SWIFT-UVOT-CALDB-##
Date Original Submitted: 2005-11-11
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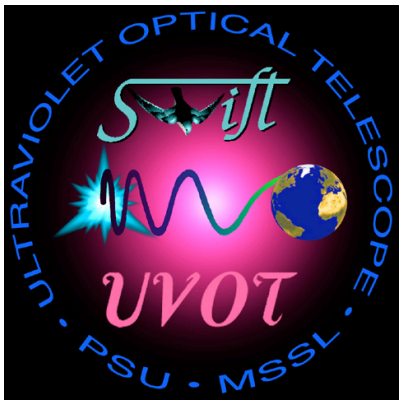
Revision #01
Revised by: A. J. Blustin
Pages Changed: all
Comments: Second analysis due to more data being obtained



SWIFT UVOT CALDB RELEASE NOTE

SWIFT-UVOT-CALDB-##: Dark frame

0. Summary:

This CALDB product gives an estimate of the dark current in the UVOT detector.

1. Component Files:

FILE NAME	VALID DATE	RELEASE DATE	VERSION

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 the data the product is based on and finally the analysis methods used to create the product.

3. Changes:

Second analysis for this product. The average dark frame count rate derived from data taken between January and April 2006 is $(7.0 \pm 0.4) \times 10^{-5}$ counts sub-pixel^{-1} s^{-1}. This is consistent with the previous measured on-orbit value obtained from data taken in January 2005 ($(6 \pm 1) \times 10^{-5}$ counts sub-pixel^{-1} s^{-1}). The value measured pre-launch was 4×10^{-5} counts sub-pixel^{-1} s^{-1}.

4. Reason For Update:

Six-monthly monitoring of dark current. Since the average dark current is close to the expected value pre-launch, there is no implication for science results.

5. Expected Updates:

The dark current will be monitored on a six-monthly basis, with updates made to the CALDB product if it is observed to change over time.

6. Caveat Emptor:

The 'dark current' measurement presented here contains some contribution from stray light. The amount of stray light getting past the blocked filter is dependent upon the field being observed, so this estimate of the dark current should be considered to be an upper limit, and cannot unambiguously be used to determine any trend in the dark current over time.

7. Data Used:

This product is derived from exposures taken with the blocked filter (without LED), with a combined exposure time of 108904 s. The observation details are listed in Table 1.

Table 1: Observation details for the data used in this analysis

Obs-ID	***Observation start***	***Observation stop***	***Exposure (s)***
00035251002	2006-01-12T01:28:40	2006-01-12T17:53:00	7961
00053401001	2006-01-23T13:56:23	2006-01-23T17:20:27	2732
00030358002	2006-01-24T00:27:53	2006-01-24T23:03:00	963
00177533007	2006-01-24T01:19:09	2006-01-24T23:44:00	8131
00053402001	2006-01-26T12:33:19	2006-01-27T00:00:00	2805
00050400013	2006-02-04T11:49:38	2006-02-04T23:11:43	3925
00179968007	2006-02-11T00:01:33	2006-02-11T22:10:34	6622
00179968008	2006-02-11T23:46:17	2006-02-12T22:16:47	437
00179968009	2006-02-13T01:28:46	2006-02-13T22:38:01	5099
00035569001	2006-02-17T00:01:40	2006-02-17T03:31:00	1592
00030366013	2006-03-17T15:30:33	2006-03-19T00:22:15	21915
00030366014	2006-03-18T12:26:08	2006-03-18T12:48:00	1291
00030366015	2006-03-19T12:48:49	2006-03-19T12:54:00	306
00030366016	2006-03-20T18:03:26	2006-03-20T21:18:00	4125
00030366017	2006-03-20T22:14:54	2006-03-21T21:13:00	18287

Obs-ID	***Observation start***	***Observation stop***	***Exposure (s)***
00030366018	2006-03-21T21:13:47	2006-03-23T23:09:00	21981
00035538001	2006-04-14T18:16:45	2006-04-14T22:50:00	730

8. Description of Analysis:

The fits images were co-added using the FTOOL fimgmerge. The resulting coadded image was converted to a pixel list using fim2lst and the mean counts per sub-pixel was obtained using the fstatistics tool. Dividing the total counts by the number of pixels and the total exposure time gave the average counts per pixel per second. The error on the dark current was estimated to be the standard error on the mean of the dark currents from all the separate observations. The average dark count rate is $(7.0 \pm 0.4) \times 10^{-5}$ counts sub-pixel^{-1} s^{-1}. The standard deviation of these individual observations, which we assume to be generally representative, was also used to provide a new estimate of the uncertainty on the January 2005 value, as quoted in Section 3.