

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-TOS-OF
No. 072
Week 06
09.02.04
Routine Phase

Prepared by: M. Walker (TOS-OFI)

LIST OF CONTENTS

1	General.....	3
2	Summary of Activities	3
3	Satellite Status.....	3
3.1	Platform	3
3.1.1	AOCS	3
3.1.2	Power	4
3.1.3	Thermal.....	4
3.1.4	OBDH.....	4
3.1.5	RFS	4
3.2	Payload	5
3.2.1	SPI	5
3.2.2	IBIS	5
3.2.3	JEM-X	5
3.2.4	OMC.....	6
3.2.5	IREM	6
4	Ground Facilities.....	7
4.1	Mission Operations Centre.....	7
4.2	Ground Stations & Network.....	7
4.3	Science Ground Segment.....	7
4.3.1	ISOC	8
4.3.2	ISDC.....	9
5	Special Events.....	9
6	Anomalies.....	9
7	Future Milestones	10
8	Appendix.....	11
8.1	Overview of Revolutions	11
8.2	Consumables	11
8.2.1	Detailed Fuel Book-keeping.....	11
8.3	Detailed Satellite Information	11
8.3.1	AOCS Operations	12
8.3.2	SPI Operations.....	14
8.3.3	IBIS Operations.....	16
8.3.4	JEM-X Operations.....	20
8.3.5	OMC Operations	22
8.3.6	IREM Operations	22

DISTRIBUTION LIST

Addressees	Copy	Addressees	Copy
D/TOS		ESA HQ	
G. Winters D/TOS	1	D. Southwood D/SCI	1
W. Frank TOS-O	1		
A. Smith TOS-OF	1	ESTEC	
J. F. Kaufeler TOS-G	1	J. Louet SCI-P	1
N. Bobrinsky TOS-ON	1	A. Gimenez-Canete SCI-S	1
R. Münch TOS-GF	1		
		ESTEC / PG	
M. Schmidt	1	K. Clausen	1
R. Southworth	1	P. Jensen	1
F. Di Marco	1	P. Strada	1
F. Cordero	1	G. Sarri	1
M. Walker	1	R. Carli	
M. Rezazad	1		
P. Lippi	1	ESTEC/RSSD	
R. Lemme	1	M. Kessler SCI-SD	1
S. Fahmy	1	C. Winkler	1
SPACONs	1	A. Parmar	1
		R. Much	1
I. Bayliss	1	L. Hansson	1
G. Di Girolamo	1	R. Kuulkers	1
F. Dreger	1		
G. Gienger	1	ESTEC/SCI-A	
S. Pallaschke	1	Nicola Rando	1
W. Hell	1		
K. Capelle	1	ISDC	
M. Butkovic	1	T. Courvoisier	1
D. Heinzer	1	R. Walter	1
A. Pena	1	N. Mowlavi	1
Shift - Coord	1	ISDC Shift Team	1
Scheduling Office	1	D. Texier	1
T. Beck	1		
B. Smeds		ALENIA	
S. Scaglioni	1	C. Cassi	1
J. Wardill	1	F. Ravera	1
Redu		PI / Instrument Teams	
B. Demellenne	1	C. Larigauderie – SPI	1
		G. La Rosa – IBIS	1
		S. Brandt – JEM X	1
		E. De Miguel - OMC	1
		W. Hajdas – IREM	1
		JPL / Goldstone	
		D. Holmes	1
		J. Green	1

1 General

The Flight Control Team at MOC has compiled this report with some input provided by the Flight Dynamics Team, ISOC and ISDC.

It addresses the activities from 31.01.04 until 06.02.04 (both dates inclusive) and covers the revolutions 159 & 160.

2 Summary of Activities

The operations were performed according to the planning inputs from ISOC combined with some manual commanding by MOC.

The target of these revolutions was Cygnus X (RA 21:13:12.00; DEC +41:15:58.0). The activities consisted of a raster dithering observation.

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 that has a permanent impact on the mission was identified.

3.1.1 AOCS

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

A spurious opening of the LCL-2 of SPDU Board 6A interrupted the power supply to the RCS-B CBH Backup Heaters and caused the temperatures of the RCS-B thruster thermocouples to drop below their warning/alarm limits. The temperatures were re-stabilized when the recovery was performed and the LCL was closed again by ground commanding.

Several slews were missed at the end of revolution 159 because the station could not support the pass. Perigee entry was made with a safe but different than planned attitude. The Timeline was rejoined at the beginning of revolution 160 with a manual slew and a manual RWB.

The fuel consumption over the period between 30/01/2004 and 06/02/2004 was 0.071 kg. The remaining propellant is in the order of 172.706 Kg on the 6th of February.

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

3.1.2 Power

The power subsystem is working as specified. The available power from the arrays is in the order of **2200W**.

At DOY 033 12.23.51z parameter P1176 changed status from ON to OFF in Telemetry. P1176 is the SPDU HLCL 6A2 status, connected in series with this LCL are the following:

Survival Cat. Bed Heaters A (not switchable)

Thruster 2B cat. Bed Heater TSW (transistor Switch)

Thruster 1B cat. Bed Heater TSW (transistor Switch)

Thruster 3B cat. Bed Heater TSW (transistor Switch)

Thruster 4B cat. Bed Heater TSW (transistor Switch)

OMC Lens Heater A TSW (transistor Switch)

FCV Nominal Heater TSW (transistor Switch)

Following the switch off the Thruster Thermocouples started to cool down and went OOL low. After analysis of the failure, the recovery started at 13.02z. Initially all switchable loads in series with P1176 were switched OFF. P1176 was switched back on. The loads in series with P1176 were then switched back on. The recovery was completed at 13.09z. The thruster thermocouples temperatures were all back in limits at 14.05z. At the time of the anomaly no other unusual behaviour was noted on the Satellite, Radiation levels were normal, the Satellite was at a height of about 152000km.

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. The occasional loss of TM (Bad Frames) during Redu passes does not impact the operations.

3.2 Payload

3.2.1 SPI

The overall status of the instrument is nominal.

During the reporting period the instrument was in photon-by-photon mode with spectra TM enabled and an assigned TM bandwidth in the science windows of 98 pkts/cycle.

The cryo-cooler is working well maintaining the temperature within 85+/-1K.

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

3.2.2 IBIS

The status of the unit is Nominal.

The TM bandwidth assigned to IBIS was 134 pkts/cycle.

No occurrence of anomalous OEM generation (ID 183-184-179-180, Class 2) was reported after the VETO S/W patch.

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.

During this period JEM-X1 was dormant with a TM allocation of 1 packet/cycle. JEM-X2 operations were performed by the automatic Timeline, with a TM allocation of 8 packets/cycle during science observations.

JEM-X2 was commanded to Safe mode 3hrs24mins earlier than it had been planned in the Timeline before radiation belt entry of revolution 159 (DOY 034), due to the delay and eventual cancellation of a Goldstone pass.

JEM-X2 made two autonomous transitions to Safe mode before it was due to be commanded to Safe mode by the Timeline before radiation belt entry of revolution 160. The first was due to a sharp peak on the IREM electron counter about 4 hours before the planned transition to Safe. JEM-X2 was then recovered to Data Taking mode by 13:58Z (about an hour later), but then made the second transition to Safe mode, triggered by the unit's SW Ratemeter, at 14:41Z. This was about 2 hours before

it was planned according to the Timeline. JEM-X2 remained in Safe mode for the rest of this revolution.

Further information on the JEM-X operations can be found in the Appendix Section 8.3.4.

3.2.4 OMC

The status of OMC is nominal.

During the reporting period OMC operations were performed by the automatic timeline, with the TM allocation to OMC of 5 packets/cycle during normal science operations.

There were 208 OMC pointings executed nominally, 7 were lost.

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

3.2.5 IREM

The overall status of the unit is Nominal.

The observation period was characterized by low solar activity but by occurrences of single high radiation (electron) spikes that in one case caused the transition of part of the payload (Jem-X2 and IBIS) to go to Safe Mode.

The Electron Belts Entry/Exit for revs 158-->159, as defined by a cut-off flux of $3.76\text{E}+02$ e/cm²/sec ($E>0.5$ MeV) and the predicted Proton Belts Entry/Exit, as defined by a cut-off flux of $1.25\text{E}+03$ p/cm²/sec ($E>8$ MeV) are shown below:

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Electron CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
158	RAD_ENTR R 2004-02-03T18:43:57Z	No data due to DSS 16 pa lost.	03-Feb-2004 19:21:33	54768.52
159	RAD_EXIT R 2004-02-04T03:46:29Z	Wed 04 Feb 04, 01:57	04-Feb-2004 02:21:33	26187.93
159	RAD_ENTR R 2004-02-06T18:32:19Z	Fri 06 Feb 04, 12:44:39**	06-Feb-2004 19:11:33	54747.48

Reference

Small error vs reference

Large error vs reference

Proton Belts

REV	S/C BCPKT (electron)	Proton CUT-OFF Predicted Entry/Exit	ALT[Km] predicted
159	RAD_ENTR R 2004-02-03T18:43:57Z	04-Feb-2004 00:41:33	11564.89
159	RAD_EXIT R 2004-02-04T03:46:29Z	04-Feb-2004 01:11:33	14735.73

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 in general good in the reporting period. The main problems this week, are briefly described in section 6.

4.1 Mission Operations Centre

The performance of the MOC was in general good in the reporting period, with only minor problems reported.

4.2 Ground Stations & Network

There were a few minor and one major incident concerning the ground stations this week, Redu has problems with occasional bad frames, and DSS-16 lost an entire pass, see section 6 for details.

4.3 Science Ground Segment

The access from external to the PI workstations that are located at MOC have ceased since the installation of protection S/E in the affected machines.

4.3.1 ISOC

1. Mission planning

PSF's: Received up to rev. 167

POS and POD generated: up to rev 163

TSF's: Received up to rev 162

No replanning performed. The mission planning was held back this week pending a solution to problem reported last week with new RWB window before perigee entry. Rev. 163 was planned by manual editing of PSF and POS. With the installation of the new system version 10.2 planning is now restarted.

2. Observation status

Nothing received this week

3. ISOC science archive

Data received last week ingested into archive.

4. ISOC system

A version 10.2 was introduced operationally late this week. This version allows the import of PSF's with the new RWB window at belt entry. It also includes the newly released OMC pointing software and star catalogue.

5. Problems

With the introduction of ISOC system version 10.2 previously reported problems should be resolved. A significant degradation of the system performance has been observed lately. Investigation traced this to be caused by the increasing size of the orbit data file received weekly from ESOC / Flight Dynamics. When removing obsolete information from this file, in consultation with Flight Dynamics, the performance improved significantly. Future deliveries of this file will have the obsolete data removed by Flight Dynamics before delivery to ISOC. Flight Dynamics has also been asked to look into improvements to the software delivered to ISOC by them.

6. AO 3 preparation

Detailed planning for this AO available for discussion next week.

7. Miscellaneous

The ISWT approved the PI request to switch from JEM-X 2 to JEM-X 1. Detailed preparation for this is performed. The switch over will take place after the CRAB calibration in rev. 170. Hence the new configuration will be used from rev 171 onwards. This is a nontrivial task requiring careful planning and implementation. In particular TOO replanning requests during the execution of rev 169 will require additional procedures to be executed. They are in preparation.

4.3.2 ISDC

On 09/02/2004, the status of ISDC observation processing is:

- Latest Standard Analysis completed: amalgamated observation 01202140005 (MR 2251-178, Revolution 136) on 06/02/2004
- Latest products archived: observation 01100090008 (Vela region, Revolution 138) on 27/01/2004
- Latest observation products sent to the observer: 01202070003 (X1916-053, Revolution 131-134) on 09/01/2004.

5 Special Events

Nothing to report

6 Anomalies

There were a number of problems related to the ground segment that impacted the operations:

- On DoY 031, at 20:36, command D3301, failed the PTV check, no apparent impact.
- On DoY 032, at 21:23 there was one bad frame from Redu.
- On DoY 033 at 12:19, there was a brief VC0 TM gap from Redu.
- On DoY 034, at 03:31, and 03:44, there was a brief TM drop, due to the on-going playback.
- Later at 14:12, until 01:44 the following day, due to station problems, contact was interrupted. The impact was pointings 01590092 to 01590098 were lost. The correspond DR # is G104011.
- On DoY 035 at 12:56, and again at 20:40, individual frames from Redu were lost.
- On DoY 036, at 06:09, an error message on the idda was received from task HFARETRI application: "CCOMnfaside::getdatarequest::datarequestchar:->rcvmsg cannot get data request from cache".
- Later at 14:23, there was a bad frame received from Redu.
- At 16:07, there was an error sending data to the ISDS. It was noted that it was not possible to telnet from idda to isdsa. At 16:35, the Firewall was rebooted, and the telnet worked, but still no data. At 16:40, data flowed again, after the isds & ifrd tasks were restarted on isdsa.
- At 21:42, 21:51, and several times around 21:54, there were bad frames from Redu. The problem was put down to noisy servo power drives, which is being looked into by the station.
- On DoY 037, at 08:48, there was an error sending data to the isds, which fixed itself.
- At 11:20, there was a bad frame from Redu.

The following new anomaly reports have been entered into the Anomaly Reporting and Tracking System. Repeats of existing anomalies are not shown in this table.

AR id	Date Occurrence	Subject	Segment	Status
INT-2551	26/01/2004	NCTRS-B application taken down by mistake		Pending
INT-2552	26/01/2004	On-line Long Term archive is corrupted.	IMCS	Open
INT-2553	26/01/2004	The consolidator archive on idda cannot be written to following reception...	IMCS	Open

Doc. Title : INTEGRAL Mission Report # 72
Doc. Ref. : INT-MOC-SYS-RP-1001-TOS-OF
Date : 09/02/04

Issue : 1
Rev. : 0
Page : 10

INT-2554	26/01/2004	Telemetry not accessible from TM Desktop or TMP task	IMCS	Open
----------	------------	--	------	------

7 Future Milestones

Planned for the beginning of February is a Veto patch to rescale the counter factor.

There is also an upcoming JEMX patch to update the on-board background rejection criteria and the HV safety limits. The precise date for this change has yet to be set.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 159

In revolution 159 a raster dithering observation of Cygnus X (RA 21:13:12.00; DEC +41:15:58.0) was planned to be performed throughout the available observation time (~62 hours). However, the last 4 hours of this observation could not be performed due the cancellation of the 2nd Goldstone pass.

Revolution 160

In revolution 160 a raster dithering observation of Cygnus X (RA 21:13:12.00; DEC +41:15:58.0) was performed throughout the available observation time (~62 hours).

During these revolutions all instruments were in their nominal science modes, except for JEM-X1 which remained in Safe mode, and the TM allocation was 134 IBIS, 98 SPI, 1 JEM-X1, 8 JEM-X2, 5 OMC.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2004-01-16T15:33:35.000Z	173.0218	F	Automatic TM processing.
2004-01-17T03:11:20.000Z	173.0117	F	Automatic TM processing.
2004-01-17T12:07:45.000Z	173.0006	F	Automatic TM processing.
2004-01-17T15:54:33.000Z	172.9794	F	Automatic TM processing.
2004-01-18T13:31:40.000Z	172.9126	F	Automatic TM processing.
2004-01-20T02:55:03.000Z	172.8937	F	Automatic TM processing.
2004-01-21T13:16:11.000Z	172.8745	F	Automatic TM processing.
2004-01-23T02:47:03.000Z	172.8537	F	Automatic TM processing.
2004-01-26T02:41:50.000Z	172.8080	F	Automatic TM processing.
2004-01-26T11:16:07.000Z	172.7928	F	Automatic TM processing.
2004-01-29T02:32:06.000Z	172.7768	F	Automatic TM processing.
2004-01-31T19:49:57.000Z	172.7586	F	Automatic TM processing.
2004-02-01T02:26:54.000Z	172.7320	F	Automatic TM processing.
2004-02-04T02:55:49.000Z	172.7150	F	Manual 0160_0501_M.RWB
2004-02-05T12:25:28.000Z	172.7059	F	Automatic TM processing.

This report was generated Fri Feb 6 08:00:10 GMT 2004

8.3 Detailed Satellite Information

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

8.3.1 AOCS Operations

AOCS operations were executed from the Automatic Timeline.

During this period, 16 Open Loop Slews, 198 Closed Loop Slews and 5 Momentum Bias were executed. 7 slews were missed or executed manually. This is equivalent to a 3.2%.

31/01/04 (Day of Year 031, Revolution 158)

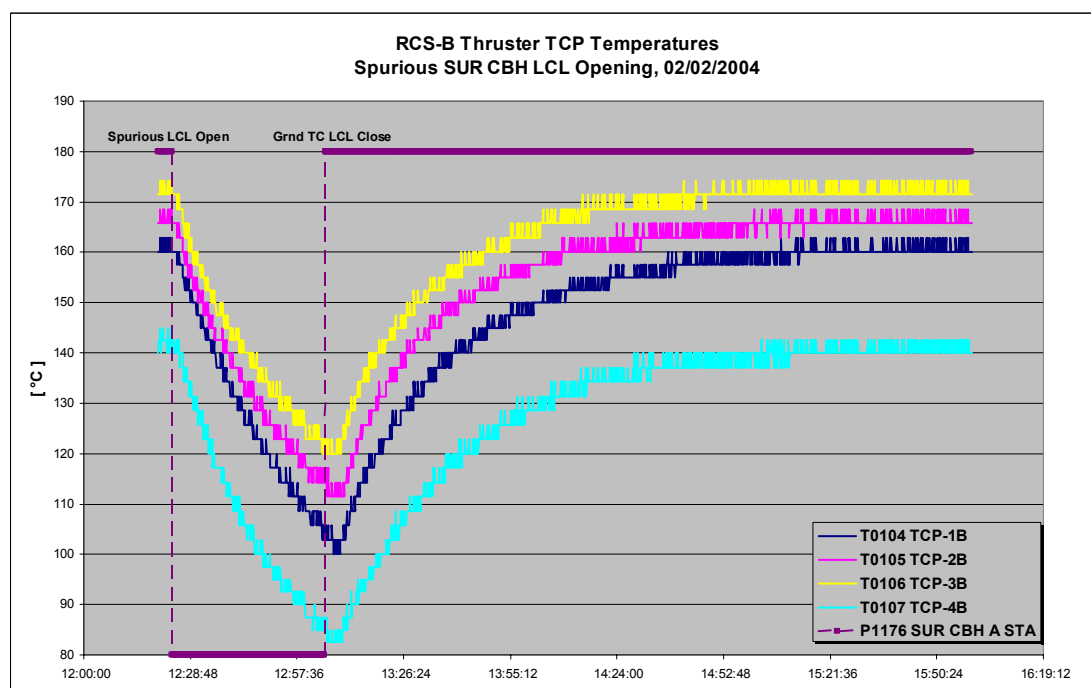
Nothing to report.

01/02/04 (Day of Year 032, Revolution 158-159)

Nothing to report.

02/02/04 (Day of Year 033, Revolution 159)

Spurious opening of the SPDU Board 6A LCL-2, which also provides power to Survival Catbed Heater A: At 12:23:51, the SPDU Board 6A LCL-2 was spuriously opened (probably by an SEU). This is the LCL that also supplies power to the backup Catbed Heaters of the thrusters of RCS-B. This caused sudden drops in the thermocouple temperatures of RCS-B thrusters. After a quick analysis by the thermal subsystem engineer, the recovery was performed by first opening all the downstream TSWs, closing the SPDU Board 6A LCL-2 and then closing all the downstream TSWs. The thermal behavior of the RCS-B thruster thermocouples during this time can be seen in the following graph:



03/02/04 (Day of Year 034, Revolution 159)

Complete loss of the Goldstone pass at the end of the revolution: The Goldstone (DSS-16) pass that was planned to cover the pass from 13:35 until the end of the revolution could not support the INTEGRAL pass. MOC was first warned of a possible delay of 4.5 hours. At around 18:00, after MOC's inquiry, it became clear that the complete pass would be missed. An unclear situation like this near the end of the revolution puts MOC in an uncomfortable situation regarding the perigee entry conditions; An early Slew/RWB to the perigee passage attitude (given a timely notice that leaves enough time to plan and perform the necessary operations) bears the risk of losing science in case the station resumes operation at a later stage. On the other hand, staying in the current attitude (if safe for perigee entry) and hoping to get the station back at a later stage, includes the risk/complications of entering the perigee with a different attitude and RWB profile than the planned ones and rejoining the Timeline at the beginning of the next revolution.

In this particular case it was decided to remain in the attitude of the last performed slew before the station handover, which was safe for perigee passage and hope to get the station back at the communicated time (i.e. 18:00z, before the last slew and RWB in the revolution). The complete pass was lost and slews 01590092 to and including 01590098 were missed. INTEGRAL entered the perigee with the attitude of PID 01590091. Fortunately the observations were part of a dither pattern that would be resumed in the next revolution. Therefore, the slews/RWBs at the end of revolution 159 and at the beginning of the next revolution were not large ones, which considerably eased the recovery.

04/02/04 (Day of Year 035, Revolution 159-160)

Rejoining the Timeline after the loss of DSS-16 pass at the end of the previous revolution: As was mentioned above, INTEGRAL entered the perigee with an attitude and RW profile that were different than the planned ones. Since the dither pattern of the previous revolution would be followed in revolution 160, performing a manual open loop slew to the attitude of PID 01600001 and then performing a manual RWB to rejoin the planned RW profile did the recovery. Close loop slew 01600001 was then manually updated (basically performed as a corrective close loop slew). The recovery was finished by 03:21, after which the AOCS operations from the Timeline were resumed.

Offset in the RW speed after manual RWB with respect to the planned profile: The manual Reaction Wheel Bias that was performed using the FDS Recovery Tool generated a wheel speed demand with an offset of about 100 rpm with respect to the planned speed for RW4. An offline investigation into the problem, done by Flight Dynamics, revealed a bug in the software that generates the manual RWBs. Apparently the S/W does not check if a slew would be executing at the point it tries to rejoin. In this particular case, the rejoining RW speeds were taken from the time that slew 01600001 would be executing. This was the source of the offset. FD is currently fixing this problem in the S/W.

05/02/04 (Day of Year 036, Revolution 160)

Nothing to report.

06/02/04 (Day of Year 037, Revolution 160)

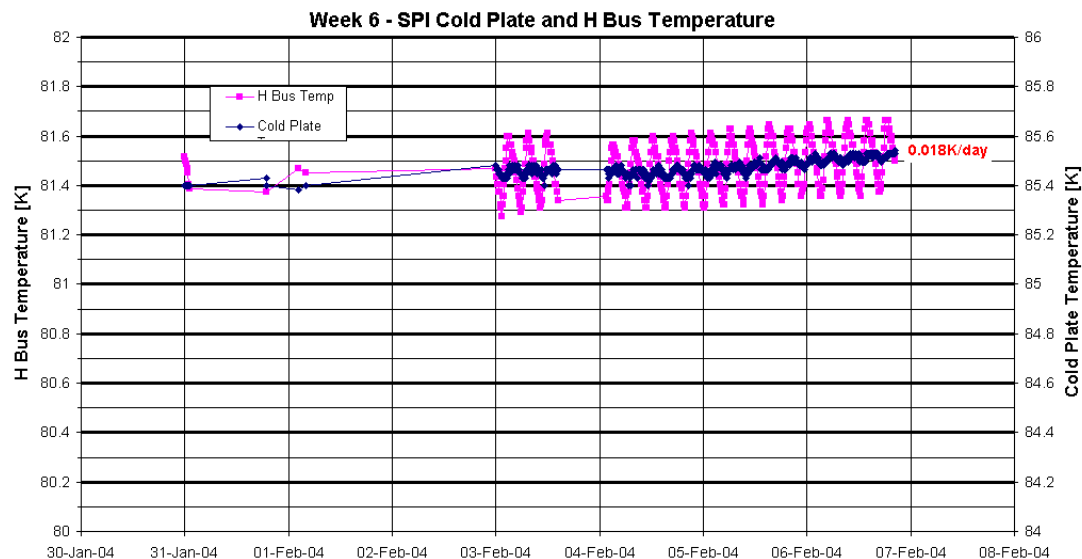
Nothing to report.

8.3.2 SPI Operations

Cryo-cooler / Detector Cold-Plate:

The cold-plate temperature leveled off at around 85.5K with a small positive drift of 0.018K/day, which is within the expected range. The performance of the cryo-cooler is nominal.

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

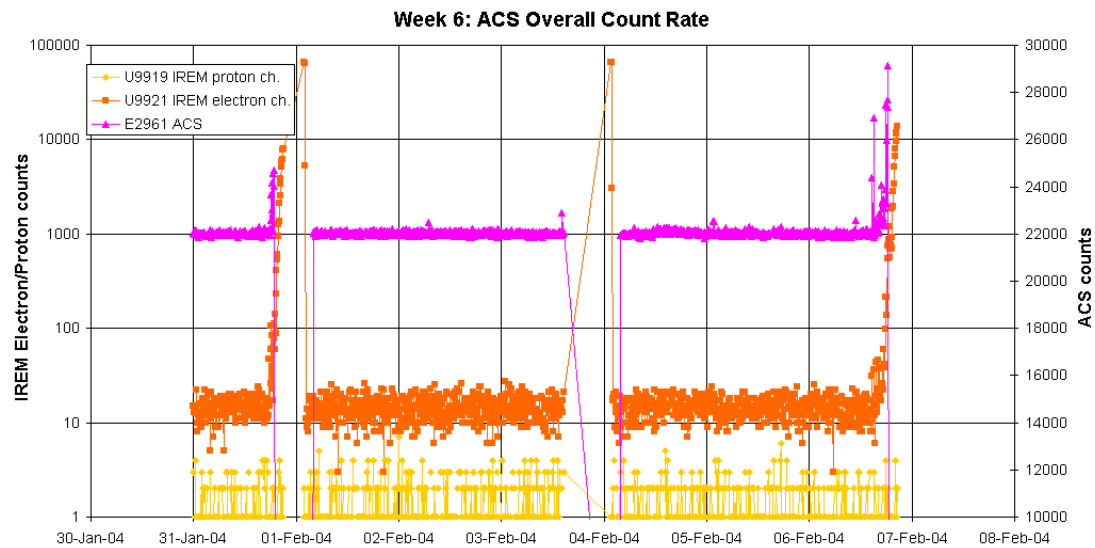


IASW/DPE:

Nothing to report.

ACS:

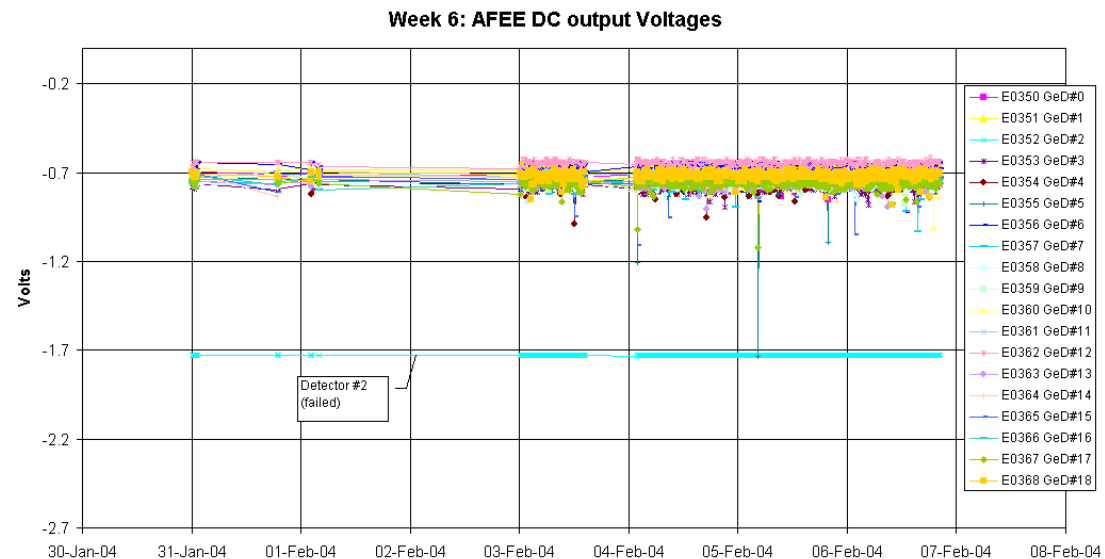
The following plot shows the ACS overall count rate evolution during the reporting period. The performance of the unit is nominal.



AFEE:

The AFEE dc output signals are here after plotted during the reporting period. These signals represent the DC component of the current flowing through the Ge crystals polarised at 4kV; they provide a measure of the health status of both the detectors and the HV section.

The performance of the detectors is nominal except for the detector #2 failed since 06.12.2003 (see anomaly report INT_SC-72).

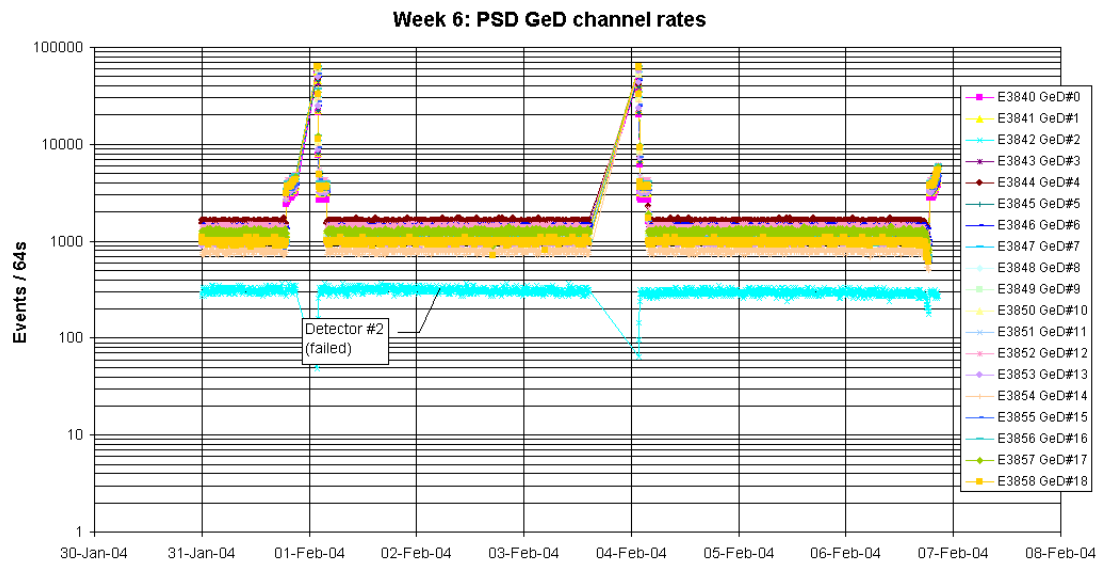


DFEE:

Nothing to report.

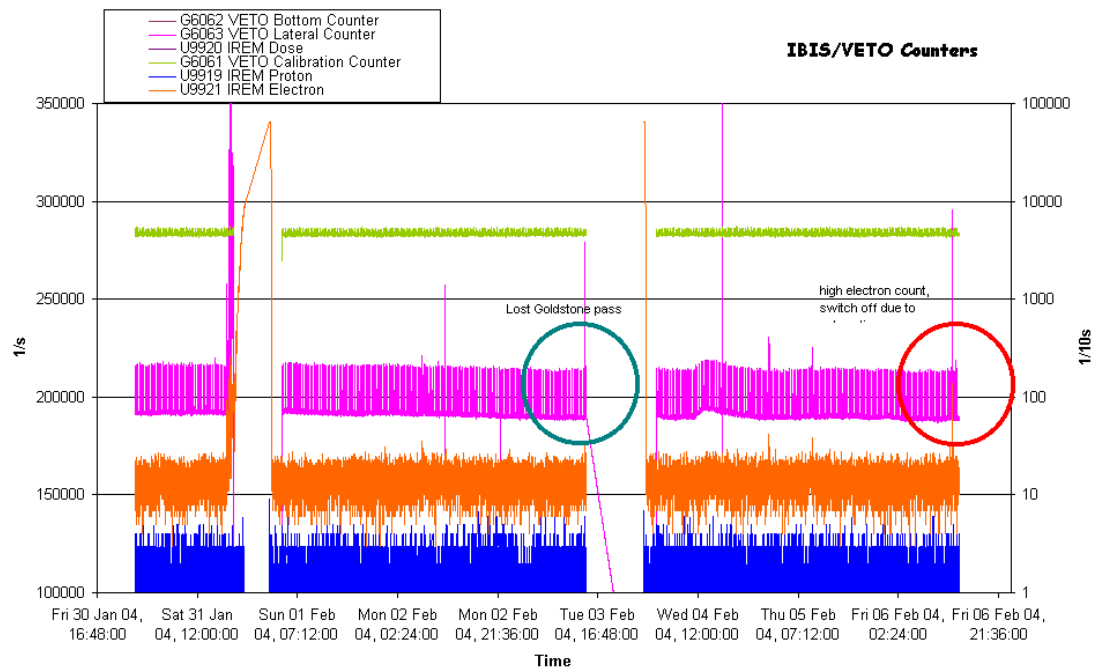
PSD:

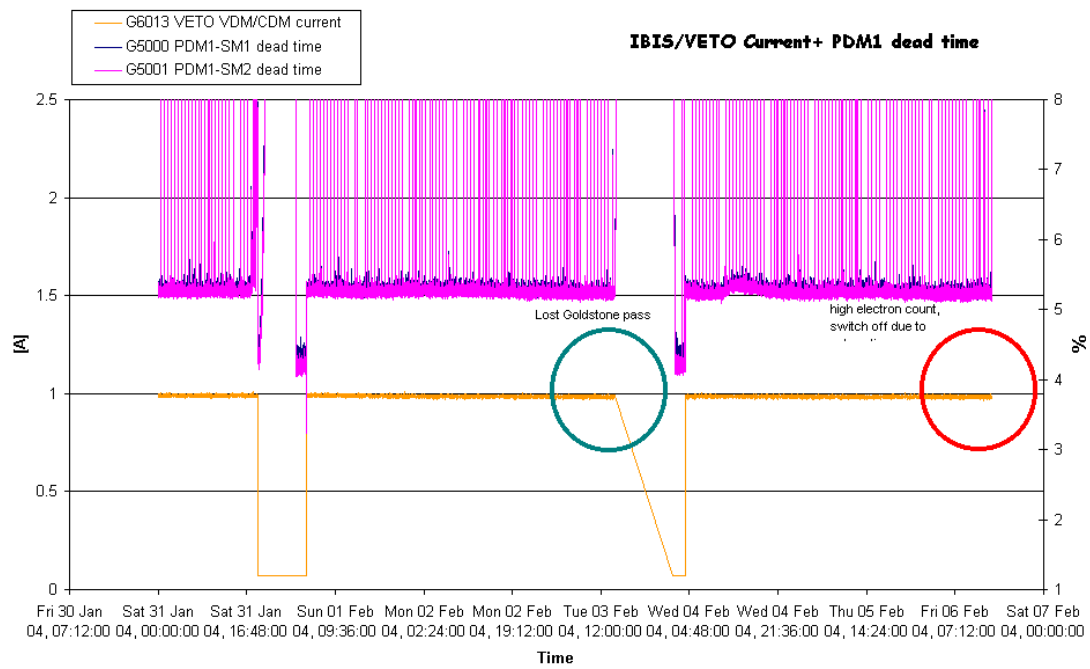
The following plot shows the GeD channel rates detected by the PSD during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2, whose residual counts are triggered by noise.



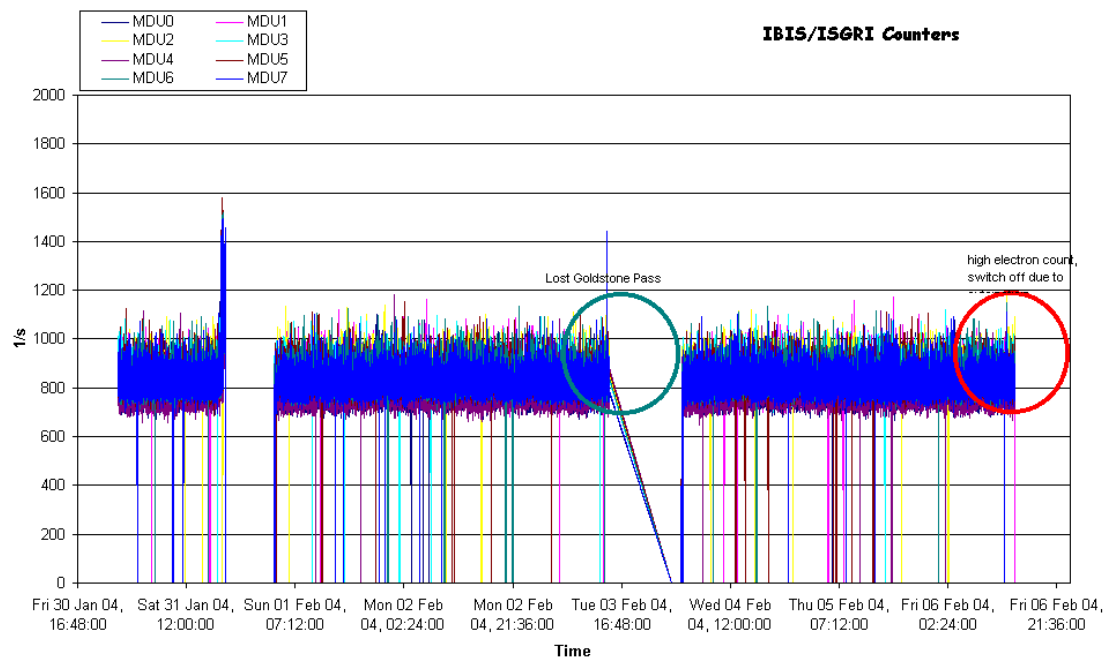
8.3.3 IBIS Operations

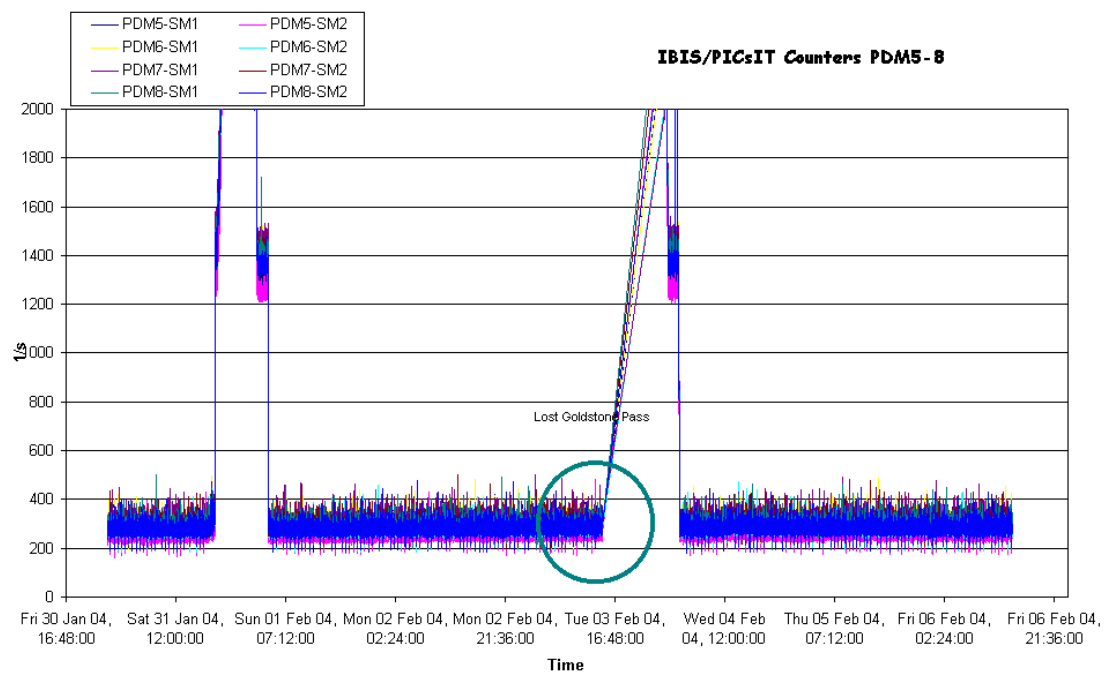
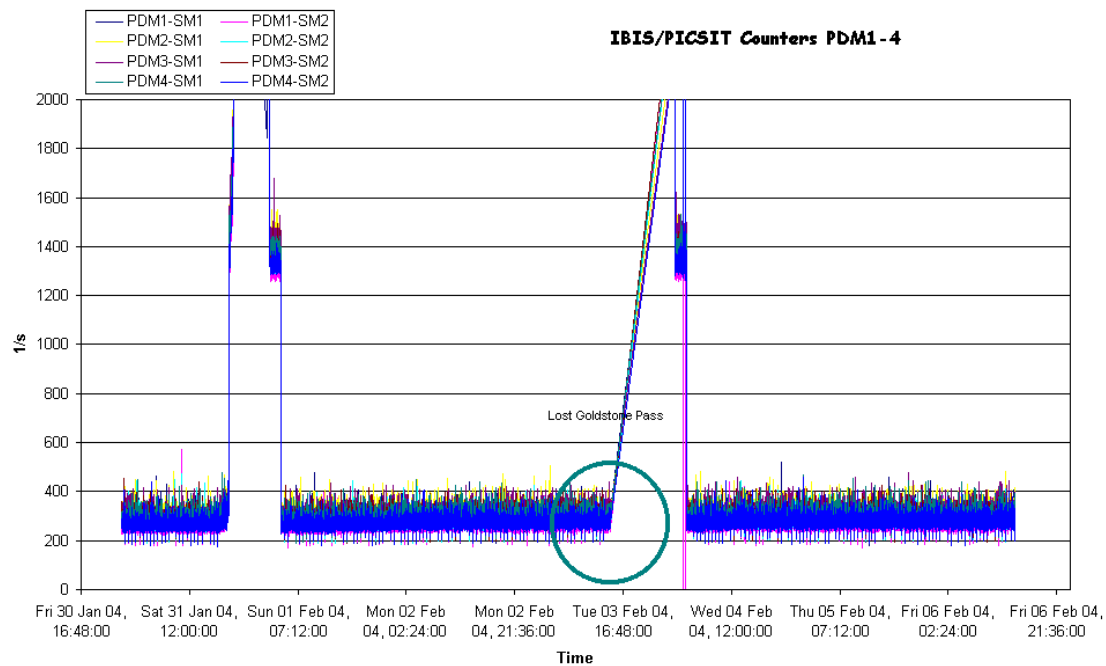
Plots of VETO VDM/CDM current, the VETO bottom and lateral counter and the PICsIT PDM#1 SM1-2 dead times are shown below:





Plots of ISGRI and PICsIT counters, during the observation period are shown below:





DOY 2004.031 (31/01/04)

At 17:43Z the parameters G6062 and G6063 were reported going in/out Soft High limit several times between 17:43Z and 18:27Z. No further action was taken.

DOY 2004.032 (01/02/04)

There were a few reports during the Belt passage of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the

PICsIT detectors being ON without the VETO anticoincidence system, as required by the PIs.

At 03:55Z the OEM APID 1280 ID 169 CLASS 0 <<HK OUT OF SYNCH>> was reported. This was flagging lost data during the polling of the HK from the peripherals. As suggested by the FDIR no action was taken, the unit able to recover the synch autonomously.

DOY 2004.033 (02/02/04)

Nothing to report.

DOY 2004.034 (03/02/04)

At 14:02Z due to a problem with the Ground Station in Goldstone, the complete pass was lost from DSS16. The s/s SOE decided to leave the unit running in Scientific Mode for the following hours (14:02Z -> 00:30Z) protected by the on-board automatisms to avoid excessive detector temperature drops.

DOY 2004.035 (04/02/04)

There were a few reports during the Belt passage of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as required by the PIs.

DOY 2004.036 (05/02/04)

At 07.43 Z the following OEMs were reported:

APID 1280 ID 133 CLASS 2 << IBIS1 IASW LSL TRANSFER FAILED (LOW LEVEL)>>

APID 1280 ID 131 CLASS 2 <<IBIS1 IASW LSL TRANSFER FAIL REPORT FOR HIGH-LEVEL MODULE RESET>>;

Due to the single occurrence of both OEMs no action was taken, as suggested by FDIR doc.

DOY 2004.037 (06/02/04)

At 16:06Z the parameters G6062(VETO Bottom Counter) - G6063 (VETO Lateral Counter) - G8080 (HBR-A valid event rate meter) reported in Soft High going in/out limit for fewTM cycles from 16:06Z until 16:52Z. No action was taken , as suggested by FDIR doc.

At 17:39Z, the automatic transition to Safe configuration (IASW In Stand-By + HVs OFF) due to the high radiation background (electron counter > 384 cts/10 sec), was reported, about 67 minutes prior the S/C broadcasted Radiation Belts entry time.

RAD_ENTR R 2004-02-06T18:32:19Z D Radiation belt entry time

There were a few reports during the Belt passage of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as required by the PIs.

8.3.4 JEM-X Operations

2004-01-31 (DOY 031, Rev 158)

Nothing to report

2004-02-01 (DOY 032, Rev 158-159)

Nothing to report

2004-02-02 (DOY 033, Rev 159)

Nothing to report

2004-02-03 (DOY 034, Rev 159)

Due to the planned delay in ground station support from Goldstone, which meant that the ED LESAFE01 scheduled in the Timeline at 17:22:28Z would have been missed, JEM-X2 was commanded into Safe mode at 13:58Z by manually uplinking the ED LESAFE01. This was ~30 minutes before loss of coverage from Redu.

2004-02-04 (DOY 035, Rev 159-160)

Nothing to report

2004-02-05 (DOY 036, Rev 160)

At 09:55:52Z the following radiation monitoring parameters from IREM went Out of Limits:

K5317 RAD MONITOR 3 (Electron Counter), value = 65
L5317 RAD MONITOR 3 (Electron Counter), value = 65,

However, this did not trigger a transition of JEM-X2 to Safe mode as the value of the IREM electron counter parameter had returned to below the JEM-X2 threshold by the next TM cycle.

2004-02-06 (DOY 037, Rev 160)

At 12:45Z the following radiation monitoring parameters from IREM went Out of Limits:

K5317 RAD MONITOR 3 (Electron Counter), value = 103
L5317 RAD MONITOR 3 (Electron Counter), value = 103,
causing the autonomous transition of JEM-X2 to Safe mode (issuing OEM 231 JEM-X2 AUTO EVENT 1).

At 12:55Z JEM-X2 performed an autonomous recovery to Setup mode (issuing OEM 233 JEM-X2 AUTO EVENT 3) after the IREM RMCR values had remained below the JEM-X2 thresholds for exiting from Safe mode for more than 10 minutes. Timeline commanding to JEM-X2 was then disabled at 13:10Z.

At 13:28Z the procedure FCP_JEM2_1010 (JEM-X2 Configuration Setting for Science Ops) was executed and at 13:58Z JEM-X2 was commanded back to Data Taking mode by the procedure FCP_JEM2_0044. At 14:00Z commanding to JEM-X2 by the automatic Timeline was re-enabled.

However, at 14:41Z the parameter L5119 SOFTWARE TRIGGER went out of limits (value = 25000), causing the autonomous transition of JEM-X2 back to Safe mode.

At this time, the following OEMs were received:

OEM189 JEM-X2 PROB DFEE 9

OEM 254 ERROR OFF

Timeline commanding to JEM-X2 was disabled at 14:56Z.

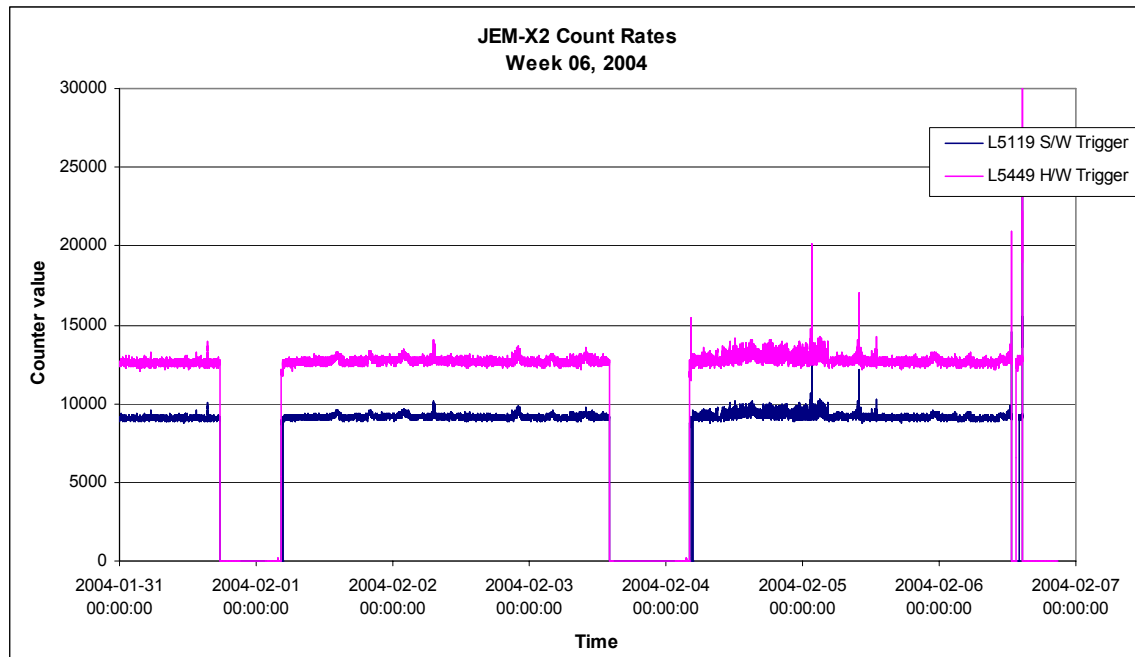
This was about 2 hours before JEM-X2 was due to be commanded into Safe mode by the Timeline before radiation belt entry. Also, starting at 15:08Z, there were a few sets of occurrences of the IREM electron counter exceeding and later returning within the Safe threshold for JEM-X2. Therefore, JEM-X2 was left in Safe mode for the rest of the revolution.

At 16:54Z commanding to JEM-X2 from the autostack was enabled to allow the ED LESAFE01 to be executed from the Timeline at 17:10:53Z, at which time the OEM 231 JEM-X2 AUTO EVENT 1 was received.

8.3.4.1 JEM-X2 Count Rates

JEM-X2 count rates over the reporting period are displayed in the following graph¹. The peak in L5449 at 2004-02-06T14:41Z, which is off the scale of the plot, has a value of 42813.

¹ Data sampled to smooth spikes in S/W Trigger due to flushing of buffer during slews.



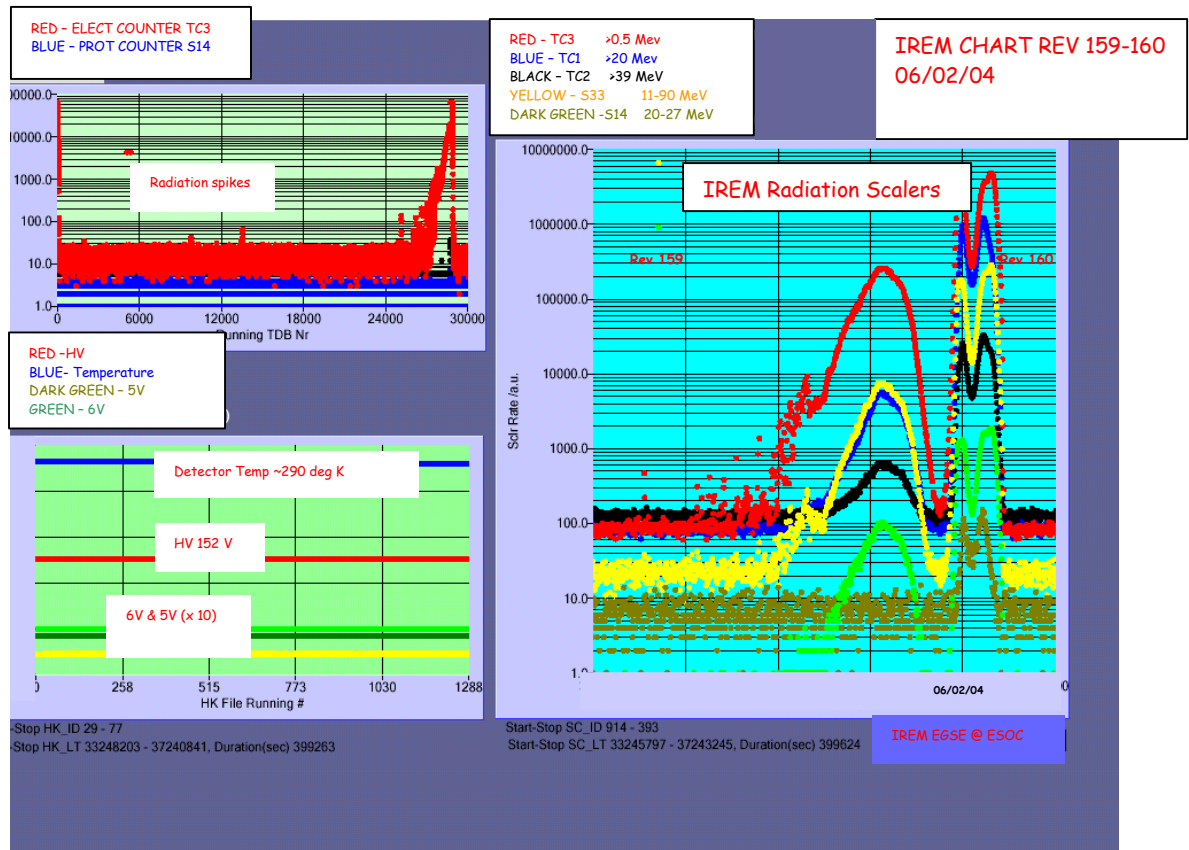
8.3.5 OMC Operations

On DoY 034 at 14:12, the DSS-16 stations had problems causing the pass to be interrupted. It was not recovered until 01:44 the following day, the impact was pointings 01590092 to 01590098 were lost.

On DoY 031, at 18:55:29, and again on DoY 037, at 18:32:36, OMC was switched by the Timeline to SAFE mode, at the nominal time, the switchover on DoY 034 was not observed owing to the lost Goldstone pass.

8.3.6 IREM Operations

Plots of the evolution of the IREM counters from revs 159-->160, due to a security problem (external hacking) on the IREM ECOE, it was not possible to produce the IREM counters plot for rev 158-159. The problem was fixed on 04/02/04 by the installation of a local firewall on the IREM ECOE.



The predicted Belts passages (as calculated with AP8Max and AE8Max models by using the RADMON tool), are shown below:

