SWIFT-UVOT-CALDB-01
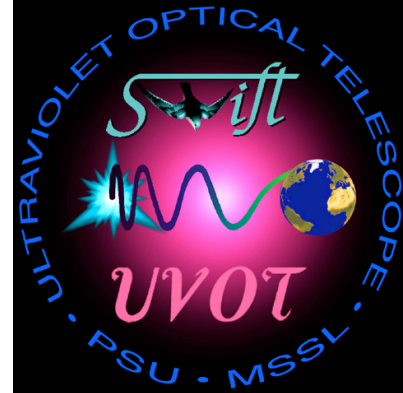Date Original Submitted: 2006-07-27
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Revision #02
Revised by: A. A. Breeveld
Pages Changed: many
Comments: Update

SWIFT UVOT CALDB RELEASE NOTE

SWIFT-UVOT-CALDB-01: Bad pixels

0.   Summary:

This CALDB product gives the locations of UVOT bad pixels.

1.   Component Files:

FILE NAME	VALID DATE	RELEASE DATE	VERSION
swubadpix20080101v001.fits	2008-01-01		

2.   Scope of Document:

This document describes changes from the previous product, reason for update, expected future updates, warnings for the user, a list of data the product is based on and finally the analysis methods used to create the product.

3.   Changes:

This is the second on-orbit calibration for this product. The number and location of bad pixels has not changed significantly since launch, but this is the first product with all the edges and corners marked as bad.

4.   Reason For Update:

To more fully map the bad pixels.

5.   Expected Updates:

The numbers and locations of bad pixels are monitored regularly, with updates made to

the CALDB product if they are observed to change over time.

6. Caveat Emptor:

None.

7. Data Used:

This product is derived from a total of 33200 s of exposure taken with the blocked filter with LED, in 2008. The obs-IDs used are listed in Table 2. Sufficient data was used to ensure that the Poisson error on the counts per CCD pixel were less than 1%.

OBS-ID
00036985004
00036985005
00036994003
00037142004
00050100030

Table 2: the data used for the bad pixel analysis in 2008.

8. Description of Analysis:

Exposures were taken with the blocked filter and LED illumination. These exposures were co-added into three separate binned (256x256) images, to check for consistency. A combined image was produced from all the data, and was used (appropriately scaled) to divide out the lamp signature from the individual images. Histograms were produced of the pixel counts in each smoothed image; these are plotted in Figure 1. Low pixels were defined to be those 3 sigma below the mean (0.817) counts per pixel and high pixels were defined to be those with counts per pixel 3 sigma above the mean (1.18). Low and high pixels were found for the three separate images.
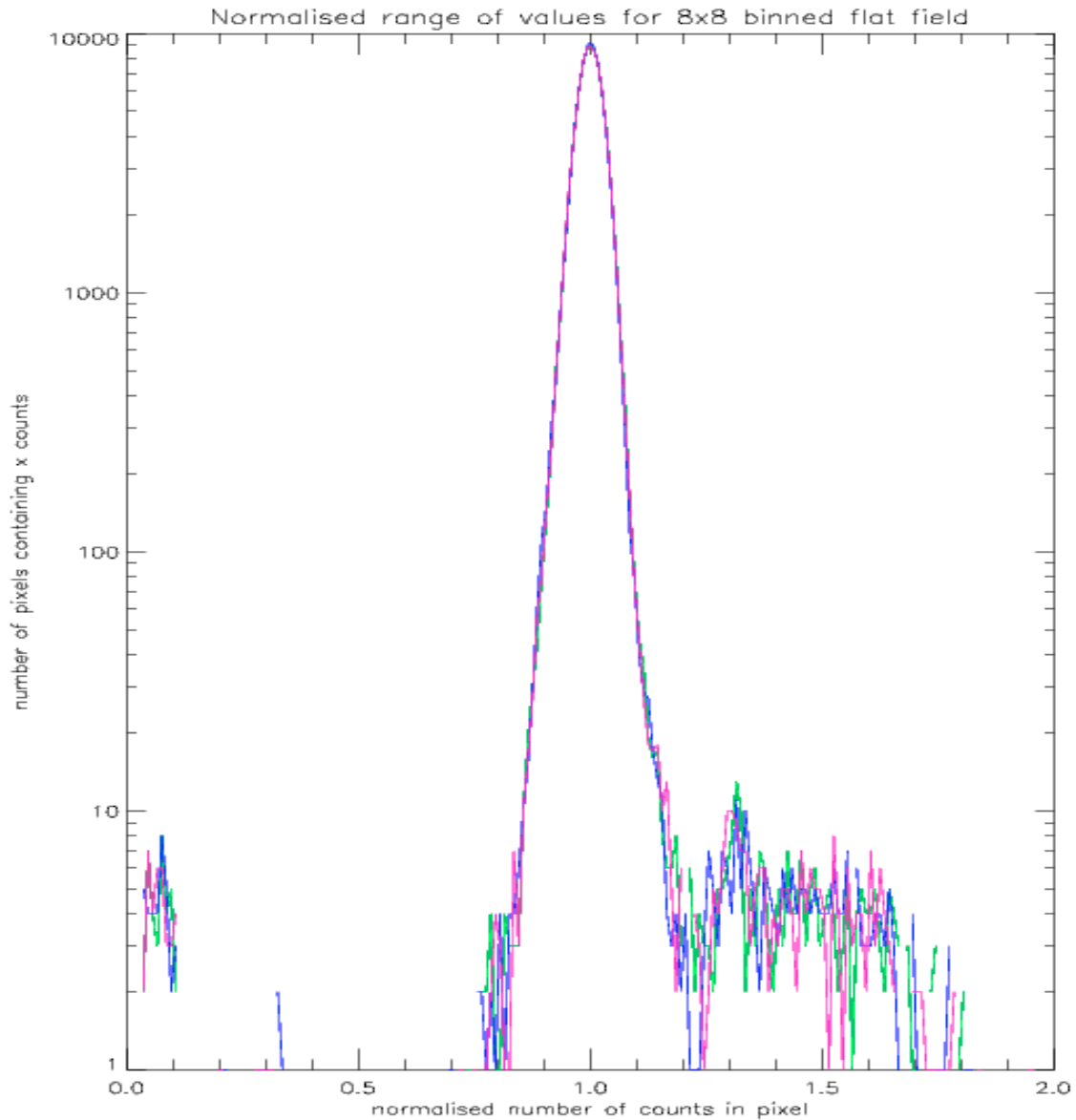
Figure 1: These are log plots of the histograms obtained for each of the three normalised files. Pixels with values less than 0.817 and greater than 1.18 are labelled as low or high bad pixels respectively.

There were no significant differences between the numbers and locations of bad pixels in the three separate files (and no significant difference from 2005 data; there were some minor changes in the arrangements and numbers of subpixels in known bad areas, see Fig. 3), so the combined image was used to produce the pixel lists for the low and high pixels. Fig. 2 shows the locations of the 66 low and 265 high pixels. The pixel lists were used to create the CalDB product. The CalDB product lists the positions in terms of subpixels (2048x2048 image) even though the bad pixels were detected using CCD pixels (256x256 image).
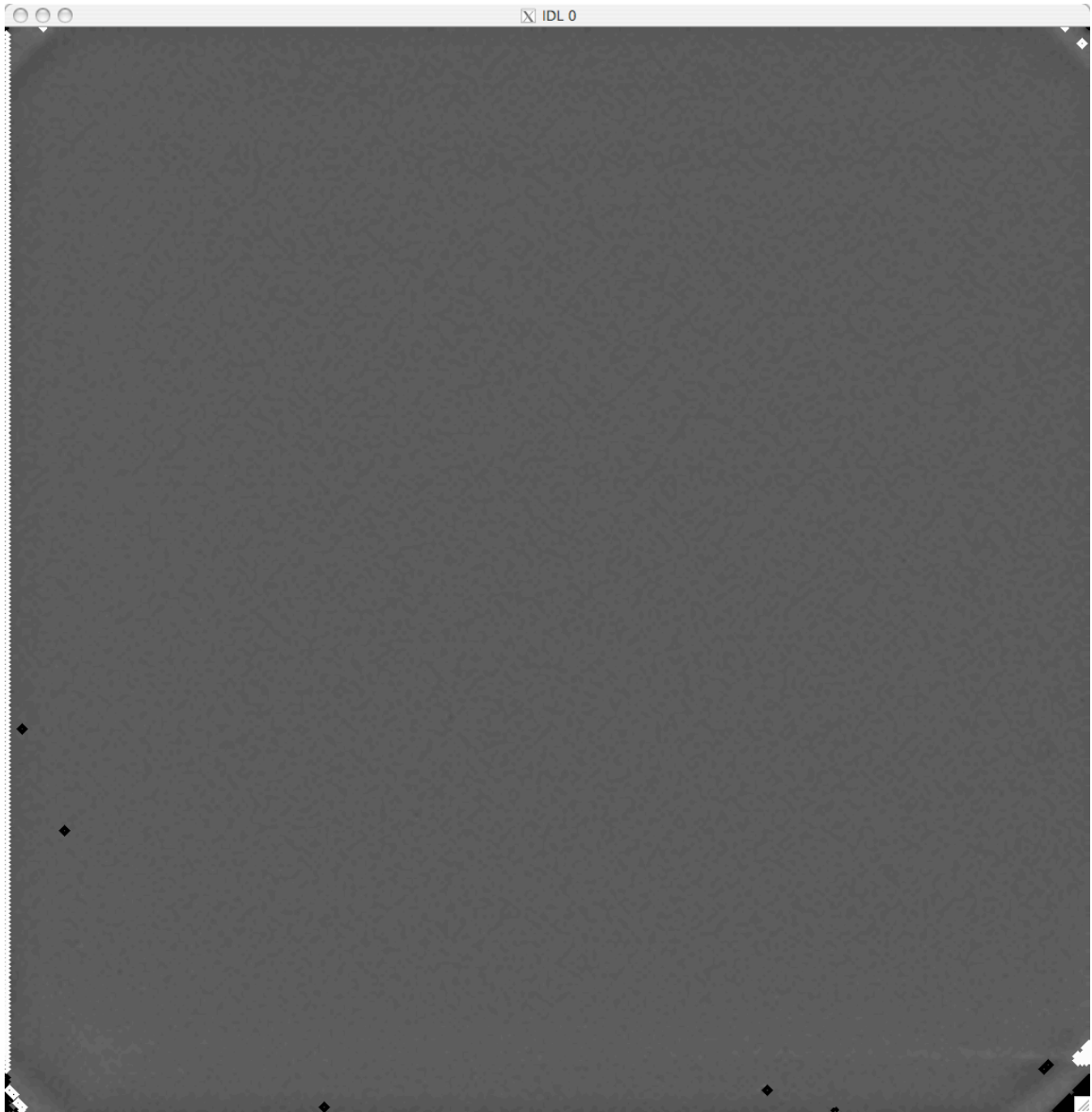
Figure 2: This is an image of the combined flat field. Low sub-pixels are marked in black; high ones in white.
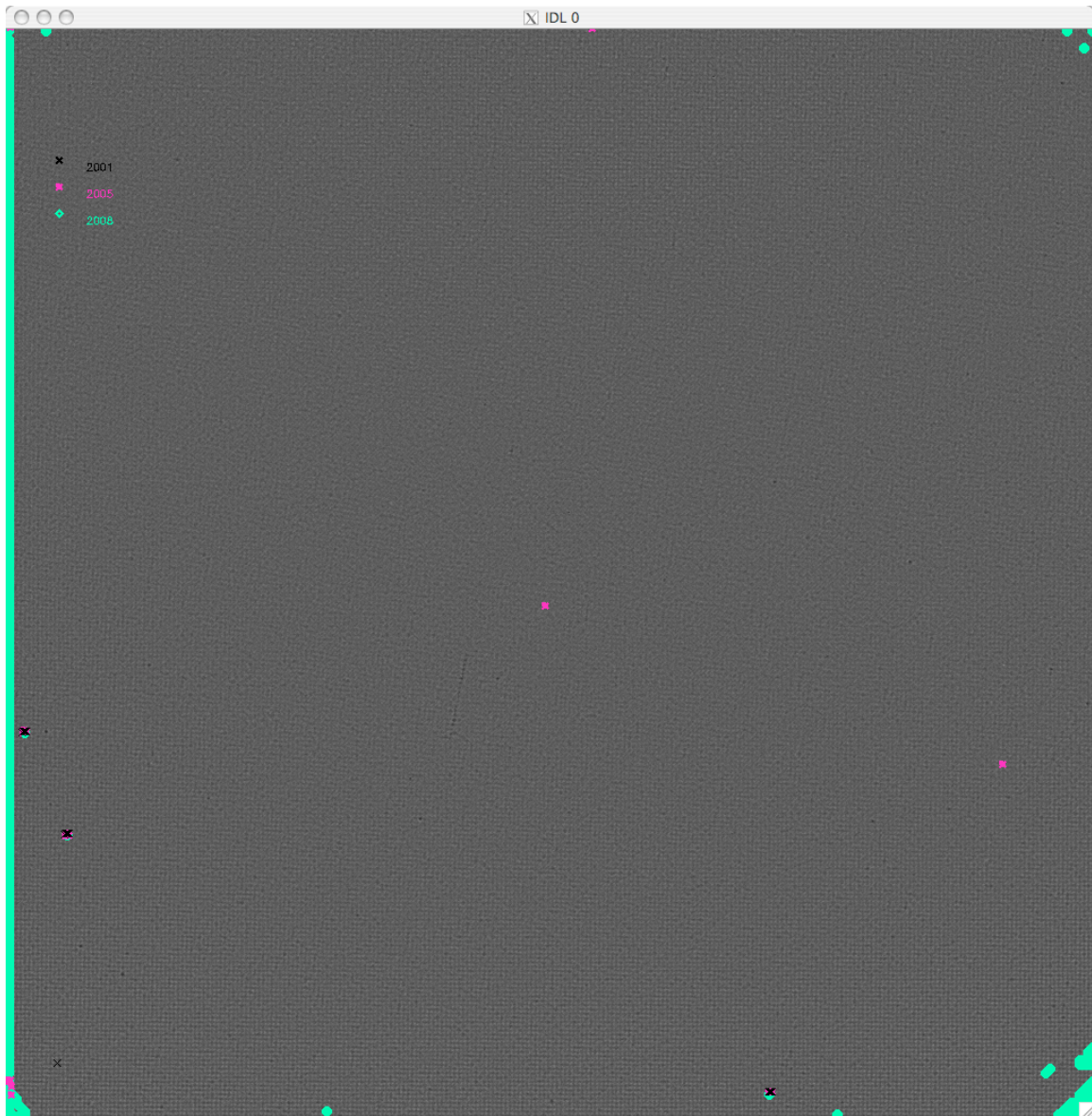
Figure 3: This shows the changes since the previous versions of the bad pixel maps. The pre-launch bad pixels are shown as black crosses; first post-launch release as pink crosses; this release as green diamonds. There are very few significant bad pixels in the main part of the image; most are around the edges or in the corners. Two marked as bad in the previous release are not considered bad in this release.