

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 138
Week 19
17.05.05
Routine Phase

Prepared by: M. Walker (OPS-OFO)

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	3
3.1.3	Thermal.....	4
3.1.4	OBDH.....	4
3.1.5	RFS	4
3.2	Payload	4
3.2.1	SPI	4
3.2.2	IBIS	4
3.2.3	JEM-X	5
3.2.4	OMC.....	5
3.2.5	IREM	6
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	8
8	Appendix.....	8
8.1	Overview of Revolutions	9
8.2	Consumables	9
8.2.1	Detailed Fuel Book-keeping.....	9
8.3	Detailed Satellite Information	10
8.3.1	AOCS SUMMARY OPERATIONS REPORT, 07/05/2005 - 13/05/2005	10
8.3.2	SPI Operations.....	14
8.3.3	IBIS Operations.....	18
8.3.4	JEM-X Operations.....	22
8.3.5	OMC Operations	24
8.3.6	IREM Operations	24

DISTRIBUTION LIST

Addressees	Copy	Addressees	Copy
D/OPS		ESA HQ	
G. Winters D/OPS	1	D. Southwood D/SCI	1
W. Frank OPS-O	1		
A. Smith OPS-OF	1	ESTEC	
J. F. Kaufeler OPS-G	1	J. Louet SCI-P	1
N. Bobrinsky OPS-ON	1	A. Gimenez-Canete SCI-S	1
R. Münch OPS-GF	1		
		ESTEC / PG	
M. Schmidt	1	G. Sarri	1
R. Southworth	1		
F. Di Marco	1		
F. Cordero	1		
M. Walker	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
O. Bergogne	1	L. Hansson	1
I. Bayliss	1	E. Kuulkers	1
G. Di Girolamo	1		
F. Dreger	1		
G. Gienger	1	ESTEC/SCI-A	
S. Pallaschke	1	Nicola Rando	1
W. Hell	1		
K.J. Schulz	1	ISDC	
M.A. Larsen	1	T. Courvoisier	1
K. Capelle	1	R. Walter	1
M. Butkovic	1	N. Mowlavi	1
D. Heinzer	1	ISDC Shift Team	1
G. Servoz	1	D. Texier	1
Shift - Coord	1		
Scheduling Office	1	ALENIA	
T. Beck	1	M. Montagna	1
J. Wardill	1	F. Ravera	1
M. Unal	1		
P. Maldari	1	PI / Instrument Teams	
		J. P. Roques – SPI	1
Redu		G. La Rosa – IBIS	1
B. Demellenne	1	P. Ubertini – IBIS	1
		S. Brandt – JEM X	1
Vilspa		E. De Miguel - OMC	1
P. Kretschmar	1	W. Hajdas – IREM	1
		JPL / Goldstone	
		D. Holmes	1
		J. Valencia	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 07.05.05 until 13.05.05 (both dates inclusive) and covers the revolutions 314 & 315.

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 point source NGC2992 (RA + 09:45:42.0; DEC -14:19:35.0), a region identified as FIELD-3 (RA +09:01:34.0 ; DEC +41:33:26.0), a GPS, the point source GRS 1915+105 (RA +19:15:11.5 ; DEC +10:56:44.0) and the Coma Cluster (RA +12:59:48.7 ; DEC +27:58:50.0). The activities consisted of GPS, raster and hexagonal dithering observations.

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.

As part of the periodic AOCS calibrations and in preparation for the summer eclipse season a complete IMUs calibration and health-check was performed on 11/05/2005. In parallel RMU-B was switched on and its overall status was checked. The health checks show that all the IMUs and as well as the redundant RMU are healthy. The ACC IMU drift corrections, as resulted from the calibration, were uplinked on 13/05/2005.

No slews were missed from the Timeline during this period.

The fuel consumption over the period between 04/05/2005 and 13/05/2005 was 0.0922 kg. The remaining propellant is in the order of 161.4585 Kg.

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

3.1.2 Power

The EPS is working nominally, available power from the arrays is of the order of 2100W.

3.1.3 Thermal

The thermal control of the satellite is working well. The temperatures are currently all within the specified operational limits.

3.1.4 OBDH

The OBDH subsystem is working flawlessly. No on-board communications problem was identified.

3.1.5 RFS

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

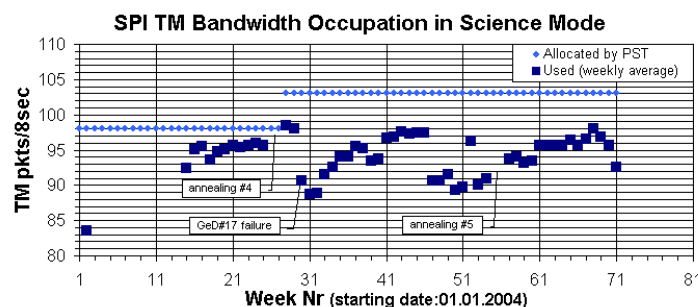
3.2 Payload

3.2.1 SPI

The overall status of the instrument in this week is nominal.

During the reporting period, the instrument has been kept in photon-by-photon mode, with spectra TM enabled, an assigned TM bandwidth in the science observation windows of 103 pkts/cycle and an actual occupation of 92.5 pkts/cycle average. The workaround to the TM leakage anomaly (INT_SC-107) has been resumed, since 11th April.

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



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

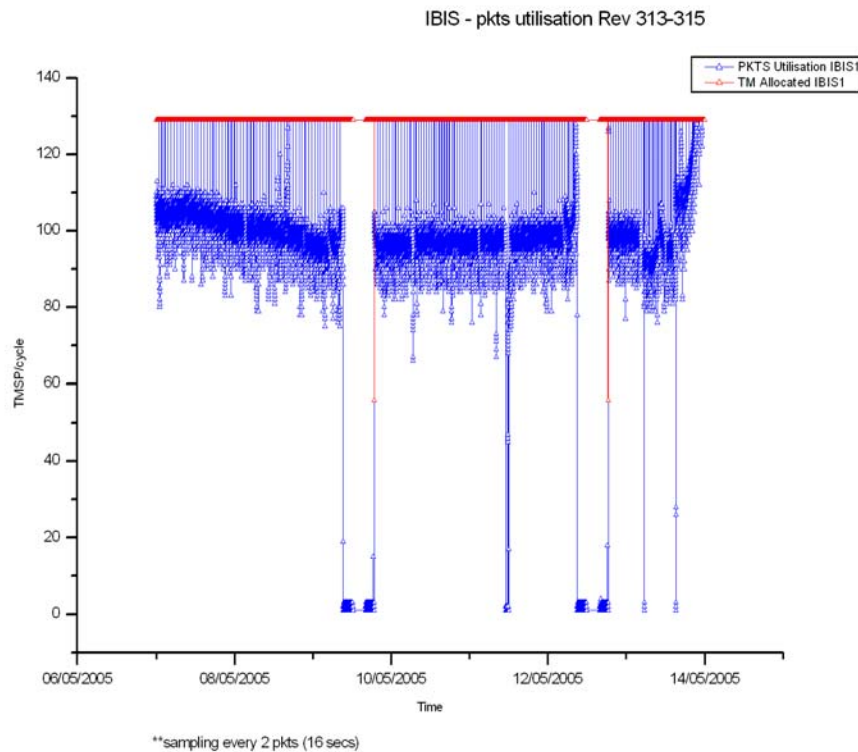
3.2.2 IBIS

The Overall status of the unit is Nominal.

The week was characterised by moderate to high solar activity.

During the reporting period the PST allocation to IBIS was most of the time 129 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 100.94 TMPS/cycle, down 1.16 on last week.

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



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

3.2.3 JEM-X

The status of both JEM-X units is nominal.

JEM-X operations were performed by the automatic Timeline.

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

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

3.2.4 OMC

The status of OMC is nominal.

OMC operations were performed by the automatic Timeline. OMC was operated in Science Normal mode during science observations, with a TM allocation of 5 packets/cycle.

During this reporting period, 156 pointings were executed nominally, 1 was lost.

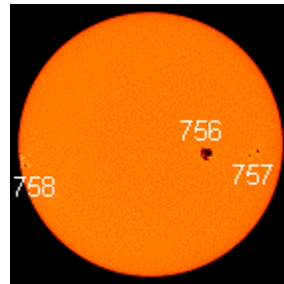
Note: Some more information concerning the OMC operations is provided in the Appendix Section 8.3.5.

3.2.5 IREM

The overall status of the unit is nominal.

Solar Activity

The observation period was characterised by moderate to high solar activity. Sunspot 756 created high radiation on Earth between the 6th and the 8th of May.



Sunspot 758, which was only a “rash” on the 8th of May, became a so-called “big” sunspot, which posed threat for M-class solar flare between the 10th and the 13th of May. In the meanwhile sunspot 759 that appeared on May 9th kept growing and started posing threat for solar flare at the end of the week.

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

4 Ground Facilities

The performance of the Operational ground facilities was very excellent this week, 176 slews were executed correctly, none were lost to ground problems.

4.1 Mission Operations Centre

The performance of the MOC was excellent this week, with no pointings lost. There were minor problems with the Command Releaser, Limit Checker, and Archive tasks, and a disc space problem, none of which impacted operations.

4.2 Ground Stations & Network

The performance of the ground stations and Network was good this week. There were problems with the links to Redu, and an occasion when the DSS-16 carrier was brought up early, but no pointings were lost. The overall performance was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's up to rev 324 have been received. Mission planning for revolutions 322 and 323 generated and sent to MOC. Three ToO requests were received in principle for the same target. Replanning due to an approved ToO has been performed of revolutions 316 and 317. TSF for rev 316 and 317 were received.

2. Observation status

ECS's for revolutions 300 up to 307 were received except rev 301. Corresponding OCS's were sent to ISDC. No extra time was credited.

3. ISOC science data archive

The development of ISDA version 2 is progressing according to plan. This was confirmed in an internal progress meeting. A planning for beta testing has been agreed. This will start on 23 May. A reassessment of the data volumes shows a significant increase due to the size of the revision 2 data. Therefore purchase of more disk memory is initiated.

4. ISOC system

The version 10.9.0 was installed this week. The main new features are a rewrite of the STARMAP tool in JAVA. There is also a change of the calls to the Flight Dynamics routines provided by MOC resulting in an improved performance and a better maintainability. An urgent SPR was also fixed resulting in a second release of Version 10.9.

5. Problems

none.

4.3.2 ISDC

Status of ISDC observation processing on 17/05/2005:

- Latest Standard Analysis completed: observation 03201090013 (Gal. Bulge region, Revolution 299) on 17/05/2005
- Latest products archived: observation 03200650012 (GRO J1655-40, Revolution 289) on 09/05/2005
- Latest observation products sent to the observer: observation 02297000013 (CAS A, Revolution 261-269) on 24/03/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 129, at 05:51, the TC from Redu was lost, at 05:58, the TM also went down. At 06:00, the TM returned, and at 06:01, the TC was back. The cause was put down to DSS16 bring up the carrier too early. The corresponding DR# is G105631.
- At 07:02, the command releaser died, the task was restarted at 07:05. The RMU calibrations for Yaw and pitch had to be re-uplinked, there was no further impact.
- On DoY 130, at 01:04, there was a 1 second drop in VC0 TM from Redu, there was no impact.
- On DoY 131, at 02:29, 11 bad frames were received from Redu, there was no impact.

- At 05:09, the Archive task was not running on sun127 MADDS-B (idda), it was restarted.
- At 05:27, the message EV: Error 'idda'- MADDS-B is not extracting ASF files. Production stopped. At 05:32, the Aux and Arch tasks were restarted on MADDS-B for idda, there was no further impact.
- At 11:07, there was an IREM SEU (No. 22), which caused IBIS and OMC to go to SAFE mode, see instrument reports for details.
- On DoY 132, at 16:36, it was noticed that the OOL display, was not showing all of the OOLs that were being displayed on the b-chain. At 17:05, the problem was cured by stopping and restarting the LIMITS task on the the imca.
- On DoY 133, at 17:30, sun128 was indicating yellow due to low available disc space. At 21:00, after a clean-up, and compression of old Timeline files, sufficient space was created, and the MMI indicated green.

The following anomaly report was entered into the ARTS system.

AR id	Date Created	Subject	Segment	Status
INT_SC-117	02/05/2005	IREM Anomaly: Reset of IREM_CSCI S/W #22, 11/05/2005	Payload	Open
INT-2730	11/05/2005	Error sending data to ISDC	IMCS	Pending
INT-2731	13/05/2005	TM link VC0/7 from DSS-16 had several drops	NASA Station	Closed
INT-2732	13/05/2005	TM link VC0/7 from DSS-16 had several drops	NASA Station	Closed
INT-2733	13/05/2005	LIMIT CHECKER on IMCA failed after server restart	IMCS	Closed

7 Future Milestones

The next Eclipse season will start on 18th May.

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

Upgrade of the IMCS, to use S2K release 3.1, a major update of the MCS is currently undergoing acceptance testing. A date for installation on the operational machines has not yet been decided.

Change of communication protocol to ESA Station from X25 to TCP IP, testing of this change will start in April. 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 314

The observations in revolution 314 started with raster dithering (5x5) observations of the point source NGC2992 (RA + 09:45:42.0; DEC -14:19:35.0) lasting ~ 11.5 hours, followed by a raster dithering observation of the region identified as FIELD-3 (area not covered until now by Integral) (RA +09:01:34.0; DEC +41:33:26.0) lasting ~ 45.9 hours.

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

Revolution 315

The observations in revolution 315 started with raster dithering observations of the region identified as FIELD_3 (RA +09:01:34.0; DEC +41:33:26.0) lasting ~ 9.6 hours, followed by a GPS lasting ~7.9 hours, by an Hexagonal dithering observations of the point source GRS 1915+105 (RA +19:15:11.5; DEC +10:56:44.0) lasting ~ 27.8 hours and ended with raster dithering observations of the Coma Cluster (RA +12:59:48.7; DEC +27:58:50.0) lasting ~10.2 hours.

Throughout these observations all instruments were in their nominal science modes, except from the day 14/05/05 when the high radiation background, due to a solar x-ray flare, forced the payloads in safe condition at the following times:

OMC in Safe at 06:24z;
 IBIS in Safe at 17:48z
 JEM-X in Safe at 17:56z

The instruments remained in Safe condition, due to the persistence of the high radiation condition, until the end of the revolution.

JEM-X2 DFEE remained off along the entire revolution.

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

2005-04-21T18:05:29.000Z	161.7674	F	Automatic TM processing.
2005-04-22T07:26:26.000Z	161.7421	F	Automatic TM processing.
2005-04-24T17:49:45.000Z	161.7361	F	Automatic TM processing.
2005-04-26T04:17:40.000Z	161.7159	F	Automatic TM processing.
2005-04-27T17:36:16.000Z	161.6996	F	Automatic TM processing.
2005-04-29T04:05:16.000Z	161.6378	F	Automatic TM processing.
2005-04-30T17:20:08.000Z	161.6165	F	Automatic TM processing.
2005-05-01T02:16:49.000Z	161.5859	F	Automatic TM processing.
2005-05-03T17:10:09.000Z	161.5719	F	Automatic TM processing.
2005-05-04T12:40:03.000Z	161.5507	F	Automatic TM processing.
2005-05-08T03:44:36.000Z	161.5369	F	Automatic TM processing.
2005-05-09T16:50:00.000Z	161.5324	F	Automatic TM processing.

2005-05-10T06:58:17.000Z 161.4991 F Automatic TM processing.
2005-05-12T16:35:59.000Z 161.4919 F Automatic TM processing.
2005-05-13T04:51:13.000Z 161.4585 F Automatic TM processing.

This report was generated Fri May 13 08:00:23 GMT 2005

8.3 Detailed Satellite Information

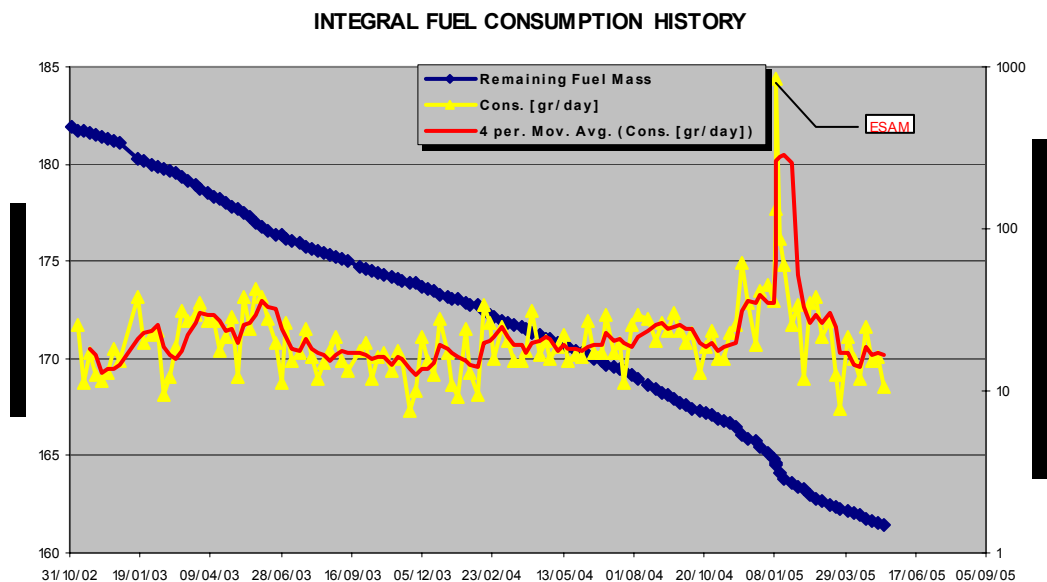
This section contains some detailed information concerning the various subsystems of the satellite and instruments.

8.3.1 AOCS SUMMARY OPERATIONS REPORT, 07/05/2005 - 13/05/2005

AOCS operations were executed from the Automatic Timeline.

During this period, 40 Open Loop Slews, 136 Closed Loop Slews and 6 Momentum Bias were executed. No slews were missed.

The fuel consumption over the period between 01/11/2002 and 13/05/2005 is reported in the plot below.



07/05/05 (Day of Year 127, Revolution 313)

Nothing to report.

08/05/05 (Day of Year 128, Revolution 313)

Nothing to report.

09/05/05 (Day of Year 129, Revolution 313-314)

Nothing to report.

10/05/05 (Day of Year 130, Revolution 314)

Nothing to report.

11/05/05 (Day of Year 131, Revolution 314)

Complete IMU calibration/health-check and RMU-B health-check: In preparation for the summer eclipse season and as part of the periodic AOCS calibrations, a calibration and health-check of IMU 1-2-3-4 units was performed. In parallel, RMU-B was switched on and its overall status was checked. The checks showed that all the IMUs as well as the redundant RMU are healthy. The timeline of this operation as well as the obtained drift and noise levels of the selected IMU channels are presented in the following table:

Time z	Complete IMU Health-Check / Calibration and RMU-B Health Check 11/05/2005 (DoY 131)		
06:52	Verify the end of AOCS TL commanding Disable ACC Autonomous IMU Switch Off, FCP-AOC-1051 <i>Remark for procedure AOC_1051: Step 2.2 the correct TC-parameters setting is A1379=INHIBIT, A1380=ENABLE, A1381=ENABLE Step 3.2 the right TC is that (A2712) reported in sequence and not in procedure Step 3.5 the right TC is that (A2722) reported in sequence and not in procedure</i>		Step 1, IMU1 and IMU3 PID 03140044 Start at 06:45:35Z End at 07:30:02Z
07:00:16	IMU1 Switch On, FCP-AOC-1600 <i>Remark for procedure AOC_1600: Step 4.2 remember to log the IMU time of activation in the IMU lifetime log</i>		
07:10:03	IMU3 Switch On, FCP-AOC-1604 <i>Remark for procedure AOC_1604: Step 4.2 remember to log the IMU time of activation in the IMU lifetime log</i>		
07:14:20	RMU-B switch On, FCP-AOC-1902 <i>Remark for procedure AOC_1902: Step 3.2 refer to RMU-B rates</i>		(AOCS TL commanding start at 07:26:40Z)
	IMUs warm-up time (>30 minutes)		
07:43	Set IMU Selection ACC: IMU1 on Roll, IMU1 on Yaw, FCP-AOC-1050		PID 03140045 Start at 07:31:58Z End at 08:16:25Z (AOCS TL commanding start at 08:12:06Z)
07:50	FDE: IMU1-X on Roll(X), IMU3-Y on Pitch(Y), IMU3-Z on Yaw(Z), FCP-AOC-1218		
08:24:24 08:25:37	Verify the end of AOCS TL commanding Reset IAAD Accumulators, FCP-AOC-1210 Reset FCE RMU Integrators, FCP-AOC-1254 <i>Remark for procedure AOC_1254: Step 2.1 TM verification as follows, A9183(roll rate), A9181(pitch rate), A9956(yaw rate)</i> Perform IMU-1 Drift and Noise evaluation, FCP-AOC-1623		PID 03140046 Start at 08:18:29Z End at 09:02:56Z (AOCS TL commanding start at 08:59:34Z)
08:24:24 to 09:02:56	>35 minutes of data collection From TM: IMU1 Noise Roll = 0.2861as/s IMU1 Drift Roll = 0.2 as/s IMU1 Noise Yaw = 0.0650 as/s IMU1 Drift Yaw = 0.1280	Calculated by FD: => 0.1934 as/s => 0.1249 as/s	Stable pointing: PID 03140046 Start of Slew 03140047: 09:02:56Z

	as/s	
09:10	Set IMU Selection ACC: IMU1 on Roll, IMU3 on Yaw, FCP-AOC-1050	PID 03140047 Start at 09:04:52Z End at 09:49:19Z (AOCS TL commanding start at 09:45:00Z)
09:13	FDE: IMU1-X on Roll(X), IMU3-Y on Pitch(Y), IMU1-Z on Yaw(Z), FCPAOC-1218	
09:16:22 09:18:40	Reset IAAD Accumulators, FCP-AOC-1210 Reset FCE RMU Integrators, FCP-AOC-1254 <i>Remark for procedure AOC_1254: Step 2.1 TM verification as follows, A9183(roll rate), A9181(pitch rate), A9956(yaw rate)</i> Perform IMU-3 Drift and Noise evaluation, FCP-AOC-1623 <i>Remark: compare with values of the previous IMU drift reported in the specific IMU drift file</i>	
09:16:22 to 09:49:19	>33 minutes of data collection From TM: IMU1 Noise Roll = 0.2665as/s IMU1 Drift Roll = 0.2083as/s IMU3 Noise Yaw = 0.1586as/s IMU3 Drift Yaw = - 0.0650as/s	Calculated by FD: => 0.1934 as/s => - 0.0646 as/s Stable pointing: PID 03140047 Start of Slew 03140048: 09:49:19Z
09:57	8.3.1.1 Verify the end of AOCS TL commanding Deselect IMU1 and IMU3 from ACC Word B, FCP-AOC-1050	PID 03140048 Start at 09:51:23Z End at 10:35:50Z
10:00	Deselect IMU1 and IMU3 from FDE, FCP-AOC-1218	
10:03:43	Switch Off IMU1, FCP-AOC-1601 <i>Remark: report the IMU1 on-time in the log</i>	
10:06:54	Switch Off IMU3, FCP-AOC-1605 <i>Remark: report the IMU3 on-time in the log</i>	
10:10	Re-enable ACC Autonomous IMU Switch Off, FCP-AOC-0526 <i>Remark for procedure AOC-0526 Step 4.1 use AND A1004 (not A1005)</i>	
10:15:13	RMU-B switch Off, FCP-AOC-1903	(AOCS TL commanding start at 10:31:31Z)
Thermal stabilisation after IMU1 and IMU3 Switch Off (> 2 hours) PID 03140049-PID 03140050 10:05:00 – 12:20:00		
12:18	Verify the end of AOCS TL commanding Disable ACC Autonomous IMU Switch Off, FCP-AOC-1051 <i>Remark for procedure AOC_1051: Step 2.2 the correct TC-parameters setting is A1379=INHIBIT, A1380=ENABLE, A1381=ENABLE Step 3.2 the right TC is that (A2712) reported in sequence and not in procedure Step 3.5 the right TC is that (A2722) reported in sequence and not in procedure</i>	<u>Step 2, IMU2 and IMU4</u> PID 03140051 Start at 12:10:48Z End at 12:55:12Z
12:27:43	IMU2 Switch On, FCP-AOC-1602 <i>Remark for procedure AOC-1602: Step 2.2.1 do not requested to check if IMU1 is selected for YAW. If for any reason during the calibration, the guide star is lost the controller will switch ON the IMU1: the contingency reaction foresees to switch OFF the IMU2 to avoid thermal problem Step 4.2 remember to log the IMU time of activation in the IMU lifetime log</i>	
12:32:53	IMU4 Switch On, FCP-AOC-1606 <i>Remark for procedure AOC-1606: Step 4.2 remember to log the IMU time of activation in the IMU lifetime log</i>	
12:37	Set IMU Selection	(AOCS TL commanding start at 12:50:56Z)

12:42	ACC: IMU2 on Roll, IMU2 on Yaw, FCP-AOC-1050 FDE: IMU2-X on Roll(X), IMU4-Y on Pitch(Y), IMU2-Z on Yaw(Z), FCP-AOC-1218	
	IMUs warm-up time (>30 minutes)	
13:06:13	Reset IAAD Accumulators, FCP-AOC-1210 Perform IMU-2 Drift and Noise evaluation, FCP-AOC-1623 <i>Remark: compare with values of the previous IMU drift reported in the specific IMU drift file</i>	PID 03140052 Start at 12:57:19Z End at 13:41:46Z (AOCS TL commanding start at 13:37:27Z)
13:06:13 to 13:41:46	>35 minutes of data collection From TM: IMU2 Noise Roll = 0.2472 as/s IMU2 Drift Roll = 0.2122 as/s IMU2 Noise Yaw = 0.0390as/s IMU2 Drift Yaw = - 0.01as/s Calculated by FD: => 0.2217 as/s => 0.0091 as/s	Stable pointing: PID 03140052 Start of Slew 03140053: 13:41:46Z
13:49 13:53	<i>Verify the end of AOCS TL commanding</i> Set IMU Selection ACC: IMU4 on Roll, IMU2 on Yaw, FCP-AOC-1050 FDE: IMU4-X on Roll(X), IMU4-Y on Pitch(Y), IMU2-Z on Yaw(Z), FCP-AOC-1218	PID 03140053 Start at 13:43:50Z End at 14:28:17Z (AOCS TL commanding start at 14:23:58Z)
13:55:20	Reset IAAD Accumulators, FCP-AOC-1210 Perform IMU-4 Drift and Noise evaluation, FCP-AOC-1623 <i>Remark: compare with values of the previous IMU drift reported in the specific IMU drift file</i>	
13:55:20 to 14:28:17	>33 minutes of data collection From TM: IMU4 Noise Roll = 0.2682 as/s IMU4 Drift Roll = - 0.1050as/s IMU2 Noise Yaw = 0.0360 as/s IMU2 Drift Yaw = 0.0174 as/s Calculated by FD: => -0.0973 as/s => 0.0091 as/s	Stable pointing: PID 03140053 Start of Slew 03140054: 14:28:17Z
14:38	Deselect IMU2 and IMU4 from ACC Word B, FCP-AOC-1050	PID 03140054 Start at 14:30:21Z End at 15:14:48Z
14:41	Deselect IMU2 and IMU4 from FDE, FCP-AOC-1218	
14:44:50	Switch Off IMU2, FCP-AOC-1603 <i>Remark: report the IMU2 on-time in the log</i>	
14:47:23	Switch Off IMU4, FCP-AOC-1607 <i>Remark: report the IMU4 on-time in the log</i>	
14:51	Re-enable ACC Autonomous IMU Switch Off, FCP-AOC-0526 <i>Remark for procedure AOC-0526 Step 4.1 use AND A1004 (not A1005)</i>	

12/05/05 (Day of Year 132, Revolution 314-315)

Nothing to report.

13/05/05 (Day of Year 133, Revolution 315)

Update of the ACC IMU drift corrections: Starting at 09:17z, the on-board ACC IMU drift corrections were updated with the results of the IMU calibration, which was performed on 11/05/2005. The uplinked values are shown below:

AEDRA_00 S

M F 12

2005-05-13T16:00:00Z

2005-05-13T16:00:00Z

AAAA1

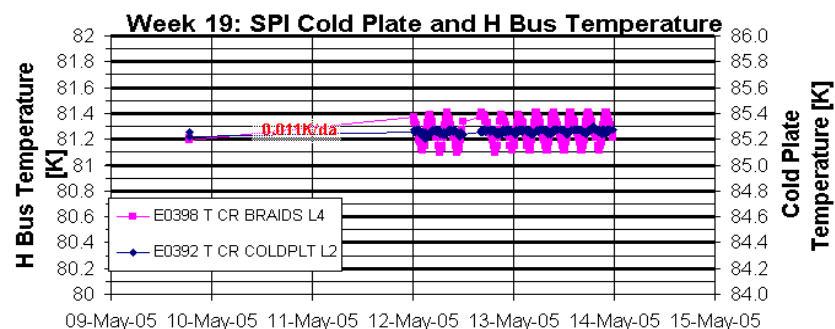
IMU1_R_1 R 0.9376684E-06	r/s	D IMU 1 roll 1
IMU1_R_2 R 0.9376684E-06	r/s	D IMU 1 roll 2
IMU1_Y_1 R 0.6057456 E-06	r/s	D IMU 1 yaw 1
IMU1_Y_2 R 0.6057456E-06	/s	D IMU 1 yaw 2
IMU2_R_1 R 0.1075157E-05	r/s	D IMU 2 roll 1
IMU2_R_2 R 0.1075157E-05	r/s	D IMU 2 roll 2
IMU2_Y_1 R 0.4417622E-07	r/s	D IMU 2 yaw 1
IMU2_Y_2 R 0.4417622E-07	r/s	D IMU 2 yaw 2
IMU3_Y_1 R -0.3133351E-06	r/s	D IMU 3 yaw 1
IMU3_Y_2 R -0.3133351E-06	r/s	D IMU 3 yaw
IMU4_R_1 R -0.4720631E-06	r/s	D IMU 4 roll 1
IMU4_R_2 R -0.4720631E-06	r/s	D IMU 4 roll 2

8.3.2 SPI Operations

Stirling compressors and Cryostat

The performance of the compressors is nominal. The cold plate temperature was maintained at 85K+/-1K over the reporting period, showing the expected positive drift.

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



DPE & IASW:

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

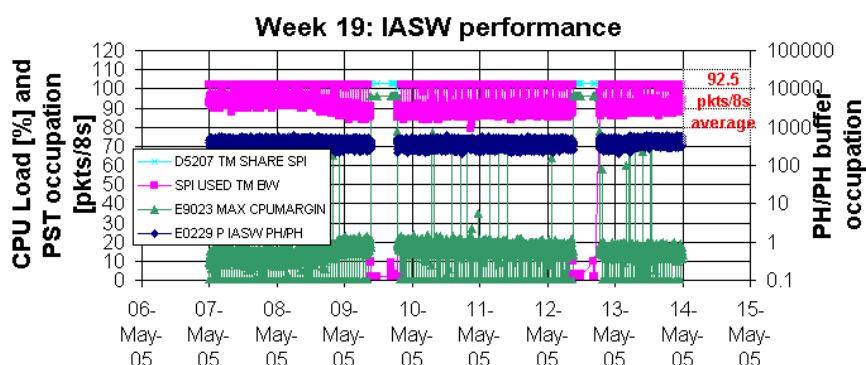
102 pkts/cycle peak (1 pkt/cycle is unused due to TM leakage problem, see after);

92.5 pkts/cycle average in science mode.

The temporary workaround to the TM leakage anomaly (AR INT_SC-107), applied at every revolution, has been resumed since 11th April.

A software patch to fix both the TM leakage malfunction and the missed belts entry ACS HV switch off malfunction (INT_SC-115) is ready: however due to an anomaly in the DPE used for ground testing, validation of the patch is not progressing.

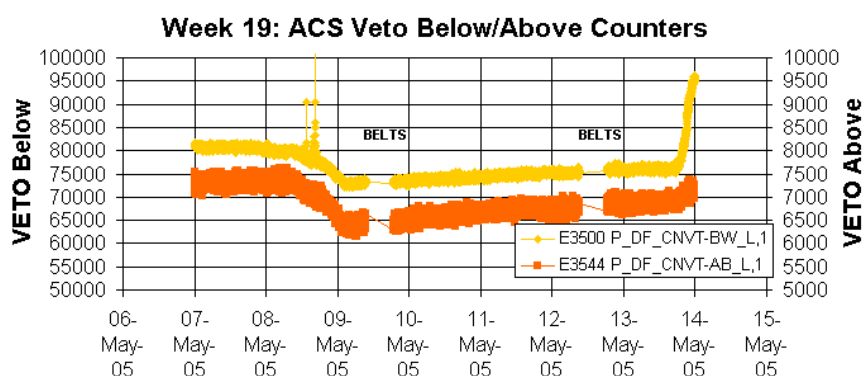
The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period.



ACS

The performance of the ACS is nominal.

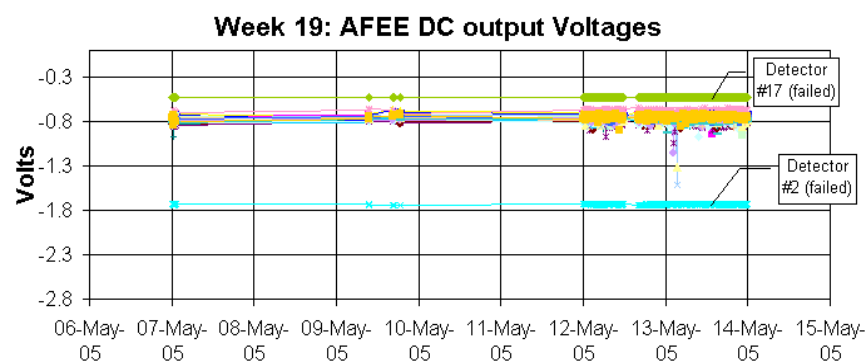
The following plot shows the ACS overall count rate evolution during the reporting period.



AFEE and Germanium Detectors

The performance of the detectors is nominal except for the detector #2, failed since 06.12.2003, and detector #17, failed since 17.07.2004.

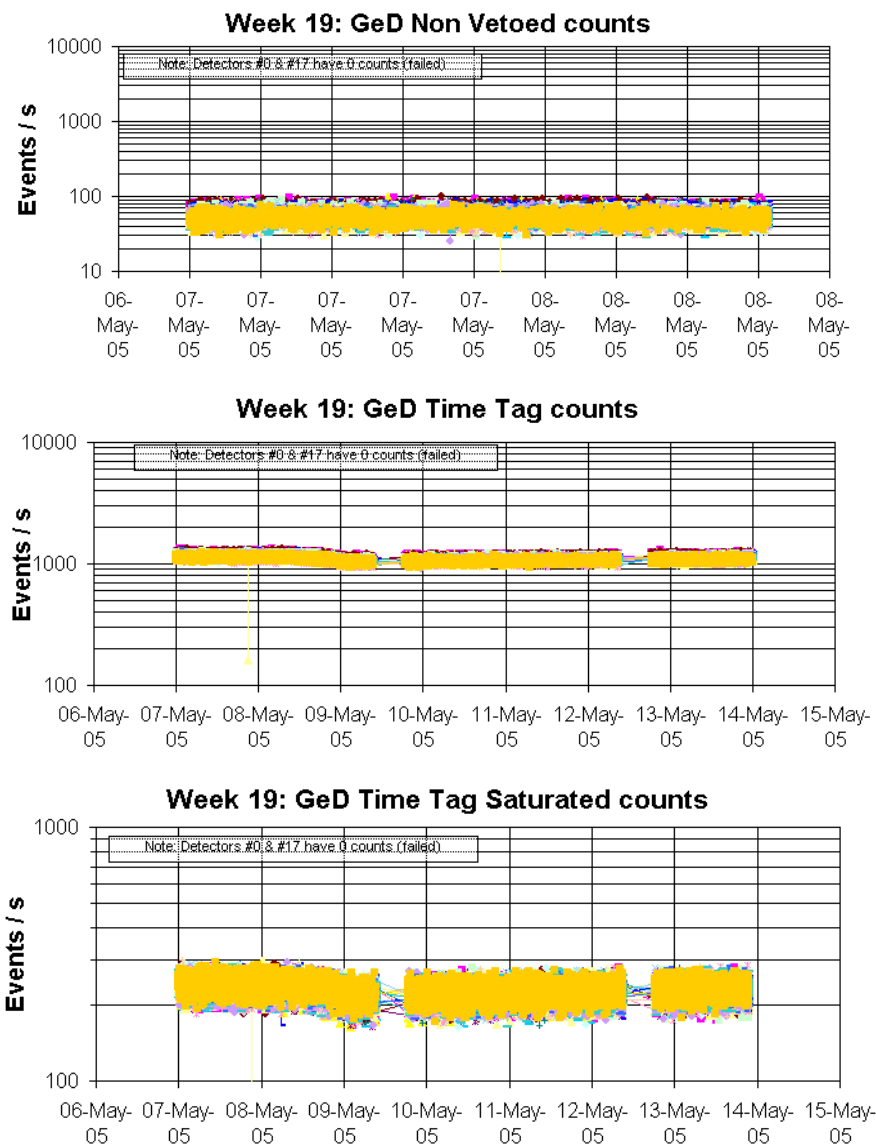
The following plot shows the AFEE dc output signals during the reporting period (due to problems in the TM retrieval tool, the plot is affected by large gaps).



DFEE

The performance of the unit is nominal.

The following plot shows the Non Vetoed event rates, processed by the DFEE during the reporting period. The count rate of each detector is within the expected range, except for the failed detector #2 and #17.

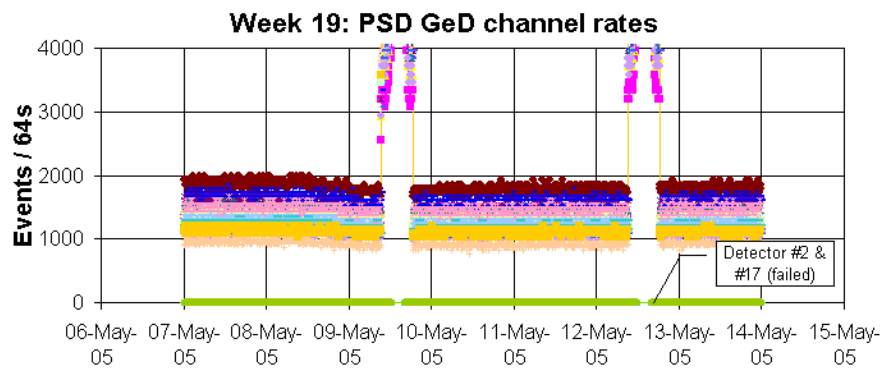


PSD

The performance of the unit is nominal.

Following the execution of OCR#191 (PSD input channels #2 and #17 disable), the channel rates blocking malfunction did not appear again. It was therefore decided to keep this setting.

The following plot shows the PSD channel rates during the reporting period.



SPI DAILY EVENTS

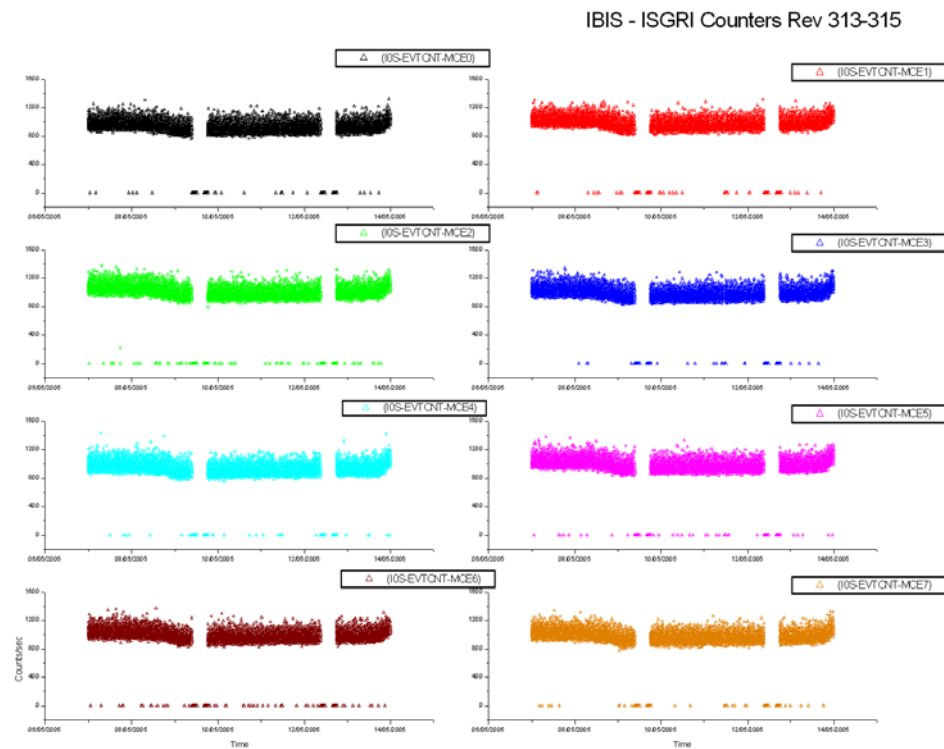
NOTE: The events log is extracted from the revolution pass summary.

DOY Time	Event
126 - 19:10	Man. PST update, INT OR 0190
127 - 07:25	TM E3178 OOL, back in limits @ 07:37
129 - 19:11	Man. PST update, INT OR 0190
132 - 18:47	Man. PST update, INT OR 0190
135 - 07:12	TM E3500 OOL, back in limits @ 07:13
135 - 07:15	TM E3500 OOL, back in limits @ 07:22

8.3.3 IBIS Operations

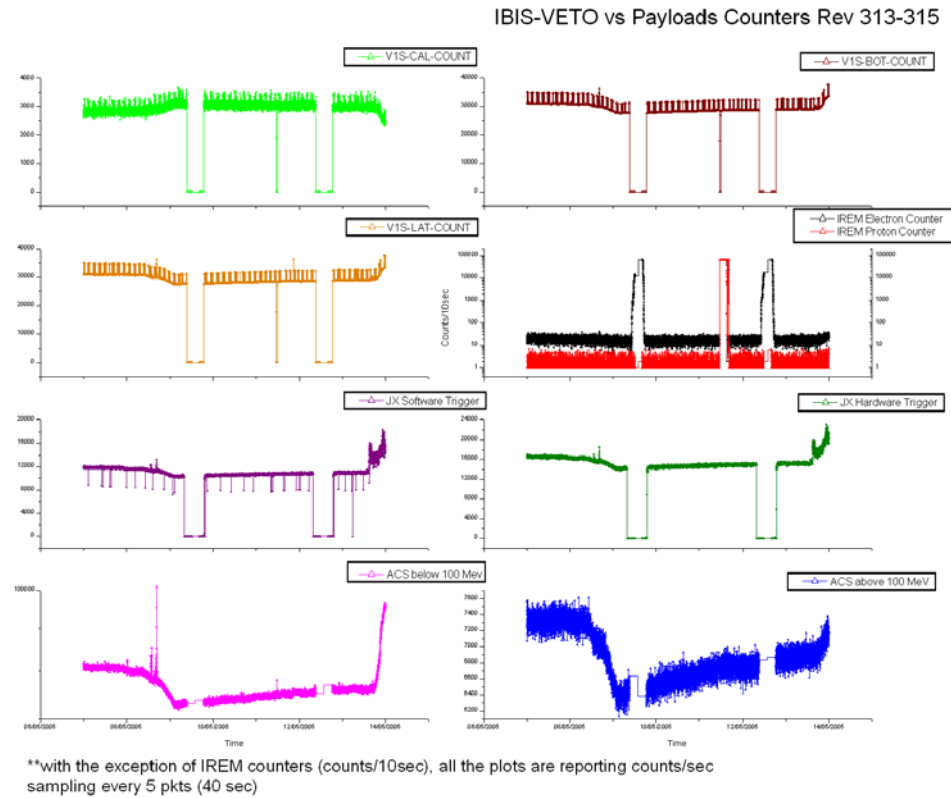
IBIS Events Counters Plots.

ISGRI Counters:



**sampling every 4 pkts (32 secs)

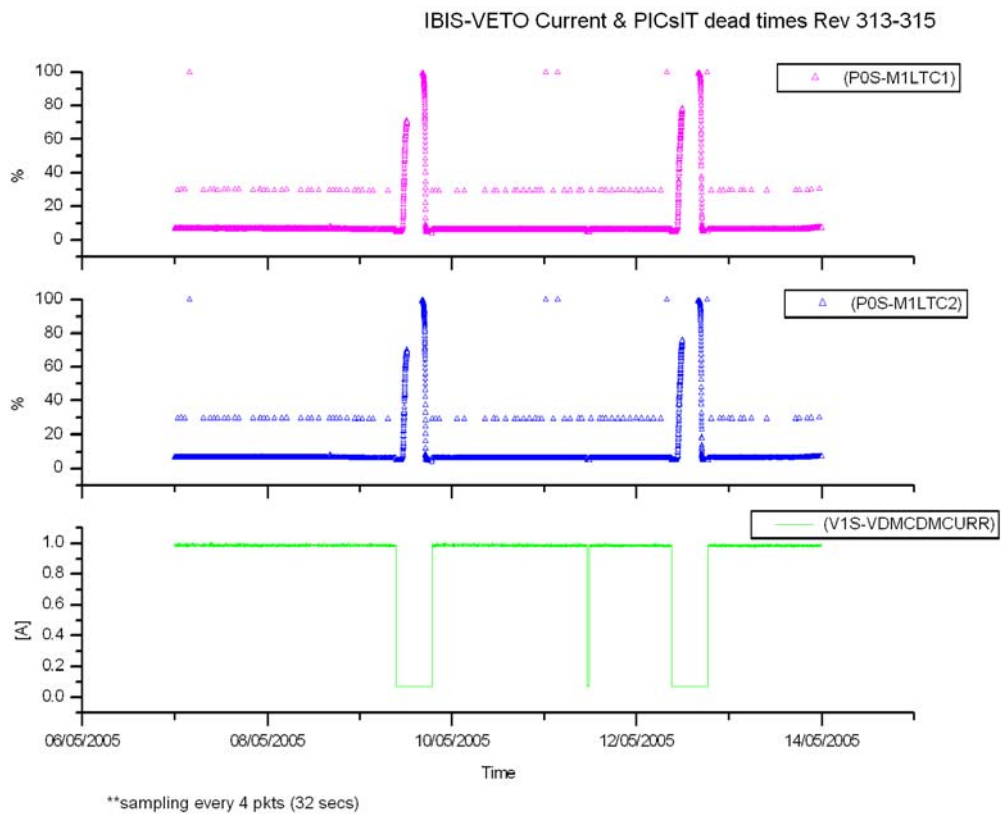
VETO vs Payloads Counters:



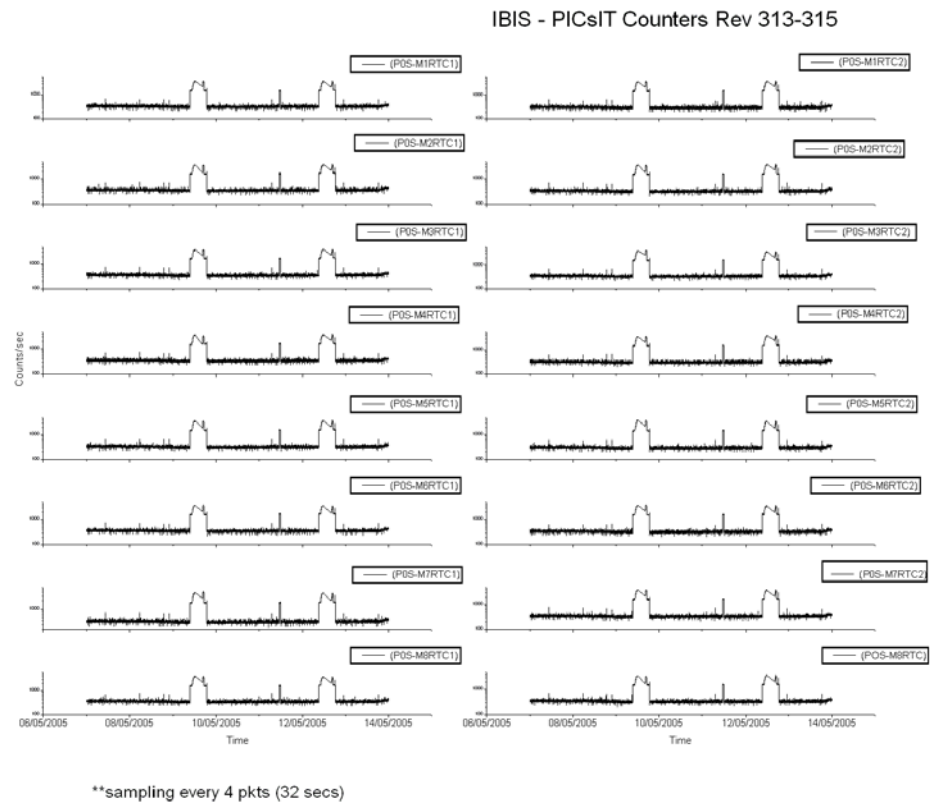
The week was characterised by moderate to high solar activity. From the 6th to the 8th of May, the Payload counters reported high radiation. Similarly, they showed increasing high values at the end of the week.

On Doy 2005.128 (08/05/2005) at 16:22Z, a high background was observed by JEMX, SPI and IBIS. On DoY 2005.131 (11/05/2005) at 11:07Z, an IREM S/W reset (SEU #22) was reported; consequently IBIS automatically switched to Safe configuration (VETO counters to 0).

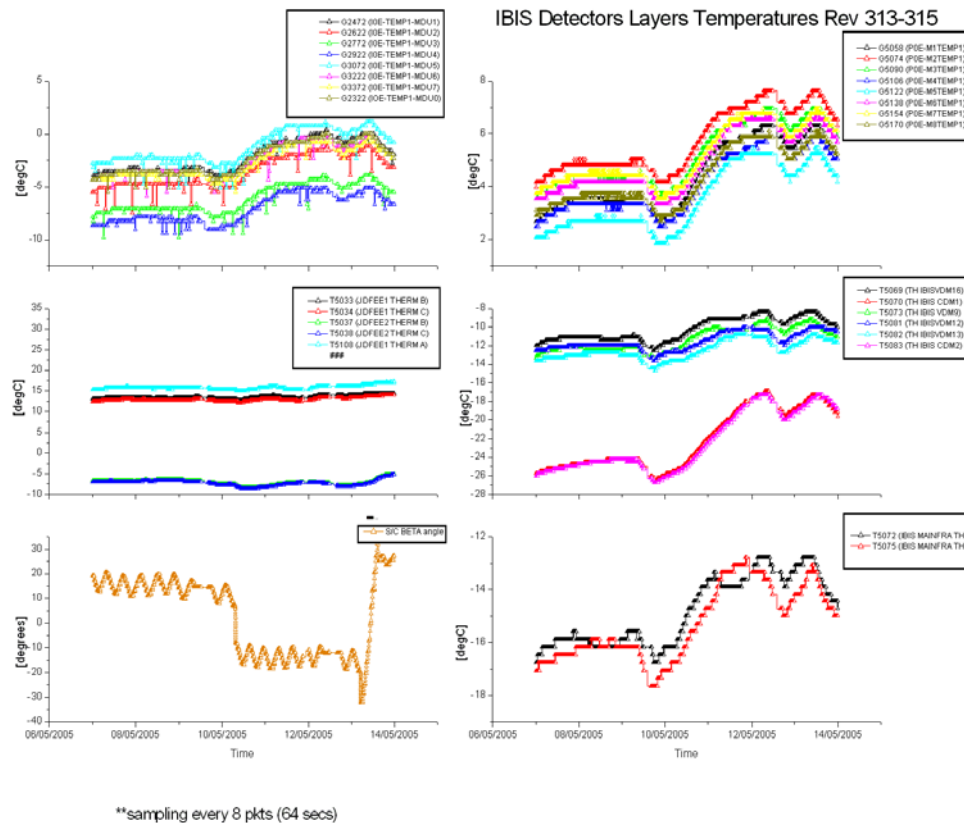
Veto Current:



Picsit Counters:



IBIS Detectors Layer Temperatures:



IBIS daily report

DoY 2005.129 (09/05/2005)

At 09:21Z 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 18:48Z. As this happened close to the radiation belts, according to V-VLT-1 no action was taken.

DoY 2005.131 (11/05/2005)

At 11:07Z an IREM SW failure (SEU #22) forced IBIS to Stand-by mode. Following procedure FCP_IBIS1_0803, IBIS exited this Safe configuration and went back to Scientific Standard mode at 12:05Z thanks to TC G0129.

At 11:07Z 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 11:47Z. No action was taken.

DoY 2005.132 (12/05/2005)

At 09:08Z 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 18:35Z. As this happened close to the radiation belts, according to V-VLT-1 no action was taken.

DoY 2005.133 (13/05/2005)

At 12:32Z the following OEM APID 1280 ID 133 CLASS 2 was reported:
"IBIS1 IASW LSL TRANSFER FAILED (LOW LEVEL) (TOGETHER WITH 11)",
together with OEM APID 1280 ID 131 CLASS 2:
"IBIS1 IASW LSL TRANSFER FAIL REPORT FOR HIGH LEVEL MODULE
RESET"

Similar anomalies were previously reported for ISGRI (MCE 4 on 17/01/2004, MCE 6 on 27/01/2004, MCE 4 on 01/06/2004 and MCE5 on 10/02/2005), but they were followed by a MCE Time Out on-event message.

Analysing parameters of OEM ID 131 revealed that the problem concerned this time VETO (G1581 = 128: IASW sub-instrument address for VETO).

IBIS incurred a timing problem on the LSL that affected the communication with the peripherals. During this time a request for HK1 was sent to VETO without any answer due to the drop in communication between VETO and the DPE. At the contrary of ISGRI similar anomalies, the IASW did not flagged the non-generation of HK1 from VETO as an on-board rejection (time-out) of the internal TC (G1582 = 6: IASW TC ID in OEM ID 131). During this time no valid HK was collected from VETO therefore what was reported in HK1 was simply the IASW default (i.e all 000000... raw). This was confirmed by reading some TM parameters such as the High Voltages, VDM and CDM status, VETO mode and VETO counters, all reporting raw value 0. After few TM cycles, the unit solved autonomously the internal conflict on the LSL and reported the valid HK1 for VETO.

The detailed description of the anomaly, for MCE4, was reported in Weekly Report #69. Moreover a closed AR has been raised in order to keep track of this anomaly INT_SC_113.

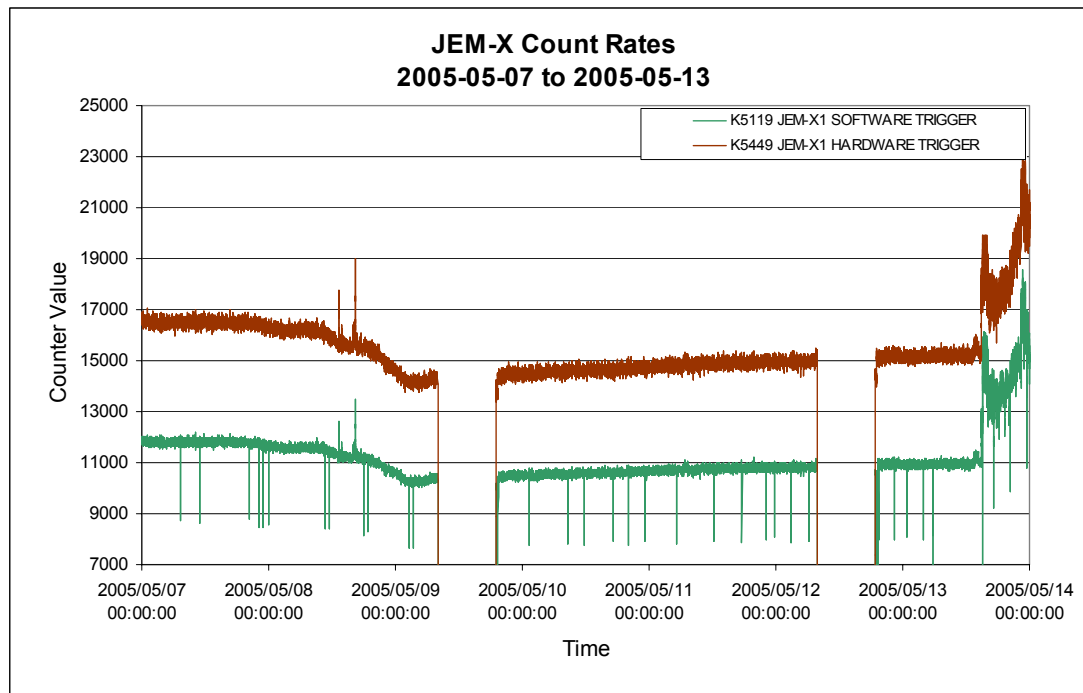
From 21.57Z, TM G6061 ("V1S-CAL-COUNT": VETO calibration counter) has been reported Out of Limit "low-low". The radiation background was high (M8-solar flare) but the IBIS\IREM thresholds not yet exceeded. The reason of this OOL is due to a known problem of the VETO CDM01 FEE not able to follow high count-rates. G6061 was hence monitored until IBIS entered Safe mode automatically when IREM thresholds were crossed on 2005.134.17.48.

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

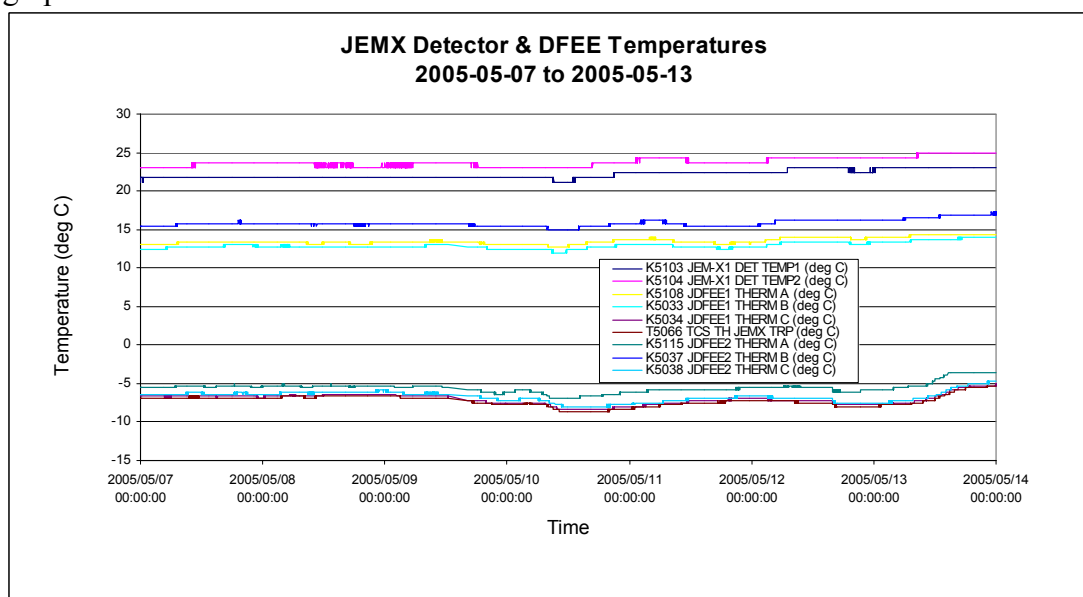
JEM-X count rates over the reporting period are displayed in the following graph¹.

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



8.3.4.2 JEM-X Temperatures

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



8.3.4.3 JEM-X Daily Report

2005-05-09 (DoY 129, Rev 313)

From 07:58 to 07:59, after the KESAFE command, the TM parameter K5002 HVCathode, went out of limits High High, no action was taken.

² Data sampled (1 frame in 8)

8.3.5 OMC Operations

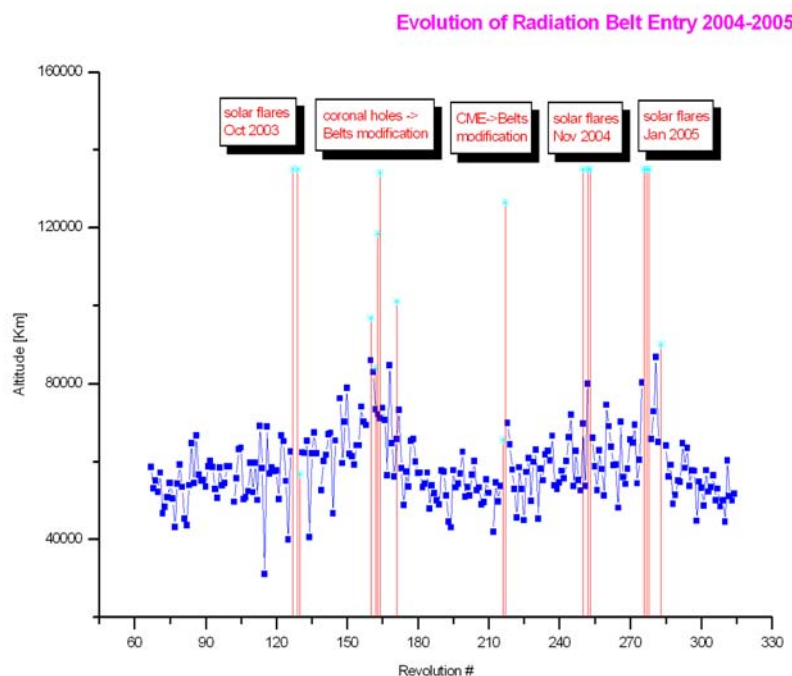
2005-05-11 (DoY 131, Rev 314)

At 11:07:41, there was an IREM SEU (No. 22). This caused OMC to switch immediately to SAFE mode shortly after the completion of pointing 03140049. The unit was recovered to Stand-by at 11.36.44, and was again in SCIENCE mode at 12:11:08. The impact was pointing 03140050 was lost.

On DoY 129 at 09:22:08 and DoY 132 at 09:08:24, OMC was switched by the Timeline to SAFE mode, at the nominal times.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

DoY 2005.131 (11/05/05)

Reported at 11:07Z the local reset of the IREM CSCI S/W (SEU #22): 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) 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 2005.131.11.07.28Z at 144696.6 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 11:18Z 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 16:51Z.

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 12:07Z
- OMC re-enabled at 11:37Z

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]
313	RAD_ENTR R 2005-05-09T09:21:51Z	2005-05-09 10:37:52	49985.1	2005-05-09 10:14:59	52661.25
314	RAD_EXIT R 2005-05-09T18:36:26Z	2005-05-09 17:21:36	>>24919.4	2005-05-09 17:24:59	29144.54
314	RAD_ENTR R 2005-05-12T09:08:01Z	2005-05-12 10:12:00	51775.6	2005-05-12 10:00:37	53149.8
315	RAD_EXIT R 2005-05-12T18:22:57Z	2005-05-12 17:21:20	>>24923.4	2005-05-12 17:20:37	30179.85

Reference

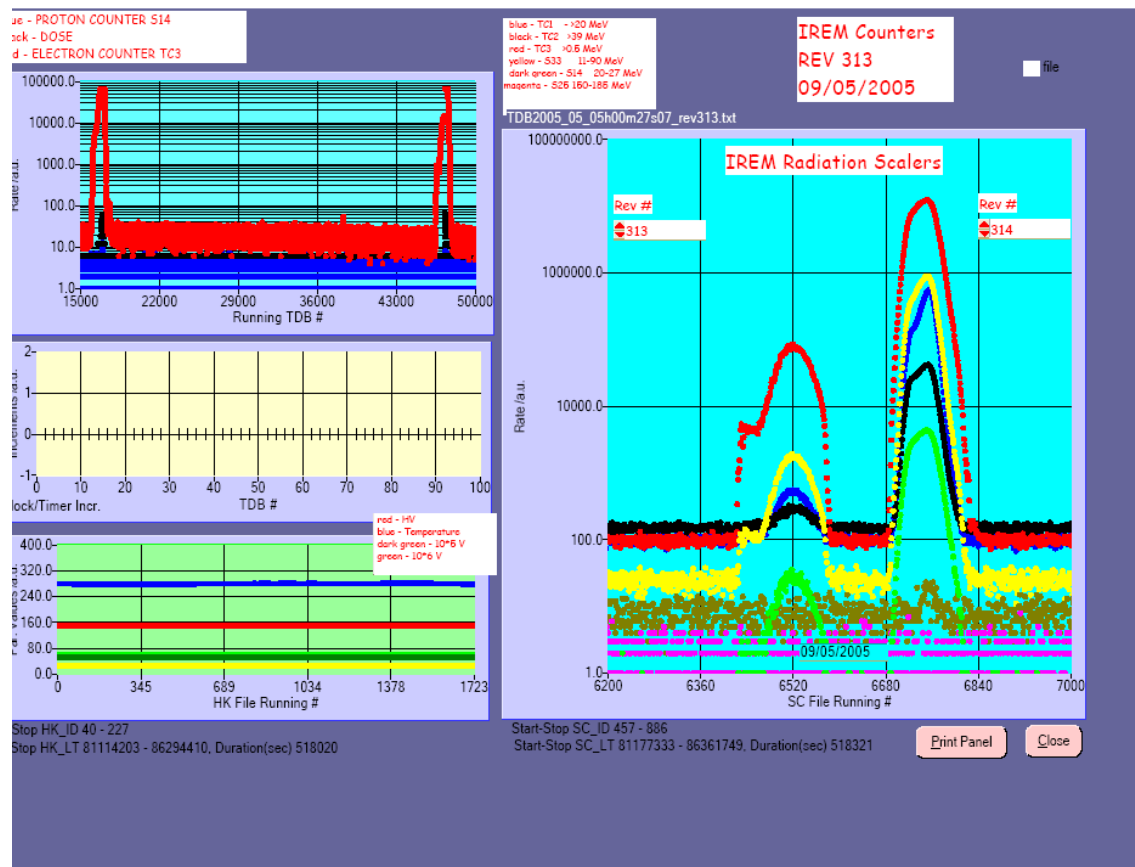
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

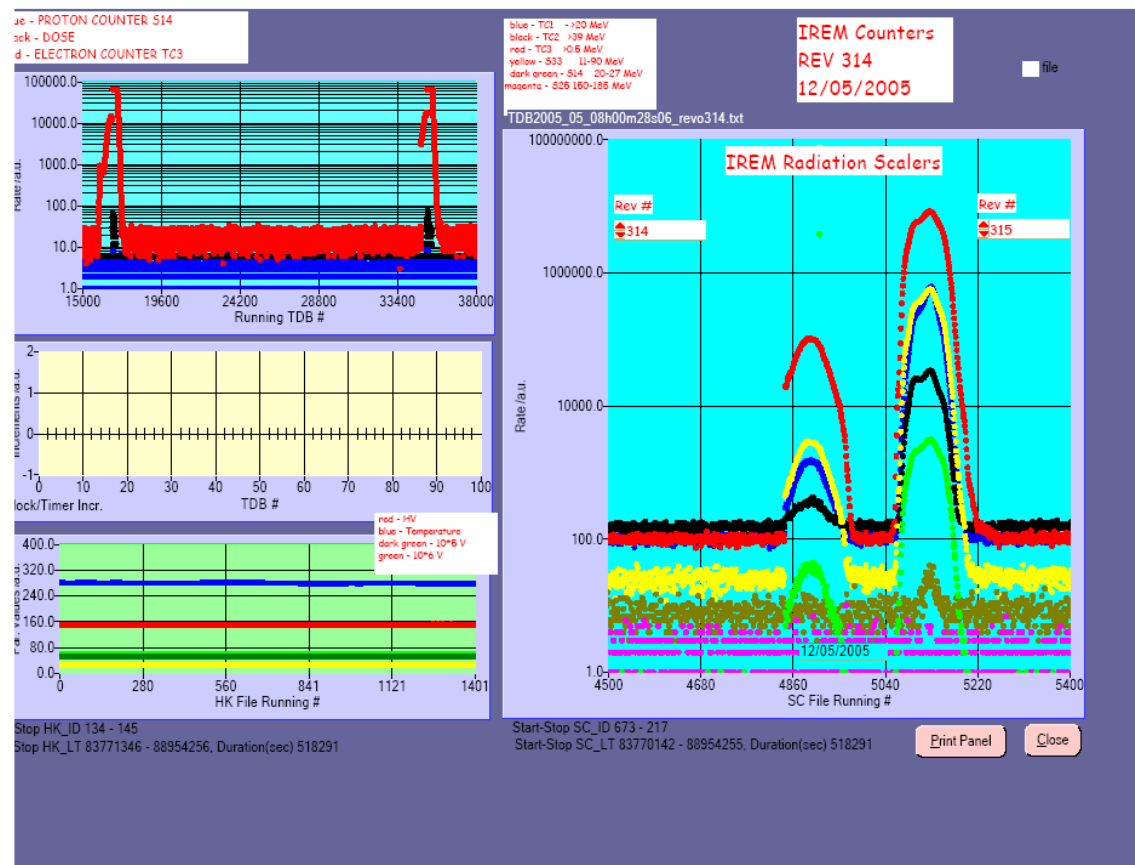
Large error vs reference (more than 30 minutes)

Radiation Spike

IREM radiation counters:



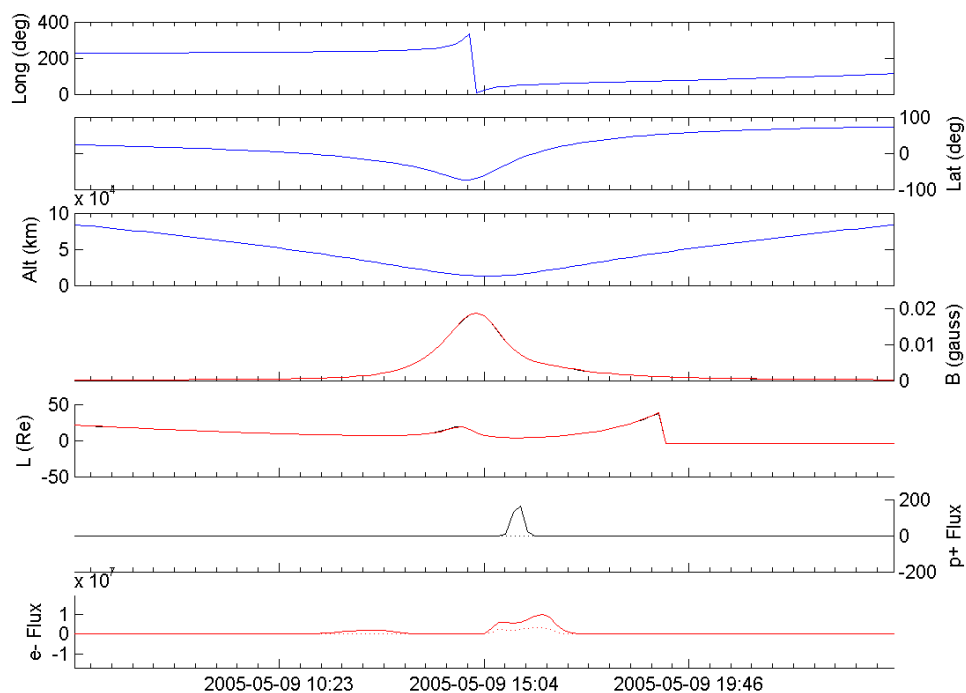
IREM counters feature a big step at belt entry. This reveals a modification in the shape of the belts.



Due to problem with the TCPIP server, data during revolution 314 are missing; particularly IREM SEU is not reported.

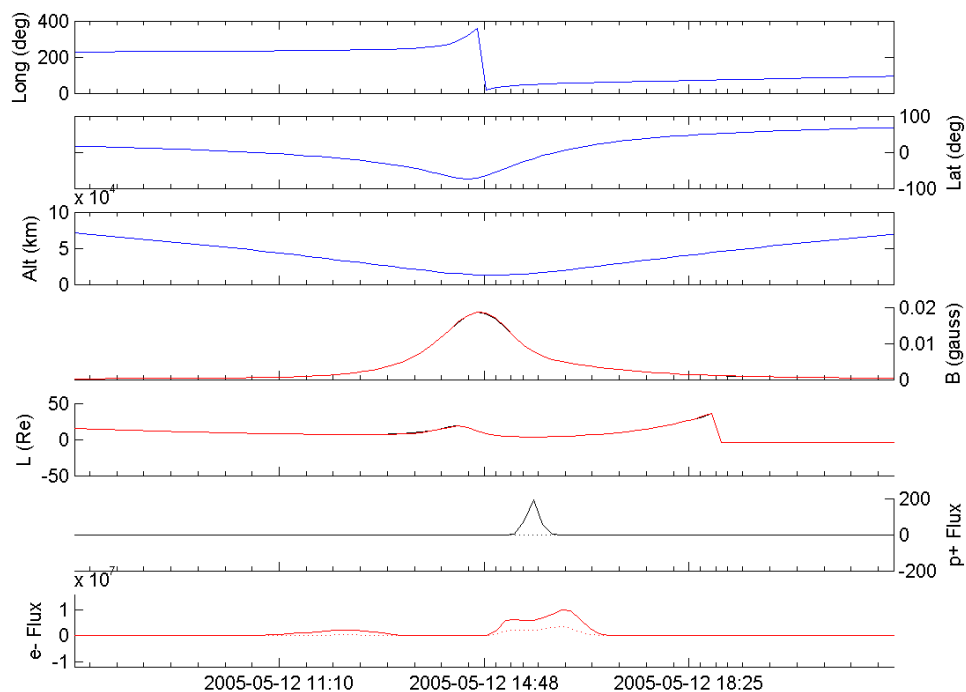
IREM Predicted Radiation Belt Passages:

Rev 313



X: 0 Y: 0 [get Data](#) [Zoom](#) [Print...](#)

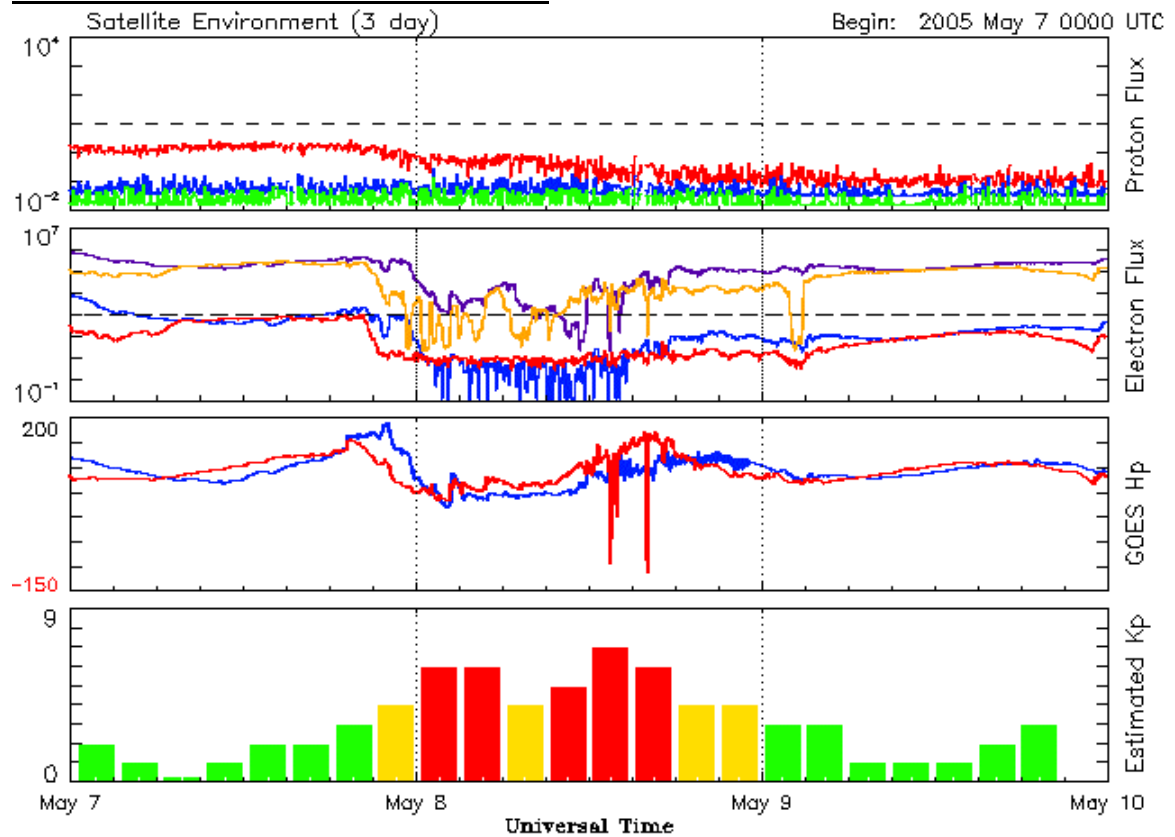
Rev 314



em_revo306.pn

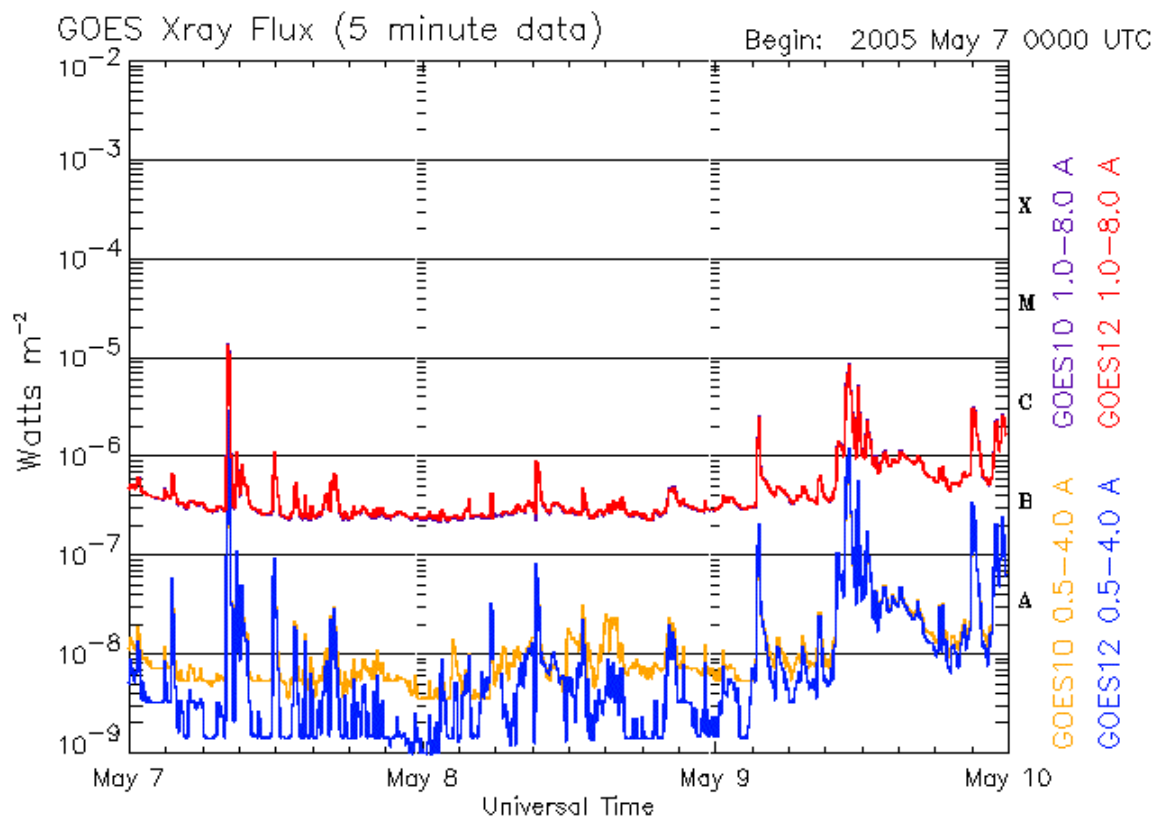
16 KB F

SEC-GOES Observed Particles Fluxes:



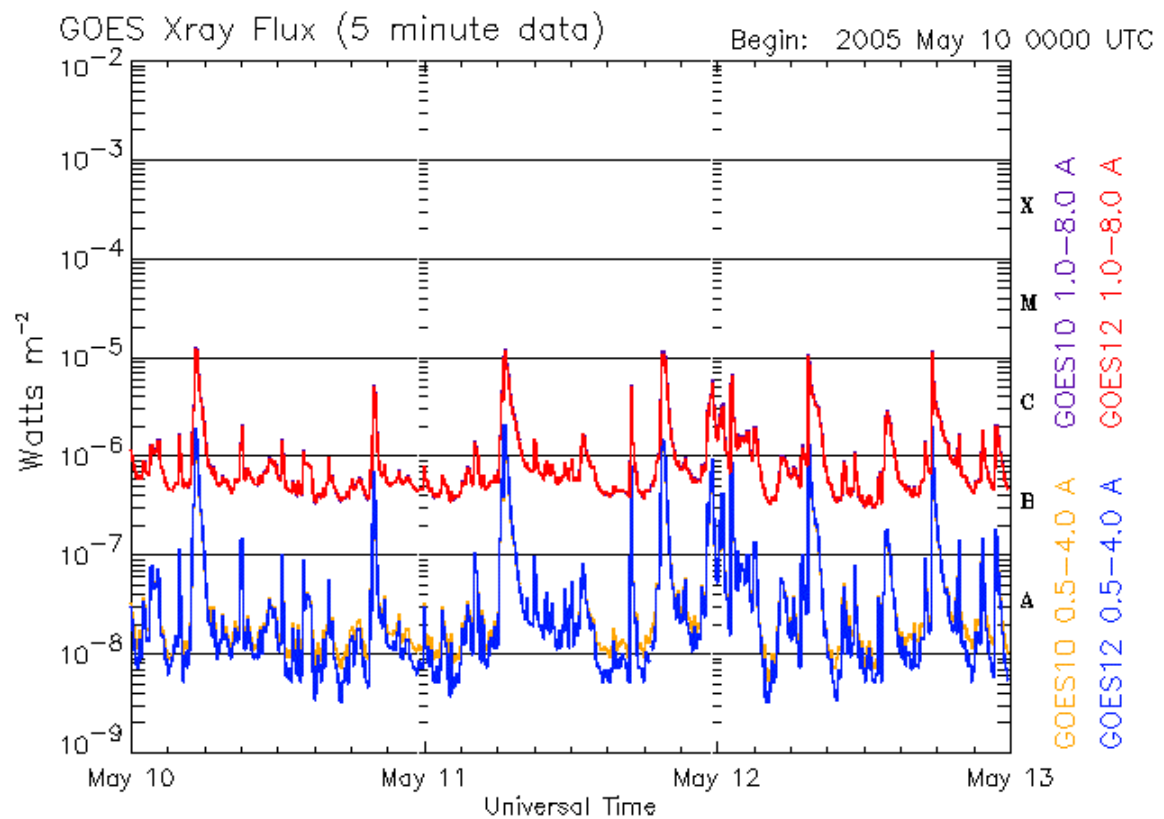
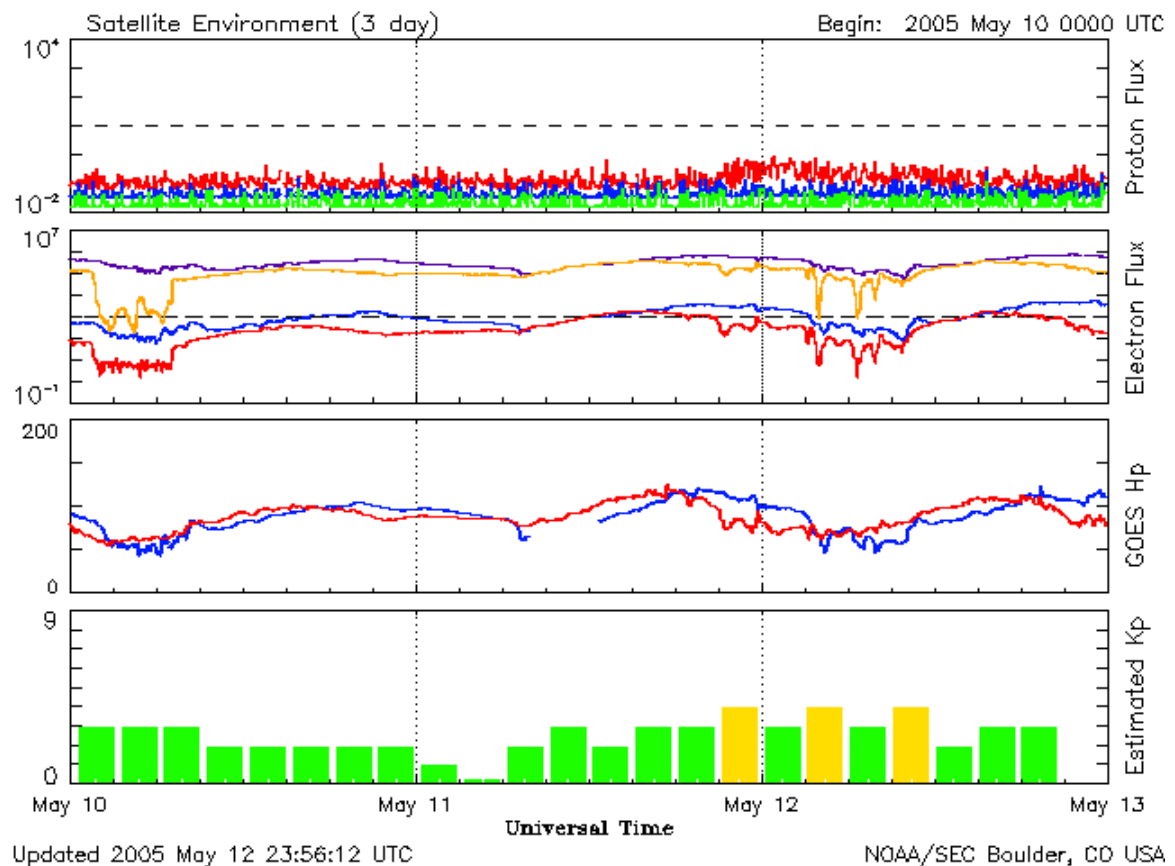
Updated 2005 May 9 23:56:12 UTC

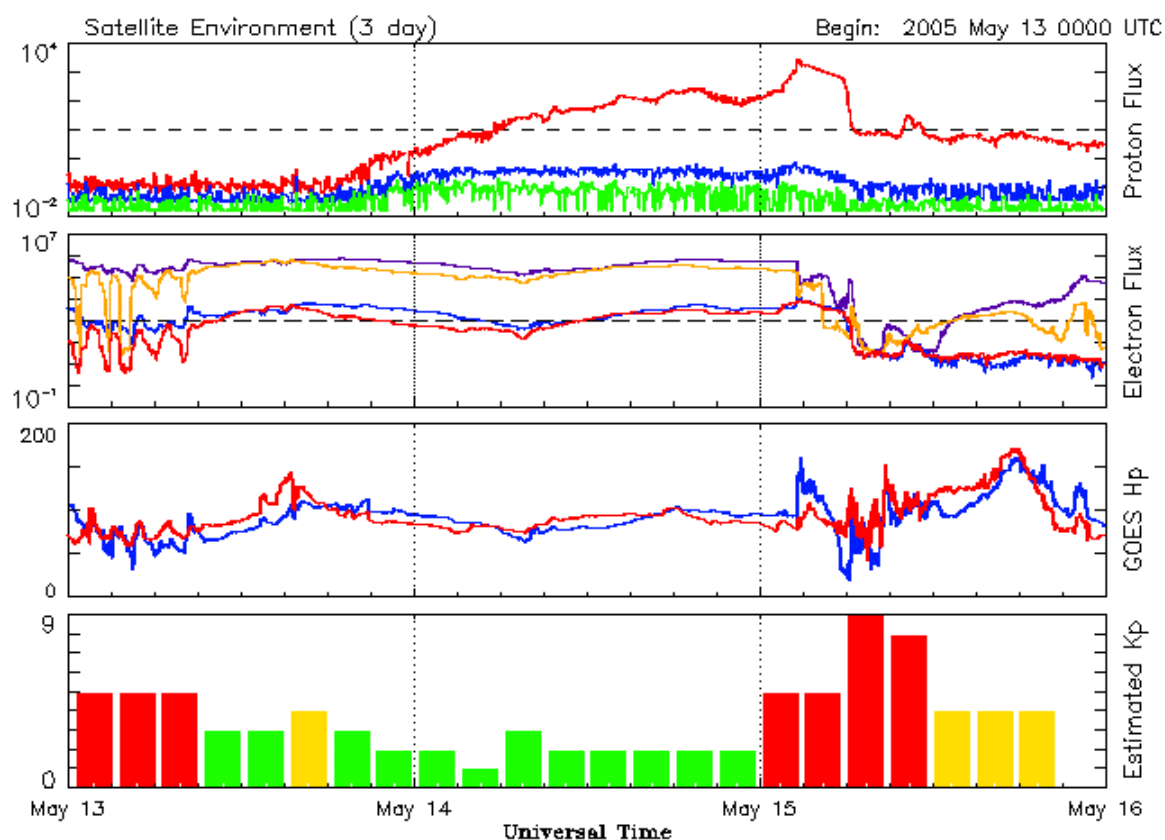
NOAA/SEC Boulder, CO USA



Updated 2005 May 9 23:56:05 UTC

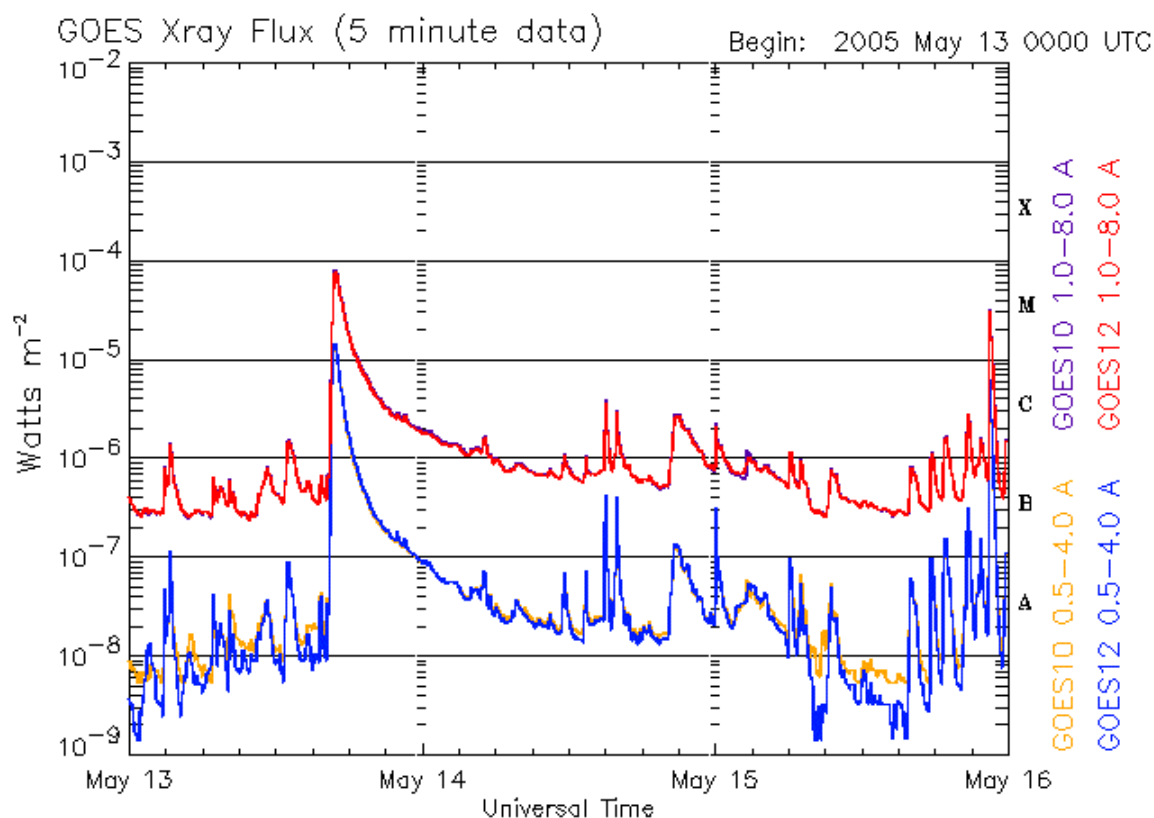
NOAA/SEC Boulder, CO USA





Updated 2005 May 15 23:56:12 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 May 15 23:56:05 UTC

NOAA/SEC Boulder, CO USA