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

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 123
Week 04
31.01.05
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 22.01.05 until 28.01.05 (both dates inclusive) and covers the revolutions 278, 279 & 280.

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; PSR B1509-58 (RA 15:13:55.62; DEC -59:08:09.0); the Target of Opportunity V0332+53 (RA 03:35:0.00; DEC +53:10:22.8) and NGC6240 (RA 16:52:58.90; DEC +02:24:01.1). The activities consisted of GPS as well as hexagonal and raster dithering observations. In addition, SPI annealing was completed and the cooling phase started.

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 partially performed from the timeline during this period.

The decreasing of the solar activity in revolution 278, allowed to exit the S/C from the hibernation status and to rejoin it to the scheduled activities.

A STR lit blemish evaluation was performed according to the request of the prime contractor (Alenia) during revolution 279.

An Update of S/C Inertias following the RCS-A Thruster Calibration was performed on 26/01/2005.

47 slews (22 CSL, 25 OSL) were missed from the Timeline during this period due to the high solar activity.

The fuel consumption over the period between 19/01/2005 and 28/01/2005 was 0.2147 kg. The remaining propellant is in the order of 163.5716 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.

The procedure to start the 5th annealing of the Germanium detectors was executed on 20th June at around 13:00z. The annealing temperature (104degC) was reached as planned on 22nd January at ~04:00z. A special configuration was loaded on-board, keeping the instrument in photon-by-photon mode in order to monitor the faulty detector GeD#2 & #17 during the whole annealing period.

An annealing summary timeline is published in this report, under the future activities section.

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

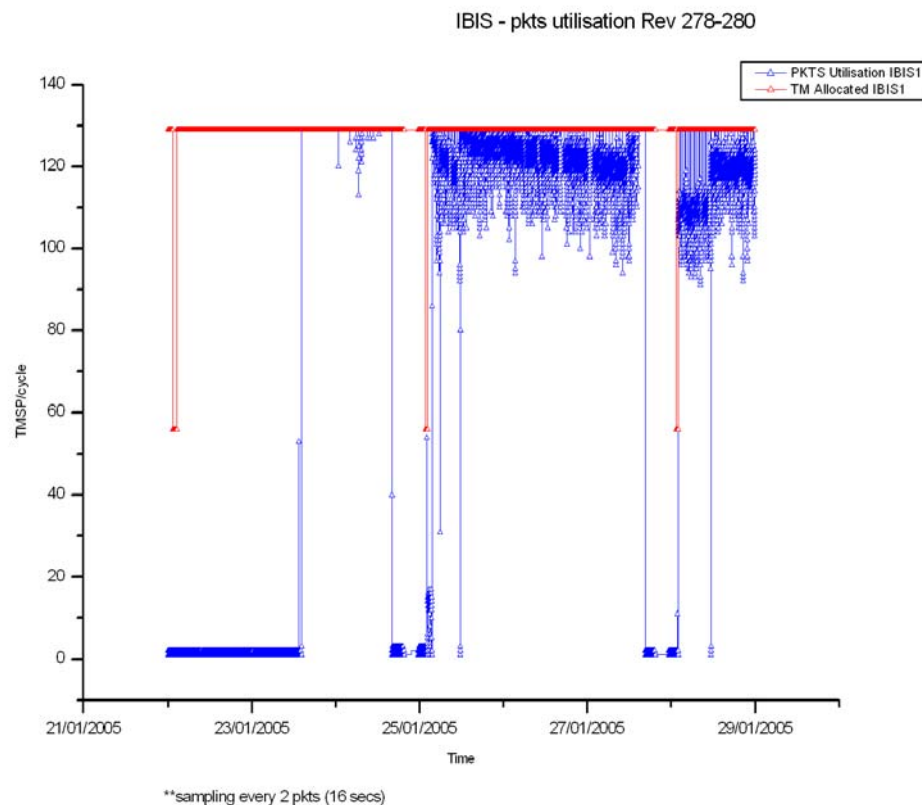
3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by low to moderate solar activity.

During the reporting period the PST allocation to IBIS was most of the time 129 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 122.67 TMPS/cycle, up 6.27 on last week. However, due to the high radiation background, IBIS packet utilisation was very low on January the 22nd and the 23rd, as the unit was in Safe configuration and only HK pkts were generated.

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. JEM-X2 remained dormant (DFEE OFF) with a TM allocation of 1 packet/cycle.

INT_OR_0189 was executed at the start of each revolution to reset the JEM-X1 Broadcast Packet override flags for IREM to DISABLED following the anode calibration ED KEACAL01 in the Timeline.

Due to high background radiation conditions as a result of a solar flare, JEM-X1 spent the first part of the reporting period in Safe mode. JEM-X1 was manually activated on 2005-01-23, partway through revolution 278, returning to Data Taking mode at 2005-01-23T13:59Z.

On 2005-01-24 at 14:16Z, due to high background radiation conditions, JEM-X1 was commanded into Safe mode manually about 75 minutes before it was due to be commanded into Safe mode by the Timeline before radiation belt entry of revolution 278.

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.

At the start of the week, the OMC was in SAFE mode due to the high radiation. There were 121 OMC pointings executed nominally, 39 were lost due to high radiation, and 3 due to ground problems.

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 to moderate solar activity. On the 22nd and 23rd of January the solar activity was still high due to the end of the solar flare caused by sunspot 720.

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, one pointing was lost to ground problems.

4.1 Mission Operations Centre

The performance of the MOC was good this week, a pointing was lost immediately after the recovery from the hibernation, possibly due to the Command Releaser. Apart from that, there was a brief interruption due to problems between the IMCS and NCTRS, that had no impact.

4.2 Ground Stations & Network

The performance of the ground stations and Network was in general good this week. No Slews were lost to ground station problems there was only one occurrence of a link drop with Redu, which had no impact. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's received up to rev 291. No new ones delivered. Redelivery of PSF's 284 to 286 were received. This caused the re-planning of rev's 284 and 285 in both ESTEC and ESAC. The POS's of these revolutions have been redelivered to MOC.

The last AO 2 revolution 286 has been planned in ESTEC. It will be planned in ESAC next Monday. Then this one will also be sent to MOC. In revolutions 278 to 282 is performed SPI annealing. In rev 286 there is included OMC flat field and dark current calibration. TSF received up to rev 280.

2. Observation status

ECS for rev 269 received this week. Corresponding OCS's sent. No extra time allocated. Rev 268 is not yet available.

3. ISOC science data archive

This is still in a transitional phase. Real progress is only expected in early February. Some problem to get the hardware up and running has been reported. This may slightly delay when the ISOC science data archive is operational and will be made open to the public.

4. ISOC system

Version 10.7 is still used both in ESTEC and ESAC

5. AO 3

Trials with amalgamation show there are very few candidates for amalgamation this time. There is a much wider spread of observation targets. Some negotiation with a PI is ongoing seek agreement on change of observation mode to be able to amalgamate. Core program surveys were rechecked and late changes are being implemented.

6. ISOC move to ESAC

The parallel mission planning continues to work very well. The intention is to switch to ESAC when AO 3 revolution planning starts (from rev 287. It is planned to perform the switch over next week. The period from switch over to actual execution of the first AO 3 revolution requires additional procedures to be used temporarily. They are in preparation.

7. Problems

The problem with some AO 3 observations when entering the TAC results have been remedied.

4.3.2 ISDC

Status of ISDC observation processing on 31/01/2005:

- Latest Standard Analysis completed: observation 02201050003 (Cygnus X-1, Revolution 259) on 31/01/2005

- Latest products archived: observation 02200280002 (GRS 1915+105, Revolution 255) on 24/01/2005

- Latest observation products sent to the observer: observation 02201120003 (IC443, Revolutions 247-248) on 24/01/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- From the start of the week to DoY 023, at about 15:30, the spacecraft was hibernated due to the on-going high radiation.
- At 15:44, an AOCS command failed uplink due to the static PTV. The reason was not clear, but as a precaution, the CMD releaser was stopped and restarted. The impact was pointing 02780047 was lost.
- On DoY 025, at 00:00, the message 'idda error HFACTMrecord::store. Link to archive with stream 2505 not present. Try to create it' appeared.
- At 01:51, there were some bad TM frames received, probably due to the antenna switch in the Timeline.
- At 02:17, and 02:23, the OMC commands failed. See section 8.3.5 for details, 2 OMC pointings were lost.
- From 13:48:49, to 13:49:20, there was a drop in TM. Network report problems between the NCTRS and IMCS, there was no impact.
- At 17:55, there were several warning/error messages on the event logger about idda-HFARetri. These messages were repeated at 22:00, and have since been traced to a fault on the disk LTS6 on idda. This will be replaced in due course, there was no impact.
- On DoY 027, from 04:11 to 04:13, all links with Redu dropped. There was no impact.

The following new anomaly report was entered into the ARTS system.

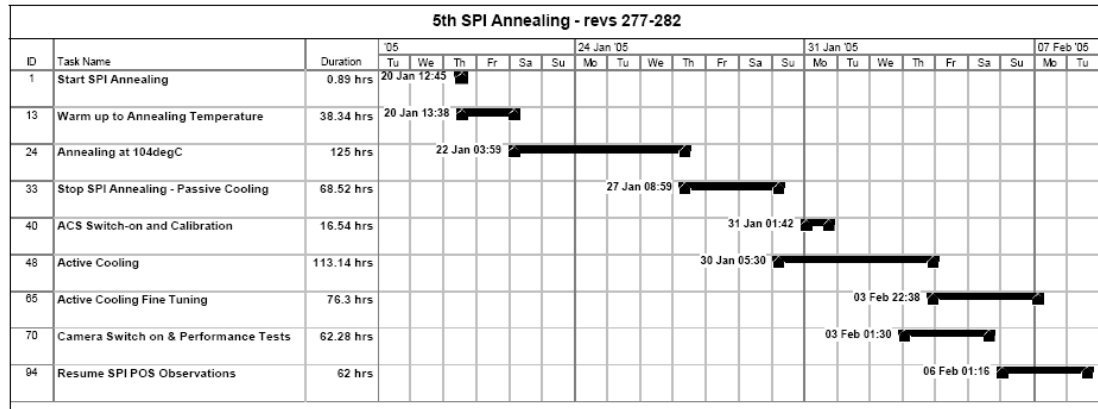
AR id	Date Created	Subject	Segment	Status
INT-2699	25/01/2005	DoY 017 Unstable Redu TC Link	ESA Stations	Pending

7 Future Milestones

The 5th annealing of the SPI Germanium detectors has started on 20th January and will continue until 6th February according to the following schedule:

Doc. Title : INTEGRAL Mission Report #123
 Doc. Ref. : INT-MOC-SYS-RP-1001-OPS-OF
 Date : 31/01/05

Issue : 1
 Rev. : 0
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8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 278

The planned activities in revolution 278 consisted of 13 pointings of a GPS lasting ~9 hours, followed by a raster dithering observation of PSR B1509-58 (RA 15:13:55.62; DEC -59:08:09.0) lasting ~23 hours. A series of hexagonal dithering observations of the Target of Opportunity V0332+53 (RA 03:35:0.00; DEC +53:10:22.8) was then planned for the remaining ~24 hours of observation time.

During these observations IBIS, JEM-X1 and OMC were planned to be in their nominal science modes, however they spent the first part of this revolution (up to the V0332+53 observation) in their safe modes due to high background radiation conditions as a result of solar flares. Throughout this revolution, SPI was undergoing annealing and the JEM-X2 DFEE remained off. The TM allocation was IBIS 129; SPI 103; JEM-X1 8; JEM-X2 1; OMC 5.

Revolution 279

The activities in revolution 279 consisted of 13 pointings of a GPS lasting ~9 hours, followed by a raster dithering observation of PSR B1509-58 (RA 15:13:55.62; DEC -59:08:09.0), performed for the remaining ~52 hours of observation time.

For these observations IBIS, JEM-X1 and OMC were in their nominal science modes, SPI was undergoing annealing and the JEM-X2 DFEE remained off. The TM allocation was IBIS 129; SPI 103; JEM-X1 8; JEM-X2 1; OMC 5.

Revolution 280

The activities in revolution 280 consisted of 13 pointings of a GPS lasting ~9 hours, followed by a raster dithering observation of PSR B1509-58 (RA 15:13:55.62; DEC -59:08:09.0) lasting ~14 hours. An amalgamated raster dithering observation of NGC6240 (RA 16:52:58.90; DEC +02:24:01.1) was then performed for the remaining ~38 hours of observation time.

Throughout these observations IBIS, JEM-X1 and OMC were in their nominal science modes, SPI was in the cooling phase following annealing and the JEM-X2 DFEE remained off. 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

2005-01-16T09:43:15.000Z	163.9366	F	Automatic TM processing.
2005-01-16T12:49:32.000Z	163.9058	F	Automatic TM processing.
2005-01-18T18:12:57.000Z	163.8867	F	Automatic TM processing.
2005-01-18T19:34:18.000Z	163.8634	F	Automatic TM processing.

2005-01-19T00:47:22.000Z	163.8549	F	Automatic TM processing.
2005-01-19T09:28:27.000Z	163.8444	F	Automatic TM processing.
2005-01-19T11:57:23.000Z	163.7863	F	Automatic TM processing.
2005-01-21T15:33:21.000Z	163.7671	F	Automatic TM processing.
2005-01-21T17:41:05.000Z	163.7456	F	Automatic TM processing.
2005-01-23T12:46:30.000Z	163.7370	F	Automatic TM processing.
2005-01-23T14:10:46.000Z	163.6710	F	Automatic TM processing.
2005-01-24T16:03:45.000Z	163.6430	F	Automatic TM processing.
2005-01-25T00:25:30.000Z	163.6090	F	Automatic TM processing.
2005-01-25T09:08:19.000Z	163.5890	F	Automatic TM processing.
2005-01-28T00:12:18.000Z	163.5716	F	Automatic TM processing.

This report was generated Fri Jan 28 08:00:23 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 22/01/2005-28/01/2005

AOCS operations were executed from the Automatic Timeline.

During this period, 54 Open Loop Slews, 83 Closed Loop Slews and 7 Momentum Bias were executed. 47 slews were not executed due to the high solar activity. This is equivalent to a $\sim 25.5\%$.

22/01/05 (Day of Year 022, Revolution 278)

S/C hibernation due to exceptional solar activity: Due to the persisting higher solar activity and the incoming perigee passage, the S/C was maintained in hibernation at the safe attitude (RA 01:37:41.6, DEC +48:31:06.9) using the magnitude 3.5 bright star “51 Andromeda”, which was picked as guide star at CCD location [1255, -1249]. This attitude remained valid (from STR constraints) until 24/01 22:41:07z allowing the S/C to pass the high radiation period in safe condition. A magnitude 6.5 star was also selected in slot #2 at CCD location [13645, 4278] and monitored, for false events rates, together with the guide star, along all the duration of the radiation event.

23/01/05 (Day of Year 023, Revolution 278)

S/C exit hibernation after solar activity: After the clear decreasing of the solar activity, it was decided to exit the S/C from the hibernation status. A new timeline for revolution 278 was re-planned (TL_0278_06). A manual open loop slew was performed to the attitude of PID 44 (RA 23:34:03.32 DEC +35:33:58.5). A RWB was requested to meet the expected wheels speeds profiles and finally an open loop slew followed by a corrective loop slew to PID 46 (03:29:13.85 +53:11:11.2) was manually executed. The slew for PID 47 was manually updated and the TL ready to be rejoined. During the execution of slew 02780047 from the timeline, a problem on the IMCS (static PTV not cleared in time) prevented the correct execution of the sequence; therefore a manual close loop slew was performed to PID 47 (03:41:09.23 +54:07:28.9). After the restarting of the Commanding tasks on the IMCS, the slew for

PID 48 (03:40:25.39 +52:07:41.1) was manually updated at 16:21z and the timeline re-joined.

During all the duration of the hibernation period, the periodical AOCS calibration/healthy check activities were performed as per timeline.

24/01/05 (Day of Year 024, Revolution 278-279)

Nothing to report.

25/01/05 (Day of Year 025, Revolution 279)

STR lit blemish calibration: As requested by Alenia Spazio, a STR lit blemish calibration was executed during revolution 279. The evaluation was performed according to the plan:

Start\End Evaluation	AR	DEC	PID	Duration	Mi Thresh
2005-01-25T02:31z 2005-01-25T02:47z	08:40:25.00	-34:40:35.8	02790002 (OSL)	2200	8.25; 8.0; 7.5; 7.0; 8.25; 8.0; 7.5; 7.0; 8.5;
2005-01-25T03:52z 2005-01-25T04:10z	09:00:24.05	-46:03:47.8	02790004 (OSL)	2200	8.25; 8.0; 7.5; 7.0; 8.25; 8.0; 7.5; 7.0; 8.5;
2005-01-25T07:12z 2005-01-25T07:28z	11:40:39.83	-63:54:07.9	02790009 (OSL)	2200	8.25; 8.0; 7.5; 7.0; 8.25; 8.0; 7.5; 7.0; 8.5;
2005-01-25T11:54z 2005-01-25T12:16z	14:46:51.34	-60:53:05.2	02790016 (CSL)	3238	8.25; 8.0; 7.5; 7.0; 8.25; 8.0; 7.5; 7.0; 8.5;
2005-01-26T09:37z 2005-01-26T09:53z	15:34:27.47	-55:58:51.7	02790040 (CSL)	3238	8.25; 8.0; 7.5; 7.0; 8.25; 8.0; 7.5; 7.0; 8.5;

The results of the calibration are the following (as reported from Alenia):

1. None of the suspected bad pixels was found in all the mappings series
2. The pixel in position Y=110 Z=29 was found during the first and the third series of mappings. The pixel was found with threshold 8.5,8.25 in both the attempts done with the same threshold
3. The pixel in Y=326 Z=274 has been found only in the fifth series of mapping. The pixel was found with threshold 8.5,8.25,8.0 in both the attempts done with the same threshold

The conclusion, agreed by Alenia, FD and FCT is that these “blemish pixels” are not pixels stuck at a fixed value. These pixels have a higher noise and therefore get detected in reduced accuracy when the threshold is set to 8.5. No action is foreseen at moment.

26/01/05 (Day of Year 026 Revolution 279)

Update of S/C Inertias from RCS-A Thruster Calibration: With the results of the RCS-A Thruster Calibration that was performed on 14/01/2005 and from the estimations of the thrust level and remaining fuel mass, the update of the Spacecraft Inertias was performed on 26/01/2005 at 13:56z. The following parameters were uplinked:

```
AESCI_00 S
      M F 6
2005-01-27T22:27:49Z
2005-01-27T22:27:49Z
AAAA1
IXX      R 0.6245330E+04      Kgm2 D S/C inertia Ixx
IYY      R 0.8221380E+04      Kgm2 D S/C inertia Iyy
IZZ      R 0.8362750E+04      Kgm2 D S/C inertia Izz
IXY      R 0.3654080E+02      Kgm2 D S/C inertia Ixy
IXZ      R -0.1632200E+03      Kgm2 D S/C inertia Ixz
IYZ      R 0.1333720E+02      Kgm2 D S/C inertia Iyz
```

STR 1750 processor fault: at 16:28:04z a STR 1750 processor fault occurred during the execution of the PID 02790047. The sequence of the events were:

```
16:26:49z    Closed Loop Slew End
16:27:51z    Mapping start
16:28:04z    Mapping End prematurely
16:28:04z    IMU-1 ON
16:28:04z    NewMapping start and new guide start picked
16:29:01z    Mapping End
16:38:04z    IMU-1OFF
```

The fault, which occurred after the end of the closed loop slew resulted in the abortion of the on-going mapping (duration shortened to 13 sec) and start of a new mapping.

The IMU was switched ON, being the problem occurred during the execution of a pointing. According to the Star Catalogue, one bright object of magnitude 0.01, the star Rigel Centaurus (alpha1 Centaurus), was in the STR FoV at ~ 2 degree from the magnitude 5.18 guide star ID 9020-02567. This probably, as it was in the past, could have caused the fault.

No slews were missed. The operational impact of the fault was the OTF not reached during PID 02790047.

2701/05 (Day of Year 027 Revolution 279-280)

STR 1750 processor fault: at 00:52:36z a STR 1750 processor fault occurred during the execution of the PID 02790056. The sequence of the events were:

```
00:51:25z    Closed Loop Slew End
00:52:24z    Mapping start
00:52:36z    Mapping End prematurely
00:52:36z    IMU-1 ON
00:52:36z    NewMapping start and new guide start picked
```

00:53:34z Mapping End
 01:02:36z IMU-1OFF

The fault, which occurred after the end of the closed loop slew resulted in the abortion of the on-going mapping (duration shortened to 12 sec) and start of a new mapping.

The IMU was switched ON, being the problem occurred during the execution of a pointing. According to the Star Catalogue, one bright object of magnitude 0.01, the star Rigel Centaurus (alpha Centaurus), was in the STR FoV at ~ 2 degree from the magnitude 5.38 guide star ID 9011-05652. This probably, as it was in the past, could have caused the fault.

No slews were missed. The operational impact of the fault was the OTF not reached during PID 02790056.

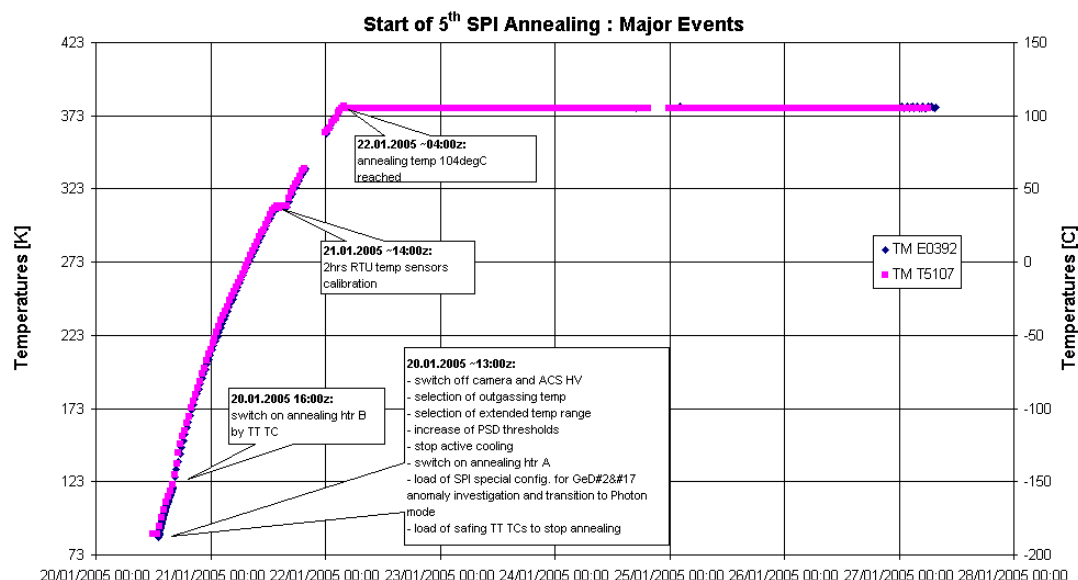
28/01/05 (Day of Year 028, Revolution 280)

Nothing to report.

8.3.2 SPI Operations

Stirling Compressors and Cryostat:

The cryo-cooler was switched off during the reporting period due to the annealing. The following plot shows the detectors cold-plate temperature covering the annealing start period.



DPE and IASW:

The performance of the IASW/DPE was nominal.

No science observations were running during the period due to the on-going annealing.

ACS:

The ACS HV power supplies were switched off during the period, due to the on-going annealing.

AFEE and Ge Detectors:

The performance of the unit is nominal.

The detectors HV power supplies were switched off during the period, due to the on-going annealing.

DFEE:

The performance of the unit is nominal.

During the annealing, the DFEE was configured in such a way to have all detectors masked except for GeD#2 channels; Single Event acquisition was enabled while Multiple Events, PSD Events and Spectra acquisition were disabled.

With this configuration the instrument was left in photon-by-photon mode to catch any signal from the failed channels triggered by thermal noise. Unfortunately not a single noise count was detected during the overall period.

PSD:

The performance of the unit is nominal. During annealing the event trigger thresholds are increased to reduce the number of counts caused by thermal noise that might lead to a PSD crash.

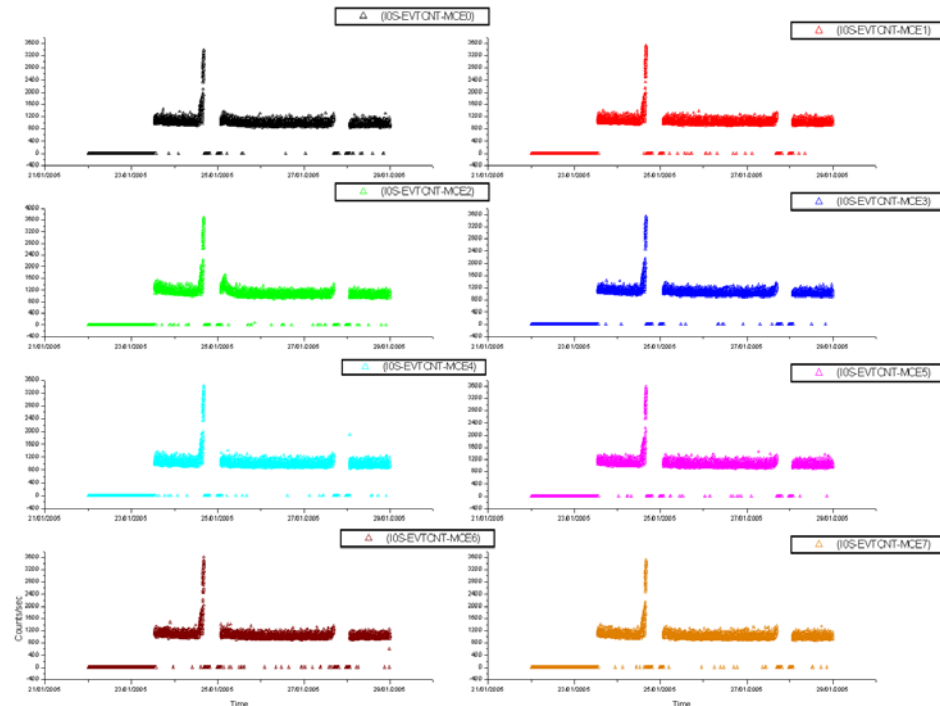
Nothing to report.

8.3.3 IBIS Operations

IBIS Event Counters Plots.

ISGRI Counters:

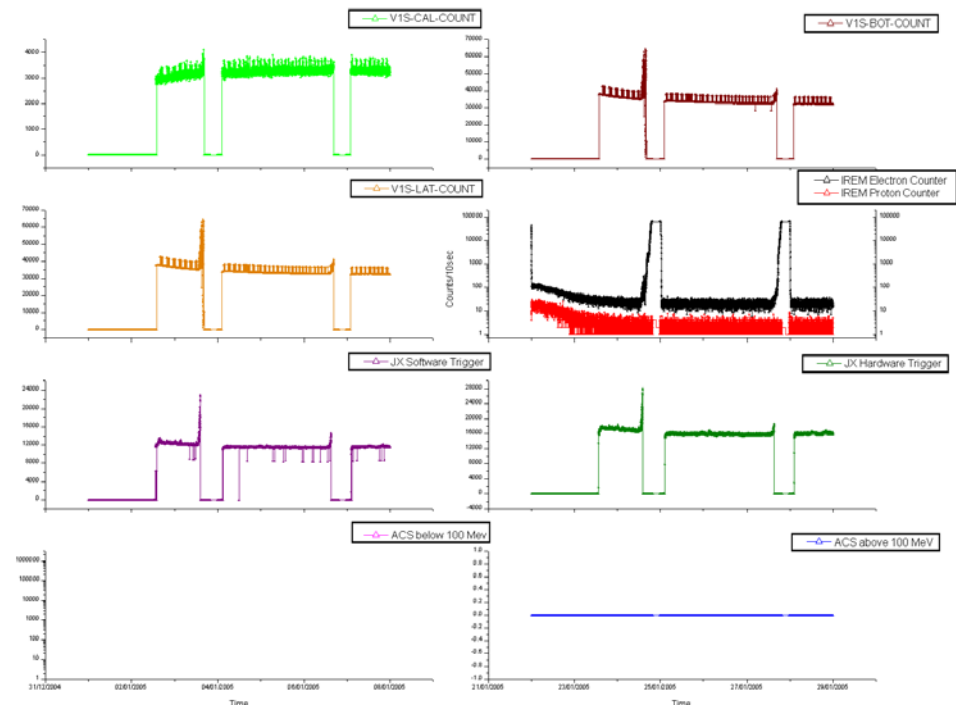
IBIS - ISGRI Counters Rev 278-280



**sampling every 4 pkts (32 secs)

VETO vs Payloads Counters

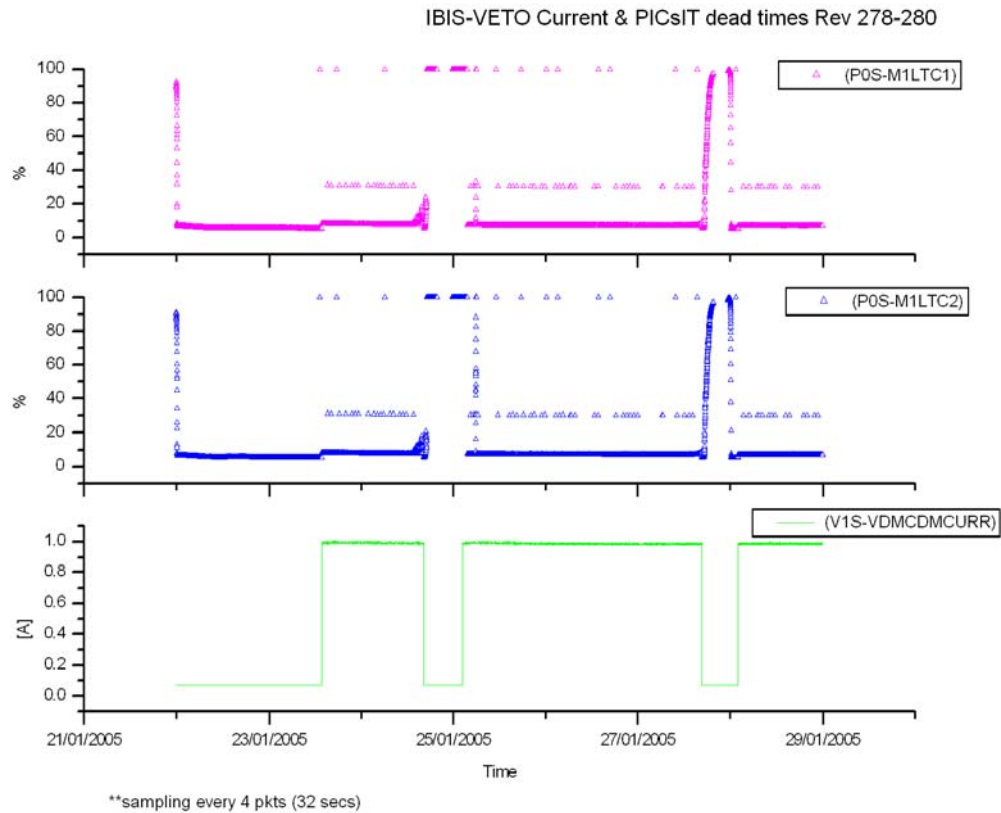
IBIS-VETO vs Payloads Counters Rev 278-280



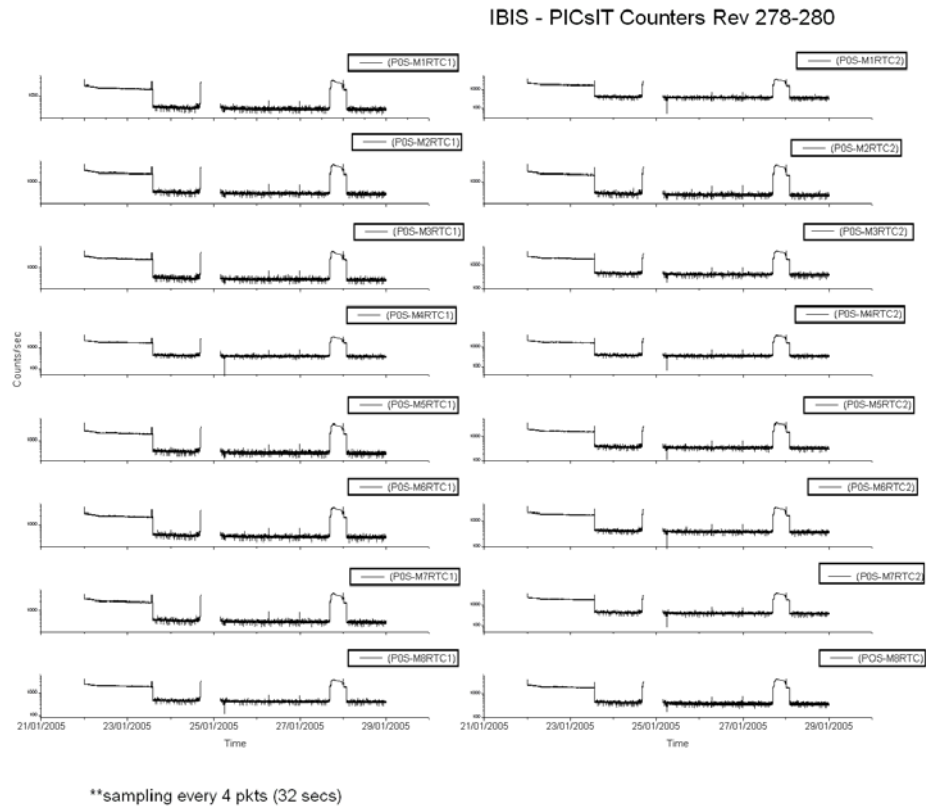
**with the exception of IREM counters (counts/10sec), all the plots are reporting counts/sec
 sampling every 5 pkts (40 sec)

The week was characterised by high solar activity that forced the payloads into safe configuration on January 22 and 23.

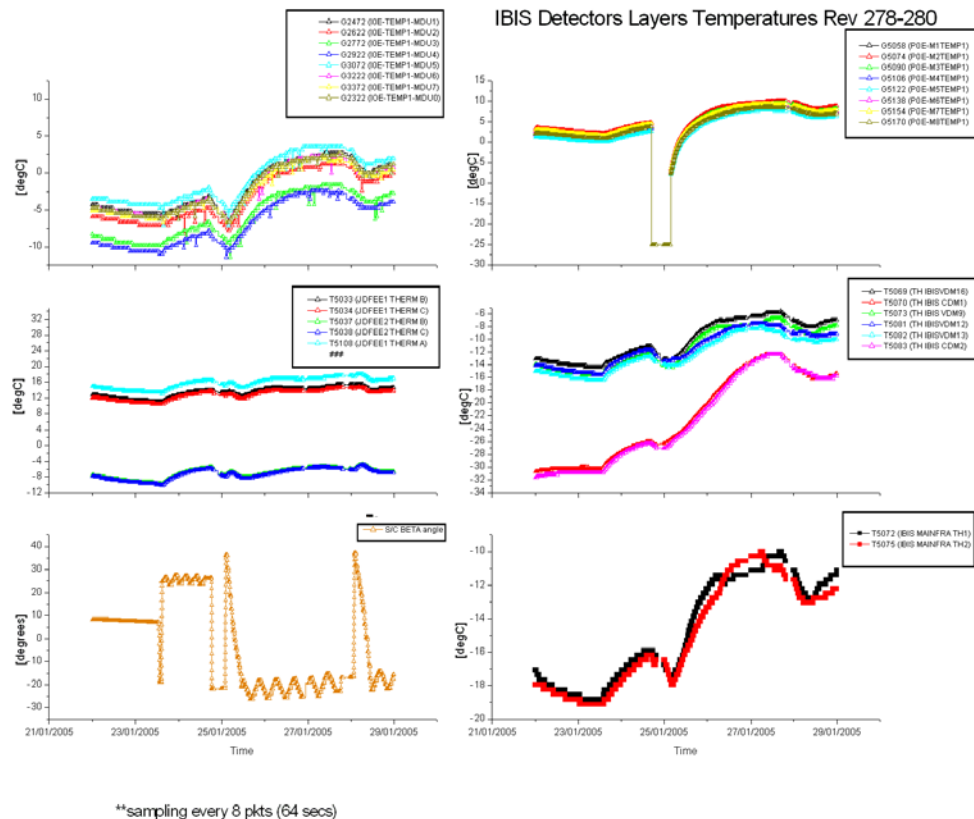
Veto Current:



Picsit Counters:



IBIS Detectors Layers Temperatures



IBIS daily report DoY 022 (22/01/2005)

Nothing to report.

DoY 023 (23/01/2005)

Since the radiation background met the criteria of IBIS and was below the threshold for the required margin time, it was decided to put IBIS back into Science Mode on the 23rd of January.

The sequence of the re-configuration was:

- at 12:09Z the ISGRI Context Tables from revolution 276 were loaded.
- at 13:09Z the ISGRI calibration was performed.
- at 14:17Z GESTAN02 was up-linked.
- at 14:19Z IBIS was back into Scientific Standard mode, and re-enabled in Timeline at 15:01Z.

DoY 024 (24/01/2005)

At 14:19Z G6062 and G6063 (VETO LAT and BOT counters) went Out of Limit "high" with values around 51000. They were then toggling at soft high threshold for some cycles. According to actions V-LAT and V-BOT, no action was taken.

At 16:03Z the G2013 parameter family (number of events triggering the MCEs per second) went Out of Limit warning "high". As this happened close to the belt entry, no action was taken.

At 16:17Z IBIS entered Stand-by mode due to an earlier than expected Radiation Belts entry (16:54Z).

DoY 025 (25/01/2005)

At 00:39Z, to prepare Belt exit, the latest ISGRI Ctx tables available (from revolution 276) were up-linked.

At 02:26Z the OEM with apid 1280 and id 132 "IBIS1 IASW HEPI RESYNCHRONISED" was generated continuously by HEPI.

At 02:57Z, under the supervision of the s/s SOE, IBIS IASW was set to Stand-by. After this action the On-Event messages generation stopped.

At 02:58Z the unit was set back into Scientific Standard mode, the generation of the OEM showed up continuously.

After investigation, it was found that PICsIT PDMs were set erroneously OFF at Radiation Belt Entry during the reconfiguration following the solar flare. The problem was caused by the uplink of an incorrect ED expected at Radiation Belts Entry: the ED GEBENT01, used during the Commissioning and powering OFF PICsIT, was loaded instead of GEBENT02, used post-Commissioning and maintaining PICsIT ON.

At 03:32Z the sequence for the reactivation of PICsIT was executed and the OEM "IBIS1 IASW HEPI RESYNCHRONISED" disappeared.

As this occurred inside Radiation Belts, no science was lost and no impact was reported on the instrument, apart from a decrease in the detector temperature (still inside the operating limits), which quickly recovered after the reactivation.

At 02:45Z G8080 (S1E-VS-HBRA-RT) went Out of Limit low. According to H-OVF2, no action was taken.

At 05:58Z the G5003 (PDMi counter semi-module #2) family went OOL and OEM "IBIS1 IASW HEPI RESYNCHRONISED" was reported. According to P-CNT-1 no action was taken.

DoY 026 (26/01/2005)

Nothing to report.

DoY 027 (27/01/2005)

At 23:25Z G8015 (S1E-A2 PMT V) was 29.4, was reported in OOL.

Because this occurred inside radiation belts, according to V-VLT1, no action was taken. It went back within limits at 02:07Z on day 028 (28/01/2005).

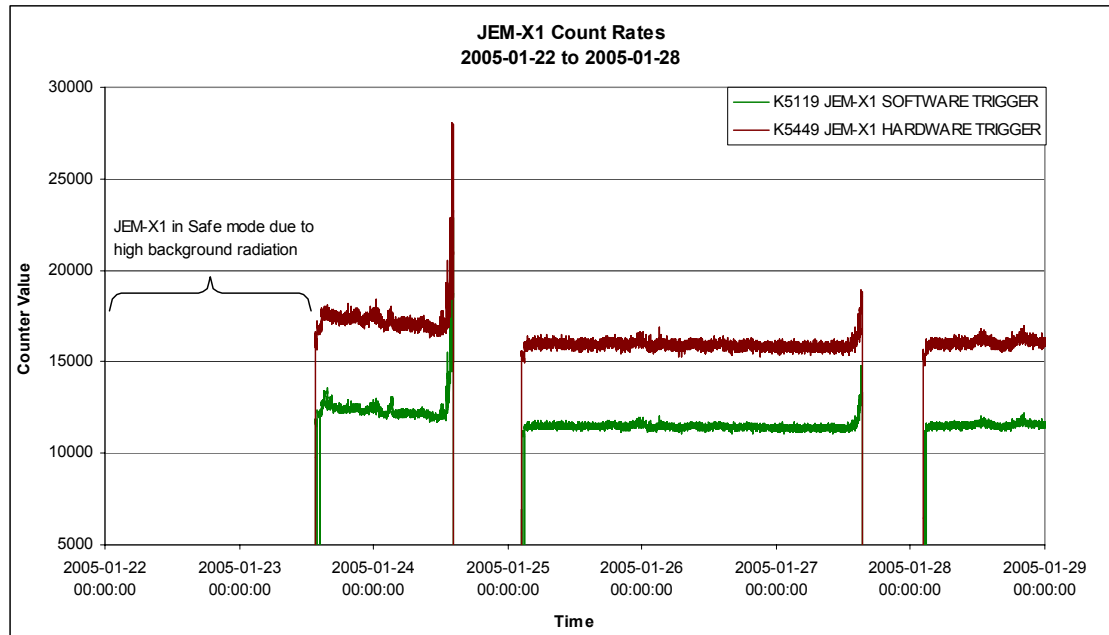
DoY 028 (28/01/2005)

Nothing to report.

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 graph¹.

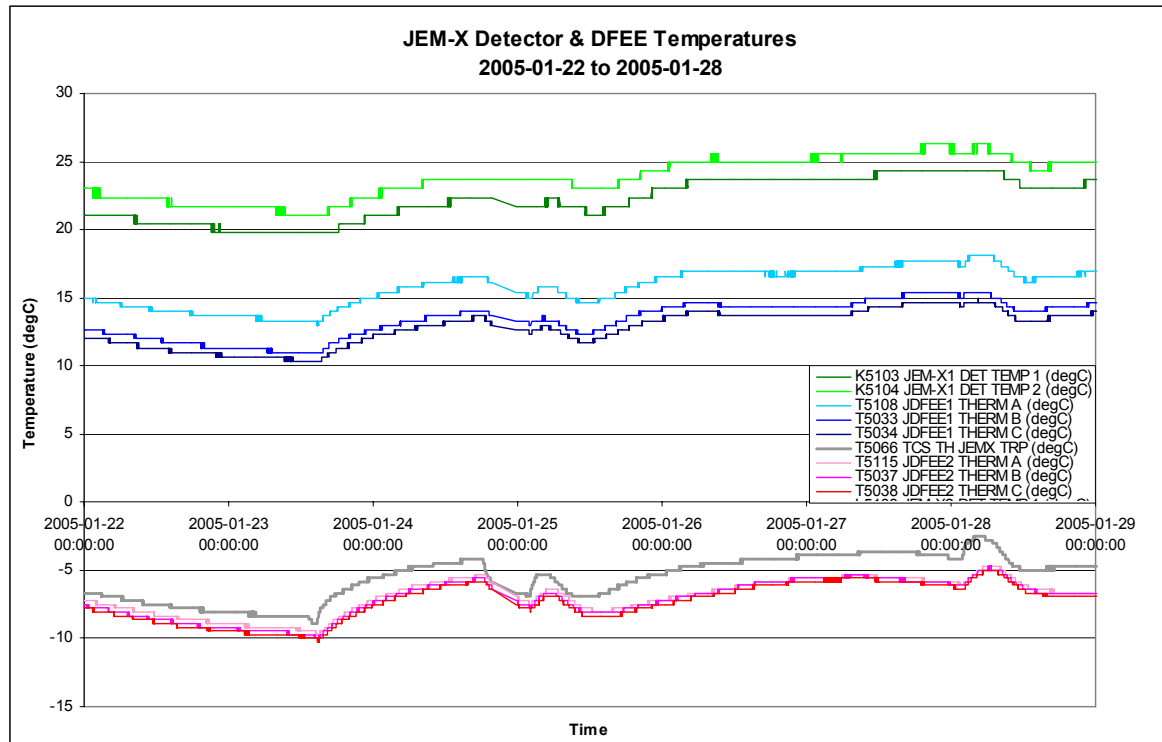


8.3.4.2 JEM-X Temperatures

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.

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

² Data sampled (1 frame in 8)



8.3.4.3 JEM-X Daily Report

2005-01-22 (DOY 022, Rev 278)

Due to continuing high background radiation conditions, JEM-X1 remained in Safe mode (with commanding from the Timeline disabled) throughout this day.

2005-01-23 (DOY 023, Rev 278)

Once the background radiation levels had returned stably within the Safe limits for JEM-X1, a manual activation was performed as follows:

At 12:30Z the ED KEACAL01 for the JEM-X1 anode calibration was re-uplinked.

At 12:58Z FCP_JEM1_0120 was executed to disable the JEM-X1 reactions to the IREM count rates in the Broadcast Packet as per INT_OR_0189.

At 13:25Z the ED KEACT_03 for the JEM-X1 activation and configuration for science operations was re-uplinked.

At 13:59Z the KEACT_03 sequence finished executing, with JEM-X1 entering Data Taking mode.

At 14:26Z the ED KEDATA01 was also re-uplinked with the observation parameters as planned in the Timeline for the observation at which the Timeline was being joined.

At 15:01Z commanding to JEM-X1 from the Timeline was enabled (the Timeline had been started at 14:41Z with commanding to JEM-X1 and the AOCS as well as other subsystems disabled).

2005-01-24 (DOY 024, Rev 278-279)

At 13:35:37Z the TM parameter K5317 RAD MONITOR 3 (Electron counter) went out of limits Alarm High (value = 76) for 1 TM cycle. It then began to fluctuate in and out of limits, with the parameter value and the period of time spent out of limits gradually increasing.

At 14:03:13Z the parameter K5119 SOFTWARE TRIGGER also went out of limits Warning High (value = 21012) and then began to fluctuate in and out of its soft limit, with its value reaching 22993 at 14:14:17Z.

Therefore, at 14:16Z JEM-X1 was commanded to Safe mode manually via FCP_JEM1_0040. At this time the value of K5317 RAD MONITOR 3 was 104. This was about 1 hour and 15 minutes before it had been planned to command JEM-X1 to Safe mode via the ED KESAFE01, scheduled in the Timeline at 15.31.02Z. (The ED KESAFE01 was also allowed to execute from the Timeline.)

2005-01-25 (DOY 025, Rev 279)

At the start of revolution 279, at 02.02.43Z, FCP_JEM1_0120 was executed to disable the JEM-X1 reactions to the IREM count rates in the Broadcast Packet as per INT_OR_0189.

2005-01-26 (DOY 026, Rev 279) to 2005-01-27 (DOY 027, Rev 279-280)

Nothing to report

2005-01-28 (DOY 028, Rev 280)

At the start of revolution 280, at 01.49.27Z, FCP_JEM1_0120 was executed to disable the JEM-X1 reactions to the IREM count rates in the Broadcast Packet as per INT_OR_0189.

8.3.5 OMC Operations

On DoY 023, at 12:33, the Instrument was switched back into stand-by after 2 revolutions in SAFE mode due to high solar activity. At 12:34, the Reset ROE command was uplinked, prior to the first pointing start at 15:49, which was PID# 02780047. Pointings 02780004 – 02780016, 02780018 – 02780042, and 02780046 were lost. During the recovery, a commanding problem also caused the loss of pointing 02780047. The unit went to science at the correct time, but with an incorrect attitude.

On DoY 024, from 03:48 to 03:54, the OMC lens temperature (T5016) dropped out of soft limits, no action was taken and there was no impact.

On DoY 025, at 02:17, the OMC commands SAFE-OFF and Reset ROE failed. The cause of this was the high radiation on the previous orbit, which caused the unit to trip to SAFE mode a couple of minutes before the time scheduled in the broadcast packet. Subsequently the following commands were rejected:

```

2005.025.02.23.19.466 2005.025.02.23.07.467 1792 Real Time Rejection 131
REJECTED TC1
      FIX2=0 M5010=2,SAFE M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=390
2005.025.02.23.27.449 2005.025.02.23.14.967 1792 Real Time Rejection 131
REJECTED TC1
      FIX2=0 M5010=2,SAFE M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0 M9069=391
2005.025.03.02.55.716 2005.025.03.02.46.469 1792 Real Time Rejection 131
REJECTED TC1
      FIX2=0 M5010=2,SAFE M9079=3 M9080=131 M5001=130,RESET IM M9068=1 FIX2=0
M9069=392
2005.025.03.03.03.797 2005.025.03.02.52.469 1792 Real Time Rejection 131
REJECTED TC1
      FIX2=0 M5010=2,SAFE M9079=3 M9080=131 M5001=60,IM A M9068=1 FIX2=0 M9069=393
  
```

These correspond to the M1130 (RESET IM) and MU1310 (IMAGING-A) commands for the pointings 02790002 & 02790003, which were both lost.

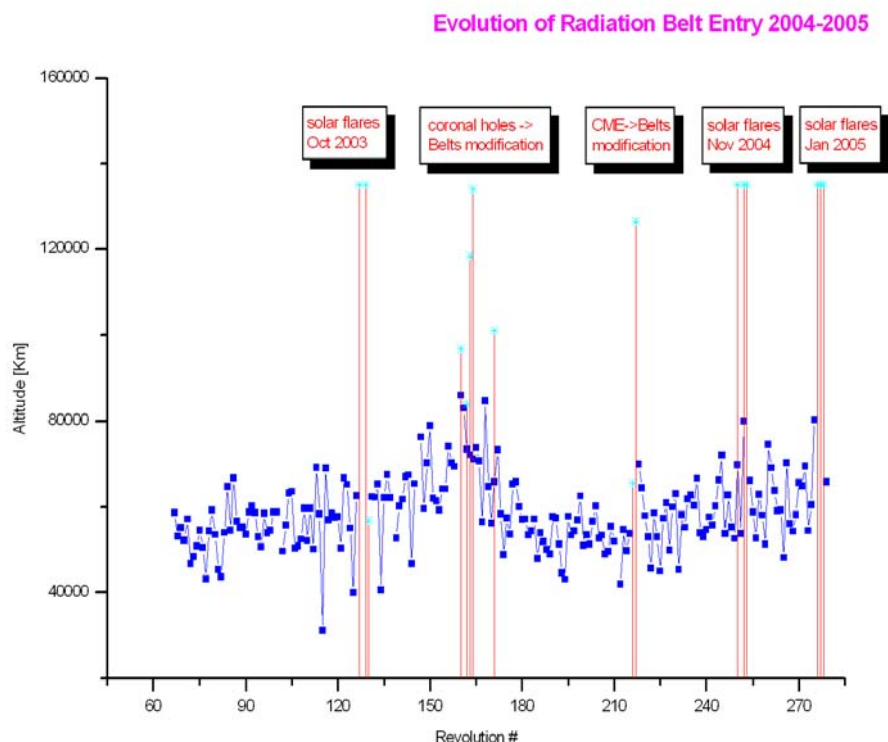
On DoY 024 at 16:43:39, high radiation caused OMC to switch to SAFE and on DoY 027 at 16:41:12 OMC was switched by the Timeline to SAFE mode, at the nominal time.

8.3.6 IREM Operations

IREM daily report

Nothing to report.

Radiation Belts Entry



Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
278	RAD_EXIT R 2005-01-22T02:19:08Z	2005-01-22 21:02:50	134366.1	2005-01-22 01:10:44	29262.86
278	RAD_ENTR R 2005-01-24T16:54:02Z	2005-01-24 13:35:38	82520.5	2005-01-24 17:40:44	53005.04
279	RAD_EXIT R 2005-01-25T02:05:17Z	2005-01-25 00:41:30	>24879.0	2005-01-25 00:50:44	29175.81
279	RAD_ENTR R 2005-01-27T16:40:59Z	2005-01-27 15:53:07	65788.0	2005-01-27 15:03:52	51047.86
280	RAD_EXIT R 2005-01-28T01:51:41Z	2005-01-28 00:21:23	24874.6	2005-01-27 22:13:52	30757.81

Reference

Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

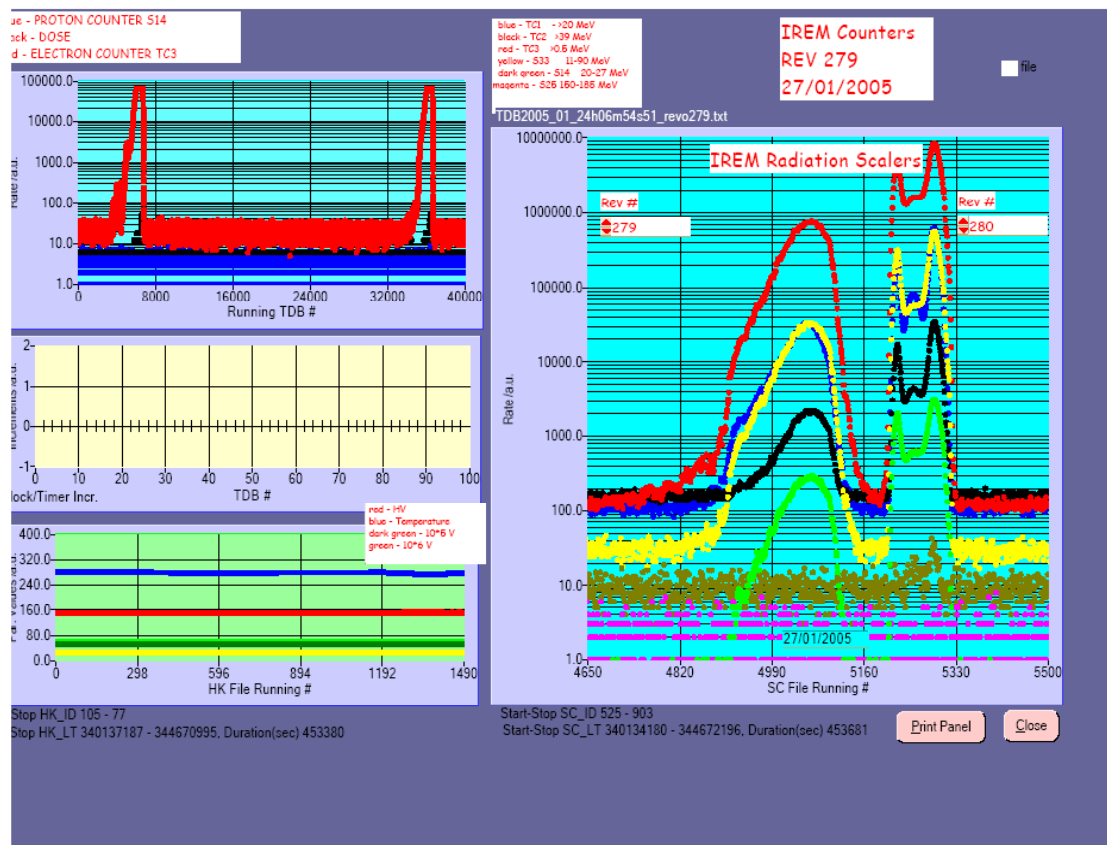
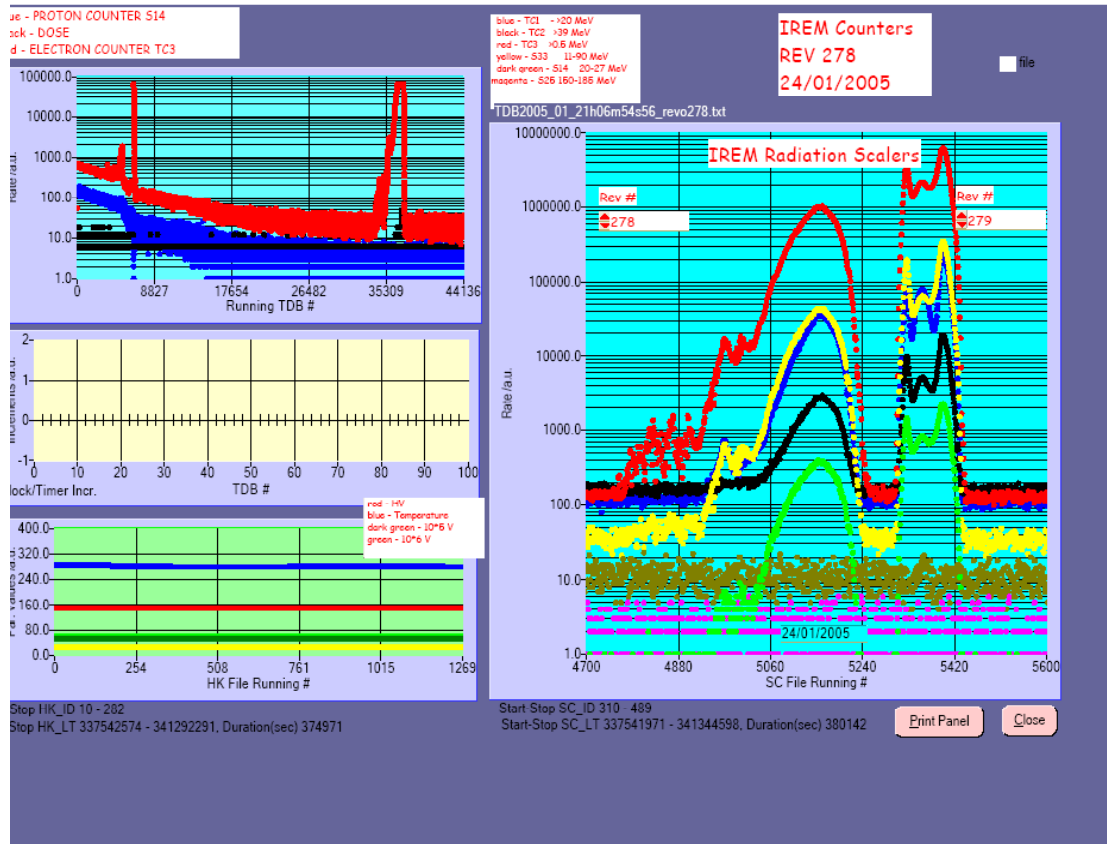
Large error vs reference (more than 30 minutes)

Radiation Spike

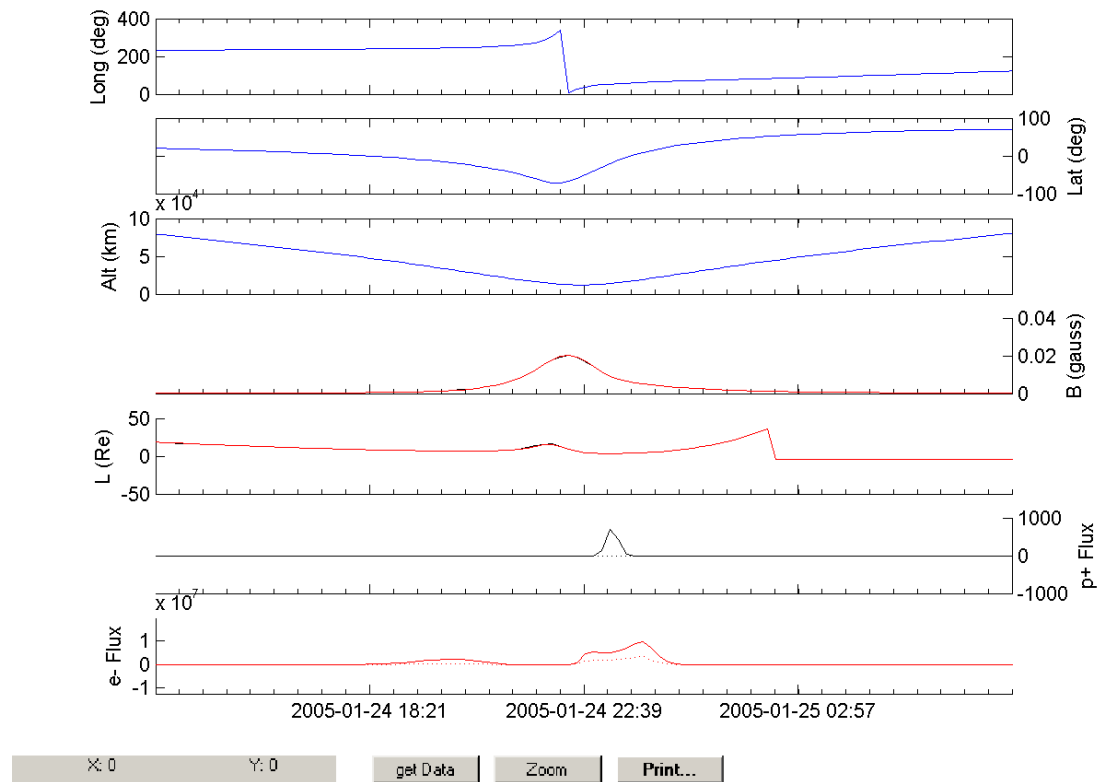
Proton Belts

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

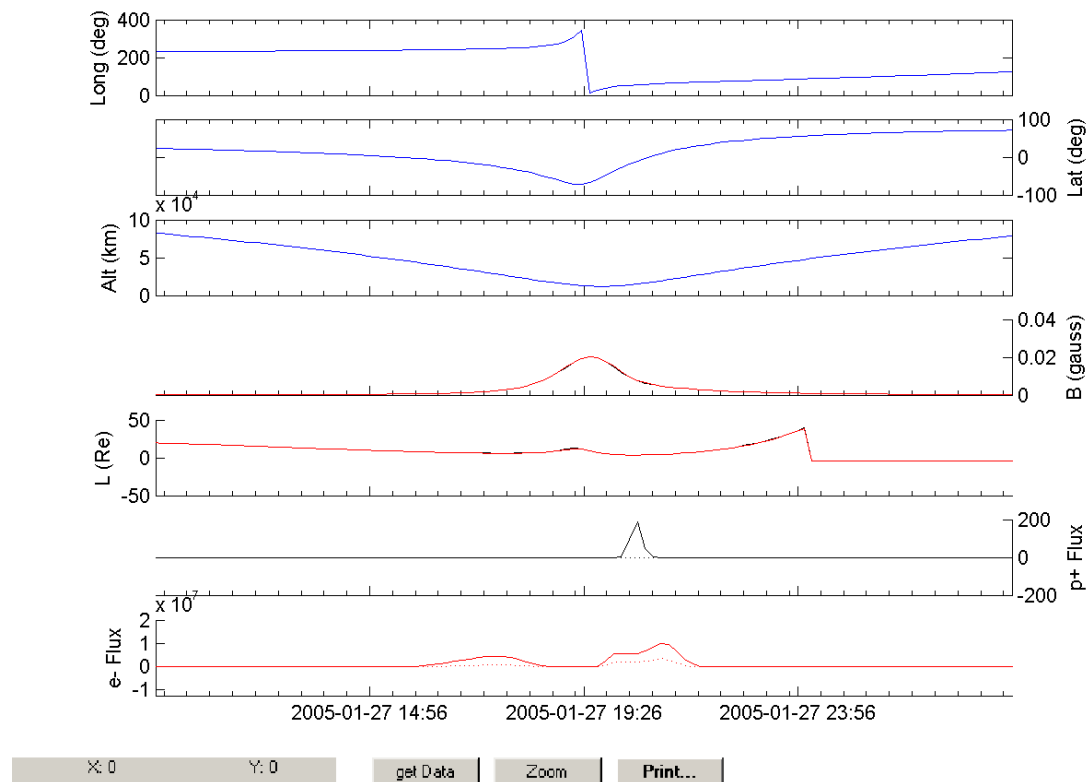
IREM radiation counters



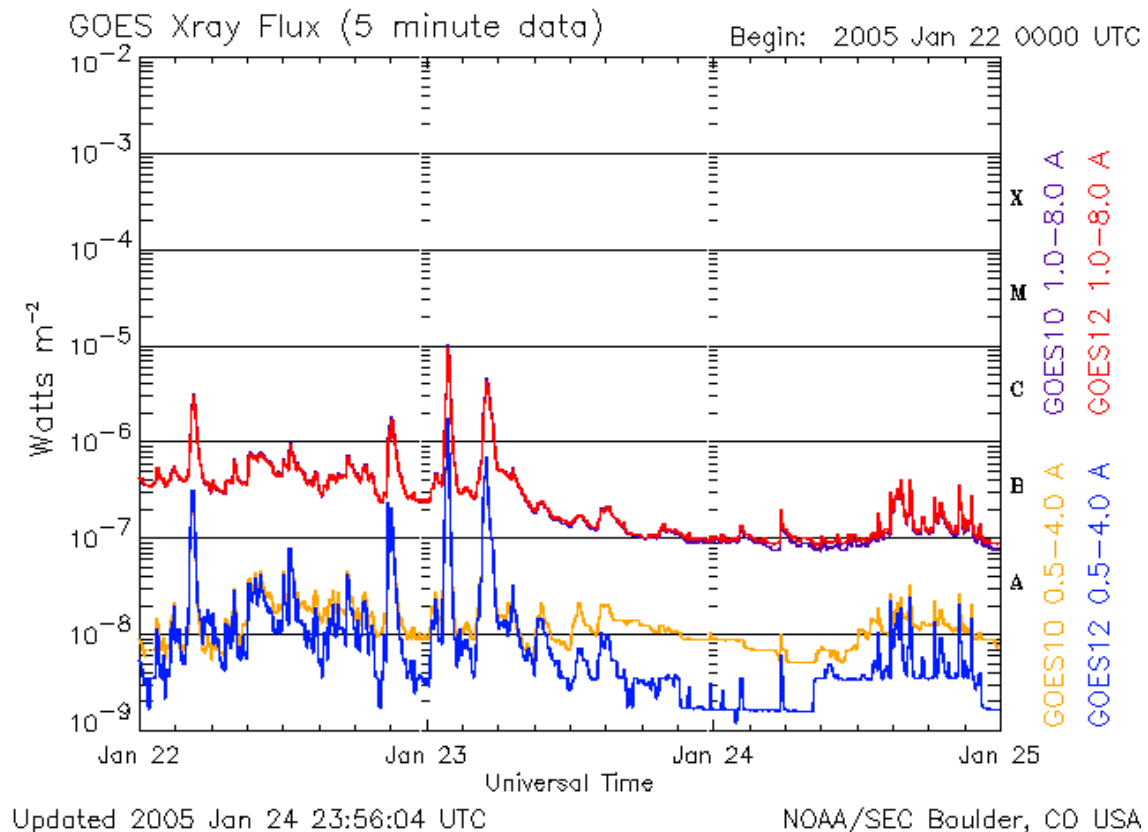
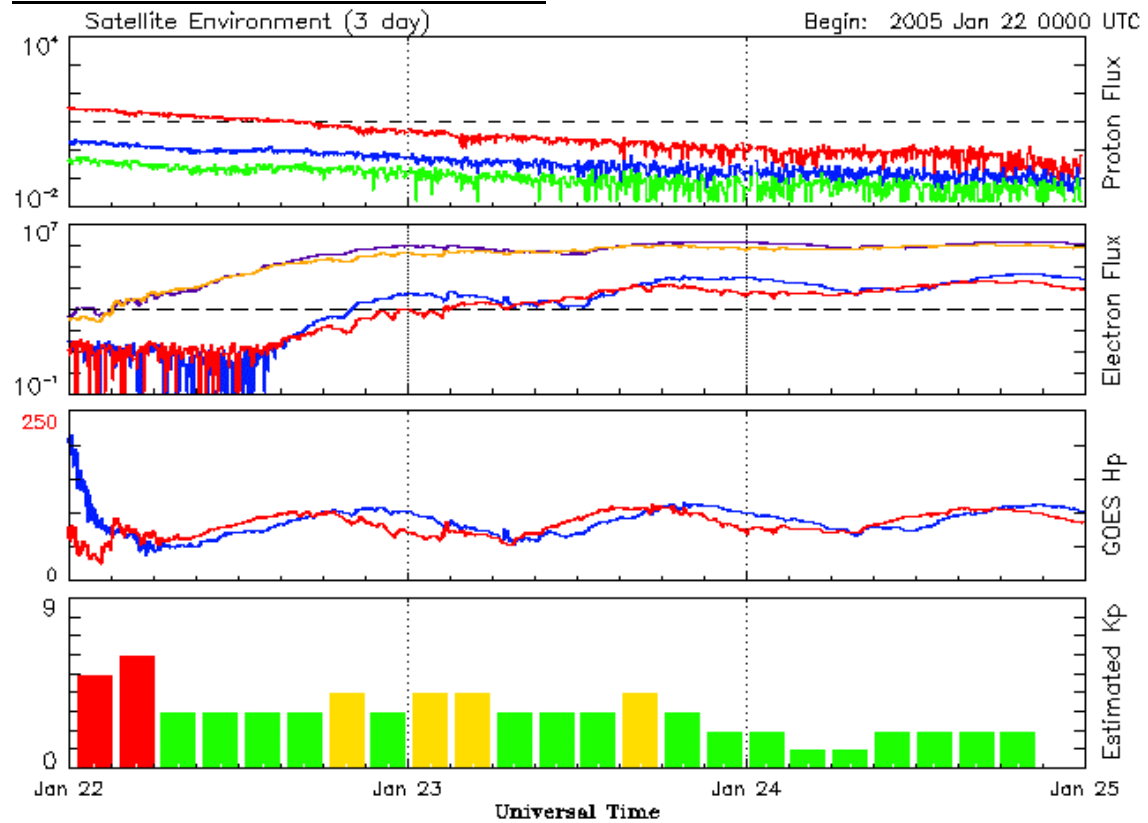
IREM Predicted Radiation Belt Passages.
Rev 278

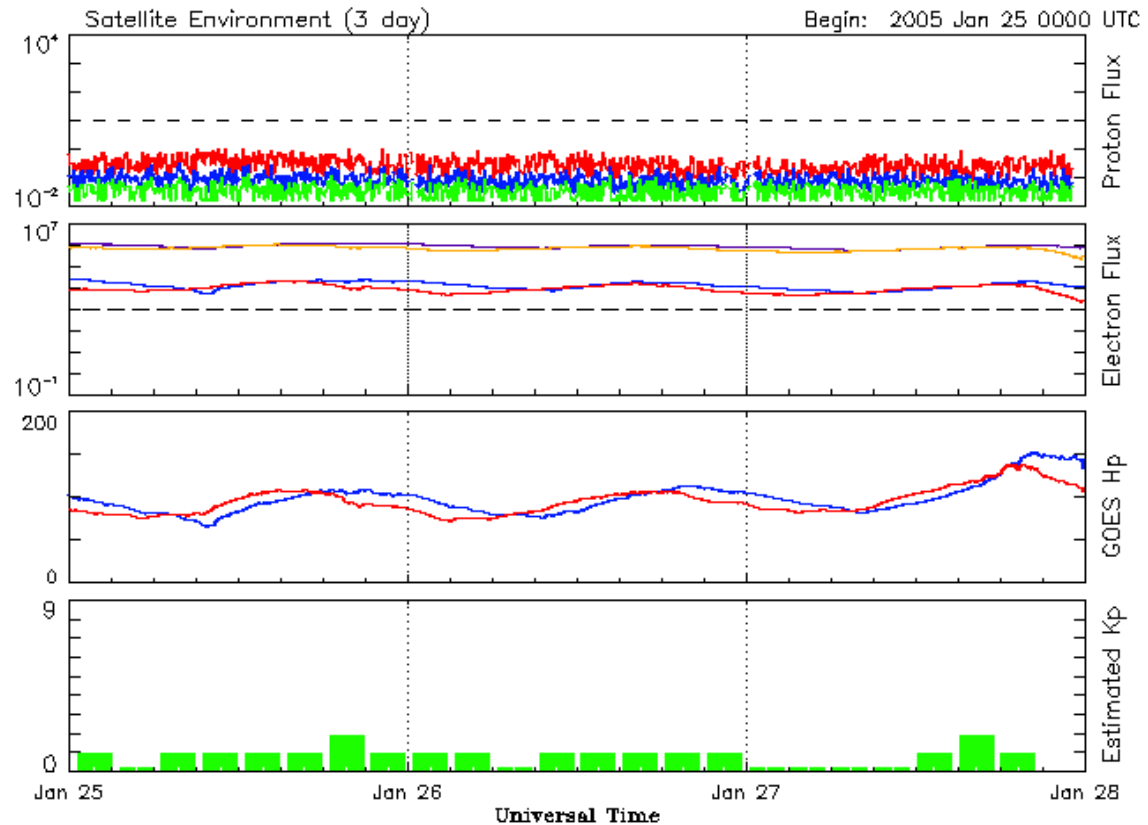


Rev 279



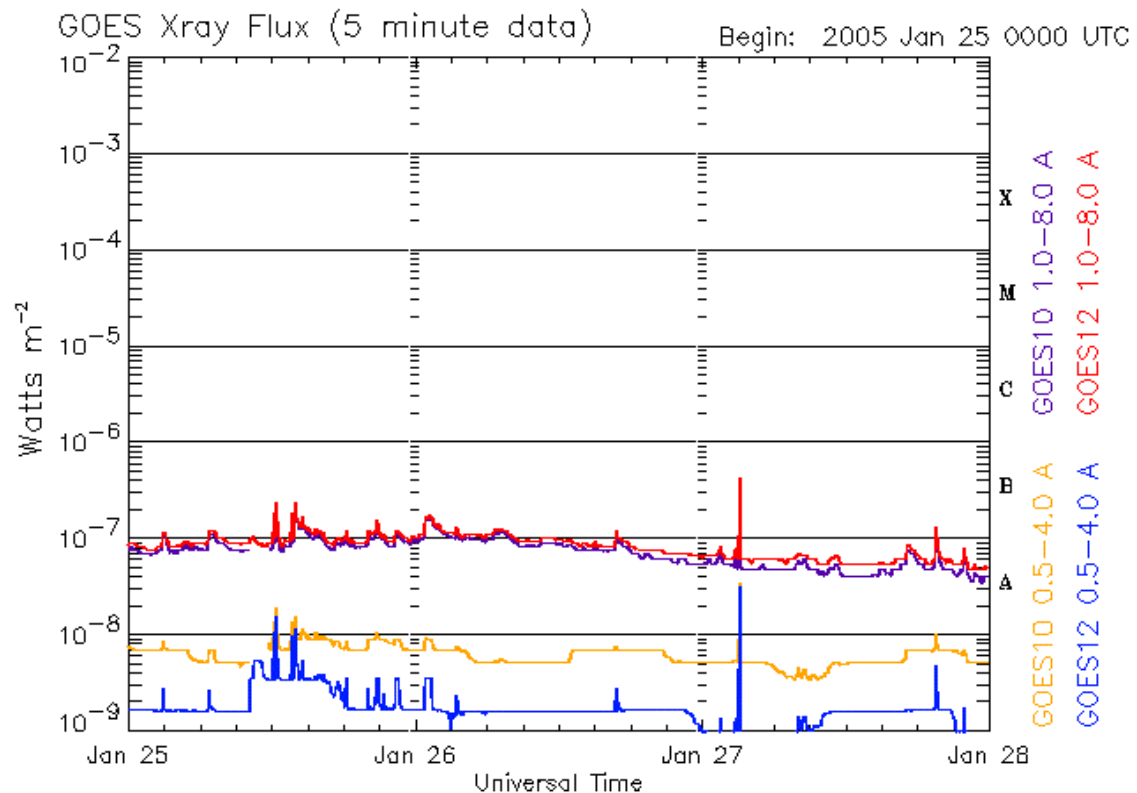
SEC-GOES Observed Particles Fluxes.





Updated 2005 Jan 27 23:56:11 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Jan 27 23:56:04 UTC

NOAA/SEC Boulder, CO USA

