

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-OPS-OF
No. 165
Week 46
21.11.05
Routine Phase

Prepared by: M. Walker (OPS-OFO)

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1 General

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

It addresses the activities from 12.11.05 until 18.11.05 (both dates inclusive) and covers the revolutions 377 and 378.

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 GRO J0852-4642 (RA 08:51:38.31; DEC - 46:41:50.9). 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 was identified.

3.1.1 AOCS

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

The Eclipse season continued with the eclipse passages on 14/11/2005 and 17/11/2005. The eclipse passages were nominal from an AOCS point of view.

1 slew (CSL) was lost from the Timeline during this period due to problem on DSS16 station.

The fuel consumption over the period between 11/11/2005 and 17/11/2005 was 0.0490 kg. The remaining propellant is in the order of 158.2203 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.

14/11/2005: Eclipse #2 of the current eclipse season took place, total eclipse duration was 00:46:51, of which the Umbra duration was 00:43:41.

The battery Depth of Discharge was 4.35Ah, recharge time was 2h 35m. Both figures were in line with expectation, the behaviour of the EPS was in all respects nominal.

14/11/2005: In preparation for eclipse #3 of the current eclipse season, the MRU timer threshold was set to 34 (2h 41m).

17/11/2005: Eclipse #3 of the current eclipse season took place, total eclipse duration was 00:54:51, of which the Umbra duration was 00:51:56.

The battery Depth of Discharge was 5.3Ah, recharge time was 3h 8m. Both figures were in line with expectation, the behaviour of the EPS was in all respects nominal.

17/11/2005: In preparation for eclipse #4 of the current eclipse season, the MRU timer threshold was set to 37 (2h 56m).

20/11/2005: Eclipse #4 of the current eclipse season took place, total eclipse duration was 00:59:28, of which the Umbra duration was 00:56:40.

The battery Depth of Discharge was 5.8Ah, recharge time was 3h 27m. Both figures were in line with expectation, the behaviour of the EPS was in all respects nominal.

3.1.3 Thermal

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

3.1.4 OBDH

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

3.1.5 RFS

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

3.2 Payload

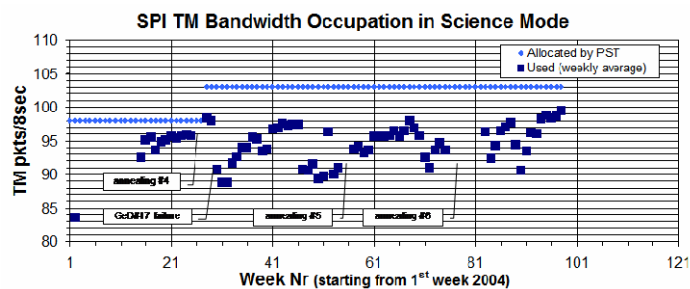
3.2.1 SPI

The overall status of the instrument is nominal.

During science operations, the instrument was 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 average occupation of 99.4 pkts/cycle.

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

The following plot shows the TM bandwidth occupation information.



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

3.2.2 IBIS

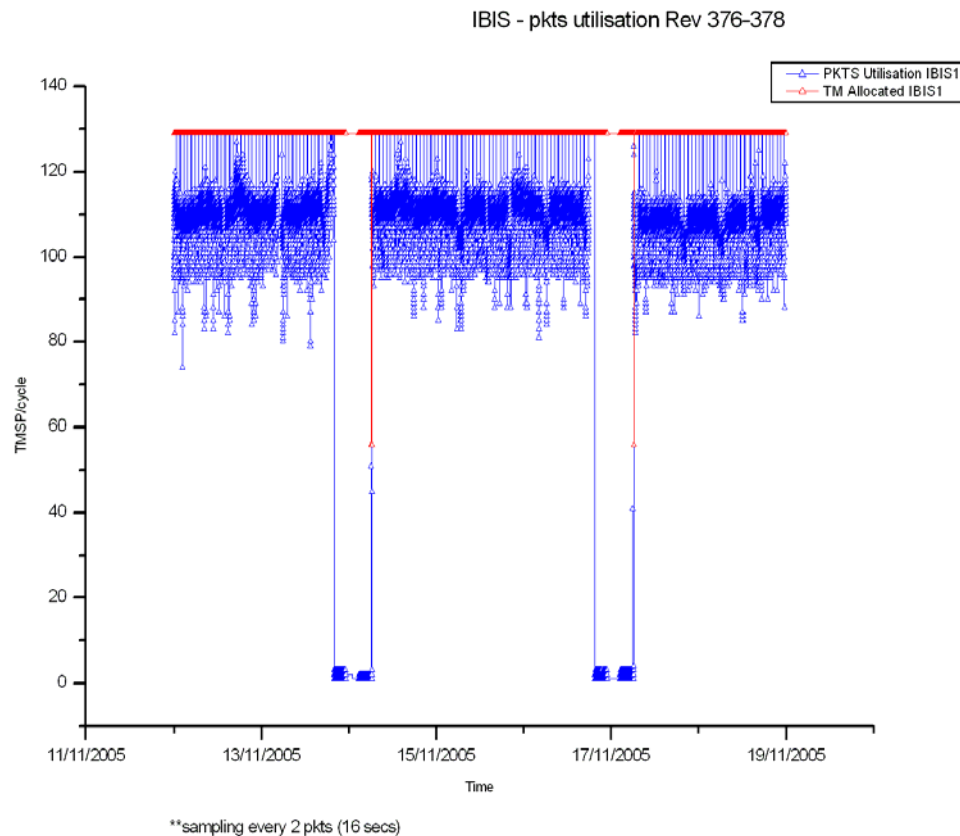
The Overall status of the unit is Nominal.

The Eclipse season continued with the eclipse passages on 14/11/2005 and 17/11/2005. The eclipse passages were nominal from the unit point of view.

On 12/11/2005 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 the MCE5 without any answer due to problem in communication between the peripheral and the DPE.

During the reporting period, the PST allocation to IBIS was 129 TMPS/cycle. The IBIS mean bandwidth utilisation during the observation period was 111.5 TMPS/cycle, up 4.14 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.

On 2005-11-14 at 04:16Z, during the post-eclipse reconfiguration of JEM-X1 following the 2nd eclipse of this season, another DFEE anomaly occurred like those observed during previous eclipse seasons. This anomaly is recorded as INT_SC-131. JEM-X1 was recovered to Data Taking mode at 07:45Z.

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, 139 of the 139 planned science pointings for OMC were executed nominally, none 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 Eclipse season continued with the eclipse passages on 14/11/2005 and 17/11/2005. The eclipse passages were nominal from the unit point of view.

Solar Activity

The observation period was characterised by low solar activity.

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

4 Ground Facilities

The performance of the Operational ground facilities was excellent this week, no science pointings were lost, 1 non science slew was lost and had to be recovered. The overall performance was well above the 95% requirement.

4.1 Mission Operations Centre

The performance of the MOC was very good this week, although there were several minor incidents of icons turning red on the Global MMI, and the occasional error message in the Event Log, but these had no operational impact. The overall performance was well above the 95% requirement.

4.2 Ground Stations & Network

The performance of the ground stations and Network was excellent this week. Only one slew was lost to communications difficulty with DSS-16, but it was not scheduled as a science pointing, and no dta was lost. The overall performance though was well above the 95% requirement.

4.3 Science Ground Segment

4.3.1 ISOC

1. Mission planning

PSF's for revolutions 384 to 386 were received this week. Planning of the revolutions 383 and 384 has been performed in ISOC and sent to MOC. Further planning will be done once MOC has agreed the revolution 384. This revolution includes AOCS calibration activities requiring very special pointings. The implementation of this has been subject of lots of interactions between ISOC and MOC. Revolution 383 has also

been replanned at least three times. This is because MOC had difficulties to find a reaction wheel profile for the planned scenario. This problem is presumably due to the current eclipse season which implies further constraints on the satellite performance. No ToO request was received. TSF for revolutions 379 to 381 were received.

2. Observation status

This week ECS's for revolutions 361 to 369 were received. The corresponding OCS's were generated and sent to ISDC. No extra time credited.

3. ISOC science data archive

After installation of the new disk arrays recently the back up procedure is now adjusted to cater for the new hardware configuration. The first release of ISDA with the 2nd ISGRI catalogue was re-discussed this week. It is reconfirmed to release the next IDA version 2.5 before end of this year.

4. ISOC system

The version 11.2 has been in use this week without problems. A version 11.3 is planned for next week.

5. AO 4 preparation

In order to perform the ISOC tasks related to the AO with the reduced team available it is necessary to replace the helpdesk system. A new system has been selected and is being installed at ESAC. Other tools to support an AO are being reviewed to determine how to maintain them in future. A detailed plan for the necessary software changes to the ISOC core system is established and work related to AO 4 is expected to start next week.

5. Problems

The problem reported last week related to placing of handover windows is still there but the resolution is not critical any more and will be resolved as normal work. The previously reported problem related to the difference in ISOC and MOC/FD constraint checks is probably resolved. The problem resolution requires some Ground Segment level agreements for full resolution.

4.3.2 ISDC

Status of ISDC observation processing on 21/11/2005:

- Latest Standard Analysis completed: observation 03200200003 (GRS 1915+105, Revolution 367) on 21/11/2005
- Latest products archived: observation 03201090040 (Gal. Bulge, Revolution 367) on 20/11/2005
- Latest observation products sent to the observer: observation 02297000020 (galactic disk $l < 0$, Revolution 347) on 03/10/2005

5 Special Events

6 Anomalies

There were a number of problems that impacted the operations:

- On DoY 316, at 15:45, All links with Redu dropped, the TM was restored at 15:48, and the TC link at 15:50, there was no impact.
- On DoY 317, at 01:30, the Event Log message: “'IMCA' – lost connection to TM-RT-cache. Will try to re-establish connection” was seen, there was no impact.
- At 17:20, the Autostack was showing TM red, but the nctrsa was showing green, the Event log then showed the message: “CMDHmply, imca, ERROR, LOG, Connecting link status set to TC: RDTCE1-1, No TM flow” The problem did not clear until the VC0 TM link with Redu was disconnected, and re-established. This problem repeated at 17:22 & 17:24. The cause was put down to difficulties establishing a connection to DSS-16, there was no impact.
- At 20:22, the Event log message: “CMDAmstk: Error in receiving update from PIF server” was seen, there was no impact.
- On DoY 318, at 12:43, the VC0 & VC7 TM from Redu dropped, the flow was restored at 12:44, network reported a problem with the link, there was no impact.
- At 15:31, the event log indicated there were some missing source packets, there was no impact.
- At 16:11, the event log had the following message repeated twice: “CMDHveri, imca, Warning, Software, Trying to deregister TmVerCheck, as non-existing packet ID 152722”, this coincided with the antenna swap, there was no impact.
- At 17:40, there was an FD timestamp message: Cannot open /home/intatt/data/mps/messages/show-mpm.timestamp – sun126.new no such file or directory, there was no impact.
- From 21:03 to 21:07, the idda icon on the Global MMI turned red, there was no apparent cause, and no impact.
- From 22:00 to 22:01, the iddb icon on the Global MMI turned red, there was again no apparent cause, and no impact.
- At 23:50, there was a message on the Global MMI: iddb has disconnected. At 23:50, the MCCM MMI was restarted on sun129. The iddb icon now showed green, there was no impact.
- On DoY 319, at 00:00, the event log message: “TCONmainRT: idda: Error: Software: HFACTMrecord::store archive with HFID 10 and stream 31905 not present. Try to create it”. At the same time there was an identicle message on the b-chain for iddb, there was no impact.
- On DoY 320, at 20:38, on the a-chain (sun121, sun122, sun123) the message: “Limit checker is now active synchronisation by stop and drive” appeared in the bottom line of the TM display task, there was no message in the event log. The same thing happened at 21:17, there was no impact.
- At 21:15, on the b-chain, the event log messages:”TCOserver, imcb, Warning, log no update of time correlation” followed by: “BEHVLimC, imcb, Warning, Software, Limit checker is not receiving TM.” appeared, there was no impact.
- At 21:23, on nctrs-b, the VC0 has gone to Data flow, and the MCS link no longer shows. The VC0 link was reconnected, curing the effect. At 21:30, the

b-chain was showing some OOLs that were not visible on the a-chain, eg E2141.

- At 21:40, 8 bad frames were received on nctrs-a from DSS-16. Network re-connected the VC0 link. At 21:50, 45 more bad frames were received, and at 22:00 more were received. The impact was the loss of slew 03770060, which was not a science pointing. The corresponding DR# is 106260.
- On DoY 321, at 06:40, there was a delay in the handover from Redu to Vilspa II due to problems with the nctrs-a. The impact was EDs DEBPG200 & KEDATA02 failed release, (these were later uplinked manually at 07:20 & 07:23 respectively). At 07:24, the nctrs was swapped to the b-chain. At 08:28, after successful reboot the nctrs was swapped back to the a-chain, there was no further impact.
- At 08:40, the idda icon on the Global MMI was yellow indicating a problem with the TMDMain RT & PB, there was no impact.
- On DoY 322, at 03:00 and 03:08, there were brief drops on the TM link from Redu, there was no impact.
- At 06:23, there was a brief data gap due to the handover from Redu to Vilspa II, there was no impact.
- From 10:00 to 10:04, the links with Vilspa II dropped after a firewall reboot, there was no impact.
- From 13:36 to 13:41, due to the line dropping, there was no TM from Vilspa II, there was no impact.
- From 13:43 to 13:50, due to a hit on the line, there was no TM from Vilspa II, there was no impact.

The following anomaly report was entered into the ARTS system.

AR id	Date Created	Subject	Segment	Status
INT-2806	15/11/2005	Simulator: PDU TM Unreliable.	Simulator	Pending
INT_SC-131	16/11/2005	JEM-X1 DFEE CRC anomaly following eclipse on 2005-11-14	Payload	Open
INT-2807	21/11/2005	CPD on host IMCA is not receiving packets	IMCS	Pending
INT-2808	21/11/2005	CSL TPF lost from Timeline due to bad frames	NASA Station	Closed
INT-2809	21/11/2005	INCTRS-A dropped at ground station handover from REDU to VIL2	NCTRS	Pending
INT-2810	22/11/2005	TPF update failed	FDS	Pending
INT-2811	23/11/2005	TMDesktop not synchronised	IMCS	Pending

7 Future Milestones

A patch of the IMCS is planned for November, which should fix a couple of problems.

DSS-16 is to be decommissioned, and replaced by DSS-27, initial testing of DSS-27 was performed in October. A final test including ISDC will take place during November.

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Preparation is on-going for the earth observation, currently planned to take place in January.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 377

In revolution 377 a raster dithering observation of GRO J0852-4642 (RA 08:51:38.31; DEC -46:41:50.9) was performed throughout the available observation time (~60.5 hours).

Revolution 378

In revolution 378 a raster dithering observation of GRO J0852-4642 (RA 08:51:38.31; DEC -46:41:50.9) was performed throughout the available observation time (~60.5 hours).

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

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2005-11-02T06:48:33.000Z	158.5335	F	Automatic TM processing.
2005-11-03T14:51:49.000Z	158.5165	F	Automatic TM processing.
2005-11-03T23:52:46.000Z	158.4560	F	Automatic TM processing.
2005-11-05T04:10:49.000Z	158.4394	F	Automatic TM processing.
2005-11-06T14:49:48.000Z	158.4157	F	Automatic TM processing.
2005-11-08T04:10:32.000Z	158.4131	F	Automatic TM processing.
2005-11-09T04:21:47.000Z	158.3927	F	Automatic TM processing.
2005-11-09T14:33:48.000Z	158.3520	F	Automatic TM processing.
2005-11-10T15:32:47.000Z	158.3331	F	Automatic TM processing.
2005-11-10T20:32:07.000Z	158.2907	F	Automatic TM processing.
2005-11-10T22:56:40.000Z	158.2769	F	Automatic TM processing.
2005-11-11T04:50:24.000Z	158.2693	F	Automatic TM processing.
2005-11-12T14:00:36.000Z	158.2590	F	Automatic TM processing.
2005-11-14T04:49:04.000Z	158.2469	F	Automatic TM processing.
2005-11-17T04:43:28.000Z	158.2203	F	Automatic TM processing.

This report was generated Fri Nov 18 08:00:26 GMT 2005

8.3 Detailed Satellite Information

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

8.3.1 AOCs SUMMARY OPERATIONS REPORT, 12/11/2005 – 18/11/2005

AOCs operations were executed from the Automatic Timeline.

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During this period, 20 Open Loop Slews, 122 Closed Loop Slews and 3 Momentum Bias were executed (TL + manual recovery). 1 slew (CSL) was lost from the Timeline during this period due to problem on DSS16 station.

This is equivalent to a 0.7 % of the total number of slews planned (142).

The AOCS eclipse operations were nominal. For the winter eclipse season passages on 14/11 and 17/11, the Eclipse Timers and the Time-Tagged sequence to re-enable the IMU Auto Switch-Off function of the ACC were loaded from the Timeline and the pre-eclipse IMU health checks were performed at the planned times. Some information regarding the eclipse times and IMU usage up to this stage of the eclipse season are provided below:

AOCS Eclipse Times														Winter 2005		
Date	LOS	AOS	ACC Eclipse Imminent	Eclipse Start						Eclipse End						Eclipse Duration
				ACC	FDE	FCE	Penumbra	FSS Sun Out	Umbra	Umbra	FSS Sun In	Penumbra	FDE/FCE	ACC		
2005-11-02	23:56:00	03:44:00	01:42:13	02:24:16	02:32:58	02:33:40	02:41:53	no	00:00:00	00:00:00	no	03:13:57	03:17:52	03:23:42	0:32:04	
2005-11-11	23:28:00	03:02:00	02:26:27	03:08:27	03:17:22	03:18:06	03:26:07	03:27:39	03:28:02	03:57:52	03:58:17	04:00:08	04:03:46	04:09:50	0:34:01	
2005-11-14	23:17:00	02:47:00	02:11:51	02:53:53	03:02:34	03:03:18	03:11:31	03:12:40	03:12:56	03:56:35	03:56:52	03:58:22	04:02:10	04:08:06	0:46:51	
2005-11-17	23:03:00	02:32:00	01:57:27	02:39:29	02:48:10	02:48:54	02:57:07	02:58:16	02:58:23	03:50:19	03:50:39	03:51:58	03:55:50	04:01:42	0:54:51	

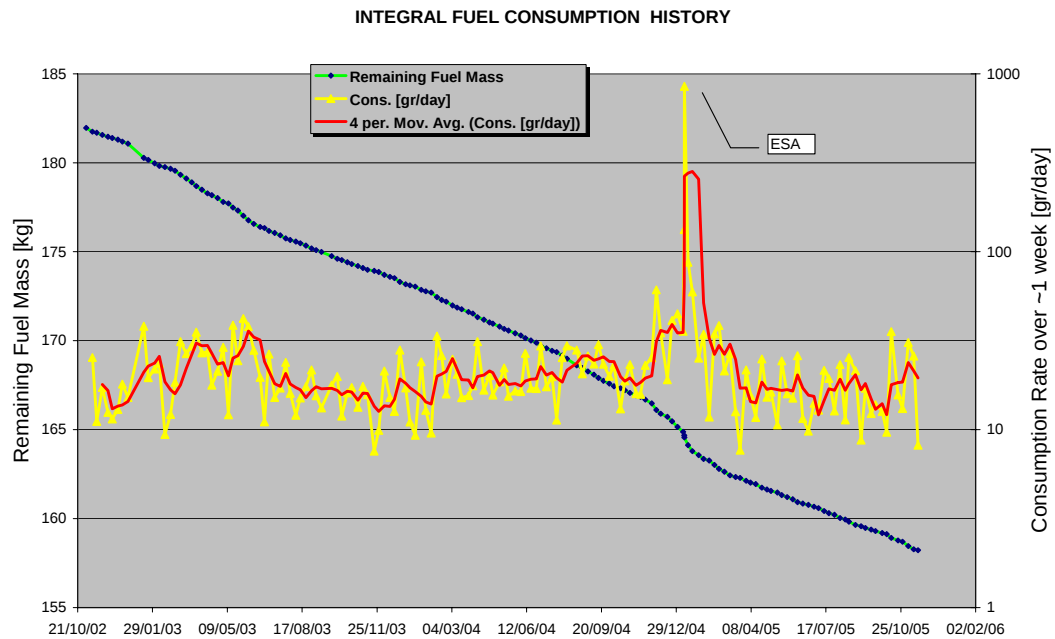
IMU Usage during Eclipse Season						Winter 2005
IMU On	IMU Off	From Health Check		From Auto Calibration	On Time	Accumulated On Time
		Noise Roll [as/s]	Drift Roll [as/s]	Drift Roll [as/s]		
2005-11-02 21:06:21	2005-11-03 03:25:57	0.2272	0.2300	NA	6:19:36	6:19:36
2005-11-10 21:47:48	2005-11-11 04:12:08	0.1930	0.2841	0.2752	6:24:20	12:43:56
2005-11-13 20:18:18	2005-11-14 04:10:21	0.1960	0.1750	0.1657	7:52:03	20:35:59
2005-11-16 20:28:59	2005-11-17 04:03:58	0.2060	0.2319	0.2946	7:34:59	28:10:58

Orbit Control

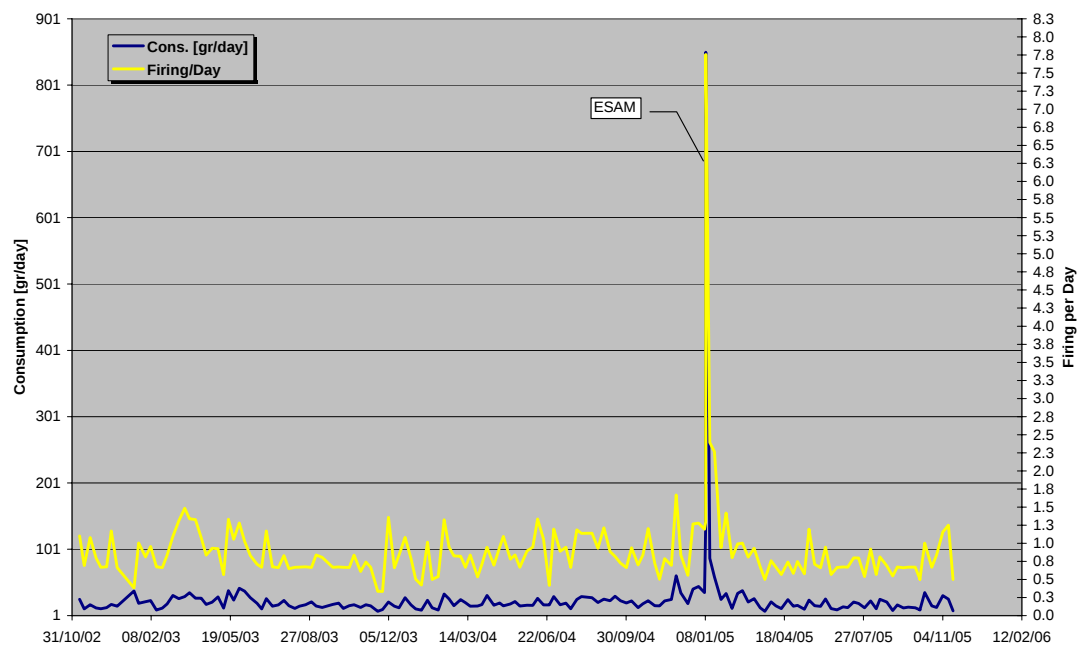
N.A. this week, provided on monthly basis

Fuel consumption

The fuel consumption (total, grams/day) over the period between 01/11/2002 and 17/11/2005 is reported in the plot below.

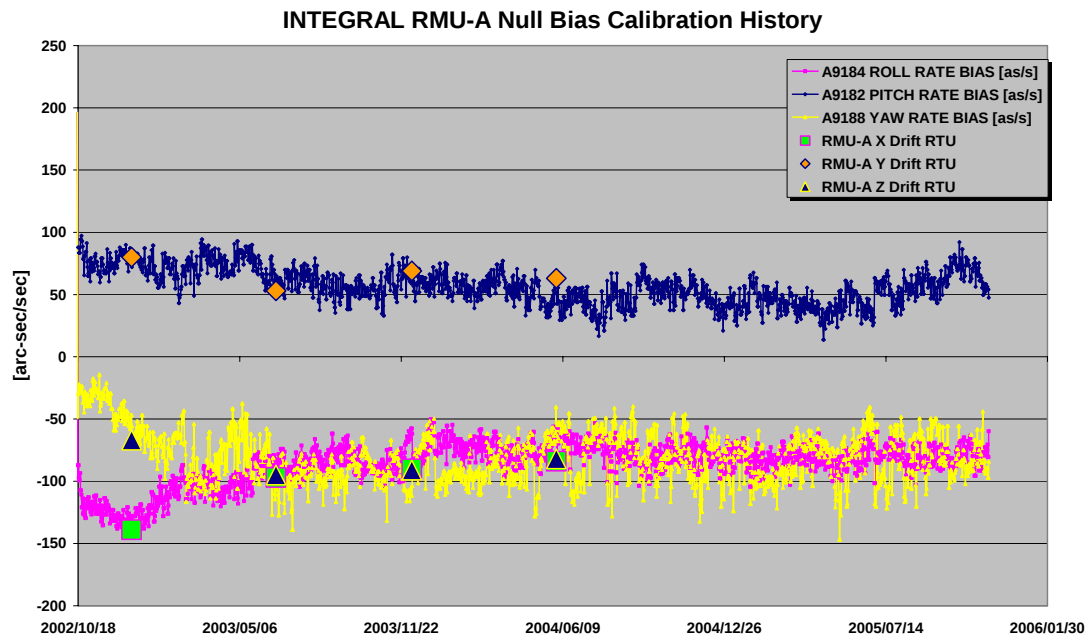


The fuel consumption (grams/day) over the period between 01/11/2002 and 17/11/2005 is reported in the plot below.

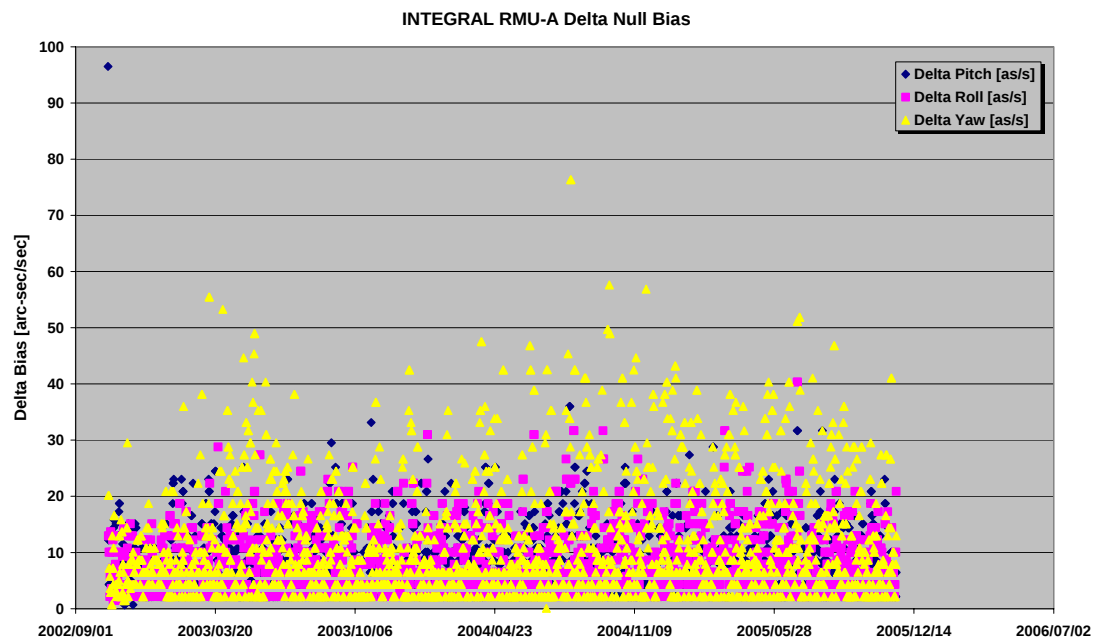


The RMU-A null bias calibration

The RMU-A null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 18/11/2005 is reported in the plot below.



The RMU-A delta null bias calibration history, on pitch, roll and yaw channel over the period between 01/11/2002 and 18/11/2005 is reported in the plot below.



12/11/05 (Day of Year 316, Revolution 376)

Nothing to report

13/11/05 (Day of Year 317, Revolution 376)

OTF low during PID 03760047: Due to star lost on STR, when the guide star was Mi 7.5 at CCD location [-24375, 4050], the OTF went low and the pointing not

reached. The reason of the star lost is likely due a false event or to the position of the guide star, about at the edge of the STR FOV in Y. No IMU was switched ON because the false event occurred in the first minute after the slew end. After the event the ACC automatically commanded a mapping and a new valid guide star picked.

No impact on TL.

14/10/05 (Day of Year 318, Revolution 376-377)

Nothing to report

15/11/05 (Day of Year 319, Revolution 377)

Nothing to report

16/11/05 (Day of Year 320, Revolution 377)

Slew missed from the Timeline: Due to a problem on DSS16 station (see problem report DR# 106260), the slew ID 03770060 failed release.

The AOCS s/s was disabled in TL at 22:00z.

A manual recovery was attempted from attitude of PID 03770059 to the attitude of PID 03770060. The next CGS, at the end of revolution, was executed from the Timeline.

The AOCS s/s was re-enabled in TL at 22:40z.

The following slew was not executed from TL while recovering the AOCS s/s: 03770060(CSL).

17/11/05 (Day of Year 321, Revolution 377-378)

Nothing to report

18/11/05 (Day of Year 322, Revolution 378)

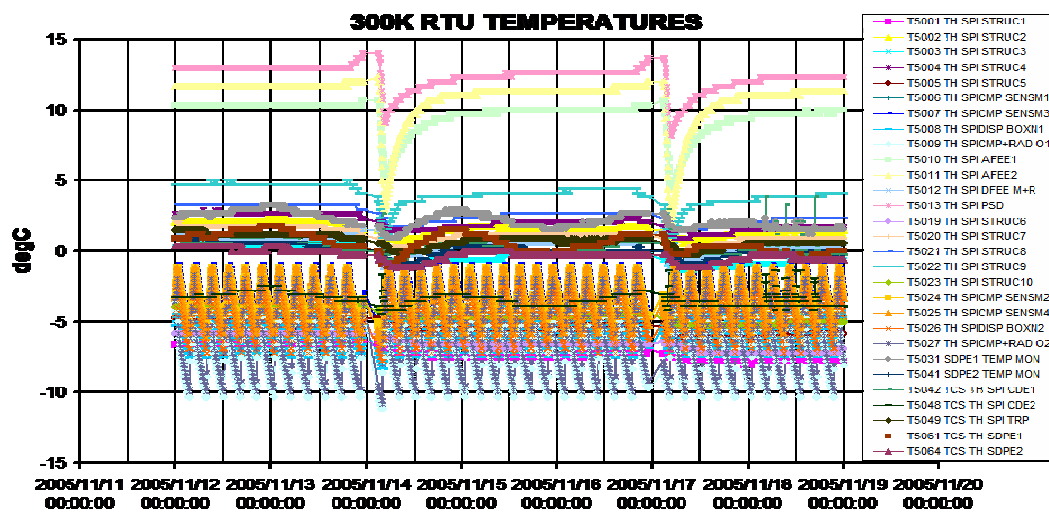
Nothing to report.

8.3.2 SPI Operations

Unit Temperatures

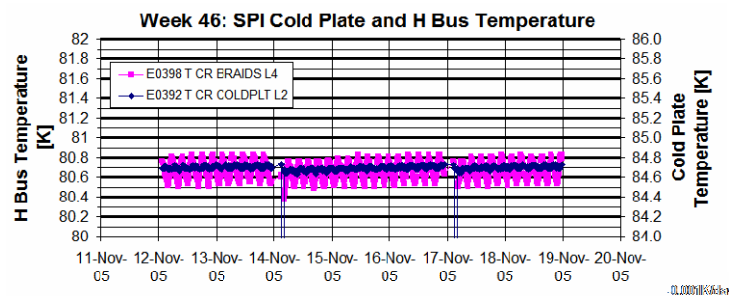
All the temperatures of the equipment are inside the operational limits. The following plot shows their evolution along the reporting period.

The variation of the DFEE, PSD, AFEE and ACS temperatures (still inside limits) are due to eclipse passages.



Stirling compressors and Cryostat

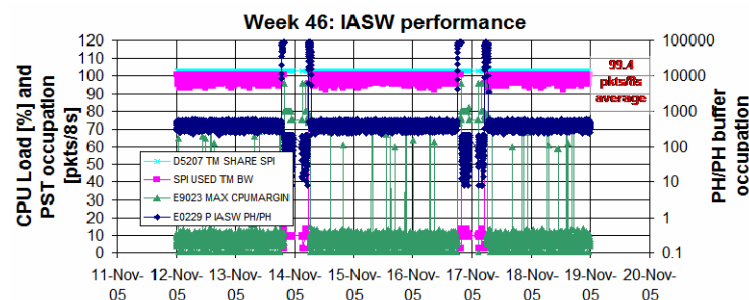
The performance of the compressors is nominal. The cold plate temperature was maintained at 85K $\pm$ 1K showing the expected positive drift. The following plot shows the evolution of the cold-plate and H bus temperatures during the reporting period.



DPE & IASW

The IASW performance is nominal.

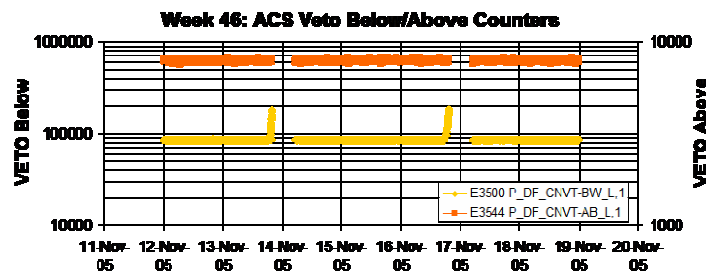
The following plot shows the IASW performance in terms of TM bandwidth, event buffer occupation and DPE CPU load during the reporting period



ACS

The performance of the ACS is nominal.

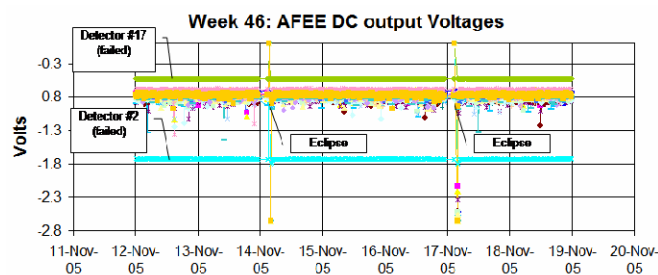
The following plot shows the ACS overall count rate evolution during the reporting period.



AFEE

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

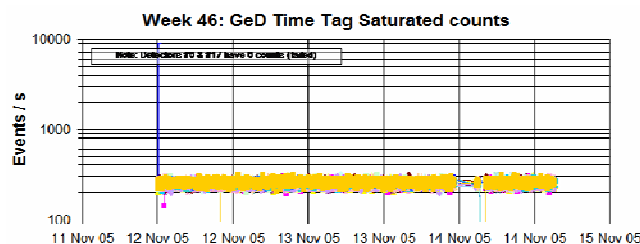
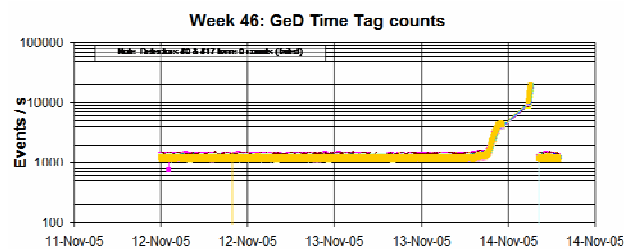
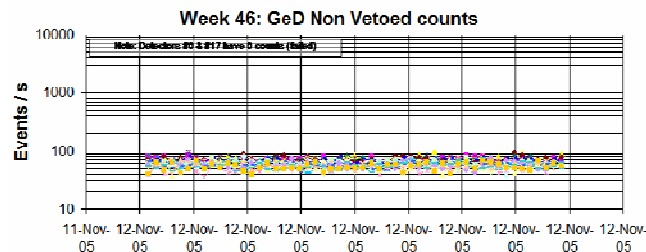
The following plot shows the dc voltage offset of the detector channels during the reporting period.



DFEE

The performance of the unit is nominal

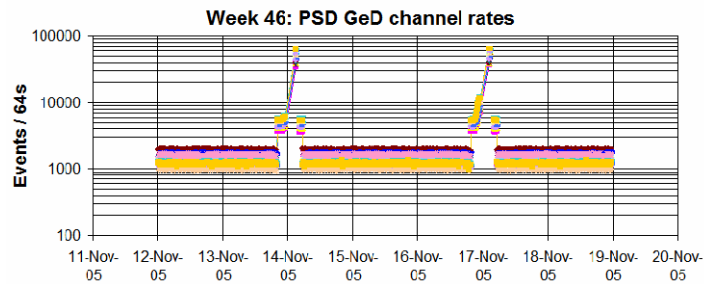
The following plots show the count rates of the detectors during the reporting period (due to problems in the data retrieval tool, some gaps could be present).



PSD

The performance of the unit is nominal

The following plots show the PSD channel rates during the reporting period



SPI EVENTS LOG

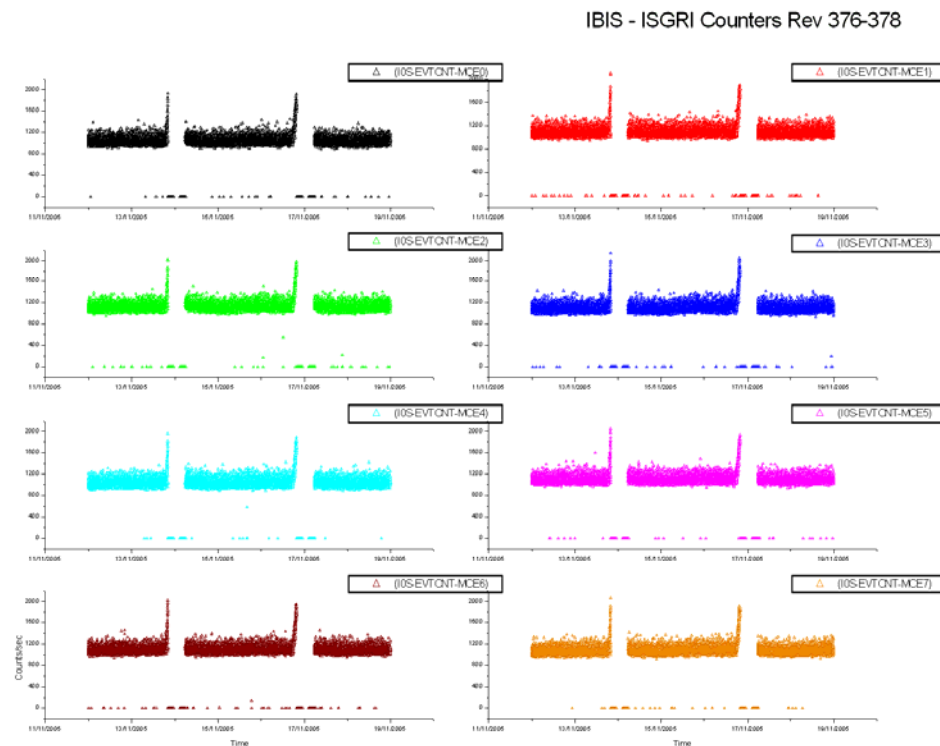
NOTE: The events log is extracted from the revolution pass summaries (courtesy of the Integral Analysts).

DOY Time	Event
317 - 19:00	TM E3500 OOL, back in limits @ 19:02
317 - 19:18	TM E3500 OOL, back in limits @ 19:20
317 - 19:26	TM E3500 OOL, back in limits @ 19:28
318 - 03:08	EV: SPI1 failure in analyzing HSL data
320 - 11:47	TM E2372 OOL
320 - 18:00	TM E3500 OOL, back in limits @ 18:03
321 - 02:55	EV: SPI failure in analyzing data & SPI fixed point overflow
322 - 17:17	TM E2115 OOL

8.3.3 IBIS Operations

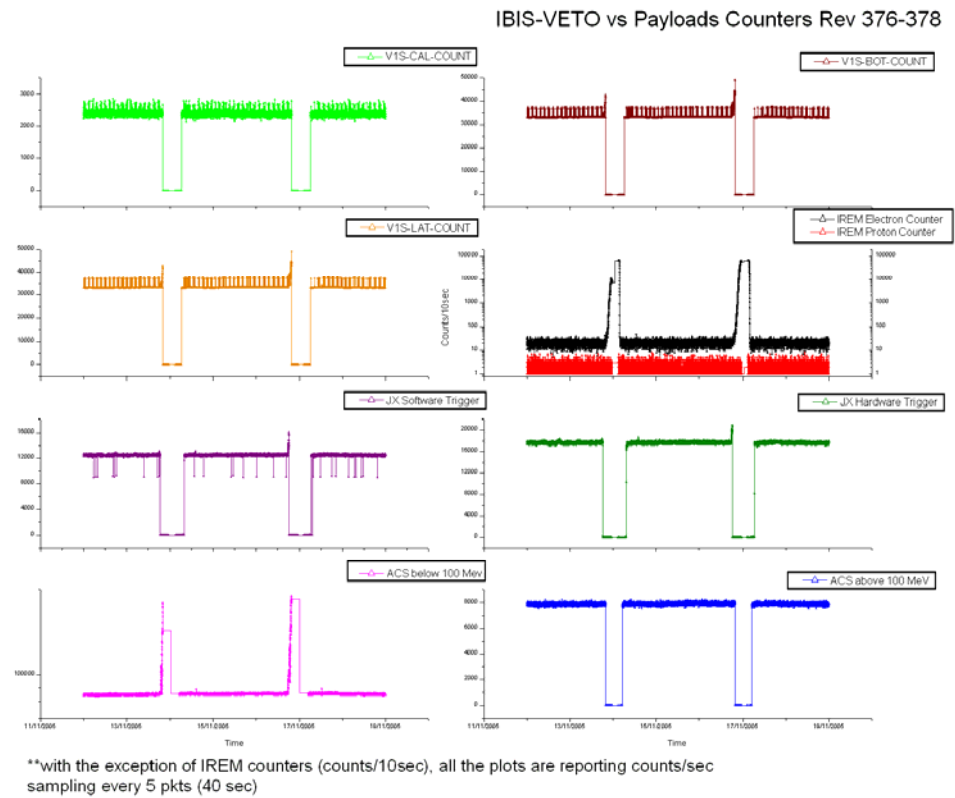
IBIS Event Counters Plots.

ISGRI Counters:



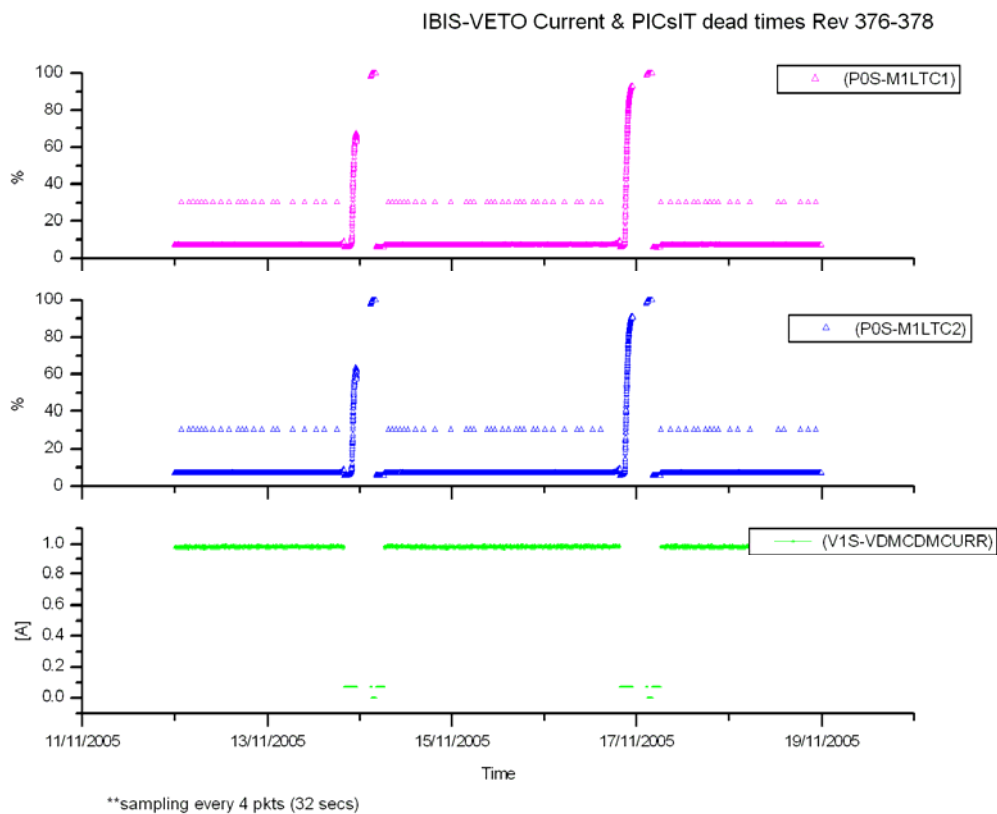
**sampling every 4 pkts (32 secs)

VETO vs Payloads Counters:



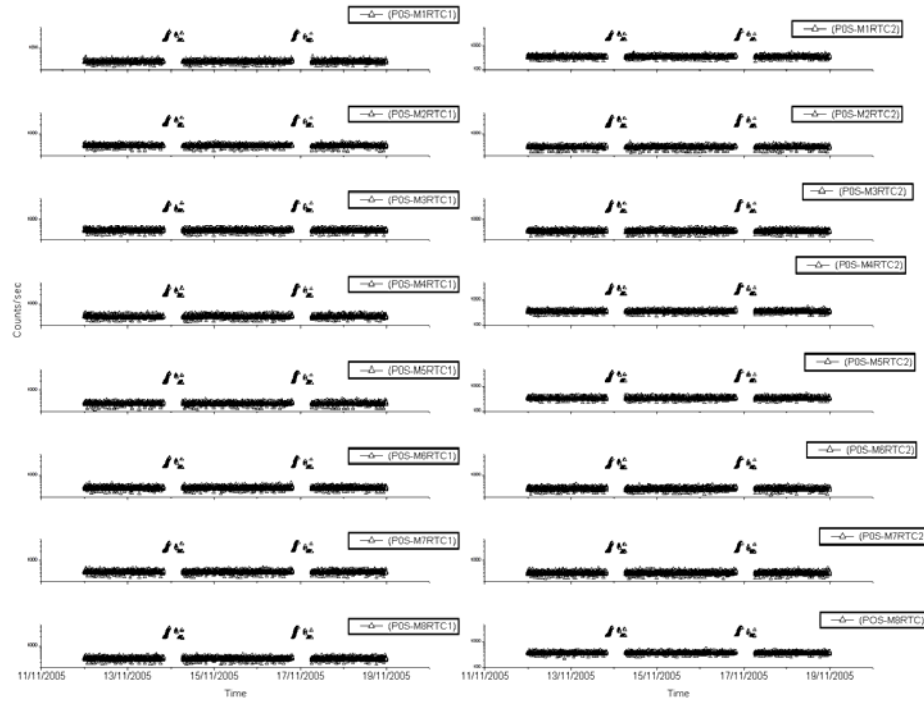
The week was characterised by low radiation.

VETO Current:



PICsIT Counters:

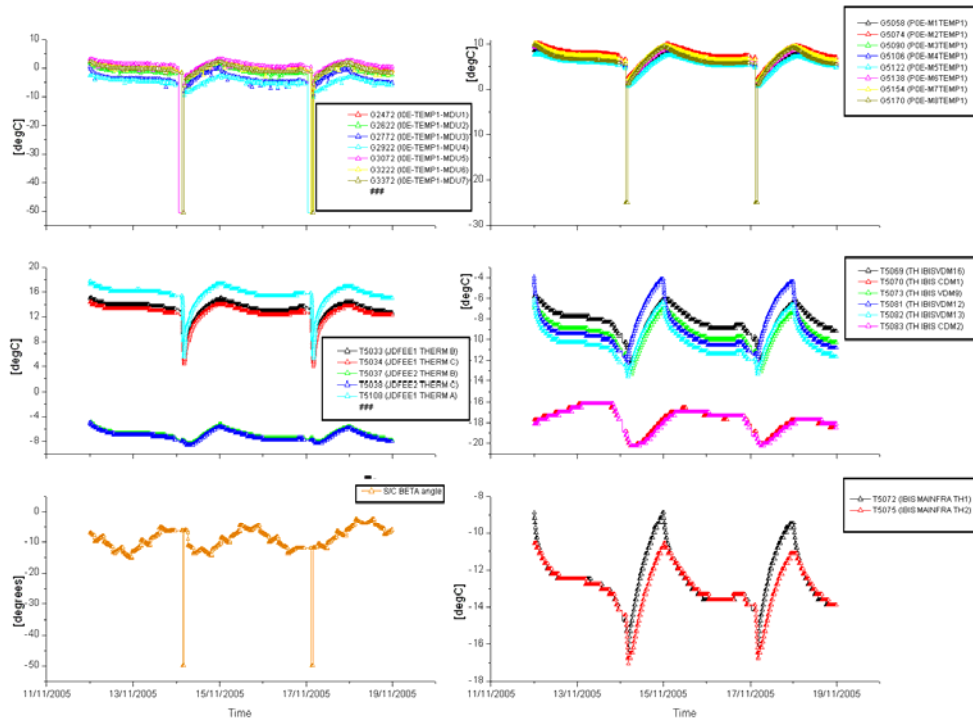
IBIS - PICsIT Counters Rev 376-378



**sampling every 4 pkts (32 secs)

IBIS Detectors Layers Temperatures:

IBIS Detectors Layers Temperatures Rev 376-378



**sampling every 8 pkts (64 secs)

IBIS daily report

DoY 2005.316 (12/11/2005)

MCE5 time-out: At 14:04Z, the following OEM APID 1280 ID 133 CLASS 2 was reported:

"IBIS1 IASW LSL TRANSFER FAILED (LOW LEVEL)"

together with OEM APID 1280 ID 131 CLASS 2:

"IBIS1 IASW LSL TRANSFER FAIL REPORT FOR HIGH-LEVEL MODULE RESET".

These 2 OEMs were followed after few seconds by OEM APID1280 ID 238 CLASS 3:

"IBIS1 MCE5 TIME OUT". (the numbering system in the OEM goes from 0 to 7, this OEM indeed concerns HW MCE6)

This anomaly is similar to the ones that occurred in MCE4 on DoY 2004.017, MCE6 on DoY 2004.027, MCE4 on DOY 2004.153, MCE5 on DoY 2005.041 and MCE3 on DOY 2005.077.

Summarising, 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 the MCE5 without any answer due to a black out in communication between the peripheral and the DPE. The IASW flagged the non-generation of HK1 from MCE5 as an on-board rejection (time-out) of the internal TC indicated in the OEM body. During this time no valid HK was collected from MCE5 therefore, what was reported in the HK1 was simply the IASW default (i.e all 0000...). This is confirmed by the reading of some TM parameters as the bias, operating mode and MDU temperatures all reporting the raw value 0. After few TM cycles, the unit solved autonomously the internal conflict on the LSL and reported the valid HK1 for MCE5 (see ref. AR INT_SC-113). No further action was requested as for recovery action I-REJ-1.

8.3.4 JEM-X Operations

8.3.4.1 JEM-X Count Rates

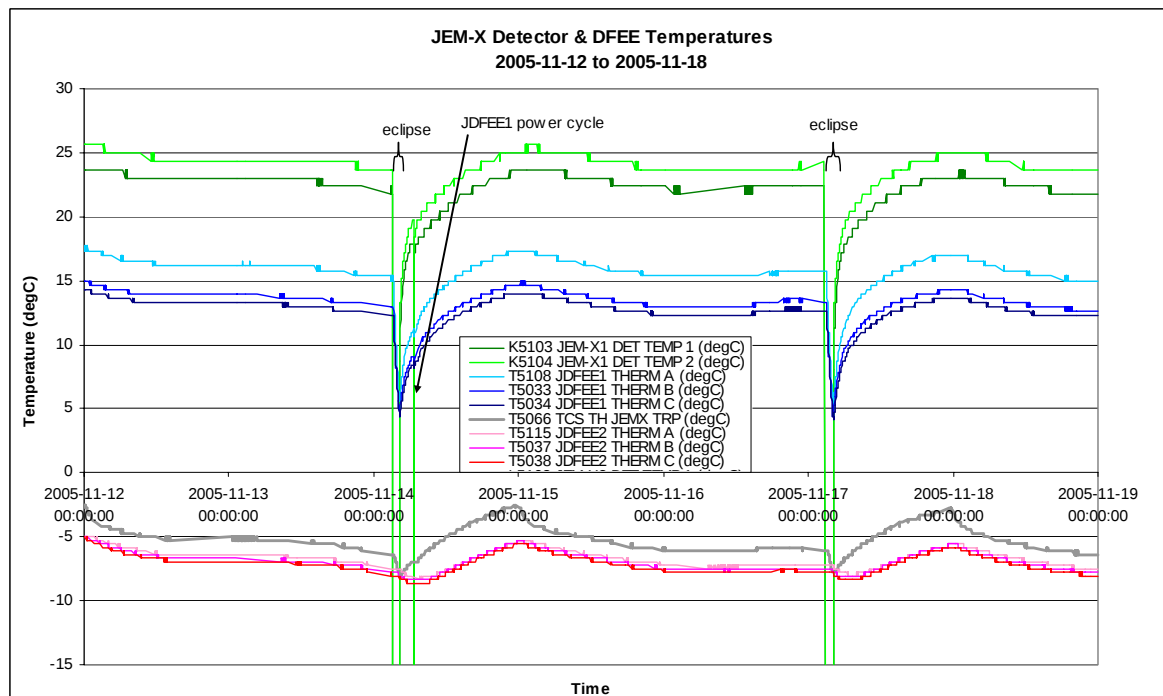
JEM-X count rates over the reporting period are displayed in the following graph¹.

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

² Data sampled (1 frame in 8)

2005-11-12 (DOY 316, Rev 376) to 2005-11-13 (DOY 317, Rev 376)

Nothing to report

2005-11-14 (DOY 318, Rev 376-377)

At 04:16Z, during the post-eclipse reconfiguration of JEM-X1 following the 2nd eclipse of this season, another DFEE anomaly occurred like those observed on 2004-06-20, 2004-06-23, 2004-12-08 and 2005-05-18 (ref: Anomaly Reports INT_SC-84; INT_SC-104 and INT_SC-119). This anomaly is recorded as INT_SC-131, the details of which are as follows:

The symptoms of the anomaly were:

1) The following OEMs were received after the JEM-X1 DFEE was switched on by the ED KECLEX01 in the Timeline (uplinked at 2005-11-14T04:15:17Z):

```
2005.318.04.15.57.896 2005.318.04.16.02.897 1536 Real Time 191
EVENT JEM-X1 PROB DFEE 11
  FIX6 11
  K9079 MESS CLASS 0
  K9080 MESS ID 191
  FIX16 8
  FIX16 0
```

>> Indicating that the operation "Load DFEE context" was unsuccessful due to CRC failure for code area B000 to CFFF.

```
2005.318.04.15.57.896 2005.318.04.16.02.924 1536 Real Time 234
EVENT JEM-X1 AUTO EVENT 4
  FIX6 4
  K9079 MESS CLASS 0
  K9080 MESS ID 234
  K5419 ACTUAL LEVEL ECLIPSE
  K5420 TARGET LEVEL RAD. BELTS
```

>>> Indicating failure of the automatic recovery from shutdown level ECLIPSE to shutdown level RAD. BELTS

2) Following the KECLEX01 ED, the JEM-X1 DFEE state (TM parameter K5022) remained MEMORY, instead of SAFE, and the Active Shutdown Level (TM parameter K5381) remained ECLIPSE instead of RAD. BELTS. This also remained the case after the broadcast packet radiation belt exit time of 2005-11-14T05:15:05Z.

3) The DFEE CPU speed, TM parameter K5583 CPU MODE, remained at a value of 8 MHz WAIT (as at start-up) rather than the nominal value of 16MHz.

Commanding to JEM-X1 from the Timeline was disabled at 05:44Z, before the Anode Calibration ED KEACAL01, and the recovery of JEM-X1 was then performed via a DFEE power cycle according to CRP_JEM1_5010 JEMX1 DFEE POWER CYCLE, consisting of:

- 06:32:52Z FCP_JEM1_9010 JEMX1 DFEE SWITCH OFF
- 06:40:28Z FCP_JEM1_0021 JEMX1 DFEE ACTIVATION

followed by further activation of JEM-X1 for science operations:

- 06:54:52Z FCP_JEM1_0042 JEMX1 ELECTRONIC CALIBRATION
- 07:15:46Z FCP_JEM1_1010 JEMX1 CONFIGURATION SETTING FOR

SCIENCE OPS

- 07:45:31Z Sequence KEDATA02 (ACTIVATE JEMX1 DATA TAKING MODE AND SET TRIGGER LIMIT) re-uplinked with the planned observation parameters for the ongoing observation.

Commanding to JEM-X1 from the Timeline was re-enabled at 07:47Z and JEM-X1 operations then continued nominally.

2005-11-15 (DOY 319, Rev 377) to 2005-11-16 (DOY 320, Rev 377)

Nothing to report

2005-11-17 (DOY 321, Rev 377-378)

Due to a problem with NCTRSA during the ground station handover from Redu to Vilspa (see Anomaly Report INT-2809), the ED KEDATA02 scheduled at 06:50:00Z was missed from the Timeline. Once a swap to NCTRSB and the handover were completed, the ED KEDATA02 was resent manually at 07:23:40Z. JEM-X1 operations then continued nominally.

2005-11-18 (DOY 322, Rev 378)

Nothing to report

8.3.5 OMC Operations

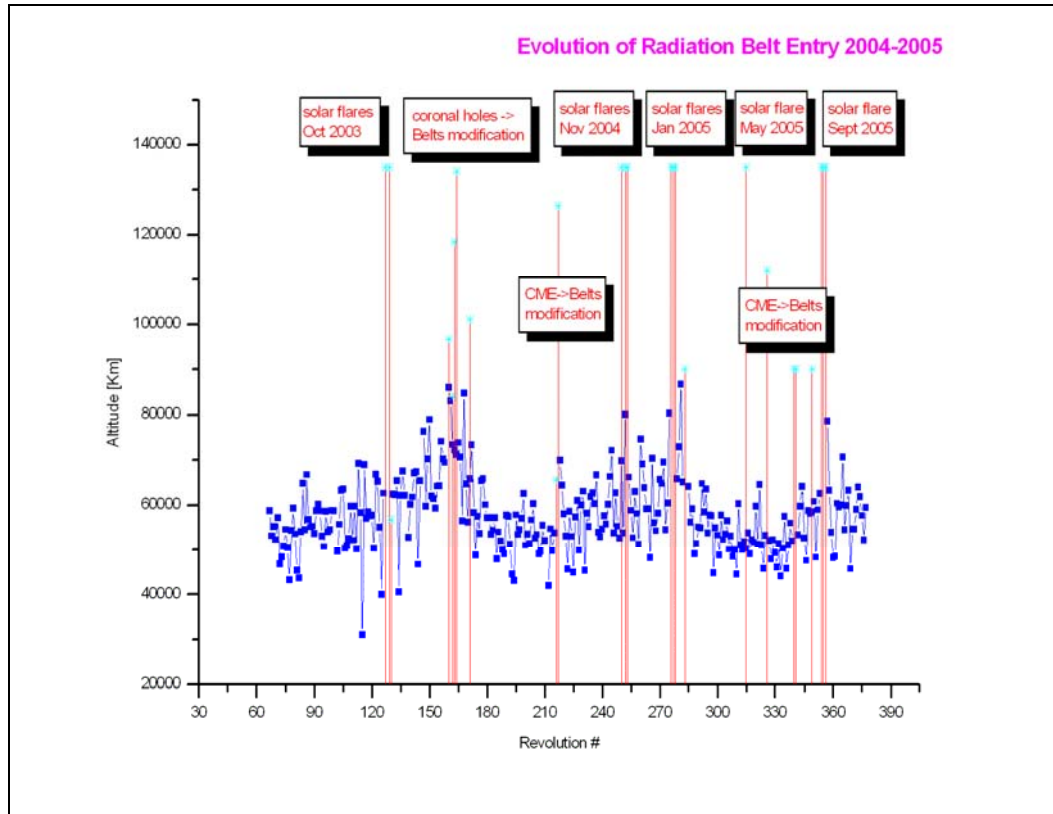
2005-11-12 (DOY 316, Rev 376) to 2005-11-18 (DOY 322, Rev 378)

Nothing to report

On DoY 317 at 19:57:14 and DoY 320 at 19:41:23 OMC was switched by the Timeline to SAFE mode, at the nominal time.

8.3.6 IREM Operations

Radiation Belts Entry



IREM daily report

Nothing to Report.

Electron Belts

REV	S/C BCPKT (electron)	Electron CUT-OFF Observed Entry/Exit	Observed Entry/Exit Altitude [Km]	Electron CUT-OFF Predicted Entry/Exit	Predicted Entry/Exit Altitude [Km]
376	RAD_ENTR R 2005-11-13T19:57:13Z	2005-11-13 20:58:42	52174.2	2005-11-13 21:04:00	51281
377	RAD_EXIT R 2005-11-14T05:15:05Z	2005-11-14 03:55:54	28144.4	2005-11-14 04:14:00	30474
377	RAD_ENTR R 2005-11-16T19:41:16Z	2005-11-16 19:45:38	59448.2	2005-11-16 20:41:35	52447
378	RAD_EXIT R 2005-11-17T04:59:48Z	2005-11-17 03:59:46	<31309.7	2005-11-17 04:01:35	30635

Reference

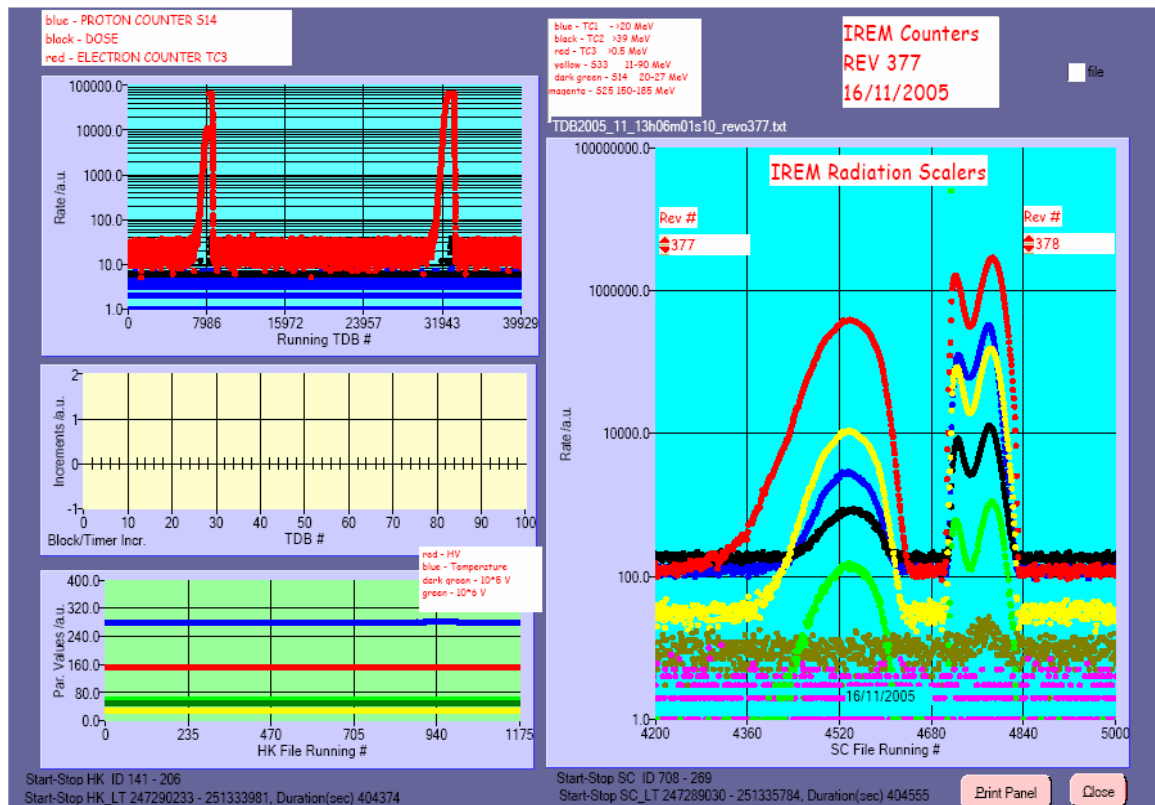
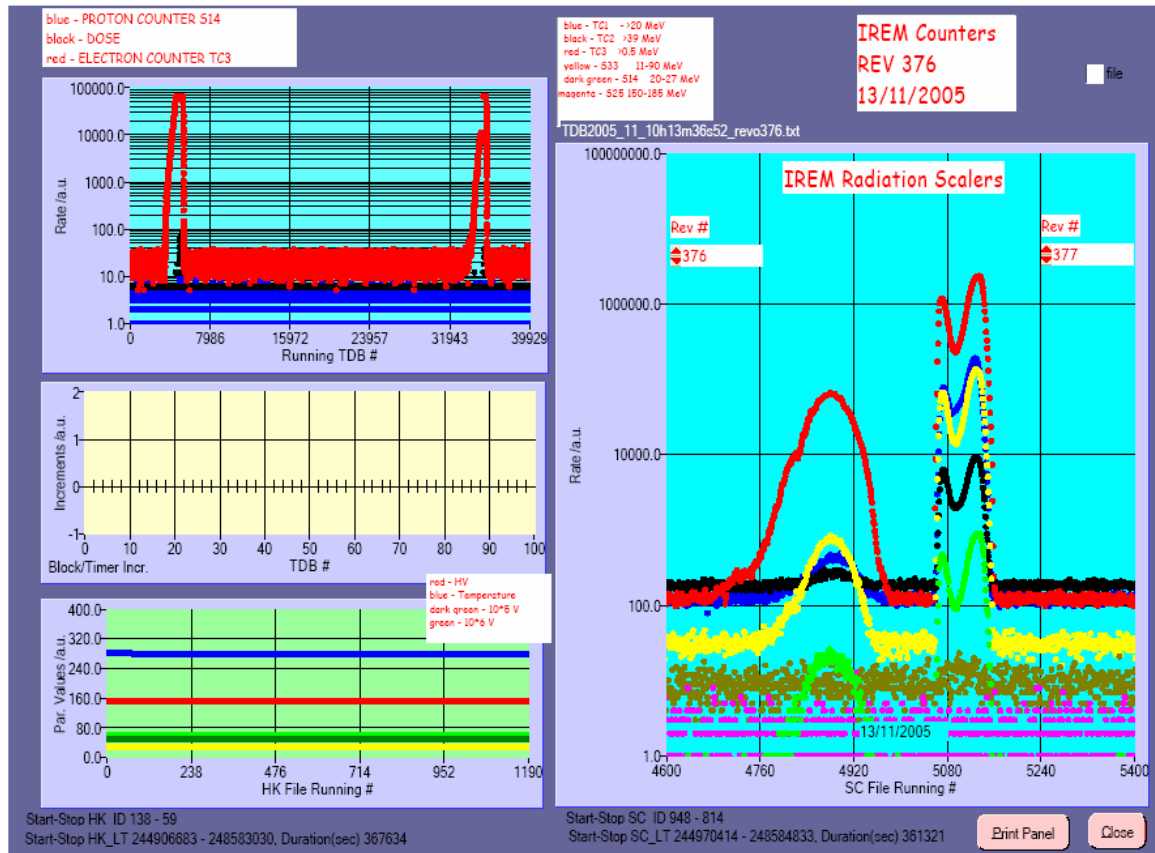
Very small error vs reference (less than 10 minutes)

Small error vs reference (between 10 and 30 minutes)

Large error vs reference (more than 30 minutes)

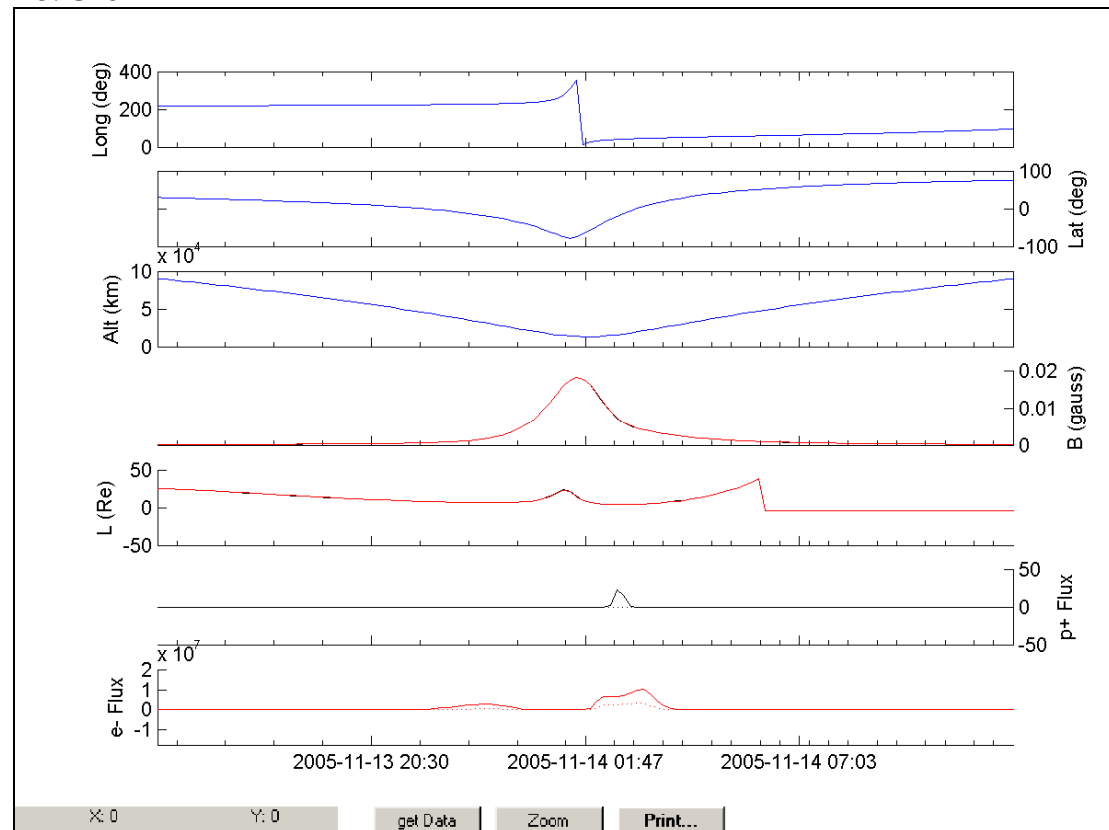
Radiation Spike

IREM radiation counters:

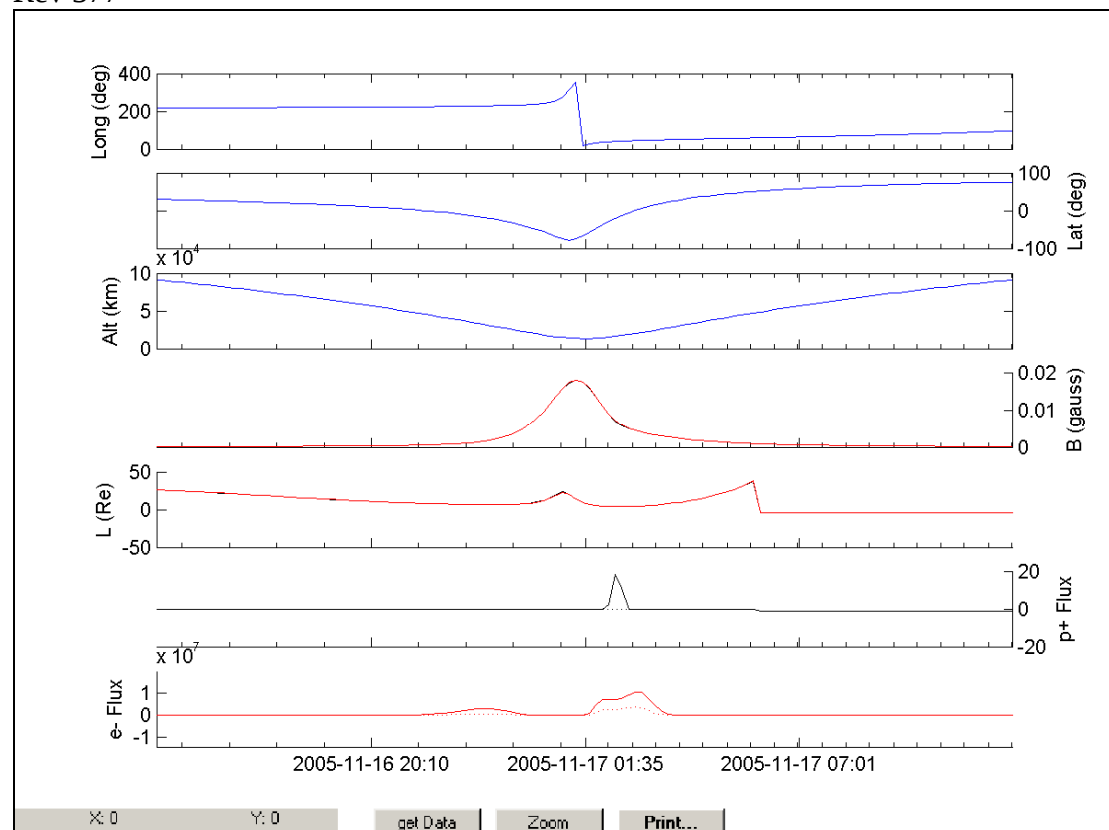


IREM Predicted Radiation Belt Passages:

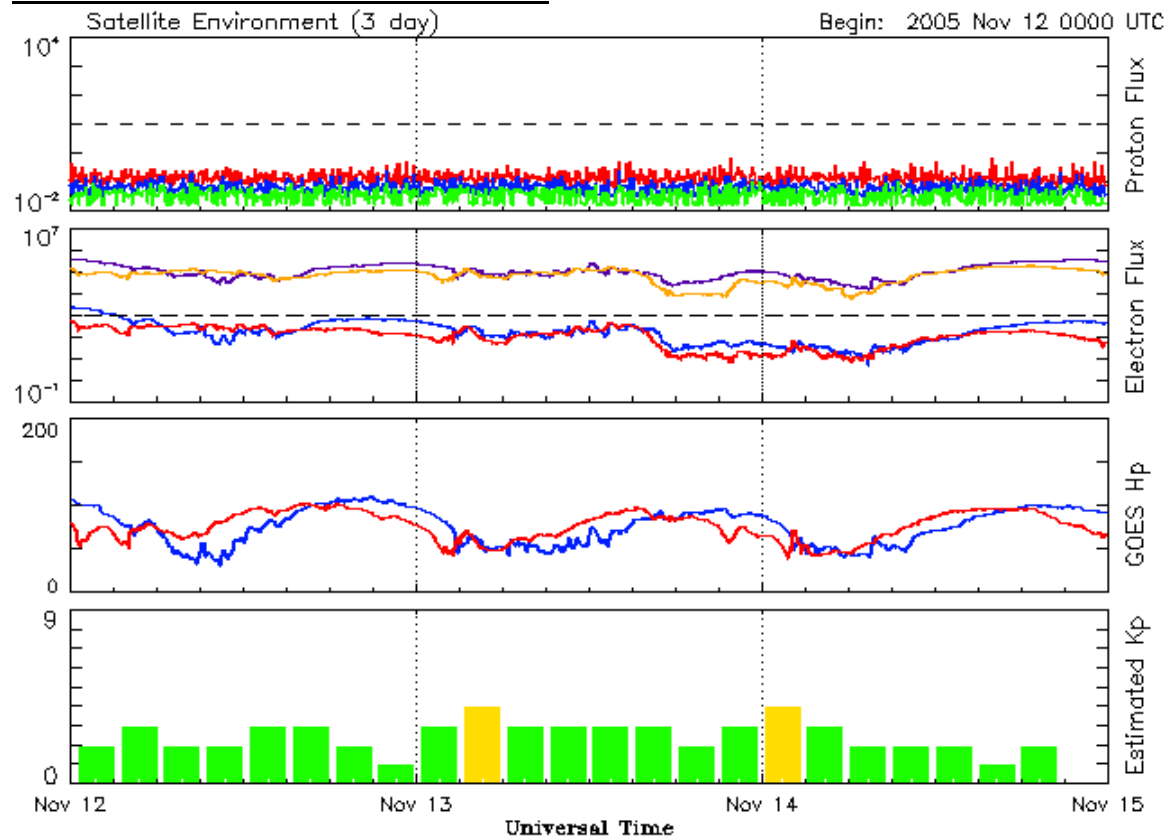
Rev 376



Rev 377

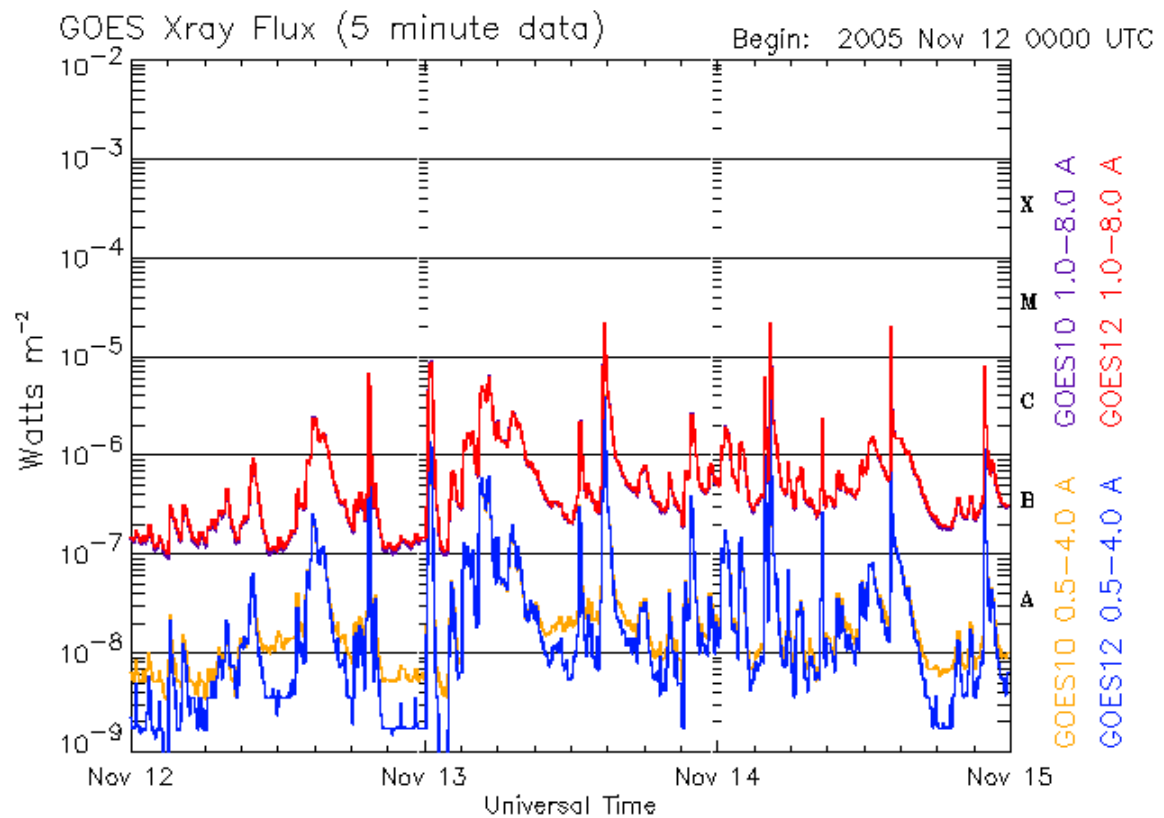


SEC-GOES Observed Particles Fluxes:



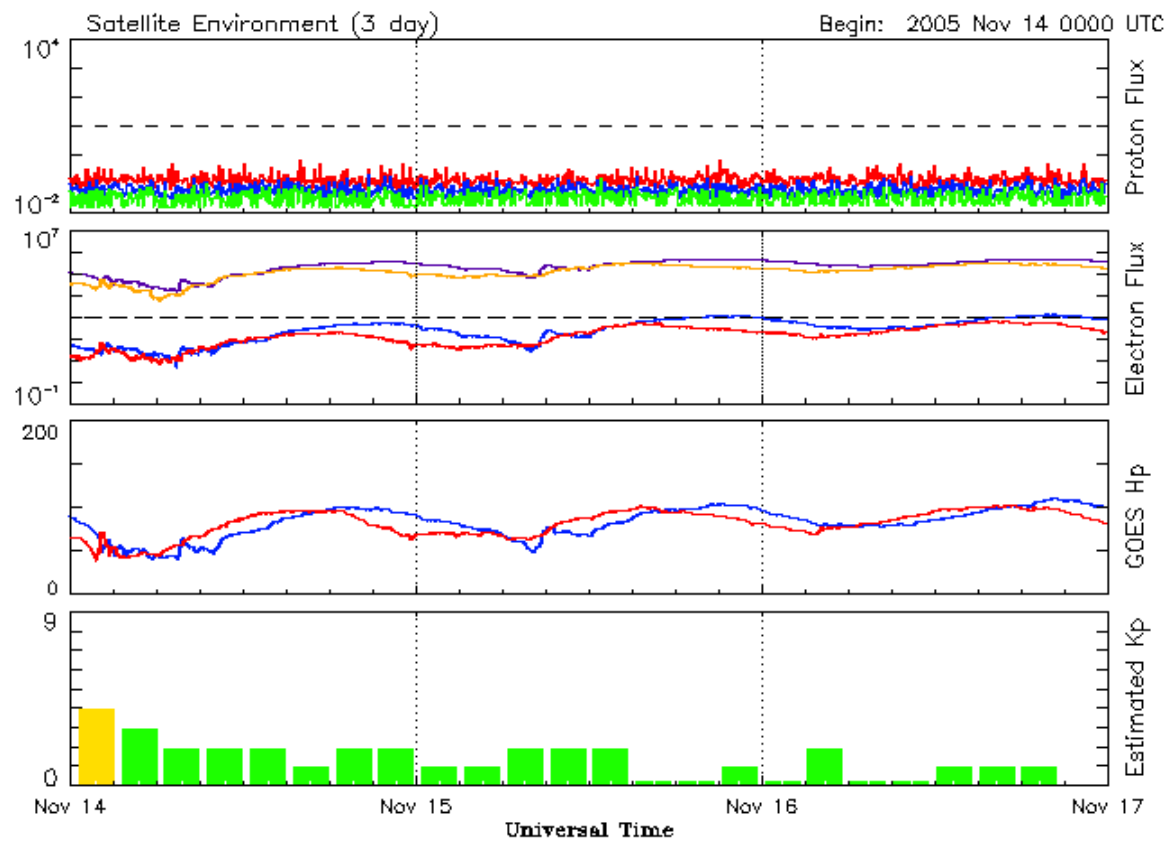
Updated 2005 Nov 14 23:56:14 UTC

NOAA/SEC Boulder, CO USA



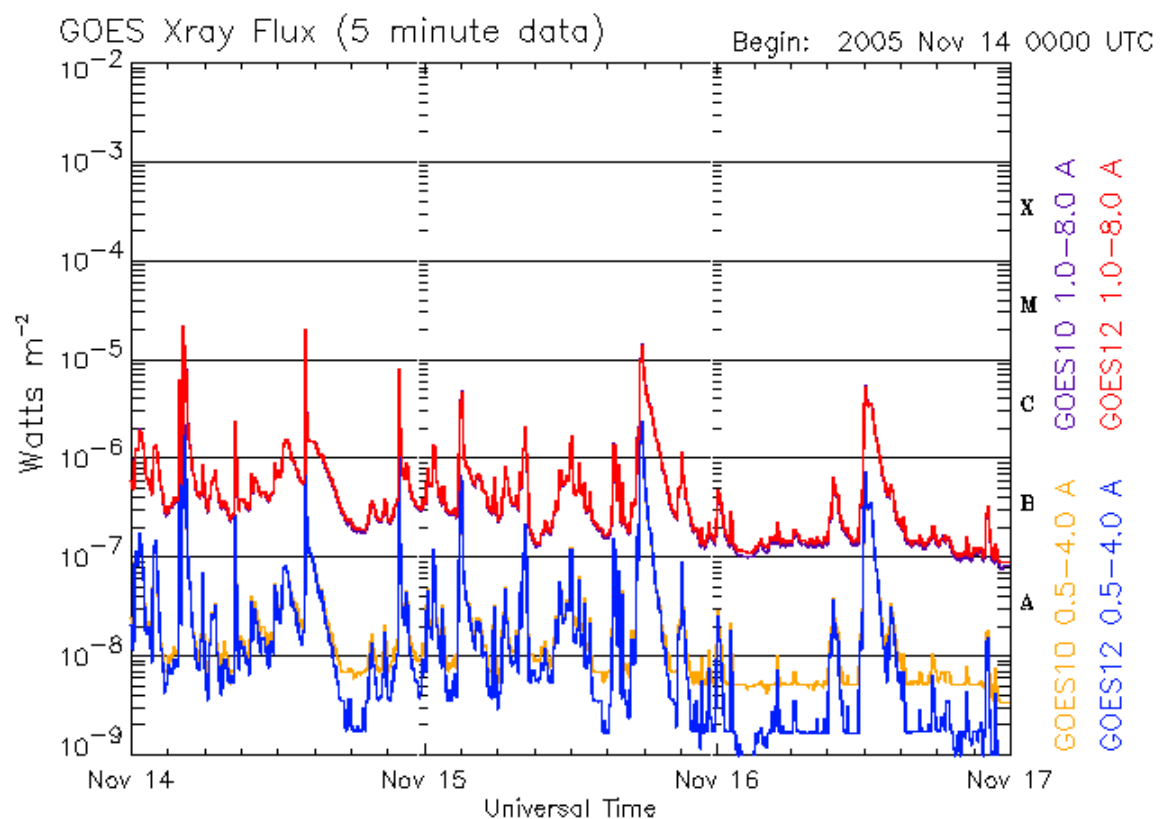
Updated 2005 Nov 14 23:56:05 UTC

NOAA/SEC Boulder, CO USA



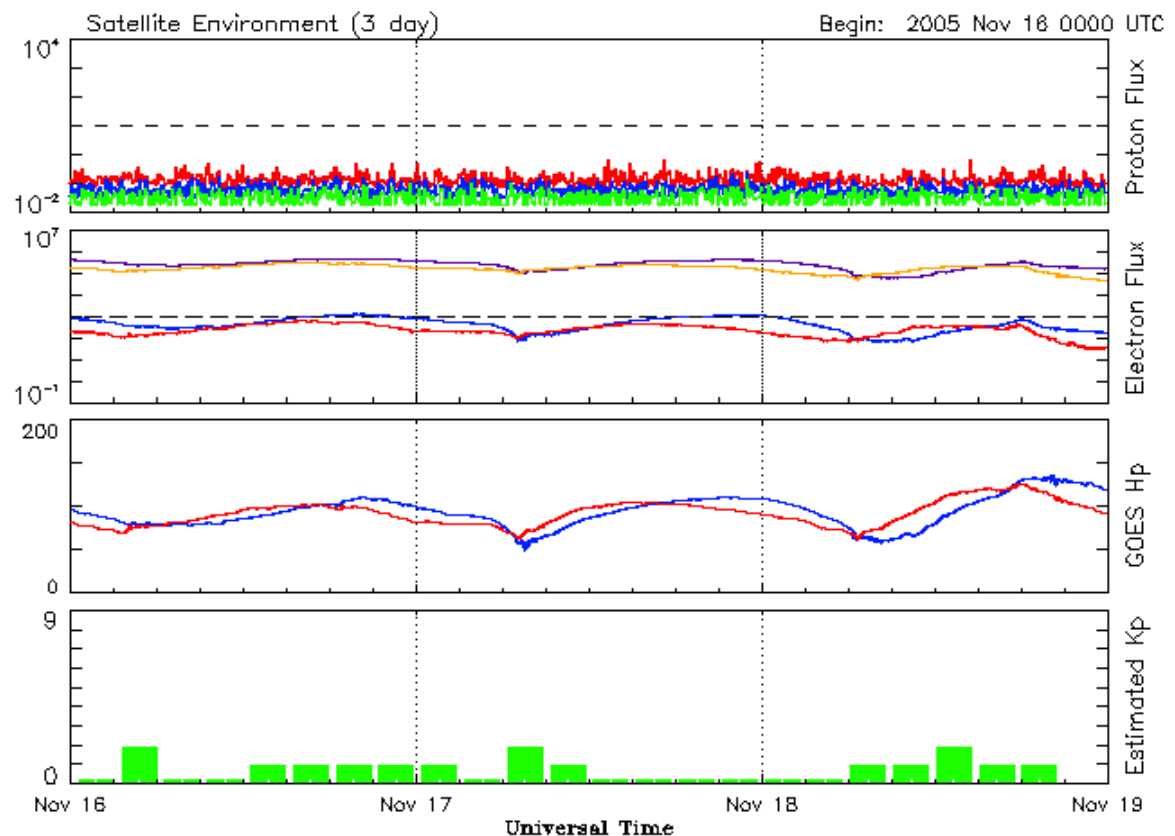
Updated 2005 Nov 16 23:56:13 UTC

NOAA/SEC Boulder, CO USA



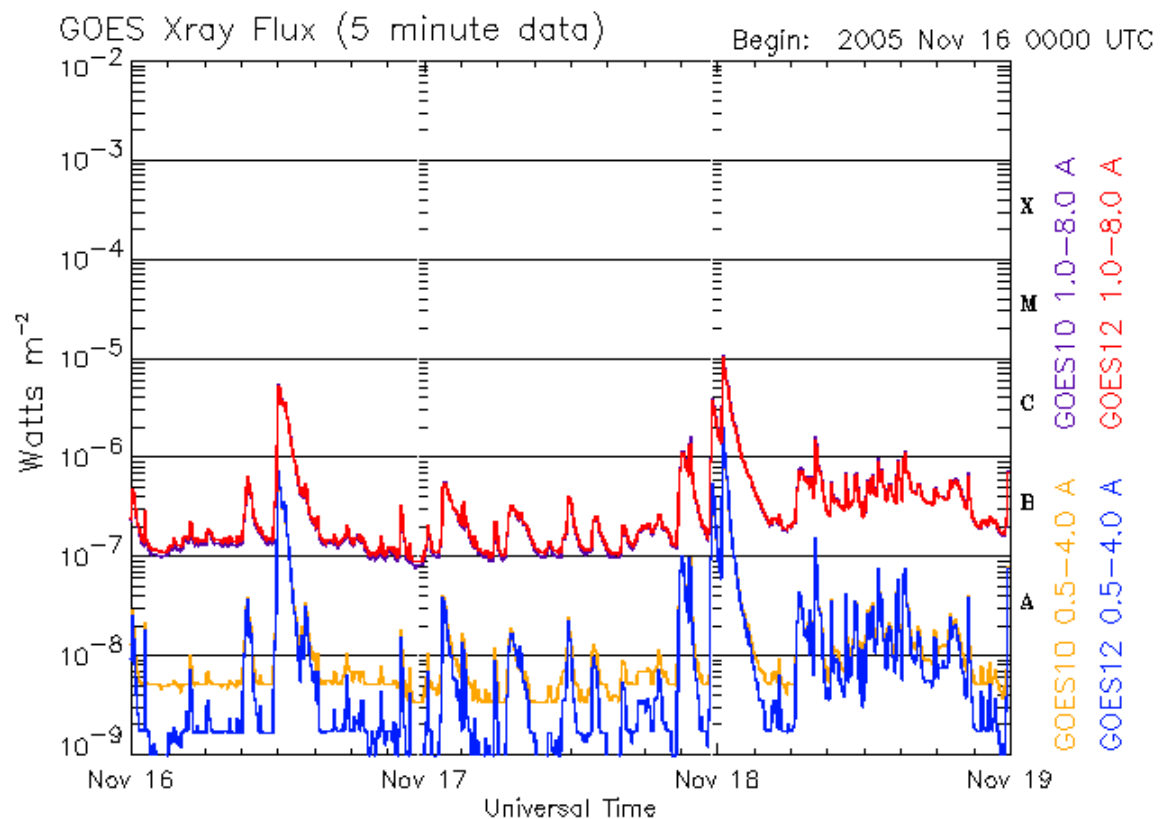
Updated 2005 Nov 16 23:56:03 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Nov 18 23:56:14 UTC

NOAA/SEC Boulder, CO USA



Updated 2005 Nov 18 23:56:05 UTC

NOAA/SEC Boulder, CO USA