

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-TOS-OF
No. 060
Week 46
17.11.03
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	RF.....	4
3.2	Payload.....	4
3.2.1	SPI.....	4
3.2.2	IBIS.....	5
3.2.3	JEM-X.....	5
3.2.4	OMC.....	5
3.2.5	IREM.....	5
4	Ground Facilities.....	6
4.1	Mission Operations Centre.....	6
4.2	Ground Stations & Network.....	6
4.3	Science Ground Segment.....	6
4.3.1	ISOC.....	6
4.3.2	ISDC.....	7
5	Special Events.....	7
6	Anomalies.....	7
7	Future Milestones.....	9
8	Appendix.....	9
8.1	Overview of Revolutions.....	9
8.2	Consumables.....	10
8.2.1	Detailed Fuel Book-keeping.....	10
8.3	Detailed Satellite Information.....	10
8.3.1	AOCS Operations.....	11
8.3.2	SPI Operations.....	12
8.3.3	IBIS Operations.....	13
8.3.4	JEM-X Operations.....	17
8.3.5	OMC Operations.....	18
8.3.6	IREM Operations.....	18

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
J. Pineiro	1	P. Jensen	1
R. Southworth	1	P. Strada	1
F. Di Marco	1	G. Sarri	1
F. Cordero	1	R. Carli	
M. Walker	1		
M. Rezazad	1	ESTEC/RSSD	
J. Houser	1	M. Kessler SCI-SD	1
P. Lippi	1	C. Winkler	1
SPACONs	1	A. Parmar	1
S. Fahmy	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 08.11.03 until 14.11.03 (both dates inclusive) and covers the revolutions 131 & 132.

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 X1916-053 (RA 19:18:48.01; DEC -05:14:08.6) and an amalgamated observation of 0716+714 (RA 07:21:53.45; DEC +71:20:36.4); mkn3 (RA 06:15:36.30; DEC +71:02:15.1) and mkn6 (RA 06:52:12.25; DEC +74:25:37.5). The planned activities consisted of staring and raster dithering observations. In addition, SPI annealing operations were commenced at the end of revolution 131.

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.

A few slews were missed during this time. Two cases were caused by problems in the TM/TC links. The third case was due to failure in attitude determination, caused by lack of enough stars in the Star Tracker Field-of-View.

The fuel consumption over the period between 07/11/2003 and 14/11/2003 was 0.094Kg. The remaining propellant is in the order of 173.99 Kg on the 14th of November.

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**. There have been some effects during the last weeks due to the solar storms, which are currently on-going. A preliminary assessment of the solar arrays indicated a degradation of about 0.2A on each panel as a result of the storms.

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 identified.

3.1.5 RF

The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

3.2 Payload

3.2.1 SPI

The overall status of the instrument is nominal.

During the reporting period, up to the end of rev.131, 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.

At radiation belts entry of rev.131, at 23:30z on 11th Nov, the instrument was configured to start the annealing procedure.

The completion of the 3rd Ge detectors annealing is planned on 27th November.

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 is 134 pkts/8sec. The observation period was characterised by the tail of the exceptional solar activity of the previous two weeks. For all the observation period the unit was in SCI Standard Mode. The unit detectors are progressively recovering the nominal count-rates after the high radiation event (see IBIS S1 plots in the detailed part). Since rev 132 the TM bandwidth assigned is 164 pkts/8sec in order to cope with the increased background, avoiding saturation of the bandwidth with consequent gap in the scientific data production.

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 operations in revolutions 130 and 131 and 16 packets/cycle during science observations in revolution 132.

Due to high background radiation levels as reported by the IREM radiation monitor counters, JEM-X2 made one autonomous transition to Safe mode and therefore was not in its planned observation mode during the following time period:

- 2003-11-12T18:38Z to 2003-11-12T21:11Z.

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 this period OMC operations were performed from the automatic Timeline, with the TM allocation to OMC of 5 packets/cycle during normal science operations.

A total of 110 images were captured during this period, with 3 missed due to AOCS or ground station problems.

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

3.2.5 IREM

The status of the unit is Nominal.

The observation period was characterised by the tail of the exceptional solar activity that interested the Earth in the period end of October-beginning of November. The major effect observed was the modification of the Radiation Belts in shape and max value reached. The outer part (electrons) suffered the depletion caused by the solar wind on the geomagnetic field, while the inner part (protons) changed the typical slope due to the peculiar INTEGRAL orbit.

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

4 Ground Facilities

Some problems with Radio Frequency interference were experienced this week. Also a few problems with disc-space on the consolidator, and IMCS occurred.

4.1 Mission Operations Centre

There were some problems with the MOC recorded this week:

- The TMD on sun122, crashed.
- The consolidator had a problem, with disk space.
- Minor problems sending data to the ISDC.
- Disk space problems on IMCS-A.

4.2 Ground Stations & Network

See anomalies below.

4.3 Science Ground Segment

4.3.1 ISOC

This report covers to end of week 46.

1. Mission planning

Short term PSF: Received up to rev. 136

Long term PSF: up to rev. 150

POS and POD generated: up to rev 136

TSF: Up to rev 133.

No replanning this week

2. Observation status

No ECS's received this week. Still exist up to rev 118 except for rev's 81 and 84. Consequently no OCSs generated this week.

3. ISOC science archive

No archive data received from ISDC. Preparation in VILSPA of final delivery of version 1. Delivery now planned no later than week 48.

4. System

The ISOC operational system continues to be very stable. Final acceptance testing of ISOC system version 10 is completed this week. Detected problems will be fixed and reverified early next week. The acceptance testing has been performed on new LINUX server. This server will be installed on the operational network as soon as acceptance testing is finished. Some network reconfiguration is required as a result of the new hardware move. Expect that version 10 becomes operational during the course of next week.

5. Problems

none

6. AO 2 preparation

Updating of the proposal data base with the results of the TAC process has started. Output from two out of four panels entered. Once all panel results are entered amalgamation can be started. Galactic plane scan (GPS) implementation has been agreed. It will be implemented in a slightly different way in AO 2. Galactic Centre deep exposure (GCDE) is significantly more complex than the AO 1 one. This requires a very different implementation. This has been discussed and agreed within ISOC this week.

4.3.2 ISDC

On 18/11/2003, the status of ISDC observation processing is:

- Latest Standard Analysis completed: observation 01200160003 (SGR1806-20, Revolution 108-110) on 01/11/2003
- Latest products archived: observation 01200160003 (SGR1806-20, Revolution 108-110) on 17/10/2003
- Latest observation products sent to the observer: observation 01201140002 (IC 4329A, Revolution 104) on 31/10/2003

5 Special Events

Nothing to report

6 Anomalies

New anomalies raised during the past week are listed below:

Starting on DoY 311, at 23:45, a star tracker command failed release due to a lack of TM from DSS-16, probably caused by RFI. The timeline was stopped, and was not re-enabled until 01:19 on the following day. The impact was pointings 01300042 & 01300043 were missed.

On DoY 312, at 05:13, there were some bad TLM frames from Redu, no impact.

Also, on DoY 312, at 20:13, the TMD on sun122, crashed, in the log, it read: 'No handler for Exception'.

Later, at 16:27, the consolidator machine's (IDDA) status was red, due to low disk space, this was cleaned up, no impact.

From 19:19 to 19:47, there were problems sending data to the ISDS, computer restarted IFRD & ISDS, curing the problem.

At 23:39, there was a 3 second drop in VC7 TM from DSS-24, no impact.

On DoY 315, at 05:08, there was a bad frame from Redu, later, at 07:04, there were Reed-Solomon alarms, no impact.

At 19:35, after the station handover to DSS-16, the AOCS commands failed to get on-board, causing the loss of pointing 01310045.

At 21:09, the VC0 & VC7 TLM from DSS-16, was lost, and at 21:11, the TC was lost as well. At 21:28, the links returned, no apparent impact.

During this evening (DoY 315), there were problems with CD production. TMAN and ARCH were down on IDDA, and there was also very limited free space on the hard-disk.

On DoY 316, there were frequent brief drops in TLM from Redu, due to the on-going playbacks, no impact.

On DoY 317, at 03:50, the IDDA was again showing problems with disk space.

Later at 21:04, there was a late handover to DSS-16, after that, at 21:18, there were TM drops due to RFI, which recovered at 21:50. Nothing was lost, as there was still coverage from Redu.

On DoY 318, at 03:40, imca, showed yellow, due to low space space, the MCS IFTS was restarted without effect, then the OBS IFTS was restarted, which recovered the situation, at 04:40, the IMCS-A, showed green.

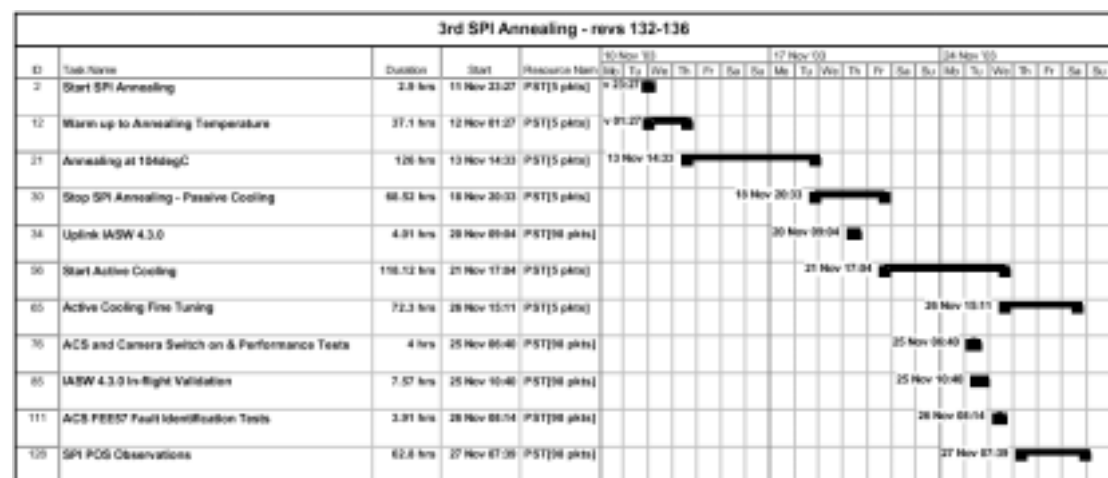
Later, at 18:55, after the handover to DSS-16 from Redu, there were again problems with TM reception, which eventually recovered at 19:27. Redu was still receiving good TM, so no impact.

Arid	Date Occurrence	Subject	Segment	Status
INT - 002506	11/11/2003	Telemetry loss from DSS-16 due to RFI DR: G103635	Ground	NASA Sta.
INT - 002507	11/11/2003	TMAR task on MADDS stopped running	Ground	IMCS
INT - 002509	12/11/2003	Problems to establish TC link at station handover	Ground	NCTRS
INT - 002510	12/11/2003	Lost TC and TM link via Goldstone's DSS-16 DR G103656	Ground	NASA Sta.
INT - 002511	14/11/2003	Telemetry loss from DSS-16 due to RFI	Ground	NASA Sta.
INT - 002512	14/11/2003	Late handover to DSS-16 DR G103676	Ground	NASA Sta.

7 Future Milestones

The 3rd SPI annealing has started and will last until 27th November (revs 132 and 136). The annealing timeline includes 126.5hrs annealing time, the patch and the in-flight validation of the IASW 4.3.0 and a few additional tests to investigate the FEE57 anomaly.

Here follows the summary view of the timeline:



Planned for DoY 324 at around 16:55:00 is the OMC Fast Monitoring test, which should take about 20 minutes.

Planned for DoY 325 at around 07:30, is the latest VETO patch, (version 3.1.0)

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 131

The observations in revolution 131 began with a staring observation of X1916-053 (RA 19:18:48.01; DEC -05:14:08.6) lasting ~23 hours. This was followed by a raster dithering observation of 0716+714 (RA 07:21:53.45; DEC +71:20:36.4), which was amalgamated with observations of mkn3 (RA 06:15:36.30; DEC +71:02:15.1) and mkn6 (RA 06:52:12.25; DEC +74:25:37.5), and was performed for the remaining ~35 hours of observation time.

Throughout these observations, 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.

Revolution 132

In revolution 132, a raster dithering observation of 0716+714 (RA 07:21:53.45; DEC +71:20:36.4), which was amalgamated with observations of mkn3 (RA 06:15:36.30; DEC +71:02:15.1) and mkn6 (RA 06:52:12.25; DEC +74:25:37.5), was performed for the entire duration of observation time (~61 hours).

Throughout this observation, SPI was in Configuration mode and was undergoing annealing, JEM-X1 remained in Safe mode and IBIS, JEM-X2 and OMC were in their nominal science modes. The TM allocation was 164 IBIS, 5 SPI, 1 JEM-X1, 16 JEM-X2, 5 OMC.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

The latest entries in the history file for INTEGRAL

2003-10-22T07:41:23.000Z	174.3097	F	Automatic TM processing.
2003-10-25T00:59:22.000Z	174.2961	F	Automatic TM processing.
2003-10-25T07:30:34.000Z	174.2745	F	Automatic TM processing.
2003-10-28T00:33:29.000Z	174.2498	F	Automatic TM processing.
2003-10-28T07:18:18.000Z	174.2291	F	Automatic TM processing.
2003-10-30T12:46:07.000Z	174.1999	F	Automatic TM processing.
2003-11-01T09:50:52.000Z	174.1850	F	Automatic TM processing.
2003-11-01T12:04:12.000Z	174.1420	F	Automatic TM processing.
2003-11-03T06:55:38.000Z	174.1230	F	Automatic TM processing.
2003-11-05T22:11:12.000Z	174.1048	F	Automatic TM processing.
2003-11-06T06:48:01.000Z	174.0819	F	Automatic TM processing.
2003-11-07T17:22:21.000Z	174.0727	F	Automatic TM processing.
2003-11-09T06:46:41.000Z	174.0543	F	Automatic TM processing.
2003-11-10T08:38:27.000Z	174.0111	F	Automatic TM processing.
2003-11-12T06:40:00.000Z	173.9877	F	Automatic TM processing.

This report was generated Fri Nov 14 08:00:10 GMT 2003

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, 25 Open Loop Slews, 102 Closed Loop Slews and 3 Momentum Bias were executed. 4 slews were missed or executed manually. This is equivalent to a 3.1%.

08/11/03 (Day of Year 312, Revolution 130)

Slews missed due to drops in TM (Goldstone DSS-16): Intermittent drops in TM, which were being experienced since the beginning of the Goldstone pass finally resulted in failure in the uplink of AOCS commands and stopping of the Timeline. We were already warned of possible RFI during the pass. Slews/pointings 01300042 and 01300043 were missed. After re-establishment of the TM link, an Open Loop slew was manually performed to the attitude of pointing 01300044. This attitude was reached before the planned time in the Timeline and therefore pointing 44 was not affected.

09/11/03 (Day of Year 313, Revolution 130-131)

Wraparound of the CDMU LOBT: The second CDMU LOBT wraparound occurred at 2003.313.10.20.36. Before the wraparound the ACC OEM buffer was reported and then reset. No OEMs were generated during the event. After the wraparound, an ACC time verification was done.

10/11/03 (Day of Year 314, Revolution 131)

Slews missed because of failure in attitude determination due to Sparse Field: After completion of Open Loop Slew 01310008, the flight Dynamics system failed to determine the attitude because it could only find two suitable stars in the STR FoV. With the current settings, the FDS requires that at least four stars be found in the mapping, three of which should match the catalogue. The effect was that corrective Open Loop slew 01310009 was performed without being updated. The AOCS commanding was then stopped and corrective Close Loop slew 01310010 was also missed. These two slews were intermediate corrective slews of a Dog-Leg manoeuvre to slew from the attitude of an staring observation to the starting attitude of exposure 01310003. Therefore, the event did not affect science observations. The Flight Dynamics team then determined the attitude with the two available stars and it was decided that the achieved attitude was good enough to continue the Dog-Leg manoeuvre by updating the parameters of slew 01310011 and letting it run from the Timeline.

11/11/03 (Day of Year 315, Revolution 131)

Slew Missed due to late establishment of TC link after Station Hand-Over: Late establishment of TC link after station hand-over (REDU to Goldstone DSS-16) caused uplink failure of AOCS commands and loss of slew/pointing 01310045. After the TC

link was established, a manual Close-Loops Slew was performed to the attitude of pointing 01310045. Slew 01310046 was performed from the Timeline.

12/11/03 (Day of Year 316, Revolution 131-132)

Nothing to report.

13/11/03 (Day of Year 317, Revolution 132)

Nothing to report.

14/11/03 (Day of Year 318, Revolution 132)

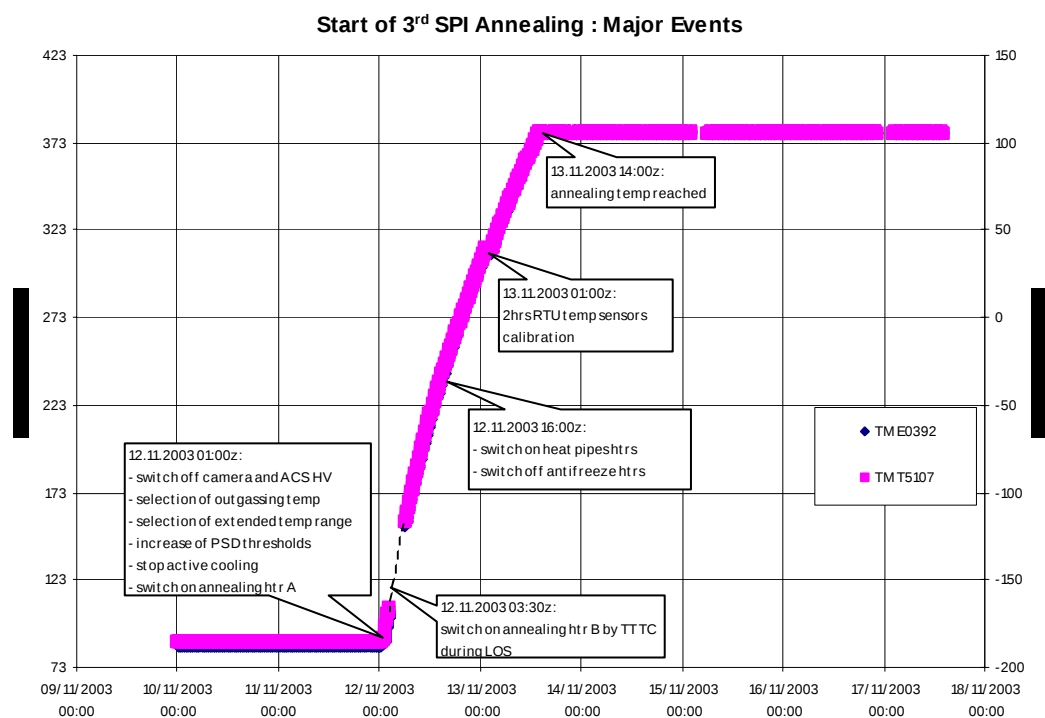
Nothing to report.

8.3.2 SPI Operations

Cryo-cooler / GeD cold-plate:

Up to the start of the annealing procedure, the cryo-cooler performance was nominal, maintaining the temperature at 85K +/-1K. At annealing start-up the four compressor strokes were run down to zero and the CDEs (Compressor Drive Electronics) put in stand-by.

The major events of the annealing start procedure are summarized in the following plot.



IASW/DPE:

Nothing to report.

ACS:

The ACS High Voltage power supplies were switched off at the annealing start-up.

AFEE :

The detector High Voltage power supplies were switched off at the annealing start-up.

DFEE:

Nothing to report.

PSD:

The event trigger threshold was increased to avoid the potential crash of the PSD computer due to the high level of noise when the detector is heated up for annealing.

8.3.3 IBIS Operations

On DOY 312 (08/11/03), at 19:41, after the recovery on DoY 310-311 and a monitoring period of 24 hours the IBIS s/s was enabled in the automatic Timeline.

On DOY 313 (09/11/03), at 10:05 the OR-108 was executed to prepare the unit for the OBT counter wrap-around. The instrument performed a transition to Stand-By Mode and time synchronization with the COBT(Central On Board Time). At the end of the wrap-around activity the CCCF was enabled and the instrument went back in SCI Standard Mode.

At 20:27, the VETO lateral and Bottom counter reported OOLs. The relevant TM_paras G6062-63 showed values inside limits and therefore the problem has been disregarded, as suggested by the nominal reaction to this OEM.

At 21:38, the TM para G2056 went OOL (SCC). The parameter flagged an overflow of the noisy pixel address in MDU4. The parameter returned within limits the following TM cycle therefore no further action was taken.

On DOY 314 (10/11/03), at 07.39.03 following the activity of DoY 313, a second verification was performed with all the instrument in SCI mode. At this time, IBIS was in Standard Mode, performing an observation, (with Hist downloading). TM utilisation was 134, i.e. all the bandwidth was saturated, due to the continuing high background. The first TC for the verification was sent at 07.39.03Z, the on board counter was incrementing but no report packet was generated and received on-ground.

The operation was repeated and a second TC for the verification was sent at 07.41.02, the on board counter incremented but no report was received;

The operation was repeated a third time at 07.42.23, the IBIS on-board rejection counter increased by 1, no report packet was received and two OEMs were generated

- Class 2 ID 4 <<IBIS1 DPE CSSW INTERNAL ERROR - BUFFER OVERFLOW>>

- Class 3 ID 3 << IBIS1 TC REP TC SBFULL>>

flagging an overflow problem in the ICB sub-buffer ID=0 (= CSSW TC) provoked by the task ID=10 (=RTX task).

The TM para G9046 reported the reason for the rejection to be <<ICB (intercommunication buffer) TC FULL>> in agreement with the OEM: i.e.at that time the ICB sub buffer "CSSW TC" was full (with the two TC pending the execution) and no other CSSW TC was accepted by the CSSW.

After consultation with s/s SOE it was decided to send the test TC (G9043 - test command) for the verification of the communication link with DPE at 08.15.07. Again the two OEMs were generated.

ISDC was informed and no problems were reported on the timing of the scientific packets and for the rest the status of the unit was nominal.

At 08.33.56, it was decided to perform a transition to Stand-By and time verification during a planned RWB (reaction wheel bias) so with no impact on the current observation. Before this activity, in coincidence with the transition from pointing to slew (08.32.12), due to the scheduled RWB, were received on ground two report pkts (with SPID 79103)-----> probably connected to the previous two TCs pending the execution in the buffer and finally executed: the verification times were "13817FFFF" and "13818FFFF"; the TM utilisation during the transition pointing/slew dropped down.

At 08.39.16 another OBT verification command was sent, (with IASW in Stand-By) and the pkt was generated correctly: the verification time was "139BFFFFFF". The difference in the verification time between this pkt and the previous two was ~7 minutes, i.e. the time between the transition pointing/slew and the verification with the IASW in Stand-By.

During the transition to Stand-By, as expected, the TM utilisation dropped down until 36 pkt.

The problems reported above were observed only during SCI Mode and briefly are:

- 1) CSSW was not able to execute the mentioned time verification (and therefore to generate the on request pkt) while the unit is performing an observation activity (TM bandwidth saturation) with high production of scientific packets, saturating the TM;
- 2) ICB "CSSW TC" sub-buffer error (full) when trying to send another time verification command.

The adopted work around was to command an IBIS time verification only after transition to Stand-By.

At 19:18, the TM para G2056 was reported OOL (SCC). The parameter flagged an overflow of the noisy pixel address in MDU4. The parameter went back in limits in the following TM cycle therefore no further action was taken.

At 20:02, the VETO lateral and Bottom counter reported OOLs a few times. The relevant TM_paras G6062-63 showed values within limits and therefore the problem has been disregarded, as suggested by the nominal reaction to this OEM.

On DOY 315 (11/11/03), at 03:37, the VETO lateral and Bottom counter reported OOLs few times. The relevant TM_paras G6062-63 had values inside limits and therefore the problem has been disregarded, as suggested by the nominal reaction to this OEM.

At 06:11, the OEM ID 183 Class 2 <<IBIS1 VETO +5V VOLTAGE OUT OF RANGE>> was reported. The relevant TM_para G6106 showed values inside limits and therefore the problem has been disregarded, as suggested by the nominal reaction to this OEM (FDIR doc). This problem will be fixed with the next VETO patch.

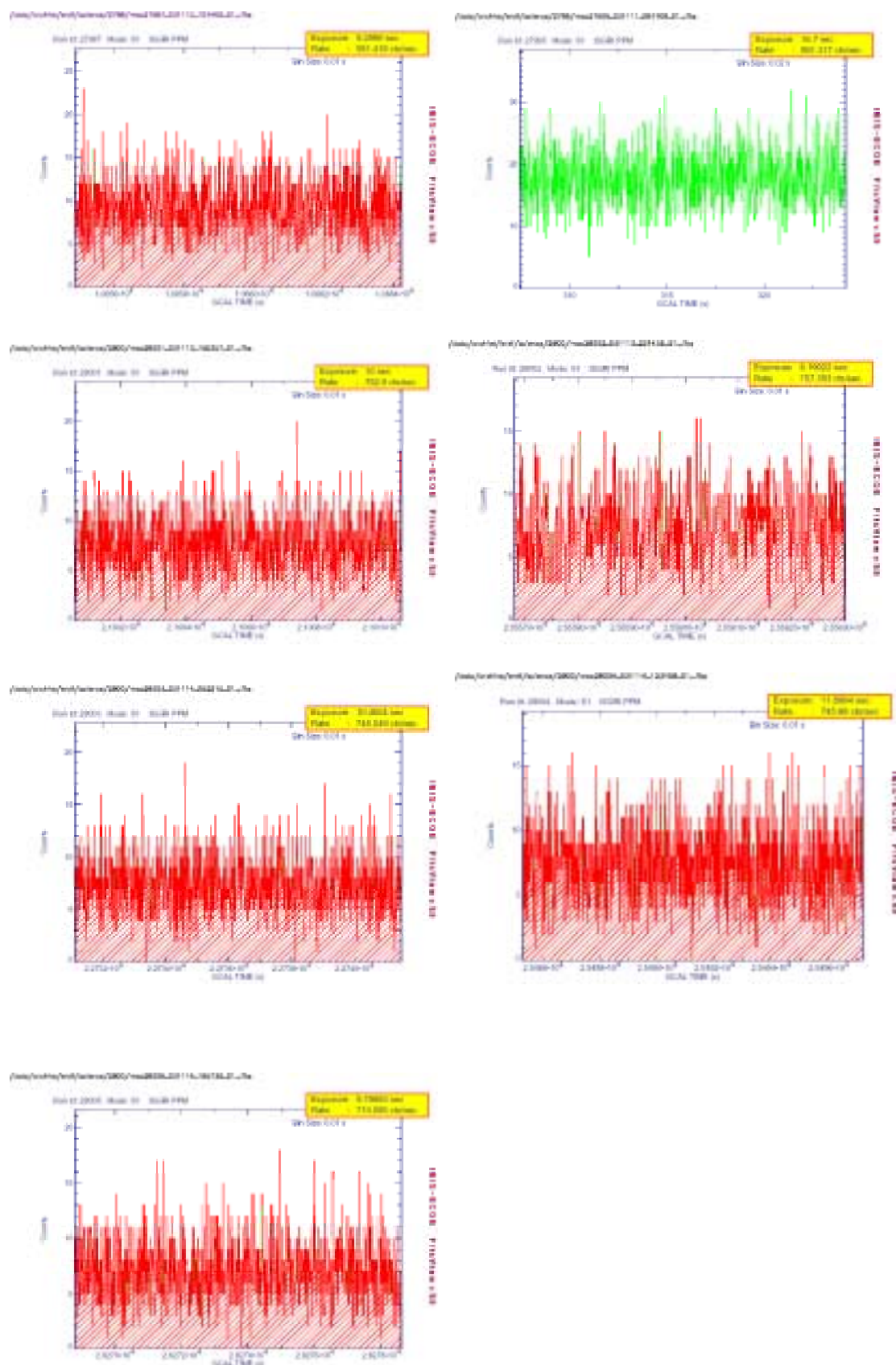
On DOY 316 (12/11/03), there were a few reports during Belt passages of the OEM APID 1280 ID 167 Class 2 <<IBIS1 PICsIT NOISY SEMIMODULE SIGNALLING>> due to the PICsIT detectors being ON without the VETO anticoincidence system, as it required by PIs.

On DOY 317 (13/11/03) at 02:25 the VETO lateral and Bottom counter were reported OOLs few times. The relevant TM_paras G6062-63 showed values inside limits and therefore the problem has been disregarded, as suggested by the nominal reaction to this OEM.

On DOY 318 (14/11/03) at 06:03, the OEM ID 183 Class 2 <<IBIS1 VETO +5V VOLTAGE OUT OF RANGE>> was reported. The relevant TM_para G6106 showed values inside limits and therefore the problem has been disregarded, as suggested by the nominal reaction to this OEM (FDIR doc). This problem will be fixed with the next VETO patch.

The evolution of the IBIS/ISGRI count-rates (S1) post solar activity, as recorded by the IBIS ECOE at ESOC is shown below.

IBIS S1 count-rates evolution



8.3.4 JEM-X Operations

2003-11-08, DOY 312, Rev 130

JEM-X2 began the reporting period performing nominal operations in Data Taking mode.

Between 09:36Z and 22:22Z a JEM-X2 Diagnostic was performed (ending when JEM-X2 was put into Safe mode by the Timeline before entry into radiation belts). During this time, 31 separate Diagnostic Data Dumps were performed. TM parameter L5317 indicated that all events were downlinked between successive dumps and no errors in the TM were reported.

2003-11-09, DOY 313, Rev 130-131

At 10:02Z procedure FCP_JEM2_0041 was executed to put JEM-X2 in Setup mode in preparation for the OBT wraparound.

The OBT wraparound occurred at 10:20:37Z, and at 10:31:17Z TC D3717 was sent to report the CDMU OBT and JDPE2 OBT and it was verified that they were equal.

CCCFs were then enabled in the Timeline and at 10:46Z JEM-X2 returned to Data Taking mode via the CCCF_ED LEDATA01 in the Timeline and the operations continued nominally.

2003-11-10, DOY 314, Rev 131

Nothing to report.

2003-11-11, DOY 315, Rev 131

Nothing to report.

2003-11-12, DOY 316, Rev 131-132

At 18:38Z the following radiation monitoring parameters from IREM went Out of Limits:

K5317 RAD MONITOR 3 (Electron Counter), value = 71
L5317 RAD MONITOR 3 (Electron Counter), value = 71,

causing JEM-X2 to transition to Safe mode autonomously at this time (issuing OEM 231 JEM-X2 AUTO EVENT 1).

At 18:53Z 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.

Once JEM-X2 had remained in Setup mode for about 1.5 hours, the recovery of the unit was performed by first executing procedure FCP_JEM2_0041 (JEM-X2

Transition to Setup) at 20:28Z, followed by the procedure FCP_JEM2_1010 (JEM-X2 Configuration Setting for Science Ops) at 20:39Z.

At 21:11Z JEM-X2 was put back into Data Taking mode by the procedure FCP_JEM2_0044 and JEM-X2 operations continued nominally.

2003-11-13, DOY 317, Rev 132

Nothing to report.

2003-11-14, DOY 318, Rev 132

Nothing to report.

8.3.5 OMC Operations

There were no interruptions this week due to radiation, but 3 science pointings were lost due to S/C or ground station problems.

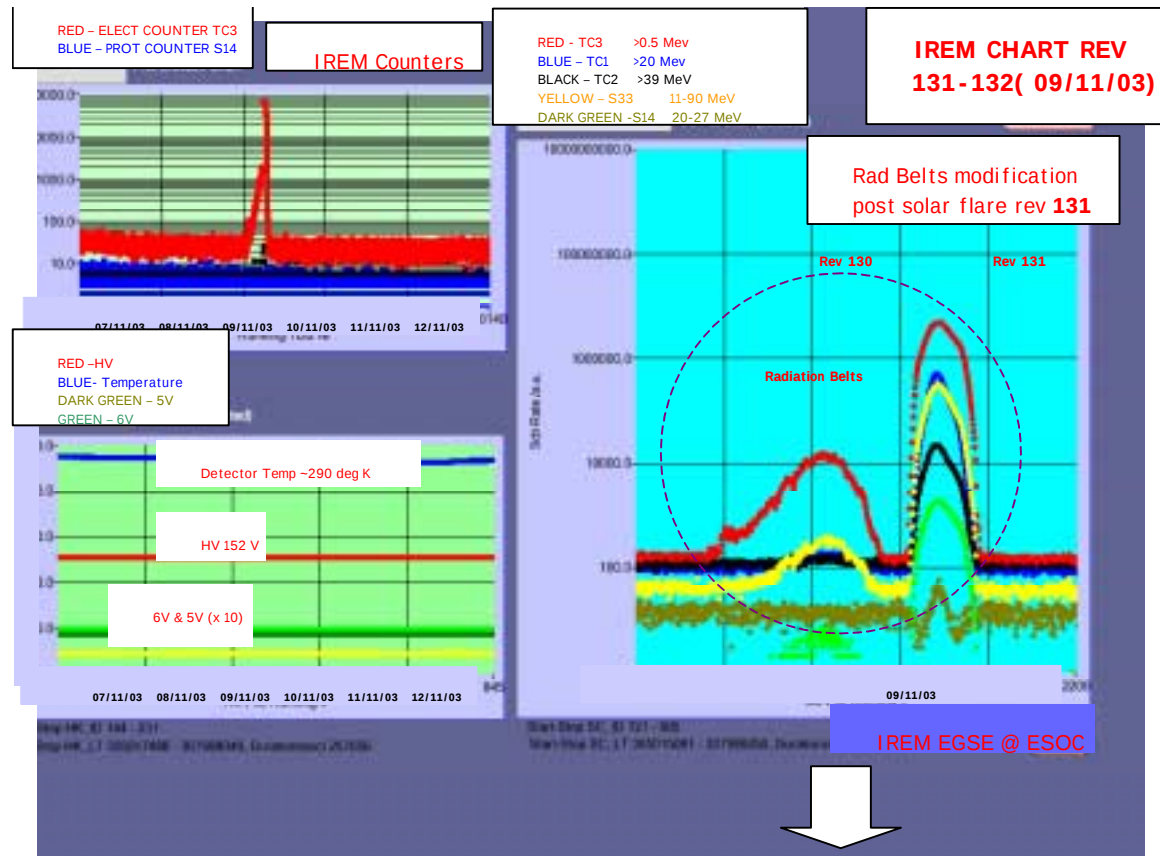
Between 23:45 on DoY 311 and 01:19 the following day, pointings 01300042 & 01300043 were lost due to RFI causing a drop in TM, which in turn prevented the uplink of an AOCS command. During this period, at 00:33, there were 2 rejected OMC commands.

On DoY 315, a station problem prevented commands getting on-board, and caused the loss of pointing 01310045

8.3.6 IREM Operations

Plots of the IREM count rates for the Belts passage in revs 130->131 and 131-132 in comparison with the analogue passage on 9/11/2002 are shown below..

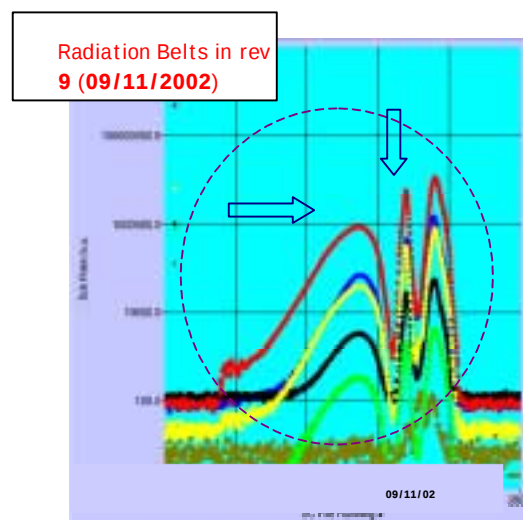
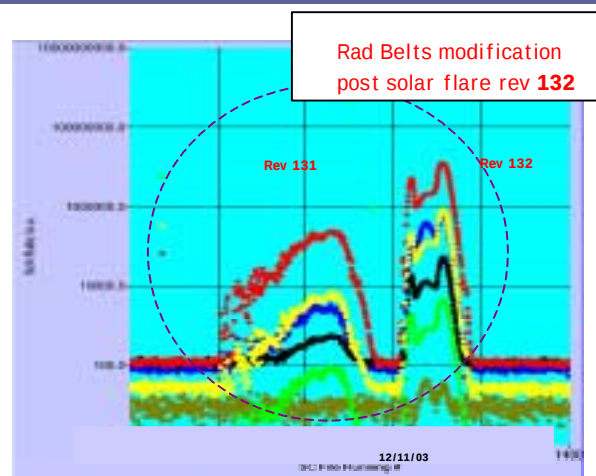
There are indications of the effect of the last solar activity on the Radiation Belts as depletion of the outer part (electrons) due to the "peeling" operated by the solar wind on the geomagnetic field. The Radiation belts inner part (protons) does result, at moment, stable in the population but missing the typical INTEGRAL orbit "fingerprint" observed since the beginning of the mission.



The solar flare was affecting:

- the shape of the inner part (protons) changing the Belts typical passage due to the INTEGRAL orbit;
- the max value of the outer part (electrons), read as "depletion" of the outer shell.

It is expected to come back to typical Belts passages, as for rev 9 below, in the next revs



Doc. Title : INTEGRAL Mission Report # 60
Doc. Ref. : INT-MOC-SYS-RP-1001-TOS-OF
Date : 17/11/03

Issue :1
Rev. : 0
Page : 20