

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 148
Week 29
25.07.05
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 16.07.05 until 22.07.05 (both dates inclusive) and covers the revolutions 337 and 338.

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; Field 7 (RA 23:16:49.00; DEC +29:39:16.0); the XMM LSS field (RA 02:17:60.00; DEC -07:00:00.0) and Her X-1 (RA 16:57:49.83; DEC +35:20:32.6). 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.

1 slew (1 CSL) was not executed from the Timeline during this period, due to problems with the attitude reconstruction process on FDS.

The fuel consumption over the period between 14/07/2005 and 20/07/2005 was 0.122 kg. The remaining propellant is in the order of 160.3046 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+/-1K.

One PSAC temperature is out of range since 24th May. This is a permanent failure of the sensor and the measurement has been taken out of 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.

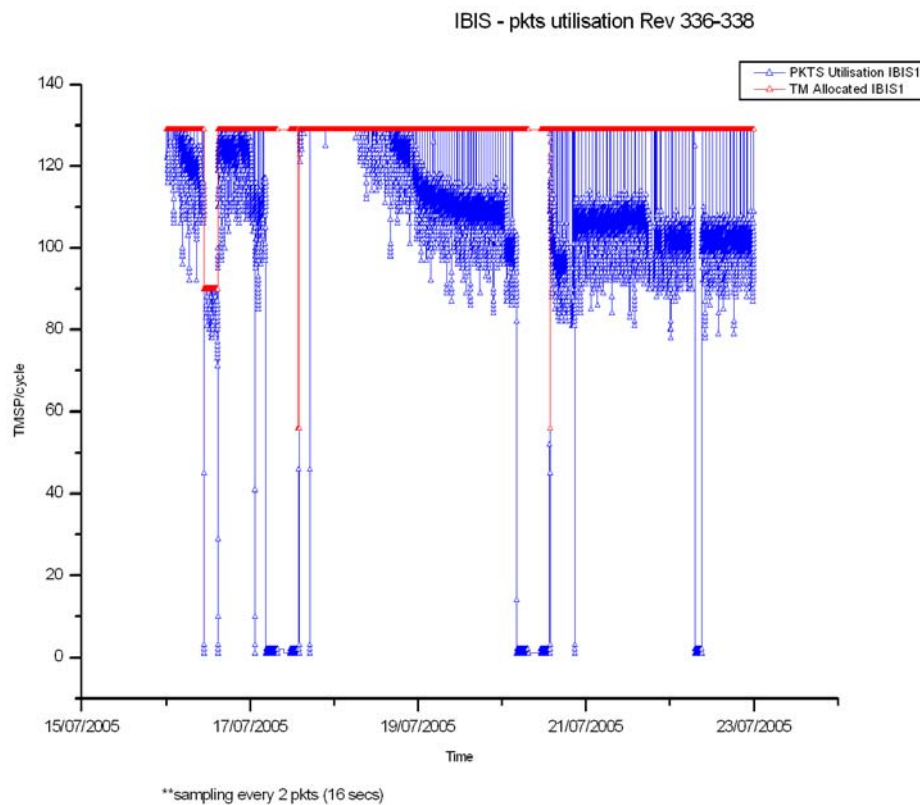
3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by low solar activity.

During the reporting period, the PST allocation to IBIS was most of the time 129 TMPS/cycle. However between 10:51:40Z and 14:45:53Z on DoY 2005.197, it was 90 TMPS/cycle due to an OMC FF Calibration. The IBIS mean bandwidth utilisation during the observation period was 113.02 TMPS/cycle, up 3.33 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.

JEM-X1 began the reporting period in Safe mode due to high background radiation conditions (see Integral Mission Report # 147). It was recovered to Data Taking mode on 2005-07-16 at 18:24Z.

Several out of limits were received on the IREM RMC TM parameters K5317 (Electron counter) and K5315 (Proton counter) between 2005-07-17T14:52:34Z and 2005-07-18T08:26:50Z. However, the radiation levels were not high enough to trigger a transition of JEM-X1 to Safe mode.

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, 128 of the 159 planned science pointings for OMC were executed nominally, 1 started about 38 minutes late, 2 were interrupted, and 28 were lost, due to high solar radiation forcing the instrument to SAFE mode. The Flat Field and Dark Current calibrations erroneously omitted last week were successfully conducted between periods of high radiation.

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 low solar activity.

During the whole observation period the Sun was blank. Only coronal holes were affecting the Space Weather by blowing a solar wind stream toward Earth.

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 excellent this week, 175 slews were executed correctly, and none were lost, 1 was delayed due to an on-board Star Tracker problem.

4.1 Mission Operations Centre

The performance of the MOC was excellent this week, with no pointings lost. A minor problem with one of the IMCS tasks was noted, which did not impact the mission.

4.1.1 Upgrade of IMCS.

The upgrade of the IMCS is now completed. The only outstanding issue is the configuration of the Off-line Performance Analysis (TDRS) Software.

4.2 Ground Stations & Network

The performance of the ground stations and Network was also excellent this week. There were no TM drops, a minor problem with data flow to the ISDC was noted, The overall performance though was nearly 100%.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's for revolutions 344-346 have been received. The POS's for revolutions have been generated and sent to MOC. No ToO has been performed (however, a TOO trigger has been received and is tentatively to be done in rev 345; depending on the source's behaviour a replan of 345 may be done in the future).

Rev's 338-343 were re-planned, see under Problems. Exercises to improve the scheduling were performed for revolutions 343 and 344, which were therefore re-planned and resent.

TSF's for rev's 338-341 were received.

2. Observation status

ECS's received for rev's 316 and 321. The corresponding OCS's have been sent to ISDC. No extra time has been credited.

3. ISOC science data archive

No news.

4. ISOC system

Still working with ISOC version 11.0.0.

5. Problems

MOC discovered that since the middle of June the wrong value has been up-linked for the low threshold for PICsIT (TC formal parameter G8829 PPM PICSIT energy lower threshold), through the GESTAN02 Event designator. This problem is due to a new Mission Control System (MCS). In this new MCS the raw value was set to 1 (calibrated 52 keV) instead of 2 (calibrated 104 keV). The default value set by ISOC for this parameter is 100 keV, which is apparently rounded-down by the new MCS system to 52 keV [=1 raw]. It was concluded that to solve the problem the minimum effort would be at the ISOC side. The ISOC default value was set to 104 keV and rev's 338-343 were re-planned and sent to MOC.

Note that there is no immediate impact on the observations performed after mid June, since in IBIS Standard mode PICsIT is only collecting histograms, and is not operating in PPM mode.

4.3.2 ISDC

Status of ISDC observation processing on 25/07/2005:

- Latest Standard Analysis completed: observation 03200100210 (3C 454.3, Revolution 316) on 23/07/2005

- Latest products archived: observation 03200150002 (NGC 2992, Revolution 312-314) on 11/07/2005

- Latest observation products sent to the observer: observation 03201080004 (Field_4, Revolution 319-320) on 22/07/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 197, at 23:02, there was an error sending data to the ISDC, at 23:03, TM was flowing again. There was no impact.
- On DoY 198, at 07:39, the following Event Log error was seen: CMDHobqm – IMCA – Invalid conversion, cannot convert time to unsigned integer.
- At 11:50, a problem with false events on the star mapper, caused the Reaction Wheel Bias to be delayed by 47 minutes, see AOCS section for details. There was no impact to science operations.
- On DoY 200, at 03:40, due to insufficient number of stars detected, the planned closed loop slew could not be performed, an OSL was done instead, the impact was a delay from the scheduled time of 04:13 to 04:31 in the start of the slew number 03370051.
- At 11:39, there was a VC0 TM gap from Redu, there was no impact.

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

AR id	Date Created	Subject	Segment	Status
INT_SC-122	22/07/2005	IBIS: VETO reset	Payload	Open

7 Future Milestones

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 337

The observations in revolution 337 began with 3 pointings of GPS lasting ~2 hours. A raster dithering observation of the field known as Field 7 (RA 23:16:49.00; DEC +29:39:16.0), part of a survey of regions not probed by Integral so far, was then performed for the remaining ~59 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.

Revolution 338

The observations in revolution 338 began with 8 pointings of GPS lasting ~5.5 hours. A raster dithering observation of the XMM LSS field (RA 02:17:60.00; DEC -07:00:00.0) lasting ~21 hours was then performed, 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 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

2005-07-02T13:12:26.000Z	160.6464	F	Automatic TM processing.
2005-07-02T22:02:51.000Z	160.6237	F	Automatic TM processing.
2005-07-05T12:56:09.000Z	160.6110	F	Automatic TM processing.
2005-07-06T23:38:52.000Z	160.5889	F	Automatic TM processing.
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.

This report was generated Fri Jul 22 08:00:28 GMT 2005

8.3 Detailed Satellite Information

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

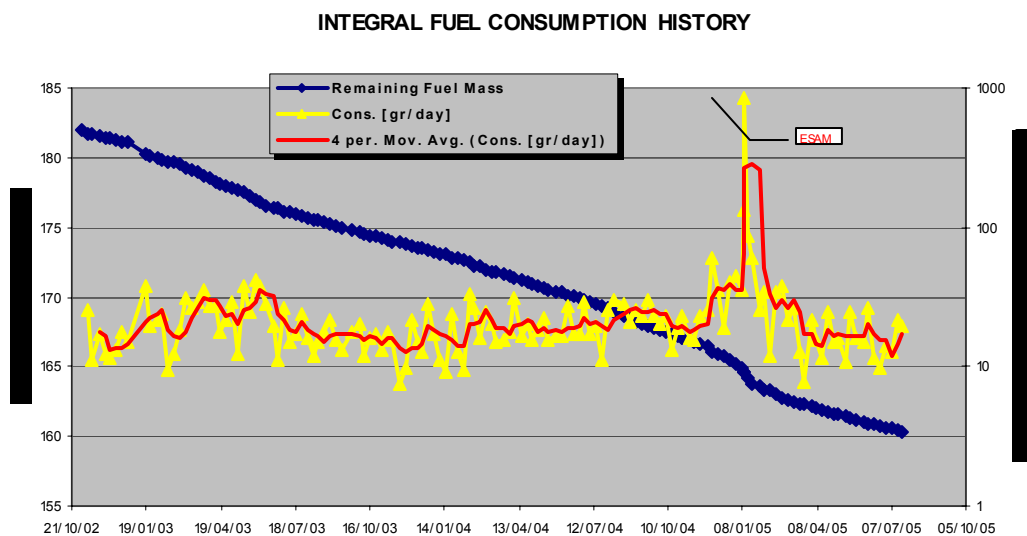
8.3.1 AOCS SUMMARY OPERATIONS REPORT, 16/07/2005 – 22/07/2005

AOCS operations were executed from the Automatic Timeline.

During this period, 82 Open Loop Slews, 93 Closed Loop Slews and 4 Momentum Bias were executed. 1 (1 CSL) slew was not executed from TL due to problems with the attitude reconstruction process on FDS.

This is equivalent to a ~0.5 % of the total number of slews planned (176).

The fuel consumption over the period between 01/11/2002 and 20/07/2005 is reported in the plot below.



16/07/05 (Day of Year 197, Revolution 336)

Nothing to report.

17/07/05 (Day of Year 198, Revolution 336-337)

Several occurrences of False Events: observed several occurrences of ‘false events’ on the STR during the perigee passage of rev 336. The guide star selected was a Mi 7.1 star at CCD location [1710, 7612]. The observed false events started at 11:31z. No IMU was triggered ON because the events did not exceed the SEU threshold (the rate of the false events was such not to determine the lost of guide star). As preventive action, considering the incoming RWB, the AOCS s/s was disabled in TL at 11:57z and the wheels bias activity recovered later when the false events rate dropped down. The AOCS s/s was re-enabled in TL at 13:04z.

No impact reported on TL.

18/07/05 (Day of Year 199, Revolution 337)

Nothing to report.

19/07/05 (Day of Year 200, Revolution 337)

Slew missed from the Timeline: Due to problem with the attitude reconstruction process (not enough stars detected in STR FOV to perform a CSL), the slew sequence ID 03370051 (CSL) failed the automatic update from the FDS.

The AOCS s/s was disabled in TL at 03:54z

A first attempt to recover the slew, by manual updating it, failed, for the few stars detected during the attitude reconstruction process, preventing the generation of any update of CSL. A second attempt to recover was successfully executed (by generating an OSL) to the attitude of PID 03370051. The next slew (OSL) for PID 03370052 was manually updated and executed from the TL.

The AOCS s/s was re-enabled in TL at 04:45z.

The following slew was not executed from TL while recovering the AOCS s/s: 03370051(CSL).

RMU calibration failed: Due to problem on FDS to access the system HK1 packet history file, the planned RMU calibration failed the automatic generation of the TPF at 07:41z. After action by FD on-call the problem was fixed and the RMU calibration TPF manually generated.

20/07/05 (Day of Year 201, Revolution 337-338)

Nothing to report.

21/07/05 (Day of Year 202, Revolution 338)

Nothing to report.

22/07/05 (Day of Year 203, Revolution 338)

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 taken out of 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

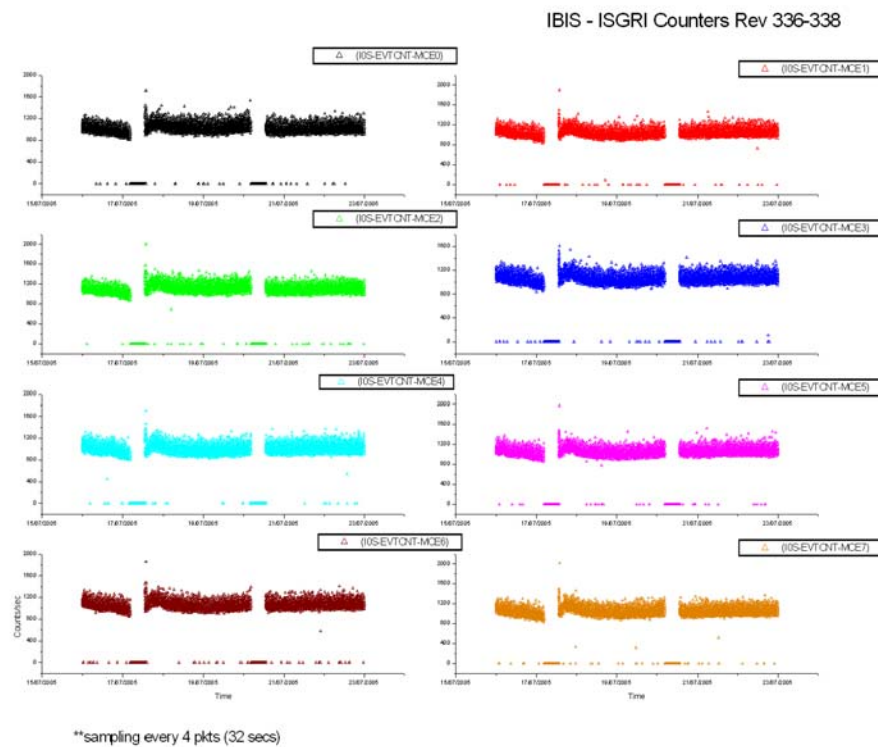
NOTE: This event log was extracted from the revolution pass summary reports of rev.336, 337 and 338.

DOY Time	Event
195 14:03-14:05	TM P2014 "LCL CUR ACS-A" OOL Alarm High @ 1.7 A and backs into limits.
195 / 14:07	E3500 "P_DF_CNVT-BW_L,1" OOL Alarm High @ 113119
197 / 15:05	OEM: "SPI Constraint DPE CULPR" - Exception "SPI S/W Error" - Exception > No action required. After the SPI messages the Onboard Event History Display started showing events from DoY 192.
198 / 00:04	TM E0392 "T CR COLDPLT L2" OOL Warning High.
198 / 00:28	Execution of FCP_SPI1_2504 > SPICO: Stroke increased by 1 LSB. New value = 36
198 / 01:02	TM E0392 "T CR COLDPLT L2" backs into limits.
198 / 14:30	E3500 "P_DF_CNVT-BW_L,1" OOL Alarm High

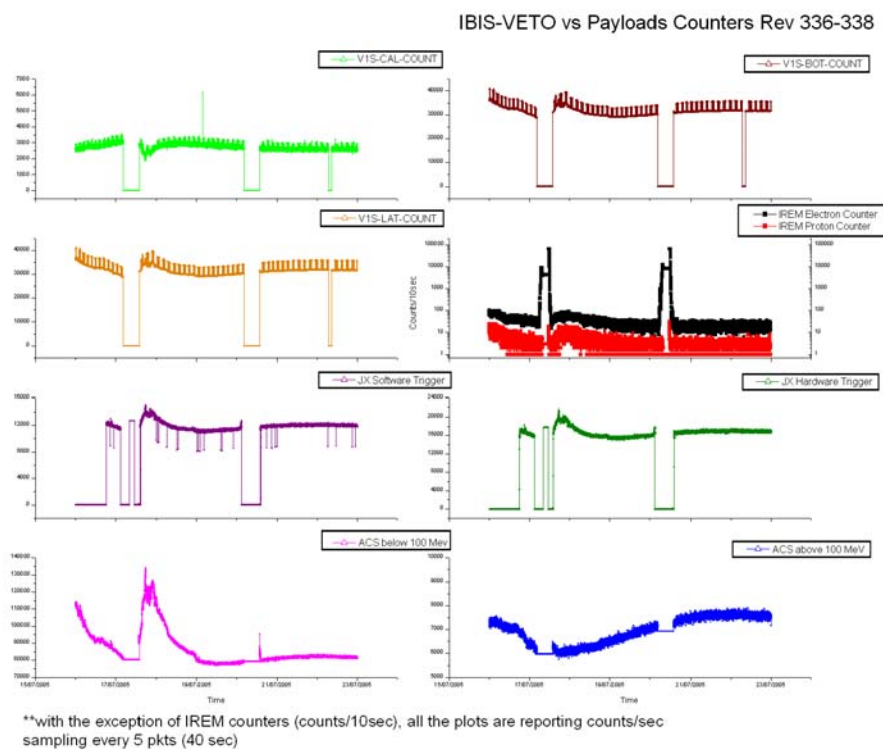
8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:



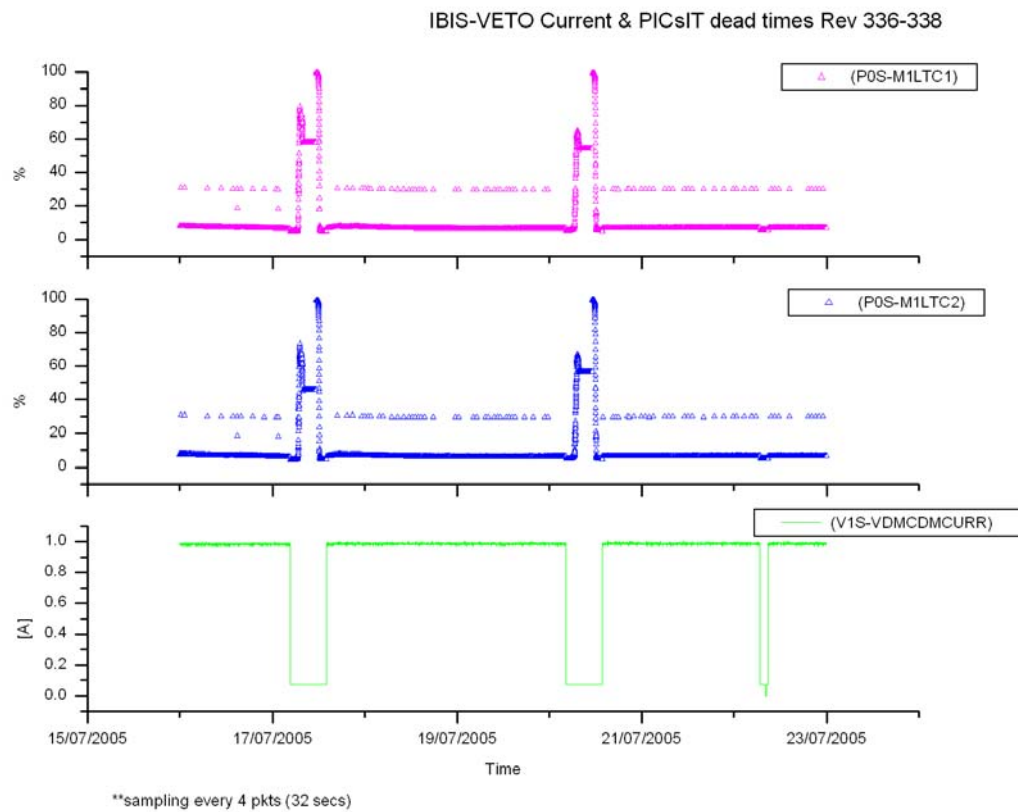
VETO vs Payloads Counters:



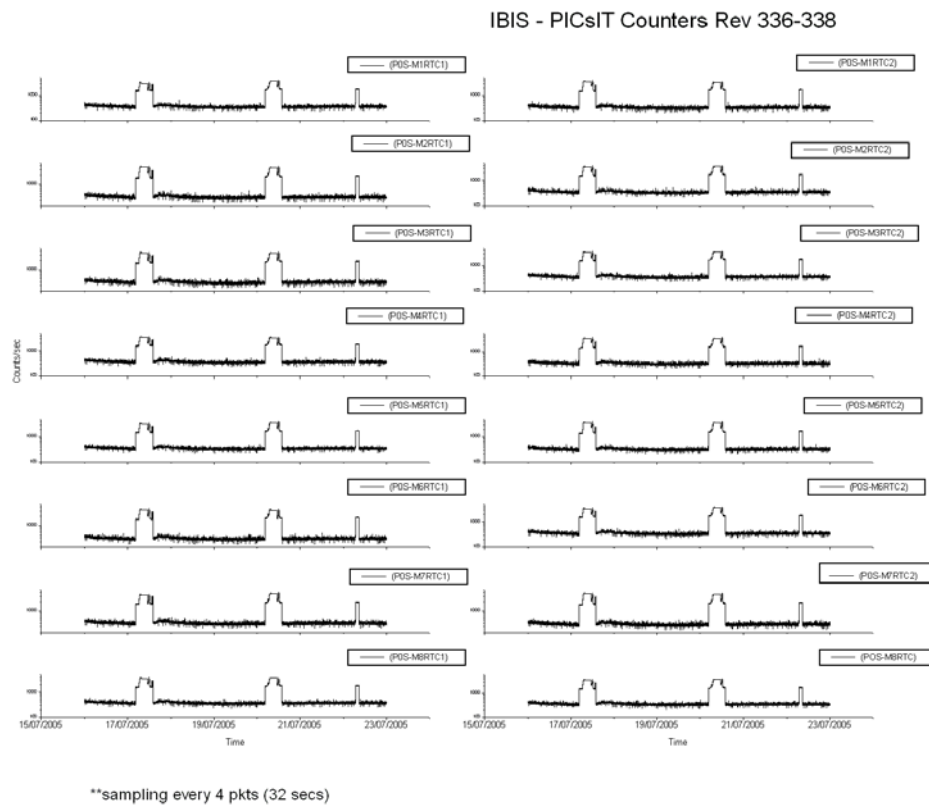
The week was characterised by low radiation.

On 19/07/2005, at 03:33Z TM G6061 reported a high value (6156). No correlation has been established yet. Investigations are still on-going.

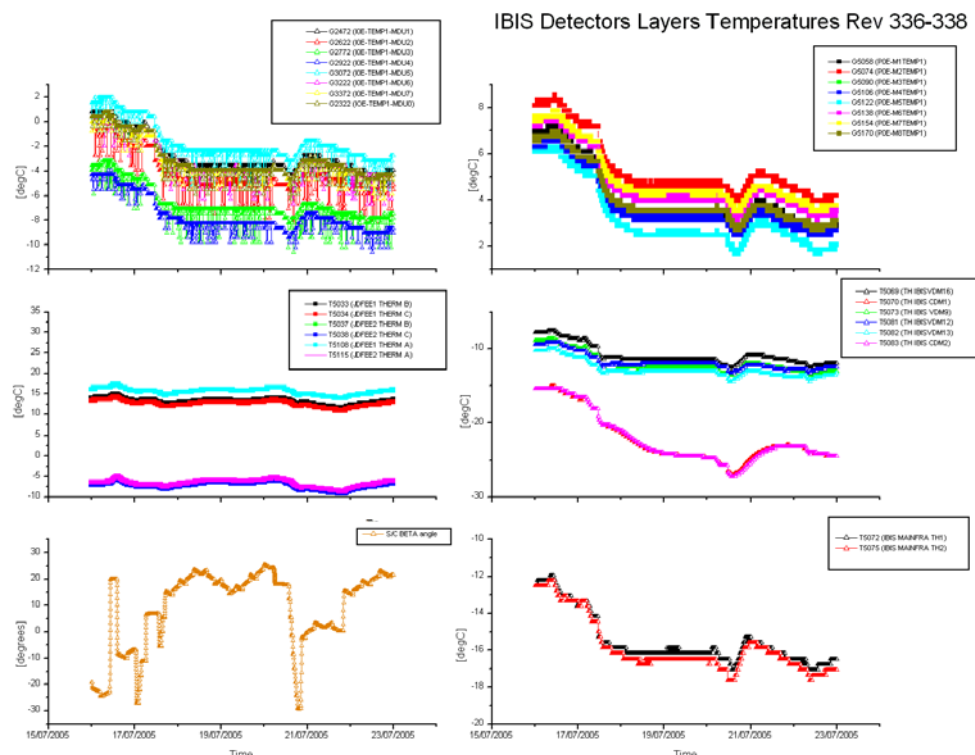
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



**sampling every 8 pkts (64 secs)

IBIS daily report:

DoY 2005.197 (16/07/2005)

On DoY 196, it was found out that due to a problem with the new MCS release, since the middle of June, TC parameter G8829 (PPM PICSIT energy lower threshold) has been up-linked through ED GESTAN02 with the value Raw 1 (Engineering 52 KeV) instead of Raw 2 (Engineering 104 KeV).

Therefore, on DoY 196 17:01Z, the Event Designator GESTAN02 was up-linked manually with TC parameter G8829 set to Raw 2. Following INT_OR_0214, from DoY 2005.197 10:51Z to the end of revolution 337, GESTAN02 was up-linked manually every time that it was planned in the timeline (6 times). For revolution 338 to 343, the parameter has been set to Engineering 104 KeV (up-linked correctly by the system as Raw 2) in the POS file by ISOC. This latter is the temporary solution while waiting for a permanent fix of the IMCS.

DoY 2005.198 (17/07/2005)

At 04:33Z TM parameter G8015 (28V PMT set by IASW) went OOL High with the value 29.4V. It went back inside limit at 14:01Z. As this happened inside the Radiation Belts, according to V-VLT-1, no action was taken.

At 12:01Z TM parameter G5018 (POS_M4RTC2) went OOL High and back. According to P-CNT-1, as this happened inside radiation belts, no action was taken.

DoY 2005.200 (19/07/2005)

At 03:33Z TM G6061 reported a high value (6156). No correlation has been established yet. Investigations are still on-going.

DoY 2005.201 (20/07/2005)

At 04:21Z TM parameter G8015 (28V PMT set by IASW) went OOL High with the value 29.4V. It went back inside limit at 13:48Z. As this happened inside the Radiation Belts, according to V-VLT-1, no action was taken.

At 11:55Z TM parameters G5018 (P0S-M4RTC2) and G5038 (P0S-M8RTC2) went OOL High and back. According to P-CNT-1, as this happened inside radiation belts, no action was taken.

At 13:12Z, TM parameter G2056 (I0E-OVFWPXADD-M4) failed SCC. According to I-OVF-1, no action was taken.

DoY 2005.203 (22/07/2005)

At 06:43Z, VETO reset itself: it went to Stand-by mode with the default configuration where both Calibration Modules (CDM1 and CDM2) are ON. As detailed in INT_SC-122, to recover from this anomaly, in addition to the reactivation, a VETO power cycle was needed. VETO was back in nominal mode at 08:47Z. And IBIS was back into Scientific Standard mode at 09:17Z.

Probably because of this VETO reset, TM parameter G8015 was reported OOL High (29.4V) at 06:43Z. It went back inside limit when VETO was back into Nominal.

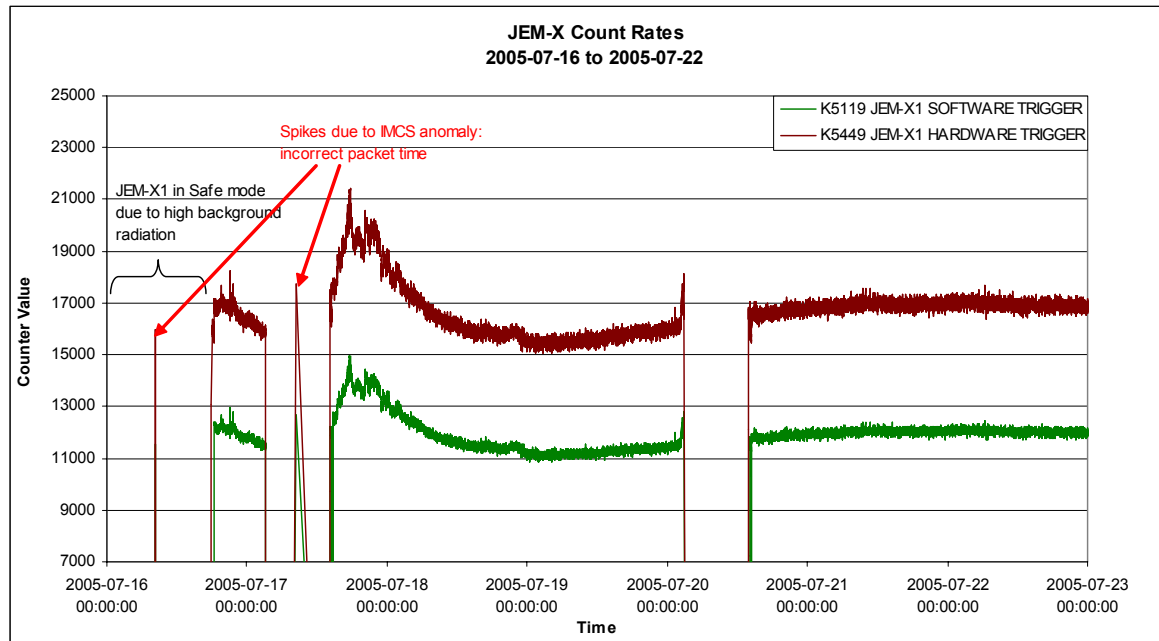
8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

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

Up to 2005-07-19 inclusive, this data is affected by the anomaly INT-2754 reported previously, consisting of an incorrect calculation of the packet Generation Time (calculated to be about 18hours 12 minutes in the past with respect to the Reception Time). On 2005-07-20 this anomaly was fixed and is no longer present.

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

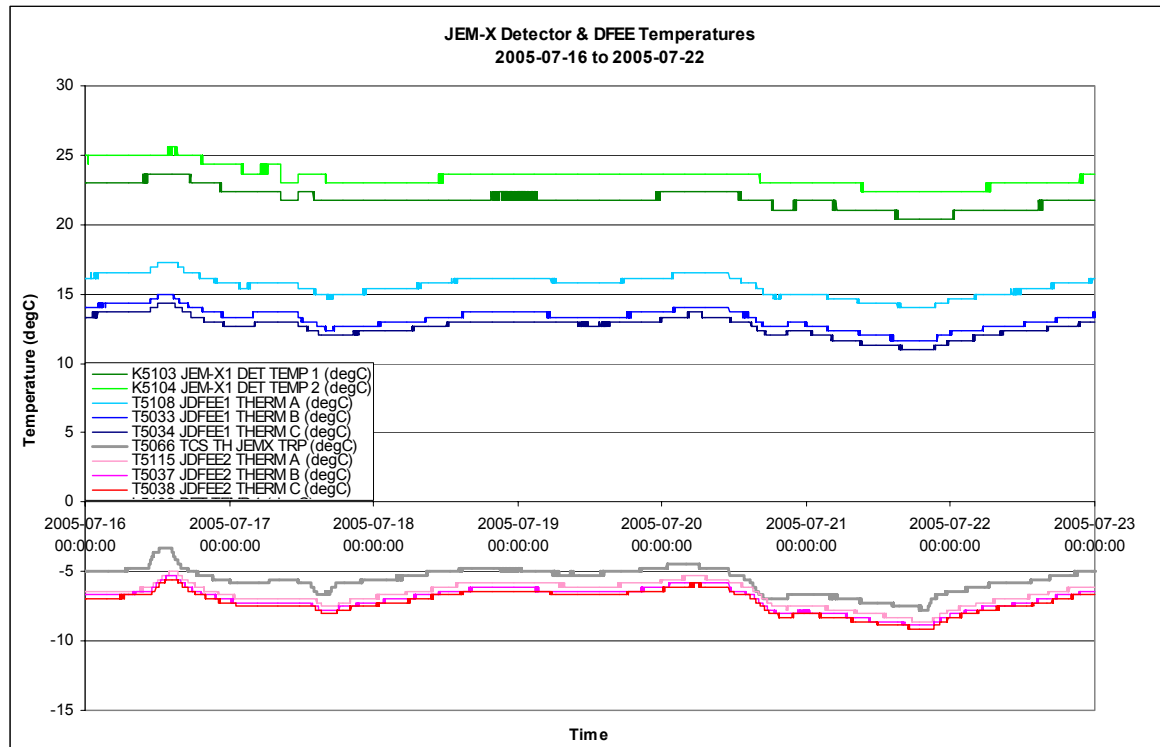


8.3.4.2 JEM-X Temperatures

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.

Up to 2005-07-19 inclusive, this data is affected by the anomaly INT-2754 reported previously, although this is not as evident as in the case of the count rates as the temperature values remain fairly steady over the week. On 2005-07-20, this anomaly was fixed and is no longer present.

² Data sampled (1 frame in 8)



8.3.4.3 JEM-X Daily Report

2005-07-16 (DOY 197, Rev 336)

JEM-X1 began the day in Safe mode, with commanding from the Timeline disabled, due to ongoing high background radiation conditions.

Once the radiation levels had returned stably within the safe thresholds for JEM-X1, JEM-X1 was activated as follows:

- At 17:43Z FCP_JEM1_0041 was executed to put JEM-X1 in Setup mode.
- At 17:47Z JEM-X1 HV was activated via FCP_JEM1_1010.
- At 18:24Z FCP_JEM1_0044 was executed to put JEM-X1 in Data Taking mode with the observation parameters for the ongoing observation. Commanding to JEM-X1 from the automatic Timeline was then re-enabled.

JEM-X1 operations then continued nominally.

2005-07-17 (DOY 198, Rev 336-337)

Starting at 14:52:34Z, the TM parameter K5317 RAD MONITOR 3 (Electron counter) started to frequently toggle in and out of limits (High), remaining out of limits for less than a minute on each occurrence. Starting at 19:27:30Z the TM parameter K5315 RAD MONITOR 1 (Proton counter) also started to go out of limits High, remaining OOL for less than a minute on each occurrence. The frequency of the OOLs on this parameter was, however, much lower than for K5317.

These Out of Limits on the IREM RMC parameters were due to slightly higher than normal background radiation conditions (however, not high enough to trigger a transition of JEM-X1 to Safe mode). This continued for the rest of the day.

2005-07-18 (DOY 199, Rev 337)

Due to continuing background radiation conditions which were slightly higher than normal, the TM parameters K5315 RAD MONITOR 1 and K5317 RAD MONITOR 3 continued to fluctuate around their high limits until they returned stably within limits at 00:07:06Z for K5315 and 06:16:50Z for K5317.

At 08:16:26Z and again at 08:26:42Z there were further OOLs on K5317 for 1 TM cycle.

2005-07-19 (DOY 200, Rev 337) to 2005-07-22 (DOY 203, Rev 338)

Nothing to report

8.3.5 OMC Operations

2005-07-16 (DOY 197, Rev 336)

At 10:01, OMC was commanded from Safe to Stand-by mode, after the background radiation levels had come down. The impact was pointings 03360037 to 03360046 were lost.

From 10:51:41 to 11:19:08, the Flat Field Calibration was performed. This was followed by the Dark Current Calibration from 11:22:57 to 11:50:25. Both calibrations were performed successfully.

2005-07-17 (DOY 198, Rev 336-337)

At 17:38.36, OMC was switched autonomously to SAFE mode, when IREM indicated the background radiation had climbed beyond the threshold. The unit remained in SAFE mode until 20:51:05. The impact was that pointing 03360006 was interrupted after 2121 from a scheduled duration of 2667 seconds, and that pointings 03370007 through to 03370010 were lost. It was at this time the following 2 commands were rejected:

2005.198.17.47.57.674	2005.198.17.48.06.484	1792	RealTime	131	TC REJECT
REJECTED TC1			0	0	65535 PR N
E E					
2005.198.17.48.03.924	2005.198.17.48.14.572	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 pointing 03370007.

At 21:05.16, OMC was again switched autonomously to SAFE mode, when IREM indicated the background radiation had risen beyond the threshold. The unit remained in SAFE mode until 07:40:43 the following day. The impact was that pointing

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03360011 was interrupted after 585 from a scheduled duration of 2667 seconds, and that pointings 03370012 through to 03370025 were lost

2005-07-19 (DOY 200, Rev 336-337)

At 03:40, a problem with the star tracker caused a delay in the scheduled time for pointing 03370051. The following commands were then rejected:

```
2005.200.04.18.27.999  2005.200.04.18.38.658  1792  RealTime  131      TC REJECT
REJECTED TC1          0          0      65535  PR      N
E      E
2005.200.04.18.34.374  2005.200.04.18.38.662  1792  RealTime  131      TC REJECT
REJECTED TC1          0          0      65535  PR      N
E      E
```

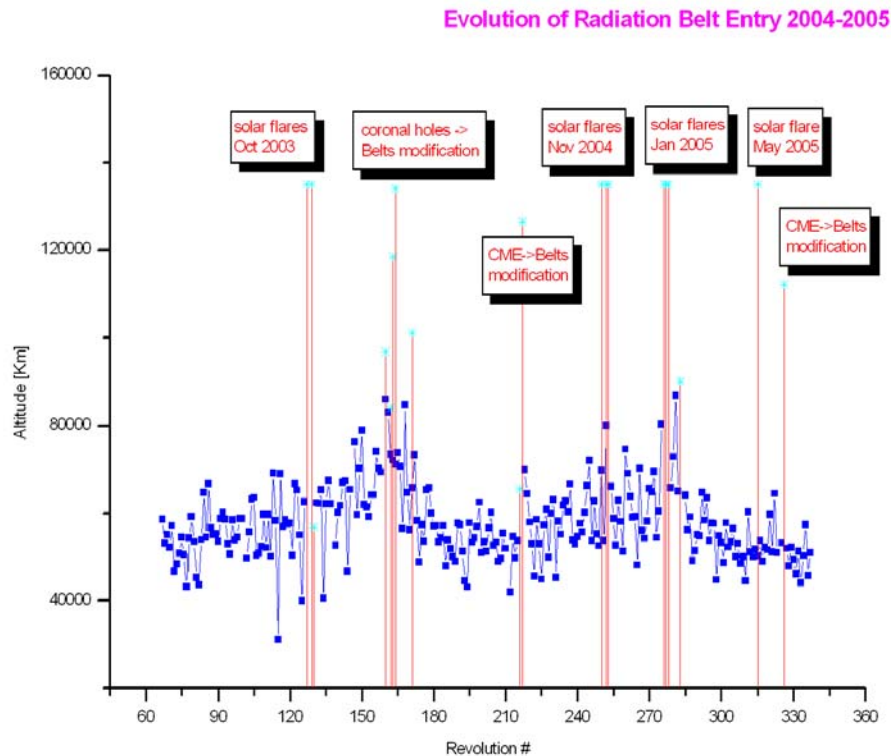
Which correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) for that pointing. These commands were manually uplinked at 04:56:51 to try and recover some of the observation.

On DoY 198 at 04:33:24 and DoY 201 at 04:21:25, 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

Nothing to report.

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
336	2005-07-17T04:33:20Z	2005-07-17 06:18:10	45807.6	2005-07-17 05:29:05	52811
337	2005-07-17T13:48:29Z	2005-07-17 12:51:46	>>24926.4	2005-07-17 12:49:05	30582
337	2005-07-20T04:21:21Z	2005-07-20 05:29:22	51019.4	2005-07-20 05:19:05	52969
338	2005-07-20T13:35:47Z	2005-07-20 12:34:10	>>24914.0	2005-07-20 12:39:05	30465

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)

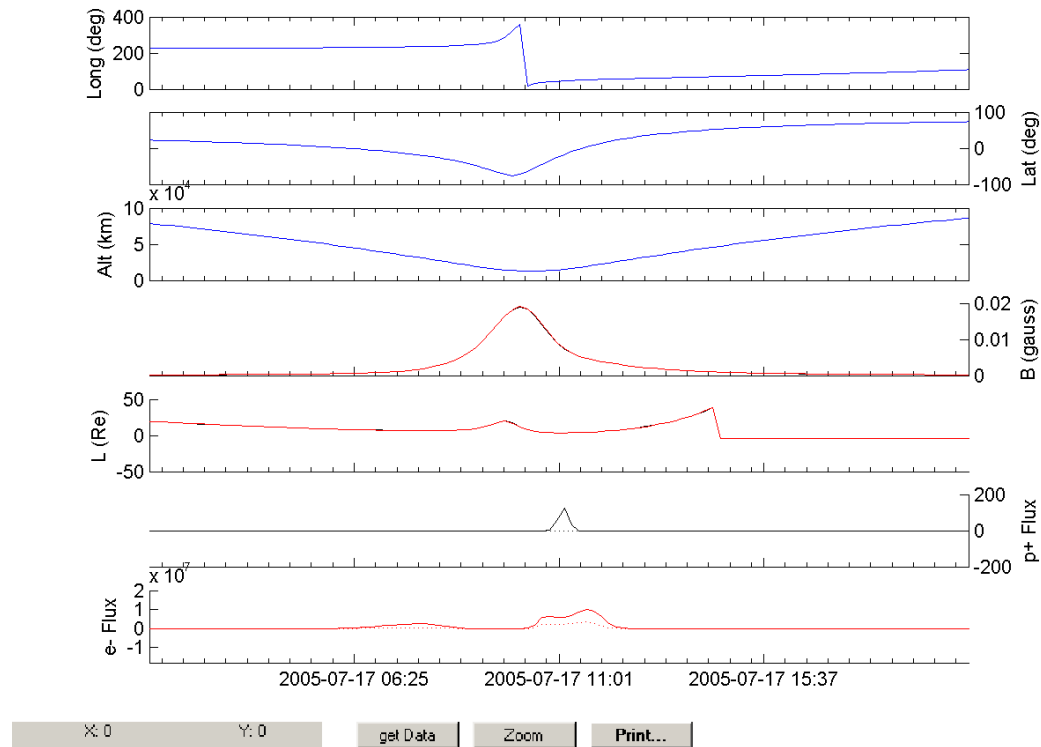
Radiation Spike

IREM radiation counters:

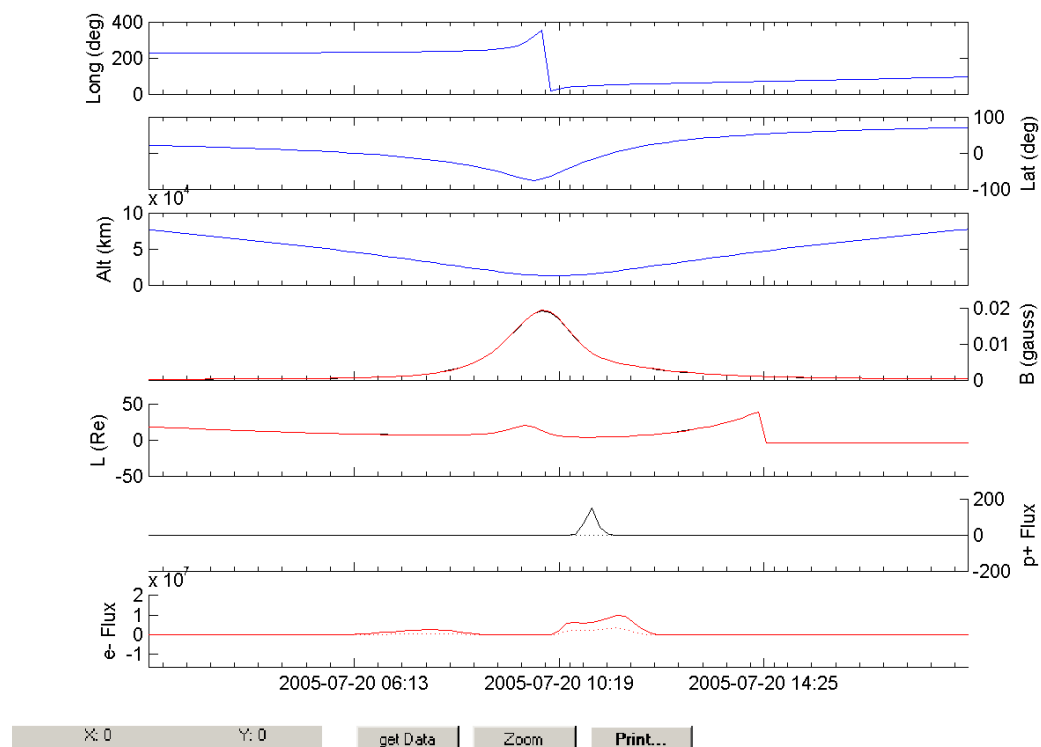
Due to a problem with the ECOE machine, no data are available this week.

IREM Predicted Radiation Belt Passages:

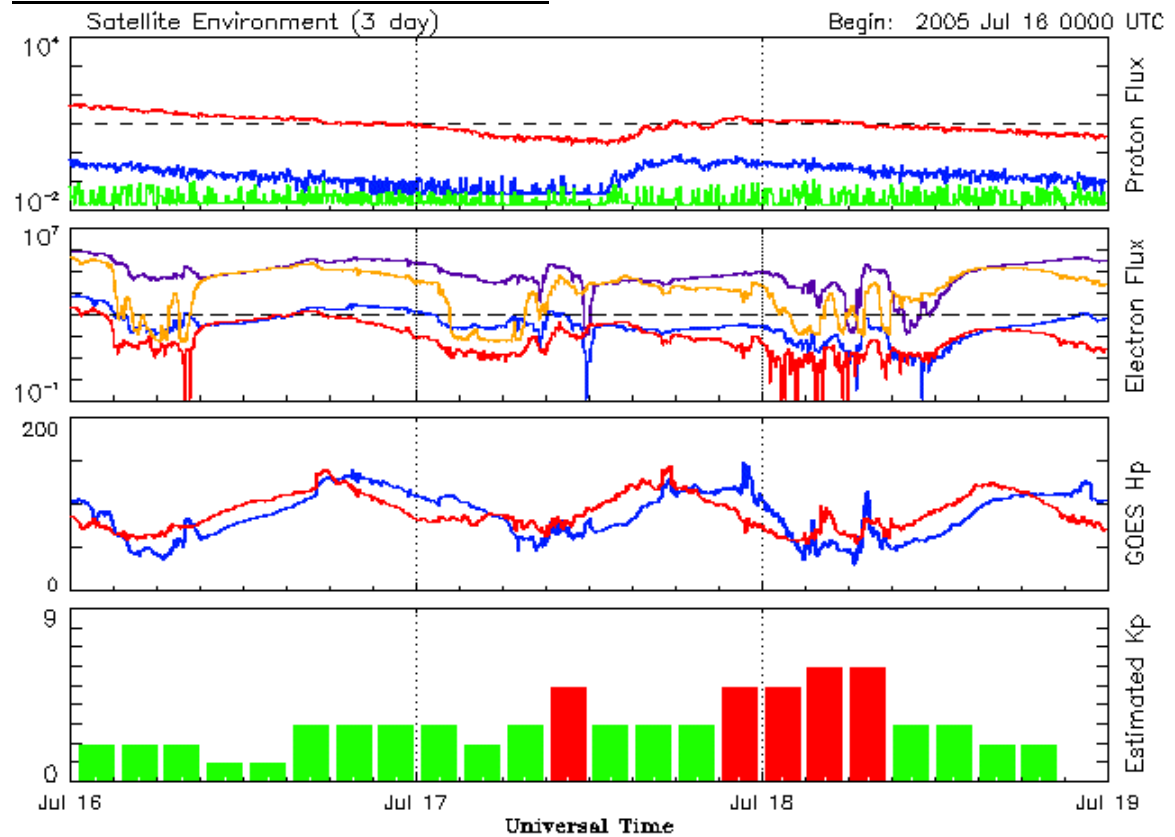
Rev 336:



Rev 337:

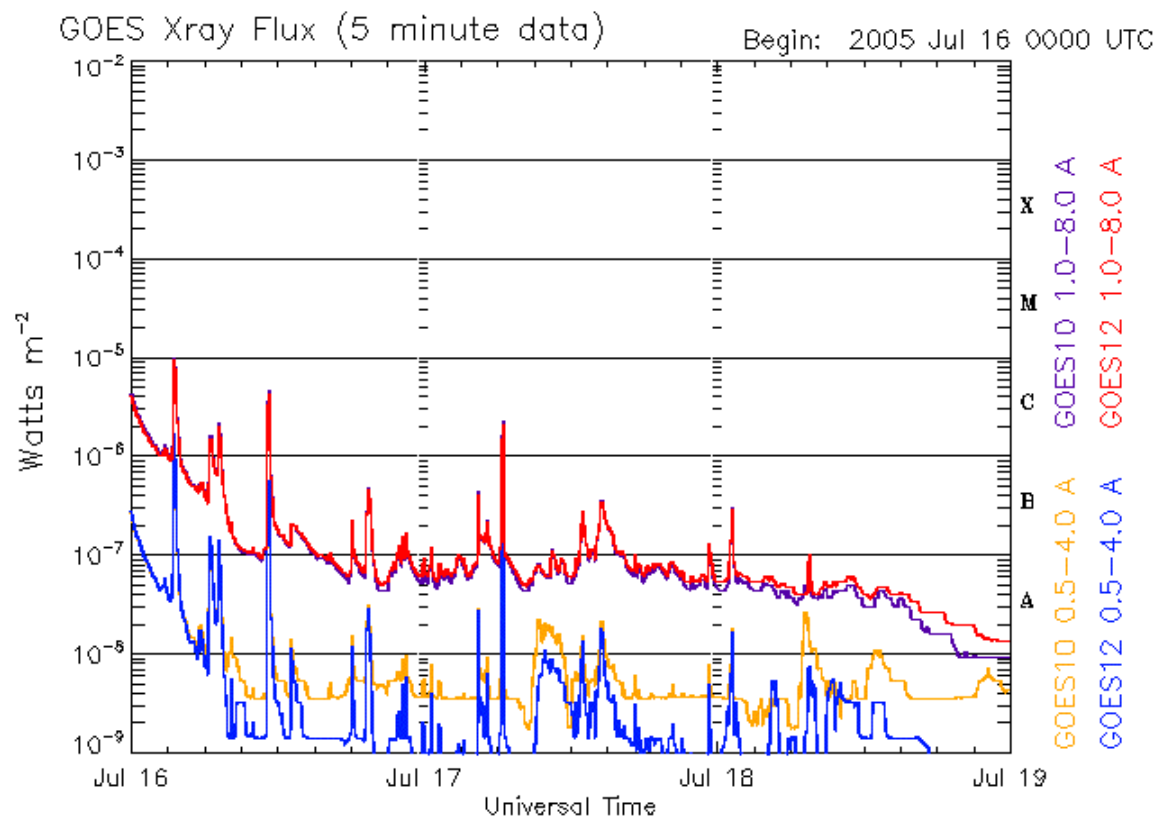


SEC-GOES Observed Particles Fluxes:



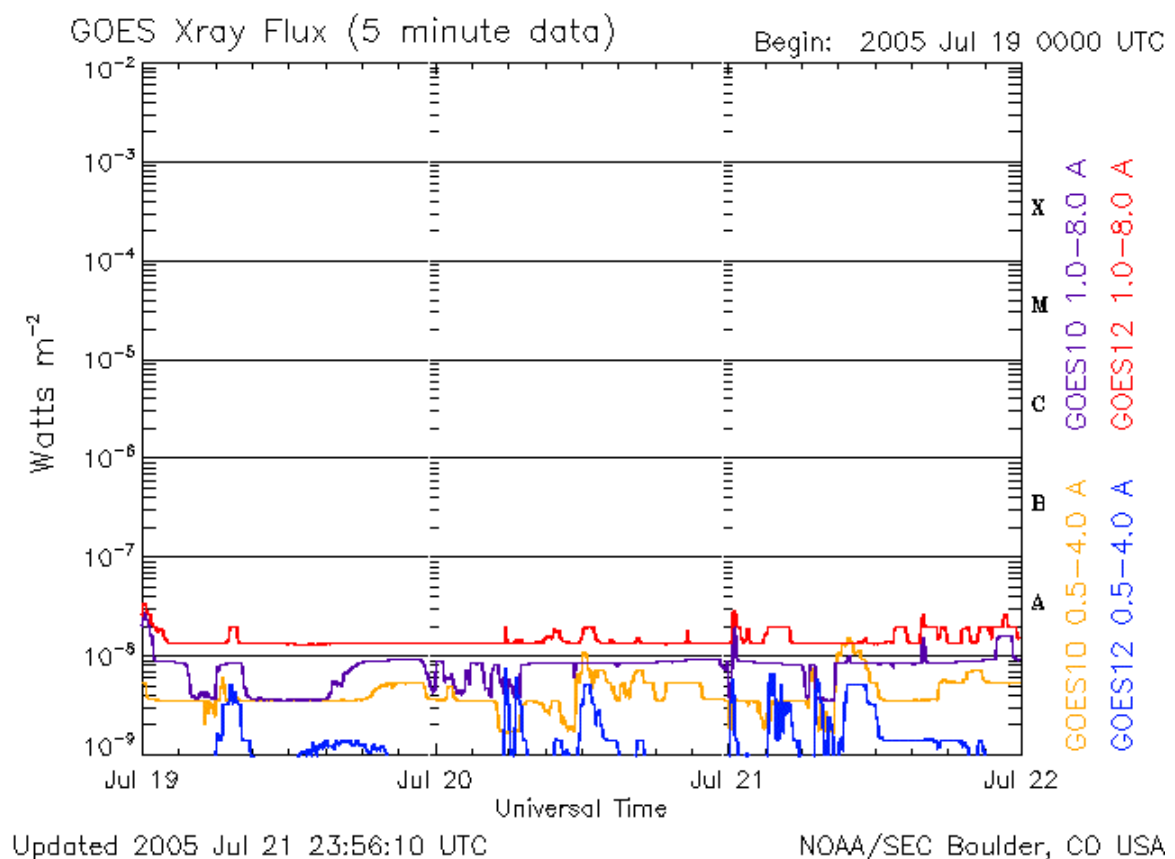
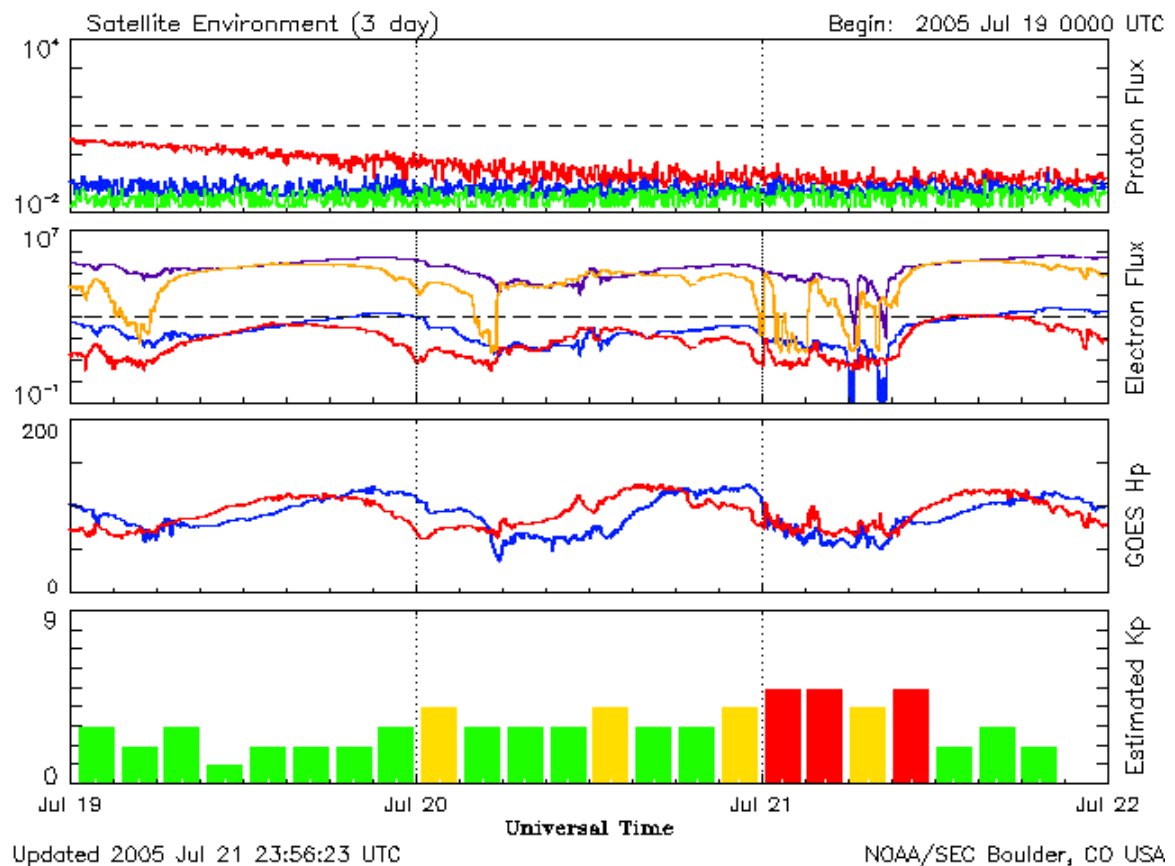
Updated 2005 Jul 18 23:56:24 UTC

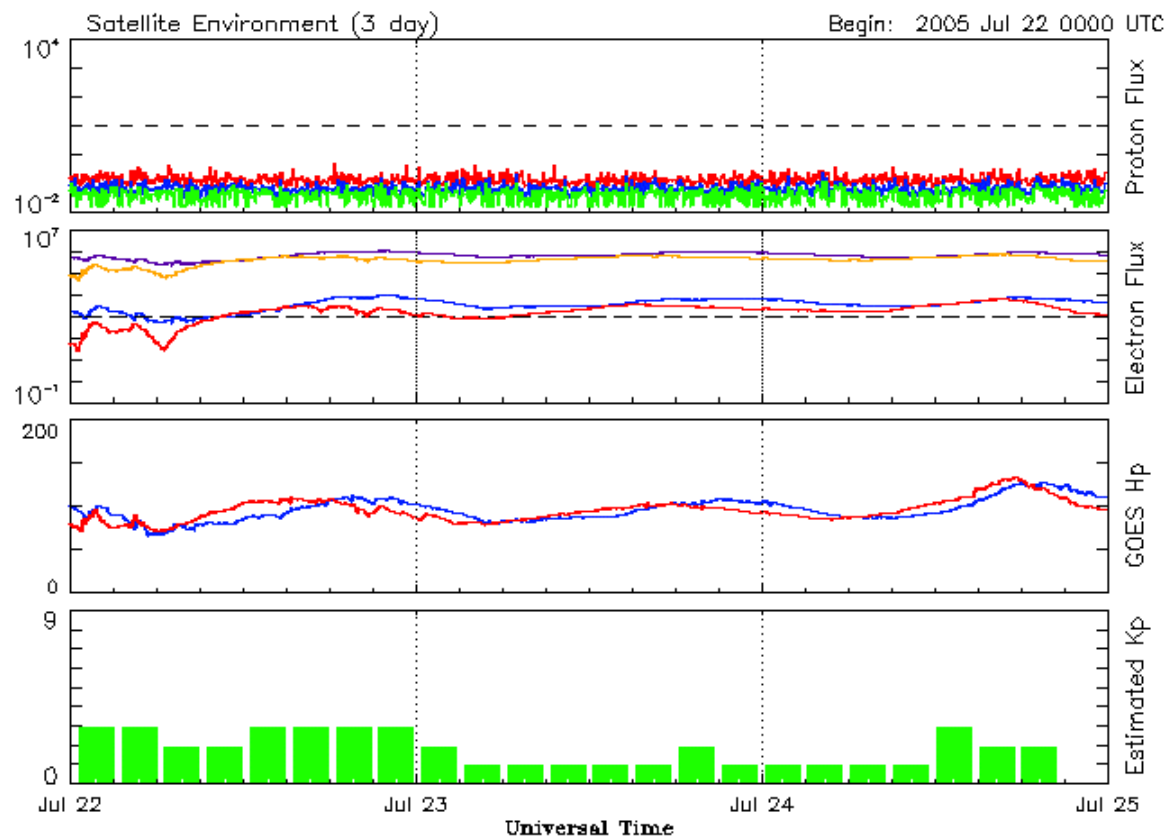
NOAA/SEC Boulder, CO USA



Updated 2005 Jul 18 23:56:10 UTC

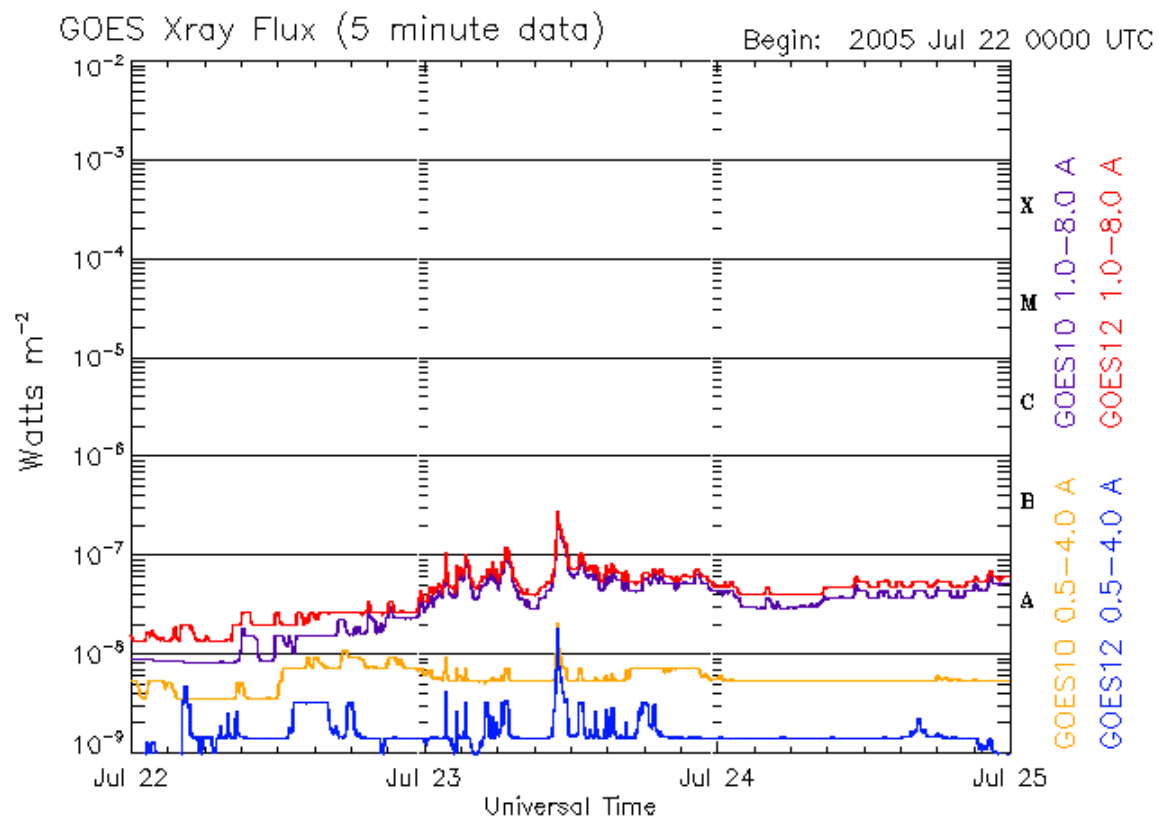
NOAA/SEC Boulder, CO USA





Updated 2005 Jul 24 23:56:24 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Jul 24 23:56:09 UTC

NOAA/SEC Boulder, CO USA