

XMM-Newton CCF Release Note

XMM-CCF-REL-86

EPIC MOS ASTROMETRY

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1 CCF components

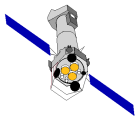
Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
EMOS1_LINCOORD_0016	2000-01-01T00:00:00	FOV		NO
EMOS2_LINCOORD_0016	2000-01-01T00:00:00	FOV		NO

2 Changes

The relative positions between CCDs for both MOS cameras have been adjusted to provide the highest astrometric accuracy over the full field-of-view of the MOS cameras. The new relative positions are mostly derived from a study by M. Denby using the bright stellar OMC field (from rev 237), cross-correlating XMM positions with optical positions.

This has been confirmed independently by B. Altieri with deep surveys: (i) on the Lockman Hole and cross-correlating with optical ROSAT sources counterparts, as found by Lehmann et al. (2001) and (ii) the 100ks deep exposure on the HDF-North (revolution 271), cross-correlating with high-accuracy VLA radio-positions from Richards et al. (2000)

A few CCDs were shifted up to 3 arcsec, mostly MOS1 CCD3 and MOS2 CCD4 and CCD5 (that cover a similar area of the sky !) The following shifts have been introduced with respect to the previous version (15):



MOS1	Delta CCX (mm)	Delta CCY (mm)
CCD1	None	None
CCD2	-0.045	-0.073
CCD3	0.102	0.034
CCD4	0.051	0.034
CCD5	0.010	-0.032
CCD6	None	None
CCD7	-0.016	0.006

MOS2	Delta CCX (mm)	Delta CCY (mm)
CCD1	None	None
CCD2	0.035	0.062
CCD3	0.030	-0.015
CCD4	-0.041	0.091
CCD5	0.036	0.124
CCD6	0.006	0.099
CCD7	-0.017	0.021

Note the plate scale is approx 1" to 0.040 mm

There was not enough data and statistics to define the position and an eventual shift of the CCD6 of MOS1.

3 Scientific Impact of this Update

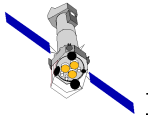
Compared to version 15 this LINCOORD CCF will (correctly) move the coordinates of sources in some MOS peripheral CCDs up to 3".

4 Estimated Scientific Quality

With this CCF version the astrometric accuracy throughout the whole MOS field-of-view is believed to be better than 1 arcsec, once a possible global shift, up to 4 arcsec (but often much less), is applied using a cross-correlation with optical catalogue (e.g. USNO A2.0 catalogue). The Relative Pointing Accuracy is limited by the accuracy of attitude reconstruction of the Star Tracker.

Note however that faint sources close to the detection limit have 90% coordinates confidence radii of only 2-4 arcsec, limited by the statistical accuracy of the measurement (see Watson M.G. et al., 2000, A&A 365, L51)

No residuals in rotation have been observed with the current BORESIGHT CCF, within the accuracy of the current measurements.



5 Expected Updates

With growing experience on other fields if some residuals are still left, the CCF might still be tuned. The accuracy of these metrology CCFs will be monitored on the NGC2516 open-cluster stellar field. For the moment no distortion or shift trend has been observed since the start of the mission, therefore this CCF is applicable since the start of the mission.

6 Acknowledgements

I thank M. Denby for the useful comments on the EPIC camera metrology and his valuable work on the OMC field.