

**INTEGRAL**  
**Mission Report**  
**INT-MOC-SYS-RP-1001-OPS-OF**  
**No. 183**  
**Week 12**  
**27.03.06**  
**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 18.03.06 until 24.03.06 (both dates inclusive) and covers the revolutions 419 and 420.

## **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 a Galactic Plane Survey, a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00; DEC -28:56:00.0), and a raster dither of the Mid-latitude North region (RA 16:18:13.65; DEC -14:13:46.6).

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

## **3 Satellite Status**

### **3.1 Platform**

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

#### **3.1.1 AOCS**

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

5 slews were lost during the observation period due to problem on VILSPA2 station and SEU threshold exceeded on Star Tracker.

The fuel consumption over the period between 17/03/2006 and 24/03/2006 was 0.2036 kg. The remaining propellant is in the order of 155.5090 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

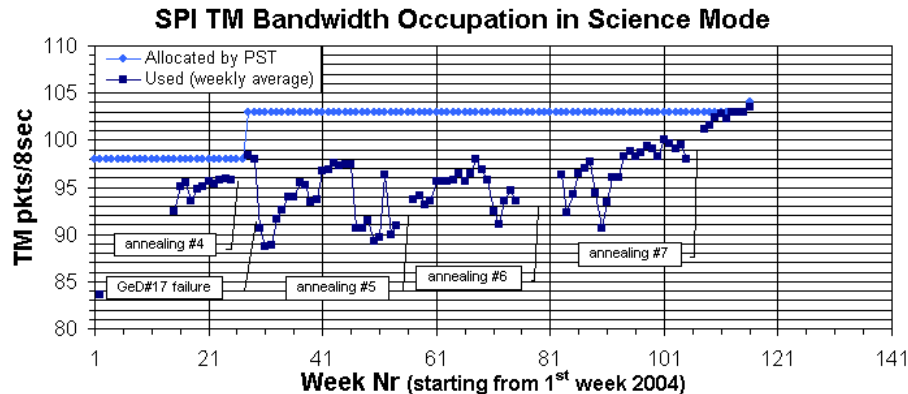
### 3.2.1 SPI

Following the 7<sup>th</sup> annealing, ended on 24<sup>th</sup> January, the overall status of the gamma-ray spectrometer is nominal, except for the Ge detector #15, which is showing since 09.02.2006 a slightly degraded energy resolution. Detector #2 is failed since 06.12.2003, detector #17 since 17.07.2004.

During science operations, the instrument was kept in photon-by-photon mode, with spectra TM enabled, an assigned TM bandwidth in the science observation windows of 104 pkts/cycle (increased by one since 20<sup>th</sup> March after ISWT decision to remove one packet from IBIS – from 129 to 128 – and allocate it to SPI – from 103 to 104 -) and an average occupation of 103.5 pkts/cycle.

The Stirling compressors work nominally, maintaining the Germanium detectors at 85K +/-1K.

The following plot shows the assigned and the average occupation of the SPI TM bandwidth.



*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.

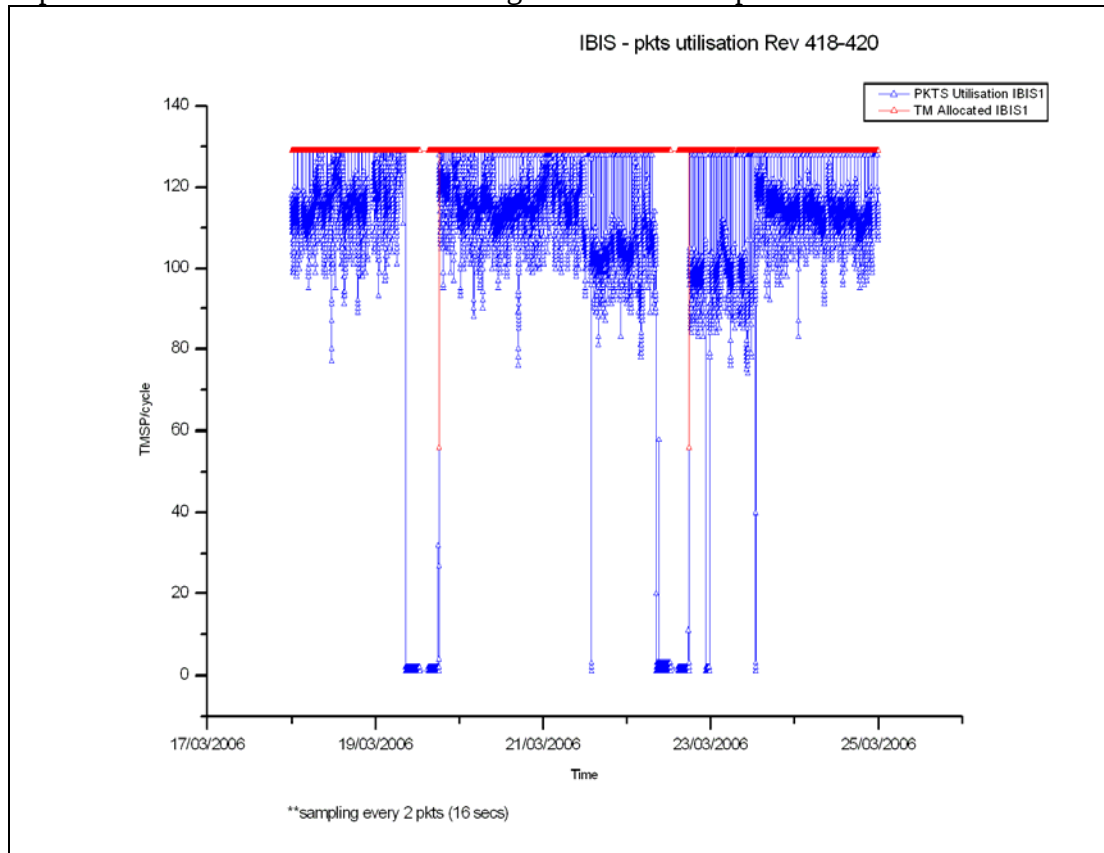
On 22/03/2006 in line with GSCR, the Calibration Histogram Integration Time has been changed from 1800s to 3600s.

On 22/03/2006, VETO VDM #10 reported a HV break-down.

During the reporting period, the PST allocation to IBIS was 129 TMPS/cycle until DoY 2006.079 (20/03/2006) at 09:45Z when the PST was manually uplinked with an allocation of 128 TMPS/cycle for IBIS in line with ISWT of 17/03/2006. The IBIS

mean bandwidth utilisation during the observation period was 113.80 TMPS/cycle, up 5.46 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 throughout the reporting period, with a TM allocation of 8 packets/cycle. JEM-X2 was dormant (DFEE OFF) with 1 packet/cycle.

As during the previous week, due to high count rates from the source being observed, the TM parameters K5449 HARDWARE TRIGGER; K5119 SOFTWARE TRIGGER and K5136 BUFFER LOSS went Out of Limits High on several occasions during the week. This did not affect the operations of JEM-X1 as the counts were not high enough to trigger a transition 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, 158 of the 161 planned science pointings for OMC were executed nominally, 3 were lost.

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

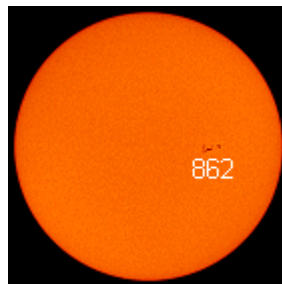
### **3.2.5 IREM**

The overall status of the unit is nominal.

#### **Solar Activity**

The observation period was characterised low solar activity.

The Sun was quiet throughout the observation period. However the 19<sup>th</sup> of March, sunspot 860 had grown and posed threat of solar flare. On the 20<sup>th</sup> it started decaying and sunspot 862 appeared. On 21<sup>st</sup> and 22<sup>nd</sup> of March, sunspot 862 posed threat of solar flares (cf. picture on 21/03/2006). At the end of the week, sunspot 862 had been decaying.



Reference: [www.spaceweather.com](http://www.spaceweather.com)

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

## **4 Ground Facilities**

The Operational ground facilities performance was very good this week. Three pointings were lost when the links with Vil2 dropped, and there were several minor problems with ground station and ISDC links, but these had no impact. The overall performance was well over the 95% requirement.

### **4.1 Mission Operations Centre**

The performance of the MOC was excellent this week. There were only minor problems reported, which had no impact. The overall performance was well over the 95% requirement.

## **4.2 Ground Stations & Network**

The performance of the ground stations and Network was good this week. Three pointings were lost when the links with Vil2 dropped, and there were several other instances of bad frames and TM drops, plus a couple of problems sending data to the ISDC, but these had no impact on the mission. The overall performance though was well above the 95% requirement.

## **4.3 Science Ground Segment**

### **4.3.1 ISOC**

#### **1. Mission planning**

New PSF's for revolution 427 has been received. Planning for this revolution has been performed and sent to MOC. This week revolutions 421 and 423 to 426 have been re-planned. The reason for this is agreements reached during a recent Integral Science Team (ISWT) meeting. Then it was agreed to change the default telemetry allocation used most of the time and to change the step size slightly for a standard 5 x 5 dither pattern. The reason for the first change is that SPI requires more telemetry due to the increased background event rate. The change of the step size is to get a better removal of systematic effects in the IBIS instrument. TSF for revolutions 421 and 422 were received.

#### **2. Observation status**

No new ECS's were received this week. ISDC has reported some difficulty in processing of the missing revolution 407 and 410.

#### **3. ISOC science data archive**

The ISDA version 2.5 was publicly released on 15 March. A couple of points to refine this release are in progress with priority. One relates to handling of observations where there is more than one data set available due to reprocessing at ISDC and the other point is to fill gaps in available icons at observation level. The DELL hardware continues to crash as before.

#### **4. ISOC system**

The version 12.2 is still in use. It is the version to support the AO 4 proposal submission. A version 12.3 is planned for release next week. This should contain all required functionality to support the AO process when the submission is closed.

#### **5. AO 4**

The system is open for reception of proposals. However, as expected, very few proposals have been received up to now.

#### **6. Problems**

The archive hardware problem still remains. A problem of placing hand over windows was detected in revolution 422. Investigations showed it to be a very rare combination of events. For revolution 422 the problem has no consequence since the hand over happened outside the window of science operations. A temporary procedure in ISOC is put in place to avoid this problem to reappear if the same situation should happen again.

#### **4.3.2 ISDC**

Status of ISDC observation processing on 27/03/2006:

- Latest Standard Analysis completed: observation 03200560001 (Cas A /Tycho, Revolution 386) on 22/03/2006
- Latest products archived: observation 03200160001 (NGC 4945, Revolutions 396) on 08/03/2006
- Latest observation products sent to the observer: observation 02297000019 (Cas A, Revolutions 352 & 384-385) on 13/02/2006

### **5 Special Events**

### **6 Anomalies**

The following problems relating to the ground segment impacted operations this week.

- On DoY 082, at 07:11, a drop in TM from Vil2 caused the loss of pointing 04200020.
- At 11:59, another TM drop from Vil2 caused the loss of pointings 04200027 & 04200028.

The following anomaly reports were entered into the ARTS system this week:

| AR id    | Date Created | Subject                                                     | Segment | Status  |
|----------|--------------|-------------------------------------------------------------|---------|---------|
| INT-2848 | 23/03/2006   | FDS failed slew update during parallel update of orbit file | FDS     | Pending |

### **7 Future Milestones**

## 8 Appendix

The appendix includes various detailed information.

### 8.1 Overview of Revolutions

#### Revolution 419

The observations in revolution 419 began with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00; DEC -28:56:00.0), for ~3.5 hours. Next came a raster dither of the Mid-latitude North region (RA 16:18:13.65; DEC -14:13:46.6), which lasted ~35.8 hours. For the remainder of the orbit, (~15.3 hours), a Galactic Plane Survey was performed.

#### Revolution 420

The observations in revolution 420 began with a Galactic Plane Survey lasting ~14 hours. It continued with a hexagonal dither of the Galactic Bulge region (RA 17:45:36.00; DEC -28:56:00.0), for ~3.5 hours. Finally, a raster dither of the Mid-latitude North region (RA 16:18:13.65; DEC -14:13:46.6), which lasted ~37.7 hours, was performed.

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

### 8.2 Consumables

#### 8.2.1 Detailed Fuel Book-keeping

|                          |          |   |                          |
|--------------------------|----------|---|--------------------------|
| 2006-03-08T14:02:10.000Z | 155.8406 | F | Automatic TM processing. |
| 2006-03-10T12:58:55.000Z | 155.8288 | F | Automatic TM processing. |
| 2006-03-10T17:01:03.000Z | 155.7819 | F | Automatic TM processing. |
| 2006-03-13T12:42:24.000Z | 155.7554 | F | Automatic TM processing. |
| 2006-03-13T16:39:44.000Z | 155.7442 | F | Automatic TM processing. |
| 2006-03-15T03:00:04.000Z | 155.7253 | F | Automatic TM processing. |
| 2006-03-16T16:18:56.000Z | 155.7126 | F | Automatic TM processing. |
| 2006-03-18T02:49:55.000Z | 155.6962 | F | Automatic TM processing. |
| 2006-03-19T15:47:35.000Z | 155.6792 | F | Automatic TM processing. |
| 2006-03-21T02:28:51.000Z | 155.6686 | F | Automatic TM processing. |
| 2006-03-21T13:03:24.000Z | 155.6229 | F | Automatic TM processing. |
| 2006-03-21T21:06:05.000Z | 155.6071 | F | Automatic TM processing. |
| 2006-03-22T15:31:43.000Z | 155.5826 | F | Automatic TM processing. |
| 2006-03-23T00:54:00.000Z | 155.5260 | F | Automatic TM processing. |
| 2006-03-24T02:25:07.000Z | 155.5090 | F | Automatic TM processing. |

This report was generated Fri Mar 24 08:00:36 GMT 2006

### 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, 18/03/2006 – 24/03/2006**

AOCS operations were executed from the Automatic Timeline.

During this period, 98 Open Loop Slews, 71 Closed Loop Slews and 8 Momentum Bias were executed (TL + Manual Recovery).

5 slews (3 CSL, 2 OSL) were lost during the observation period due to a problem on VILSPA2 station and SEU threshold exceeded (twice) on Star Tracker.

This is equivalent to a ~2.9 % of the total number of slews planned (170).

#### **Orbit Control**

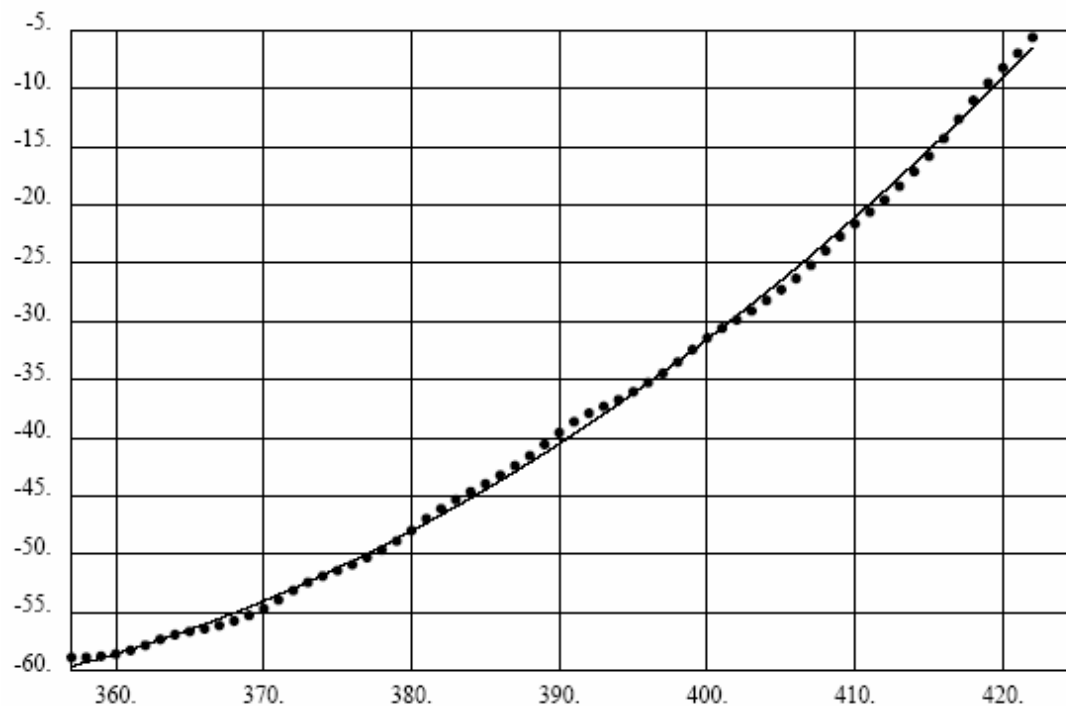
At present time the target is to reduce the eastward drift, by reversing the control and to increase the semi-major axis. From mid July onwards Redu should have coverage down to 40000 km altitude. The apogee longitude will be about 32 deg East.

The following table shows the shortening of the necessary Goldstone pass:

| Orbit number | Apogee passage date | Time from LOS Redu to 40000 km altitude |
|--------------|---------------------|-----------------------------------------|
| 362          | 2005/10/01          | 284 min                                 |
| 372          | 2005/10/31          | 268 min                                 |
| 382          | 2005/11/30          | 244 min                                 |
| 393          | 2006/01/02          | 213 min                                 |
| 402          | 2006/01/29          | 188 min                                 |
| 412          | 2006/02/28          | 159 min                                 |
| 422          | 2006/03/30          | 122 min                                 |

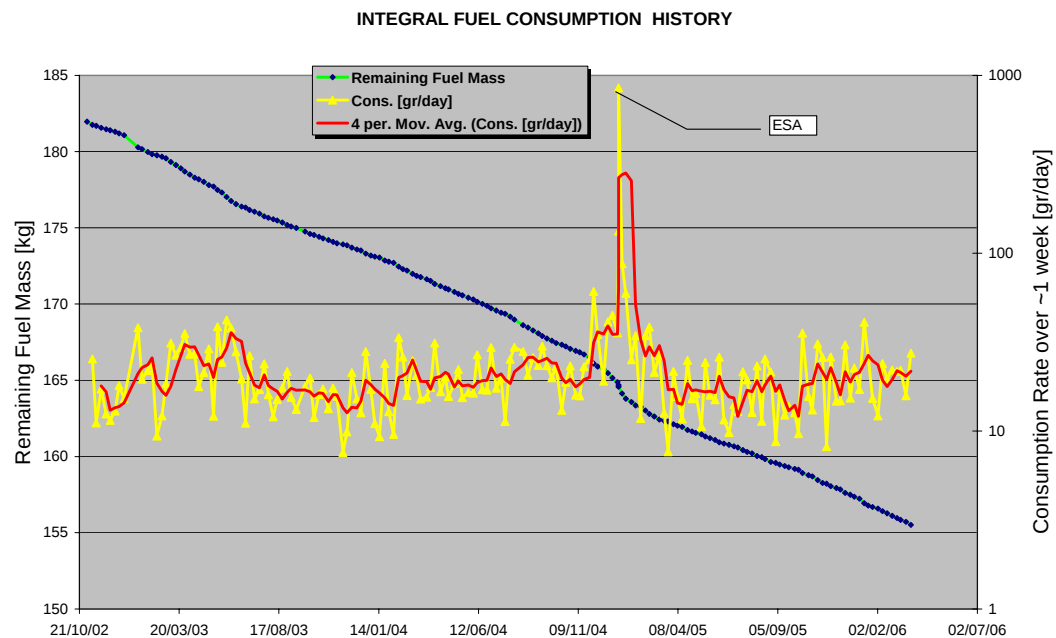
The attached plot shows the apogee longitude of Integral as a function of the orbit number. According to the linear least squares approximation with a parable the drift rate is 1.30 deg eastward shift per orbit at the end of the period.

APOGEE LONGITUDES OF INTEGRAL 16.9.2005 - 01.04.2006  
 LEAST SQUARES APPROXIMATION WITH PARABLE

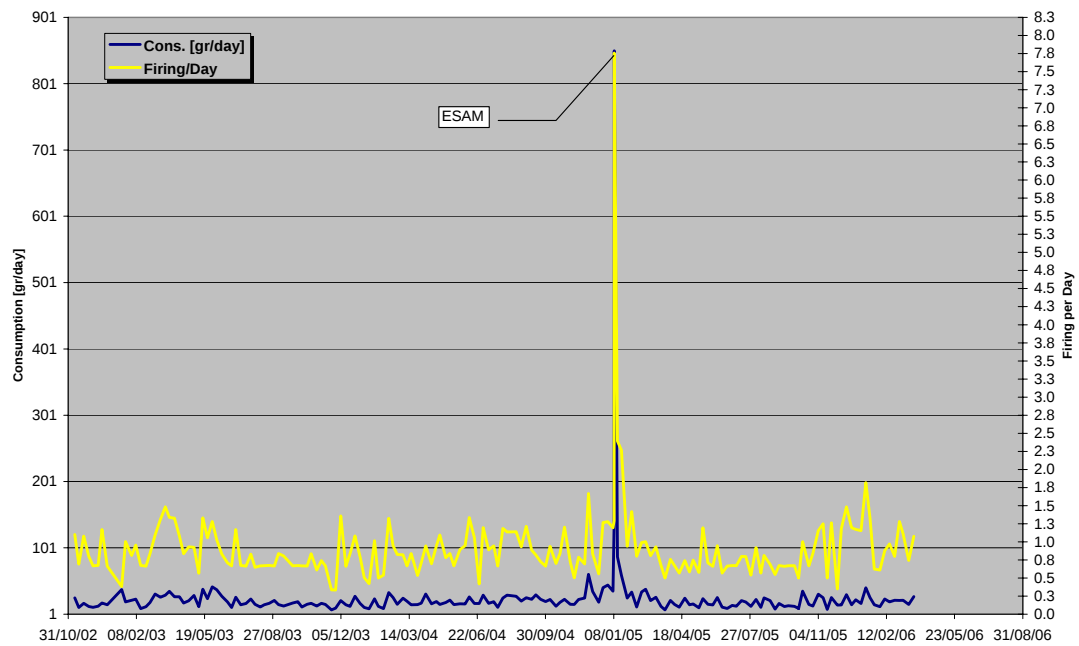


## Fuel consumption

The fuel consumption (total, grams/day) over the period between 01/11/2002 and 24/03/2006 is reported in the plot below.

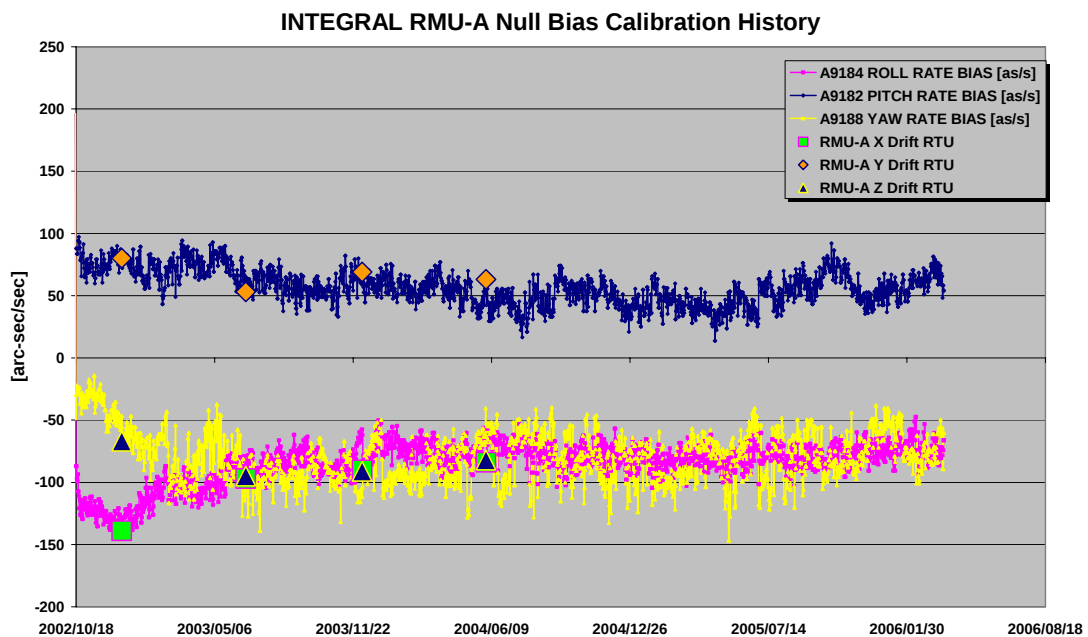


The firing\day over the period between 01/11/2002 and 24/03/2006 is reported in the plot below.

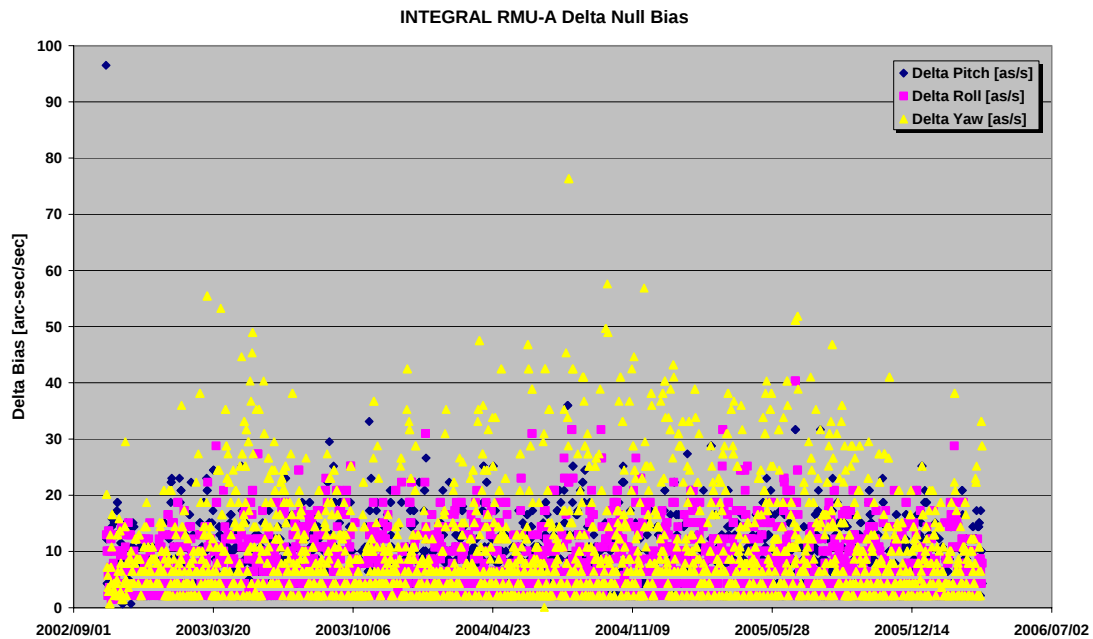


### The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 24/03/2006 is reported in the plot below.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 24/03/2006 is reported in the plot below.



### 18/03/06 (Day of Year 077, Revolution 418)

**Guide star released:** at 22:12z the ACC reported lost of guide star: the guide star, Mi 8.2 [-7413, -22273] ID 6201-915, was released during the first minute after slew ID 04180055 and the IMU1 therefore was NOT switched ON. A new guide star, Mi 8.3 [2467, 2181], not reported in FD star catalogue, was picked in the first automatic mapping, which was kept afterwards. The OTF was not reached during the end of PID 04180055.

The AOCS s/s was disabled in TL at 22:12z.

A manual recovery was then performed and the following slew ID 04150056 manually updated. The guide star selected as slew star, Mi 6.5 [22717, 10142] ID 5624-1433, was not found during the search/track process likely due to a not correct set of the magnitude threshold in the S/T sequence: the magnitude limit set was too close to the effective star magnitude and this caused the failing of the CSL sequence because of no star found in slot # 2.

The recovery was manually performed from the attitude of PID 04180055 to attitude of PID 04180056. The update for the next slew (ID 04180057) from TL was performed at 23:37Z and the AOCS s/s re-enabled in TL.

The following slew, 04180056(CSL) was not executed from the TL.

### 19/03/06 (Day of Year 078, Revolution 418-419)

**Guide star released by the STR SEU Filter:** at 12:26z the ACC reported STR threshold exceeded: the guide star, Mi 8.5 [15757, 4903] (not clearly identified in the star catalogue, likely ID 6853-1959), was released during pointing ID 04180066 and the IMU1 was switched ON. A new guide star, Mi 4.75 [3153, -3953] ID 7378-3132,

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was picked in the first automatic mapping, which was kept afterwards. The OTF was not reached during the end of PID 04180066.

No impact on TL reported, except that the OTF for the PID 04180066 (last slew of the revolution) was not reached.

#### **20/03/06 (Day of Year 079, Revolution 419)**

Nothing to report

#### **21/03/06 (Day of Year 080, Revolution 419)**

Nothing to report

#### **22/03/06 (Day of Year 081, Revolution 419-420)**

Nothing to report

#### **23/03/06 (Day of Year 082, Revolution 420)**

**Slew missed from the Timeline:** at 07:11z due to a problem on the link with VILSPA2 station, the slew ID 04200020 (OSL) failed release.

The AOCS s/s disabled at 07:12z and a manual recovery performed from the attitude of PID 04200019 to the attitude of PID 04200020. The update for the next slew (ID 04200021) from TL was performed at 08:13z and the AOCS s/s was re-enabled in TL.

The following slew ID 04200020 (OSL) was not executed from the TL.

**Slew missed from the Timeline:** at 12:19z due to a problem on the link with VILSPA2 station, the slew ID 04200026 (OSL) failed execution.

The AOCS s/s was disabled at 12:19z and a manual recovery performed from the attitude of PID 04200025 to the attitude of PID 04200029. The update for the slew ID 04200029 from TL was performed at 12:51z and the AOCS s/s was re-enabled in TL.

The following slews ID 04200026(OSL)-27(CSL)-28(CSL) were not executed from the TL.

#### **24/03/06 (Day of Year 083, Revolution 420)**

**Guide star released by the STR SEU Filter:** at 22:41z the ACC reported STR threshold exceeded and lost of guide star: the guide star, Mi 7.25 [-8807, -7594] ID 6216-529, was released during pointing ID 04200064 and the IMU1 was switched ON. The same guide star, Mi 7.25 [-8807, -7594], was picked in the first automatic mapping, which was kept afterwards. The OTF was not reached during PID 04200064.

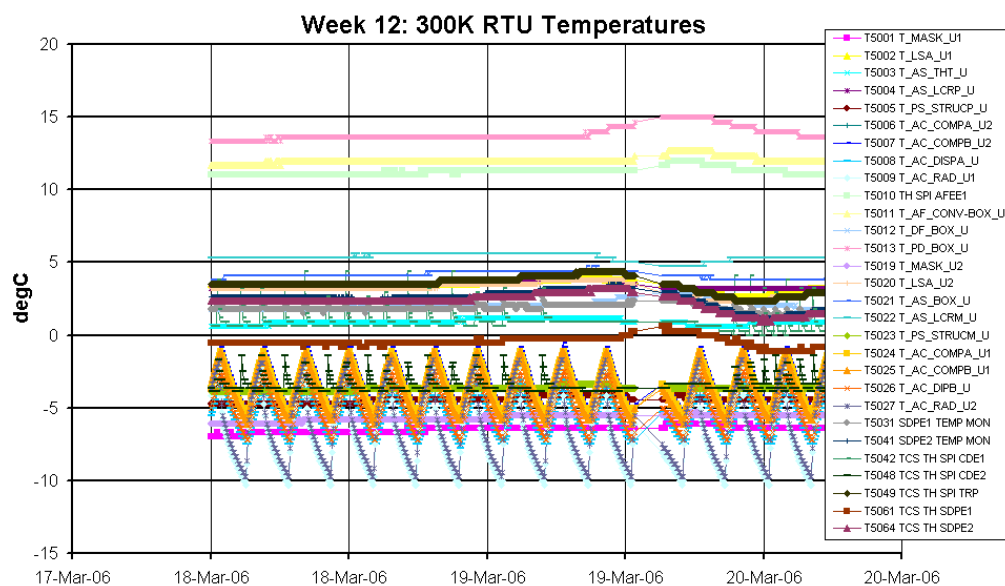
The AOCS s/s was disabled at 22:56z and the slew ID 04200065 failed release. A manual recovery was performed from the attitude of PID 04200064 to the attitude of PID 04200065. The update for the slew ID 04200066 from TL was performed at 00:00z and the AOCS s/s re-enabled in TL.

The following slew ID 04200065 (CSL) was not executed from the TL.

### 8.3.2 SPI Operations

#### Unit Temperatures:

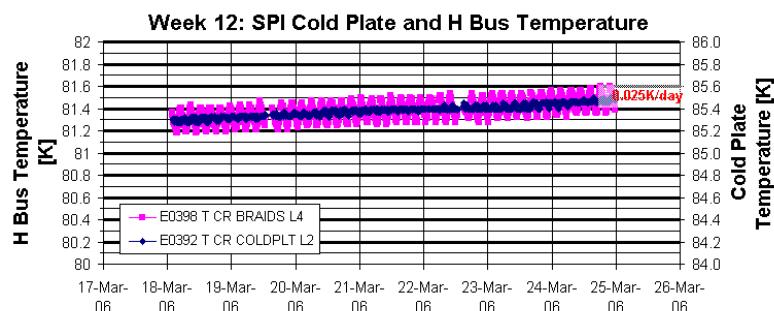
All the equipment temperatures are inside the operational limits. The following plot shows their evolution along the reporting period.



#### Stirling Compressors and Cryostat:

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

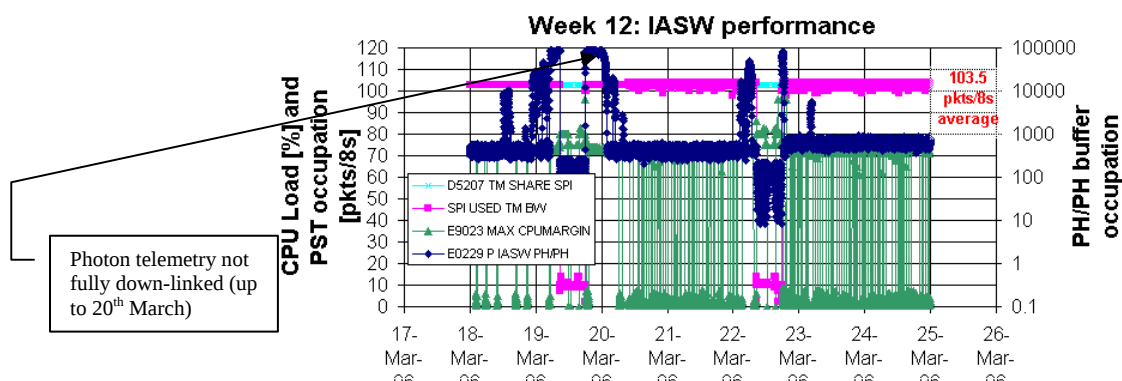
The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period.



#### DPE & IASW:

The Iasw performance is nominal. The current IASW version installed is 432.

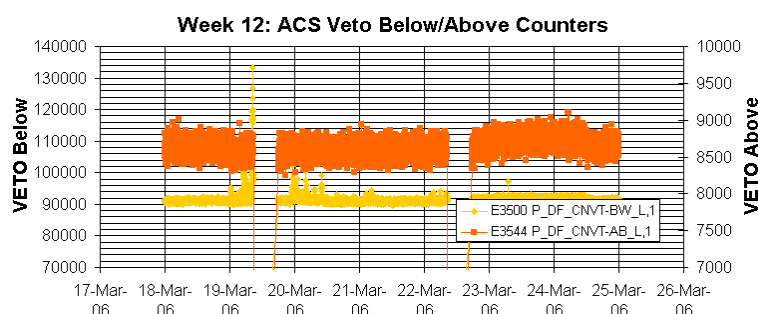
The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



### ACS:

The performance of the ACS is nominal.

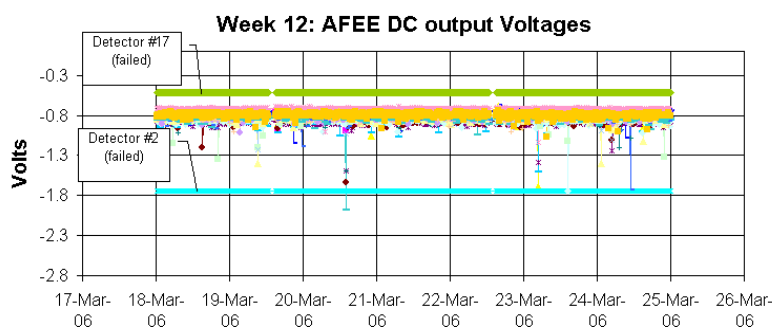
The following plot shows the ACS overall count rate evolution during the reporting period



### AFEE:

The performance of the AFEE and the detectors is nominal, except for detector #15, which shows a degraded energy resolution. The anomaly has been recorded in the ESOC Anomaly Report and Tracking System (ARTS) as INT\_SC-140.

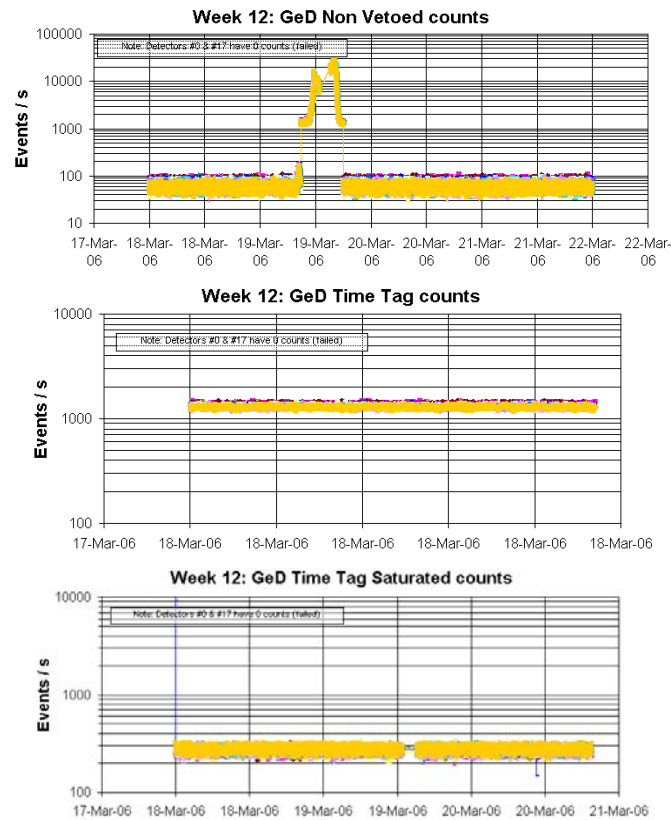
The following plot shows the dc voltage offset of the detector channels during the reporting period. The values are nominal. Detector #2 is failed since 06.12.2003 and detector #17 is failed since 17.07.2004.



### DFEE:

The performance of the unit is nominal.

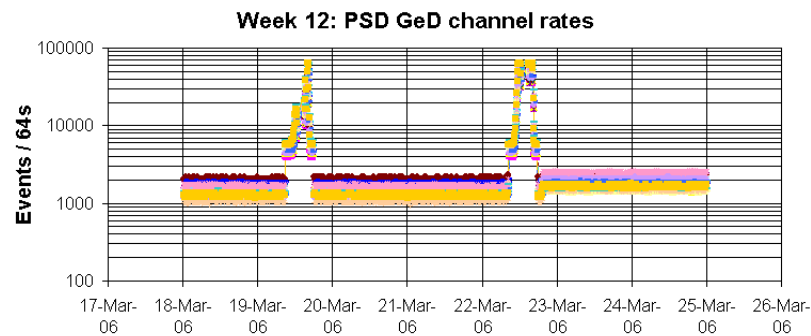
The following plots show the count rates of the detectors during the reporting period (due to problems in the data retrieval tool, some gaps could be present).



#### PSD:

The performance of the unit is nominal

The following plots show the PSD channel rates during the reporting period



#### SPI EVENTS LOG

NOTE: The events log is extracted from the revolution pass summaries (courtesy of the Integral Analysts).

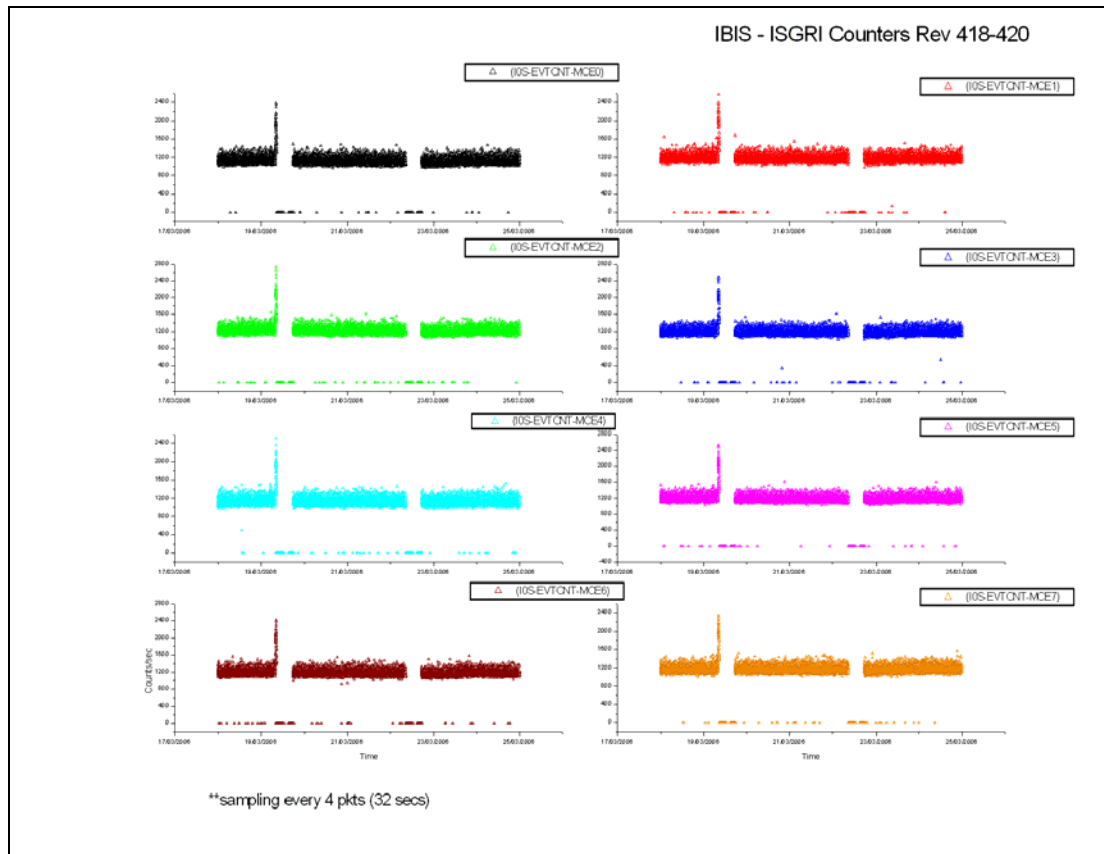
| DOY / Time         | Description                                                                                                                                                               |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 078 – 05:08        | TM E3500 OOL, back in limits @ 05:31                                                                                                                                      |
| 078 – 08:07        | TM E3500 OOL, back in limits @ 08:07                                                                                                                                      |
| 078 – 08:10        | TM E3500 OOL                                                                                                                                                              |
| 078 / 23:25        | TM E3500 “P_DF_CNVT-BW_L,1” OOL Alarm High (@ 95303) for about 1' and back into limits.                                                                                   |
| 081<br>08:30-09:06 | Execution of OR_0242: <b>Disable EEORTM01 ED from Timeline</b><br>Suspend the SPI Tele-commanding on the Auto-Stack.<br>This will prevent the EEORTM01 ED from executing. |
| 081 / 10:24        | TM P2016 “LCL CUR PSD A” OOL Warning High at 0.45 A. for about 1'.<br>SPI SOE investigating.                                                                              |

| DOY / Time               | Description                                                                                              |
|--------------------------|----------------------------------------------------------------------------------------------------------|
| 081<br>Starting at 12:07 | TM P2017 "LCL CUR AF2 DT A" toggling in and out of OOL Warning High. SPI SOE investigating               |
| 81 / 14:54               | TM P2017 "LCL CUR AF2 DT A" toggling in and out of OOL Warning High for few times. SPI SOE investigating |
| 081 / 15:39              | TM E4009 "S DF HSLERR L" violated the fix check at O for few sconds.                                     |
| 081 / 16:12              | TM P2017 "LCL CUR AF2 DT A" back in limits                                                               |
| 84<br>08:19-08:21        | G/S H/O Redu to Goldstone slightly delayed to complete the verification of the sequence "EEORTM01"       |

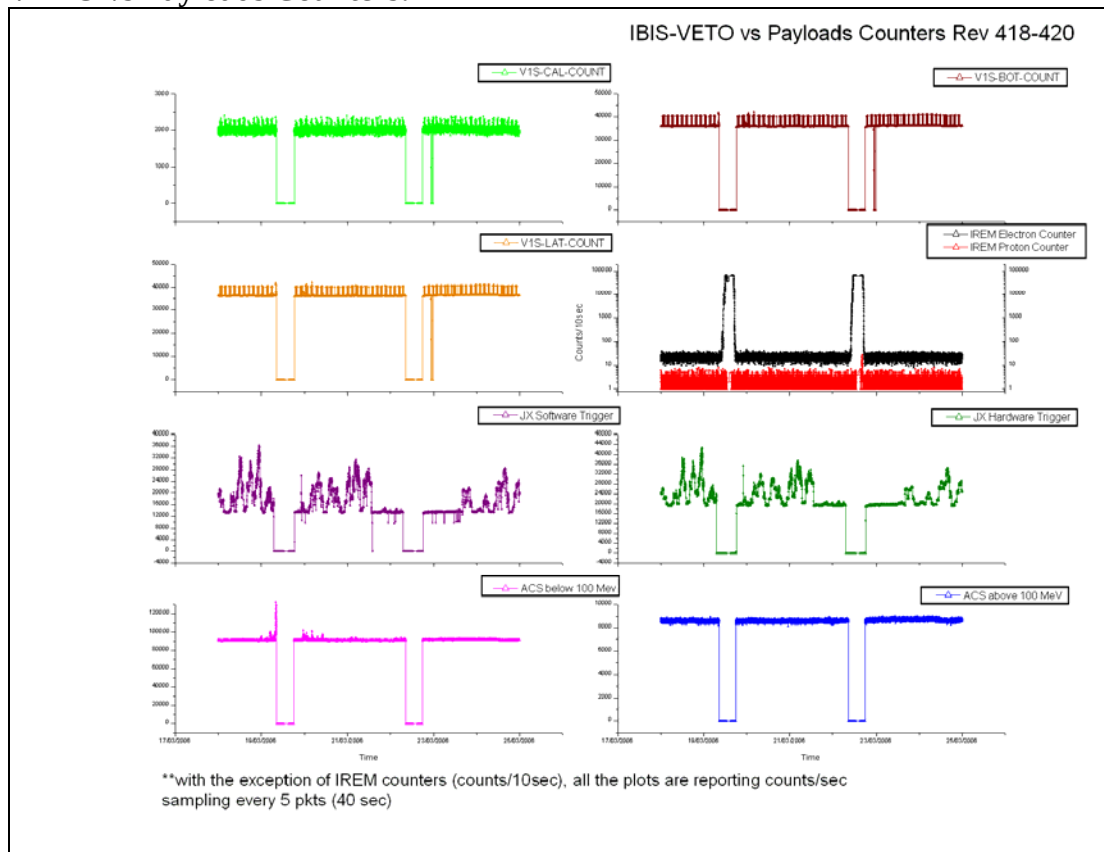
### 8.3.3 IBIS Operations

#### IBIS Event Counters Plots.

#### ISGRI Counters:

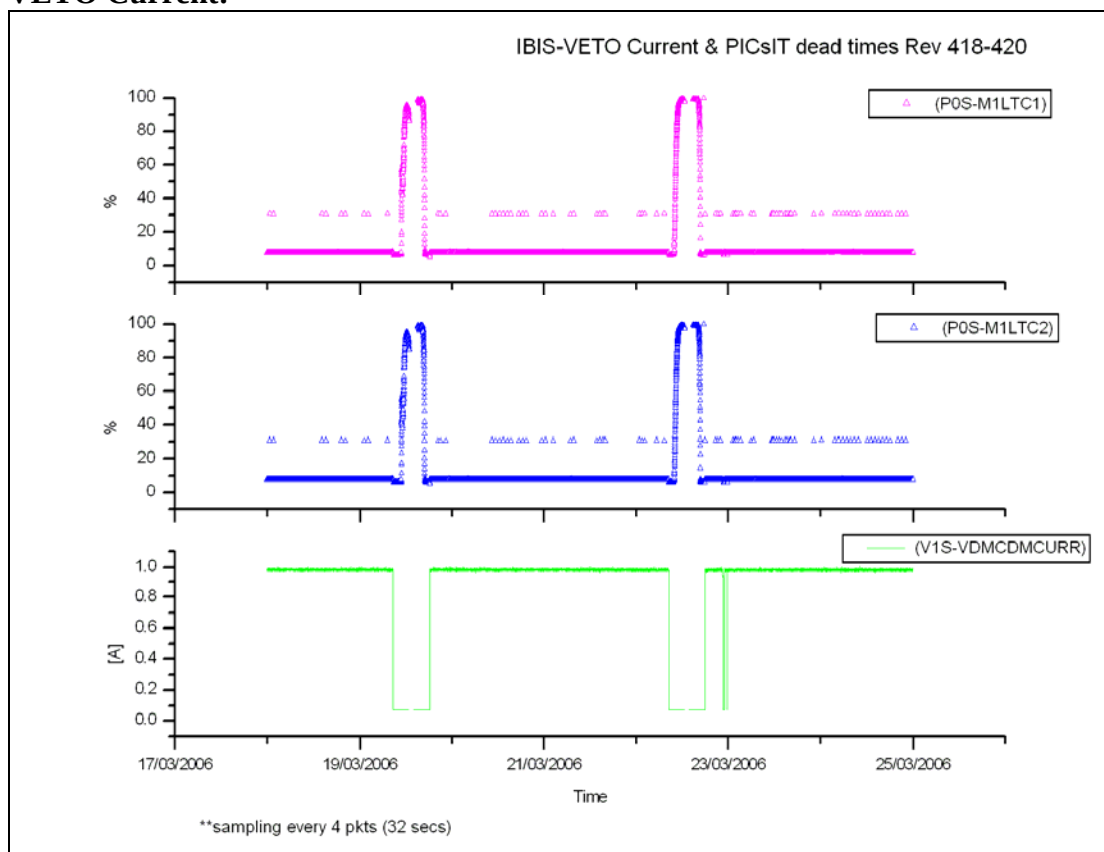


## VETO vs Payloads Counters:

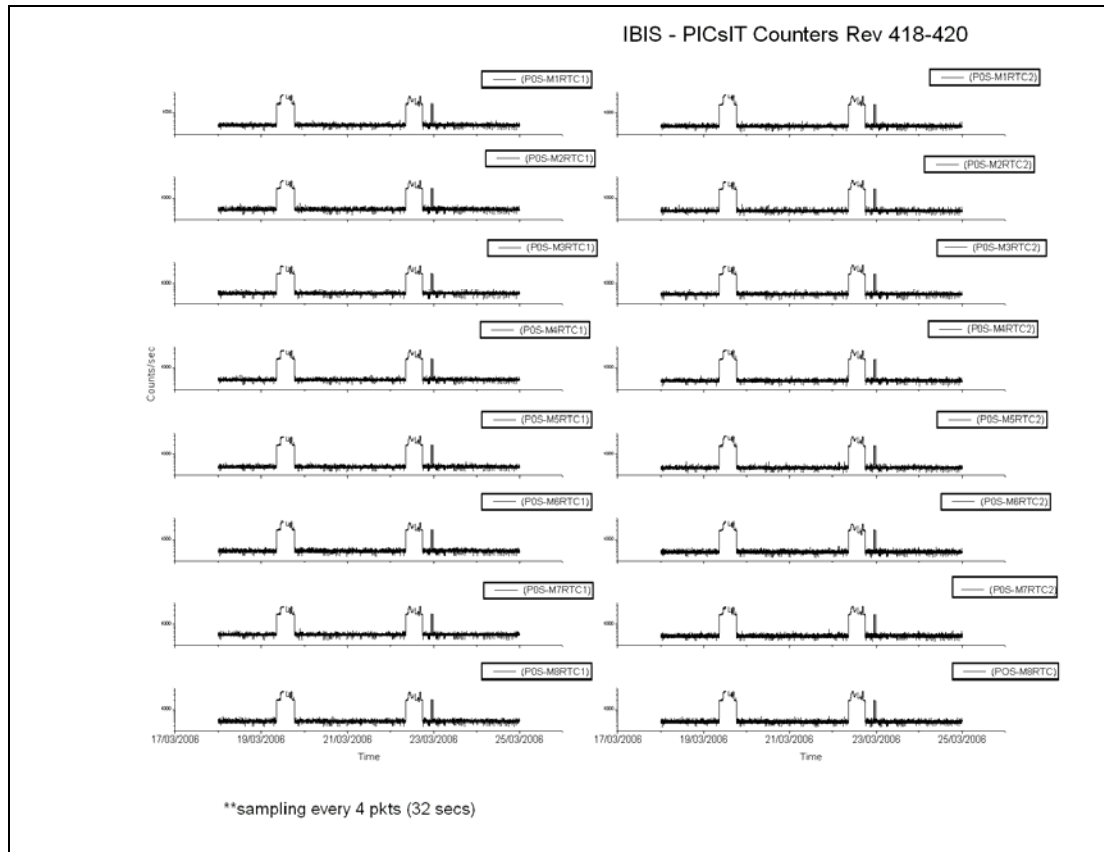


The week was characterised by low radiation.

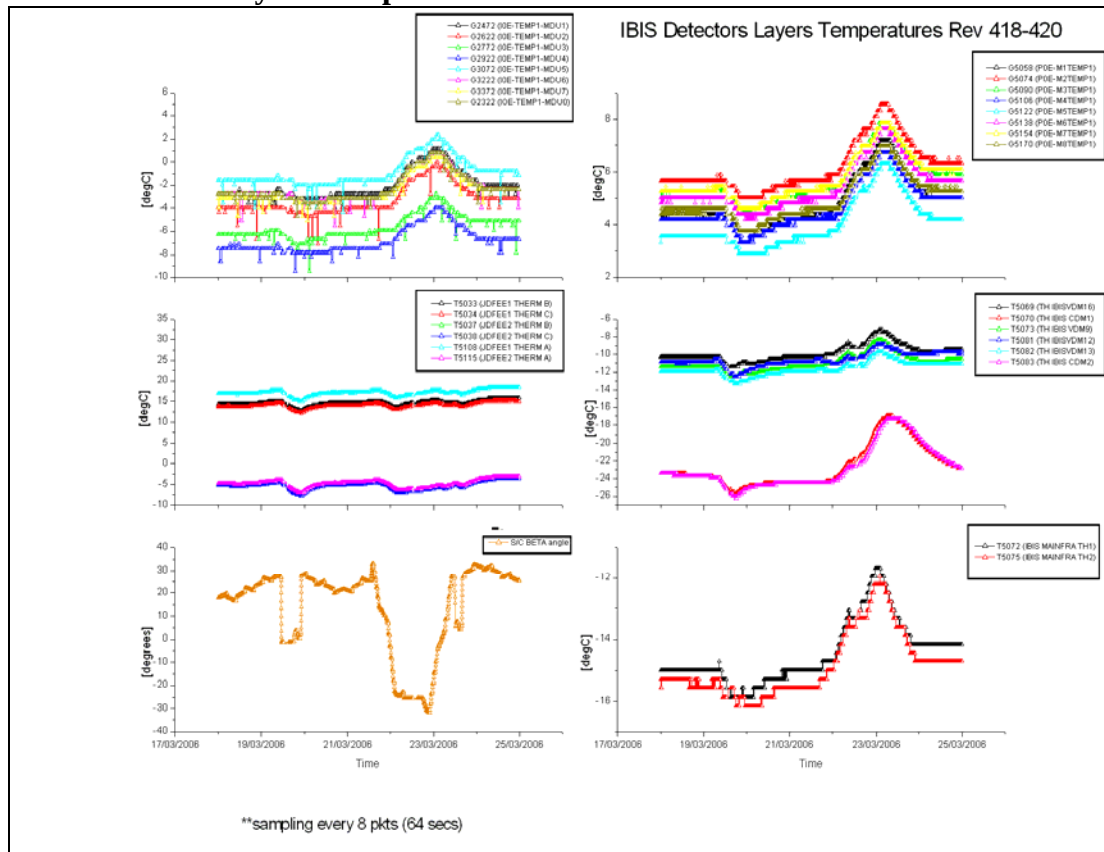
## VETO Current:



## PICsIT Counters:



## IBIS Detectors Layers Temperatures:



## **IBIS daily report**

### **DoY 2006.078 (19/03/2006):**

Between 08:24Z and 08:32Z, TM parameters G2027 (I0S-EVTCNT-MCE1), G2041 (I0S-EVTCNT-MCE2), G2055 (I0S-EVTCNT-MCE3), G2083 (I0S-EVTCNT-MCE5) and G2097 (I0S-EVTCNT-MCE6) were toggling OOL High due to a high radiation background close to the radiation belts.

At 08:29Z TM parameter G8080 (S1E-VS HBRA-RT) was reported OOL High for the same reason.

At 08:45Z, TM parameter G8015 was reported Out Of Limit high. It went back inside limit at 18:14Z. As this happened inside the radiation belts (following VETO Stand-By mode), according to V-VLT-1 no action was taken.

Inside the radiation belts, TM parameters G5002 (P0S-M1RTC1), G5003 (P0S-M1RTC2) and G5027 (P0S-M6RTC1) were toggling OOL high. According to P-CNT-1, no action was taken.

At 17:49Z, TM parameter G2014 (I0E-OVFWPXADD-M1) failed SCC and back. At 17:59Z, TM parameter G2084 (I0E-OVFWPXADD-M6) failed SCC and back. According to I-OVF-1, as this happened inside radiation belts, no action was taken.

### **DoY 2006.079 (20/03/2006): PST change**

At 09:45Z, following the ISWT of 17/03/2006, the PST was manually uplinked with a move of 1 packet from IBIS to SPI, giving for IBIS an allocation of 128 TMPS/cycle. This new TM allocation has been manually updated by the operator during revolutions 419 and 420 following INT\_OR-241. From revolution 421, ISOC has implemented this change in the timeline (note that special settings are defined for revolution 422).

### **DoY 2006.080 (21/03/2006):**

At 00:04Z the status of the PPDU Board 4B1 went to OPEN unexpectedly (TM parameter P2173). This board controls TSW B for MCE 1 to 4, as well as Heater B for IEB2. Nominally TSW are all OPEN and the heater is ENABLED. As at the time of the anomaly this later was not being used, the HLCL was closed back without any impact on IBIS (cf. INT\_AR\_143).

### **DoY 2006.081 (22/03/2006):**

At 08:27Z, TM parameter G8015 was reported Out Of Limit high. It went back inside limit at 17:57Z. As this happened inside the radiation belts, according to V-VLT-1 no action was taken.

Inside the radiation belts, TM parameters G5022 (P0S-M5RTC1) and G5013 (P0S-M3RTC1) were toggling OOL high. According to P-CNT-1, no action was taken.

Between 09:09Z and 09:29Z, HEPI, LUT1, LUT2, VETO and PICsIT CTX tables were dumped from DPE for a routine check. All 5 tables were found as expected and the check was approved. Next routine CTX dump is planned for June 2006.

At 15:49Z, due to an unavailability of ISGRI CTX tables from revolution 419, the operator uplinked the tables of revolution 418 as agreed with ISDC.

#### **DoY 2006.081 (22/03/2006): Calibration Histogram Integration Time change**

At 15:12Z, following INT\_OR-244 (in line with **GSCR**), the Calibration Histogram Integration Time was changed to 3600sec.

#### **DoY 2006.081 (22/03/2006): VDM #10 HV break-down**

At 22:35Z, VETO VDM #10 reported a high voltage break-down. Recovery was performed as indicated in FDIR action V-HV-1 and the unit was operationally back at 23:50Z (cf. INT\_AR-144).

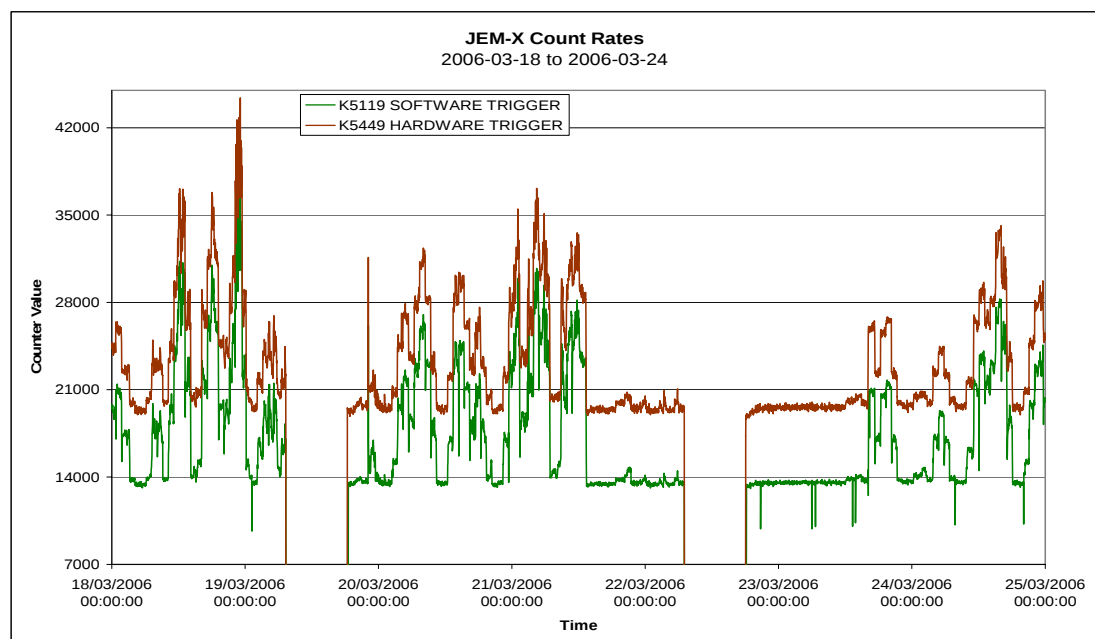
#### **DoY 2006.082 (23/03/2006):**

Due to a lost of links, ED GESTAN02 was missed from timeline at 12:14Z. The operator uplinked manually this sequence at 13:01Z.

### **8.3.4 JEM-X Operations**

#### **8.3.4.1 JEM-X Count Rates**

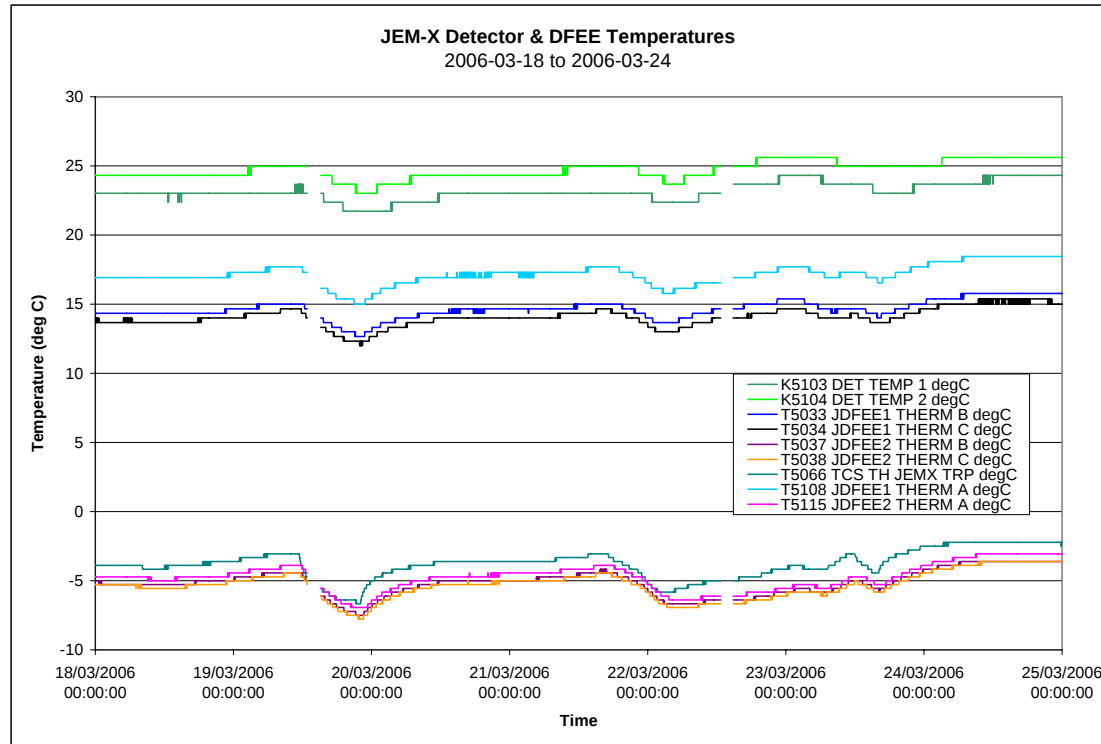
JEM-X count rates over the reporting period are displayed in the following graph<sup>1</sup>.



<sup>1</sup> 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<sup>2</sup>.



### 8.3.4.3 JEM-X Daily Report

#### 2006-03-18 (DOY 077, Rev 418)

Due to continuing high counts from the source being observed, the following parameters toggled OOL High over the following periods:

- K5449 HARDWARE TRIGGER from 11:45Z to 13:12Z and again from 17:14Z to 19:13Z.

#### 2006-03-19 (DOY 078, Rev 419)

Nothing to report

#### 2006-03-20 (DOY 079, Rev 419)

Due to continuing high counts from the source being observed, the following parameters toggled OOL High over the following periods:

- K5136 BUFFER LOSS from 07:26Z to 07:27Z.
- K5449 HARDWARE TRIGGER from 07:25Z to 08:23Z.

<sup>2</sup> Data sampled (1 frame in 8)

#### **2006-03-21 (DOY 080, Rev 419)**

Due to continuing high counts from the source being observed, the following parameters toggled OOL High over the following periods:

- K5136 BUFFER LOSS briefly at 05:52Z, 05:54Z, 08:52Z, and again at 09:52Z.
- K5449 HARDWARE TRIGGER from 05:52Z to 10:16Z.

#### **2006-03-22 (DOY 081, Rev 420)**

Nothing to report

#### **2006-03-23 (DOY 082, Rev 420)**

Due to continuing high counts from the source being observed, the following parameters toggled OOL High over the following periods:

- K5136 BUFFER LOSS briefly at 16:21Z, 18:21Z, and again at 19:21Z.

#### **2006-03-24 (DOY 083, Rev 420)**

Due to continuing high counts from the source being observed, the following parameters toggled OOL High over the following periods:

- K5136 BUFFER LOSS briefly at 13:06Z, and again at 14:06Z.
- K5449 HARDWARE TRIGGER from 15:04Z to 16:08Z, and briefly at 16:09Z and 16:25Z.

### **8.3.5 OMC Operations**

#### **2006-03-18 (DOY 077, Rev 418) to 2006-03-19 (DOY 078, Rev 419)**

Nothing to report

#### **2006-03-20 (DOY 079, Rev 419)**

From 04:16 to 04:20, the OMC Lens temperature briefly went to -10.2°C, below the soft limit of -10°C, there was no impact.

#### **2006-03-21 (DOY 080, Rev 419)**

At 06:38 and again at 13:07, the OMC Lens temperature briefly went to -10.27°C, below the soft limit of -10°C, there was no impact.

#### **2006-03-22 (DOY 081, Rev 420)**

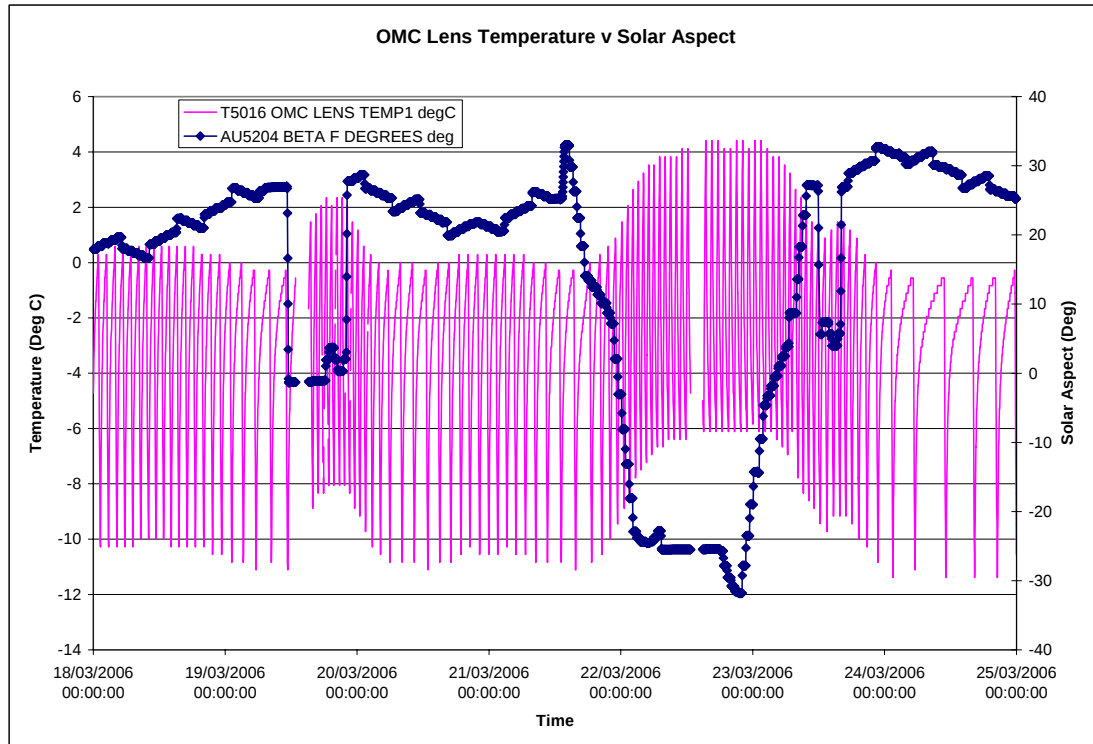
Nothing to report

#### **2006-03-23 (DOY 082, Rev 420)**

At 07:11, a drop in TM from Vil2, caused the loss of pointing 04200020. Later at 11:59, the links again dropped, causing the loss of pointings 04200027 & 04200028.

**2006-03-24 (DOY 083, Rev 420)**

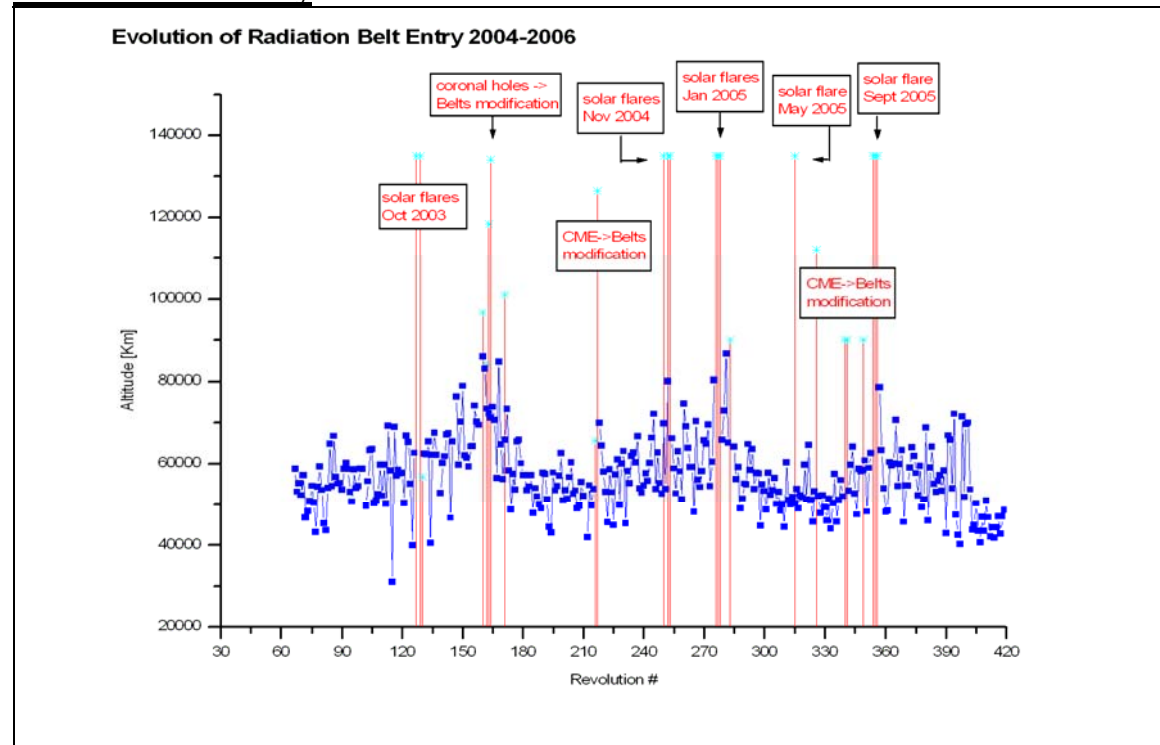
Nothing to report



On DoY 078 at 08:45:28 and DoY 081 at 08:27:28 OMC was switched by the Timeline to SAFE mode, at the nominal time.

### 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] |
|-----|---------------------------------|--------------------------------------|-----------------------------------|---------------------------------------|------------------------------------|
| 418 | RAD_ENTR R 2006-03-19T08:45:24Z | 2006-03-19 10:18:07                  | >47090.7                          | 2006-03-19 10:16:59                   | 49182                              |
| 419 | RAD_EXIT R 2006-03-19T18:02:01Z | 2006-03-19 17:43:03                  | <<42264.0                         | 2006-03-19 17:26:59                   | 33043                              |
| 419 | RAD_ENTR R 2006-03-22T08:27:27Z | 2006-03-22 09:53:04                  | <48695.4                          | 2006-03-22 10:08:15                   | 48183                              |
| 420 | RAD_EXIT R 2006-03-22T17:43:47Z | 2006-03-22 17:13:52                  | <<42286.3                         | 2006-03-22 17:18:15                   | 34232                              |

#### Reference

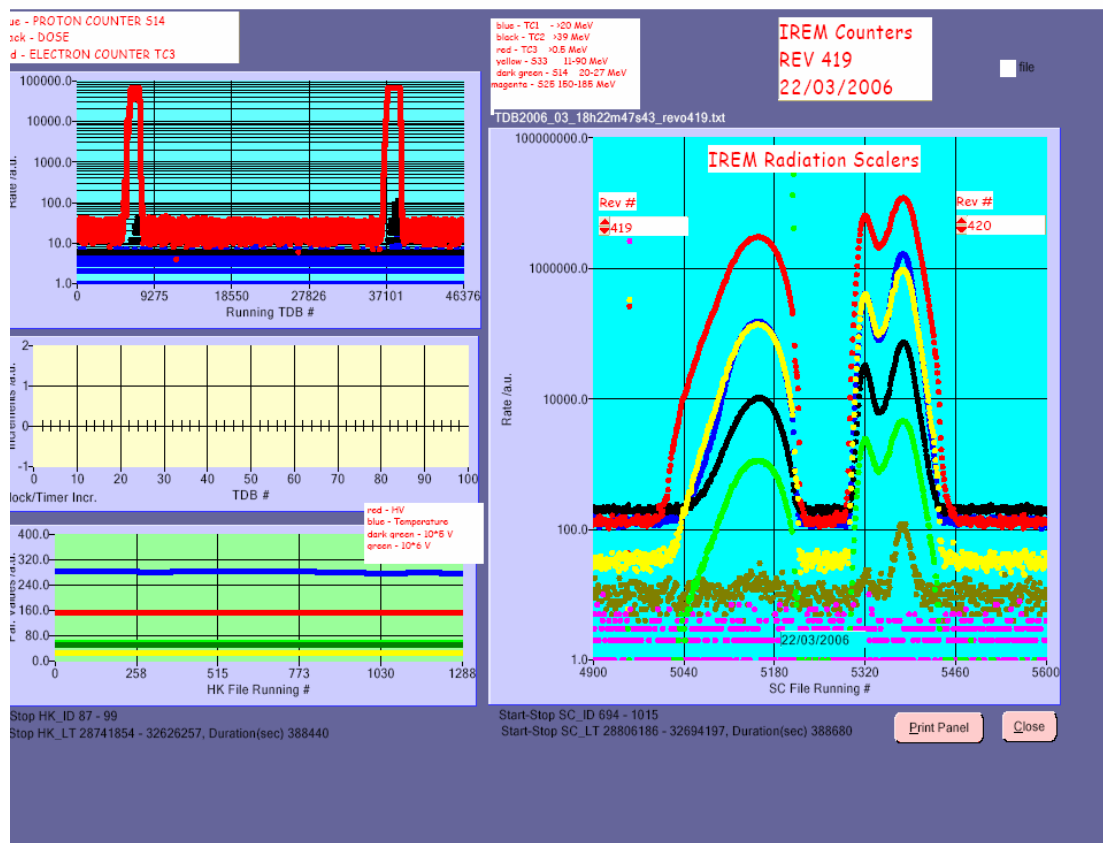
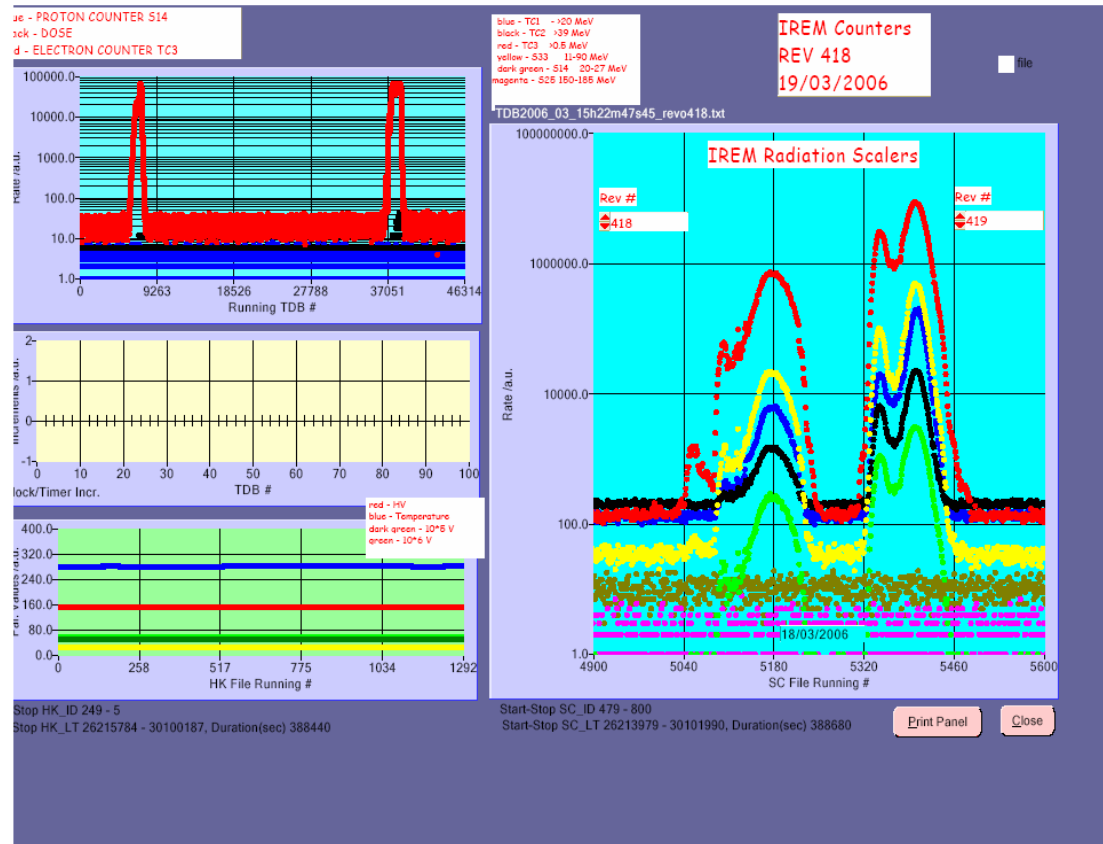
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

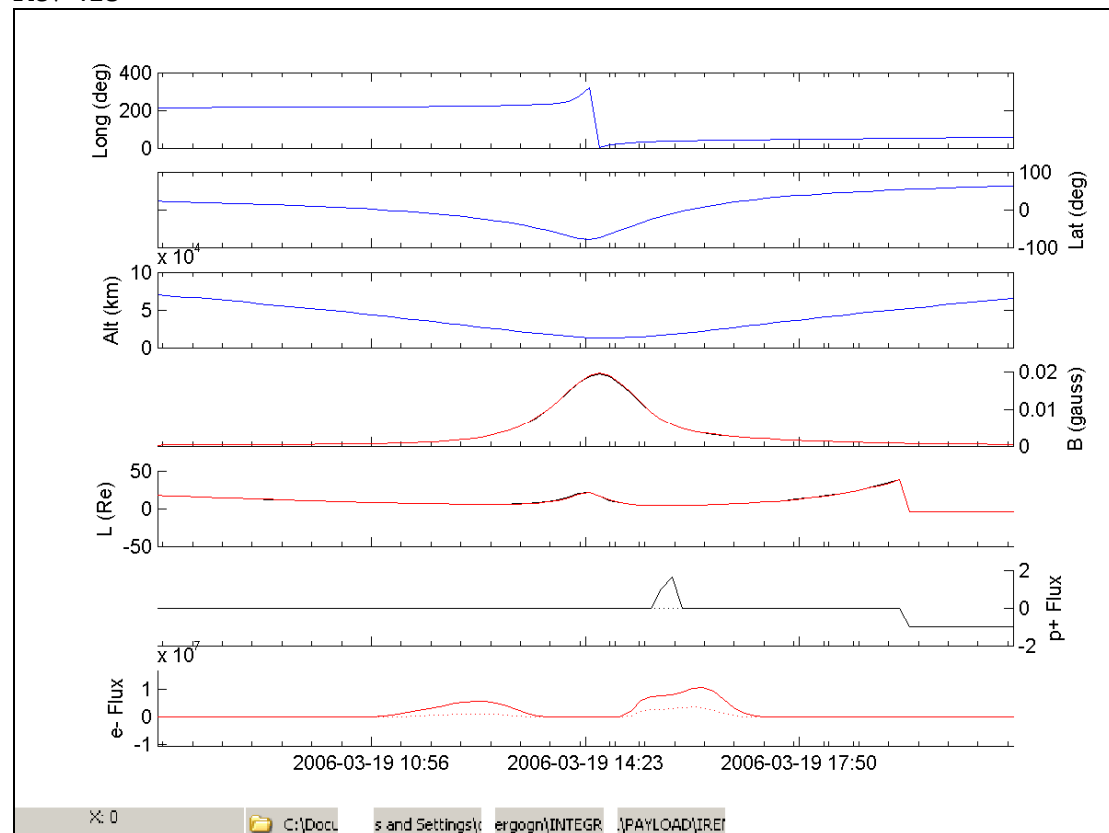
Radiation Spike

## IREM radiation counters:

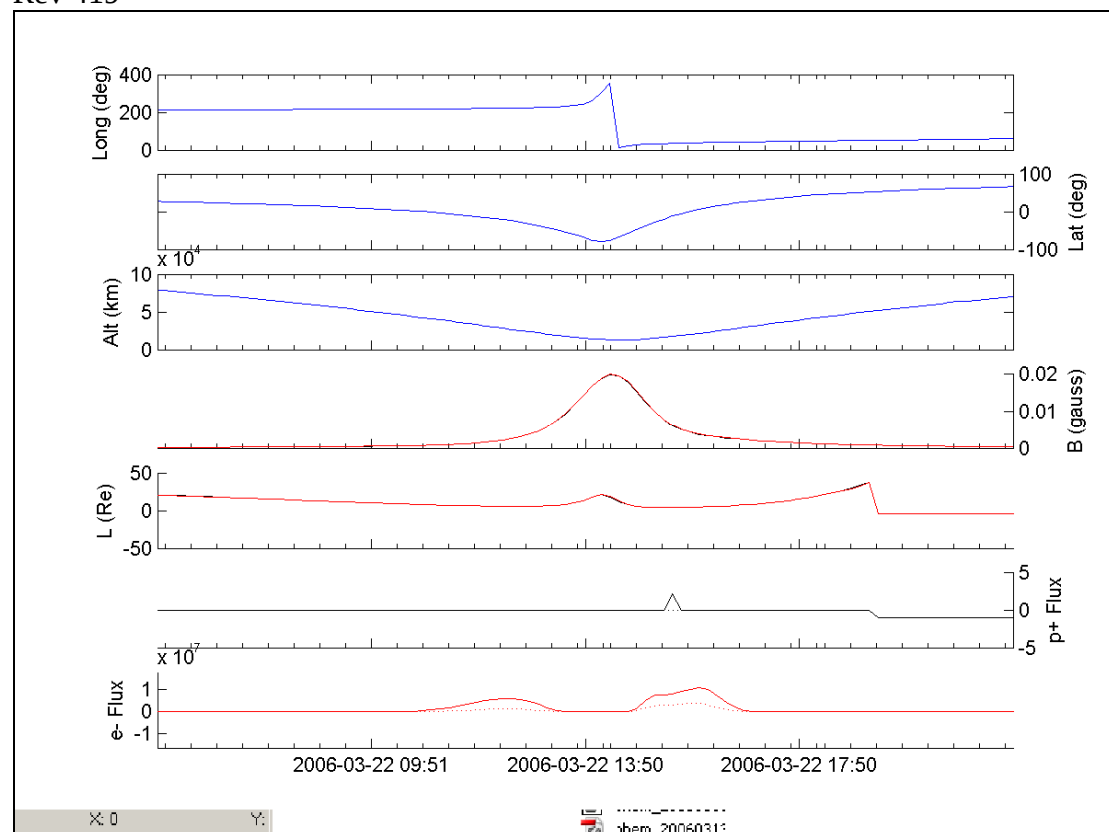


## **IREM Predicted Radiation Belt Passages:**

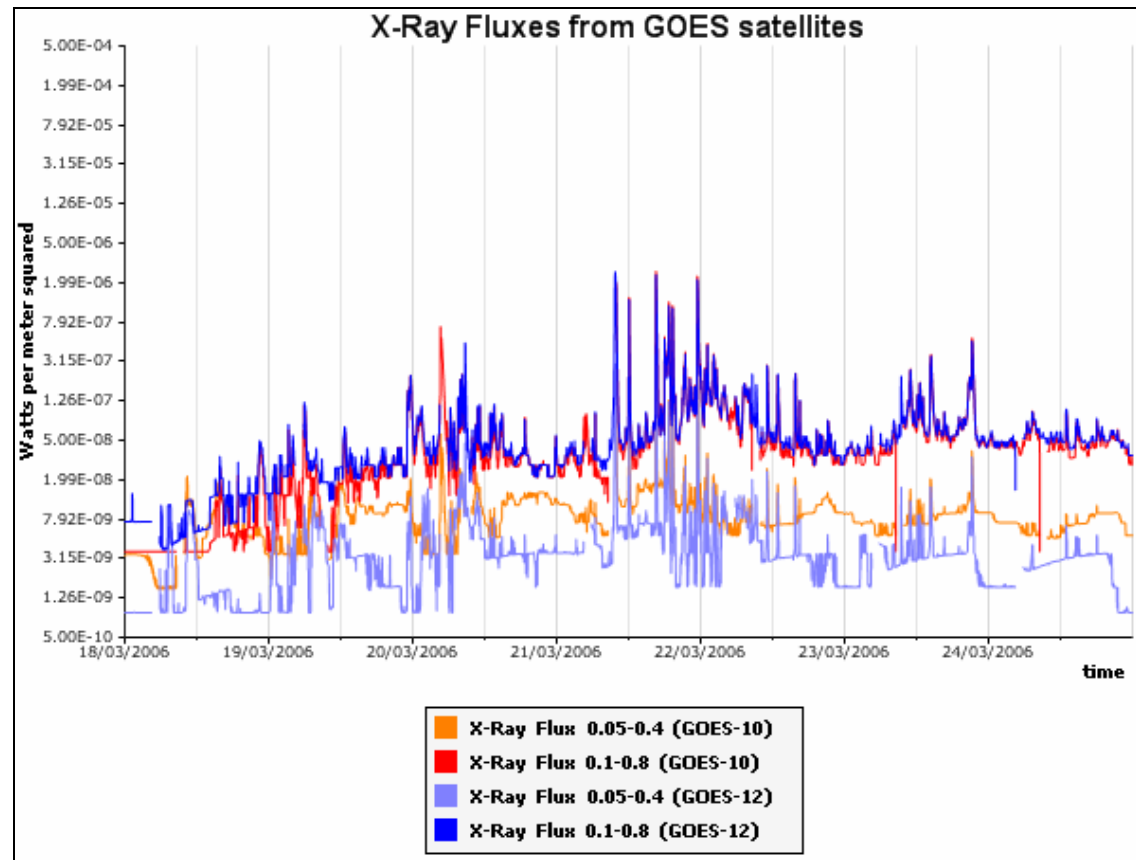
Rev 418



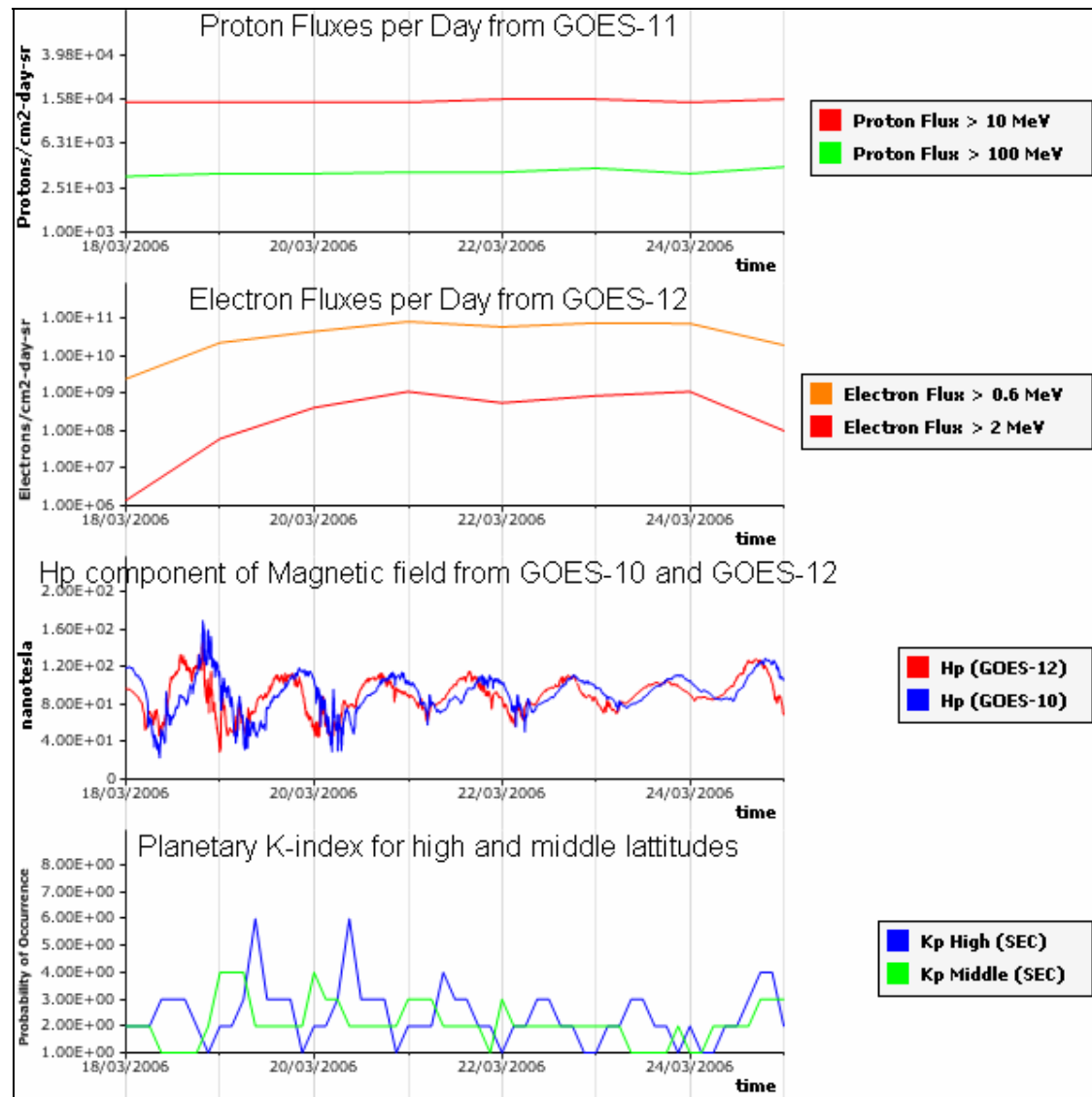
Rev 419



**SEC-GOES Observed Particles Fluxes (using SEIS/RAT tool):**



X-Ray fluxes start to be significant over  $10^{-5}\text{W/m}^2$  (corresponding to M-class flares). Above  $10^{-4}\text{W/m}^2$ , they correspond to strong X-class flares.



Proton and electron flux are rather low, reporting no high radiation background. Hp component of the Geomagnetic Field is essentially parallel to the Earth's rotation axis. A drop near 0 nT is associated with a significant variation in the magnetic field. Kp index is based on ground magnetometers.  $Kp \geq 5$  features storm-level geomagnetic activity.