

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 143
Week 24
20.06.05
Routine Phase

Prepared by: O. Bergogne (OPS-OFO)

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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 11.06.05 until 17.06.05 (both dates inclusive) and covers the revolutions 325 and 326.

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 Coma Cluster (RA 12:59:48.70; DEC +27:58:50.0) and the Crux Arm (RA 11:57:7.00; DEC -59:12:12.0). The activities consisted raster dithering observations. In addition, the periodic FSS/STR Misalignment and SAS calibration pointings 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 Summer Eclipse season was completed nominally, with the last eclipse passage on the 8th of June. After the end of the season, the AMD thresholds were set to their non-eclipse season values.

As part of the AOCS periodic calibrations, after the end of the eclipse season, the FSS/STR Misalignment and the SAS calibration were performed. The pointings required for the FSS/STR Misalignment Calibration were planned in a dedicated engineering window in the Timeline of revolution 325. Four pointings were also included in this window for the calibration of the SAS Alpha and Beta Scale Factors. The operation executed nominally from the Automatic Timeline.

6 slews (5 CSL, 1 OSL) were missed from the Timeline during this period, due to problems on the new release of the MCS and problem on the S/C Receiver #1.

The fuel consumption over the period between 08/06/2005 and 16/06/2005 was 0.0815 kg. The remaining propellant is in the order of 160.8444 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

On DOY 167 (16/6/2005), a long period of anomalous behavior was observed on Receiver 1, the details are given below. Initially it was suspected that the anomalous behavior was caused by RF interference from another source, however the duration of the event is rather long, which places some suspicion upon the RX itself.

The sequence of events were as follows:

- 05.04z Significant increase in noise on the On-board RX-1 AGC levels noted, RX-2 is unaffected - note that RX-1 and RX-2 have different rest frequencies on integral.
- 05.34z First "No Decoder Bitlock", the Decoder Bitlock status is contained in the CLCW, if the RF signal is sufficiently corrupted the Decoder will no longer be able to detect individual bit transitions in the incoming signal, when this happens Bitlock is lost. The Decoder Bitlock Status continues to flicker occasionally between locked and unlocked and the noise on RX-1 continues to increase until 06.14z When TC A3089 fails release due to this problem, slew 03260039 is missed, as well as the corresponding OMC commands.
- 06.20z SPACON request an increase in the uplink power, initially it is increased from 38W to 45W, this increase has no visible effect on either the on-board AGC or the Decoder Bitlock status
- 06.29z SPACON Request the Uplink to be stopped and restarted, Test commands are sent successfully. When the carrier was down at REDU the RX-2 AGC dropped to about -137dbm as expected, RX-1 AGC remained unchanged at about -100dbm.
- 06.34z manual Start Tracker mapping (Part of recovery from missed slew) fails due to loss of Decoder bitlock
- 06.40z At this point the SPACON decides (correctly) that commanding via RX-1 is not feasible and decides to start uplink to RX-2 which luckily (ie within the visibility overlap region) is also visible from REDU. the swap to RX-2 is successful and the SPACON completes the recovery of the attitude and the Payload. Again when the carrier was down at REDU the RX-2 AGC dropped to about -137dbm as expected, RX-1 AGC remained unchanged at about -100dbm.
- Following discussion with REDU and OPS-ONN it is decided to return Uplink to Onboard RX-1 with higher output power to try to overcome the problem. The disadvantage of this is that higher uplink power can lead to cross-talk between

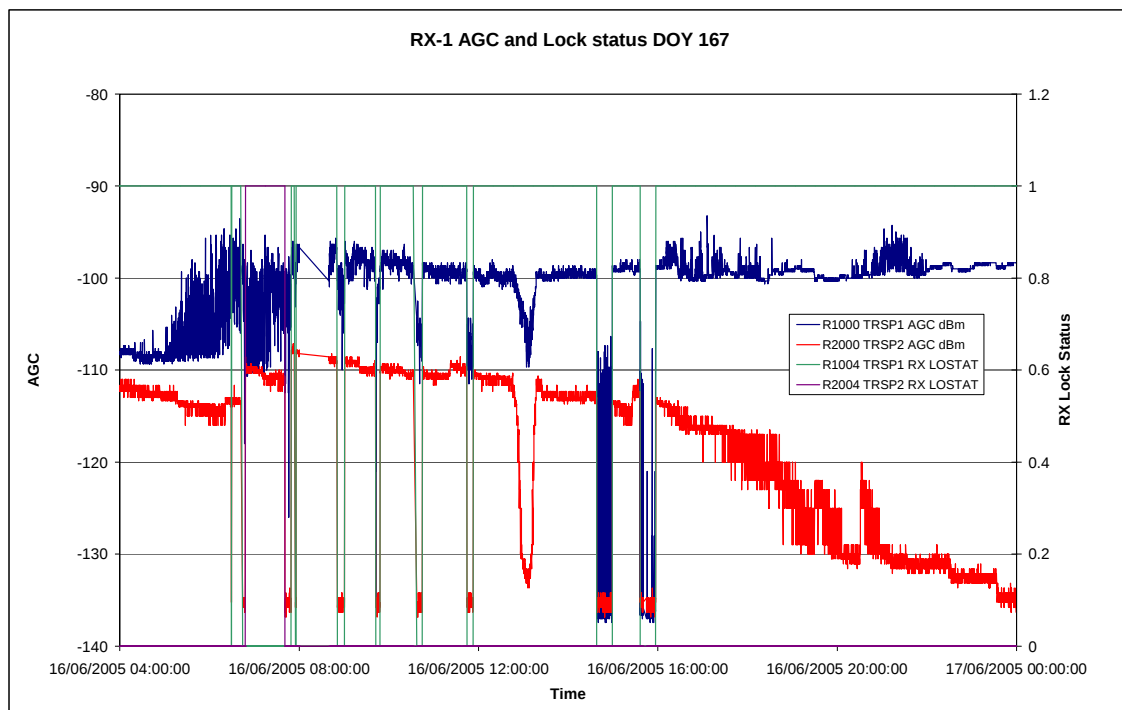
TX / RX and occasional corrupted TM Frames, at this stage this is thought preferable to reconfiguring the on-board RX / TX configuration.

- 07.42z REDU start Uplink to RX-1 with output power of 158W. The on-board AGC signal increases slightly, and the noise level on the RX-1 AGC reduces slightly, the Decoder Bitlock is stable, indicating that the TC path is viable again. Nominal operations commence on RX-1 again.
- 08.50z The carrier is taken down in REDU to check the behavior of the on-board AGC levels, as before, when the carrier was down at REDU the RX-2 AGC dropped to about -137dbm as expected, RX-1 AGC remained unchanged at about -100dbm. Indicating that the interference is still present
- Periodically the SPACON stops the uplink at REDU to check the RX-1 AGC behavior when no carrier is present.
- In order to rule out the possibility of a problem at REDU, a station handover to VIL2 is made and the antenna at REDU is depointed, the AGC behavior remains unchanged.
- Finally at about 22.05z the anomalous behavior ends.

The Plot below shows the behavior of the on-board AGC during the incident.

Note the increase of noise on RX-1 AGC signals and the different behavior of RX-1 and RX-2 AGC signals when the carrier is taken down at REDU. The vertical green lines indicate changes in RX-1 Lock status.

To date (24/6/2005) RX-1 has behaved nominally since the anomaly ended. Investigations into the incident are on-going with industry (ALENIA), at the same time ESOC are checking with other agencies for possible sources of RF interference.



3.2 Payload

3.2.1 SPI

The overall status of the instrument is nominal.

Until 14th June, the instrument was kept in photon-by-photon mode, with spectra telemetry enabled, an assigned telemetry bandwidth in the science observation windows of 103 pkts/cycle.

On 14th June the 6th annealing cycle of the Germanium detectors was started successfully. An annealing summary timeline is published in this report, under the future activities section.

One PSAC temperature is still out of range since the start of the eclipse season (18th May). This is currently under investigation.

OCR#196 has been executed to test the patch to fix both the TM leakage malfunction (AR INT_SC-107). The patch seems fixing the problem, however further testing is still planned in the upcoming week.

Due to a problem in the off-line data retrieval system, TM bandwidth occupation information is not available this week.

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

3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by moderate to high solar activity.

Because of the upgrade of the Mission Control System, no data are available on retrieval at the moment. Further information and plots will be provided next week.

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 in revolutions 324-326 and 15 packets/cycle during science observations in revolution 327. JEM-X2 was dormant (DFEE OFF) with a TM allocation of 1 packet/cycle.

The wraparound of the DPE'S LOBT occurred on 2005-06-13 at 23:22:12Z. JEM-X1 was put in Setup mode over the time of the wraparound.

Due to high background radiation as a result of a solar flare, JEM-X1 made an autonomous transition to Safe mode on 2005-06-16 at 21:09Z, ~8 hours before it was due to be commanded to Safe mode before radiation belt entry of revolution 326. JEM-X1 remained in Safe mode for the rest of revolution 326.

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, 122 of the 146 planned science pointings for OMC were executed nominally. 5 pointings (PID 03250002-03250003; 03250015-03250016 and 03260039) were missed due to PTV failures of slew TCs as result of ground segment problems. 1 pointing (PID 03260026) was lost and 1 cut short (PID 03260025) due to an IREM SEU and 16 pointings (PID 03260054-03260061 and 03270001-03270008) were missed due to a solar flare. In addition, OMC generated several OEM 179 CENT CYCLE and OEM 171 SCI WINDOW REJECTED during pointing 03250040, indicating that this pointing was not successfully executed.

The wraparound of the DPE'S LOBT occurred on 2005-06-13 at 23:22:12Z. OMC was put in Standby mode over the time of the wraparound.

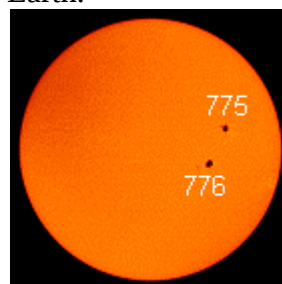
Note: Some more information concerning the OMC operations is provided in the Appendix Section 8.3.5.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by moderate to high solar activity. Sunspot 775 unleashed 2 C-class solar flares on 13 and 14 June (see picture below: Sun on 13/06; image credit: SOHO/ MDI). However they had no stormy effect on Earth's magnetic field. On 16 June, it sparked an M4-class solar flare that erupted a Coronal Mass Ejection towards Earth.



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

4 Ground Facilities

The performance of the Operational ground facilities was excellent this week, 151 slews were executed correctly, and 6 were lost due to problems on the new MCS release and on the S/C receiver 1.

4.1 Mission Operations Centre

The performance of the MOC was good this week. 3 pointings were however 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, with IMCS-A running as hot back up, connected to VC-0 TM stream only.

Some errors continued to be observed in the distribution of auxiliary data files to ISDC and in the various TM archives. By the end of the reporting period all problems were understood and a fix was in place for all but 2 of the major problems (THF, occasional corrupted archive file indexes).

At the end of the week the IMCS A-chain was dismantled and the upgrade to version E1.3 was started. From perigee on DOY 168 the MCS configuration was: C-chain prime, B-chain hot back-up, A-chain unavailable. It is planned to hand prime control back to the A-chain during perigee on DoY 174.

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. DSS16 reported problems which caused twice TM/TC drops. 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 336 have been received. Mission planning in ISOC was done up to revolution 333. Revolution 330 had to be replanned due to earth constraints detected at MOC. The perigee attitude was changed and new POS was sent. POS for revolution 331 was automatically regenerated since the perigee exit attitude had changed. Why this constraint was not detectable at ISOC is under investigation. The SPI annealing started as planned in revolution 326. This is expected to last up to and including 330. TSF for rev 327 and 328 were received.

2. Observation status

No ECS received this week.

3. ISOC science data archive

A third release of the beta version was issued this week. It includes minor changes as agreed during a status meeting. The ingestion of data into the archive has progressed

well this week since the team is complete again. The status will be reassessed again early next week. The potentially critical problem related to the data rate on the network between ISDC and ESAC has now been escalated to the ESA service provider GEANT for further investigation.

4. ISOC system

The version 10.9.3 that was installed last week has been used without any problems.

5. Problems

The network problem mentioned above is a critical for the ISDA.

4.3.2 ISDC

Status of ISDC observation processing on 20/06/2005:

- Latest Standard Analysis completed: observation 03201090014 (Gal. Bulge region, Revolution 301) on 18/06/2005
- Latest products archived: observation 03201090020 (Gal. Bulge region, Revolution 307) on 20/06/2005
- Latest observation products sent to the observer: observation 03201090009 (Gal. Bulge region, Revolution 295) on 06/06/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 162, DSS16 switched transmitters at the station. Consequently at 05:39Z TC link was removed and at 05:48Z TM drops were reported. At 05:52Z the carrier was up again at DSS16 and test commands were reported successful.
- On DoY 162, at 07:35Z, 2 missing frames were reported from DSS16.
- On DoY 162 at 16:10Z OSL 03250001 was interrupted (see AOCS section).
- On DoY 163, at 08:14Z, TM drops on TM VC0 link were reported from REDU.
- On DoY 163 at 08:15Z, bad frames were received from REDU.
- On DoY 163 at 20:12Z, after many messages “Lost connection to NCTRS” and “TM-DDS-VC7RT disconnected” reported in the Event logger, TMDS-RT was restarted on iddc. This cured the problem.
- On DoY 164 at 07:24Z, “Software, ERROR sending data to ISDS” was reported in the Event logger as well as “System, Exception raised during request for release next request”.
- On DoY 165 at 03:40Z, DSS16 reported a problem with the antenna. The station handover was postponed to a backup window. At 04:17Z, the handover took place from REDU to DSS24, and then at 05:10Z from DSS24 to DSS16. Between 04:51Z and 05:12Z TM frames were received from both DSS16 and DSS24 (double TM streams). From 05:10Z to LOS (09:53Z) there was no

VC0 TM link to A-chain, connection was only available to C-chain from DSS16. This latter implied a gap in LTA.

- On DoY 165 at 20:52Z, iddc briefly lost connection with NCTRS on VC0. At 21:07Z, iddc showed intermittent connections with NCTRS-A. More connectivity problems were reported at 21:14Z. Investigations are on-going at CCC.
- On DoY 166 at 08:30Z, ISDC reported that they did not receive AUX files since DoY 165 at 10:03Z. It was due to IFTS not running on ISDS-C. At 09:23Z IFTS was restarted and ISDC confirmed they received AUX files (including Back-log).
- On DoY 167 at 05:34Z, decoder Bit-Lock was lost (see RFS section for details).
- On DoY 168 at 04:06Z TM drops were reported from DSS16.
- On DoY 168 at 23:37Z, TC A2549 failed release. This was first indication of a problem with the command chain, which required a restart of several tasks on the IMCS.

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

AR id	Date Created	Subject	Segment	Status
INT-2751	19/06/2005	IBIS Context: LUT2 (ECT) first address (2E000) reported wrong values since IDPE1 reset on January 2005	OBSM	Open
INT_SC-121	15/06/2005	IREM Anomaly: Reset of IREM_CSCI S/W #24, 15/06/2005	Payload	Open

7 Future Milestones

Upgrade of the NCTRS (Network Controller and Telemetry Router System) for Integral to release 9.1.4. This will cure some known problems with the current release and is also compatible with TCP IP communications to ESA Stations as well as X25. The upgrade 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 325

The observations in revolution 325 began with a raster dithering observation of the Coma Cluster (RA 12:59:48.70; DEC +27:58:50.0) lasting ~8.5 hours, followed by a

raster dithering observation of the Crux Arm (RA 11:57:7.00; DEC -59:12:12.0) lasting ~28 hours. A series of pointings for the FSS/STR Misalignment and SAS calibrations were then performed for a total of ~14 hours. The raster dithering observation of the Crux Arm was then resumed and performed for the remaining ~9 hours of observation time.

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

Revolution 326

In revolution 326 a raster dithering observation of the Crux Arm (RA 11:57:7.00; DEC -59:12:12.0) was performed throughout the available observation time (~61.5 hours).

Throughout this observation 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.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2005-06-04T01:16:08.000Z	161.0309	F	Automatic TM processing.
2005-06-05T15:45:00.000Z	161.0175	F	Automatic TM processing.
2005-06-06T00:12:05.000Z	160.9965	F	Automatic TM processing.
2005-06-06T02:39:41.000Z	160.9714	F	Automatic TM processing.
2005-06-08T15:16:52.000Z	160.9580	F	Automatic TM processing.
2005-06-08T23:47:25.000Z	160.9259	F	Automatic TM processing.
2005-06-11T14:31:48.000Z	160.9049	F	Automatic TM processing.
2005-06-12T01:16:13.000Z	160.8749	F	Automatic TM processing.
2005-06-14T14:20:28.000Z	160.8608	F	Automatic TM processing.
2005-06-16T00:53:43.000Z	160.8444	F	Automatic TM processing.
2005-06-17T14:05:55.000Z	160.8378	F	Automatic TM processing.
2005-06-17T22:59:00.000Z	160.8185	F	Automatic TM processing.
2005-06-20T13:52:59.000Z	160.8050	F	Automatic TM processing.
2005-06-22T00:36:07.000Z	160.7858	F	Automatic TM processing.
2005-06-23T13:39:06.000Z	160.7705	F	Automatic TM processing.

This report was generated Fri Jun 24 08:00:26 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, 11/06/2005 – 17/06/2005

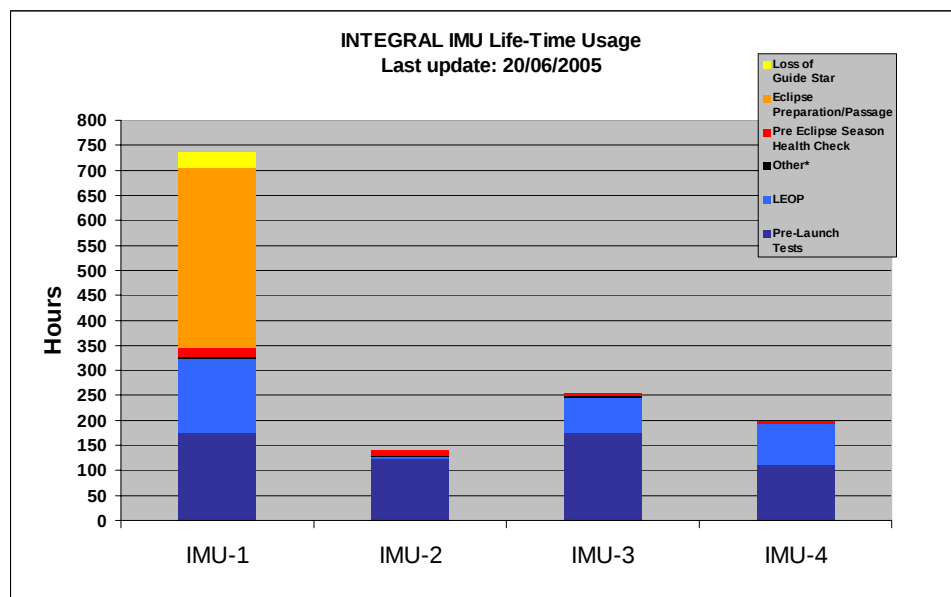
AOCS operations were executed from the Automatic Timeline.

During this period, 60 Open Loop Slews, 93 Closed Loop Slews and 6 Momentum Bias were executed. 6 (5 CSL, 1 OSL) slews were missed due to problem on the new release of the MCS and problem on the S/C Receiver #1. This is equivalent to a ~ 3.7 %.

The AOCS eclipse operations were completed nominally. An update of the IMU usage up to 20/06/2005 is provided in the following table and plot:

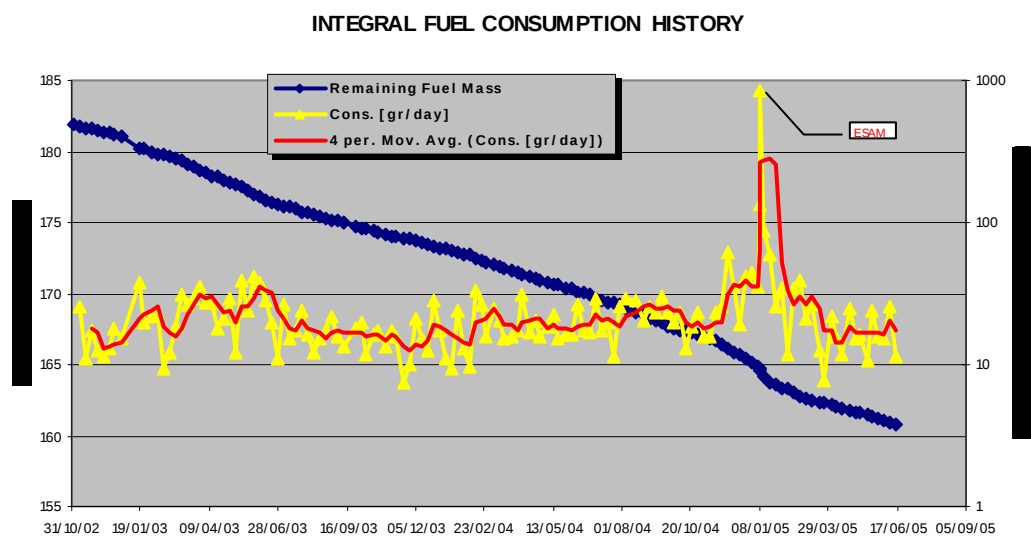
INTEGRAL IMU Life-Time Usage									
Unit	Total [hours]	% Usage WRT 1800 hr Reserved Flight Time	Pre-Launch Tests	LEOP	Loss of Guide Star	Eclipse Preparation/Passage	Pre Eclipse Season Health Check	Other*	Last Switch-Off
IMU-1	735.293780	40.85	175.045556	147.371944	31.045169	359.104444	16.929444	5.797222	08/06/2005
IMU-2	140.747778	7.82	123.023889	3.871111	0.000000	0.000000	11.567500	2.285278	11/05/2005
IMU-3	254.725278	14.15	175.449167	70.057500	0.000000	0.000000	6.271111	2.947500	11/05/2005
IMU-4	199.760278	11.10	111.528889	80.834167	0.000000	0.000000	5.155556	2.241667	11/05/2005

* Other consists of operations like STR bright object test, STR window dump, etc.



* **Other** consists of operations like the STR Bright Object Test, STR Window Dump, etc.

The fuel consumption over the period between 01/11/2002 and 16/06/2005 is reported in the plot below.



11/06/05 (Day of Year 162, Revolution 324-325)

Reconfiguration of the AOCS after the eclipse season: With the ending of the summer eclipse season, the AMD thresholds were set back to their non-eclipse season values. The manual operation started at 09:33z and the following AMD thresholds were loaded:

Thresholds from INT-MA-AI-0001, 5.3.2.4.2.2, and INT-PR-MMB-0005 page 5-9, modified as per new AMD Threshold agreement for the eclipse season.							
01- Update of thresholds after uplink of new RW Inertias on 22/01/2004. 0155_0001_M.RWI							
Wheel Inertia:							
RW#1:	0.096000	Kgm**2					
RW#2:	0.097650	Kgm**2					
RW#3:	0.097272	Kgm**2					
RW#4:	0.097649	Kgm**2					
Sunlight Season:							
	Subset 1		Subset 2				
WSMAX	39		35.9				
WSMIN	2.2		4.8				
WSMAX	To Uplink:				In rpm:		
	X1		X2		X1	X2	
RW#1:	406.250000	rd/s	373.958333	rd/s	3879	3571	
RW#2:	399.387606	rd/s	367.641411	rd/s	3814	3511	
RW#3:	400.938401	rd/s	369.068939	rd/s	3829	3524	
RW#4:	399.388015	rd/s	367.641788	rd/s	3814	3511	
WSMIN	To Uplink:				In rpm:		
	X1		X2		X1	X2	
RW#1:	22.916667	rd/s	50.000000	rd/s	219	477	
RW#2:	22.529557	rd/s	49.155398	rd/s	215	469	
RW#3:	22.617038	rd/s	49.346265	rd/s	216	471	
RW#4:	22.529580	rd/s	49.155448	rd/s	215	469	

Slows missed from the Timeline: Due to a problem on the new release of the MCS (user defined constant table not generated at server start-up), the slew sequence ID 03250001 (OSL) failed release due to static PTV failure. The AOCS s/s was disabled in TL at 16:18z. A manual recovery was then performed to the attitude of PID 03250003. The next slew (OSL) for PID 03250004 was manually updated and executed from the Timeline. The AOCS s/s was re-enabled in TL at 17:58z. The following slows were not executed from TL while recovering the AOCS s/s: 03250001(OSL)-02(CSL)-03(CSL).

12/06/05 (Day of Year 163, Revolution 325)

Slows missed from the Timeline: Due to a problem during the Search and Track process for slew sequence ID 03250015 (guide star to be tracked on slot#2 not found, star ID 8642-949 at CCD location Y=-2539 Z=11247), the sequence for the slew ID

032500015 (CSL) failed release at 05:14z due to static PTV failure for TC A3189 (START GUIDE STAR). The AOCS s/s was disabled in TL at 05:14z.

A first manual recovery was attempted to the attitude of PID 03220015 but being the recovery manoeuvre generated a CSL, it failed again for the reason mentioned above (star in slot # 2 not found). A second manual recovery, to the attitude of PID 03250016 was successfully performed, by an OSL. The next slew (CSL) for PID 0350017 was manually updated and executed from the Timeline. The AOCS s/s was re-enabled in TL at 06:30z. The following slews were not executed from TL while recovering the AOCS s/s: 03250015(CSL)-16 (CSL).

13/06/05 (Day of Year 164, Revolution 325)

Execution of the FSS/STR Misalignment Calibration: As part of the periodic AOCS calibrations, the FSS/STR Misalignment calibration and SAS calibration were performed in revolution 325. This operation was executed completely from the Timeline.

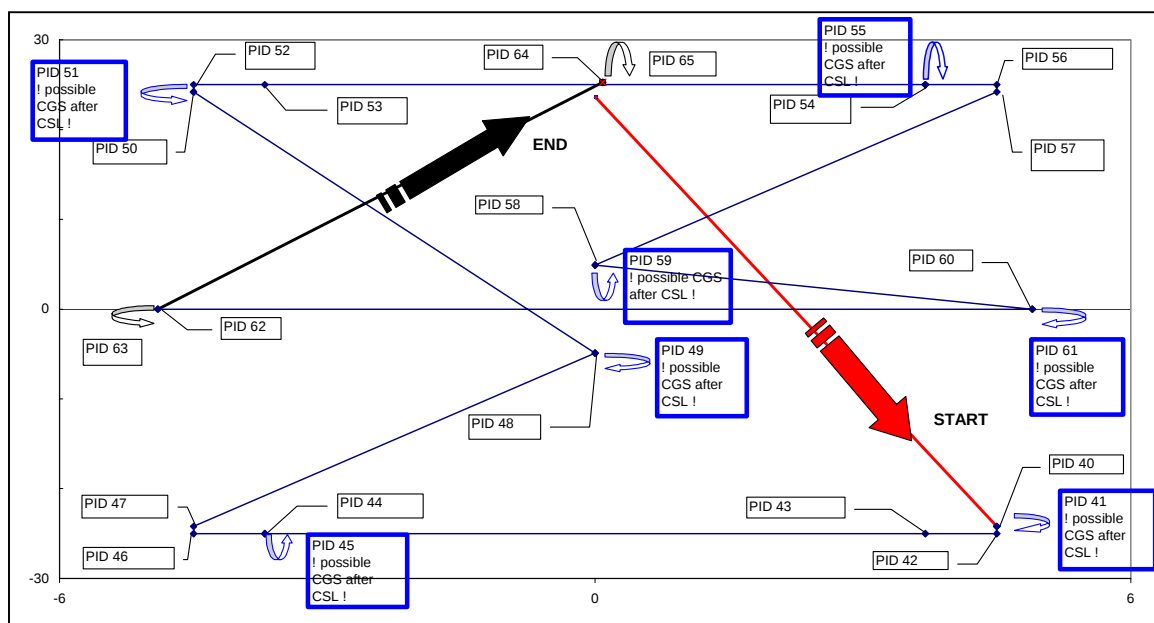
The STR/FSS misalignment calibration is scheduled after each eclipse season. The calibration is executed by performing a 4 corner x 3 points in the FSS FOV: for each point 4 SSTs activities are performed in order to acquire data for off-line evaluation.

from PID 03250040 @ 2005-06-13T06:55:00Z Start of FSS/STR + SAS Calibration

to PID 03250063 @ 2005-06-13T19:56:00Z End of FSS/STR + SAS Calibration

The FSS/STR calibration itself consists of 3 pointings of 0.8 degrees offset at each corner (Roll= $\pm 4.5^\circ$ Pitch = $\pm 25^\circ$) of the FSS FoV and tracking four stars (in addition to the Guide Star) for the duration of each pointing.

Hereafter follows a plot of the PIDs used for the calibration, reported in the FSS FOV.



Execution of the SAS Calibration: As requested already in the past by FCT, four additional pointings were inserted inside the sequence of slews for the FSS/STR calibration, to be used for the calibration of the SAS Alpha and Beta Scale Factors and update of the SAS thresholds. These included four pointings with (Alpha, Beta) equal to (0.0, +4.9), (0.0, -4.9), (+4.9, 0.0) and (-4.9, 0.0) degrees.

This operation was executed completely from the Timeline.

14/06/05 (Day of Year 165, Revolution 325-326)

Guide star released by the STR SEU Filter: in two occurrences at 13:02:04z and 14:11:32z the SEU Filter threshold of the ACC was exceeded, the guide star released, Mi 7.6 at CCD location [9492,-4606] and the IMU1 switched ON. The same guide star was picked in the first automatic mapping, which was kept afterwards.

No impact reported on the TL.

15/06/05 (Day of Year 166, Revolution 326)

STR 1750 processor fault: at 11:38:34z a STR 1750 processor fault occurred during the execution of the PID 03260021. The sequence of the events was:

11:37:41z Open Loop Slew End for PID 03260021
11:38:33z Mapping start
11:38:34z Mapping End prematurely (aborted)
11:38:34z New automatic mapping commanded by the ACC.
11:43:00z FDS failed attitude reconstruction and the update of slew ID 22
11:49:15z Manual mapping commanded
11:49:16z Mapping End prematurely (aborted)
11:49:16z IMU 1 ON
11:59:16z IMU 1 OFF
12:03:10z Manual mapping commanded
12:03:12z Mapping End prematurely (aborted)
12:03:12z IMU 1 ON

12:08:00z AOCS s/s disabled and after discussion with AOCS SOE and FD on-call decided to leave the next slew executing without parameters update.

12:13:12z IMU 1 OFF

Due to the presence of two extended objects (diffuse Nebula # 136 and the galactic cluster NGC 3766 in the constellation of Centaurus) in the same CCD column of the guide star, were observed repetitive STR 1750 fault with mapping duration shortened to ~1 sec. After discussion with AOCS SOE and FD on-call was decided to leave the next slew (ID 22, CSL) executing with no update, based on the following reasons:

- 1) the slew ID 21 was a short OSL, preceded by short CSLs, therefore the error in position accuracy very small;
- 2) the current guide star, Mi 7.65 at CCD location [7280, -1978], was found to the expected position with an in determination of few arcsec;

- 3) the error in position if propagated to the next slew (CSL) would not have determined more problem due to the accuracy of the CSL.

No impact reported on the TL.

16/06/05 (Day of Year 167, Revolution 326)

Slews missed from the Timeline: Due likely to a problem on Receiver #1 (receiver not locked but AGC still high and noisy), the slew sequence ID 03260039 (CSL) failed release. The AOCS s/s was disabled in TL at 06:14z. A manual recovery was then performed to the attitude of PID 03260040. The next slew (OSL) for PID 03260041 was manually updated and executed from the Timeline. The AOCS s/s was re-enabled in TL at 07:29z.

The following slews were not executed from TL while recovering the AOCS s/s: 03260039(CSL)-40 (OSL).

17/06/05 (Day of Year 168, Revolution 326-327)

Update of the FSS coefficients after FSS\STR Misalignment Calibration: after the execution of the FSS\STR calibration the new coefficients (A9-10-11; B9-10-11) were evaluated on-ground and updated on board at 14:46z.

The evaluated jump in roll expected after the update was estimated in 13 arcsec (worst case). Below follows the list of values updated as per TPF 0327_0001_M.FSA

AEFSA_00 S

M F 22

2005-06-17T23:00:00Z

2005-06-17T23:00:00Z

AAAA1

FSS_A1	R -0.1191590E+01	D FSS-A transfer function parameter A1
FSS_A2	R 0.3635371E-04	D FSS-A transfer function parameter A2
FSS_A3	R 0.1200000E-04	D FSS-A transfer function parameter A3
FSS_A4	R 0.6135914E-02	D FSS-A transfer function parameter A4
FSS_A5	R -0.1745329E+01	D FSS-A transfer function parameter A5
FSS_A6	R 0.4100000E-04	D FSS-A transfer function parameter A6
FSS_A7	R 0.1227185E-01	D FSS-A transfer function parameter A7
FSS_A8	R 0.1518436E+01	D FSS-A transfer function parameter A8
FSS_A9	R 0.3984276E-03	D FSS-A transfer function parameter A9
FSS_A10	R 0.5547238E-02	D FSS-A transfer function parameter A10
FSS_A11	R -0.5659812E-02	D FSS-A transfer function parameter A11
FSS_B1	R -0.1191421E+01	D FSS-A transfer function parameter B1
FSS_B2	R 0.3633825E-04	D FSS-A transfer function parameter B2
FSS_B3	R 0.1170000E-03	D FSS-A transfer function parameter B3
FSS_B4	R 0.6135914E-02	D FSS-A transfer function parameter B4
FSS_B5	R 0.2076942E+01	D FSS-A transfer function parameter B5
FSS_B6	R 0.3600000E-04	D FSS-A transfer function parameter B6
FSS_B7	R 0.1227185E-01	D FSS-A transfer function parameter B7
FSS_B8	R -0.1186824E+01	D FSS-A transfer function parameter B8
FSS_B9	R -0.4750112E-03	D FSS-A transfer function parameter B9
FSS_B10	R 0.7410183E-03	D FSS-A transfer function parameter B10
FSS_B11	R 0.6693532E-03	D FSS-A transfer function parameter B11

Hereafter follows the History of the FSS roll (A9-10-11) and pitch (B9-10-11) coefficients since the launch:

Run Time	Rev	STR FSS X	FSS_A9	FSS_A10
FSS_A11 FSS_B9	FSS_B10	FSS_B11		
2002/10/17 06:13:26	0001	B B	-84.8915860	994.2814731
1314.6779504	241.1955221	-792.7915340	253.2583531	
2002/10/17 06:13:26	0001	B A	-147.8659203	1109.3069289
915.3724221	416.2208104	390.3899050	-218.3484613	
2002/10/17 06:13:26	0001	A B	21.7121809	1021.6044798
1540.3543536	136.7246130	-819.8011812	478.7101635	
2002/10/17 06:13:26	0001	A A	-41.3633903	1136.4981023
1141.0882898	309.1626097	363.7598917	7.1161076	
2002/10/17 11:57:44	0001	A A	-10.8869311	1136.4981023
1141.0882898	-48.3742459	363.7598917	7.1161076	
2002/10/18 14:43:28	0001	A A X	-740.7515156	0.0000000
0.0000000	-62.8992210	0.0000000	0.0000000	
2002/10/22 10:26:13	0002	A A X	43.1044362	0.0000000
0.0000000	-60.6765982	0.0000000	0.0000000	
2002/10/22 10:41:00	0002	A A X	31.8405075	0.0000000
0.0000000	-58.4412611	0.0000000	0.0000000	
2002/10/22 10:46:35	0002	A A X	31.9534536	0.0000000
0.0000000	-58.8179047	0.0000000	0.0000000	
2002/10/23 12:06:48	0002	A A X	-575.7521936	0.0000000
0.0000000	-34.1473518	0.0000000	0.0000000	
2002/10/24 13:47:47	0003	A A X	-32.5119135	0.0000000
0.0000000	-73.1585486	0.0000000	0.0000000	
2002/11/05 13:37:43	0006	A A X	67.3772442	1112.4864143 -
1250.3529891	-120.1829934	435.0625162	60.2756867	
2002/11/08 12:33:15	0006	A A X	35.1912362	1149.3875188 -
1299.6735440	-106.6436234	278.5268629	185.2164330	
2002/11/08 12:54:28	0006	A A X	36.9314406	1129.9547571 -
1329.5944015	-85.0549459	346.9477086	-25.0110177	
2002/11/05 14:00:57	0006	A A	67.2067387	1131.9618229 -
1250.8956817	-120.4780133	440.9895417	60.8631778	
2003/04/04 08:12:00	0056	A A	28.0672800	1123.3090000 -
1250.8956817	-120.4780133	440.9895417	60.8631778	
2003/07/23 12:17:34	0094	A A X	83.5374642	1144.9283240 -
1290.1598577	-130.3447117	-181.2657279	173.0711922	
2003/07/23 12:26:45	0094	A A X	81.4133068	1147.8046516 -
1267.0171462	-126.3265407	-58.8911287	100.5747445	
2004/01/15 08:10:37	0153	A A X	85.6545484	1106.1829781 -
1051.4112289	-107.3048338	339.9810564	60.2342427	
2004/01/15 10:28:50	0153	A A	80.0550152	1113.7525865 -
1074.7285836	-107.3517385	342.7773785	58.3454333	
2004/01/15 12:05:43	0153	A A X	87.2218057	1107.2949504 -
1061.0560000	-107.7683725	349.3284022	64.5234373	
2004/06/30 15:52:53	0209	A A	95.2633969	1145.6387404 -
1262.1608365	-128.2915442	-43.0931566	135.4295645	
2004/12/20 14:38:46	0267	A A X	84.3454103	1118.4758548 -
1190.1861634	-68.3442729	309.2098324	-74.9239762	
2005/06/13 18:24:54	0325	A A X	82.1816238	1144.1981013 -
1167.4243763	-97.9780532	152.8463212	138.0643852	

Mapping sequence missed from the Timeline: Due to a problem on the new release of the IMCS (CMD chain failure) the mapping for the update of slew sequence ID 03270013 failed release due to Dynamic PTV failure, determined by an anomaly on the IMCS command chain. A manual recovery was then performed by manual commanding a mapping. The next slew (OSL) for PID 03270013 was manually updated and executed from the Timeline.
 No impact reported on the TL execution.

8.3.2 SPI Operations

Stirling compressors and Cryostat:

The performance of the compressors is nominal. The cold plate temperature was maintained at 85K $\pm$ 1K until 14th June 07:30z, where the compressors were stopped to start the annealing.

The plot showing the evolution of the cold-plate and H bus temperatures during the reporting period is not available this week.

DPE & IASW:

The IASW performance is nominal.

OVR#196 was submitted to test the effectiveness of a possible fix of the SPI TM packet leakage anomaly (INT_SC-107). The fix was already preliminarily tested on-ground, where the anomaly cannot be reproduced.

After the positive test, the fix will be incorporated in a new IASW release.

The OCR was executed on DOY 171 (20th June) at 13:45z. Preliminary results are positive, i.e. we could verify that all 103 pkts allocated in the PST were used after the patch. However further testing is foreseen next week, to verify different PST distributions.

The major steps of the OCR can be summarised as follows:

- Transition to Stand-by
- Deactivation of S/A's (only at IASW level)
- Suspend DPE
- Change the task priority (memory patch)
- Empty boot of the DPE
- Re-start IASW
- Re-activate S/A's (at IASW level)
- Go to Conf and load SPI configuration for annealing
- Enable all detectors on DFEE and increase AFEE energy thresholds to collect photon events triggered by thermal noise
- Change PST to 103pkts for SPI
- Go to Photon
- Tune AFEE thresholds if required
- Evaluate TM bandwidth usage of SPI and behaviour of SPI IASW
- Repeat test with different PST/task priorities if required

The plot showing the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load is not available.

ACS:

The performance of the ACS is nominal, except for the PSAC thermal environment. It is since the 4th eclipse passage (27th May) of this season that TM E2116 has exceeded the low hard alarm limit, without re-entering in range. The PI and the ACS experts have been contacted: according to preliminary analysis it could be a failure of the sensor chain as all other temperature readings, close to E2116, show nominal values. It has been decided to wait for the end of the upcoming annealing cycle to see if the temperature returns in limit, before drawing final conclusions.

The plot showing the ACS overall count rate evolution is not available.

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 detectors have been switched off at the annelaing start.

The plot showing the AFEE dc output signals is not available.

DFEE:

The performance of the unit is nominal.

PSD:

The performance of the unit is nominal.

SPI DAILY EVENTS:

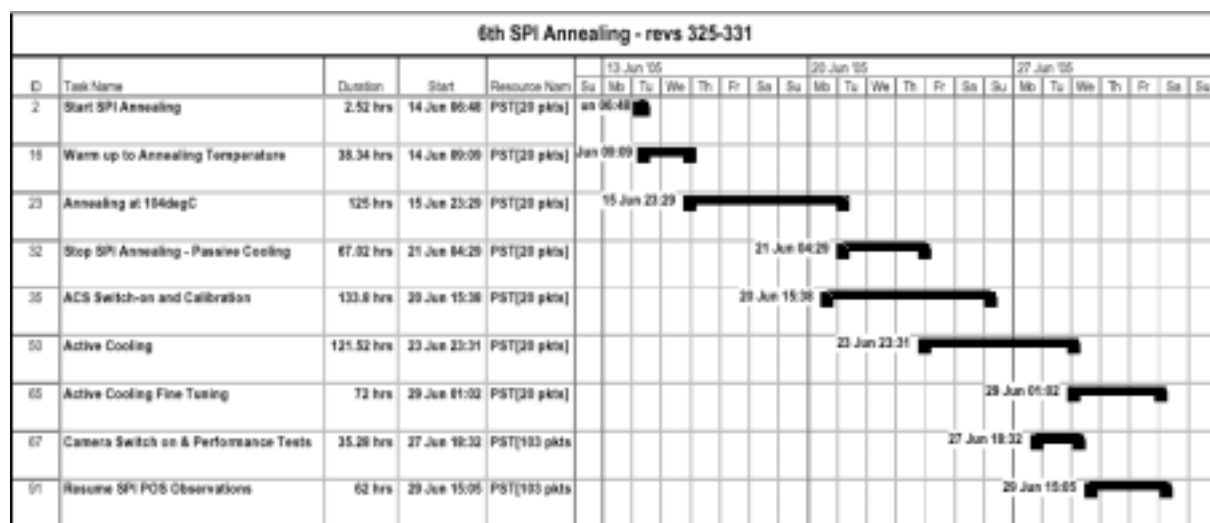
NOTE: The events log is extracted from the revolution pass summary.

DOY Time	Event
162 / 14:11	TM E4009 "S DF HSLERR L" OOL Alarm High and back within limits.
162 / 14:23	TM P2017 "LCL CUR AF2 DT A" OOL warning high.
164 / 07:23	OEM (SPI): "SCI Window Rejected" APID 1792 ID 171. / No action required.
165 / 06:40	TM E3500 "P_DF_CNVT-BW_L,1" OOL Alarm High
165 07:42-09:36	Start of the 6 th SPI Annealing
166 / 22:22	TM EU0392A "T CR COLD COND2" went over 373 K. / SOE informed at 23:48. / No actions requested

Future activities:

The 6th SPI annealing started on 14th June (rev.325 belts entry) and will last until 29th June (rev 331 belts exit). The annealing schedule includes 125hours at 104degC, several calibration runs of the ACS and a special configuration of the AFEE to monitor the faulty Ge detectors during the warm phase.

Here follows the summary view of the updated timeline:



8.3.3 IBIS Operations

IBIS Event Counters Plots.

Because of the upgrade of the Mission Control System, no data are available on retrieval at the moment. Further information and plots will be provided next week.

IBIS daily report:

DoY 2005.162 (11/06/2005):

At 14:41Z TM parameter G5032 (P0S-M7RTC1) went OOL High and back 10 minutes later. As this happened inside Radiation Belts, according to P-CNT-1 no action was taken.

At 16:03Z TM parameter G2014 (I0E-OVFWPXADD-M1) failed SCC. No action was taken.

DoY 2005.164 (13/06/2005):

At 12:58Z, FCP_IBIS1_0312 (Read all histograms) was applied in order to try another time to recover the histograms process before the planned recovery on DoY 2005.65.

At 23:01Z, IBIS was put in Stand-by mode (FCP_IBIS1_0313) following INT_OR_0211 DPE OBT wraparound. At 23:42Z it went back in Scientific Standard mode.

DoY 2005.165 (14/06/2005):

At 06:40Z and for 10 minutes, TM parameter G8080 (S1E-VS HBRA-RT) was toggling OOL High. According to H-OVF-2 no action was taken.

At 06:47Z TM family G2013 (I0S-EVTCNT-MCEi) went OOL High and back. According to I-CNT-1, no action was taken.

At 06:49Z TM parameter G8015 (S1E-A2 PMT-V) went out of limit 'high'. It went back inside limit at 15:18Z (after belt exit). As this happened close to the radiation belts, according to V-VLT-1 no action was taken.

At 08:48Z TM parameter G5037 (P0S-M8RTC1) went OOL High and back at 09:03Z. As this happened in the belts, according to P-CNT-1 no action was taken.

At 14:42Z TM parameters G5037 (P0S-M8RTC1) and G5037 (P0S-M3RTC2) went OOL High and back. As this happened in the belts, according to P-CNT-1 no action was taken.

During HBR B recovery (see below), after PlcSIT and ISGRI reactivations, at 20:08Z TM parameter G8015 (S1E-A2 PMT-V) went out of limit 'high' with the value 29.68V. It went back inside limit at 20:53Z when VETO was reactivated. At 20:20Z, after ISGRI calibration, TM parameter G2028 (I0E-OVFWPXADD-M2) failed SCC. At 20:53Z, after VETO reactivation, TM parameter G5023 (P0S-M5RTC2) went

OOL High and back at 21:03Z when IBIS was switched to Scientific Standard Mode. No action was taken.

DoY 2005.165 (14/06/2005): HBR B Anomaly (Details are reported in the Anomaly Report INT_SC-120)

Consequently to the problem reported last week (on DoY 2005.156), it was decided to perform a troubleshooting following the MOC recommendations. In agreement with IBIS PIs, it was decided to execute a reset of the IBIS SW (not powering OFF the DPE but performing an empty boot of the CSSW).

The main steps of this recovery are summarized below:

- At 14:45Z IBIS disabled from Timeline
- IBIS Deactivation as per FCP_IBIS1_0901
 - ISGRI Deactivation started at 14:57Z
 - PICsIT deactivation started at 15:09Z
 - VETO Deactivation started at 15:18Z
 - Disable BCPKT Distribution to IBIS1 started at 15:21Z

At this stage all detectors were OFF.

- DPE Restart as per FCP_IBIS1_9810 (IBIS DPE1 LOAD NEW SW VERSION)
 - At 15:31Z TC sent to put IBIS1 in SUSPEND (step 6.1)
 - At 15:33Z Restart DPE CSSW (step 11 and 12)
 - At 15:36Z LC Test Link and LOBT synchronisation (step 14)
- IBIS Reactivation as per FCP_IBIS1_0005
 - At 15:53Z IASW Activation: IASW transition to Nominal
 - Enable BCPKT Distribution to IBIS1 started at 16:03Z
 - Set IBIS automatism started at 16:43Z
 - Configuration Tables Upload: LUT1, LUT2, VETO and PICsIT reference images were uploaded. For HEPI, as we just restarted the DPE, the CTX was dumped and checked (no upload). For ISGRI, the last processed ISDC CTX (for revolution 0326) were uplinked. On this day, the reference images are:

HEPI CTX: IIMG_P_HEP_0129_00004_T_V_002_000_0.INT
LUT1: IIMG_P_ECT_0129_00004_T_V_001_000_0.INT
LUT2: IIMG_P_CLT_0129_00004_T_V_001_000_0.INT
VETO CTX: IIMG_P_VET_0129_00004_T_V_001_003_0.INT
PICsIT CTX: IIMG_P_PIC_0129_00004_T_V_001_000_1.INT

- ISGRI Activation
- PICsIT and VETO Activation: PICsIT transition to Nominal at 19:55Z
- ISGRI Calibration (ED GEISCL03) sent at 20:19Z
- VETO VEB Patch 3.1 and 3.2 (ED GEVESP01) sent at 20:45Z
- VETO transition to Nominal at 20:53Z
- IBIS transition to Scientific Standard (ED GESTAN02) at 21:02Z

- At 21:07Z IBIS re-enabled in Timeline.

Following this restart of DPE, Histogram Integration processed started at 21:26Z. At 21:35Z TM parameter G8082 (S1E_VS HBRB-RT) showed a non-zero value: 0.12 (first time since DoY 2005.156). About 1800sec after the start of histogram Integration, the Histogram downloading process started.

Since then the health of IBIS has been monitored and everything is working fine. ISDC confirmed the generation and process of P1csIT Histograms.

DoY 2005.166 (15/06/2005):

At 04:39Z TM parameter G5037 (P0-M8RTC1) went OOL High. As this lasted only few cycles, according to P-CNT-1 no action as taken.

At 15:49Z an IREM SW failure (SEU #24) forced IBIS to Stand-by mode. Following procedure FCP_IBIS1_0803, IBIS exited this Safe configuration and went back to Scientific Standard mode at 16:48Z.

At 15:49Z 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 16:46Z. As this happened in "fake" high radiation background (due to IREM S/W reset), no action was taken.

DoY 2005.167 (16/06/2005):

At 20:43Z TM G6061 (V1S-CAL-COUNT) went OOL 'low-low' due to high radiation. The radiation background was high (M4-solar flare) but the IBIS/IREM thresholds not exceeded. The reason of this OOL is due to a known problem of the VETO CDM01 FEE not able to follow high count-rates. From this time and until DoY 168 at 06:36Z, when IBIS switched to Stand-by mode at the Belt entry, TM parameters G6061 (V1S-CAL-COUNT), G6062 (V1S-BOT-COUNT), G6063 (V1S-LAT-COUNT), G8080 (S1E-VS HBRA-RT), TM families G2013 (I0S-EVTCNT-MCEi), G5002 (P0S-MiRTC1), G5003 (P0S-MiRTC2) were toggling OOL due to high radiation caused by a M4-solar flare. This flare was however not strong enough to trigger the IBIS automatism based on IBIS/IREM thresholds crossing.

At 06:36Z, when IBIS switched to Stand-by, TM parameter G8015 (S1E-A2 PMT V) went out of limit 'high' with the value of 29.54V (limit value). It went back inside limit at 16:05Z, when IBIS switched to Science Standard. As this happened close to the radiation belts, according to V-VLT-1 no action was taken.

At 08:52Z TM parameters G5022 (P0S-M5RTC1), G5038 (P0S-M8RTC2), G5013 (P0S-M3RTC2), G5028 (P0S-M6RTC2) and G5003 (P0S-M1RTC2) were toggling OOL High until 14:30Z when they went back into limit. As this happened inside the belts, according to P-CNT-1, no action was taken.

At 14:20Z TM parameter G5079 (P0E-M2ASICLINE) went OOL high with the value 2.60509V (limit = 2.6V). As this lasted only one cycle and according to P-VLT-2, no action was taken.

At 15:49Z Tm parameter G2014 (I0E-OVFWPXADD-M1) failed SCC. No action was taken.

At 16:05Z, when IBIS was back in Scientific Standard after belts passage, TM parameter G6061 (V1S-CAL-COUNT) went OOL Low-low flagging the still high environment. It kept on toggling until DoY 169 at 03:51Z.

8.3.4 JEM-X Operations

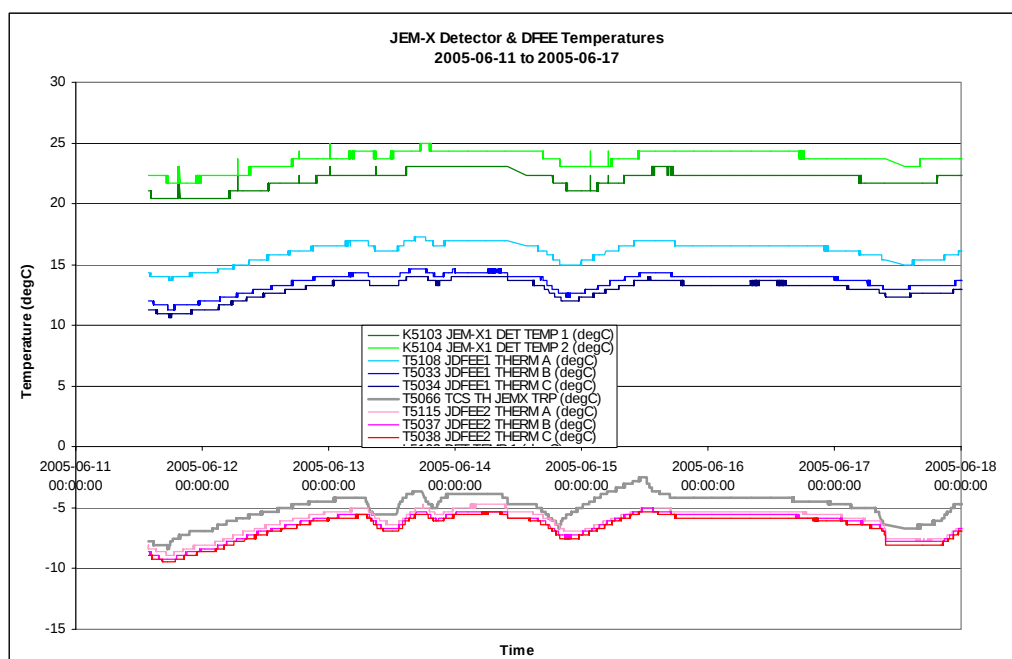
8.3.4.1 JEM-X Count Rates

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

Due to unavailability of the data at the current time, this plot will be included in next week's report.

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.



8.3.4.3 JEM-X Daily Report

2005-06-11 (DOY 162, Rev 324-325) to 2005-06-12 (DOY 163, Rev 325)

Nothing to report

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)

2005-06-13 (DOY 164, Rev 325)

Due to the wraparound of the DPE's LOBT clock, and in line with INT_OR_0211, JEM-X1 was commanded to Setup mode at 22:59Z via FCP_JEM1_0041. The OBT wraparound occurred at 23:22:12Z. The CCCF block scheduled during the next slew (ID 03250067) was then enabled and JEM-X1 returned to Data Taking mode via the ED KEDATA01 scheduled at 23:42:50Z as part of this CCCF. As a SATENG window was scheduled in the Timeline for this activity, it took place outside of the time allocated to science exposures.

2005-06-14 (DOY 165, Rev 325-326) to 2005-06-15 (DOY 166, Rev 326)

At 15:49Z an IREM SEU (#24, see Anomaly Report INT_SC-121) occurred, causing all the IREM RAD MONITOR parameters (K5315-K5317) to go Out of Limits (value = 65535). However, this had no impact on JEM-X1 operations as the JEM-X1 reactions to the IREM RMC parameters are currently disabled.

2005-06-16 (DOY 167, Rev 326)

Due to high background radiation conditions as a result of a solar flare, Out of Limits began to be received on the TM parameter K5137 RAD MONITOR 3 at 20:53Z. At 20:55Z the parameters K5449 HARDWARE TRIGGER and K5119 SOFTWARE TRIGGER also started to go out of limits. At 21:09Z the parameter K5119 exceeded its Safe threshold for JEM-X1, causing JEM-X1 to make an autonomous transition to Safe mode, with two occurrences of the OEM 189 JEM-X1 PROB DFEE 9 as the TM parameter K5462 DFEE STATE IASW reported state Safe for 1 TM cycle and then reverted to state Setup. This was ~8 hours before JEM-X1 was due to be commanded to Safe mode before radiation belt entry of revolution 326. Timeline commanding to JEM-X1 was then disabled and JEM-X1 remained in Safe mode for the rest of this day.

2005-06-17 (DOY 168, Rev 326-327)

As commanding to JEM-X1 from the Timeline was disabled due to JEM-X1 being in Safe mode, the ED KESAFE01 scheduled at 05:12:48Z failed release from the Timeline. At the Broadcast Packet radiation belt entry time, 06:36Z, the TM parameter K5462 DFEE STATE IASW also transitioned to Safe (with OEM 231 JEM-X1 AUTO EVENT 1) and OEM 254 ERROR OFF was received.

At the start of revolution 327 the JEM-X1 activation proceeded nominally via the Timeline.

8.3.5 OMC Operations

2005-06-11 (DOY 162, Rev 324-325)

Due to a PTV problem (see AOCs section), the first slew in revolution 325, PID 03250001 failed release from the Timeline. As a result, the slews to the science pointing IDs 03250002 and 03250003 were also missed from the Timeline. A manual recovery was performed to the attitude of PID 03250003. During this time,

commanding to OMC from the Timeline was still enabled, therefore the OMC Imaging EDs were executed, however OMC remained in Standby mode throughout the recovery operations as the OTF remained low.

OMC operations continued nominally from PID 03250004 onwards.

2005-06-12 (DOY 163, Rev 325)

Due to a PTV failure of one of the slew TCs (see AOCS section), the slew to pointing ID 03250015 failed from the Timeline. OMC therefore remained in Science Normal mode and the OMC Imaging ED MEIM-A01 scheduled at 05:18:00Z failed on-board, with two occurrences of OEM 131 REJECTED TC1 being issued. The other OMC Imaging EDs for this pointing subsequently failed release from the Timeline. At 06:06Z a recovery slew was then uplinked and commanding to OMC from the Autostack was disabled. During this recovery slew, OMC transitioned to Standby mode. During the recovery operations the Timeline slew to pointing ID 03250016, along with the OMC Imaging EDs, was missed.

OMC operations continued nominally from PID 03250017 onwards.

2005-06-13 (DOY 164, Rev 325)

At the end of the long Open Loop Slew ID 03250040, OMC was not able to correctly centre and extract the CCD windows during this pointing (probably due to attitude errors at the end of the slew). This was manifested by 18 occurrences of the OEM 179 CENT CYCLE, followed by 12 occurrences of OEM 171 SCI WINDOW REJECTED. This was the first in a series of pointings for the periodic FSS/STR Misalignment Calibration. The next pointing, PID 03250041, which was at the same attitude and reached by a corrective Closed Loop Slew, proceeded nominally for OMC.

Due to the wraparound of the DPE's LOBT clock, and in line with INT_OR_0211, OMC was commanded to Standby mode at 22:58Z via FCP_OMC_0042. The OBT wraparound occurred at 23:22:12Z. OMC returned to Science Normal mode nominally at start of the following pointing (PID 03250067). As a SATENG window was scheduled in the Timeline for this activity, it took place outside of the time allocated to science exposures.

2005-06-14 (DOY 165, Rev 325-326)

Nothing to report.

2005-06-15 (DOY 166, Rev 326)

At 15:49Z, during PID 03260025, an IREM SEU (#24, see Anomaly Report INT_SC-121) occurred, causing OMC to go to Safe mode. As part of the recovery operations, the Broadcast Packet DRMC flag was set to DISREGARD at 16:21Z. OMC Imaging EDs for PID 03260026 failed release from the Timeline. OMC was then recovered at 16:53Z via execution of procedure FCP_OMC_0041 OMC Exit from Safe Mode,

causing OMC to transition to Standby mode. OMC went back to Science Normal mode following the execution of the Imaging EDs and slew for the next pointing (PID 03260027) from the Timeline. OMC operations then continued nominally, however with the Broadcast Packet DRMC flag set to DISREGARD until 20:49Z, when IREM was recovered and the DRMC flag set back to REGARD.

2005-06-16 (DOY 167, Rev 326)

At 06:14Z a TC of the slew sequence to PID 03260039 failed release due to unavailability of a stable command link due to a bit lock problem at Redu (AD service terminated). At this time, commanding to the AOCS and OMC subsystems from the Timeline was disabled and the OMC imaging EDs for this pointing were missed from the Timeline. Once stable commanding capability was recovered, a manual slew was performed, starting at 07:06Z, from the attitude of PID 03260038 to PID 03260040. Once this recovery slew was started, at 07:12Z OMC was commanded to Standby mode via FCP_OMC_0042. The OMC imaging EDs for PID 03260040, scheduled starting at 07:18:17Z were missed from the Timeline, however these were re-uplinked manually starting at 07:19:15Z. The manual slew and OMC Imaging EDs for PID 03260040 were thus executed almost at the same time as planned in the Timeline and OMC went back to Science Normal at the end of this slew. Pointing ID 03260040 then continued nominally.

At 21:23Z high background radiation conditions as a result of a solar flare caused OMC to transition to Safe mode. The Imaging ED MEIM-A01 for PID 03260054, scheduled at 21:30:47Z therefore failed on-board, with two occurrences of the OEM 131 REJECTED TC1 being issued. The subsequent Imaging EDs failed release from the Timeline and commanding to OMC from the Autostack was disabled. OMC remained in Safe mode for the rest of the day and thus pointings IDs 03260055 and 03260056 were also missed.

2005-06-17 (DOY 168, Rev 326-327)

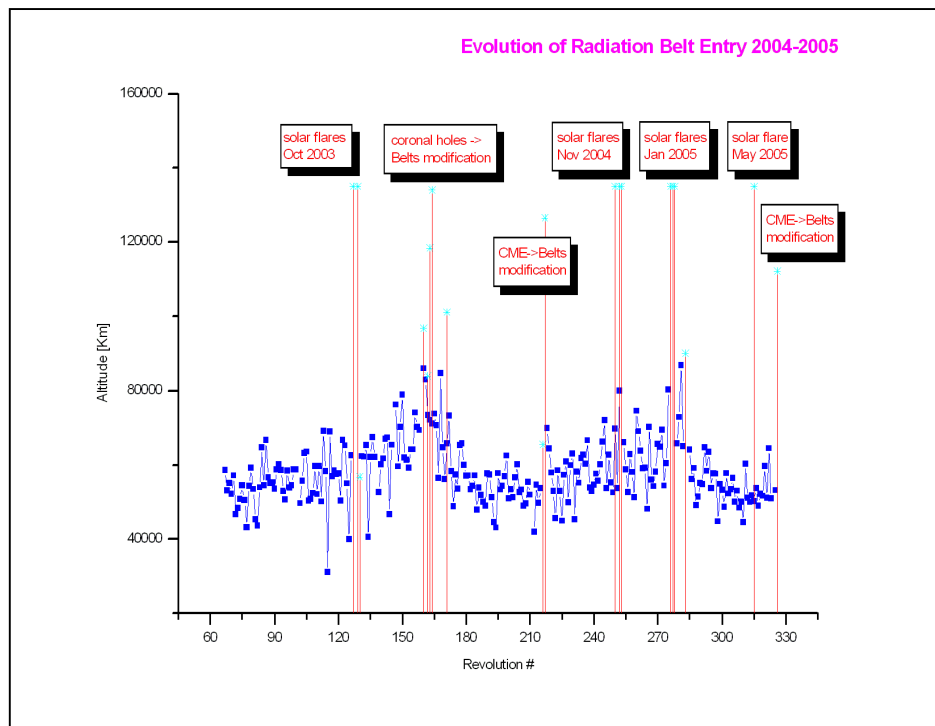
OMC began the day in Safe mode due to high background radiation conditions and remained in Safe mode until radiation belt entry or revolution 326, thus missing pointing IDs 03260057 to 03260061.

At radiation belt exit of revolution 327 OMC remained in Safe mode and therefore at 16:03Z the ED MEBEXT01 to reset the ROE failed the PTV condition for release from the Timeline. An attempt was then made to command OMC out of Safe mode by executing procedure FCP_OMC_0041 OMC Exit from Safe Mode, however this failed completion on board due to continuing high background radiation conditions (OEM 150 MODE TRANS was issued, followed immediately by OEM 231 TO SAFE). Commanding to OMC was then disabled from the Timeline again and OMC continued in Safe mode until the background radiation levels had returned stably within the safe thresholds for OMC, thereby missing pointing IDs 03270001 to 03270008. At 21:15Z procedure FCP_OMC_0041 OMC Exit from Safe Mode was executed successfully, returning OMC to Standby mode. The Reset ROE ED MEBEXT01 was then re-uplinked and commanding to OMC from the Timeline was re-enabled at 21:18Z.

OMC operations continued nominally from pointing 03270009 onwards.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

DoY 2005.163 (12/06/05):

ED UEGRON01 failed at AOS on DoY 2005.162. It was spotted by ISDC complaining that they did not receive IREM files. At 12:05Z on DoY 163 TC U4920 "INT GND LINK ON" was sent. No impact on data was reported.

DoY 2005.166 (15/06/05)

Reported at 15:49Z the local reset of the IREM CSCI S/W (SEU #24): as in the past (see anomalies on 16/12/02, 01/01/03, 03/06/03, 11/07/03, 19/07/03, 05/08/03, 24/08/03, 26/12/03, 13/05/04, 16/05/04, 09/06/04, 12/06/04, 10/09/04, 14/09/04, 28/10/04, 06/11/04, 01/12/04, 11/12/04, 30/01/05, 11/02/05, 04/03/05, 11/05/05, 17/05/05) the status of the unit, before the occurrence of the anomaly, was nominal, here is the summary:

- 1) temperatures nominal
- 2) LCL current nominal
- 3) last HK before the anomaly HV, 5V and 6V voltages inside limits
- 4) the anomaly occurred at 2005.166.15.49.00Z at 149985.3 km and the unit performed an automatic transition to Standard Mode (ie. no block counter increasing, all the TM words= FFFF hex); just before the anomaly, radiation counters reported nominal values considering the position of the S/C along the orbit

5) the recovery of the unit started at 16:21Z using procedure CRP_SYS_2570. The first dump of the status word after the anomaly shown a value of BCC0 HEX = 48320 DEC = 1011110011000000, ie. still the unit was reporting the status as if it was in Integral mode with counting ON, accumulation ON and checksum failure flag ON. This value of the status word is assumed to be an old one written by the S/W at the moment of the anomaly.

6) dumping all registers bank give a status word BC80 HEX = 48256 DEC = 1011110010000000, ie. the unit is still reporting the status as if it was in Integral mode but the checksum failure flag is now OFF and the checksum counter in the register number 3 incremented of 1 unit.

7) The patch was performed successfully with the correct re-starting of the S/W. The operation was completed at 22:02Z.

The IREM automatic transition to Standard Mode did affect the instruments since it forced them to automatically enter Safe configuration, except for SPI and JEM-X whose automatism are disabled according to PIs request.

The recovery of the payloads was performed as follows:

- IBIS re-enabled at 16:48Z
- OMC re-enabled at 16:53Z

The cause of this S/W reset is still under investigation, but it is apparently due to the unit's memory device that is sensitive to ionising radiation.

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT - OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT - OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
324	RAD_ENTR R 2005-06-11T07:02:01Z	-	-	2005-06-11 07:54:26	53043
325	RAD_EXIT R 2005-06-11T16:17:55Z	2005-06-11 15:25:31	>>24936.2	2005-06-11 15:14:26	30244
325	RAD_ENTR R 2005-06-14T06:49:34Z	2005-06-14 07:43:31	53183.7	2005-06-14 07:46:15	52439
326	RAD_EXIT R 2005-06-14T16:05:19Z	2005-06-14 15:32:27	<<40106.2	2005-06-14 14:56:15	29376
326	RAD_ENTR R 2005-06-17T06:36:39Z	2005-06-16 21:10:11	112071.5	2005-06-17 07:26:15	53340
327	RAD_EXIT R 2005-06-17T15:52:44Z	2005-06-17 17:13:55	21787.7	2005-06-17 14:46:15	29871

Reference

Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

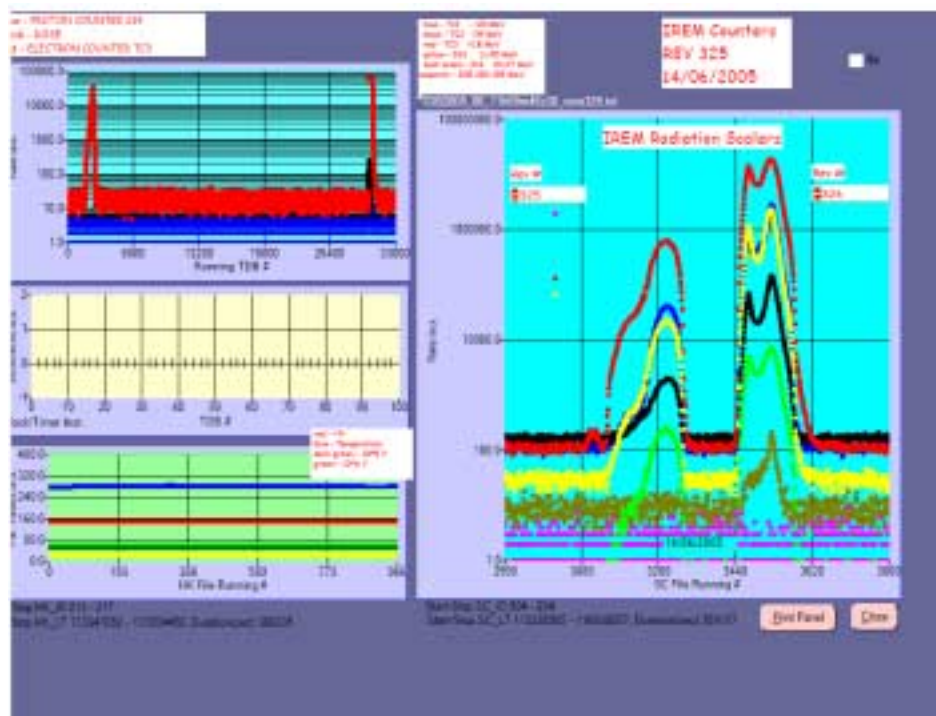
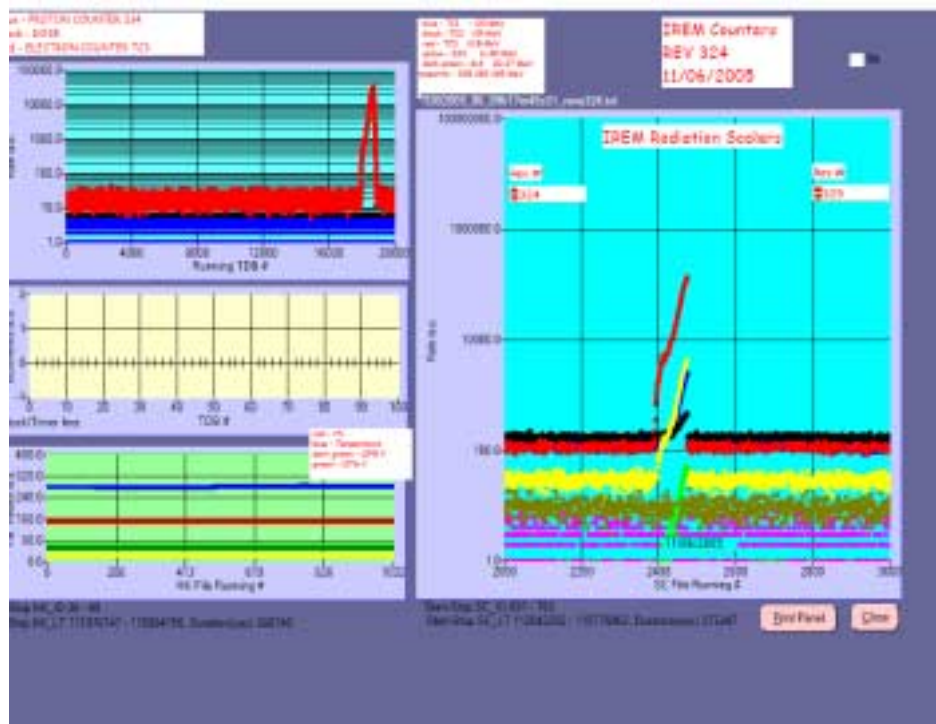
Large error vs reference (more than 30 minutes)

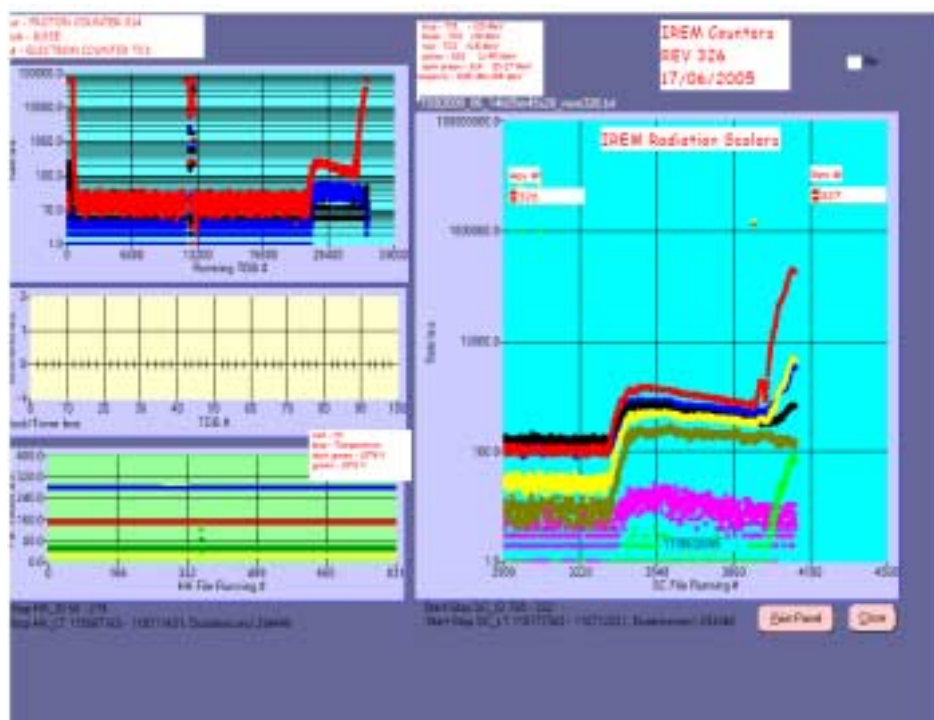
Radiation Spike

Because of the upgrade of the Mission Control System, no data are available on retrieval at the moment. Further information will be provided next week.

IREM radiation counters:

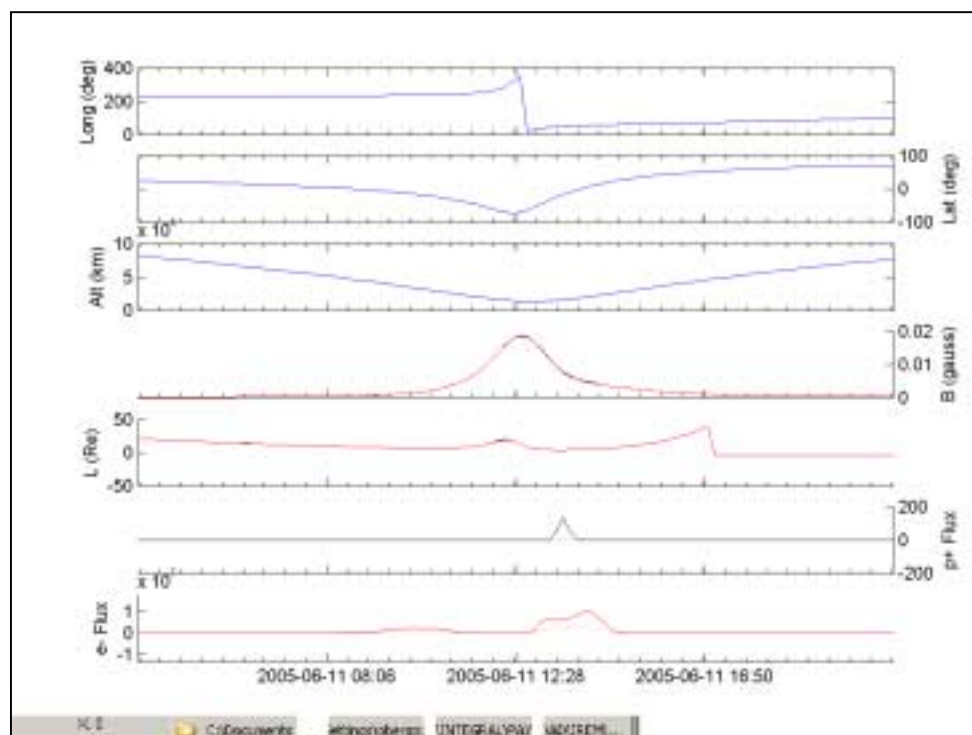
Due to upgrade of the MCS system, problems on the ECOE server occurred during revolution 324, 325 and 326. Data are only partially available.



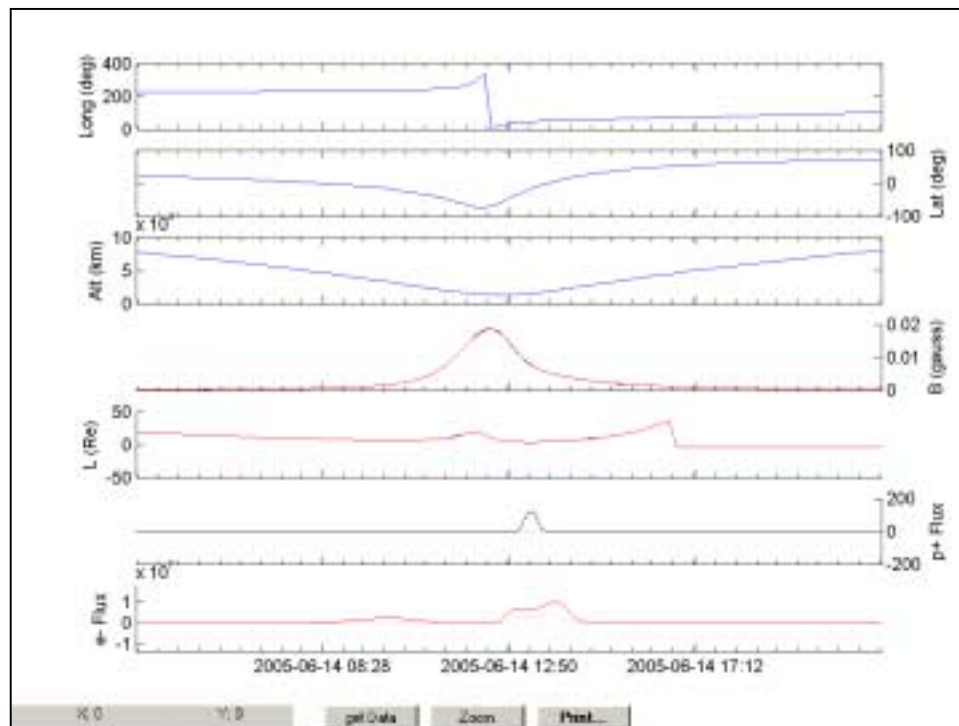


IREM Predicted Radiation Belt Passages:

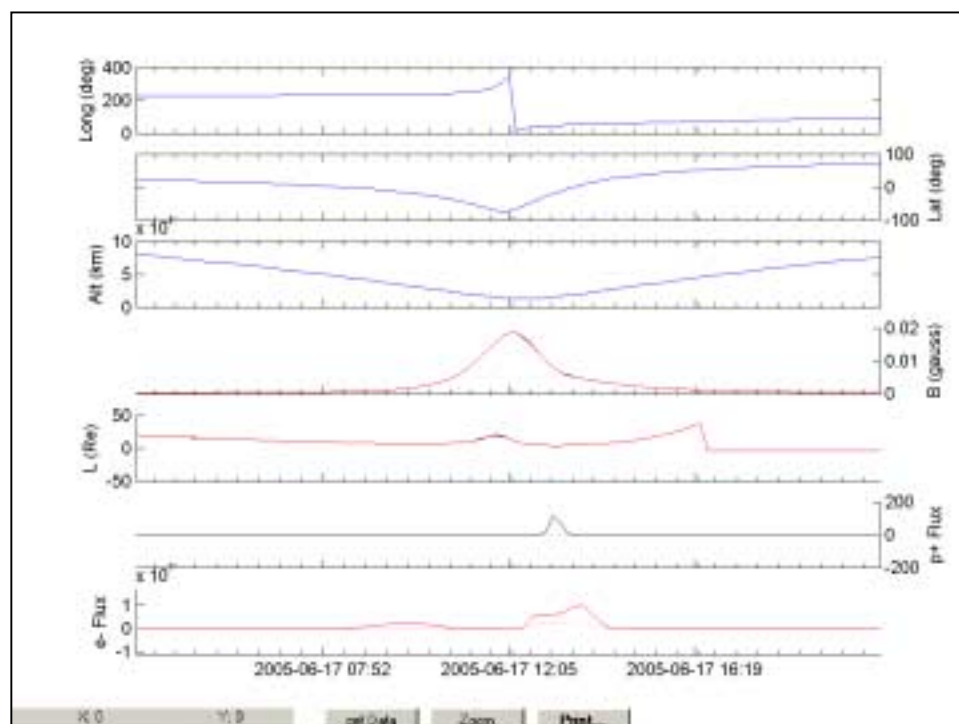
Rev 324:



Rev 325:



Rev 326:



SEC-GOES Observed Particles Fluxes:

