XMM-Newton CCF Release Note

XMM-CCF-REL-4

EPIC Bad Pixels

D Lumb

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1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
EMOS1_BADPIX_0006	2000-01-01T00:00:00	BADPIX		YES
EMOS2_BADPIX_0006	2000-01-01T00:00:00	BADPIX		YES
EPN_BADPIX_0008	2000-01-01T00:00:00	BADPIX ADUOFFSET		YES

2 Changes

There is a range of phenomena that can be classed as bad pixels. The most obvious manifestation is of individual pixels which exhibit a small above-threshold signal in most readout frames. These are generally blanked out of the telemetry by the on-board electronics. Occasionally a new bad pixel can occur, and the cycle of database updates can take some weeks to implement its rejection and implementation in the calibration files. The user might recognise these as a bright pixel in an image, and a spurious low energy emission line feature. Some bad pixels occur at such a low duty cycle that they are not implemented on-board, and indeed may be transient features. Such "warm" pixels and the temporarily un-flagged hot pixels can be detected and flagged by running the SAS task badpixfind, and applying the spatial mask filter which results.

The OFFSET extension of the PN files includes a value for the ADU offsets applied to individual whole columns, in order to reduce telemetered rates of low level pixels. This offset value must then be subtracted out on-ground to obtain the correct energy value.

3 Scientific Impact of this Update

First Release

4 Estimated Scientific Quality

The response generation tasks make a rudimentary correction for the consequent area losses, but secondary effects of changing pattern types can occur (for example bi-pixel events become single pixel events). As long as a bad pixel does not occur at the peak of the PSF or extraction region, the errors in correction will not be significant.

Currently the CAL does not handle the PN offset columns, so a small number of columns have the incorrect energy values removed via hard-coded numbers.

5 Expected Updates

Whenever there is a new release of badpixels for on-board the CCF file will be updated. Not-uplinked bad pixels which are found to be stable and should be placed in the file will be added as necessary