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

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 141
Week 22
06.06.05
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 28.05.05 until 03.06.05 (both dates inclusive) and covers the revolutions 321 and 322.

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 Deep Extragalactic Survey; the Crux Arm (RA 11:57:7.00; DEC -59:12:12.0) and an OMC Flat Field target (RA 10:51:12.00; DEC -24:12:00.0). The activities consisted of rectangular (5X12) and raster (5x5) dithering as well as 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.

The Eclipse season continued with the 5th and 6th eclipse passages on 30/05/2005 and 02/06/2005, DOY 150-153. The eclipse passages were nominal from an AOCS point of view.

3 slews (2 CSL, 1 OSL) were missed from the Timeline during this period, due to a STR 1750 Processor Fault and drop on TC link during REDU pass.

The fuel consumption over the period between 26/05/2005 and 02/06/2005 was 0.1138 kg. The remaining propellant is in the order of 161.0905 Kg.

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

3.1.2 Power

The 5th and 6th eclipses of the current eclipse season occurred during the reference period.

On 30/5/2005 Integral passed through eclipse #5 of the summer eclipse season. Eclipse #5 had a total duration of 1 hour, 8 minutes. The batteries Depth of discharge

was approximately 6.3Ah each and the battery recharge time was about 3 hours 45 minutes.

On 2/6/2005 Integral passed through eclipse #6 of the summer eclipse season. Eclipse #6 had a total duration of 1 hour, 2 minutes. The batteries Depth of discharge was approximately 5.75Ah each and the battery recharge time was about 3 hours 25 minutes.

As all eclipses took place entirely outside ground station coverage, no direct monitoring of batteries behaviour during eclipse was possible. However all indications from on-board stored data (ECD and OBM) are that the behaviour was nominal.

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

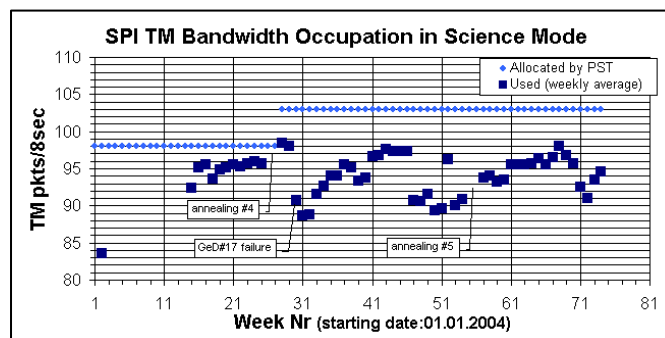
The overall status of the instrument in this week is nominal. The eclipse season, started on 18th May, has just affected some instrument temperatures.

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 94.6 pkts/cycle average.

The Stirling compressors are working well, maintaining the detector cold-plate temperature within 85+/-1K.

Testing of the software patch to fix both the TM leakage malfunction (AR INT_SC-107) and the missed belts entry ACS HV switch off malfunction (INT_SC-115) has been resumed, thanks to the OMC DPE, lent by the OMC team to SPI.

The next annealing of the detectors has been decided to take place on 14th June. 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

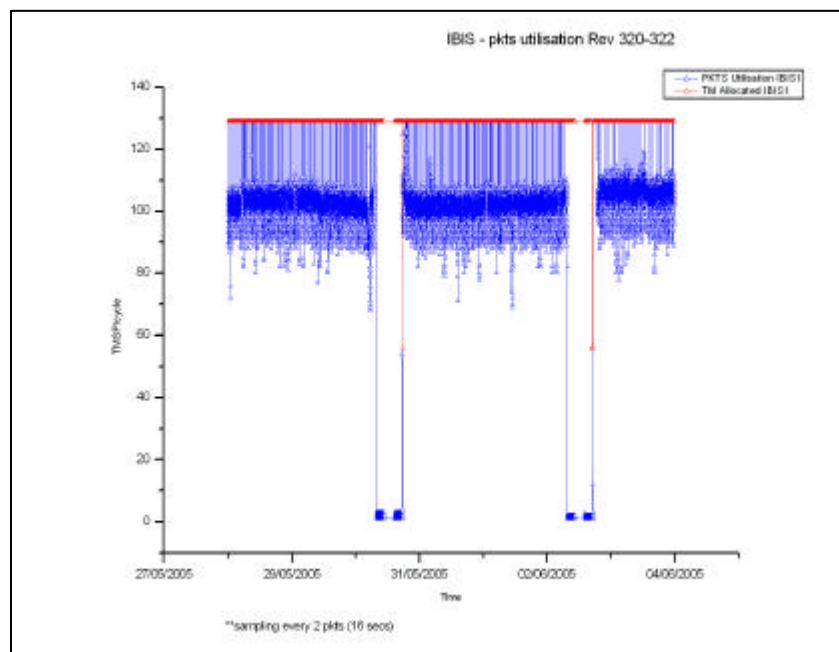
The Overall status of the unit is Nominal.

The week was characterised by low solar activity.

No anomalous or unexpected behaviour was reported during the eclipses of this week.

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 104.13 TMPS/cycle, up 3.19 on last week.

A plot of the IBIS TM utilisation during the observation period is shown below:



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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

JEM-X1 was operated in Data Taking mode during science observations with a TM allocation of 8 packets/cycle and JEM-X2 was dormant (DFEE OFF) with a TM allocation of 1 packet/cycle.

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, 213 of the 216 planned science pointings for OMC were executed nominally. Due to a Star Tracker anomaly, one pointing (PID 3220002) was missed and one (PID 3220003) started late. In addition, one pointing (PID 3220031) was missed due to a brief loss of TC capability.

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 excellent this week, 216 slews were executed correctly, and 3 were lost due to Star Tracker fault (2) and ground problem (1).

4.1 Mission Operations Centre

During the week, operations were switched from the imcs-a running the IMCS 'Classic' S/W to imcs-c running the new 'Evolution' version, more details are provided in the next section. The performance of the MOC was good this week, with no pointing lost due to MOC.

4.1.1 Upgrade of IMCS.

On 2nd June during perigee, the prime MCS used for operations was moved from IMCS-A to IMCS-C. Following upgrade of IMCS-C with new IMCS software, IMCS version E1.3. Since this time IMCS-C has been used for all operations, IMCS-A is running as back-up, connected to VC-0 TM stream only. Following the handover a number of problems were noted with new control System, the following problems were the most significant:

- The OLF files generated and sent to ISDC indicated invalid and inaccurate Time Correlation couples, in fact telemetry on the IMCS indicated valid and accurate couples. Offline checks comparing the evolution of the Time correlation on both the IMCS-A and C systems confirmed the correctness of the time correlation calculation on IMCS-C.
- In the STA (short Term Archive) on IMCS-C TM Report Packets could not be accessed, probably due to a corruption in the archive, note that the archive on the A-chain is still maintained.
- There were some problems with the IFTS instances, in particular for the first 3 days after the handover, POS / ICPs could not be received from ISOC, a back-up system via E-mail was agreed (but not used) for this period.

Apart from these major errors a number of less significant configuration problems were noted.

Monitoring of the performance and stability of the IMCS-C is still on-going. The IMCS-A will be maintained in hot back-up until all outstanding issues with the new IMCS have been resolved.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There were some minor drops in TM from Redu & DSS-16, plus a loss of bit-lock from Redu. A loss of TC from REDU resulted in the loss of 1 pointing. But otherwise, these problems did not have any impact. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's for up to rev 330 have been received. No ToO request has been received. Now that the rev 325 with the AOCS calibration has been finalised ISOC also has to regenerate the already delivered revolutions 326 to 328. This is to ensure consistent dither pattern for the very long observation covering all these revolutions. The revolution 326 has been resent to MOC. It is now planned to perform SPI annealing starting in revolution 327. In order to optimise science then it is looked into the possibility to reallocate some SPI telemetry to the other instruments. Therefore further replanning of revolution 327 and 328 is anticipated. Planning of the revolutions 329 and 330 will be performed once the planning of the previous revolutions are finalised. TSF for rev 322 and 323 were received.

2. Observation status

ECS's for revolutions 308 - 310 were received. The corresponding OCS's have been generated and sent to ISDC. ECS for revolution 301 is still missing.

3. ISOC science data archive

The beta version of ISDA version 2 has been extensively tried by the ISOC scientists. No major problems have been encountered. Testing is expected to continue next week. Ingestion of further archive data has been a problem this week due to unplanned unavailability of both key persons for this work.

4. ISOC system

The version 10.9.1 has been used most of this week. However a problem with one pointing in a dither pattern generated in revolution 327 forced a system patch to version 10.9.2. This version has been used to locally regenerate this revolution. The problem is then removed. This revolution will be sent to MOC once the telemetry allocation is sorted out. See above.

5. Problems

None besides the one mentioned above.

4.3.2 ISDC

Status of ISDC observation processing on 06/06/2005:

- Latest Standard Analysis completed: observation 03201090019 (Gal. Bulge region, Revolution 306) on 28/05/2005
- Latest products archived: observation 03201090013 (Gal. Bulge region, Revolution 299) on 30/05/2005
- Latest observation products sent to the observer: observation 02201460002 (3C273, Revolution 268) on 15/04/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 149, at about 05:00Z, the idda was showing yellow, with free disc space down to 4.6GB.
- On DoY 149, at 05:23Z, the TM parameter D9033 was indicating a 'Dirty Frame', then RD0001D was indicating both on-board RX locked. It happened again at 16:49Z. The ground station in use was Redu, there was no impact. The reason for these incidents is not clear, investigation into the possibility of interference from an external source is on-going.
- On DoY 149, at 20:02Z, a bad TM frame was received from Redu, there was no impact.
- On DoY 150, from 09:44Z to 10:12Z (during belt passage) TM VC7 link was switched to the C-chain for testing purpose. The VC-0 link was also disconnected from IMCS-B and connected to the C-chain.
- On DoY 150, at 10:13Z, in the Event logger, the link MADDs-ISDS was reported several times toggling between connected and TM flow. "TCONmain RT, idda, ERROR, software, HFACTM record store", as well as "TMDS,

idda, ERROR, software, error sending data to consolidator on VC7” were also reported at this time.

- On DoY 150, at 10:35Z, ISDS-A was disconnected from MADDS and reconnected via the TM SPACON task.
- On DoY 150, at 10:38Z, double data rate was seen on the VC-7 TM link from DSS16, probably due to JPL providing 2 data streams. A cycling of the VC-7 TM link cured the problem.
- On DoY 151, at 05:15Z, idda was in a yellow state due to lack of free disc space.
- On DoY 151, at 14:18Z, “HFARetri, idda, WARNING, software, open of archive failed” was reported in the Event logger.
- On DoY 152, at 03:38Z, TM DUT051 “CLCW VC0/VC7 BLK” reported no bitlock. There was no impact. Again, the reason for these incidents is not clear, investigation into the possibility of interference from an external source is on-going.
- On DoY 153, at 06:59Z, both ISDS and IFRD were stopped on ISDS-A because of a firewall reboot. At 07:14Z TM flow between MADDS and ISDD was back to nominal.
- On DoY 153, at 07:25Z operations were moved to the C-chain where SCOS-E with its dedicated new database is running. At 08:26Z operations were moved back to the A-chain where SCOS Classic is running. The VC-7 TM link was maintained on the A-chain.
- On DoY 153, at 10:36Z, the TM from DSS-16 dropped. It was recovered at 10:40Z, there was no impact.
- Since DoY 153 at 14:30Z (AOS), operations have been running on the C-chain (with INCTRA) used as prime having installed SCOS-E. The A-chain (with INCTRB) has been used as backup having installed SCOS Classic.
- On DoY 153, at 17:28Z, the attitude determination failed, due to a Star Trackers problem, the impact was that pointing 03220002 and part of pointing 03220003 were lost. Further details are contained in the AOCS section.
- On DoY 153, at 20:25Z, 20:26Z & 22:06Z, there were several messages received in the Event logger: “TMDSmain, iddc, WARNING, Log, cannot receive message from service NCTRS”, then “Link TM-DDS-VC7RT disconnected”, and “Link TM-DDS-VC7RT connected”. These messages are probably related to problems in the Telemetry archives on the IMCS-C.
- On DoY 154, at 07:13Z, there was a small drop in TM from Redu, there was no impact.
- On DoY 154, at 20:29Z, “Link TM-DDS-VC7RT disconnected” and “Link TM-DDS-VC7RT connected” were reported in the Event logger. These messages are probably related to problems in the Telemetry archives on the IMCS-C.
- On DoY 154, at 21:36Z, a bad TM frame was received from Redu, there was no impact.
- On DoY 154, at 21:37Z, there was a TM drop for a few seconds from Redu, again, there was no impact.
- On DoY 154, at 22:54Z, bit-lock problems at Redu, caused the loss of pointing 03220031, the timeline was eventually rejoined at 23:43Z. The reason for

these incidents is not clear, investigation into the possibility of interference from an external source is on-going.

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

AR id	Date Created	Subject	Segment	Status
INT-2738	06/06/2005	Too many blank/header pages printed in the Integral DCR	IMCS	Pending
INT-2740	06/06/2005	Parameter values in Expanded OBEH Display are truncated.	IMCS	Pending
INT-2741	07/06/2005	SPID 211001 not Accessible on IMCS E1.3.	IMCS	Pending
INT-2742	07/06/2005	E1.3: OLF indicates Invalid and Inaccurate Time Correlation.	IMCS	Pending
INT-2743	07/06/2005	E1.3: Missing Pop-up List for TC Parameter Status Values.	IMCS	Pending
INT-2744	07/06/2005	E1.3: Missing (Out of order) TMSP Genertaes Alarm.	IMCS	Pending
INT-2745	07/06/2005	E1.3: OBEH Times Yellow, Indicating Warning.	IMCS	Pending

7 Future Milestones

The current Eclipse season started on 18th May.

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

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

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

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 321

In revolution 321 a Deep Extragalactic Survey was performed throughout the available observation time (~61 hours).

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

Revolution 322

The observations in revolution 322 consisted of a raster dithering observation of the Crux Arm (RA 11:57:7.00; DEC -59:12:12.0) lasting ~57.5 hours, followed by a staring observation at the OMC Flat Field target (RA 10:51:12.00; DEC -24:12:00.0), performed for the remaining ~3.5 hours of observation time. During this observation OMC Flat Field and Dark Current calibrations were performed.

Throughout these observations SPI, IBIS and JEM-X1 were in their nominal science modes and the JEM-X2 DFEE remained off. For the Crux Arm observation OMC was in Science Normal mode and the TM allocation was IBIS 129; SPI 103; JEM-X1 8; JEM-X2 1; OMC 5. During the OMC Flat Field observation OMC was in FFCalibration followed by DCCalibration mode and the TM allocation was IBIS 90; SPI 84; JEM-X1 8; JEM-X2 1; OMC 63.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2005-05-17T02:33:14.000Z	161.3856	F	Automatic TM processing.
2005-05-18T10:13:17.000Z	161.3663	F	Automatic TM processing.
2005-05-18T16:53:58.000Z	161.3551	F	Automatic TM processing.
2005-05-19T01:23:35.000Z	161.3161	F	Automatic TM processing.
2005-05-21T16:41:58.000Z	161.3024	F	Automatic TM processing.
2005-05-23T03:00:01.000Z	161.2844	F	Automatic TM processing.
2005-05-24T16:29:02.000Z	161.2658	F	Automatic TM processing.
2005-05-25T00:58:47.000Z	161.2526	F	Automatic TM processing.
2005-05-25T02:05:43.000Z	161.2250	F	Automatic TM processing.
2005-05-26T02:12:26.000Z	161.2043	F	Automatic TM processing.
2005-05-27T09:18:21.000Z	161.1850	F	Automatic TM processing.
2005-05-27T16:17:58.000Z	161.1506	F	Automatic TM processing.
2005-05-30T16:05:25.000Z	161.1317	F	Automatic TM processing.
2005-06-01T01:42:01.000Z	161.0998	F	Automatic TM processing.
2005-06-02T15:55:09.000Z	161.0905	F	Automatic TM processing.

This report was generated Fri Jun 3 08:00:28 GMT 2005

8.3 Detailed Satellite Information

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

8.3.1 AOCS SUMMARY OPERATIONS REPORT, 28/05/2005 – 03/06/2005

AOCS operations were executed from the Automatic Timeline.

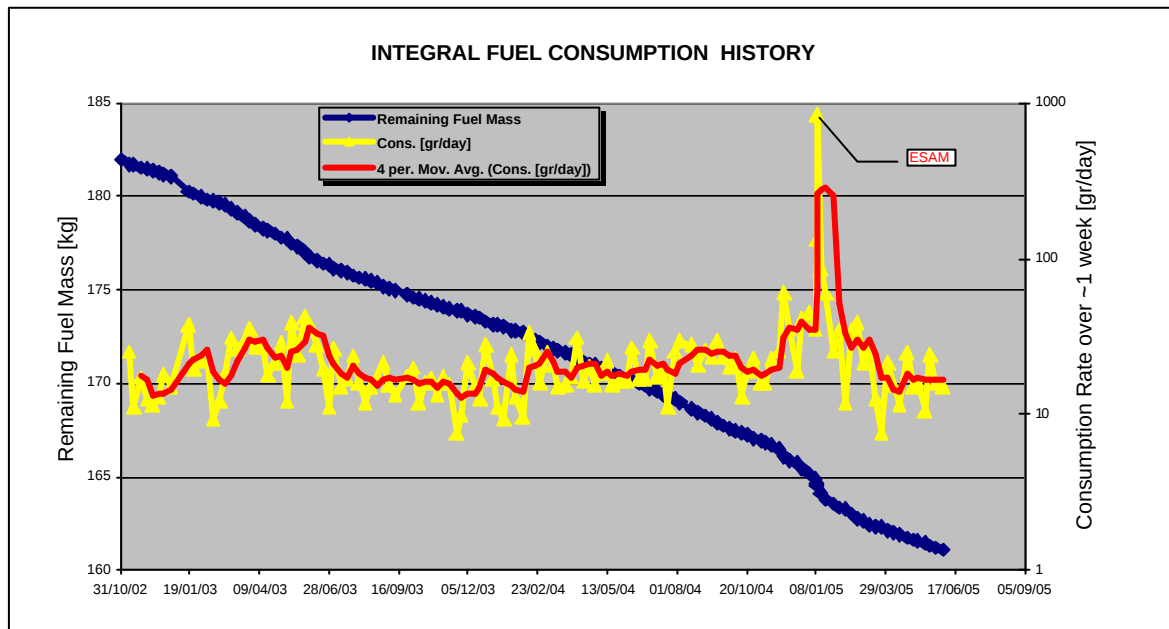
During this period, 93 Open Loop Slews, 126 Closed Loop Slews and 3 Momentum Bias were executed. 3 (2 CSL, 1 OSL) slews were missed due to a STR 1750 Processor fault and drop in TC link during REDU pass. This is equivalent to ~ 1.3 %.

The AOCS eclipse operations were nominal. For the 5th and 6th eclipse passages, the Eclipse Timers and the Time-Tagged sequence to re-enable the IMU Auto Switch-Off function of the ACC were loaded from the Timeline and the pre-eclipse IMU health checks were performed at the planned times. Some information regarding the eclipse times and IMU usage up to this stage of the eclipse season are provided below:

AOCS Eclipse Times														Summer 2005	
Date	LOS	AOS	ACC Eclipse Imminent	Eclipse Start					Eclipse End					Eclipse Duration	
				ACC	FDE	FCE	Penumbra	FSS Sun Out	Umbra	Umbra	FSS Sun In	Penumbra	FDE/FCE		ACC
2005-05-18	11:36:00	15:29:00	10:43:59	11:26:02	11:35:53	11:36:37	11:43:39	11:51:24	11:18:35	12:08:15	11:59:31	12:06:40	12:11:17	12:16:25	0:23:01
2005-05-21	11:32:00	15:17:00	10:15:57	10:58:24	11:06:58	11:07:42	11:15:37	11:18:26	11:18:35	12:09:02	12:10:39	12:14:38	12:20:50	12:20:50	0:55:02
2005-05-24	11:18:00	15:03:00	09:59:13	10:41:54	10:50:33	10:51:17	10:58:53	11:01:15	11:01:15	12:03:23	12:04:04	12:05:11	12:09:57	12:15:34	1:06:18
2005-05-27	10:55:00	14:50:00	09:50:25	10:31:50	10:43:15	10:43:59	10:50:05	10:51:23	10:52:12	11:58:27	11:58:13	12:00:00	12:05:35	12:09:08	1:09:55
2005-05-30	10:55:00	14:39:00	09:45:47	10:26:52	10:38:26	10:39:10	10:45:27	10:46:24	10:47:28	11:52:10	11:51:44	11:53:41	11:59:18	12:02:30	1:08:14
2005-06-02	10:43:00	14:30:00	09:42:58	10:24:03	10:35:38	10:36:14	10:42:38	10:43:23	10:44:45	11:42:54	11:42:13	11:44:30	11:49:46	11:53:17	1:01:52

IMU Usage during Eclipse Season						Summer 2005	
IMU On	IMU Off	From Health Check		From Auto Calibration	On Time	Accumulated On Time	
		Noise Roll [as/s]	Drift Roll [as/s]	Drift Roll [as/s]			
2005-05-18 08:39:40	2005-05-18 12:18:40	0.1997	0.1579	0.1430	3:39:00	3:39:00	
2005-05-21 08:05:31	2005-05-21 12:23:02	0.2124	0.2817	0.2901	4:17:31	7:56:31	
2005-05-24 07:47:21	2005-05-24 12:17:47	0.2904	0.2772	0.2602	4:30:26	12:26:57	
2005-05-27 07:37:09	2005-05-27 12:11:27	0.1852	0.1811	0.2119	4:34:18	17:01:15	
2005-05-30 07:55:36	2005-05-30 12:04:47	0.2733	0.1595	0.1350	4:09:11	21:10:26	
2005-06-02 07:33:06	2005-06-02 11:55:38	0.1569	0.2102	0.2370	4:22:32	25:32:58	

The fuel consumption over the period between 01/11/2002 and 02/06/2005 is reported in the plot below.



28/05/05 (Day of Year 148, Revolution 320)

Nothing to report.

29/05/05 (Day of Year 149, Revolution 320)

Nothing to report.

30/05/05 (Day of Year 150, Revolution 320-321)

Nothing to report.

31/05/05 (Day of Year 151, Revolution 321)

Nothing to report

01/06/05 (Day of Year 152, Revolution 321)

Nothing to report.

02/06/05 (Day of Year 153, Revolution 321-322)

Guide star released by the STR SEU Filter: At 14:30:53z, the SEU Filter threshold of the ACC was exceeded and the guide star released. The magnitude 7.2 guide star was located at CCD coordinates [-1132, -9649]. A new guide star, Mi 7.7 at CCD location [5266, -2393], was picked in the first automatic mapping, which was kept afterwards.

STR 1750 processor fault: at 17:29:18z repetitive STR 1750 processor faults occurred during the execution of the PID 03220001. The sequence of the events was:

17:21:26z Open Loop Slew End for PID 03220001
17:21:26z Mapping start
17:21:33z Mapping End prematurely (aborted)
17:22:29z New automatic mapping commanded by the ACC. The acquired guide star was Mi 8.45 at CCD location [-7036, -14018]

Due to the abortion of the first mapping after the OSL, the attitude reconstruction process performed by FDS failed, and the TPF update for slew ID 03220002 was not generated.

17:29:09z Ground commanded manual mapping
17:29:18z Mapping End prematurely (aborted), IMU1 ON. New automatic mapping commanded by ACC and picked the same guide star as above at CCD location [-7036, -14018]

17:40 – 18:04 attempted several mapping with no success (included search\track process), forcing the IMU1 ON\OFF each time guide star lost, due to the presence of the bright object. The reason of the mapping abortion was a bright object (ID 8979 – 3464) in the STR FOV, located around the same CCD column of the guide star, at CCD location [-7915, -710].

18:30:11z IMU1 OFF

18:40z In order to recover the AOCS and pick a guide star far from the Y location ~ -7900, a change of guide star was performed by using the star in slot # 2, Mi 8.35 at CCD location [-26579, -19136]. Being this star far enough from the Y coordinated of the Bright Object. The recovery action was successful and the recovery of the AOCS continued.

The fault, which occurred after the end of the open loop slew, resulted in the repetitive abortion of the on-going mappings (duration shortened) and start of new mappings.

The IMU was switched ON/OFF several times, being the problem occurred during the execution of a pointing. According to the Star Catalogue, one Bright Objects, the Star Alpha CRUX, was in the STR FoV, located in the first ESWs, at the same CCD detectors column of the used guide star: this likely caused the multiple faults and the abortion of the mappings.

Due to a problem on the STR 1750 Processor, the slew ID 03220002(OSL) was not executed and the AOCS s/s disabled in TL at 17:31. After the recovery described above, a manual recovery of the AOCS was then performed to the attitude of PID 03220003 (CSL). The next slew (CSL) for PID 03220004 was manually updated and executed from the Timeline. The AOCS s/s was re-enabled in TL at 19:26z.

03/06/05 (Day of Year 154, Revolution 322)

Slew missed from the Timeline: Due to a problem on the uplink (drop in TC link) during the REDU pass, the slews ID 03220031(CSL) was not executed and the AOCS s/s disabled in TL at 22:56z. A manual recovery was then performed to the attitude of PID 03220031. The next slew (OSL) for PID 03220032 was manually updated and executed from the Timeline. The AOCS s/s was re-enabled in TL at 23:43z.

Being the drop on TC link occurred when commanding the slew ID 03220031, the sequence was partially uplinked (not correctly), generating an on board rejection from the ACC flagged by the OEM:

APID 640 ID 14 Class 3 << ACC BAD TC SEQ>>

As consequence of this rejection the two on-board counters

A5009 ACC COUNT ERROR

A5008 ACC COUNT RECOVERABLE ERROR

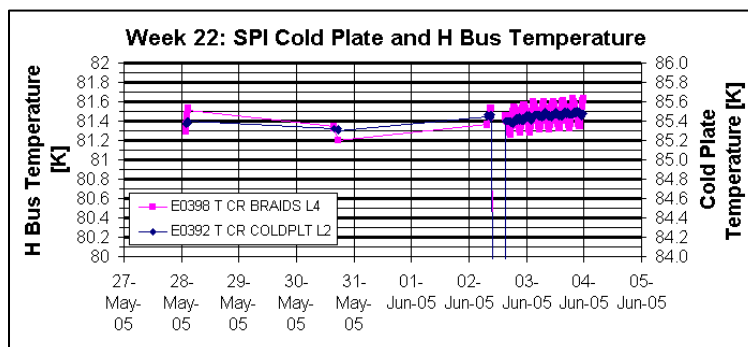
increased by one unit.

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, showing the expected positive drift.

The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period (due to problems in the TM retrieval tool, the plot is affected by large gaps).



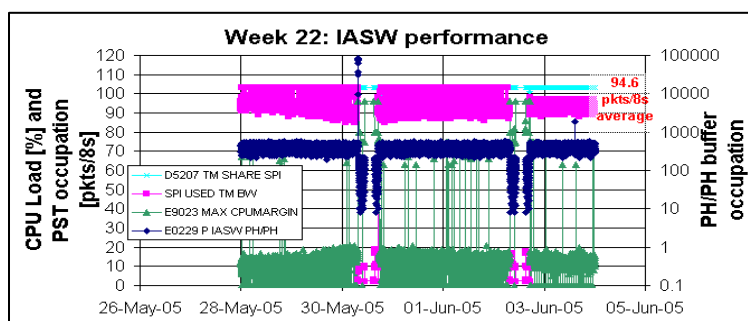
DPE & IASW:

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

- 102-103 pkts/cycle peak (1 pkt/cycle is sometimes unused due to TM leakage anomaly);
- 94.6 pkts/cycle average in science mode, during observation periods.

The temporary workaround to the TM leakage anomaly (AR INT_SC-107) has been stopped since rev.322 due to a problem in the PST commands with the new MCS release.

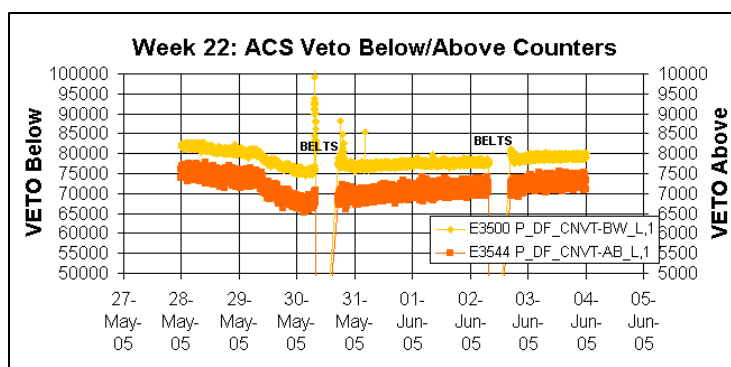
The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS:

The performance of the ACS is nominal except for the PSAC thermal environment. It is since the 2nd -3rd eclipse passage of this season (started on 18th May) that E2116 is exceeding the low hard limit. This could be due to the particular attitudes that we are currently flying, where SPI mask is in shadow for long periods also after eclipse exit. The PI and the ACS expert have been contacted to further analyse the problem.

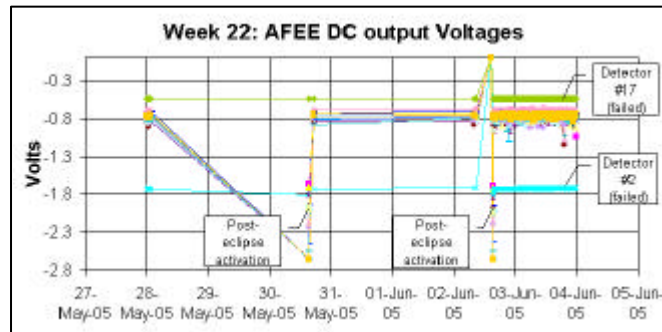
The following plot shows the ACS overall count rate evolution during the reporting period.



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.

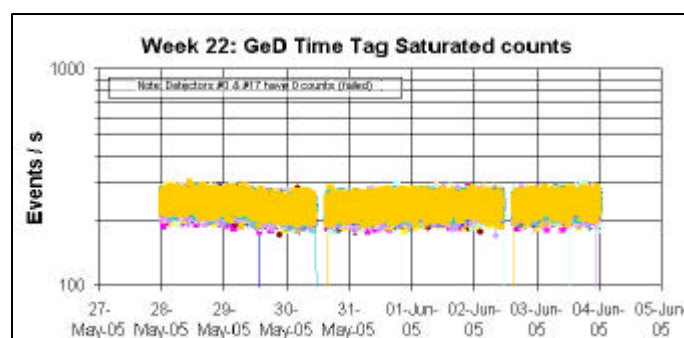
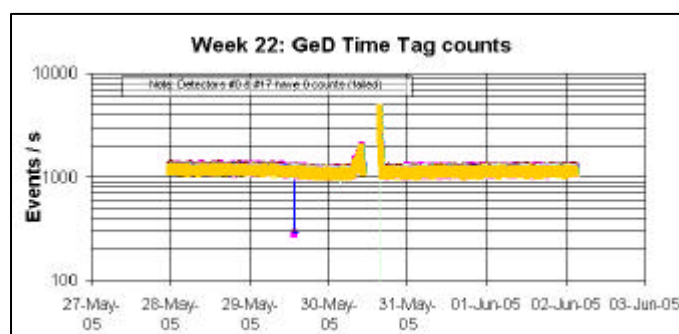
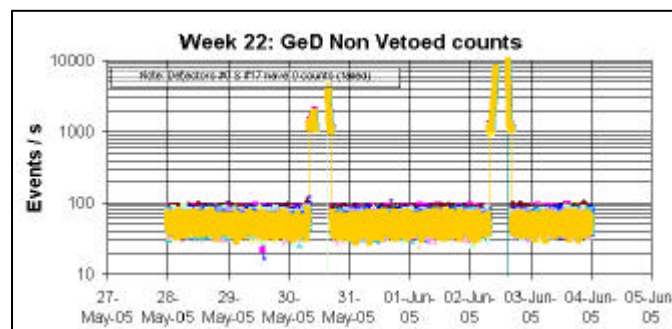
The following plot shows the AFEE dc output signals during the reporting period (due to problems in the TM retrieval tool, the plot is affected by large gaps).



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 detectors #2 and #17.

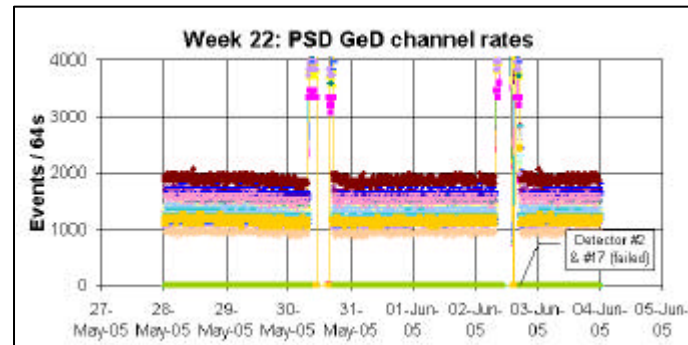


PSD:

The performance of the unit is nominal.

Following the execution of OCR#191 (PSD input channels #2 and #17 disable), the channel rates blocking malfunction did not appear again. 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
From 147 / 15:38	TM E2115 "T AS PSAC L1"; E2116 T AS PSAC L2 "" OOL Low. / This is expected because during the Eclipse the unit is switched OFF and therefore it cools down. / The TMs get back into limits after some time that the unit is switched on again.
148 05:59 - 06:12	TM E2237 "S AS DG5V L87" OOL and back into limits
149 12:55-19:09	TM E2116 "T AS PSAC L2" toggling OOL @ -19.29 to -20.07
First part of revolution	TM E2116 "T AS PSAC L2" OOL > Ref to previous report
150 / 15:28	OEM: "SPI LSL Error" ID 145
151 / 14:58	Execution of the FCP_SPI1_9513 "SPI DPE Dump of Boot Test Results"

Future activities:

The 6th SPI annealing will start on 14th June (rev.325 belts entry) and will last until 29th June (rev 331 belts exit). The annealing schedule includes 125 hours annealing time at 104degC, several calibration runs of the ACS. During the warm phase, the instrument will be maintained in PHOTON mode to monitor the faulty detector channels.

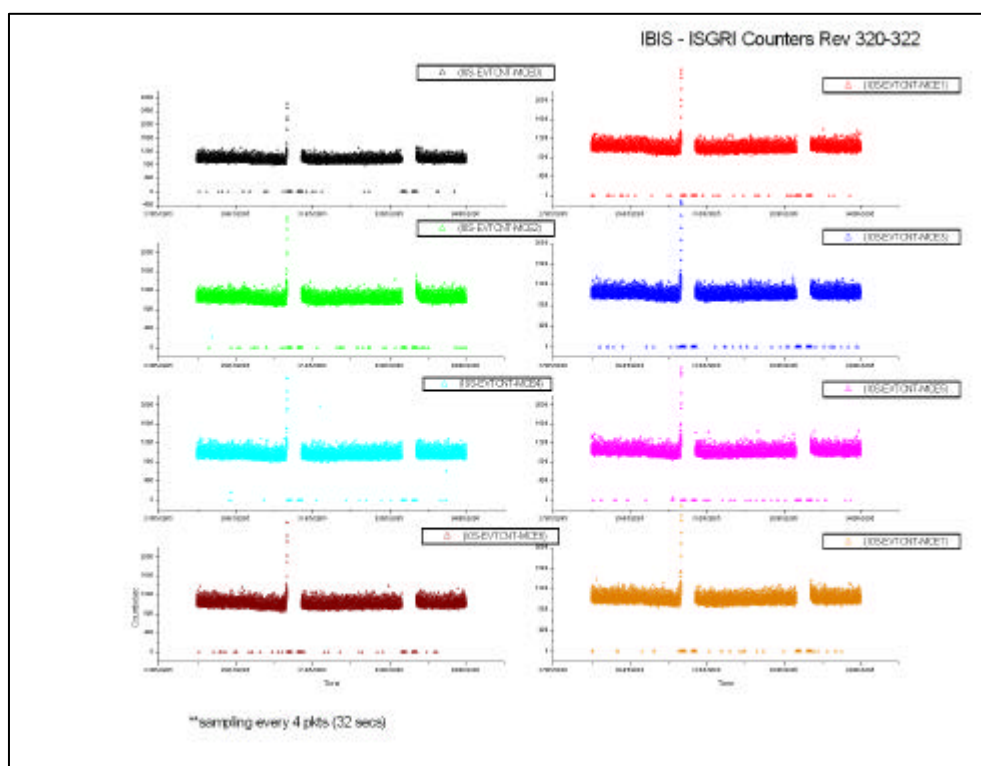
Here follows the summary view of the updated timeline:

6th SPI Annealing - revs 325-331																									
ID	Task Name	Duration	Start	Resource Nam	13 Jun '05							20 Jun '05							27 Jun '05						
					Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
2	Start SPI Annealing	2.52 hrs	14 Jun 06:48	PST[20 pkts]	un 06:48																				
16	Warm up to Annealing Temperature	38.34 hrs	14 Jun 09:09	PST[20 pkts]	Jun 09:09																				
23	Annealing at 104degC	125 hrs	15 Jun 23:29	PST[20 pkts]	15 Jun 23:29																				
32	Stop SPI Annealing - Passive Cooling	67.02 hrs	21 Jun 04:29	PST[20 pkts]																					
35	ACS Switch-on and Calibration	133.8 hrs	20 Jun 15:38	PST[20 pkts]																					
50	Active Cooling	121.52 hrs	23 Jun 23:31	PST[20 pkts]																					
65	Active Cooling Fine Tuning	72 hrs	29 Jun 01:02	PST[20 pkts]																					
67	Camera Switch on & Performance Tests	35.28 hrs	27 Jun 18:32	PST[103 pkts]																					
91	Resume SPI POS Observations	62 hrs	29 Jun 15:05	PST[103 pkts]																					

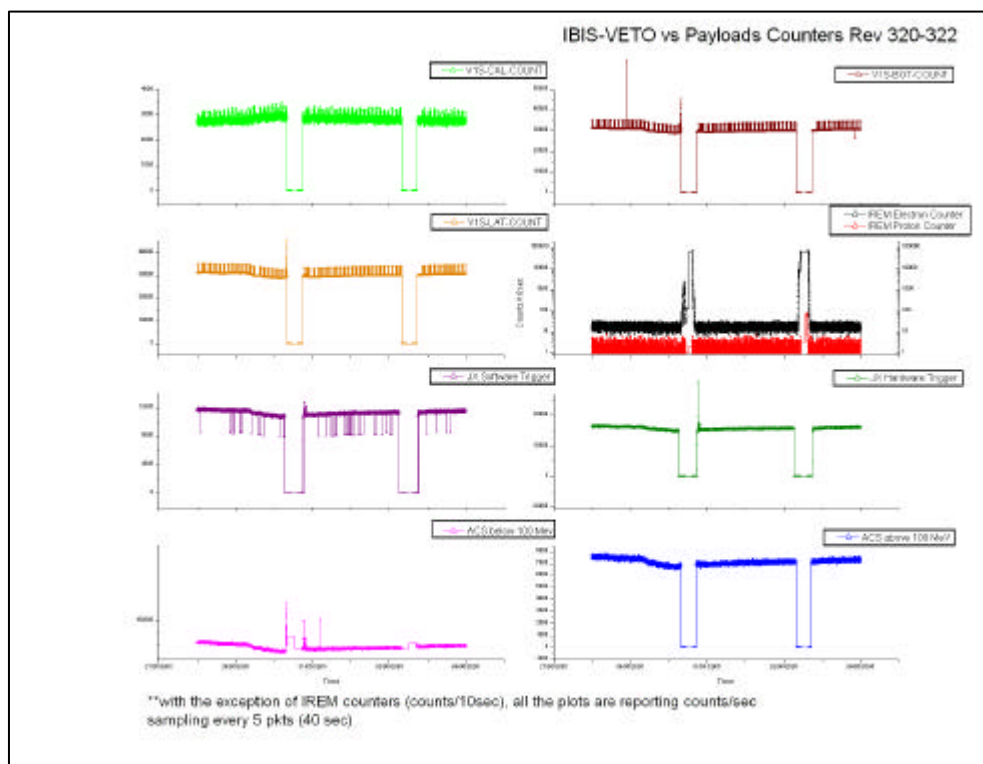
8.3.3 IBIS Operations

IBIS Events Counters Plots.

ISGRI Counters:

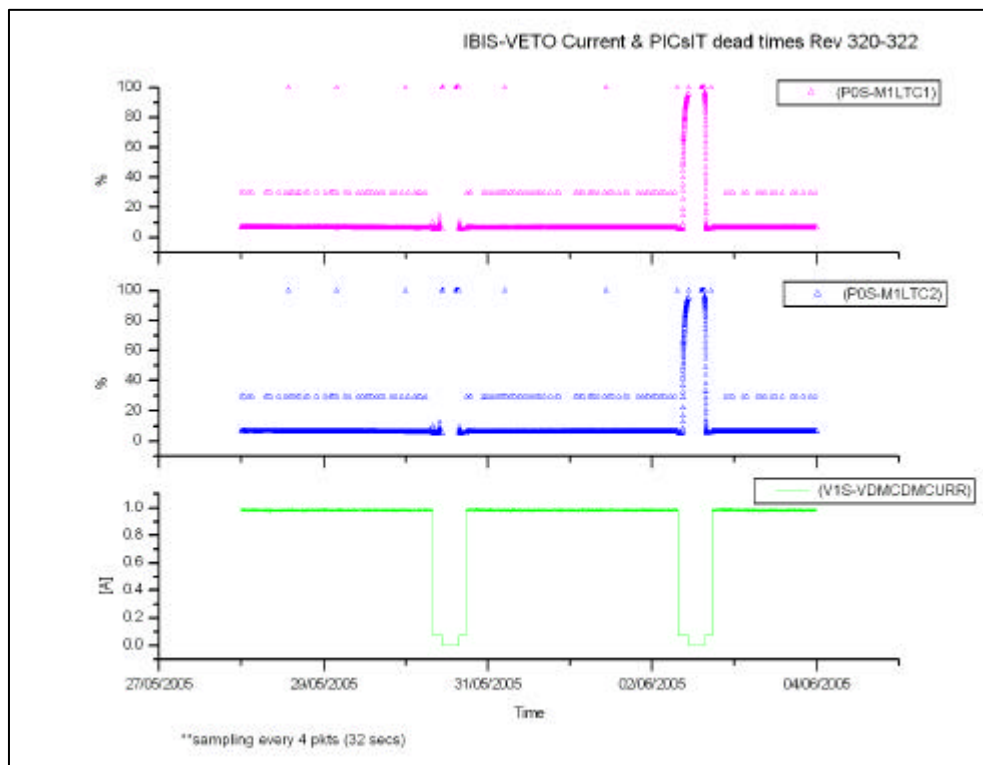


VETO vs Payloads Counters:

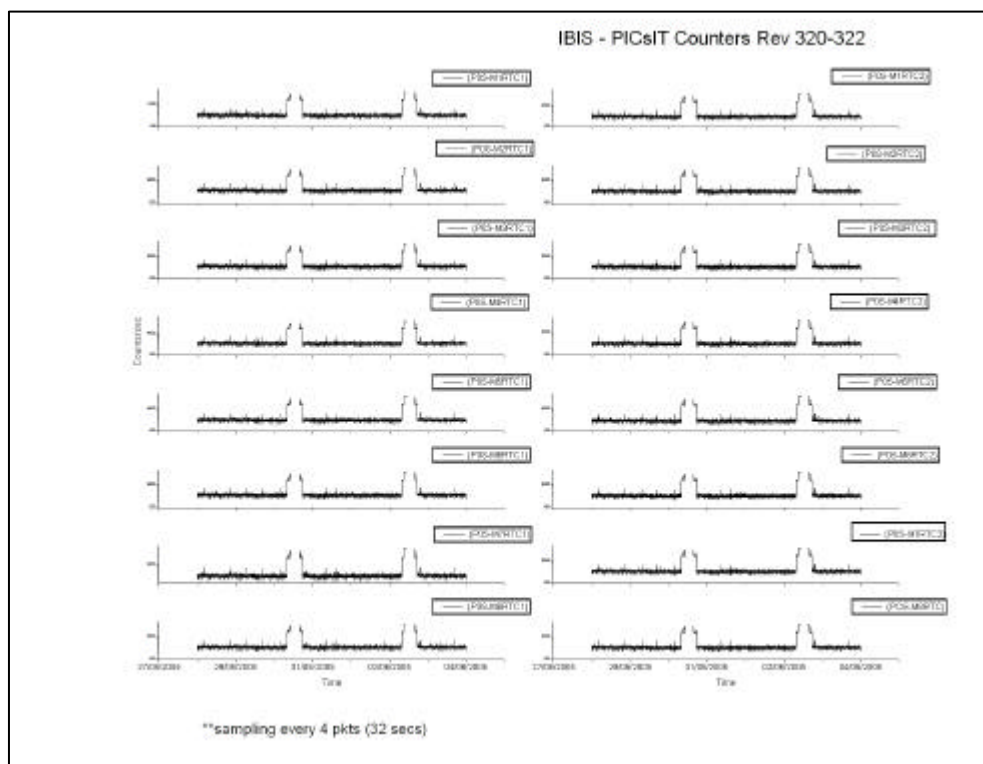


The week was characterised by low solar activity.

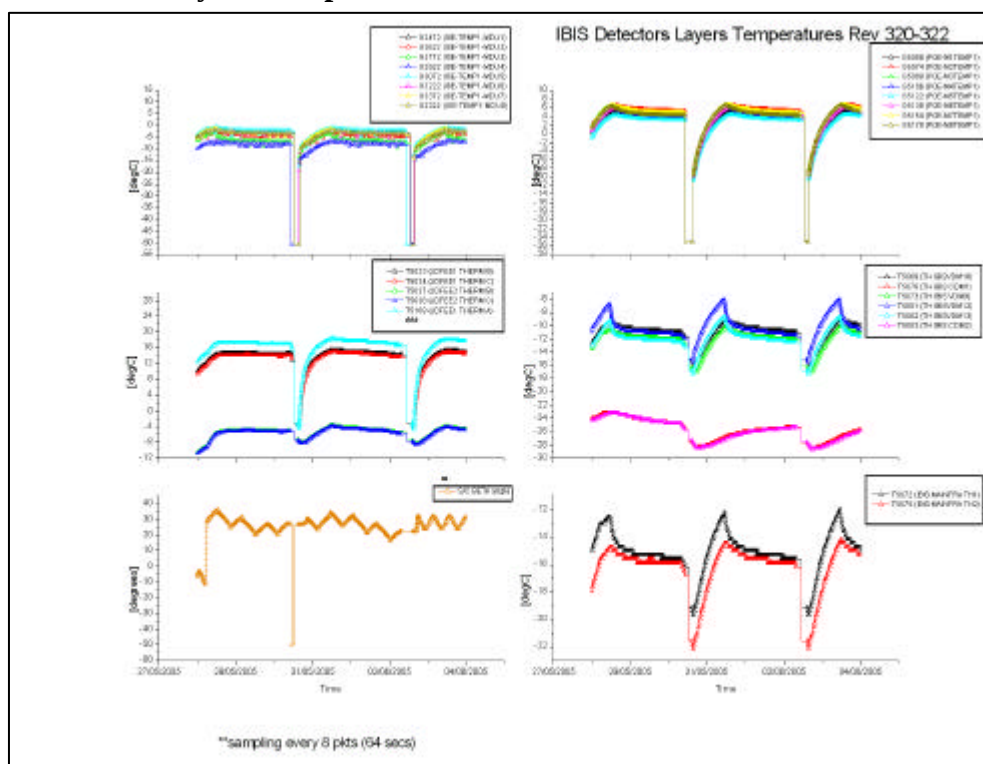
VETO Current:



PICsIT Counters:



IBIS Detectors Layers Temperatures:



IBIS daily report:

DoY 2005.148 (28/05/2005):

At 08:58Z TM parameter G2056 (I0E-OVFWPXADD-M4) failed SCC. As per reaction I-OVF-1, no action was taken.

DoY 2005.150 (30/05/2005):

At 07:50Z TM parameter G8080 (S1E-VS_HBRA-RT) went Out Of Limit warning high. As per reaction H-OVF-2, no action was taken.

At 07:51Z TM parameter G8015 (S1E-A2 PMT V) went out of limit 'high' with the value of 29.4V (limit value). It went back inside limit at 17:39Z (after belt exit). As this happened close to the radiation belts, according to V-VLT-1 no action was taken.

At 17:04Z TM parameter G2028 (I0E-OVFWPXADD-M2) failed SCC. As per reaction I-OVF-1, no action was taken.

DoY 2005.151 (31/05/2005):

At 04:28Z TM parameter G2056 (I0E-OVFWPXADD-M4) failed SCC. As per reaction I-OVF-1, no action was taken.

DoY 2005.153 (02/06/2005):

At 07:40Z TM parameter G8015 (S1E-A2 PMT V) went out of limit 'high' with the value of 29.4V (limit value). It went back inside limit at 17:29Z (after belt exit). As this happened close to the radiation belts, according to V-VLT-1 no action was taken.

At 15:28Z TM parameter G5003 (POS_M1RTC2) went OOL high and back. At 15:33Z TM parameter G5017 (POS_M4RTC1) went OOL high and back. As these OOL happened in radiation belts, according to P-CNT-1, no action was taken.

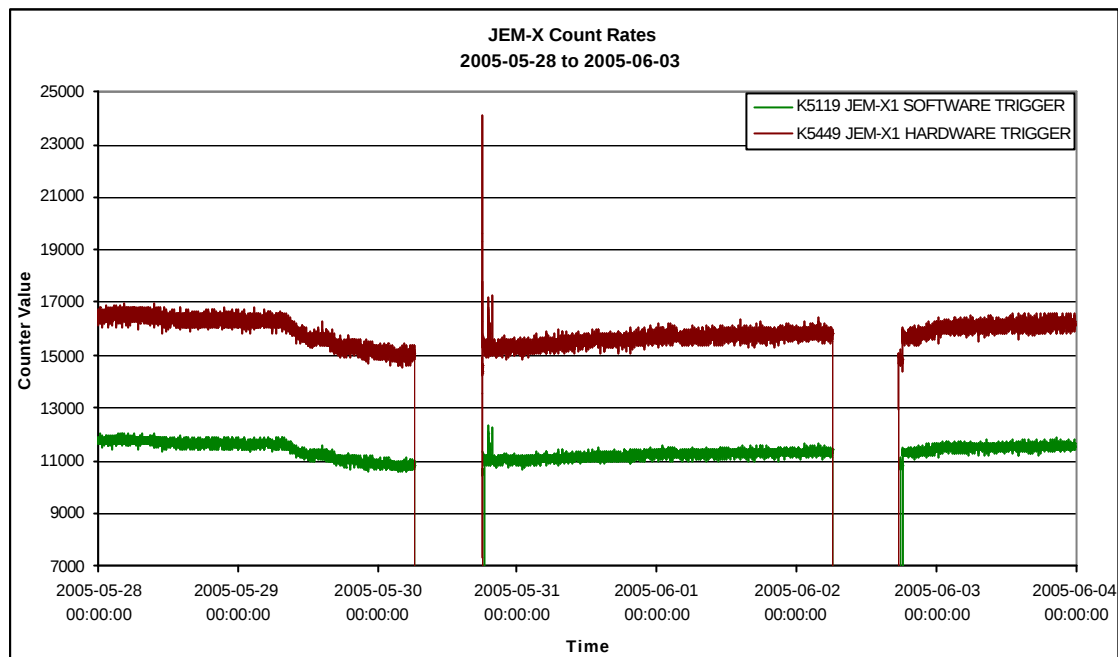
At 16:53Z TM parameter G2028 (I0E-OVFWPXADD-M2) failed SCC. As per reaction I-OVF-1, no action was taken.

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

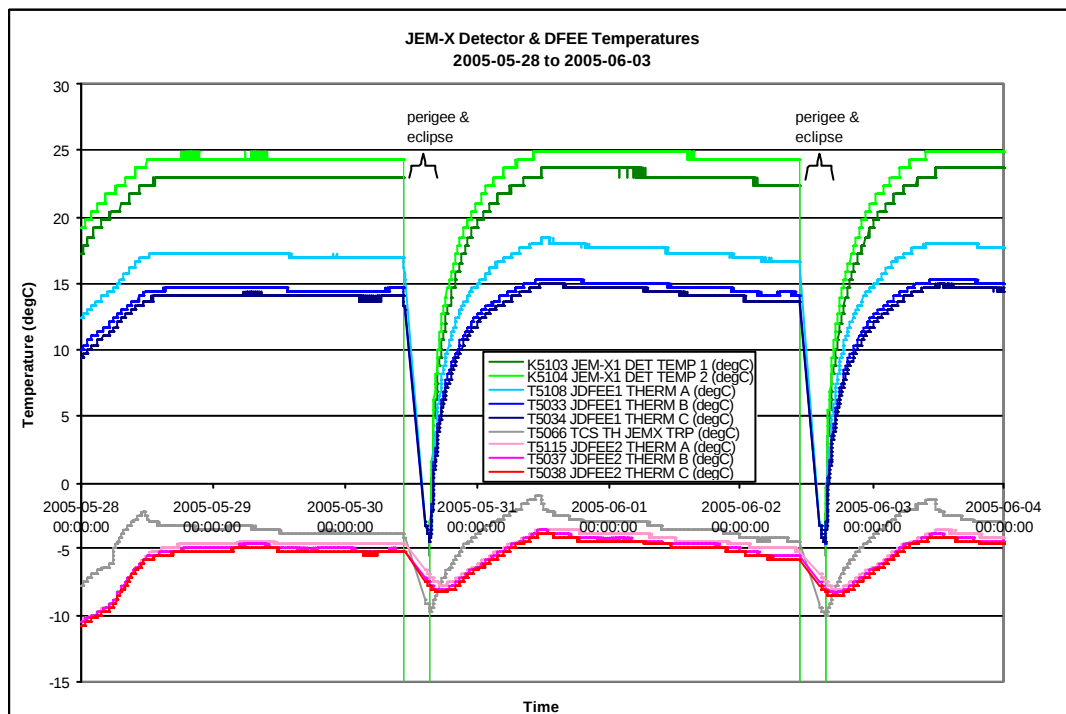
JEM-X count rates over the reporting period are displayed in the following graph¹.

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



8.3.4.2 JEM-X Temperatures

JEM-X Detector and DFEE temperatures, along with the temperature on the detector bench between the two units, over the reporting period are displayed in the following graph².



² Data sampled (1 frame in 8)

8.3.4.3 JEM-X Daily Report

2005-05-28 (DOY 148, Rev 320) to 2005-06-03 (DOY 154, Rev 322)

Nothing to report

8.3.5 OMC Operations

2005-05-28 (DOY 148, Rev 320)

Nothing to report

2005-05-29 (DOY 149, Rev 320)

At 01:43Z OEM Apid 129 ID 241 MS EVE SECL OEM1 with parameter D5555=39 was issued, indicating that the SECL task had issued the TCs to close the TSW for OMC Lens Barrel Heater loop A to ensure that this heater loop was enabled. The status of TSW OMC LNSA (TM parameter T1023) was already CLOSE and therefore no change in status occurred as a result of the TCs issued by the SECL task.

2005-05-30 (DOY 150, Rev 320-321) to 2005-06-01 (DOY 152, Rev 321)

Nothing to report

2005-06-02 (DOY 153, Rev 321-322)

At 17:29Z a Star Tracker 1750 fault occurred (see report in AOCS section), which caused slew IDs 3220002 and 3220003 to be missed from the Timeline. The OMC Imaging EDs for the corresponding pointings were uplinked from the Timeline, however OMC remained in Standby mode during the period of the recovery operations as the OTF remained low. The recovery of the AOCS was completed at 19:08Z, when the attitude of pointing 3220003 was reached via a manual slew. At this time OMC transitioned to Science Normal mode, ~30 minutes later than planned for this pointing.

OMC operations then continued nominally from pointing 3220004 onwards.

2005-06-03 (DOY 154, Rev 322)

Due to a temporary loss of TC capability, the slew to PID 3220031 was missed from the Timeline. OMC thus remained in Science Normal mode during the period in which this slew had been planned and the commands in the OMC Imaging ED MEIM-A01, scheduled at 23:02:51Z, were rejected on-board and two OEMs 131 REJECTED TC1 were issued. The other Imaging EDs for this pointing subsequently failed release from the Timeline. A manual slew to the attitude of pointing 3220031 was then performed. The slew manoeuvre started at 23:32Z, at which time OMC therefore transitioned to Standby mode. OMC then remained in Standby mode after the attitude of pointing 3220031 was reached, as the OMCAS PID (from the imaging TCs) was still 3220030.

OMC operations then continued nominally from pointing 3220032 onwards.

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]
320	RAD_ENTR R 2005-05-30T07:50:58Z	2005-05-30 08:08:49	<59706.1	2005-05-30 08:46:36	52527
321	RAD_EXIT R 2005-05-30T17:05:51Z	2005-05-30 16:27:21	>32969.7	2005-05-30 15:56:36	29379
321	RAD_ENTR R 2005-06-02T07:40:29Z	2005-06-02 08:51:45	<51189.1	2005-06-02 08:36:45	52611
322	RAD_EXIT R 2005-06-02T16:55:47Z	2005-06-02 16:03:45	>31365.8	2005-06-02 15:46:45	29186

Reference

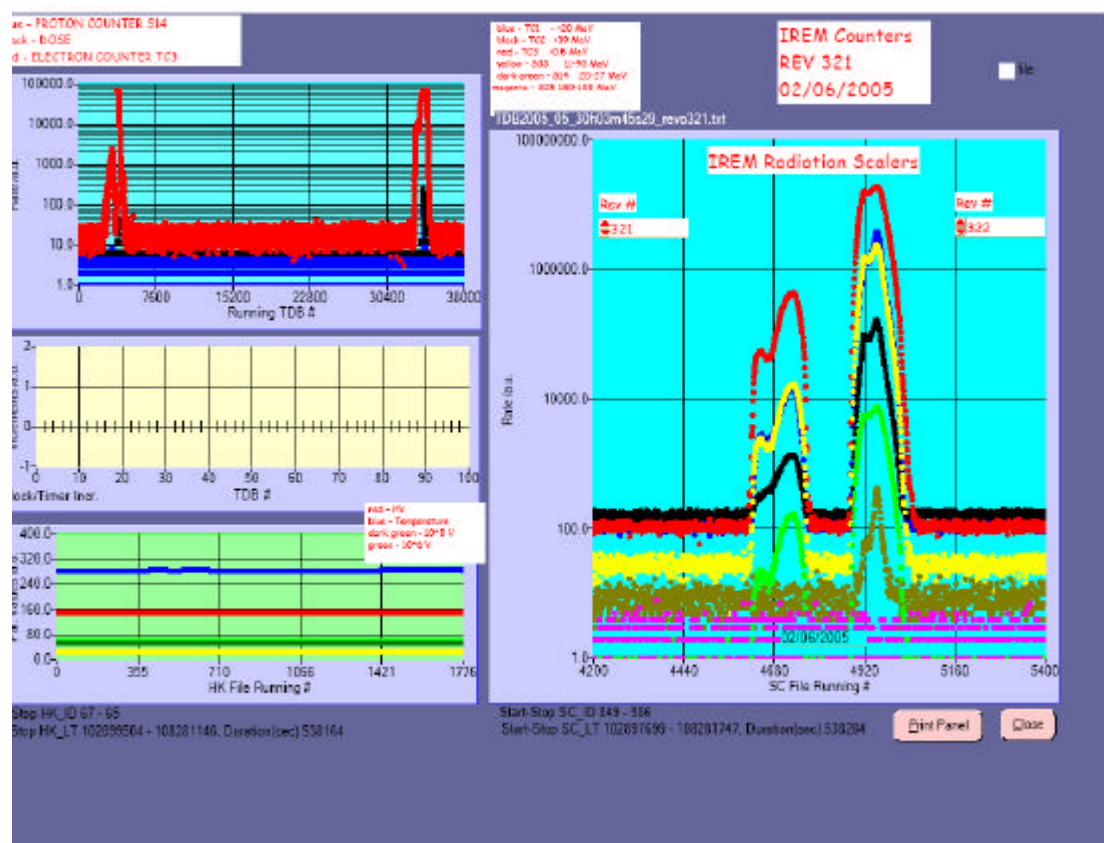
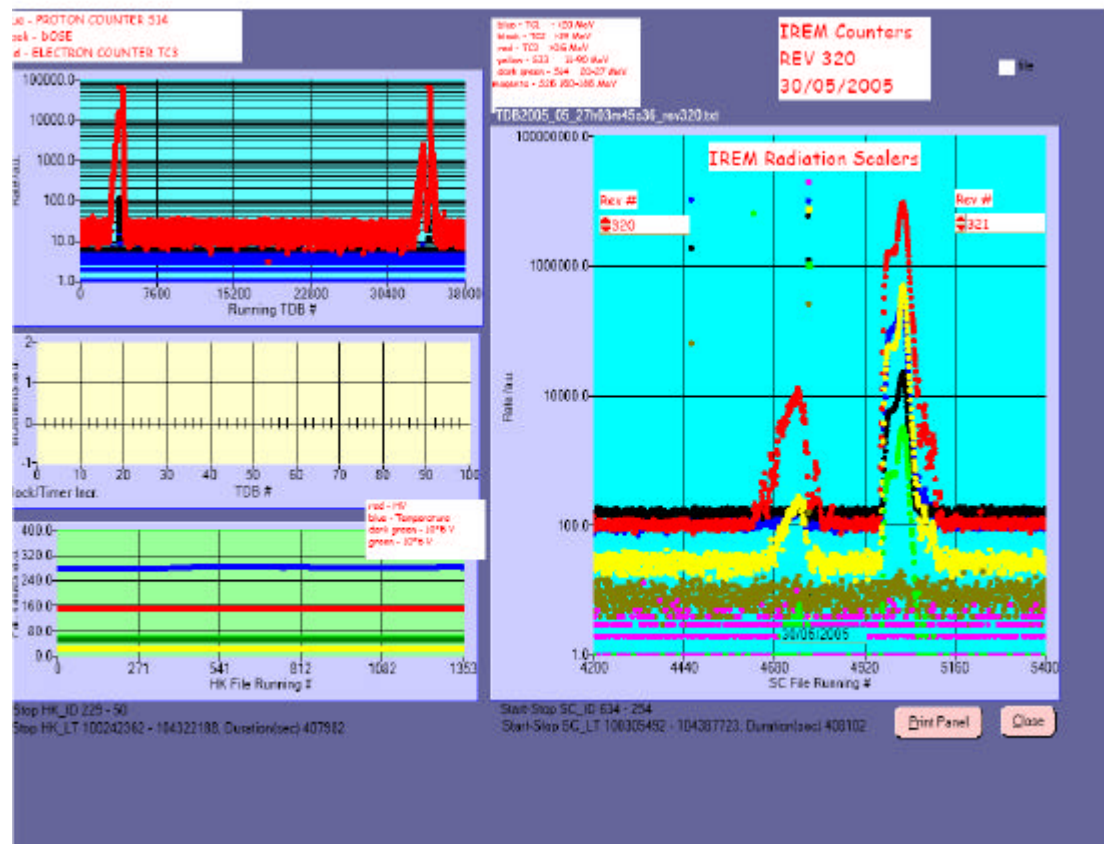
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

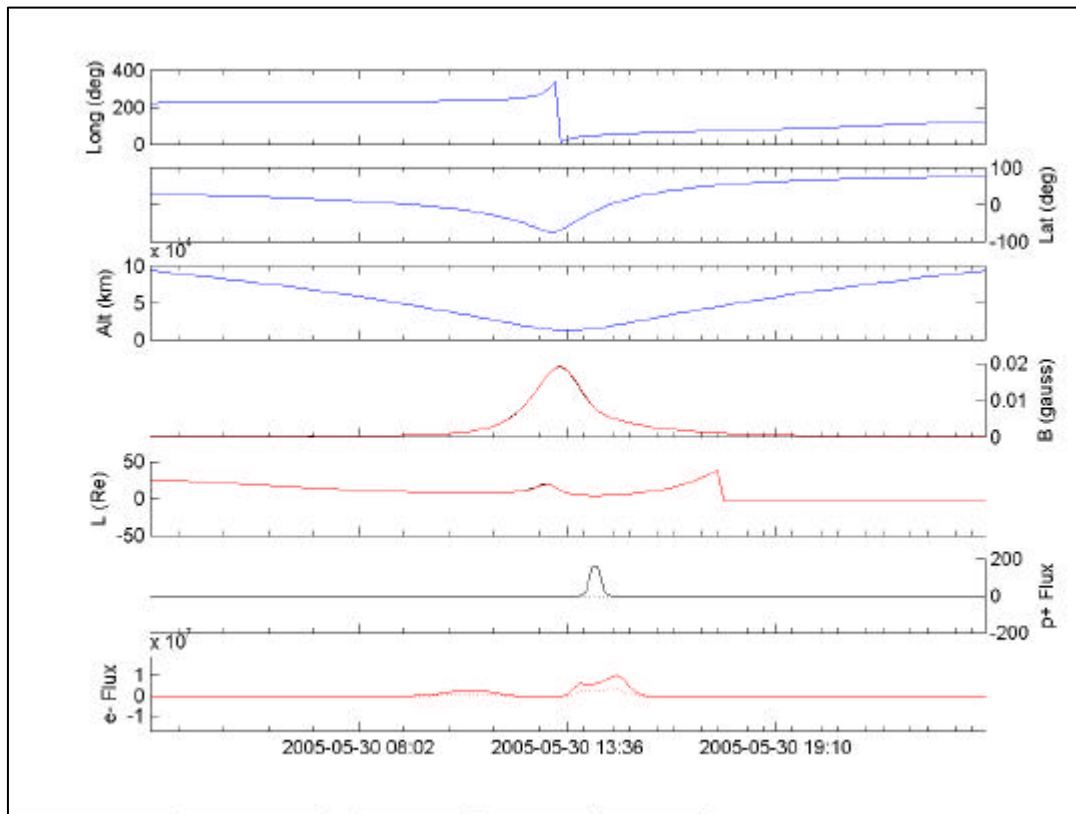
Radiation Spike

IREM radiation counters:

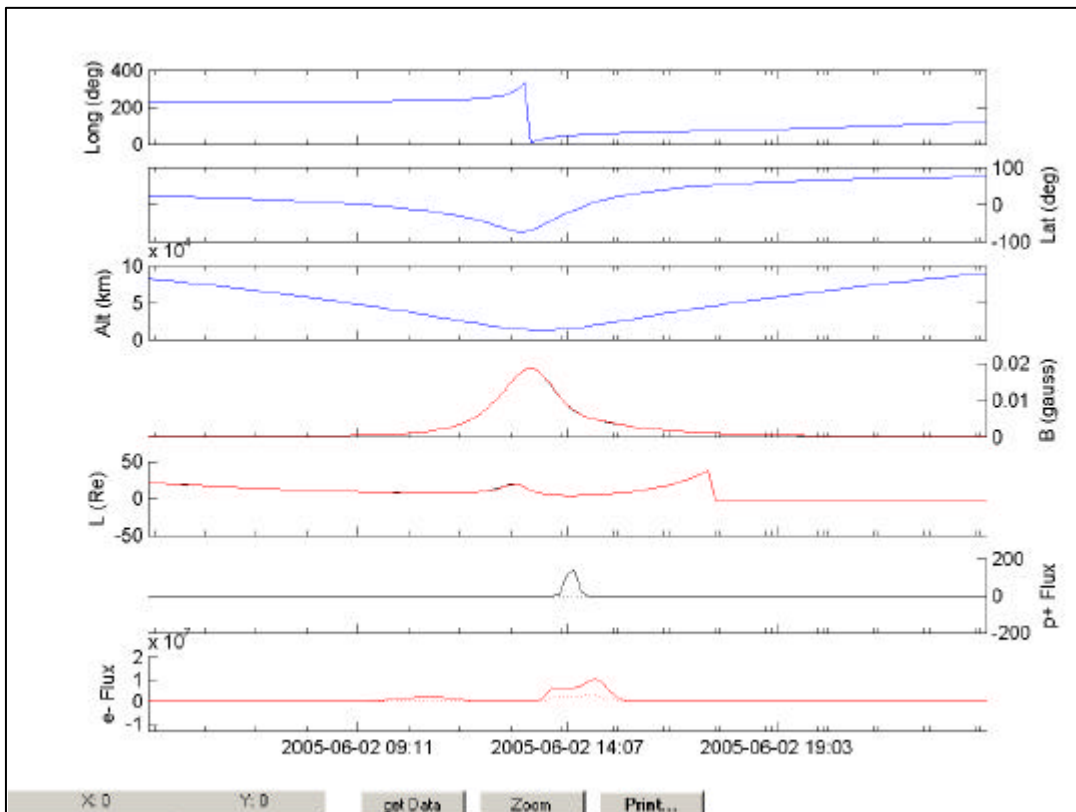


IREM Predicted Radiation Belt Passages:

Rev 320:



Rev 321:



SEC-GOES Observed Particles Fluxes:

