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

INTEGRAL
Mission Report

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

No. 131
Week 12

29.03.05

Routine Phase

Prepared by: M. Walker (OPS-OFO)

LIST OF CONTENTS

DISTRIBUTION LIST

Addressees	Copy	Addressees	Copy
D/OPS		ESA HQ	
G. Winters D/OPS	1	D. Southwood D/SCI	1
W. Frank OPS-O	1		
A. Smith OPS-OF	1	ESTEC	
J. F. Kaufeler OPS-G	1	J. Louet SCI-P	1
N. Bobrinsky OPS-ON	1	A. Gimenez-Canete SCI-S	1
R. Münch OPS-GF	1		
		ESTEC / PG	
M. Schmidt	1	G. Sarri	1
R. Southworth	1		
F. Di Marco	1		
F. Cordero	1		
M. Walker	1		
P. Lippi	1	ESTEC/RSSD	
R. Lemme	1	M. Kessler SCI-SD	1
S. Fahmy	1	C. Winkler	1
SPACONs	1	A. Parmar	1
O. Bergogne	1	L. Hansson	1
I. Bayliss	1	E. Kuulkers	1
G. Di Girolamo	1		
F. Dreger	1		
G. Gienger	1	ESTEC/SCI-A	
S. Pallaschke	1	Nicola Rando	1
W. Hell	1		
K.J. Schulz	1	ISDC	
M.A. Larsen	1	T. Courvoisier	1
K. Capelle	1	R. Walter	1
M. Butkovic	1	N. Mowlavi	1
D. Heinzer	1	ISDC Shift Team	1
G. Servoz	1	D. Texier	1
Shift - Coord	1		
Scheduling Office	1	ALENIA	
T. Beck	1	M. Montagna	1
J. Wardill	1	F. Ravera	1
M. Unal	1		
P. Maldari	1	PI / Instrument Teams	
		J. P. Roques – SPI	1
Redu		G. La Rosa – IBIS	1
B. Demelenne	1	P. Ubertini – IBIS	1
		S. Brandt – JEM X	1
Vilspa		E. De Miguel - OMC	1
P. Kretschmar	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 19.03.05 until 25.03.05 (both dates inclusive) and covers the revolutions 297, 298 & 299.

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 bulge region (RA 17:45:36.00; DEC -28:55:60.0); the Galactic Center field (RA 17:45:40.00; DEC -29:00:28.0), an OMC Flat Field target (RA 17:12:48.00; DEC -06:24:00.0) and an observation of GRO J1655-40 (RA 16:54:0.14; DEC -39:50:44.9). The activities consisted of raster and hexagonal dithering as well staring observations. In addition, OMC Flat Field and Dark Current Calibrations were performed.

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.

7 slews (1 OSL, 6 CSLs) were missed from the Timeline during this period in particular

- 2 slews (1 OSL, 1 CSL) due to a problem on FEC at REDU station;
- 5 slews (5 CSLs) due to problem at DSS24 station;

The fuel consumption over the period between 17/03/2005 and 24/03/2005 was 0.0459 kg. The remaining propellant is in the order of 162.2916 Kg.

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

3.1.2 Power

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

3.1.3 Thermal

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

3.1.4 OBDH

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

3.1.5 RFS

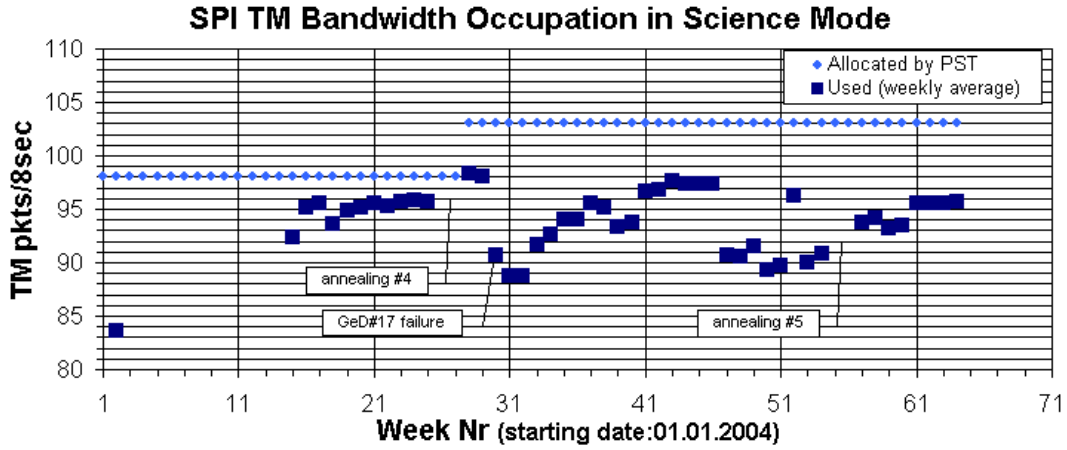
The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

3.2 Payload

3.2.1 SPI

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

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 and an actual occupation of 95.7 pkts/cycle average. The Stirling compressors are working well, maintaining the detector cold-plate temperature within 85+/-1K.



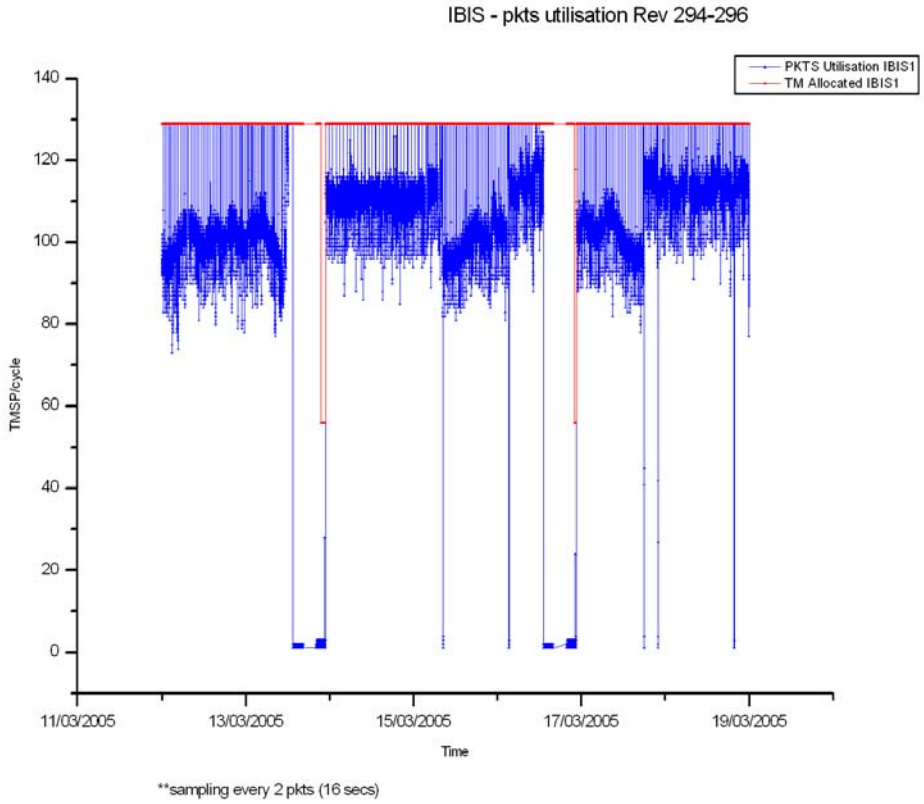
Note: Some more information concerning the SPI operations is provided in the Appendix.

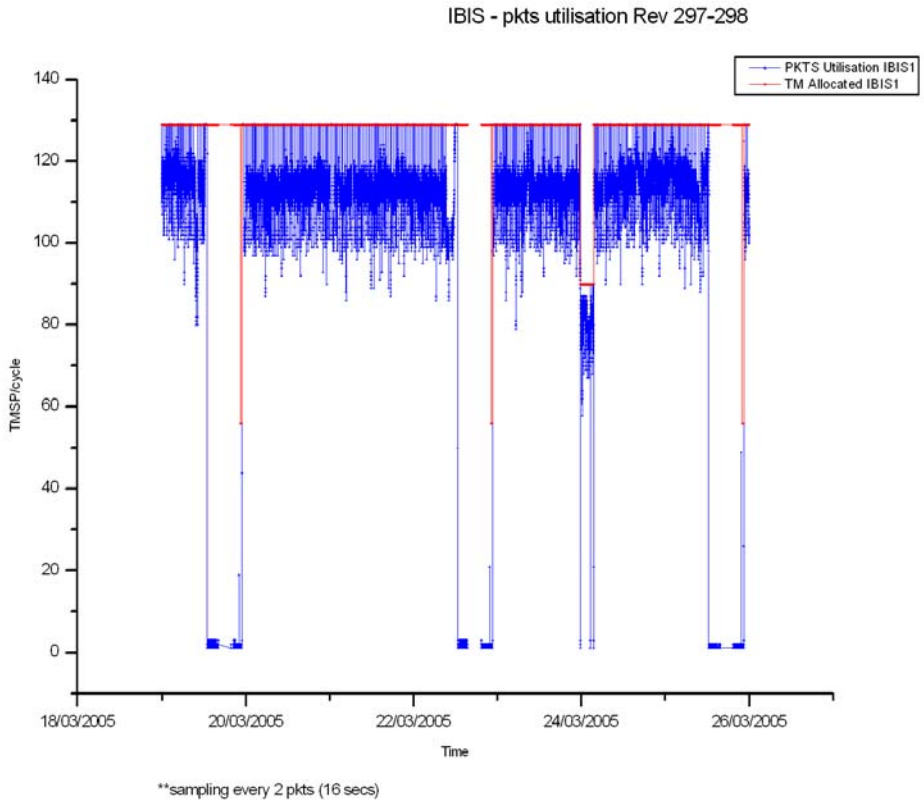
3.2.2 IBIS

The Overall status of the unit is Nominal.

During the reporting period the PST allocation to IBIS was most of the time 129 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 113.49 TMPS/cycle except the period between 2005-03-23 23:52:45Z and 2005-03-24 03:38:48Z, during the execution of OMC FFC, when the allocation was 90 TMPS/cycle.

Plots of the IBIS TM utilisation during the period 12/03 - 25/03 are presented below:





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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

JEM-X1 was operated in Data Taking mode during science observations, with a TM allocation of 8 packets/cycle.

JEM-X2 was dormant (DFEE OFF) with a TM allocation of 1 packet/cycle until 2005-03-24 at 12:18:04Z, when the JEM-X2 DFEE switch-on activities were started. The switch-on of the JEM-X2 DFEE was required in order to prepare for the activation of JEM-X2 for the Crab calibration in revolution 300, in line with OCR-193. During the JEM-X2 DFEE switch-on, following the load of the context from the DPE to the DFEE, the CRC check of the Integer Parameter Table failed. This is recorded in Anomaly Report INT_SC-116. As part of the recovery operations, the PST was reprogrammed temporarily to allocate more TM packets to JEM-X2, a dump of the JEM-X2 DFEE memory and a DFEE power cycle were performed. These operations were completed on 2005-03-24 at 14:29:58Z, after which JEM-X2 remained in Safe mode with a TM allocation of 1 packet/cycle during science observations.

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, except during the Flat-Field and Dark-Current calibrations from DoY 082 at 23:53:00 to DoY 083 at 03:39:31.

There were 238 OMC pointings executed nominally, 5 were lost.

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

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity
The observation period was characterised by low solar activity.

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

4 Ground Facilities

The performance of the Operational ground facilities was very good this week, well above the system performance requirements, 238 pointings were executed correctly, 6 were lost due to ground problems.

4.1 Mission Operations Centre

The performance of the MOC was excellent this week, with no pointings lost, there were however an incident when Portable Satellite Simulator data were inadvertently archived.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. Four pointings were lost due to problems with DSS-24, and two more due to the FEC at Redu. There were also problems with the data link with ISDC. The overall performance was well over the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning
This week planning up to revolution 304 has been performed and sent to MOC. No replanning or ToO received. In revolution 300 a dedicated calibration campaign will be carried out using the CRAB. This campaign consists of 5 very different special sets of pointings with unusual instrument configurations. Instrument operations are very complex since they involve besides the normal automatic commanding from the timeline some manual commanding performed by MOC. PSF's up to rev 304 have been received. TSF for rev 298 and 299 were received.

2. Observation status
No processing of ECS's has taken place in ISOC this week due to holidays and a short working week. New ECS's up to rev 283 have been received. ECS's for revolutions 273 and 277 are still missing.

3. ISOC science data archive
Nothing to report.

4. ISOC system
The version 10.8 of the ISOC system that was installed last week has been used successfully without problems.

5. ISOC move
Installation of ISOC applications on the recently received computers has started. The intention is to move applications currently running on RSSD computers will move to INTEGRAL dedicated computers in ESAC.

6. Problems
The problem reported last week with unavailable science staff in ISOC is still not yet formally resolved. For one company with two contracts it appears an agreement has

been reached resulting in no significant gain for ESA. For the second company the finalisation is still pending.

4.3.2 ISDC

Status of ISDC observation processing on 28/03/2005:

- Latest Standard Analysis completed: observation 02297000013 (CAS A, Revolution 261-269) on 20/03/2005

- Latest products archived: observation 02297000013 (CAS A, Revolution 261-269) on 23/03/2005

- Latest observation products sent to the observer: observation 02297000015 (Abell 2256, Revolution 257) on 20/02/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 078, at 15:56, the TM link and at 15:56, the TC link with DSS-16 dropped. The links stayed down until the end of the revolution at around 16:44. No reason or DR# was given, there was no impact.
- At 19:50, just after AOS Redu, the TM dropped due to a problem with the FEC. The problem was cleared at 20:34. The impact was slew 02970001 and pointing 02970002 were missed. Several EDs at the start of the revolution also had to be manually sent.
- On DoY 079, at 18:27, there was a TM data gap, followed by 86 bad frames from Redu. Reed Solomon alarms came up on CDS1 & 2. There was no impact.
- On DoY 080, at 15:31, ISDC reported they were not receiving the ASFs. This was fixed at 16:08 without impact.
- On DoY 081, at 09:29, the scheduled handover to DSS-24 was delayed due to problems at the station. The problems persisted, and at 10:00 the timeline was stopped. The links were eventually restored using DSS-16, at 11:24, and the timeline rejoined at 12:17. The impact was the loss of pointings 02970113 to 02970116, plus an RMU calibration. The corresponding DR# is G105462.
- Later, from 14:09 to 14:15, the TM & TC links again dropped, the impact being slew 02970118 was missed, and recovered manually. The corresponding DR# is G105463.
- From 15:50 to 16:10, after the end of the pass, TM data from a test conducted using the PSS was inadvertently archived.
- On DoY 082, at 03:50, the link ISDS-ISDC was disconnected with a Unix error 11. The problem eventually cleared itself at 06:46, the cause is currently unknown. There was another brief interruption from 08:39 to 08:41. There was no impact.

- At 21:03, there was a brief drop in TM from Redu, followed by 13 bad frames. Reed Solomon alarms were reported on both CDS's.
- On DoY 084, at 10:10, the sweep had to be re-performed, as the wrong receiver was in lock, there was no impact.

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

AR id	Date Created	Subject	Segment	Status
INT-2720	22/03/2005	Aux files were not send to ISDC	IMCS	Closed
INT-2721	24/03/2005	PSS data stored in archive	ESA Stations	Pending

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 is currently planned to take place in April.

Upgrade of the IMCS, to use S2K release 3.1, a major update of the MCS is currently undergoing acceptance testing. A date for installation on the operational machines has not yet been decided.

Change of communication protocol to ESA Station from X25 to TCP IP, testing of this change will start in April. 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.

A Crab calibration has been planned for next week, full details will be given then.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 297
The activities in revolution 297 consisted of a hexagonal dithering observation of the galactic bulge region (RA 17:45:36.00; DEC -28:55:60.0) lasting ~3.5 hours, followed by a raster dithering observation of the Galactic Center field (RA 17:45:40.00; DEC -29:00:28.0), performed for the remaining ~57 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 298
The activities in revolution 298 consisted of:

- Hexagonal dithering observation of the galactic bulge region (RA 17:45:36.00; DEC -28:55:60.0) lasting ~3.5 hours;
- Raster dithering observation of the Galactic Center field (RA 17:45:40.00; DEC -29:00:28.0) lasting ~21 hours;
- Staring observation at the OMC Flat Field attitude (RA 17:12:48.00; DEC -06:24:00.0) lasting ~3.5 hours, during which OMC Flat Field and Dark Current Calibrations were performed;
- Raster dithering observation of the Galactic Center field (RA 17:45:40.00; DEC -29:00:28.0), performed for the remaining ~32 hours of observation time.

Throughout these observations, SPI, IBIS and JEM-X1 were in their nominal science modes. During the OMC Flat Field observation, OMC was in FFCalibration followed by DCCalibration modes and the TM allocation was IBIS 90; SPI 84; JEM-X1 8; JEM-X2 1; OMC 63. For the other observations, OMC was in Science Normal mode and the TM allocation was IBIS 129; SPI 103; JEM-X1 8; JEM-X2 1; OMC 5. The JEM-X2 DFEE was off until 2005-03-24T12:18Z (start of DFEE switch-on activities) and JEM-X2 was in Safe mode from 2005-03-24T14:27Z for the remainder of the revolution.

Revolution 299
The activities in revolution 299 consisted of:

- Hexagonal dithering observation of the galactic bulge region (RA 17:45:36.00; DEC -28:55:60.0) lasting ~3.5 hours;
- Raster dithering observation of the Galactic Center field (RA 17:45:40.00; DEC -29:00:28.0) lasting ~16 hours;
- Raster dithering observation of GRO J1655-40 (RA 16:54:0.14; DEC -39:50:44.9) lasting ~30 hours;

- Raster dithering observation of the Galactic Center field (RA 17:45:40.00; DEC -29:00:28.0), performed for the remaining ~11 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.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

```
2005-03-04T21:21:48.000Z     162.6225    F   Automatic TM processing.
2005-03-04T22:50:37.000Z     162.5894    F   Automatic TM processing.
2005-03-04T23:52:13.000Z     162.5603    F   Automatic TM processing.
2005-03-05T06:17:25.000Z     162.5362    F   Automatic TM processing.
2005-03-06T07:28:00.000Z     162.5002    F   Automatic TM processing.
2005-03-07T21:12:36.000Z     162.4472    F   Automatic TM processing.
2005-03-10T21:01:24.000Z     162.4308    F   Automatic TM processing.
2005-03-12T07:19:36.000Z     162.4147    F   Automatic TM processing.
2005-03-13T14:33:39.000Z     162.4016    F   Automatic TM processing.
2005-03-13T20:48:36.000Z     162.3678    F   Automatic TM processing.
2005-03-16T20:35:23.000Z     162.3582    F   Automatic TM processing.
2005-03-18T06:41:35.000Z     162.3375    F   Automatic TM processing.
2005-03-21T06:30:23.000Z     162.3166    F   Automatic TM processing.
2005-03-22T20:06:11.000Z     162.3115    F   Automatic TM processing.
2005-03-24T06:27:42.000Z     162.2916    F   Automatic TM processing.

This report was generated  Fri Mar 25 08:00:19 GMT 2005
```

8.3 Detailed Satellite Information

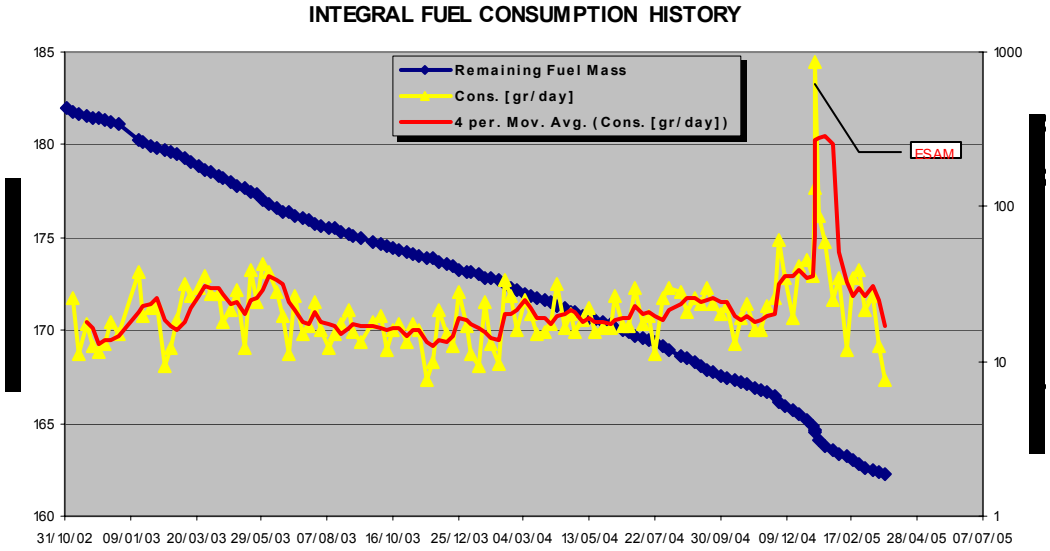
This section contains some detailed information concerning the various subsystems of the satellite and instruments.

8.3.1 AOCS Summary Operations Report 19/03/2005-25/03/2005

AOCS operations were executed from the Automatic Timeline.

During this period, 120 Open Loop Slews, 135 Closed Loop Slews and 4 Momentum Bias were executed. 7 slews were not executed due to problems at REDU and DSS24 stations. This is equivalent to a ~ 2.7 %.

The fuel consumption per day [gr/day] over the period between 01/11/2002 and 24/03/2005 is reported in the plot below.



19/03/05 (Day of Year 078, Revolution 296-297)

Slews missed from the Timeline: Due to a problem on REDU station (problem with FEC), the slews IDs 02970001(OSL)-02(CSL) were not executed and the AOCS s/s disabled in TL at 20:36z. A manual recovery was then performed to the attitude of PID 02970002. The next slew (CSL) for PID 02970003 was manually updated and executed from the Timeline. The AOCS s/s was re-enabled in TL at 23:04z.

20/03/05 (Day of Year 079, Revolution 297)

Nothing to report

21/03/05 (Day of Year 080, Revolution 297)

Nothing to report

22/03/05 (Day of Year 081, Revolution 297-298)

Slews missed from the Timeline: Due to problems on DSS24 station (problem to load the Integral pass specific files on the station servers), the slews IDs 02970113-116(CSLs) were not executed (because the TL was stopped) and the AOCS s/s disabled in TL at 11:24z. A manual recovery was then performed to the attitude of PID 02970116. The next slew (OSL) for PID 02970117 was manually updated and executed from the Timeline. The AOCS s/s was re-enabled in TL at 12:17z.

Slew missed from the Timeline: Due to problems on DSS16 station (drop in the TM\TC link), the slew IDs 02970118(CSL) was not executed and the AOCS s/s disabled in TL at 14:09z. A manual recovery was then performed to the attitude of PID 02970118. The next activity (CGS) was not updated and left failing (AOCS s/s disabled in TL) because the correct guide star for the perigee passage already reached with the manual slew to PID 02970118 and CGS not needed. The AOCS s/s was re-enabled in TL at 15:30z for EOT.

23/03/05 (Day of Year 082, Revolution 298)

Nothing to report.

24/03/05 (Day of Year 083, Revolution 298)

Nothing to report

25/03/05 (Day of Year 084, Revolution 298-299)

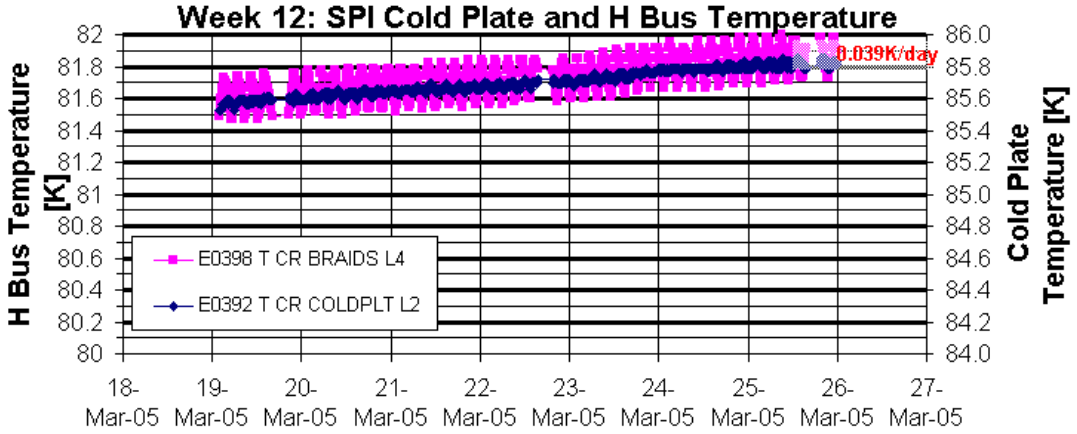
Nothing to report.

8.3.2 SPI Operations

Stirling compressors and Cryostat:

The performance of the compressors is nominal. The cold plate temperature was maintained at 85K+/-1K over the reporting period, still showing a remarkable positive drift, following the annealing, which terminated in February.

The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period.



DPE & IASW:

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

103 pkts/cycle peak;

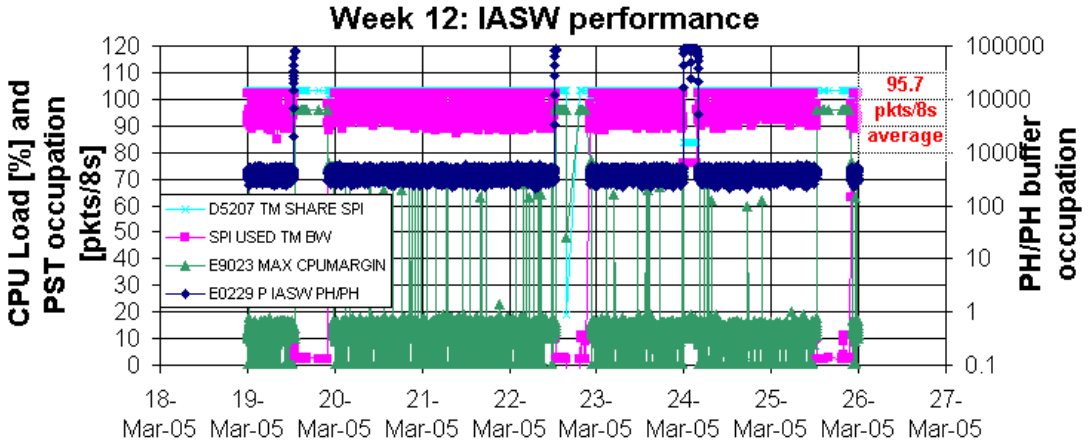
95.6 pkts/cycle average in science mode.

As a temporary workaround to the TM leakage anomaly (INT_SC-107), the SPACON uploads at every beginning of rev. a new PST rearranged such to avoid the problem.

A software patch is in preparation to fix the malfunction of the missed ACS HV switch off at belts entry (INT_SC-115). The cause of the anomaly was confirmed to be in the timing of the sequence Go to Conf -> Switch off ACS HV -> Disable DFEE sci data -> Go to Oper, which appears too quick.

Configuration of OCR#191 is still in place (disable the transition to Photon inside the belts).

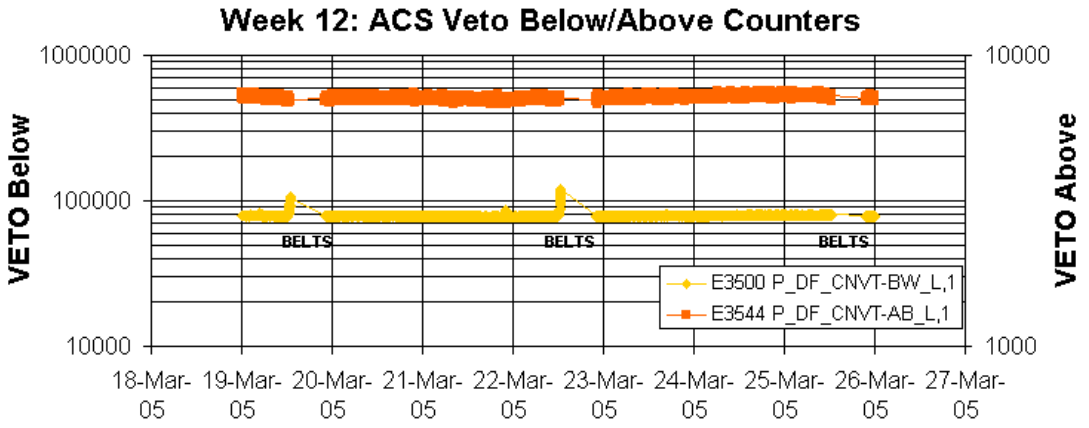
The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS:

The performance of the ACS is nominal.

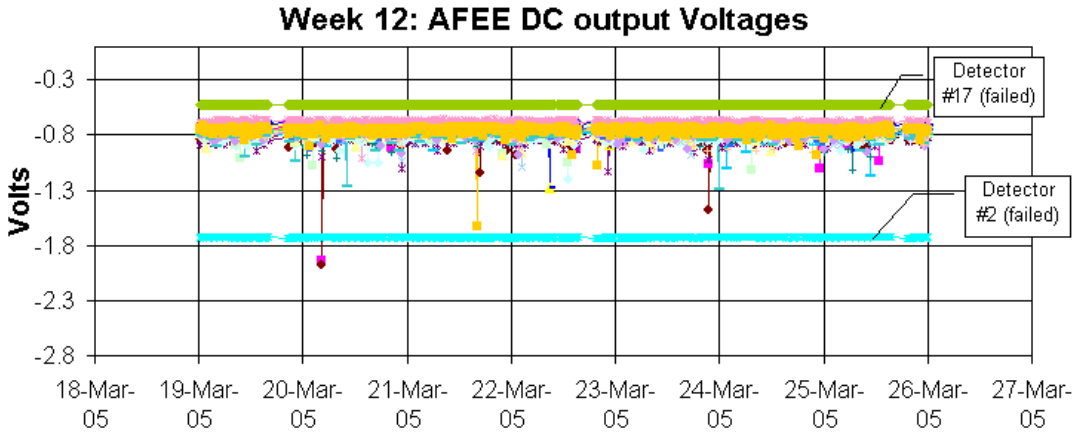
The following plot shows the ACS overall count rate evolution during the reporting period.



AFEE and Germanium Detectors:

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

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

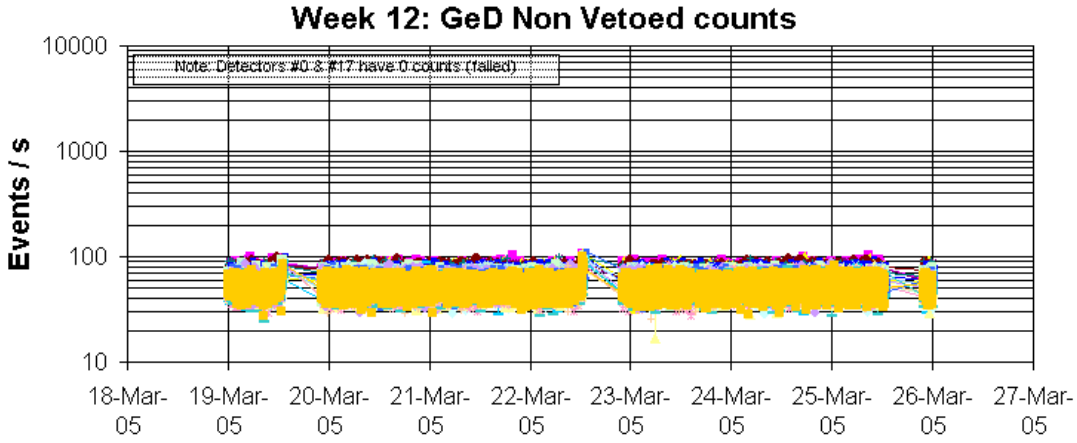


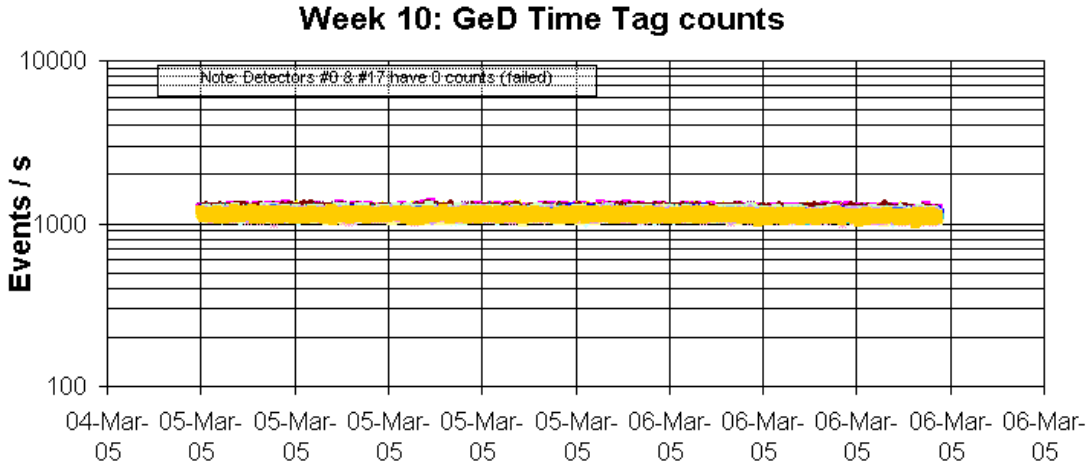
DFEE:

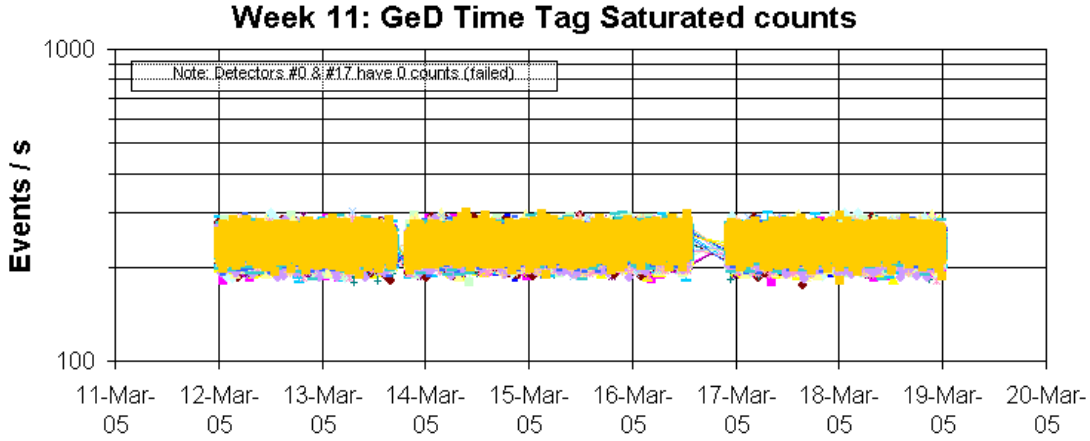
The performance of the unit is nominal.

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

NOTE: Due to a problem in the data retrieval some plot does not covers the full week.





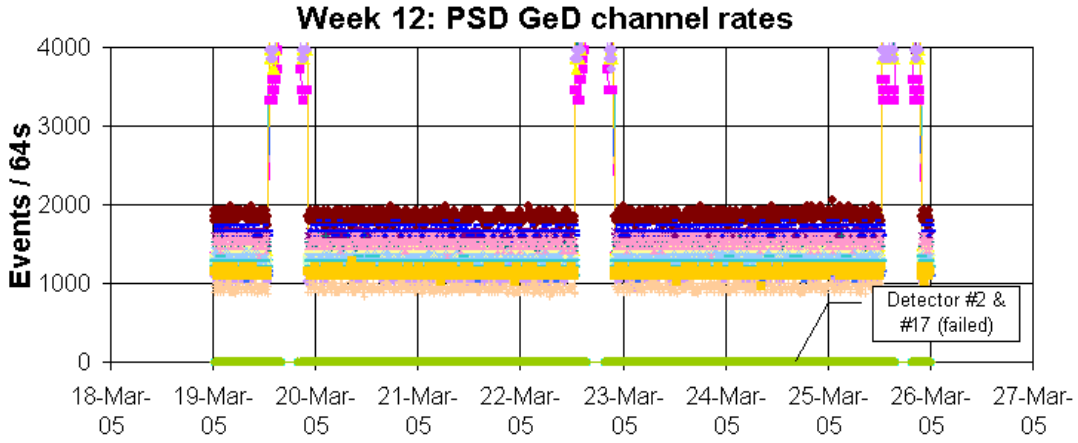


PSD:

The performance of the unit is nominal.

Following the execution of OCR#191 (PSD input channels #2 and #17 disable), executed at belts entry of rev.290), the channel rates blocking malfunction did not reappear. It was therefore decided to keep this setting.

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



SPI DAILY EVENTS

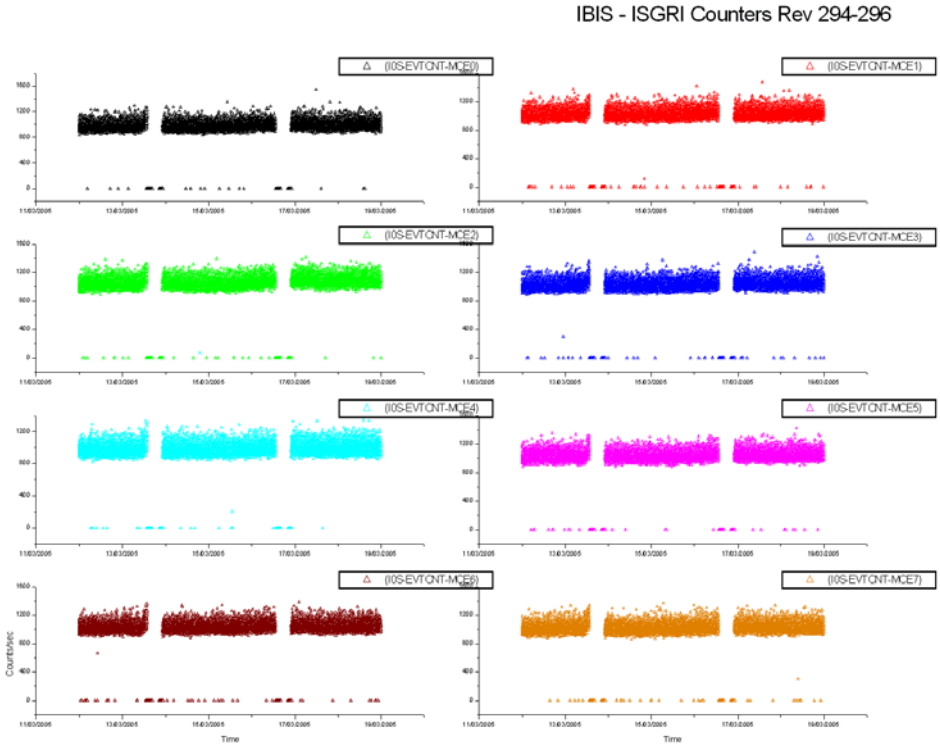
NOTE: The events log is extracted from the revolution pass summary.

DOY Time	Event
081 - 12:32	TM E3500 OOL, back in limits at 12:47
083 - 03:43	Man. PST update, INT_OR_0190
086 - 15:05	TM: E0392 OOL, back in limits @ 15:16
086 - 18:38	TM: E0392 OOL, back in limits @ 19:00
086 - 18:45	SPI stroke increase to 38, INT_OR_0116
087 - 01:24	Man. PST update, INT_OR_0190

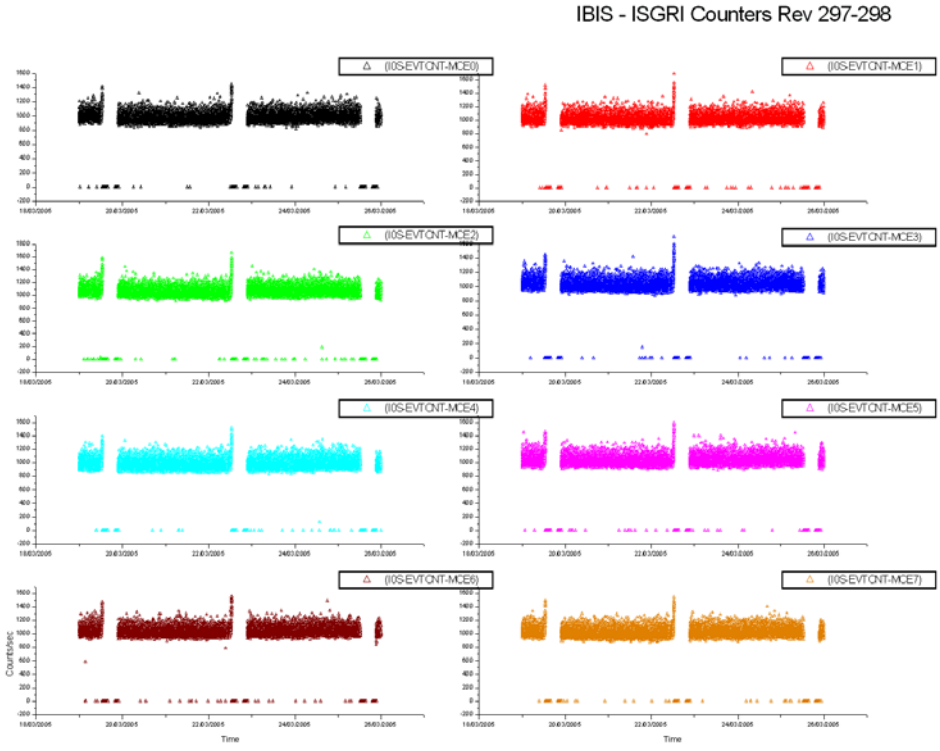
8.3.3 IBIS Operations

IBIS Events Counters Plots.

ISGRI Counters:

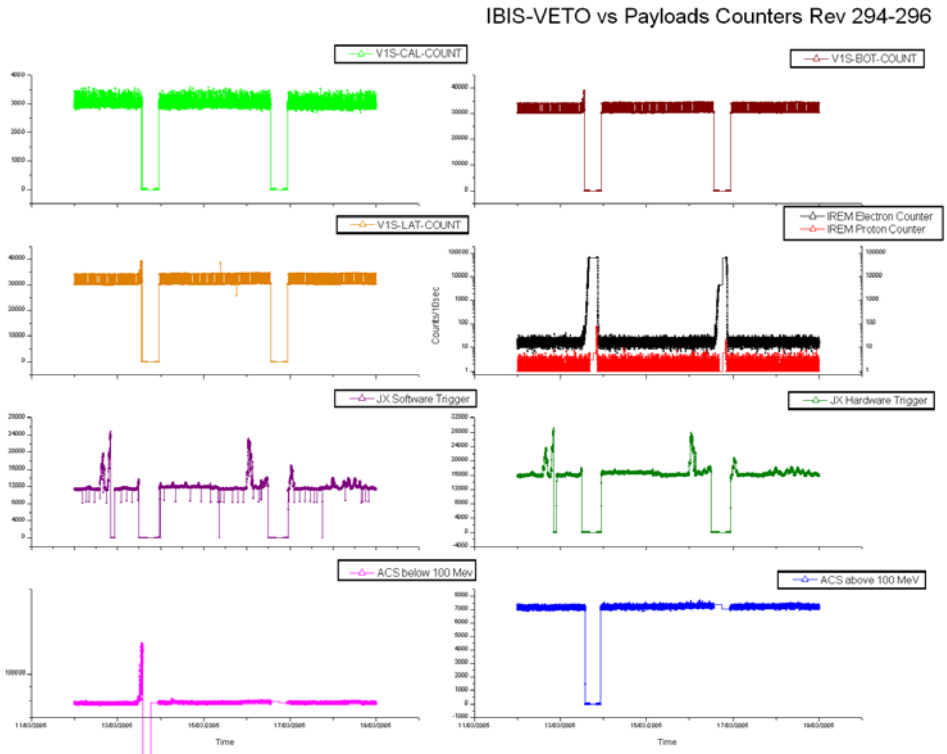


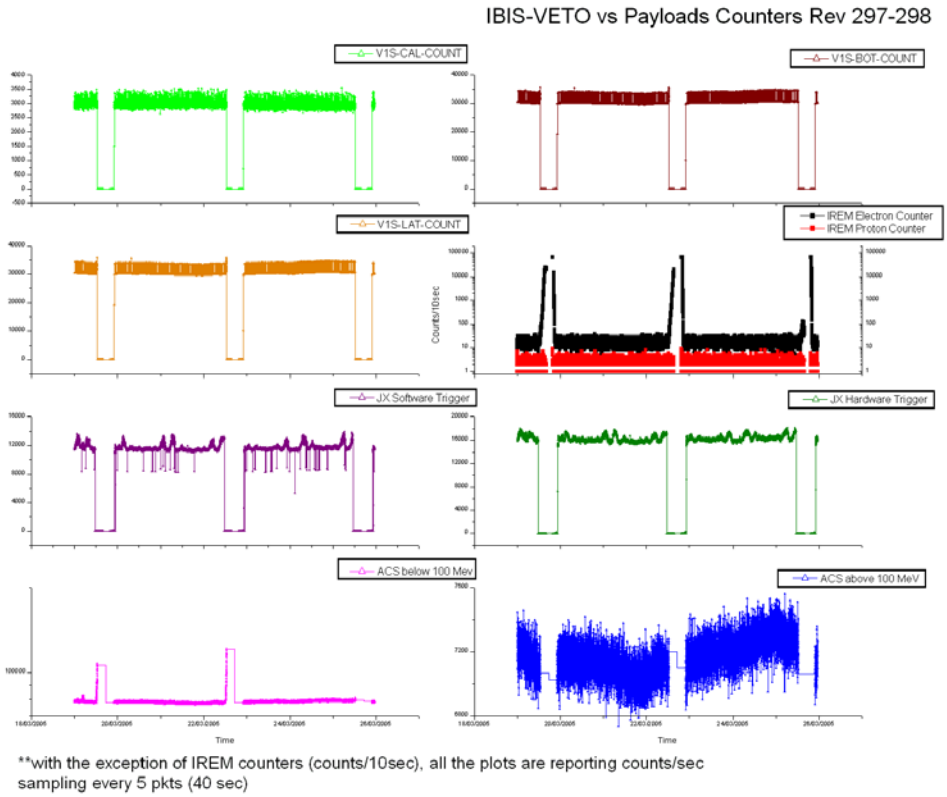
**sampling every 4 pkts (32 secs)



**sampling every 4 pkts (32 secs)

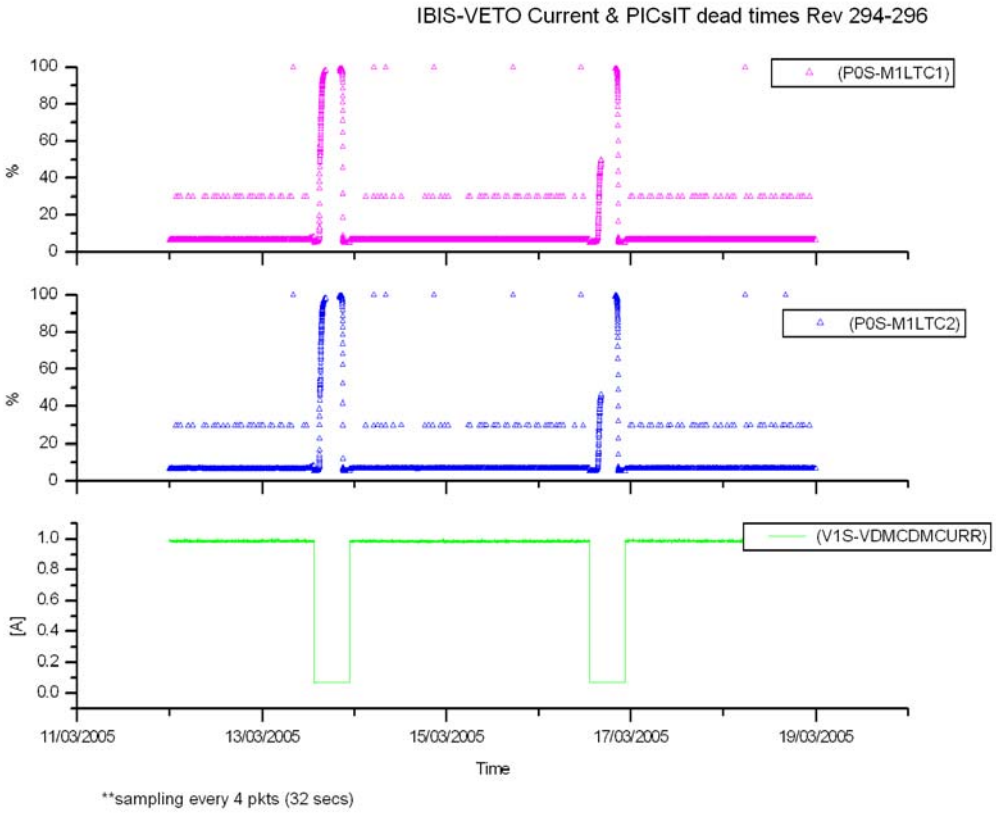
VETO vs Payloads Counters:



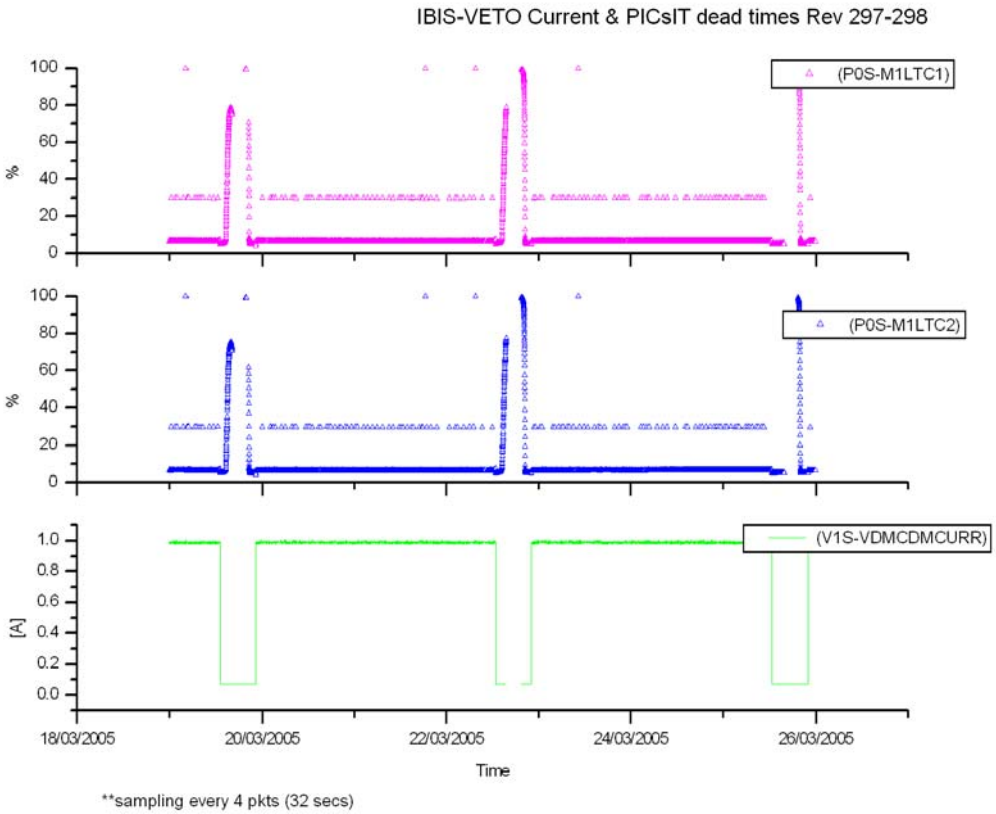


The week was characterised by low solar activity.

VETO Current:

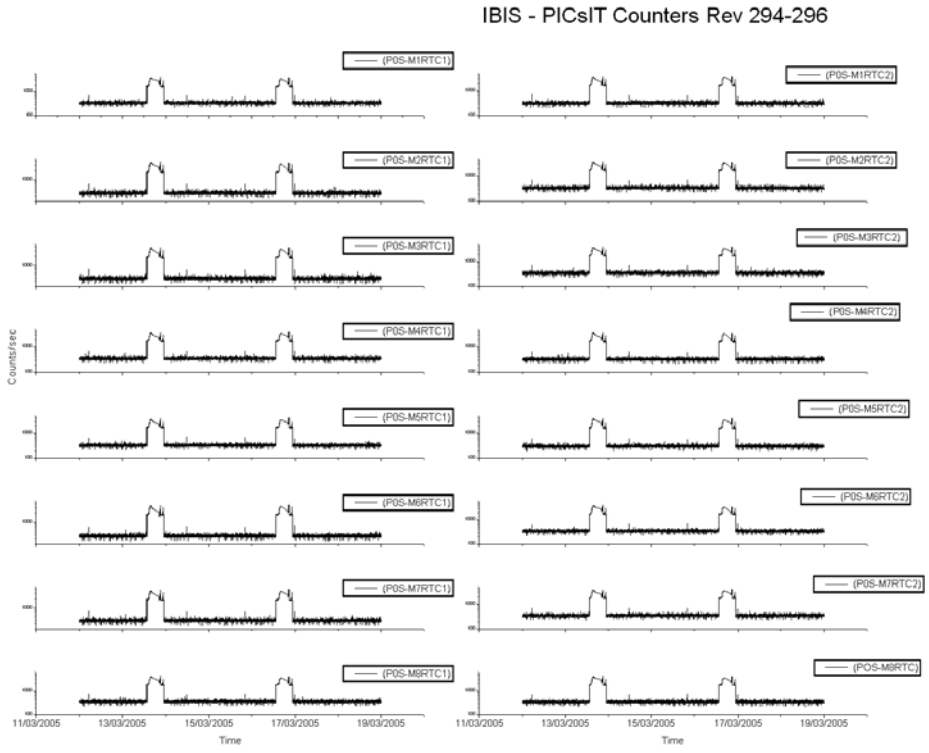


**sampling every 4 pkts (32 secs)

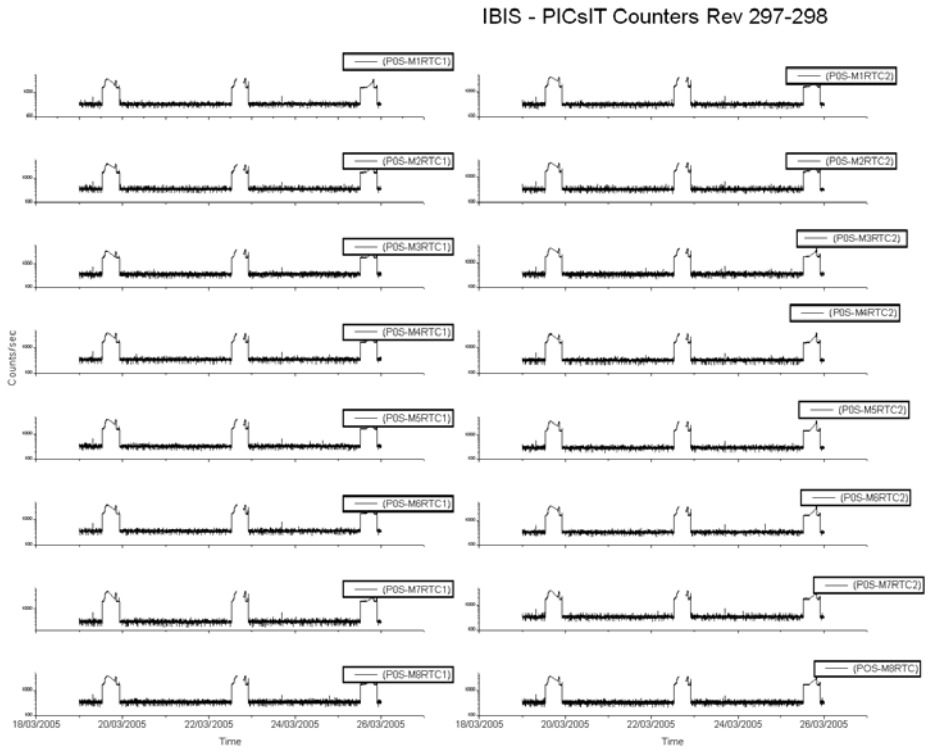


**sampling every 4 pkts (32 secs)

PICsIT Counters:

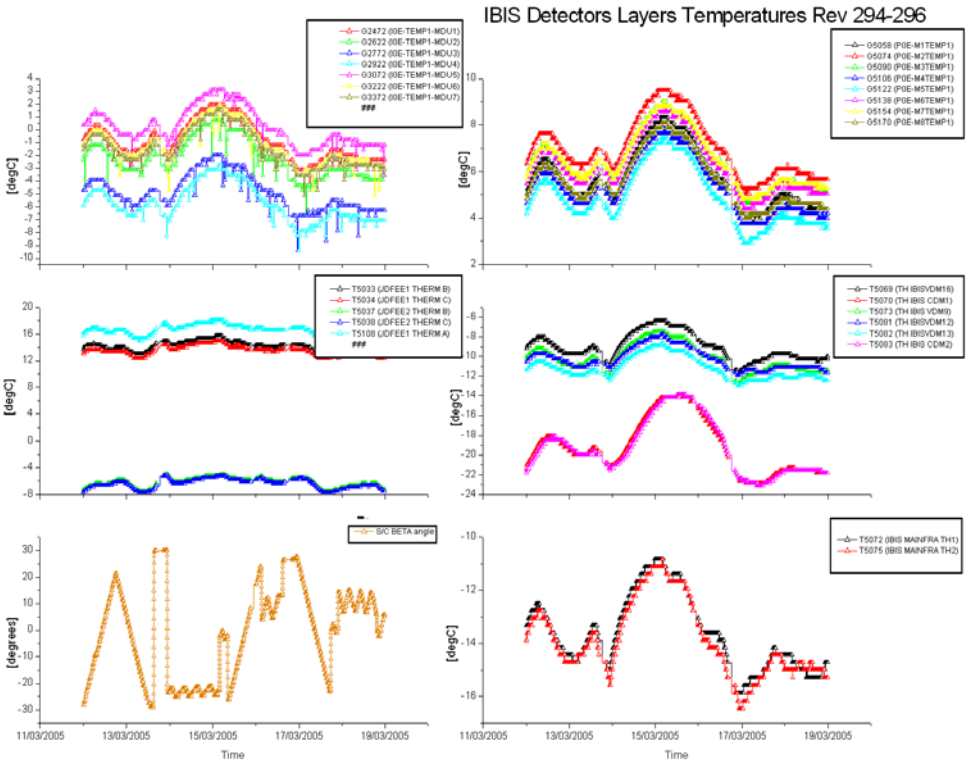


**sampling every 4 pkts (32 secs)

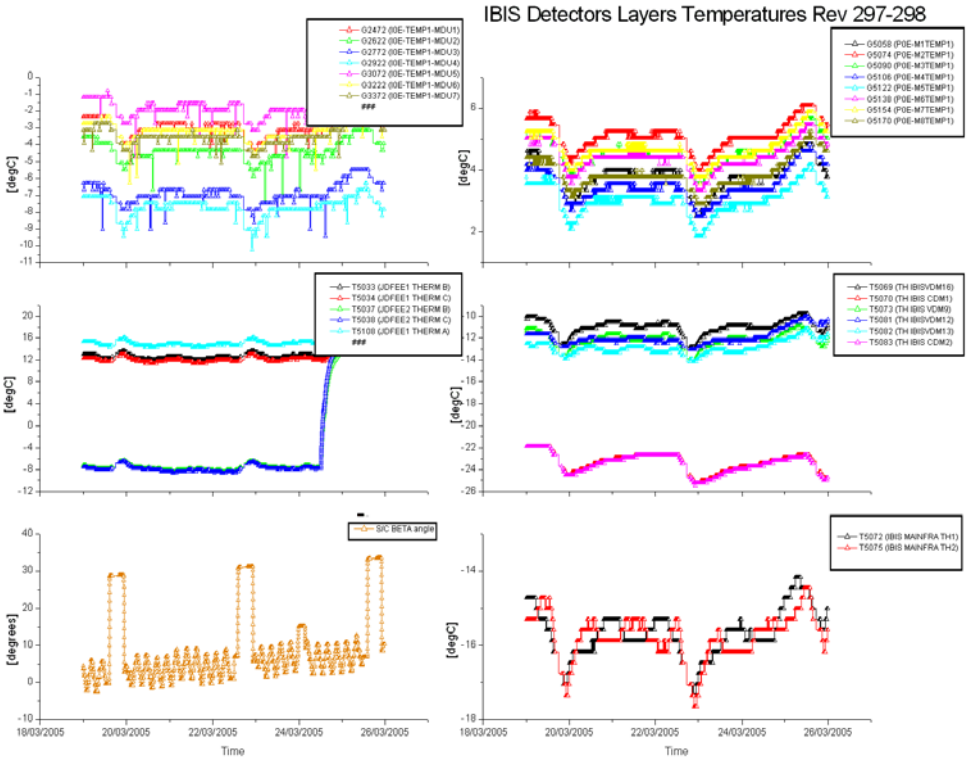


**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures:



**sampling every 8 pkts (64 secs)



**sampling every 8 pkts (64 secs)

IBIS daily report:

DoY 078 (19/03/2005)

Nothing to report.

DoY 079 (20/03/2005)

Nothing to report.

DoY 080 (21/03/2005)

Nothing to report.

DoY 081 (22/03/2005)

At 12:47Z TM G8015 (S1E-A2 PMT V) went OOL 'high'. According to V-VLT-1, as this happened at belt entry, no action was taken.

DoY 082 (23/03/2005)

Nothing to report.

DoY 083 (24/03/2005)

Nothing to report.

DoY 084 (25/03/2005)

At 12:34Z TM G8015 (S1E-A2 PMT V) went OOL 'high'. According to V-VLT-1, as this happened at belt entry, no action was taken.

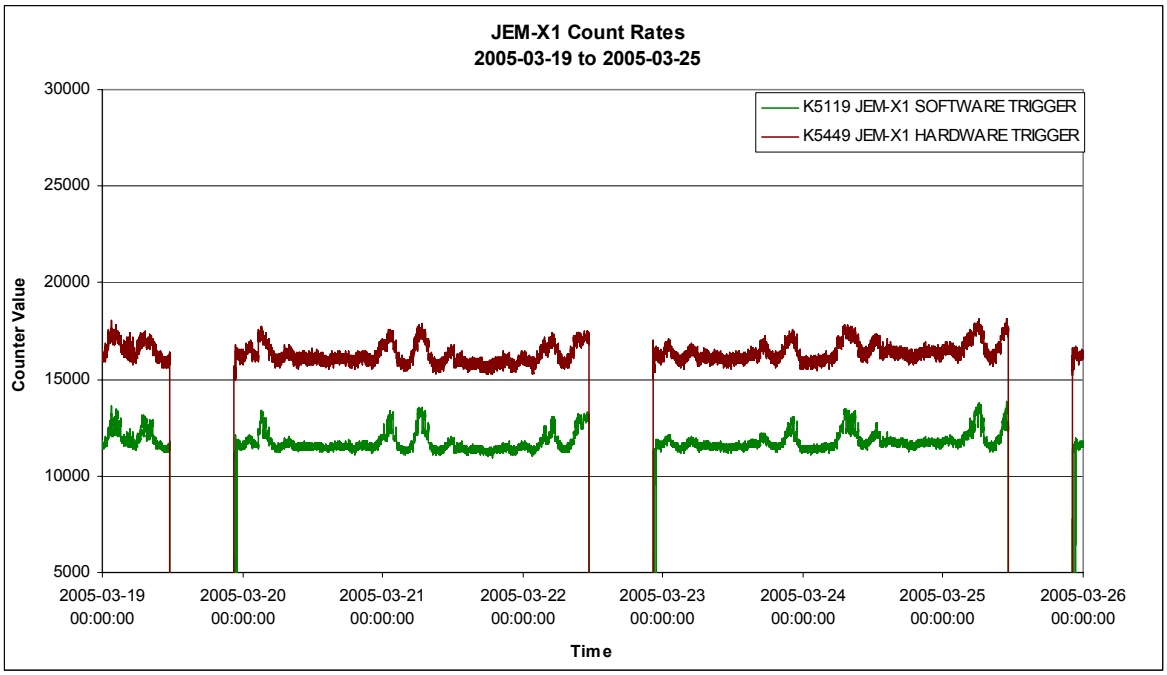
At 21:33Z TM G2014 (overflow of noisy pixel address buffer MCE1) was reported OOL "SCC failure" for one TM cycle. As indicated in I-OVF-1, no action was taken.

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

JEM-X1 count rates over the reporting period are displayed in the following graph[1].

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

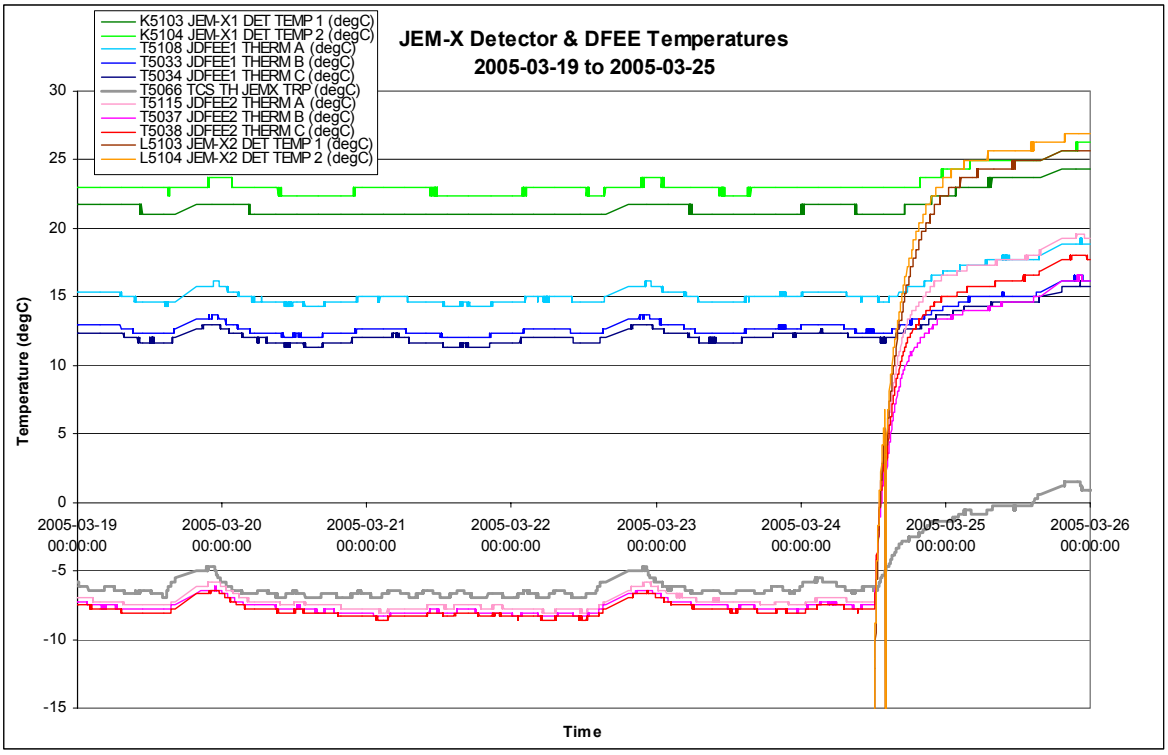


8.3.4.2 JEM-X Temperatures

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 graph[2].

The effect of switching on the JEM-X2 DFEE on 2005-03-24 can be clearly seen. The JEM-X2 DFEE temperatures increased by ~23 degC and those of JEM-X1 by ~2.5 degC.

[2] Data sampled (1 frame in 8)



8.3.4.3 JEM-X Daily Report

2005-03-19 (DOY 078, Rev 296-297) to 2005-03-21 (DOY 080, Rev 297)

Nothing to report

2005-03-22 (DOY 081, Rev 297-298)

Due to problems with the ground station, the ED KESAFE01 scheduled in the Timeline at 11:24:19Z to put JEM-X1 in Safe mode before radiation belt entry of revolution 297 was missed. Once stable TM/TC was regained, JEM-X1 was commanded to Safe mode manually by re-uplinking the ED KESAFE01 at 11:25:29Z.

2005-03-23 (DOY 082, Rev 298)

Nothing to report

2005-03-24 (DOY 083, Rev 298)

In line with OCR-193, the switch-on of the JEM-X2 DFEE was performed in preparation for the activation of JEM-X2 in revolution 300 for the Crab calibration. The activities were performed according to INT_OR_0201, with procedure FCP_JEM2_0021 JEMX2 DFEE ACTIVATION being started at 12:18:04Z.

At 12:20:41Z, during the execution of procedure FCP_JEM2_0021, an anomaly occurred at the stage of restoring the context from the DPE to the DFEE (i.e. after uplinking the command L0030 LOAD DPE TO DFEE). This anomaly is reported in AR INT_SC-116.

The **symptoms** of the anomaly were as follows:
1) The following OEMs were generated:

```
2005.083.12.20.41.691  65535  WARNING     2005.083.12.20.32.809
R 1664 1 211 "JEM-X2 IASW PROB 1" FIX6=1 L9079=1 L9080=211
L5265=2 FIX16=0 .
```

>> Indicating an exception in IASW task 2 (Task TC)

```
2005.083.12.20.41.566  65535  INFORMATION
2005.083.12.20.32.809 R 1664 0 191 "JEM-X2 PROB DFEE 11"
FIX6=11 L9079=0 L9080=191 FIX16=15 FIX16=0 .
```

>> Indicating a failure of the CRC check for the Integer Parameter Table
2) JEM-X2 performed the following state transitions: SAFE > MEMORY > SETUP > MEMORY (instead of SAFE>MEMORY>SAFE):

```
Packet Time             L5022 DFEE STATUS
2005-03-24T12:18:20Z    SAFE
2005-03-24T12:20:04Z    MEMORY
2005-03-24T12:20:20Z    SETUP
2005-03-24T12:20:28Z    MEMORY
```

The following **recovery actions** were then performed:

- At 13:29:29Z the PST was reprogrammed to allocate additional PST slots to JEM-X2 in order to enable a dump of the JEM-X2 DFEE to be performed.
- At 13:33:24Z FCP_JEM2_0051 JEMX2 DFEE MEMORY DUMP was executed, to dump the area 9000HEX to DC00HEX. A comparison was made with the dump of this DFEE area performed after the patch to DFEE S/W version 5.3. Some differences were found in the variable data segments, but these differences were in addresses outside those which had been patched.
- At 13:42:59Z FCP_JEM2_0040 JEMX2 TRANSITION TO SAFE was performed.
- At 13:44:38Z FCP_JEM2_0041 JEMX2 TRANSITION TO SETUP was performed.
- At 13:46:22Z FCP_JEM2_0071 JEMX2 REPORT DFEE INTEGER PARAMETERS was performed. The reported Integer parameters were as expected.
- At 13:49:25Z FCP_JEM2_0081 JEMX2 REPORT DFEE FLOAT PARAMETERS was executed. The reported Float parameters were as expected.
- CRP_JEM2_5010 JEMX2 DFEE POWER CYCLE was performed, which consisted of the following:
    - At 14:00:04Z FCP_JEM2_9010 JEMX2 DFEE SWITCH OFF
    - At 14:11:11Z FCP_JEM2_0021 JEMX2 DFEE ACTIVATION

  The above proceeded nominally and without any unexpected OEMs. The DFEE SW Integer and Float parameters, reported again as part of the procedure FCP_JEM2_0021 were the same as previously and as expected.
- At 14:27:12Z JEM-X2 was then commanded back to Safe mode via FCP_JEM2_0040 as had been planned.
- At 14:29:58Z the PST was changed back to the nominal TM allocation, planned in the Timeline.

Following the JEM-X2 DFEE switch-on, out of limits were received on the JEM-X2 Detector pressure as follows:

- At 14:11:32Z L5101 DET PRESSURE 1 went out of limits Warning Low (value = 132650) and remained out of limits until 19:11:24Z when it began toggling in and out of limits until it returned stably within limits at 19:41:00Z.
- At 14:11:32Z L5102 DET PRESSURE 2 went out of limits Warning Low (value = 135200) and remained out of limits until 20:31:00Z when it began toggling in and out of limits until it returned stably within limits at 21:20:28Z.

2005-03-25 (DOY 084, Rev 298-299)

Nothing to report

8.3.5 OMC Operations

On DoY 078, at 19:50, problems with FEC at Redu, delayed the start of the revolution. Several EDs had to be manually sent, delaying the recovery The impact was the loss of pointings 02970002, scheduled to start at around 22:56.

On DoY 081, from 09:29 to 12:17, problems with DSS-24 caused the timeline to be stopped. The impact was the loss of pointings 02970113 to 02970116. It was during this period that the following commands were rejected:

```
2005.081.11.44.18.484 2005.081.11.44.09.457   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=1326
2005.081.11.44.08.596 2005.081.11.44.03.457   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=1325
```

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for pointing 02970116.

From DoY 082 at 23:53:37 to DoY 083 at 02:40:33, a Flat Field calibration was performed with a Dark Current calibration directly following until DoY 083 at 03:00:41, both were successful.

On DoY 078 at 13:00:54, DoY 081 at 12:47:26 and DoY 084 at 12:34:37, OMC was switched by the Timeline to SAFE mode, at the nominal time.

8.3.6 IREM Operations

Radiation Belts Entry

The plot of Radiation Belt Altitude Entry will be provided in the next issue of the weekly report.

IREM daily report

Nothing to report.

Electron Belts

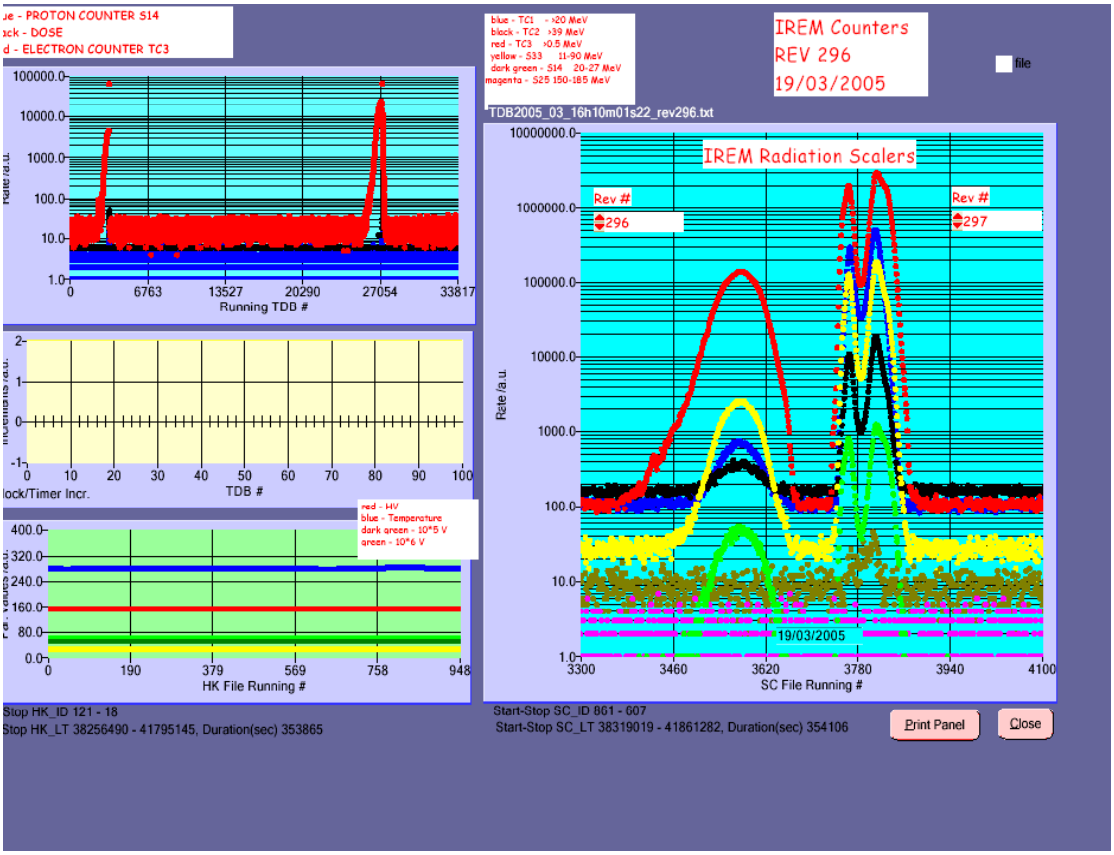
REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
296	RAD_ENTR R 2005-03-19T13:00:33Z	19/03/2005 13:15:25	57759	19-Mar-2005 13:50:31	53321
297	RAD_EXIT R 2005-03-19T22:10:51Z	19/03/2005 20:49:01	>24872	19-Mar-2005 21:00:31	28863
297	RAD_ENTR R 2005-03-22T12:47:08Z	22/03/2005 13:01:09	57621	22-Mar-2005 13:43:09	52489
298	RAD_EXIT R 2005-03-22T21:57:14Z	22/03/2005 20:38:29	>>23219	22-Mar-2005 20:43:09	28251
298	RAD_ENTR R 2005-03-25T12:34:15Z	25/03/2005 14:25:41	44809	25-Mar-2005 13:23:09	53462

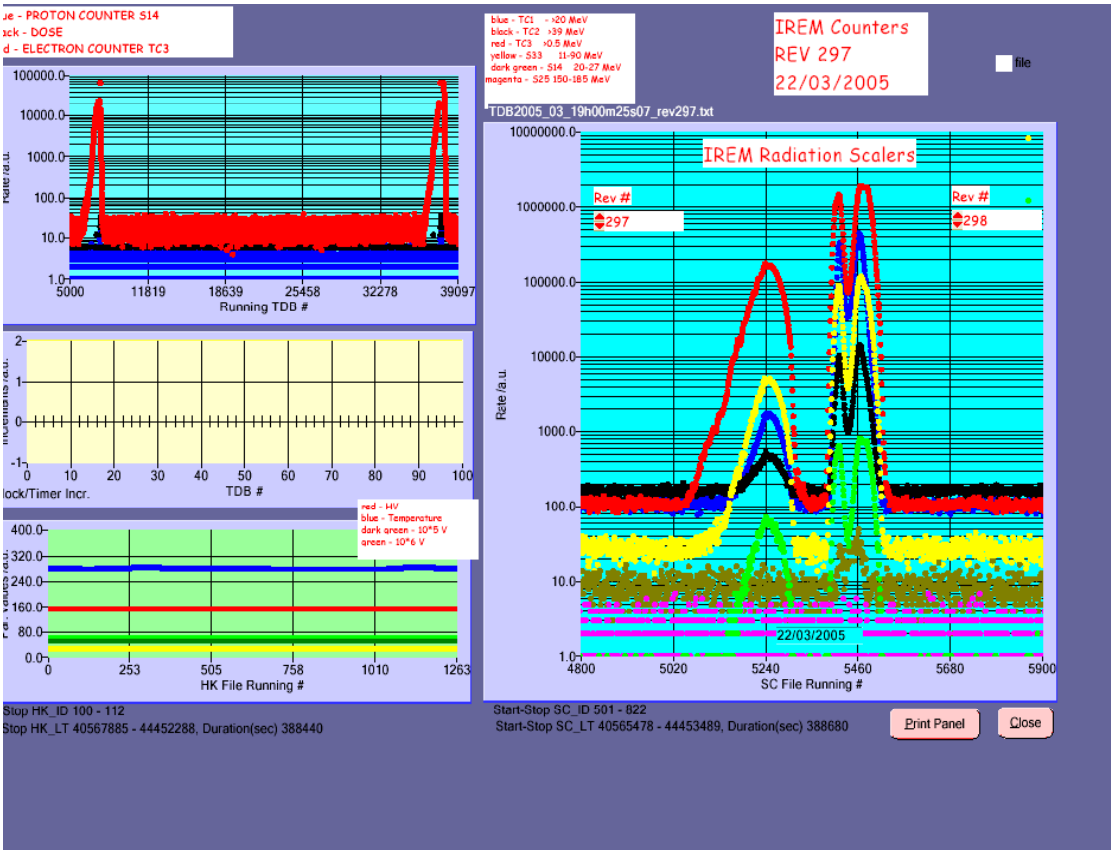
Reference
Very small error vs reference (less than 10 minutes)
Small error vs reference (between 10 and 30 minutes)
Large error vs reference (more than 30 minutes)
Radiation Spike

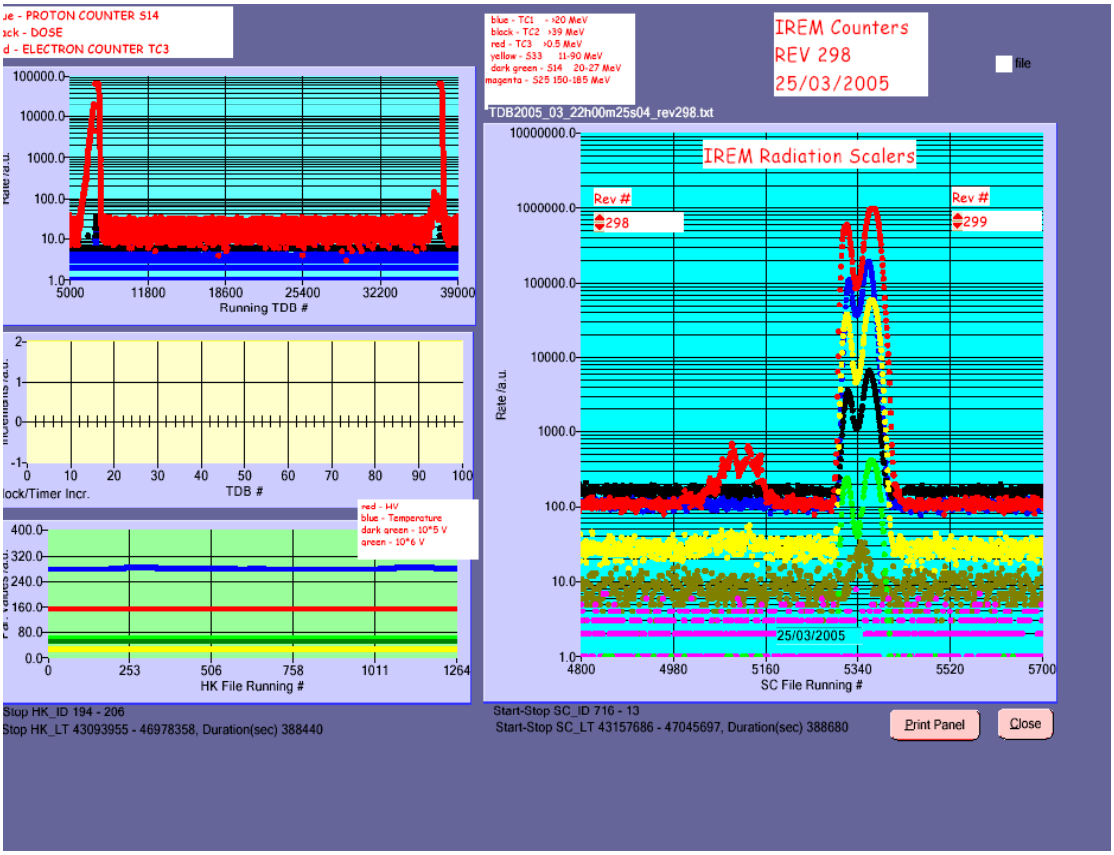
Proton Belts

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

IREM radiation counters

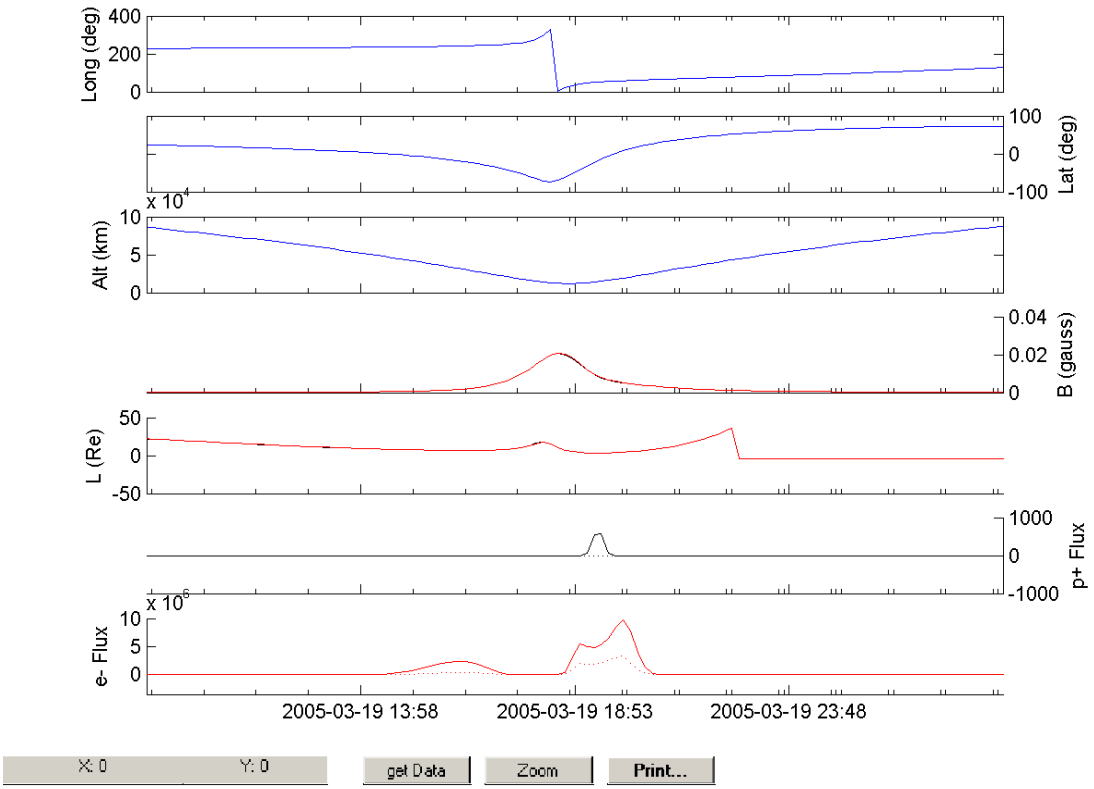




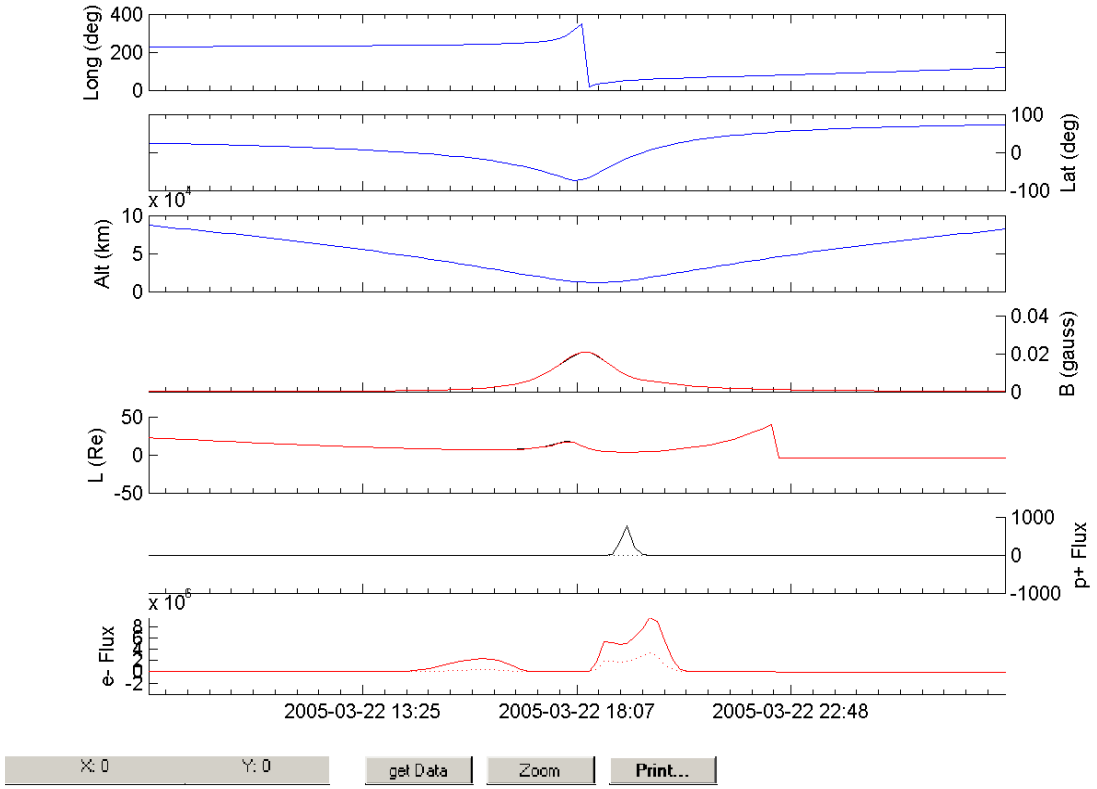


IREM Predicted Radiation Belt Passages.

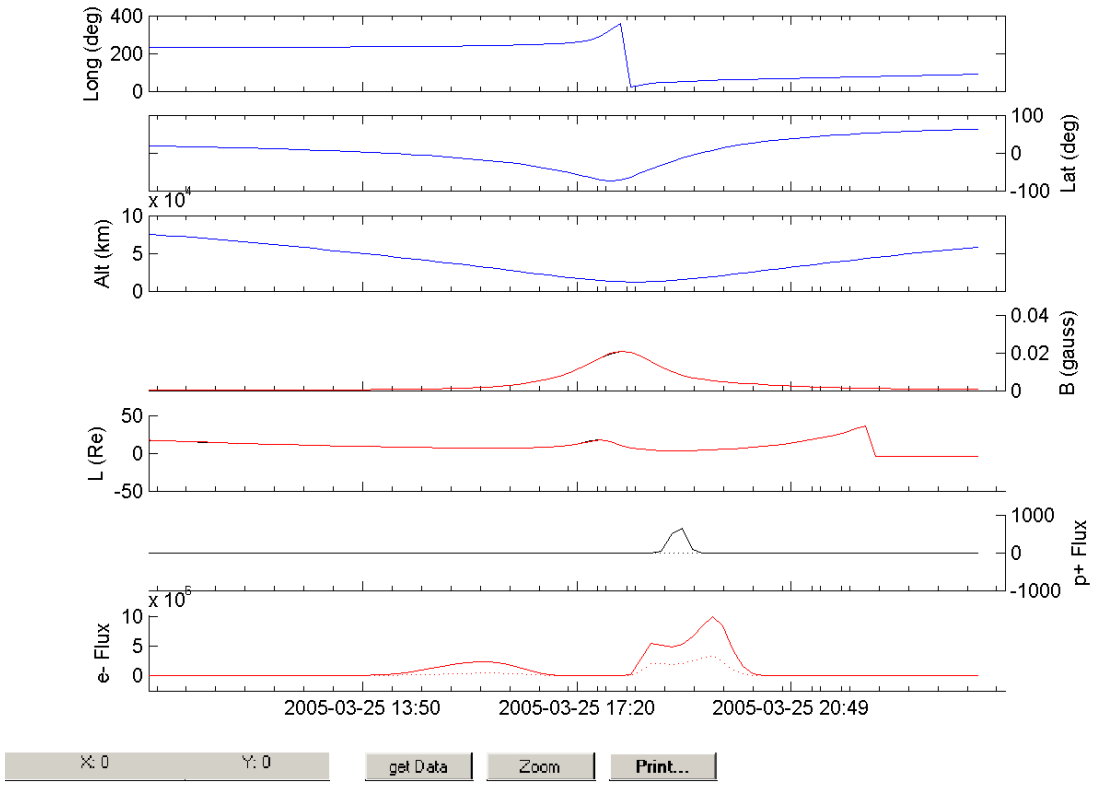
Rev 296



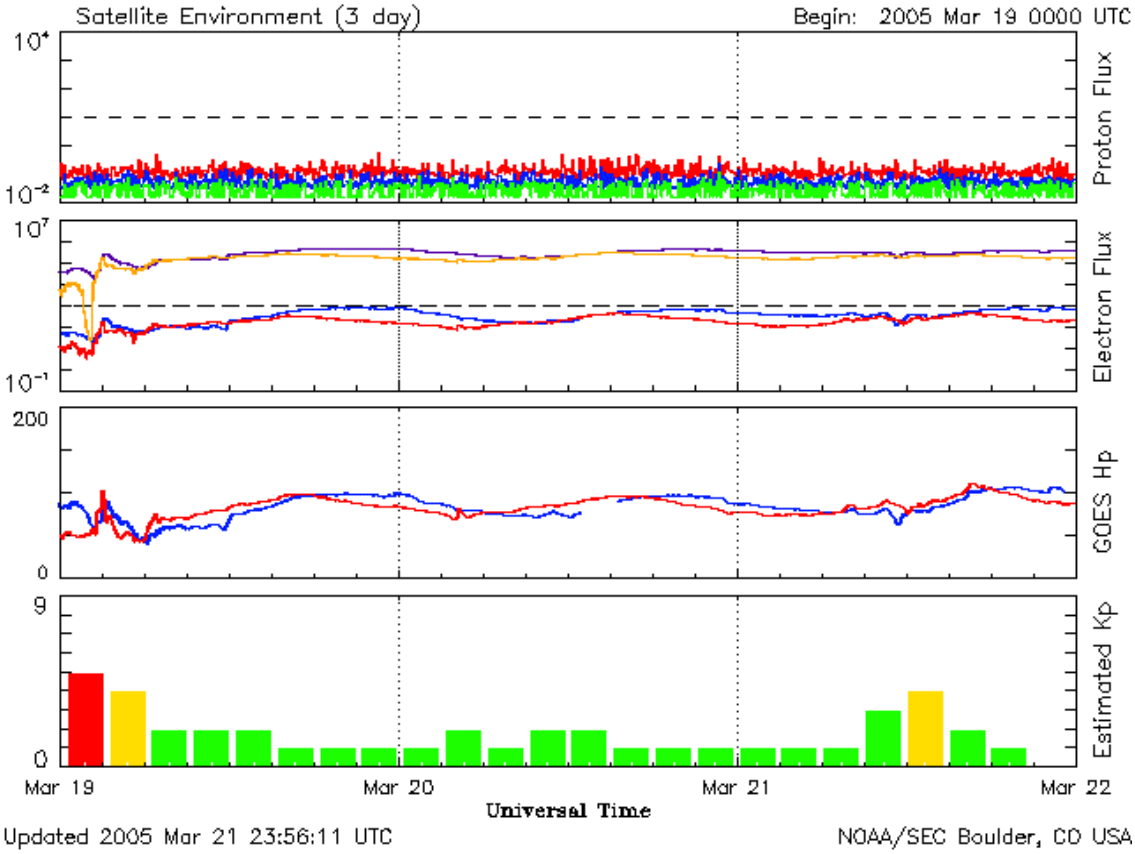
Rev 297

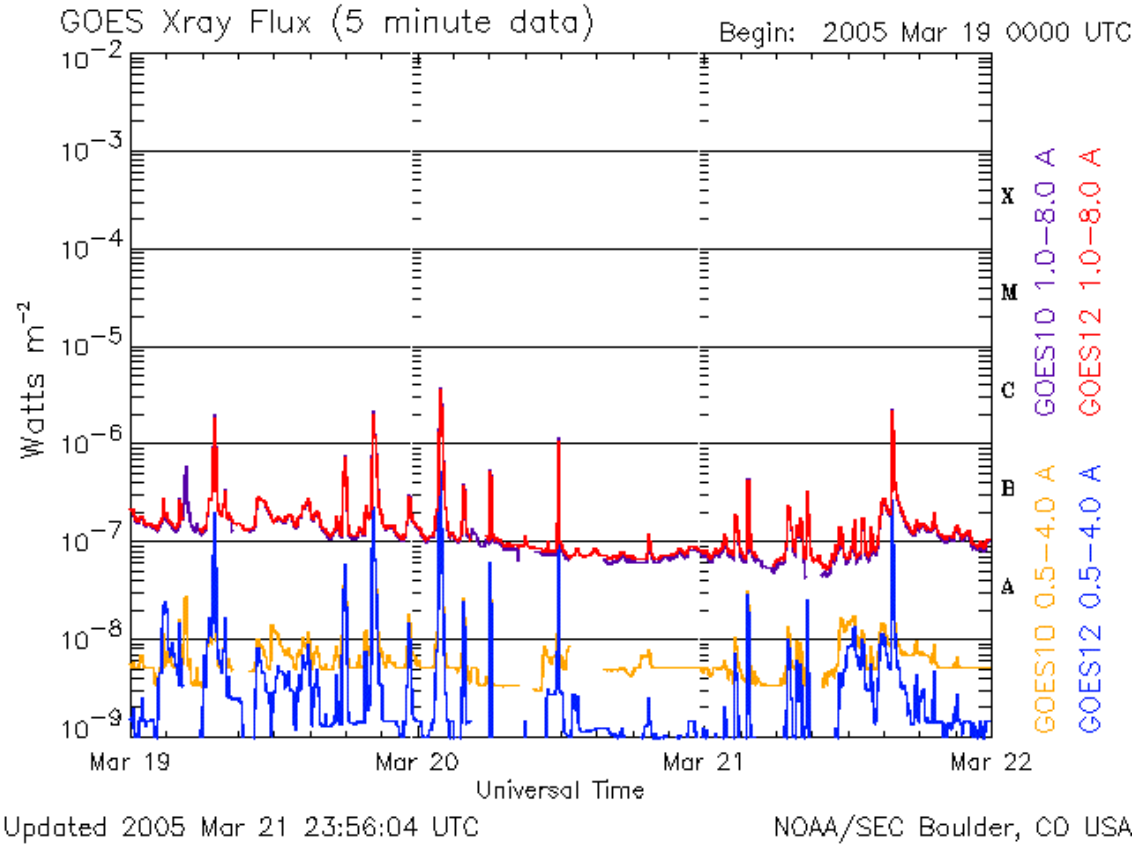


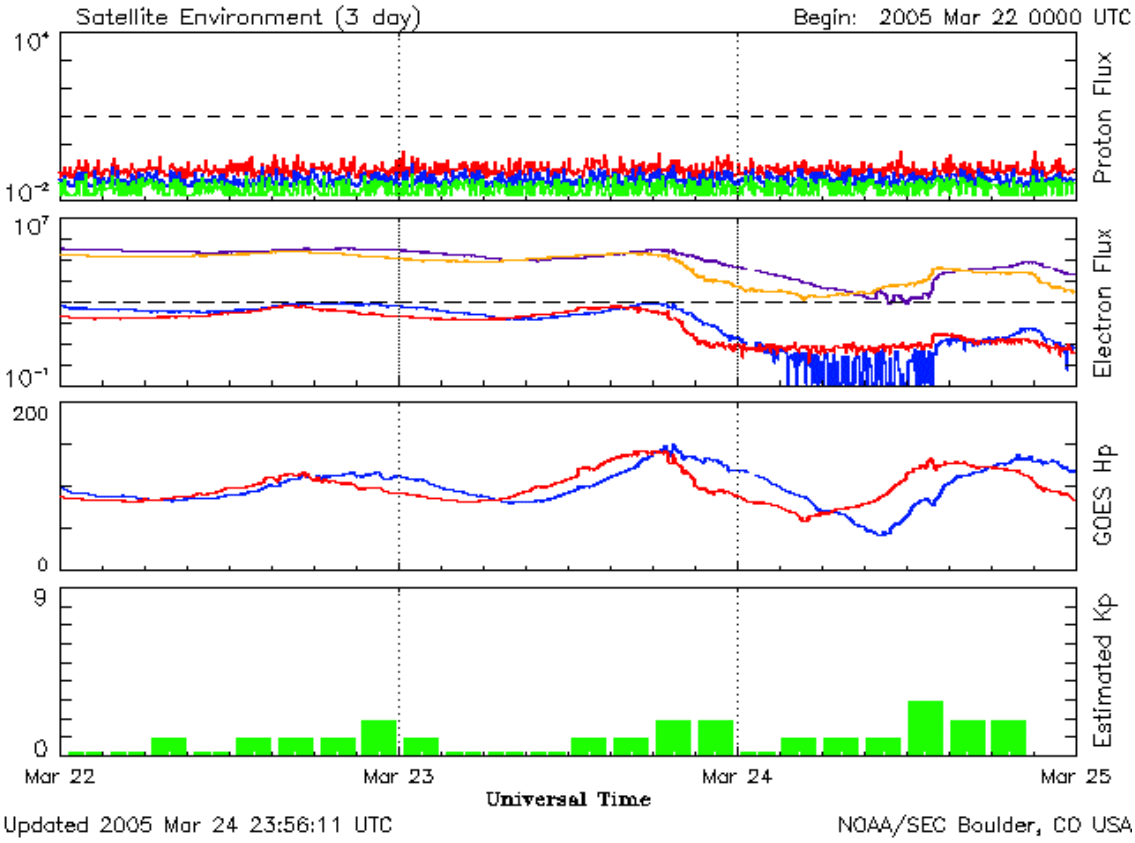
Rev 298

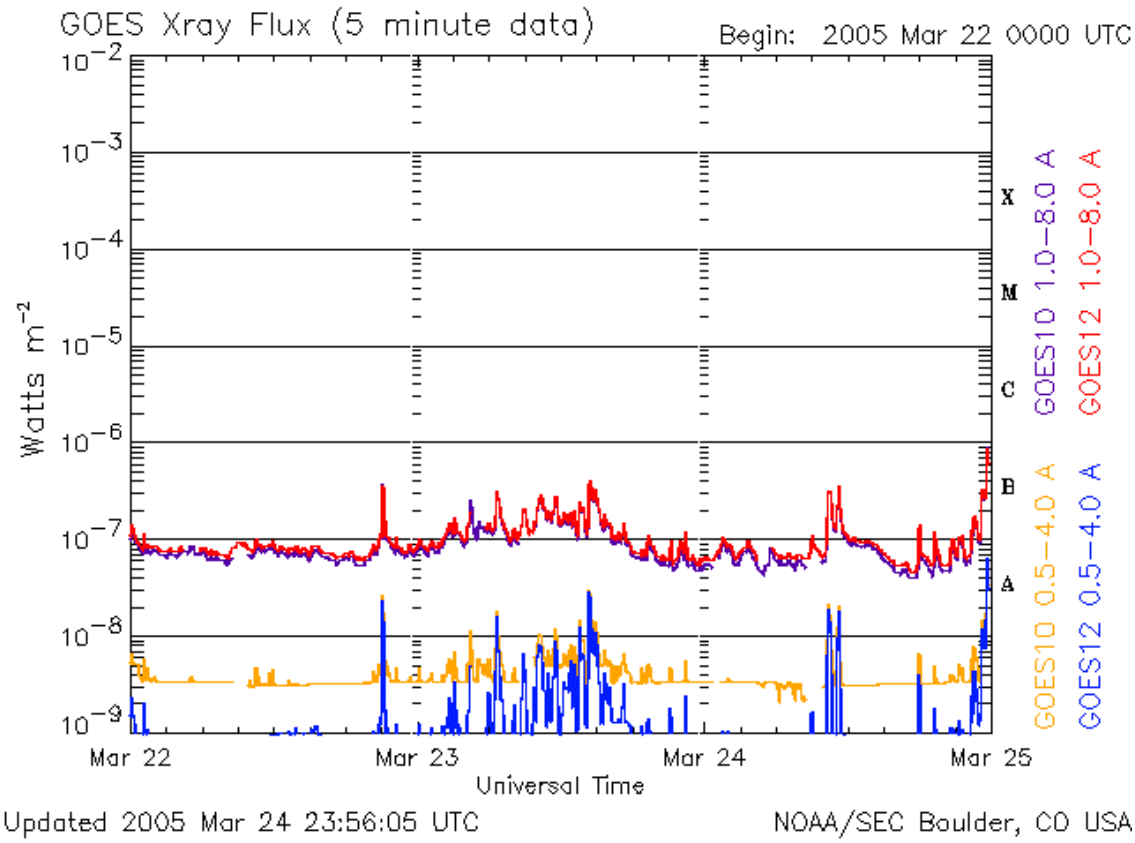


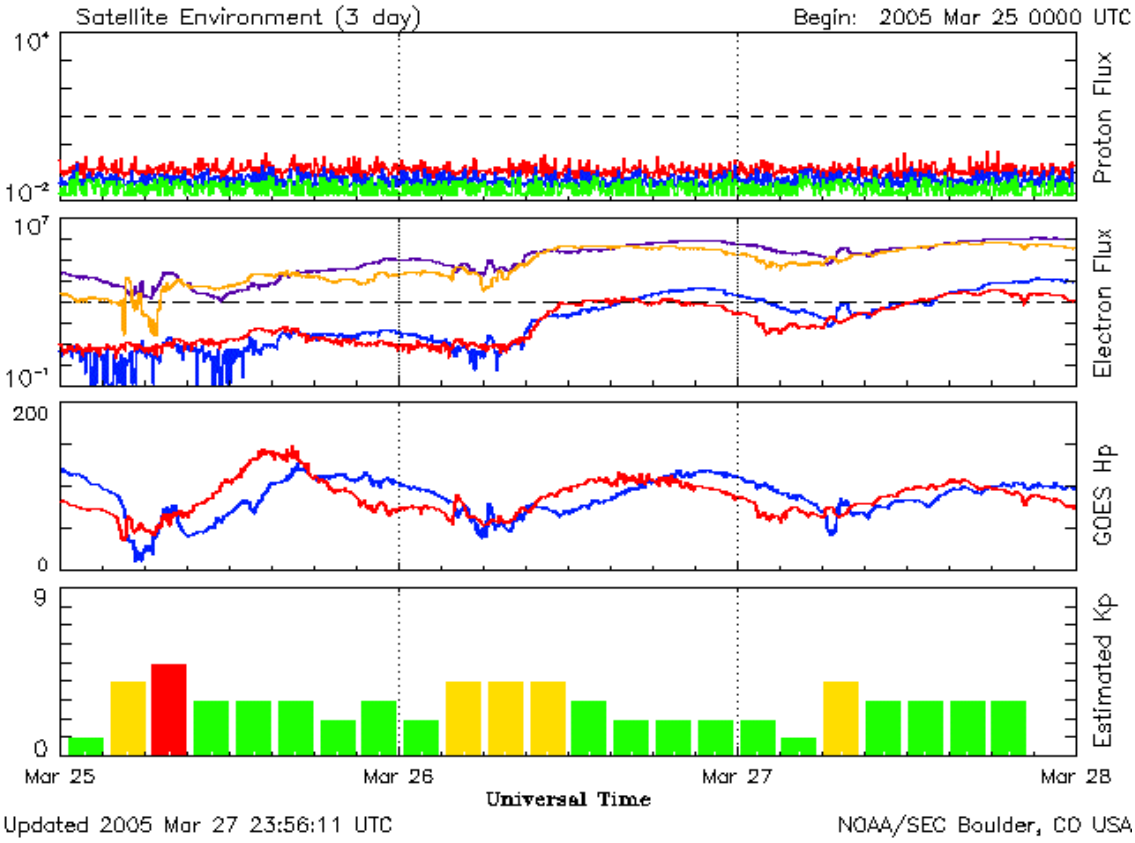
SEC-GOES Observed Particles Fluxes.

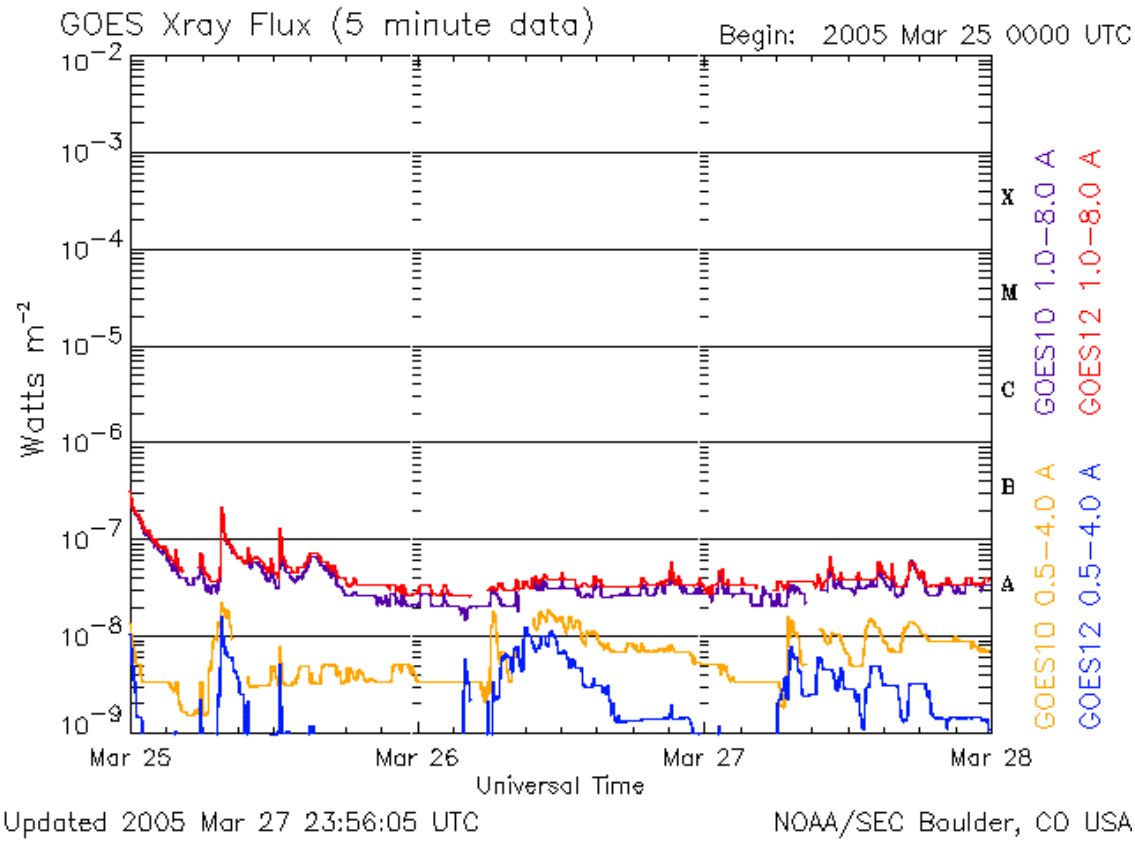





Satellite Environment (3 day)
Begin: 2005 Mar 22 0000 UTC
Proton Flux
Electron Flux
GOES Hp
Estimated Kp
Mar 22
Mar 23
Mar 24
Mar 25
Universal Time
Updated 2005 Mar 24 23:56:11 UTC
NOAA/SEC Boulder, CO USA


GOES Xray Flux (5 minute data)
Begin: 2005 Mar 22 0000 UTC
Watts m-2
GOES10 1.0–8.0 A
GOES12 1.0–8.0 A
GOES10 0.5–4.0 A
GOES12 0.5–4.0 A
X
M
C
B
A
Mar 22
Mar 23
Mar 24
Mar 25
Universal Time
Updated 2005 Mar 24 23:56:05 UTC
NOAA/SEC Boulder, CO USA


Satellite Environment (3 day)
Begin: 2005 Mar 25 0000 UTC
Proton Flux
Electron Flux
GOES Hp
Estimated Kp
Mar 25
Mar 26
Mar 27
Mar 28
Universal Time
Updated 2005 Mar 27 23:56:11 UTC
NOAA/SEC Boulder, CO USA


GOES Xray Flux (5 minute data)
Begin: 2005 Mar 25 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
Mar 25
Mar 26
Mar 27
Mar 28
Universal Time
Updated 2005 Mar 27 23:56:05 UTC
NOAA/SEC Boulder, CO USA