

Meeting date	23.-24.03.2004	ref./réf.	XMM-SOC-CAL_EPIC-MIN-0013	page/page	1 8
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date de la réunion

Meeting place	VILSPA	chairman	S. Sembay
<i>lieu de la réunion</i>		<i>président</i>	

Minute's date	20-04-2004	Participant
<i>dates de minute</i>		Andy Read Eckhard Kendziorra Frank Haberl Jean Ballet Konrad Dennerl Michael Freyberg Nicola La Palombara (partly) Andrea De Luca Vadim Burwitz Wolfgang Pietsch Steve Sembay Ulrich Briel Marcus Kirsch Matthias Ehle Michael Smith Tony Abbey Darren Baskill Bruno Altieri Cor de Vries Andy Pollock Jan Willem den Herder

Subject/objet	EPIC CAL Meeting 13	copy/copi
		<i>F.Jansen</i>

1 XSA Demo (MG)

Version 2.5 of the XMM-Newton Science Archive (XSA) is now available at the following URL:

http://xmm.vilspa.esa.es/external/xmm_data_acc/xsa/index.shtml

This version includes an extensive suite of new querying, results display and, above all, data processing functionalities:

- on-line reprocessing of ODF data for the EPIC, RGS and OM (imaging mode) cameras through the latest public SAS data reduction meta-tasks (emproc, epproc, rgsproc, omichain) via the XSA user interface. Output products are stored in an ftp area for retrieval after processing completion, together with the Calibration Index File and the ODF summary file generated by the reduction
- filtering of PPS EPIC event lists, according to standard "selectlib" expressions (<http://xmm.vilspa.esa.es/sas/current/doc/selectlib/index.html>) prior to retrieval
- interactive extraction of spectra and light curves from sky regions defined on EPIC exposure image icons in the XSA FITS viewer tool. Response matrices are generated alongside spectral products. Again, data can be screened, upon accumulation of scientific products, using the same data selection expressions as in "xmm/evselect" or "especget". Output files are made available in an ftp area for retrieval after processing completion
- sorting of query results according to different parameters (i.e.: observation start time, distance from nominal pointing, proprietary rights expiry date, in addition to the default observation ID)
- links are provided from the "Details" page of each observation to a large set of operational files : proposal abstract, instrument configuration, timeline summary, telecommand history, real-time observation event reports
- a new visualization facility is offered for PPS maximum likelihood EPIC source lists

A short "guided tour" of the XSA is available at the following URL:

http://xmm.vilspa.esa.es/external/xmm_data_acc/xsa/docs/tour.shtml

together with a list of "how-to" oriented Frequently Asked Questions:

http://xmm.vilspa.esa.es/external/xmm_data_acc/xsa/docs/xsa_faq_usage.shtml

- discussion on the incompatibility between SAS v6.0.0 and PPS-generated event lists stored in the XSA, just referring to the ongoing analysis.

2 Bit flips in the MOS offset tables (JB)

- sudden increase of one on-board offset, disappearing again after a few revolutions. Events falling on the corresponding row/column and its neighbours are rejected because of a very negative ENERGYE3 and ENERGYE4."
- detection algorithm has been developed and is implemented in SAS6.0

3 MOS column by column CTI correction (DB)

- preliminary analysis of column-by-column CTI variations with SAS 5.4.1
- all cti and gain corrections used; i.e. looking at the CTI variation with respect to the current (early 2004) calibration
- all calclosed observations per 100 revolutions summated (to get sufficient number of counts). This allows analysis of column-by-column CTI variations over 6 time periods.
- up to 200 eV differences between different columns
- FWHM/SQRT(N):50/30 ~ 2 ADU error

4 XRT point spread function (AR)

I) Analysis on MGC-6-30-15 (only for on axis)

- Status 5.4.1: extracting spectra for different radii is producing different powerlaw indices and normalizations
- With new PSF: powerlaw indices and normalization can be made agreeing by changing energy dependence of core radius and alpha
- 5.4.1 (MOS2 versus pn):
diff in slope: 0.12
diff in normalization: 13 % MOS higher
- AMR (MOS2 versus pn):
diff in slope: 0.01
diff in normalization: 11 % MOS higher
- . Analysis has also been performed using 3C273
- There were a few cross-calibration comparisons made and generally the AMR PSFs are resulting in much better agreement with the fitted spectral slopes and better (though not excellent) agreements with the fitted fluxes (compared to the current CAL PSFs).

II) Model to fit the PSF better in the core

- MOSs may require an extra small Gaussian component to model the core of the PSFs (PN does not need this).
- Current MOS PSFs underpredict flux at the very core.

5 MOS Timing Modes prospective (AA)

- Timing mode has poor DNL (no Gatti correction in order not to corrupt timing information)
- new idea: bring back Gatti
- possibility of implementing a GATTI correction in the flight s/w.
- comment EK: possibility of calibrating individually via background data

6 MOS Timing mode: calibration status (MK)

- Energy calibration:
 - MOS timing mode energy calibration agrees within $\pm 0.3\%$ with MOS-LW data at $\sim 6-7$ keV
 - pn Timing mode > MOS Timing mode by 0.3% (SS433)
 - pn Timing mode > pn FF mode by 0.3% (Cas-A)
 MOS FF mode should agree there with MOS Timing mode if source is not extended and bright
 For bright extended sources MOS would need a rate dependent CTI model !
 Rev 832: Cas-A observation in
 pn: FF and extFF
 MOS: Timing and LW
- Flux calibration:
 - Discrepancy of up to 10-15 % at energies below 1keV
 - Contradictory results for different targets and observations

7 pn DRM update (FH)

- zeta puppis spectrum: pn DRM is worse than data
- flat shelf of partial event model does not agree for different sources
- Si and Au edges gain problems improvements in red chi2 by changing that edges

8 pn detector noise suppression (KD)

- detector noise in FF 2.16 times higher than in eFF: mainly readout noise
- epreject:
 - offset corrections
 - noise corrections
- Vela:
 - full field O line illumination in order to check spatial dependent CTI correction from Vela moving observations

9 pn CTI corrections for window modes (MJF)

- Comparison of CTI in slow and fast shifts with the ground camera at Panter
- pin hole measurements at Panter in window and outside of window
- different CTI values for the ground and in orbit cameras
- probably due to different impurities/traps in the silicon
- calibration parameters for the flight model need an observation of N132D in shift position
- draft NRCO already in place, 40 ks

10 Update of soft flare rejection in Timing Mode (VB)

- all Timing mode observations show low-energy flares created by heavy particles (maximum ionising particles)
- - low energy flares can be filtered out by the epreject tool in the Timing mode with SAS 6.0
- - needs manual intervention in order to optimise the screening
- - most of this FIFO gaps are not recognised by good time intervals (not serious for most sources)

11 Temporal variation of the energy response (KOD)

- similar to MS presentation but with emphasis on calibration:
- long-term CTI correction: slightly overcorrected at Mn-K: CCF to be changed

12 Extreme low-energy features PSF (AMR)

- MOS1/2 < 250 eV, spectra in annuli normalized by core spectrum
- in MOS1 fewer low-energy events at larger radii
- MOS1 "<160 eV" PSF seems to be more compact
- difference may decrease at later revolutions due to increased redistribution

13 Astrometry (BA)

- Evidence for systematic offsets for MOS periferical CCDs
- new LINCOR CCF at DT
- Astrometry: Suspicion of systematic shifts
- To be verified with bulk reprocessing

14 RGS calibration accuracy (JW)

- typical accuracy of effective area is 15 %
- second order data is scaled to first order data
- correct QE CCD1 in RGS2 by 0.8 (CCD from poorer quality batch)
- O-edge introduced
- beta dependent fudge factor applied
- time variation
- >
- absolute uncertainty: +/- 15 %, < 40 %
- slope < 30 % over 10-35 Å
- suggestions:
- set a goal 5 %
- do we know time variability of EPIC at % level
- weaker sources (PKS0558, NS, 1E0102,...) with longer integration times
- compare to Chandra
- Proposal of Crab observation by RGS and EPIC, by SS

15 RGS stability (CdV)

- 1E0102 line ratios over time a few % difference
- stability of oxygen edge
 - no change in redistribution function
 - only 0.5 % drop in gain since cooling
 - > RGS is very stable over time

16 XMM Newton Cross Calibration (MK,AP)

- approach:
 - take various kinds of sources
 - fit: const(model) where:
 - const_p=1, others free, and model parameters linked
 - continuum sources: EPIC spectra as start for simultaneous fits
 - line rich sources: RGS spectra as start for simultaneous fits
 - compare absolute normalization constants
 - compare relative spectral features
- results:
 - RGS shows ~20 % less flux than EPIC and in addition flatter spectra

17 CROSS CALIBRATION DISCUSSION

- MOS and pn show problems in the redistribution
- MOS low energy problem seem to be caused by redistribution and NOT by contamination
- we have to get the redistribution for pn and MOS sorted out, before we can start to work on more detailed cross calibration
- RGS comparison should be done for different energy ranges
- zeta Puppis and RXJ1856 should be observed every 6 month
- PSF should be understood
- repeat VILSPA cross cal with A. Read PSF new redistribution
- Si region should be checked and astrophysical feature should be excluded
- Au edge problem should be sorted out in discussion with Bernd Aschenbach

18 Splinter Meeting: Slew Data

- Slew observations are only performed for slews of > 0.5 hours
- slew is 90deg per hour
- Data could be used for science purpose.
- Silvano should be asked if he has enough data for his purpose.
- Bruno to provide slew statistics.
- BA to send a long slew to MJF.

- Recommendation by the EPIC consortium: use all slew observations for CALCLOSED with the mode of the last observations.
Note new calculation of offset table is needed.
This data will be checked in the next half year.
- And further decisions will be taken.

- Check to be done with M. Watson (SSC) concerning scientific use of slew data

19 Splinter Meeting: pn-offset

1. The pn-team will NOT use fixed offset tables.

2. The pn-team will change the method of offset table calculation for FF from 100 times to 50 times. This will reduce the overhead time by 10 min

3. The same change would be applied to eFF, if an engineering test (defined below) is successful. This would reduce the overhead time by 25 min.

4. The pn-team wants to have the offset tables in the ODF. This is important for improvement of the low energy corrections in the (future) SAS. In order to assign the offset tables to the right ODF it is proposed to dump the offset tables in the observation. This will increase the overhead time by 8 min for every exposure. However that will reduce the manpower at the SOC currently needed to assign the tables manually to 0.

A 1 ks engineering observation with offset table calculation 50 times in eFF CALCLOSED proposed. This observation should be done under worst radiation conditions in order to have a conservative approximation. Mauro proposes for that the time from perigee +4 hours to perigee +6 hours, where currently no observations are performed. That observation should be performed ASAP.

20 actions

- AI_EPIC_13_1: Steve and RS to put new MOS redistribution into DT
- AI_EPIC_13_2: FH estimate uncertainties due to pn redistribution
- AI_EPIC_13_3: Bruno to provide slew statistics and to send a long slew to MJF.
- AI_EPIC_13_4: MK to change pn long term CTI in CCF
- AI_EPIC_13_5: RS implement CTI tuning functionality for pn eFF in CAL
- AI_EPIC_13_6: MK to update pn CTI CCF for eFF CTI tuning
- AI_EPIC_13_7: RS to enable the OAL the determine the PN offset maps (ODI)

21 Open old action items

- AI_EPIC_CAL_11_5: Frank to verify pn QE with the Crab
- AI_EPIC_CAL_12_5: TA to provide VILSPA with new sequences with old BS

22 Closed old action items in period of last Cal_meeting to this CAL-meeting

- AI_EPIC_CAL_11_6: RS to follow up the possible coordinate problem
- AI_EPIC_CAL_11_7: MK to implement values from filter CCF_6 in a new CCF
- AI_EPIC_CAL_11_8: EK/UB/MK to organise an observation with fixed offset upload in perigee
- AI_EPIC_CAL_12_1: MK to provide a proposal for MOS LOW energy problem follow up measurements.
- AI_EPIC_CAL_12_2: MK to organise Cas-A observations for EFF calibration of pn
- AI_EPIC_CAL_12_3: BA to provide status of RGS versus EPIC BS with proposal to go for one BS.
- AI_EPIC_CAL_12_6: MS/ME to make Offset maps available at VILSPA for the users & X-ray loading information.
- AI_EPIC_CAL_12_7: MK to follow up time jump problem.
- AI_EPIC_CAL_12_8: MK/LM to sort out possible resources for implementing Molendi/Sembay pile-up correction into SAS.
- AI_EPIC_CAL_12_9: SS to provide VILSPA with time dependent new QE files.
- AI_EPIC_CAL_12_10: SS to refine the ADUCONF files to cope with the slight over correction.
- AI_EPIC_CAL_12_11: BA/MS to review limits for optical loading in UHB