

ACIS Memo # 186
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To: ACIS Team
From: Catherine Grant
Subject: Preliminary Analysis of Squeegee IV: 16-row squeegee preceded by full frame flush
Date: 23 May 2000

In the continuing effort to test and optimize the squeegee readout mode, a test was performed on 22 May to verify that preceding squeegee mode data with full frame flushes eliminates the excess initial charge seen in Squeegee II (ACIS memos #183 and #184). More than 3000 exposures of 3.3 seconds were taken in ObsID 62047 which showed very little bias level decay. Figure 1 shows the time-dependence of the centroid of the corner pixel distribution for all events in all grades. While the values are still negative, indicating that the bias data had slightly more charge than the image data, the drastic change in bias level is no longer apparent. The drop in corner pixel centroid is a little less than 0.2 ADU over 3000 frames. For the Squeegee II test the drop was around 5 ADU over 1000 frames.

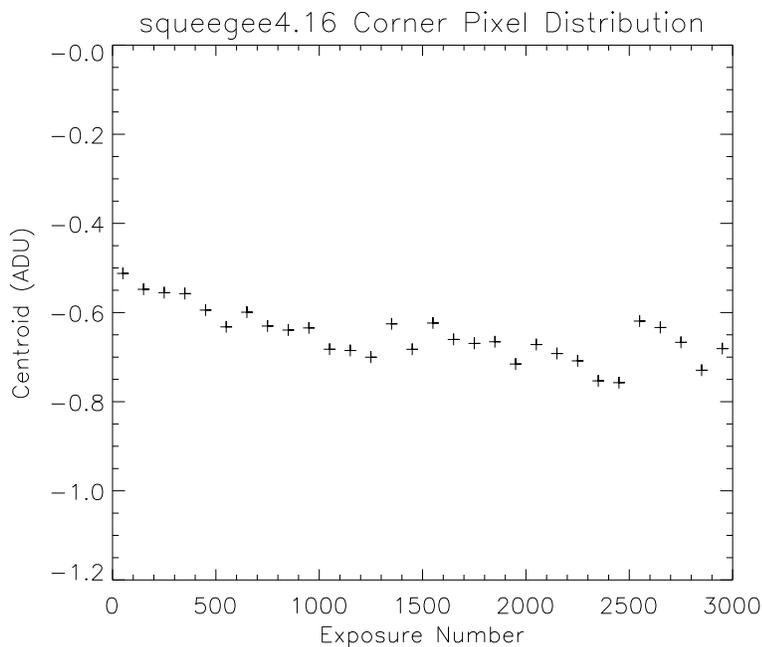


Figure 1: Time-dependence of the centroid of the corner pixel distribution for the 16-row squeegee test.

The improvement in CTI and FWHM for the Squeegee IV test is not as large as the beginning of the Squeegee II test, however it is still much better than in standard readout mode. Figure 2

compares the CTI versus exposure number for the Squeegee II and Squeegee IV tests. Even over 3000 frames, the Squeegee IV CTI is not changing noticeably. The table lists the CTI and FWHM at Mn-K and Al-K for the Squeegee IV test and for a normal CTI measurement. The FWHM was calculated using a local gain which yields an overestimate of the true FWHM.

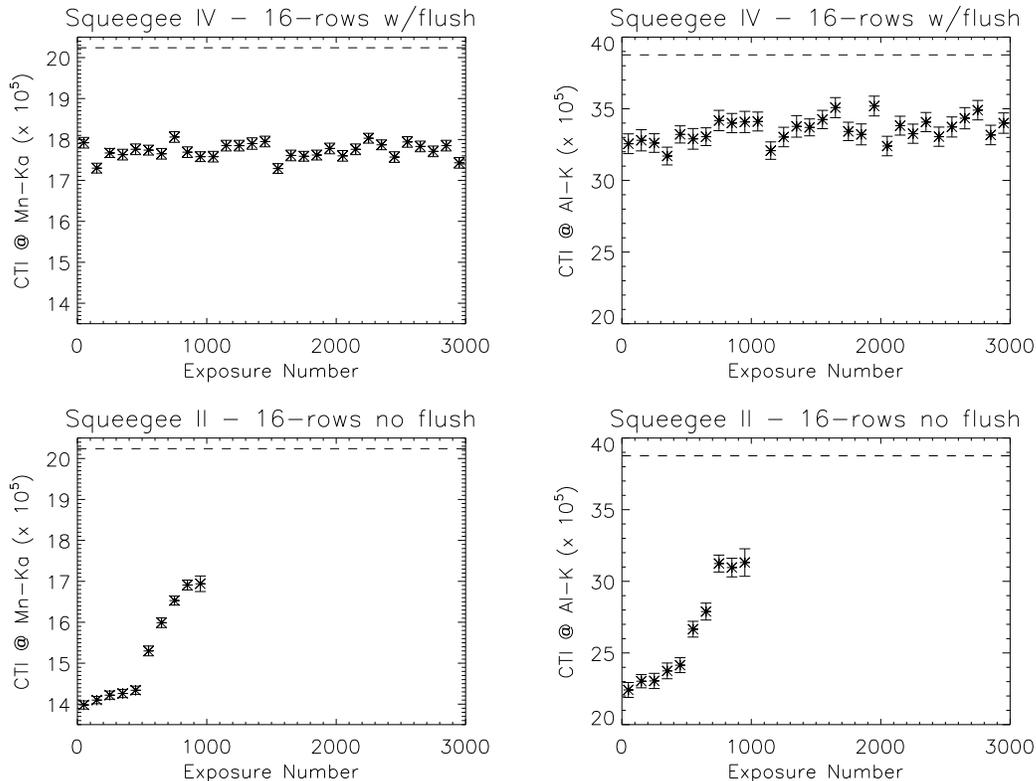


Figure 2: The change in CTI during the squeegee run for the 16-row squeegee with initial flush frames (top) and without (bottom) at 5.9 keV (left) and 1.5 keV (right). The dashed line indicates the CTI measured with standard readout and no squeegee.

Mode	CTI @ Mn-K (x 10 ⁻⁵)	CTI @ Al-K (x 10 ⁻⁵)	Mn-K FWHM @ Row 928 (eV)				Al-K FWHM @ Row 928 (eV)			
16-row squeegee with flush	17.71 ± 0.02	33.70 ± 0.09	426	492	457	428	209	242	236	211
standard readout	20.24 ± 0.05	38.76 ± 0.23	547	591	598	599	272	...	271	252