

XMM-Newton CCF Release Note

XMM-CCF-REL-149

MOS columns with shifted energies

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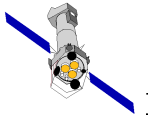
1 CCF components

Name of CCF	VALDATE (start of val. period)	EVALDATE (end of validity period)	List of Blocks changed	CAL VERSION	XSCS flag
EMOS1_BADPIX_0017	1999-12-10 06:30:00	2000-05-12 06:29:59	BADPIX		NO
EMOS2_BADPIX_0017	1999-12-10 06:30:00	2000-05-12 06:29:59	BADPIX		NO
EMOS1_BADPIX_0018	2000-05-12 06:30:00	2000-07-10 20:59:59	BADPIX		NO
EMOS2_BADPIX_0018	2000-05-12 06:30:00	2000-07-10 20:59:59	BADPIX		NO
EMOS1_BADPIX_0019	2000-07-10 21:00:00	2000-12-13 11:59:59	BADPIX		NO
EMOS2_BADPIX_0019	2000-07-10 21:00:00	2000-12-13 11:59:59	BADPIX		NO
EMOS1_BADPIX_0020	2000-12-13 12:00:00	2001-09-17 23:59:59	BADPIX		NO
EMOS2_BADPIX_0020	2000-12-13 12:00:00	2001-09-17 23:59:59	BADPIX		NO
EMOS1_BADPIX_0021	2001-09-18 00:00:00	2001-11-27 17:59:59	BADPIX		NO
EMOS2_BADPIX_0021	2001-09-18 00:00:00	2001-11-27 17:59:59	BADPIX		NO
EMOS1_BADPIX_0022	2001-11-27 18:00:00	2002-12-11 11:59:59	BADPIX		NO
EMOS2_BADPIX_0022	2001-11-27 18:00:00	2002-12-11 11:59:59	BADPIX		NO
EMOS1_BADPIX_0023	2002-12-11 12:00:00		BADPIX		NO
EMOS2_BADPIX_0023	2002-12-11 12:00:00		BADPIX		NO

2 Changes

The EPIC MOS cameras have columns where the energy of the pixels in all or part of the column are shifted by up to 1 keV. Most of these columns exist since the Orsay ground (pre-flight) calibration data (Pratt & Ballet, 2003).

The worst of these columns have been declared dead in this MOS BADPIX CCF.



3 Scientific Impact of this Update

88 and 57 column segments have been added and declared as dead in all BADPIX CCFs for MOS1 and MOS2 respectively, covering the seven time periods since launch. The effect on the exposure maps can be appreciated in figures 1 & 2.

Some minimal effective area will be lost with this shifted-energy column flagging. Note that none of these columns falls around or close to the nominal target boresight position.

Note that an error in the previous issue 13, now issue 21, covering the revolution range 325 to 361 was corrected: in this short period the defects from the micrometeoroid impact (rev 325) were not flagged as dead areas, while they were in the following period from rev 361 until the CCD cooling (rev553), together with an on-board masking of the high-PHA hot pixels.

After the cooling, a large fraction of the few remaining hot pixels are the ones due to the micrometeoroid impacts, although much less hot, than before, both in terms of PHA (energy) and recurrence frequency, (for instance, the MOS1 rev 325 meteoroid defects which are all located in CCD 6 & 7). They are hence flagged and masked in the on-board hot pixel tables, and flagged as such in the relevant bad pixel CCF (issue 16). But no dead area (3x3 pixels) due to pattern migration has been flagged anymore around the hotter of these defects (about 5 pixels per camera), as they were in the past versions.

4 Estimated Scientific Quality

The energy scale for extended sources or point sources falling on a CCD area where one or several shifted-energy columns are located will be improved, although at the expense of losing a bit of flux.

5 Test procedures & results

These new CCFs can be used only in conjunction with a new emevents (version 7.6 or higher) task, that will be part of SAS v6 (January 2004 ?), otherwise events flagged in these columns with shifted energies will not be handled correctly by the SAS. The SAS 5.4 version of emevents would simply ignore them, so the events would still be here although the bad columns would be blanked out in the exposure map.

These new CCFs have been tested with the local development version at VilSpa and at Saclay by Jean Ballet: all expected columns are now properly masked.

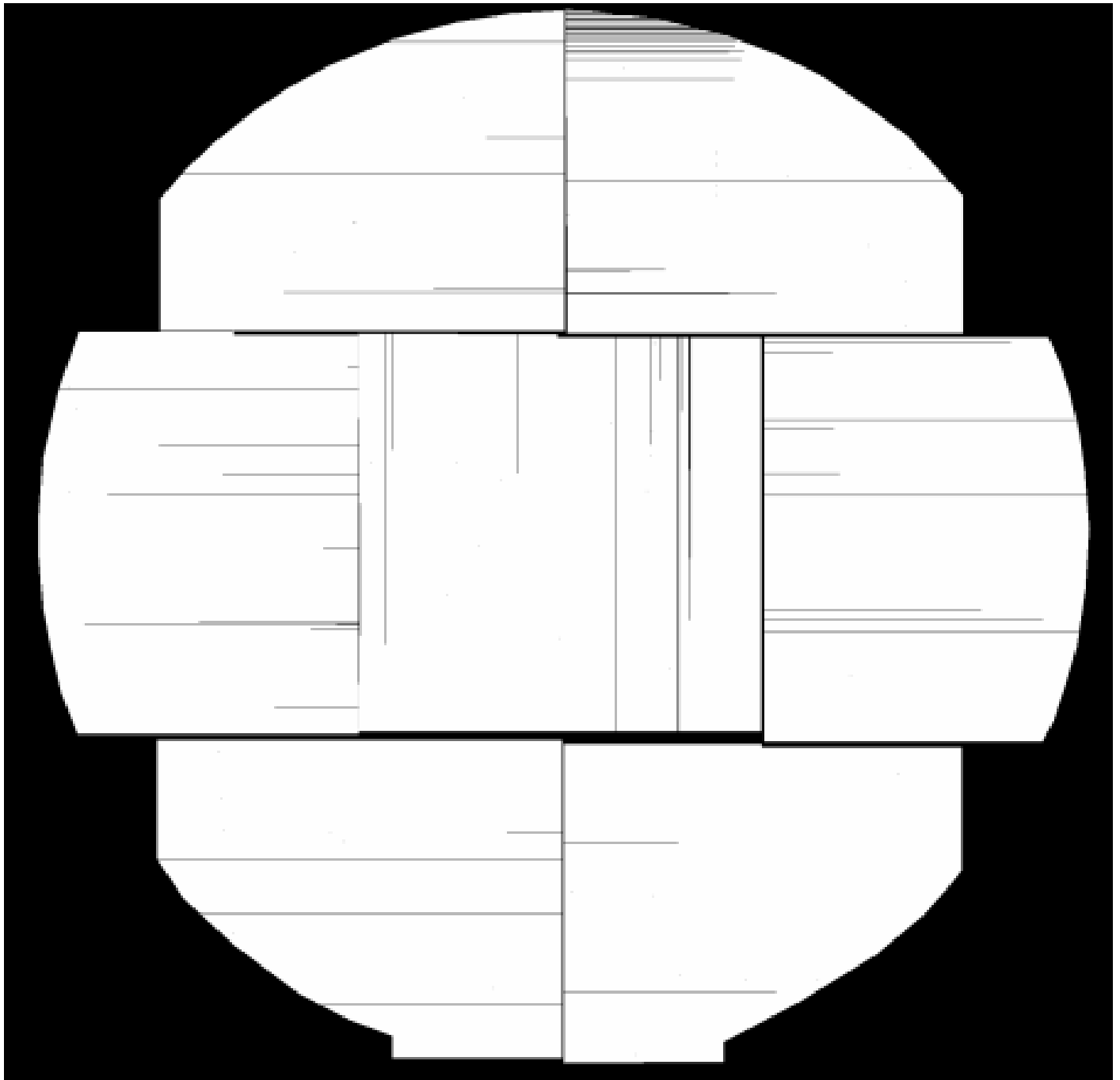
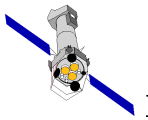


Figure 1: MOS1 exposure map with the 88 columns/segment masked out

6 Expected Updates

None.

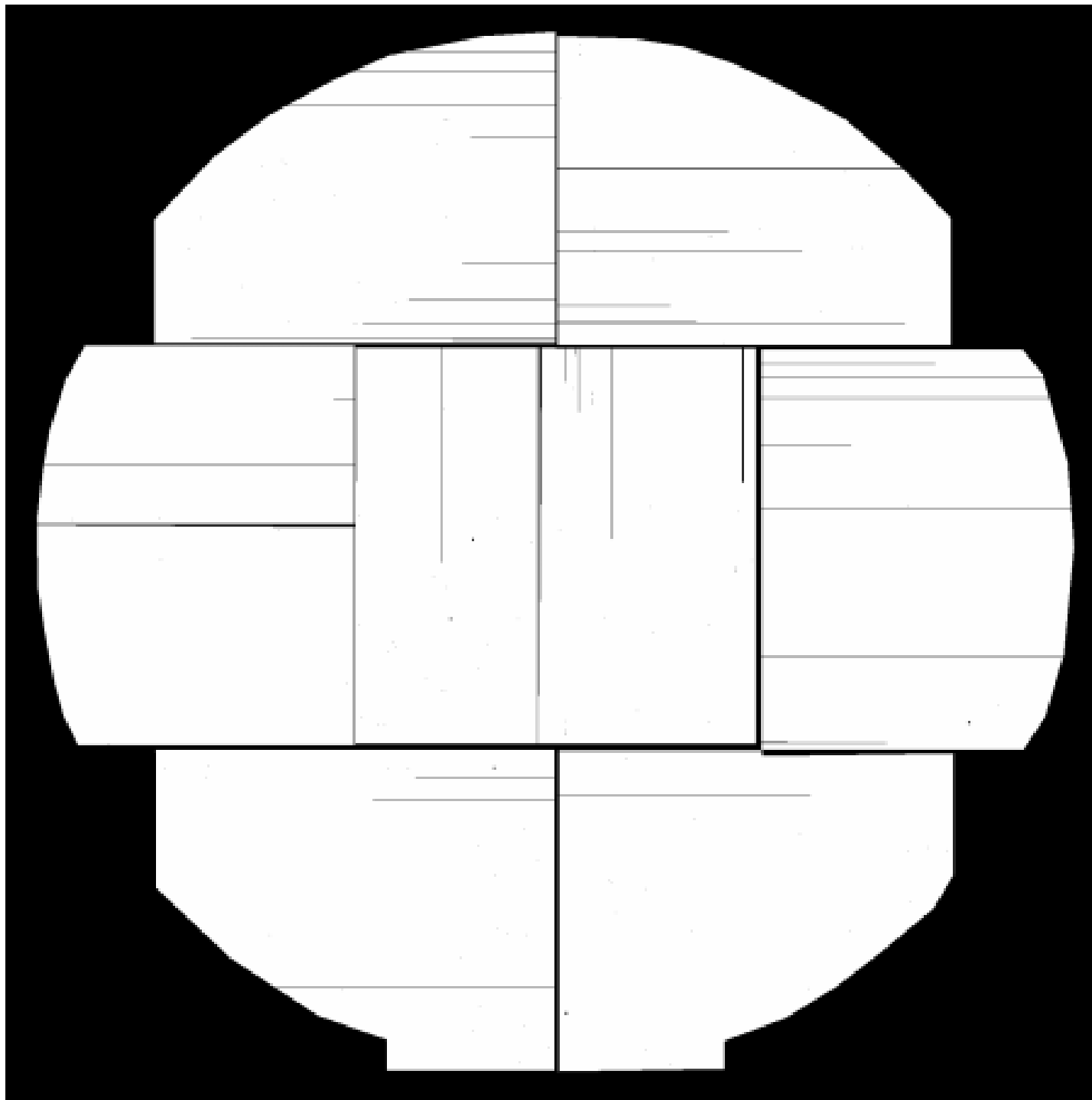
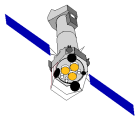


Figure 2: MOS2 exposure map with the 57 columns/segment masked out

7 References

Characterisation of MOS columns with shifted energies, EPIC-SAP-GWP-01, version 1.0, G.W. Pratt & J. Ballet, XMM-SOC-CAL-TN-0040