automatic TM processing.
2005-07-18T22:32:41.000Z	160.3512	F	Automatic TM processing.
2005-07-20T11:50:21.000Z	160.3440	F	Automatic TM processing.
2005-07-20T19:22:54.000Z	160.3046	F	Automatic TM processing.
2005-07-23T11:39:34.000Z	160.2919	F	Automatic TM processing.
2005-07-24T21:42:17.000Z	160.2683	F	Automatic TM processing.
2005-07-27T22:17:05.000Z	160.2299	F	Automatic TM processing.
2005-07-28T05:01:46.000Z	160.2103	F	Automatic TM processing.

This report was generated Fri Jul 29 08:00:32 GMT 2005

8.3 Detailed Satellite Information

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

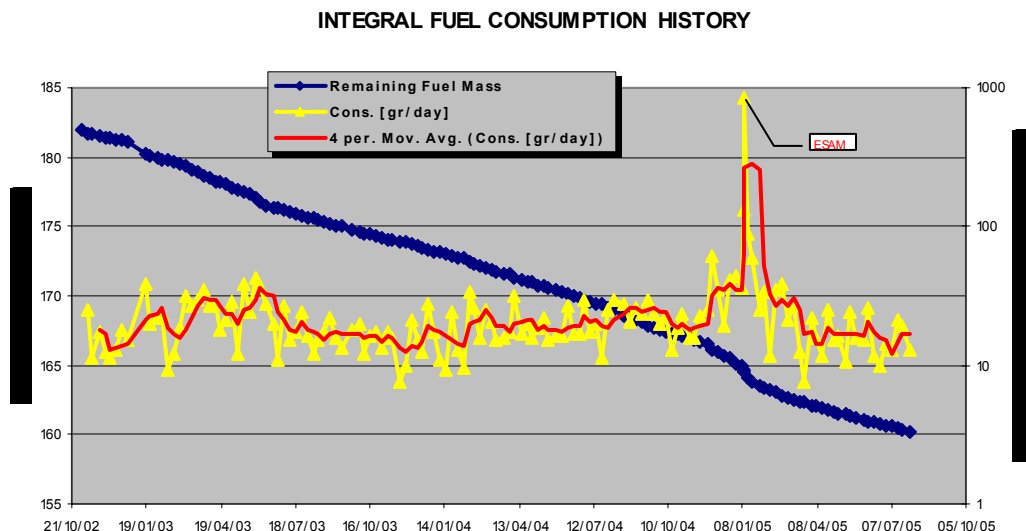
8.3.1 AOCS SUMMARY OPERATIONS REPORT, 23/07/2005 – 29/07/2005

AOCS operations were executed from the Automatic Timeline.

During this period, 47 Open Loop Slews, 106 Closed Loop Slews and 5 Momentum Bias were executed (TL + manual recovery). 11 slews (5 CSL, 6 OSL) were not executed from the Timeline during this period, due to problems with the planning process (star not found during SVT) and divergence of measured speed of RW#4 wrt the predicted value.

This is equivalent to a $\sim 7\%$ of the total number of slews planned (158).

The fuel consumption over the period between 01/11/2002 and 28/07/2005 is reported in the plot below.



23/07/05 (Day of Year 204, Revolution 338-339)

Nothing to report.

24/07/05 (Day of Year 205, Revolution 339)

Nothing to report.

25/07/05 (Day of Year 206, Revolution 339)

Nothing to report.

26/07/05 (Day of Year 207, Revolution 339-340)

RWB missed at the beginning of the revolution 340: Due to problem at REDU station (AOS delayed due to problem on TM link), the first Reaction Wheel Bias of

the revolution was missed and therefore the FDS failed the automatic update of slew ID 03400001 (OSL).

The AOCS s/s was disabled in TL at 11:25z

After clarification with FD team, the RWB was not considered needed for the starting of the revolution and therefore the operator proceeded with the manual update of slew ID 03400001

The AOCS s/s was re-enabled in TL at 12:08z.

No impact on TL was reported.

27/07/05 (Day of Year 208, Revolution 340)

Slows missed from the Timeline: Due to a problem during the Search and Track process for slew ID 03400015 (guide star to be tracked on slot# 2 not found, guide star ID 2601-1052 at CCD location Y=-12530 Z=19781), the TC A3189 (Start Guide Star) failed release at 02:01z due to static PTV failure. At the time of the failure the guide star (ID 3071-0614) was Mi 8.4 at CCD location [4700, -4682].

The AOCS s/s was disabled in TL at 02:09z

A first manual recovery was attempted to the attitude of PID 03400015 but being the recovery manoeuvre generated a CSL, using the same tracked star ID 2601-1052, it failed again for the reason mentioned above (star in slot # 2 not found). A second attempt to manual recover to the attitude of PID 03400016 was successfully performed, by an OSL. The next slew (CSL) for PID 03400017 was manually updated and executed from the Timeline.

The AOCS s/s was re-enabled in TL at 03:25z.

The following slows were not executed from TL while recovering the AOCS s/s: 03400015(CSL)-16 (CSL).

Divergence in measured wheel speeds wrt the predicted values, slows missed from the Timeline: a problem was observed at 20.44z on the measured speed of RW#4 (divergence >100 rpm of the measured wheel speeds wrt the predicted values.). The FDS flagged (with a generic message in the mission planning messages window 'update slew failed to generate TPF [error level 1]') the divergence in wheel #4 speed because the FDS AMD internal threshold ('AMD TPF generation high threshold') for the next slew ID 03400036, was going to be exceeded. As consequence of this the AOCS s/s was disabled in TL at 20:52z.

The selected guide star at the time of the anomaly was Mi 8.3 at CCD location [17360, 7775]. The wheels speeds at the time of the anomaly were

RW2=-1474 rpm

RW3=-979 rpm

RW4=-3393 rpm

A first manual recovery, in order to dump the accumulated momentum on RW#4 and rejoin to the predicted wheel profile, was attempted by generating and executing a Reaction Wheel Bias (RWB). A second manual recovery, in order to re-join the TL, was attempted to the final attitude of PID 03400039 and successfully performed. The next slew (OSL) for PID 03400040 was manually updated and executed from the Timeline.

The AOCS s/s was re-enabled in TL at 23:45z.

The selected guide star when re-joining the TL was Mi 7.6 at CCD location [7473, -1409]. The wheels speeds were

RW2=-1776 rpm

RW3=-2390 rpm

RW4= 1675 rpm

The following slews were not executed from TL while recovering the AOCS s/s: 03400036(OSL)-37 (OSL)-38(OSL)-39(OSL).

28/07/05 (Day of Year 209, Revolution 340)

Divergence in measured wheel speeds wrt the predicted values, slews missed from the Timeline: the same problem observed on DoY 208 on RW#4 occurred again. At 03.08z the measured speed of wheel #4 reported a divergence >100 rpm wrt the predicted values. The FDS flagged (with a generic message in the mission planning messages window 'update slew failed to generate TPF [error level 1]') the divergence in wheel #4 speed because the FDS AMD internal threshold ('AMD TPF generation low threshold') for the next slew ID 03400045, was going to be exceeded. As consequence of this the AOCS s/s was disabled in TL at 03:08z.

The selected guide star at the time of the anomaly was Mi 7.8 at CCD location [6683, -3270]. The wheels speeds at the time of the anomaly were

RW2=-1996 rpm

RW3=-1941 rpm

RW4= 454 rpm

A first manual recovery, in order to dump the accumulated momentum on RW#4 and rejoin to the predicted wheel profile, was attempted by generating and executing a Reaction Wheel Bias. A second manual recovery, in order to re-join the TL, was attempted to the final attitude of PID 03400049 and successfully performed. The next slew (OSL) for PID 03400050 was manually updated and executed from the Timeline.

The AOCS s/s was re-enabled in TL at 06:26z.

The selected guide star when re-joining the TL was Mi 7.3 at CCD location [-4061, -9527]. The wheels speeds were

RW2=-1231 rpm

RW3=-2463 rpm

RW4= 919 rpm

The following slews were not executed from TL while recovering the AOCS s/s: 03400045(OSL)-46 (OSL)-47(CSL)-48(CSL)-49(CSL).

29/07/05 (Day of Year 210, Revolution 340-341)

Nothing to report.

8.3.2 SPI Operations

Stirling compressors and Cryostat:

The performance of the compressors is nominal. The cold plate temperature was maintained at 85K $\pm$ 1K with the expected drift.

The plot showing the evolution of the cold-plate and H bus temperatures during the reporting period is not available this week.

DPE & IASW:

The IASW performance is nominal.

The plot showing the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load is not available.

ACS:

The performance of the ACS is nominal.

A temperature sensor in the PSAC (TM E2116) is exceeding its higher operational limit since 27th May (after an ACS post-eclipse reactivation). The PI and the ACS experts have been consulted and the malfunction appears to be in the sensor measurement chain as all other temperature readings, close to E2116, show nominal values. The parameter has been removed from the ground automatic monitoring list this week.

The plot showing the ACS overall count rate evolution is not available.

AFEE and Germanium Detectors:

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

The plot showing the dc voltage offset of the detector channels is not available.

DFEE:

The performance of the unit is nominal.

The plot showing the count rates of the detectors is not available.

PSD:

The performance of the unit is nominal.

SPI DAILY EVENTS

NOTE: This event log was extracted from the revolution pass summary reports of rev.339, 340 and 341.

DOY Time	Event
204 / 11:25	OEM: "SPI Fixed Point Overflow"

Doc. Title : INTEGRAL Mission Report #149
 Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OF
 Date : 01/08/05

Issue : 1
 Rev. : 0
 Page : 15

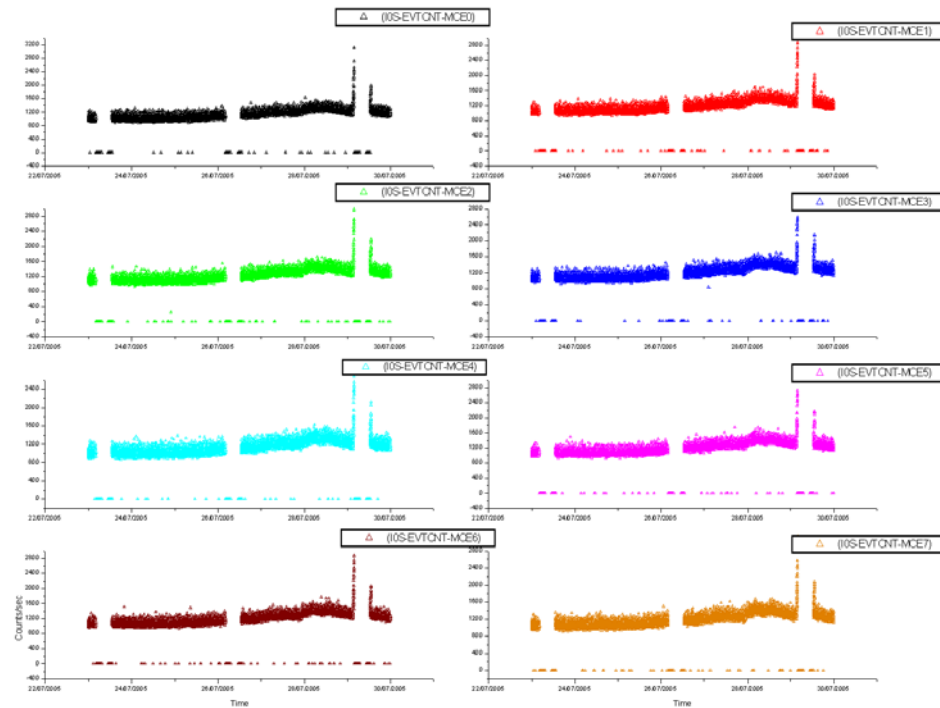
206 /22:37 to 207 / 01:24	TM E3500 "P_DF_CNVT-BW_L,1" OOL Alarm High @ 95751 and backs into limits. Many repetitions in the given window.
207 / 13:19	TM E3500 "P_DF_CNVT-BW_L,1" OOL Alarm High. / Normal at Radiation Belt Exit.
207 23:03-23:06	TM E3840, E 3841, E3843, E3845, E3846 and E3848 "P PD CHL-RTE LN" family OOL Alarm Low and back into limits.
209 / 08:49	⇒ Seq. ES0161 "" uplinked. ⇒ updated PSD settings (channel #2 and #17 disabled) ⇒ Seq. ES0130 "SPI transition to Photon by Photon Mode" uplinked
209 / 08:52	TM E3500 "P_DF_CNVT-BW_L,1" OOL Alarm High
210 - 13:08	TM E3500 OOL

8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

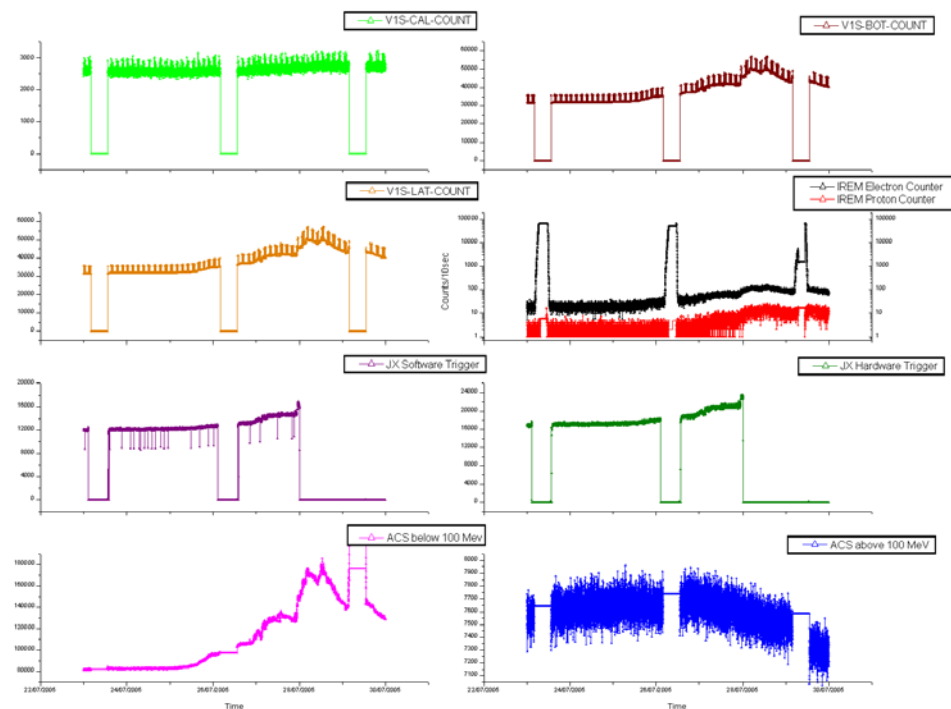
IBIS - ISGRI Counters Rev 339-341



**sampling every 4 pkts (32 secs)

VETO vs Payloads Counters:

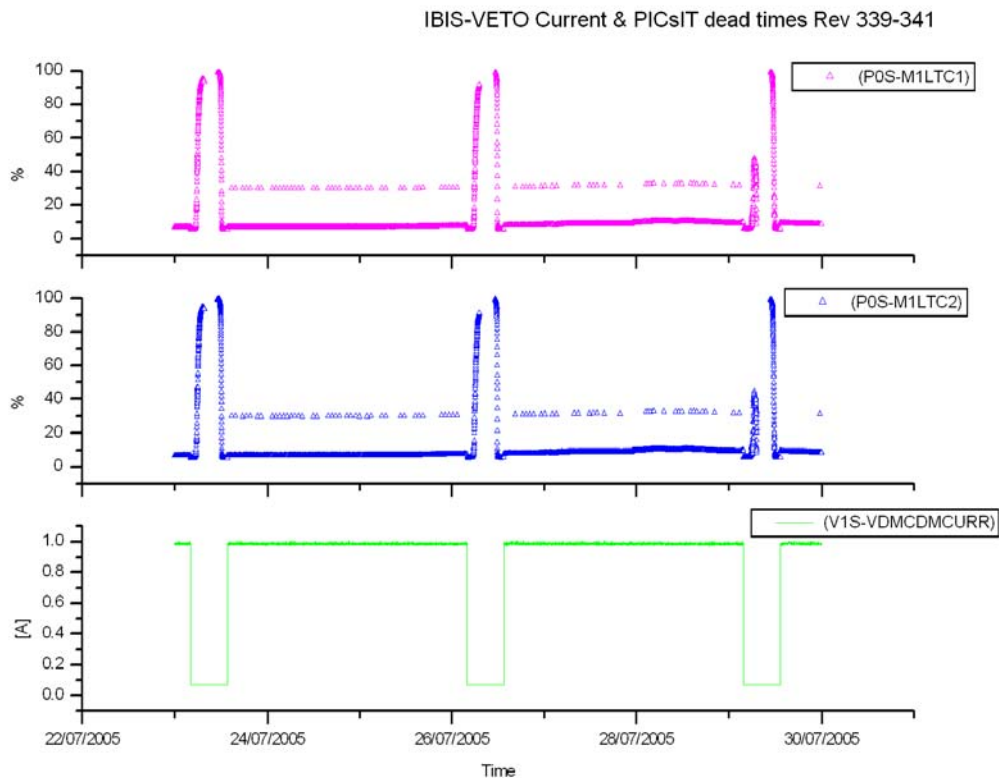
IBIS-VETO vs Payloads Counters Rev 339-341



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

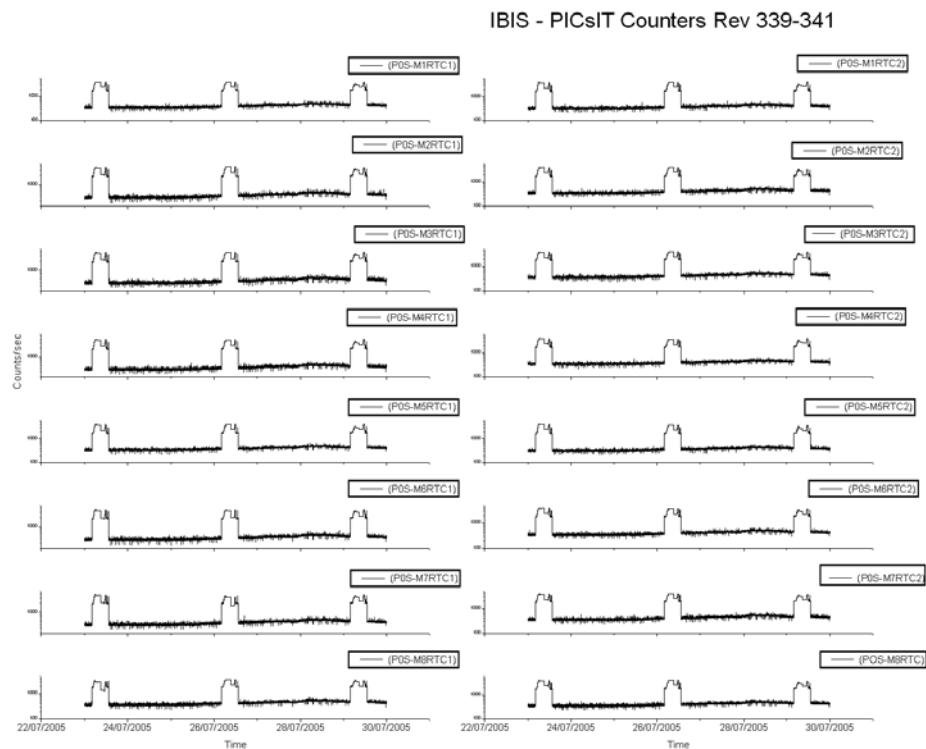
The week was characterised by moderate to high radiation.

VETO Current:



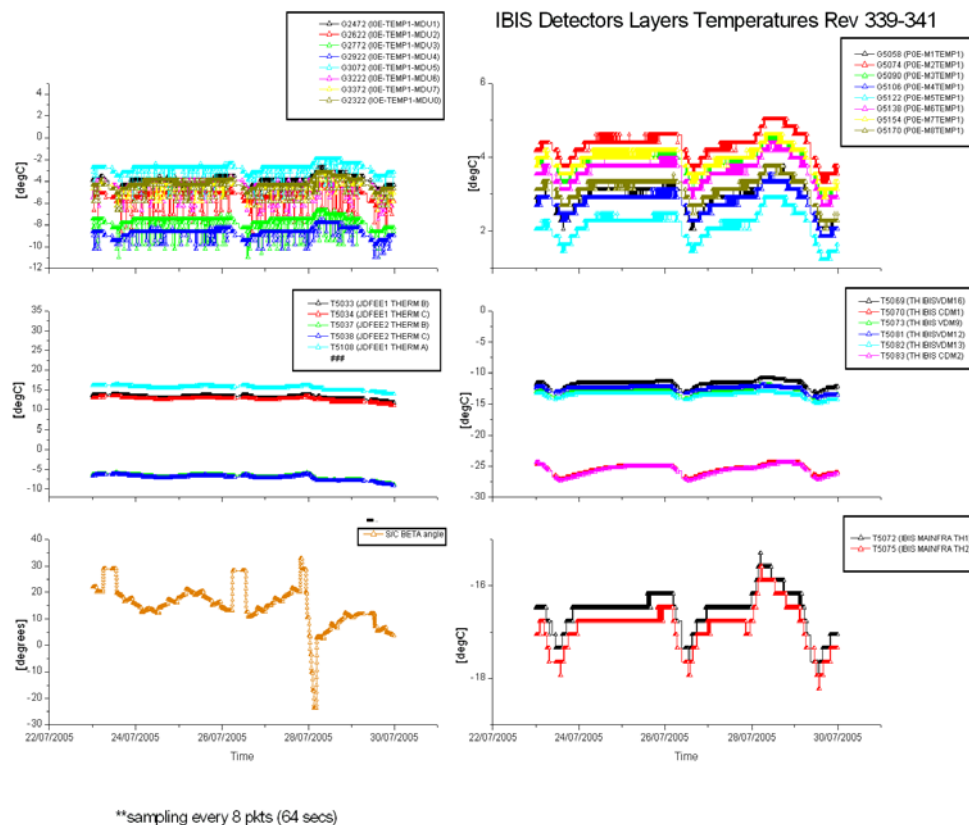
**sampling every 4 pkts (32 secs)

PICsIT Counters:



**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures:



IBIS daily report

DoY 2005.204 (23/07/2005)

At 04:10Z TM parameter G8015 (28V PMT set by IASW) went OOL High with the value 29.4V. It went back inside limit at 13:37Z. As this happened inside the Radiation Belts, according to V-VLT-1, no action was taken.

Between 06:11Z and 06:46Z, TM parameters G5023 (P0S-M5RTC2), G5038 (P0S-M8RTC2), G5003 (P0S-M1RTC2), G5002 (P0S-M1RTC1) and G5008 (P0S-M2RTC2) were toggling OOL High. One more time at 11:48Z G5023, G5008 and G5002 were toggling for 5 minutes. According to P-CNT-1, as this happened inside radiation belts, no action was taken.

DoY 2005.207 (26/07/2005)

At 04:00Z TM parameter G8015 (28V PMT set by IASW) went OOL High with the value 29.4V. It went back inside limit at 13:28Z. As this happened inside the Radiation Belts, according to V-VLT-1, no action was taken.

During the radiation belts passage, TM parameters G5038 (P0S-M8RTC2) and G5008 (P0S-M2RTC2) were toggling OOL High. According to P-CNT-1, as this happened inside radiation belts, no action was taken.

At 13:11Z TM parameter G2014 (I0E-OVFWPXADD_M1) failed SCC. As indicated in I-OVF-1, no action was taken.

DoY 2005.208 (27/07/2005)

From 04:01Z and until the end of the observation period (DoY 2005.210), TM parameter G8080 (S1E-VS_HBRA-RT) was toggling OOL High every about 50 minutes. As this happened in high radiation background, no action was taken, following H-OVF-2.

DoY 2005.209 (28/07/2005)

At 03:47Z TM parameter G6062 (V1S-BOT-COUNT) and G6063 (V1S-LAT-COUNT) started to toggled OOL High. This lasted until the end of the observation period due to high radiation. According to V-BOT-1 and V-LAT-1, no action was taken.

DoY 2005.210 (29/07/2005)

At 03:44Z TM family G2013 (I0E-EVTCNT_MCEi) went OOL High and back. As indicated in I-CNT-1, no action was taken.

At 03:48Z TM parameter G8015 (28V PMT set by IASW) went OOL High with the value 29.4V. It went back inside limit at 13:16Z. As this happened inside the Radiation Belts, according to V-VLT-1, no action was taken.

At 11:17Z and for 10 minutes, TM parameters G5003 (P0S-M1RTC2), G5022 (P0S-M5RTC1), G5017 (P0S-M4RTC1), G5018 (P0S-M4RTC2) and G5002 (P0S-M1RTC1) went OOL High. As this happened inside the radiation belts, according to P-CNT-1, no action was taken.

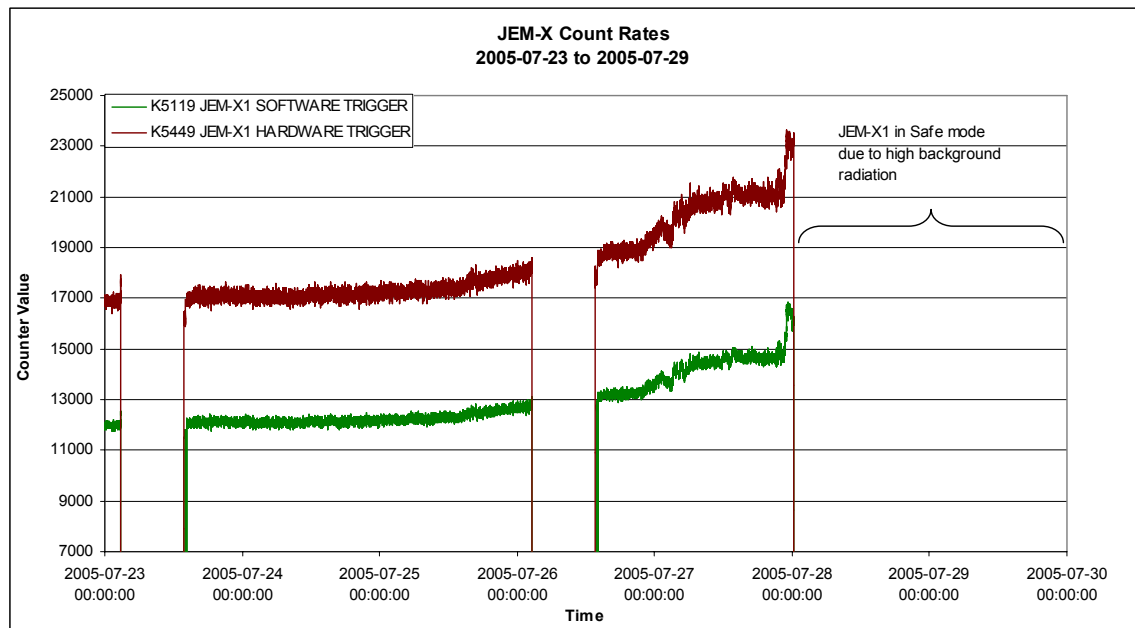
At 12:52Z TM parameters G2042 (I0E-OVFWPXADD-M3) and G2084 (I0E-OVFWPX ADD-M6) failed SCC. As indicated in I-OVF-1, no action was taken.

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

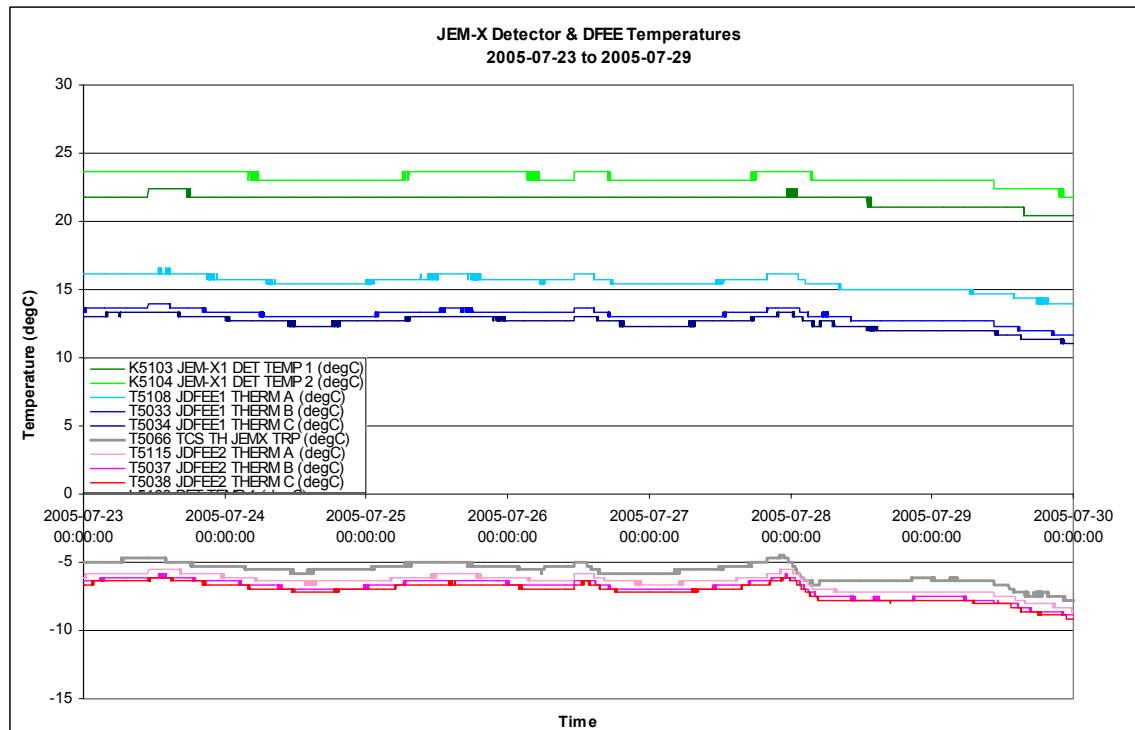
JEM-X count rates over the reporting period are displayed in the following graph¹.

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.



8.3.4.3 JEM-X Daily Report

² Data sampled (1 frame in 8)

2005-07-23 (DOY 204, Rev 338-339) to 2005-07-25 (DOY 206, Rev 339)

Nothing to report

2005-07-26 (DOY 207, Rev 339-340)

At 23:32Z and again at 23:41Z the TM parameter K5317 RAD MONITOR 3 (Electron counter) went Out of Limits High for a few TM cycles.

2005-07-27 (DOY 208, Rev 340)

Throughout the day the TM parameter K5317 RAD MONITOR 3 (Electron counter) fluctuated around the safe threshold for JEM-X1, frequently going Out of Limits High for brief periods. In consultation with the JEM-X PI, it was decided that the radiation levels were not high enough to necessitate commanding JEM-X1 to Safe mode (K5317 was not above the safe threshold consistently for a considerable length of time).

From 22:58Z onwards K5317 began to remain stably above the safe threshold for JEM-X1.

2005-07-28 (DOY 209, Rev 340)

As K5317 RAD MONITOR 3 had been above the safe threshold for JEM-X1 for over 1 hour, JEM-X1 was commanded to Safe mode at 00:15:57Z and commanding to JEM-X1 from the Timeline was then disabled. JEM-X1 remained in Safe mode, with commanding from the Timeline disabled, for the remainder of the day.

2005-07-29 (DOY 210, Rev 340-341)

JEM-X1 began the day in Safe mode and remained in Safe mode for the rest of revolution 340.

At the start of revolution 341, the Anode Calibration ED KEACAL01 was allowed to run from the Timeline, however at radiation belt exit the background radiation levels were still considerably above the safe threshold for JEM-X1 and thus commanding to JEM-X1 from the Timeline was disabled at 13:08Z (before the HV activation ED KEACT_03). JEM-X1 was then commanded back to Safe mode from Setup mode at 14:03:47Z (JEM-X1 had transitioned to Setup mode autonomously at radiation belt exit as the JEM-X1 reactions to the IREM count rates are disabled). JEM-X1 continued in Safe mode for the rest of the day.

8.3.5 OMC Operations

2005-07-27 (DOY 208, Rev 340)

At 02:01, a problem uplinking an AOCS command caused the loss of pointings 03400015 and 03400016. It was at this time the following commands were rejected:

Doc. Title : INTEGRAL Mission Report #149
Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OF
Date : 01/08/05

Issue : 1
Rev. : 0
Page : 22

2005.208.02.04.53.039	2005.208.02.05.02.479	1792	RealTime	131	TC REJECT
REJECTED TC1		0	0	65535	PR N
E E					
2005.208.02.04.59.289	2005.208.02.05.02.483	1792	RealTime	131	TC REJECT
REJECTED TC1		0	0	65535	PR N
E E					
2005.208.03.02.58.041	2005.208.03.03.02.348	1792	RealTime	131	TC REJECT
REJECTED TC1		0	0	65535	PR N
E E					
2005.208.03.03.04.166	2005.208.03.03.10.449	1792	RealTime	131	TC REJECT
REJECTED TC1		0	0	65535	PR N
E E					

Which correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) for those pointings.

At 20:29:57, OMC was switched autonomously to SAFE mode due to the ongoing high radiation levels. It was manually returned to Stand-by mode on 20:44:16, the impact was the interruption of pointing 03400034 after 2040 seconds from a scheduled 2200, with pointing 03400035 completely lost. It was at this time the following two commands were rejected:

2005.208.20.32.54.080	2005.208.20.33.02.467	1792	RealTime	131	TC REJECT
REJECTED TC1		0	0	65535	PR N
E E					
2005.208.20.33.00.330	2005.208.20.33.11.298	1792	RealTime	131	TC REJECT
REJECTED TC1		0	0	65535	PR N
E E					

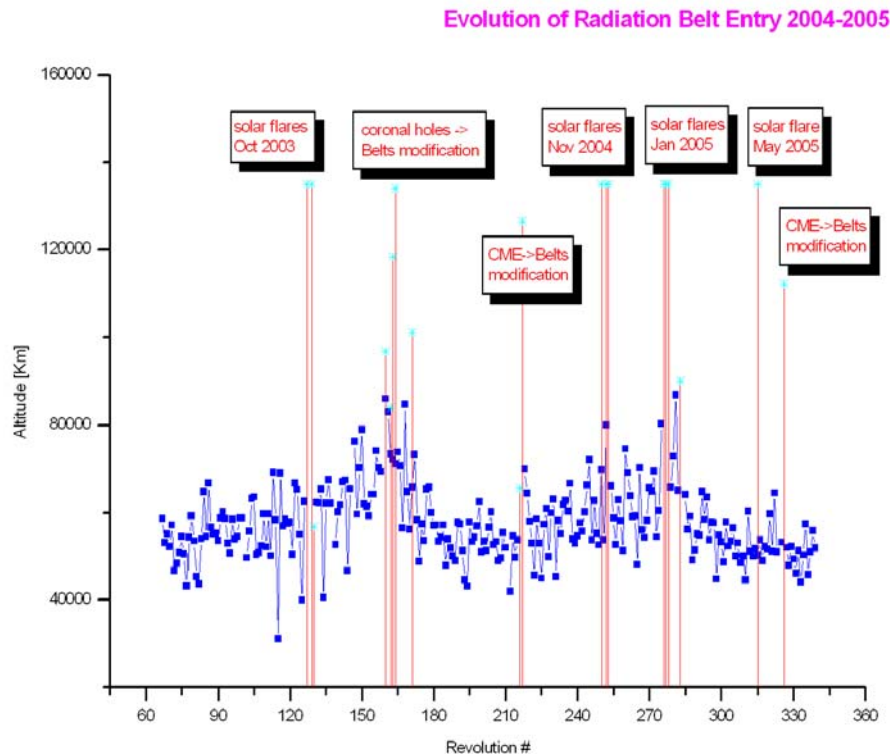
Which correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) for that pointing. After the recovery, FD problems caused the loss of the subsequent pointing, and at 23.31.01, the unit again switched autonomously to SAFE mode due to the ongoing high radiation, and remained in that state for the rest of the week. The impact was pointings 03400036 to 03400045, 03400047 to 03400075 and 03410002 to 03410012 were lost.

On DoY 204 at 04:10:37 and DoY 207 at 04:00:29, OMC was switched by the Timeline to SAFE mode, at the nominal times.

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8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

DoY 2005.207 (26/07/2005):

Due to a problem with the system on ground, the timeline was interrupted and the TC U4920 (INT GRD LINK ON) from the ED UEGRON01 did not go, it was manually re-uplinked at 11:41..

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]
324	RAD_ENTR R 2005-06-11T07:02:01Z	-	-	2005-06-11 07:54:26	53043
338	RAD_ENTR R 2005-07-23T04:10:31Z	2005-07-23 04:44:58Z	55933.0	2005-07-23 05:02:47	53022
339	RAD_EXIT R 2005-07-23T13:24:10Z	2005-07-23 12:23:54Z	>>24904.6	2005-07-23 12:22:47	30510
339	RAD_ENTR R 2005-07-26T04:00:23Z	2005-07-26 05:01:30Z	51965.3	2005-07-26 04:56:05	52581
340	RAD_EXIT R 2005-07-26T13:14:08Z	2005-07-26 12:10:34Z	>>24905.8	2005-07-26 12:06:05	29403
340	RAD_ENTR R 2005-07-	-	-	2005-07-29	52416

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]
	29T03:48:32Z			04:46:05	
341	RAD_EXIT R 2005-07-29T13:02:45Z	-	-	2005-07-29 11:56:05	29554

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)

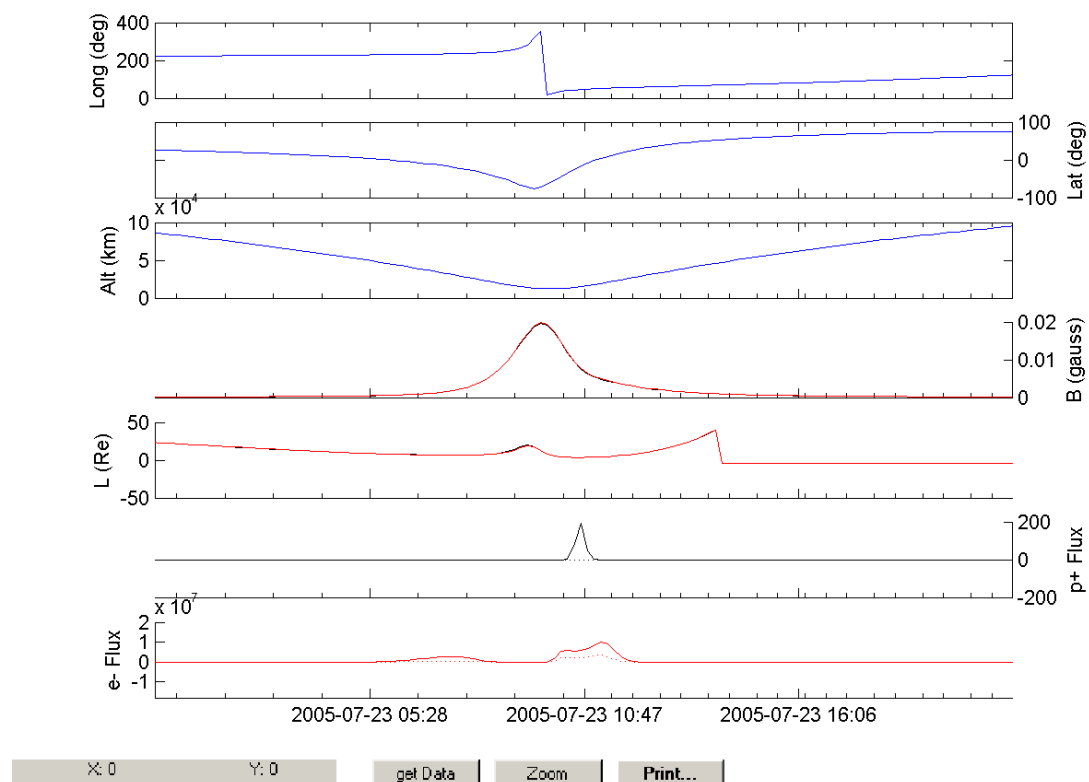
Radiation Spike

IREM radiation counters:

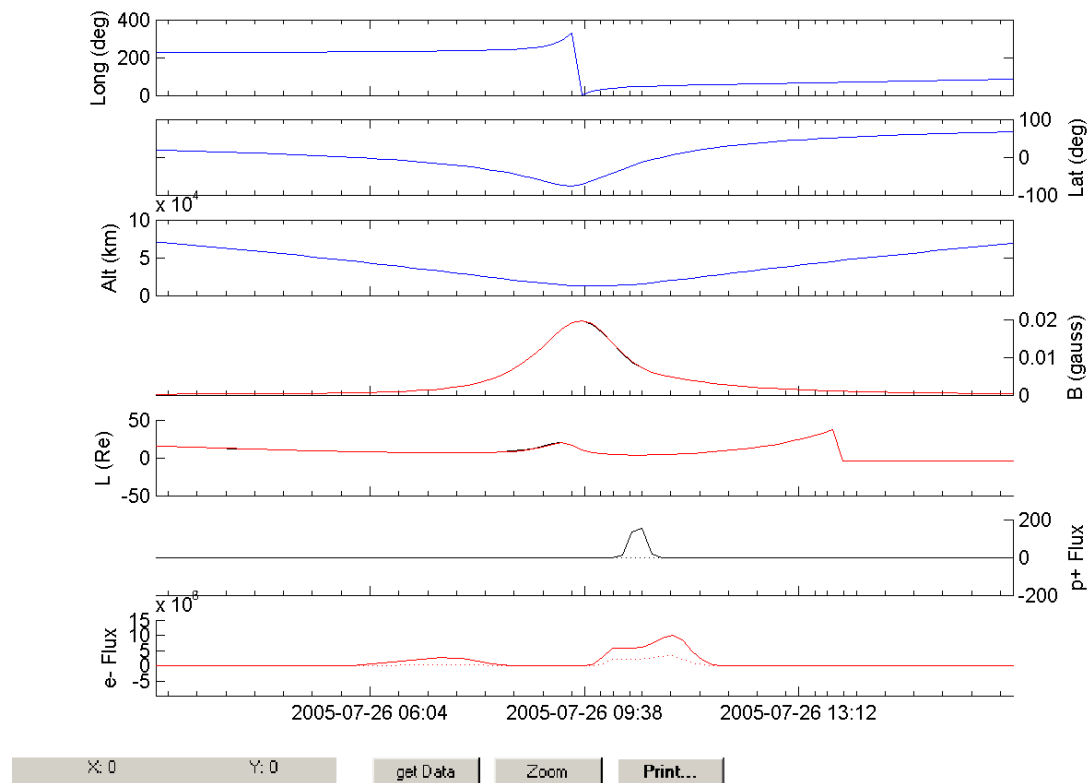
Due to a problem with the ECOE machine, no data are available this week.

IREM Predicted Radiation Belt Passages:

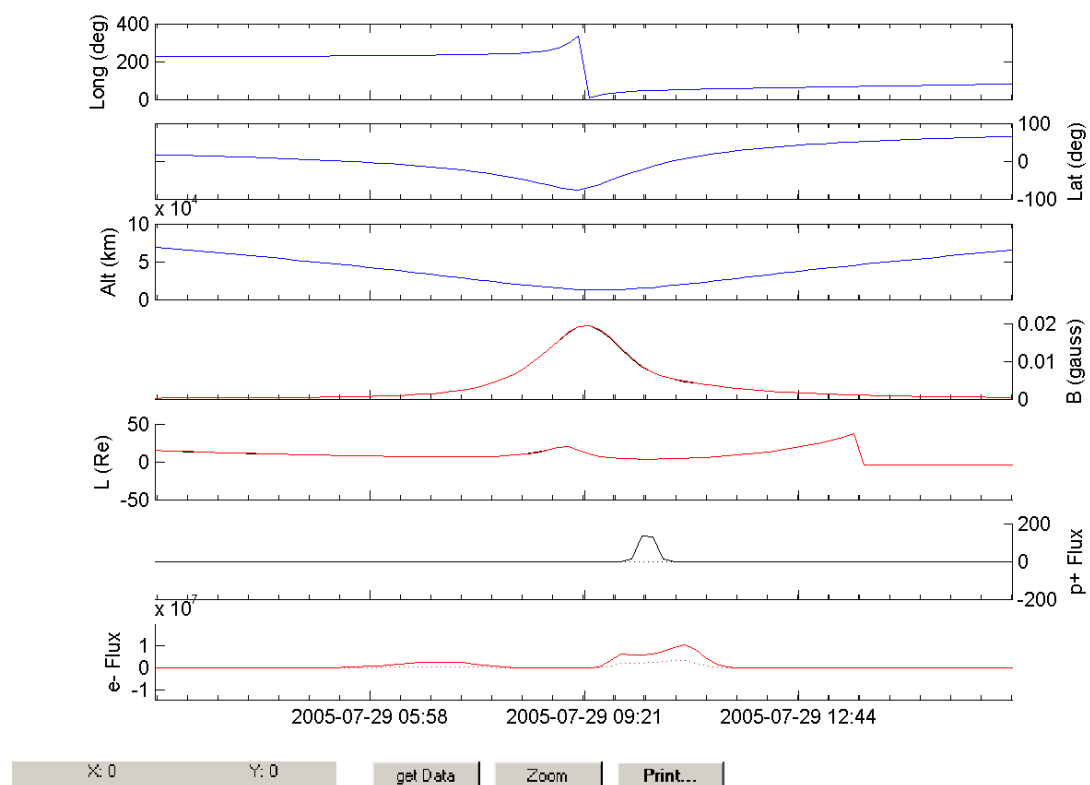
Rev 338:



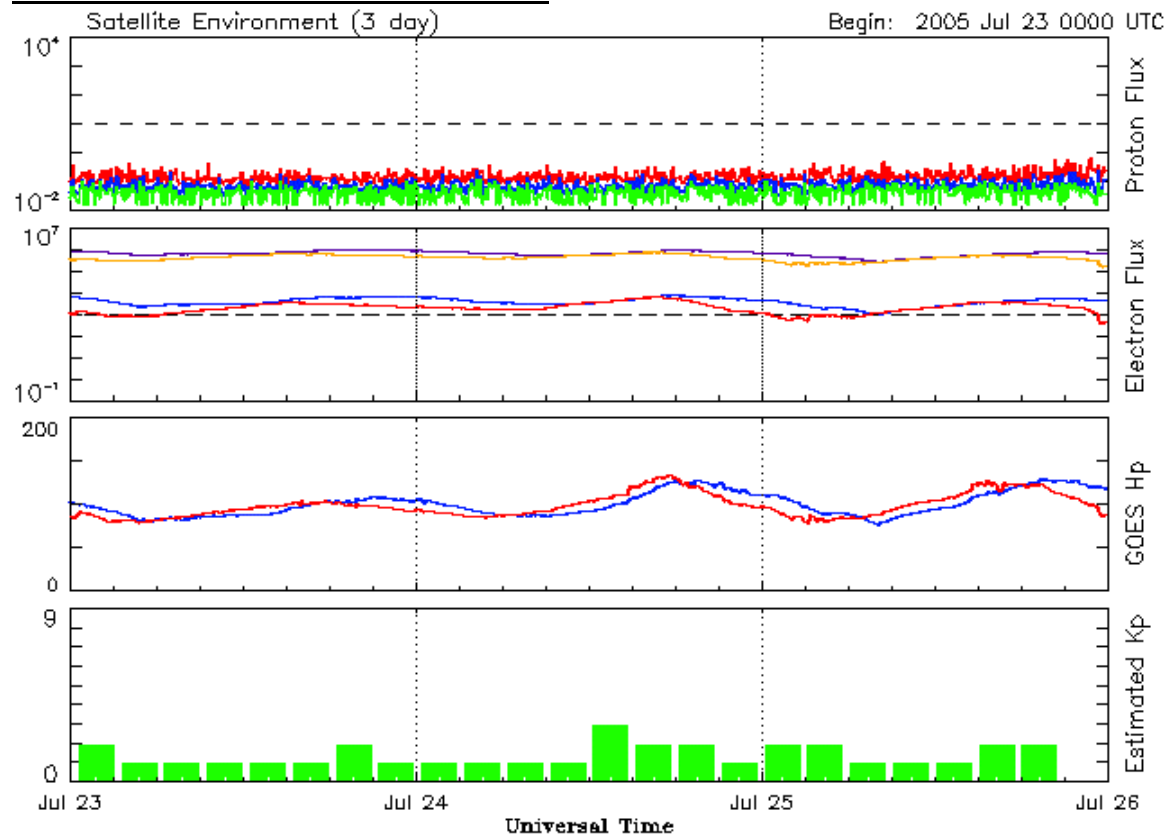
Rev 339:



Rev 340:

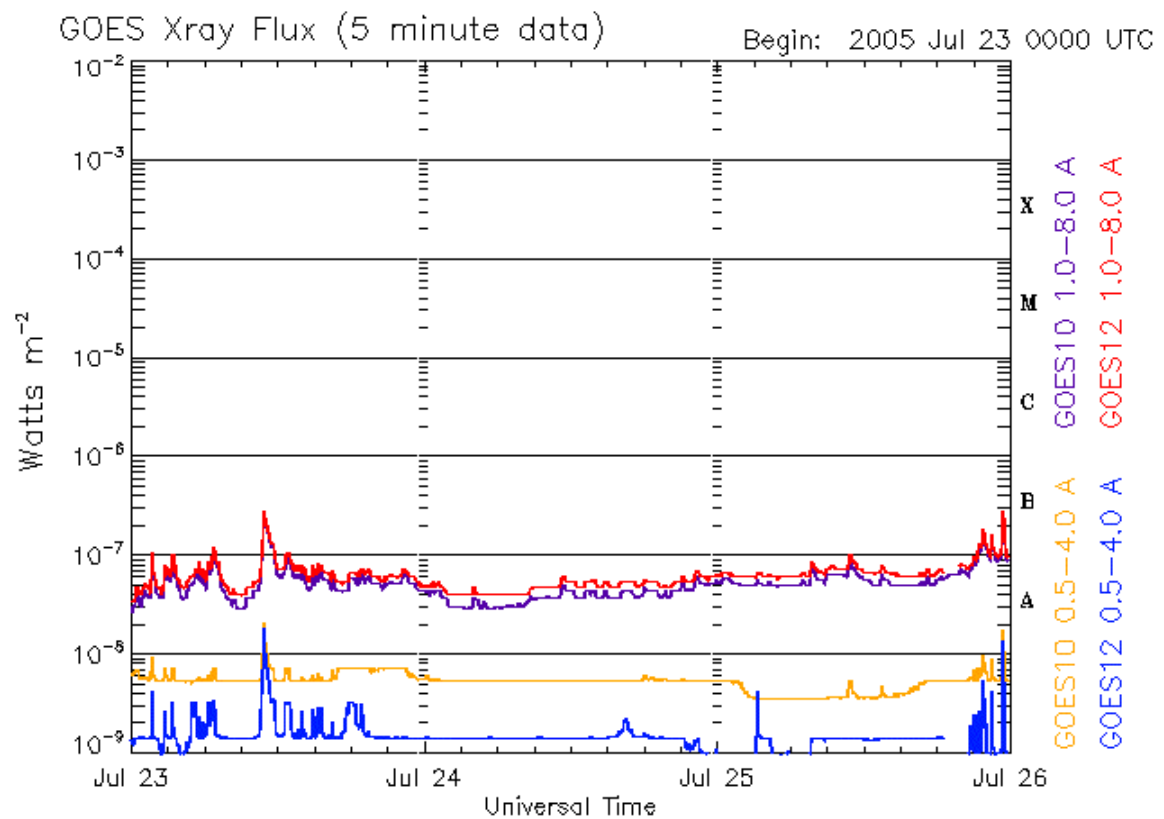


SEC-GOES Observed Particles Fluxes:



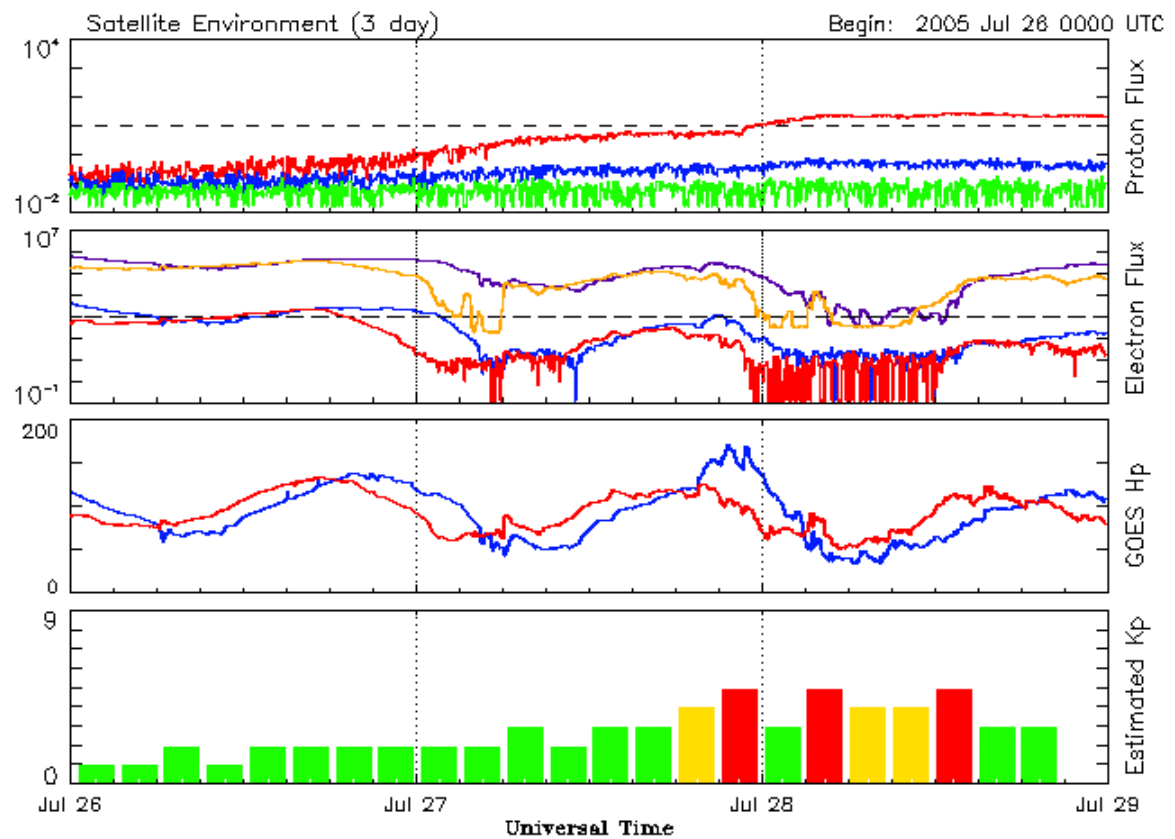
Updated 2005 Jul 25 23:56:23 UTC

NOAA/SEC Boulder, CO USA



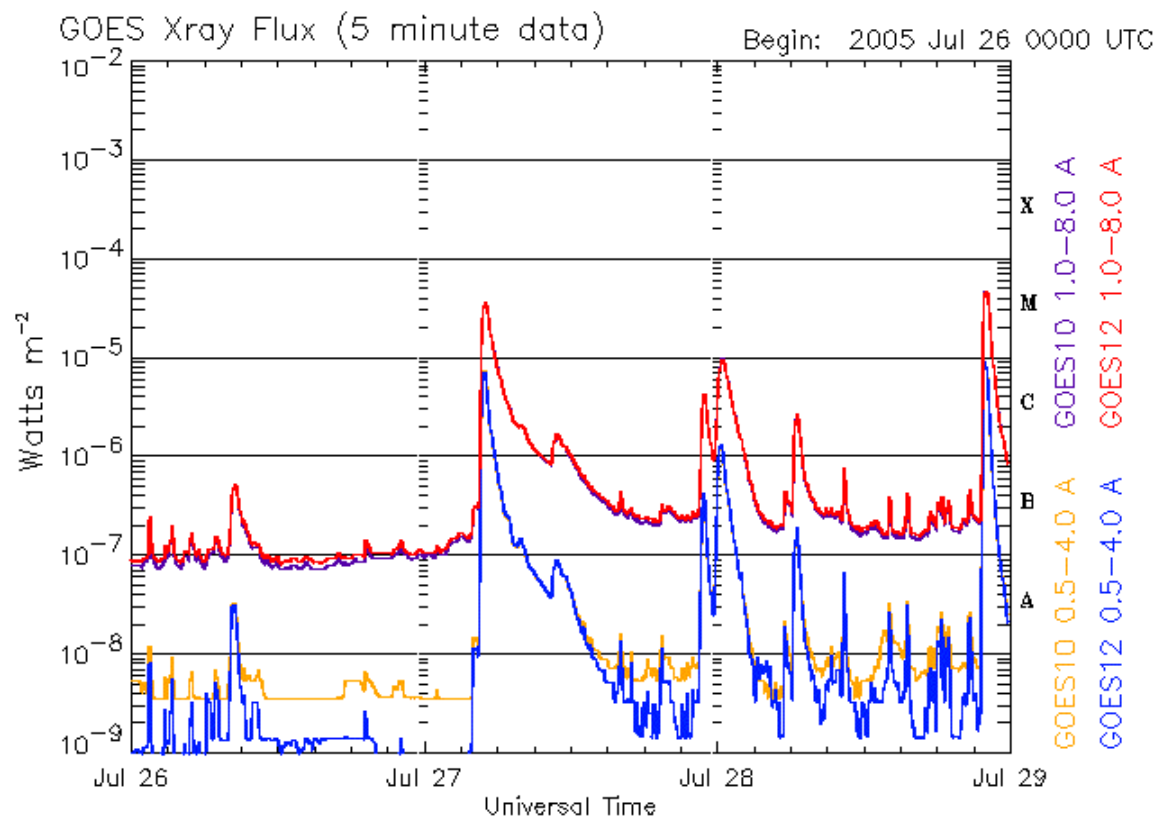
Updated 2005 Jul 25 23:56:11 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Jul 28 23:56:13 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Jul 28 23:56:04 UTC

NOAA/SEC Boulder, CO USA

