

V&V Reference Report

L2 ASCDS Version : 8.4.5

Observation 169 - L2 Version 7
Chandra X-Ray Center

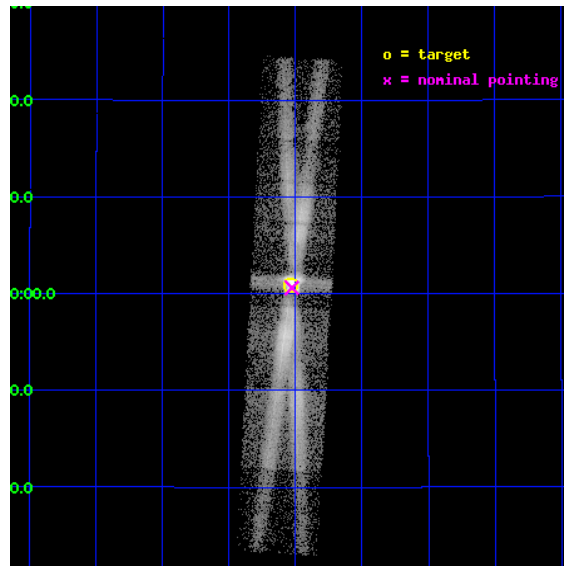
L2 Processing Date : Aug 29 2012

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1 Front

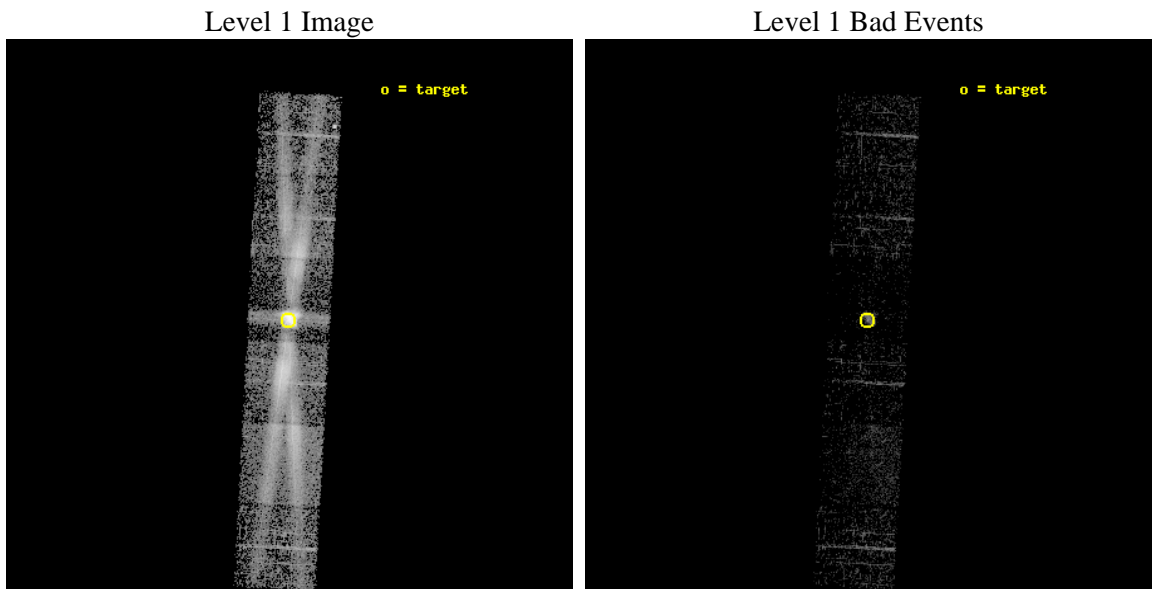
seq_num	590037	Sequence number
obs_id	169	Observation id
title	CALIBRATION OF HETGS USING THE CRAB PULSAR AND NEBULA	Proposal tit
observer	Dr. CXC Calibration	Principal investigator
object	CRAB PULSAR	Source name
dtcycle	0	
cycle	P	events are from which exps? P[rimary] S[econdar
ra_targ	83.633333	Observer's specified target RA [deg]
dec_targ	22.014472	Observer's specified target Dec [deg]
ra_nom	83.631596563644	Nominal RA [deg]
dec_nom	22.010003740729	Nominal Dec [deg]
roll_nom	273.05381435582	Nominal Roll [deg]
revision	7	Processing version of data
ontime	462.41419695318	Sum of GTIs [s]
livetime	39.507273274729	Livetime [s]
ontime4	1547.4244337529	Sum of GTIs [s]
ontime5	2351.5258713812	Sum of GTIs [s]
ontime6	955.41254615784	Sum of GTIs [s]
ontime7	462.41419695318	Sum of GTIs [s]
ontime8	1069.8794751614	Sum of GTIs [s]
ontime9	1684.367473349	Sum of GTIs [s]
l2events	106186	Number of level 2 events



2 OBI Primary

2.1 OBI

2.1.1 Images



2.1.2 Parameters

obi_num	0	Obi number	sched_exp_time	9900.000000	[s] Scheduled observation exposure time
ascdsver	8.4.5	Processing system revision	ontime	462.41419695318	Sum of GTIs [s]
caldsver	4.5.1.1	 	ontime4	1547.4244337529	Sum of GTIs [s]
date	2012-08-23T13:58:54	Date and time of file creation	ontime5	2351.5258713812	Sum of GTIs [s]
revision	6	Processing version of data	ontime6	955.41254615784	Sum of GTIs [s]
			ontime7	462.41419695318	Sum of GTIs [s]
			ontime8	1069.8794751614	Sum of GTIs [s]
			ontime9	1684.367473349	Sum of GTIs [s]
			l1events	141638	Number of level 1 events

2.1.3 Events

	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	10171	26636	32665	35809	23764	12593
rejected events	6467	5440	4006	2262	5160	6077
rejected %	63%	20%	12%	6%	21%	48%

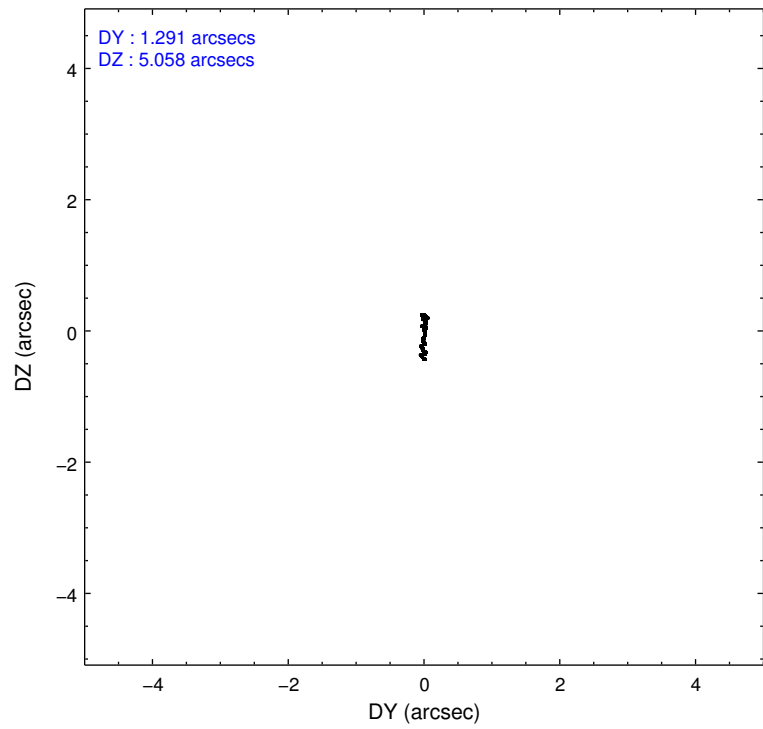
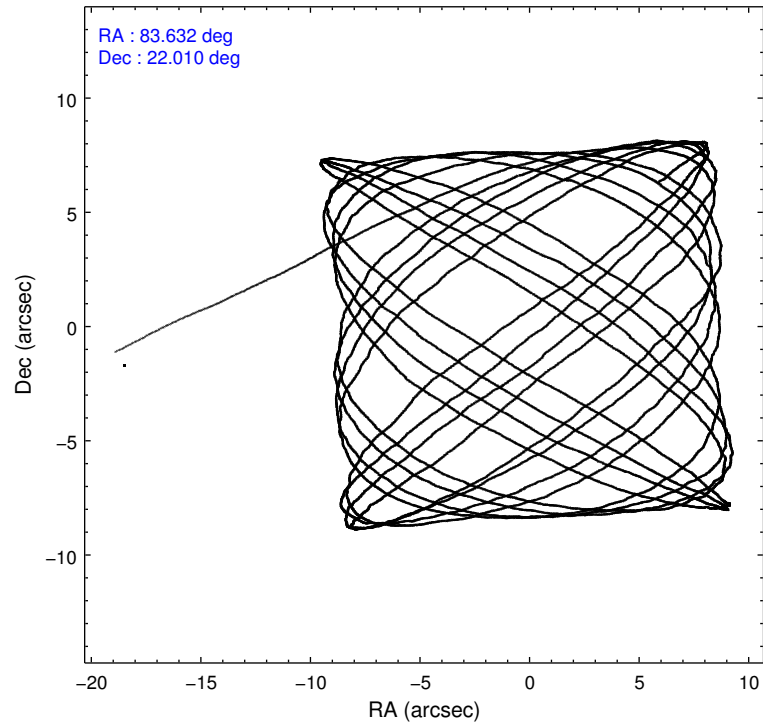
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
grade 0 events	2861	5915	22626	7913	15394	5198
	28%	22%	69%	22%	64%	41%
grade 1 events	5	7	71	86	29	10
	0%	0%	0%	0%	0%	0%
grade 2 events	480	7775	3312	9300	1879	721
	4%	29%	10%	25%	7%	5%
grade 3 events	144	1511	905	3556	519	233
	1%	5%	2%	9%	2%	1%
grade 4 events	116	1598	986	3579	507	213
	1%	5%	3%	9%	2%	1%
grade 5 events	121	598	134	495	157	138
	1%	2%	0%	1%	0%	1%
grade 6 events	121	4531	830	9444	427	187
	1%	17%	2%	26%	1%	1%
grade 7 events	6323	4701	3801	1436	4852	5893
	62%	17%	11%	4%	20%	46%

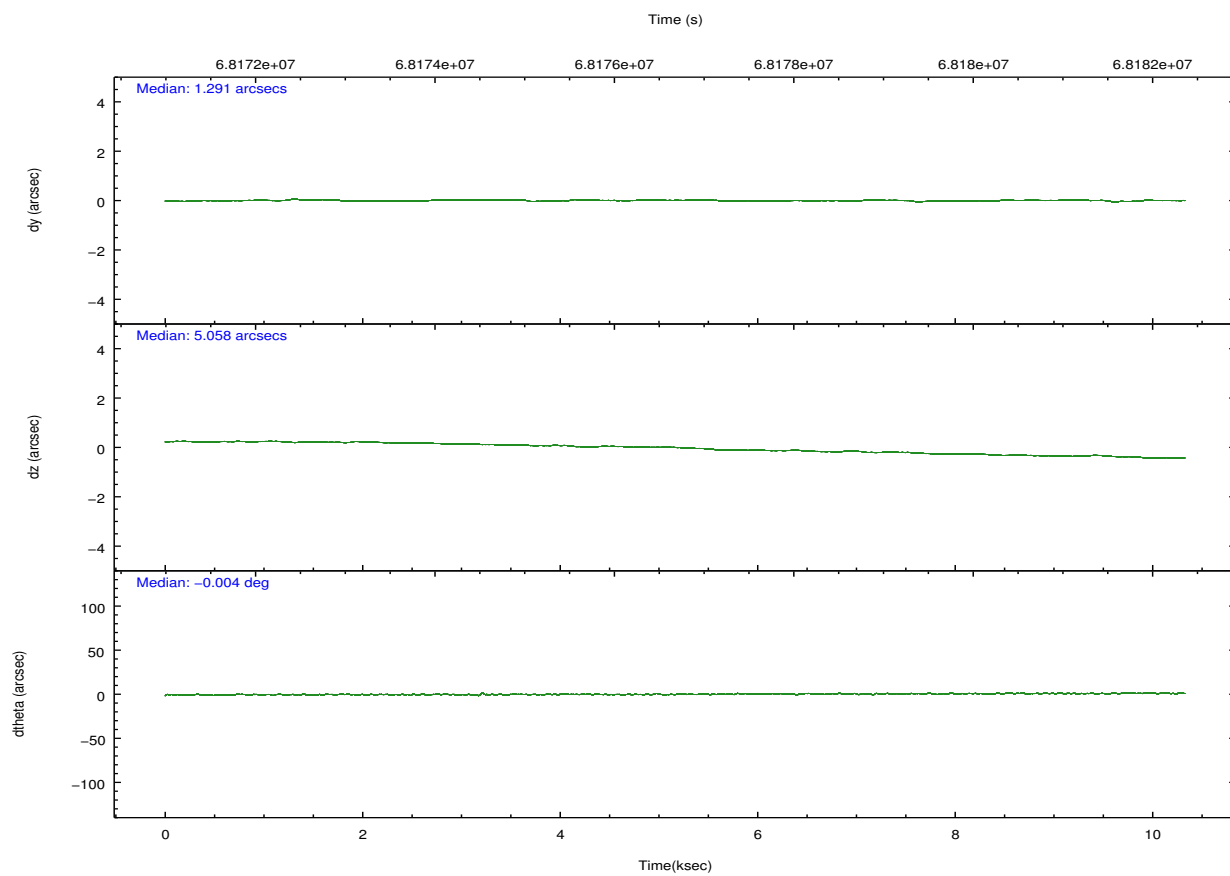
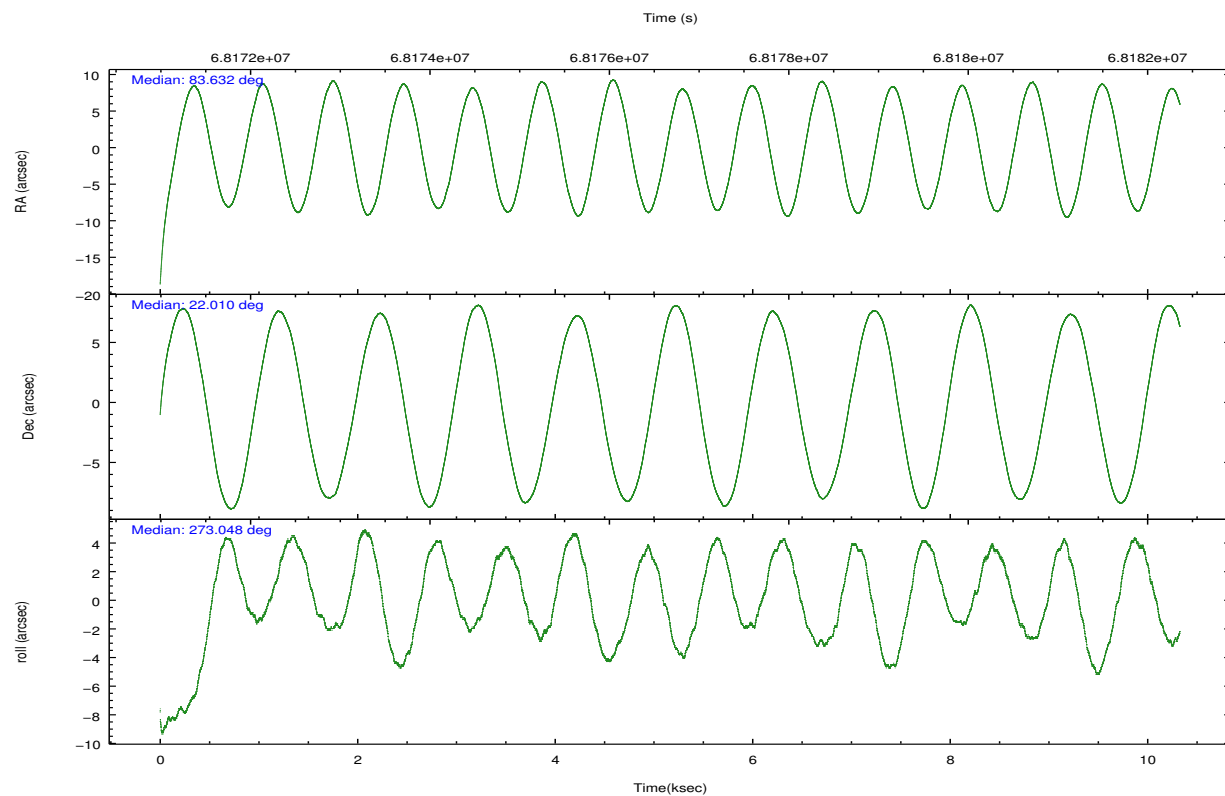
2.2 Compared Parameters

Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-456789	ACIS-456789
Grating	HETG	HETG
Data mode	GRADED	GRADED
Observation mode	POINTING	POINTING
[deg] Pointing RA	83.615402	83.63159656364434
[deg] Pointing Dec	22.032987	22.01000374072865
[deg] Pointing Roll	272.903262	273.0538143558217
[s] Window start time (MET)	65750464.184000	65750464.184000
[s] Window stop time (MET)	69465664.184000	69465664.184000
[mm] SIM focus pos	-0.684267	-0.6828225247311905
[mm] SIM defocus	0	0.001444936568705701
[mm] SIM translation stage pos	-190.132523	-190.1425803651734
[mm] SIM translation stage offset	0	0.01005778216563158
[s] Observation start time (MET)	68171938.184000	68170578.262308
Observation start date	2000-02-29T00:37:54	2000-02-29T00:16:18
[s] Observation end time (MET)	68181838.184000	68182344.237737
Observation end date	2000-02-29T03:22:54	2000-02-29T03:32:24
Read mode	TIMED	TIMED

Parameter	Planned	Actual
Obspar format version number	7	7
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	NONE	NONE
Alternating exposures requested	Y	Y
[s] Primary exposure time	0.300000	0.3
[s] Secondary exposure time	3.200000	3.2
Duty cycle	3	3

2.3 Aspect



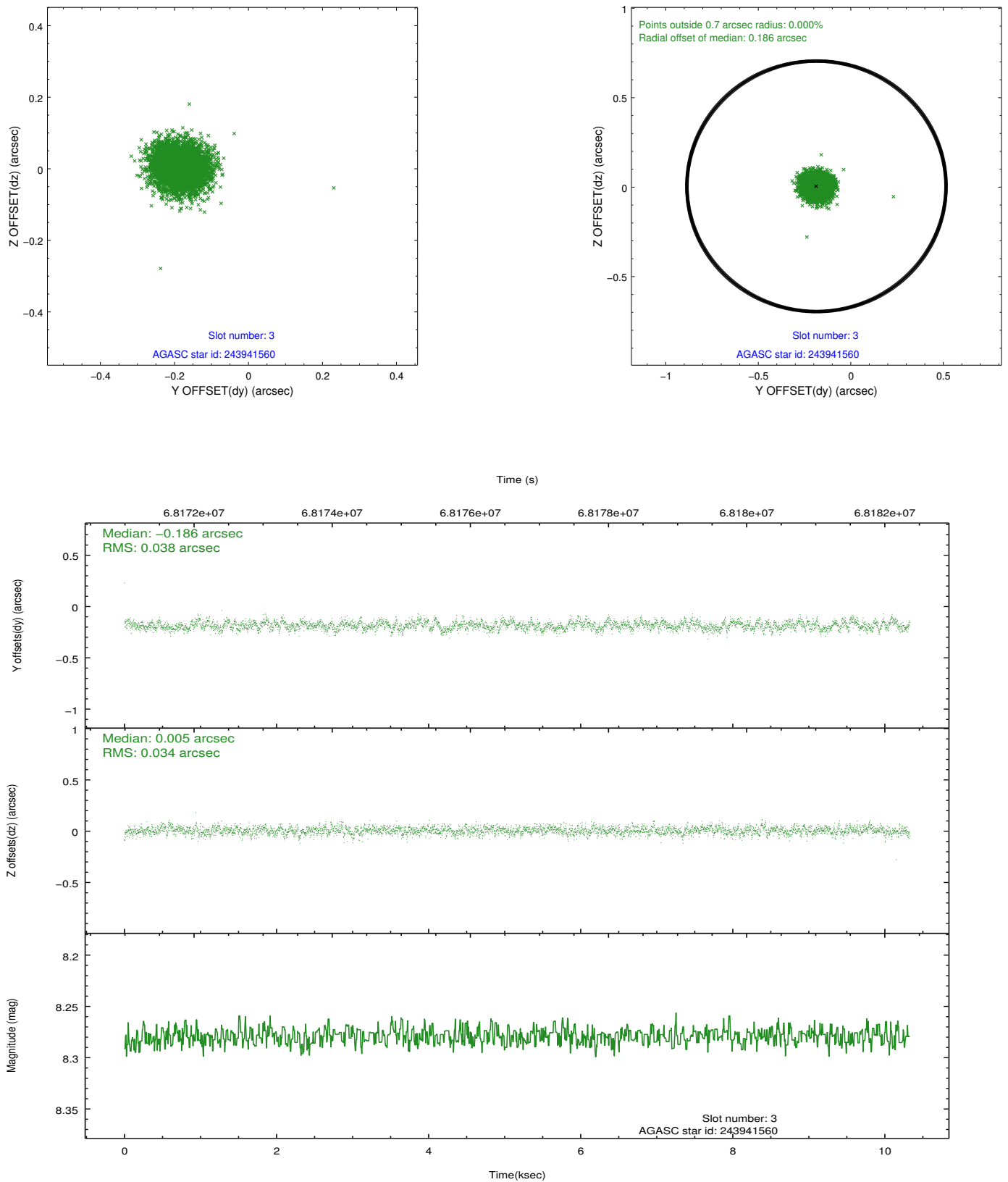


Slot Statistics

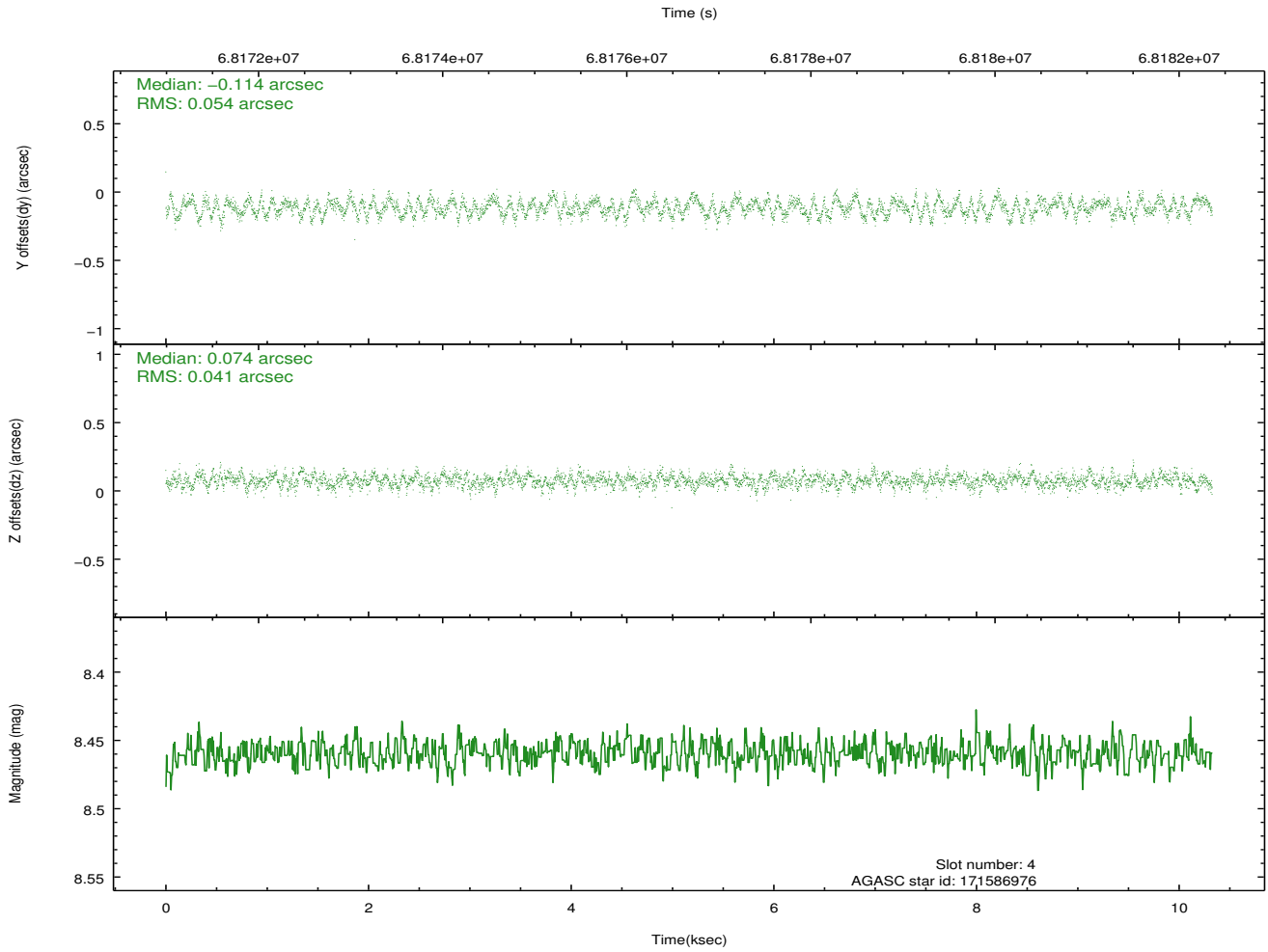
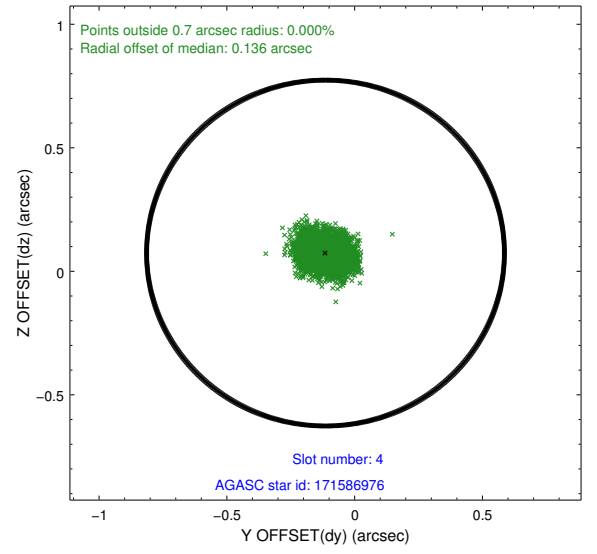
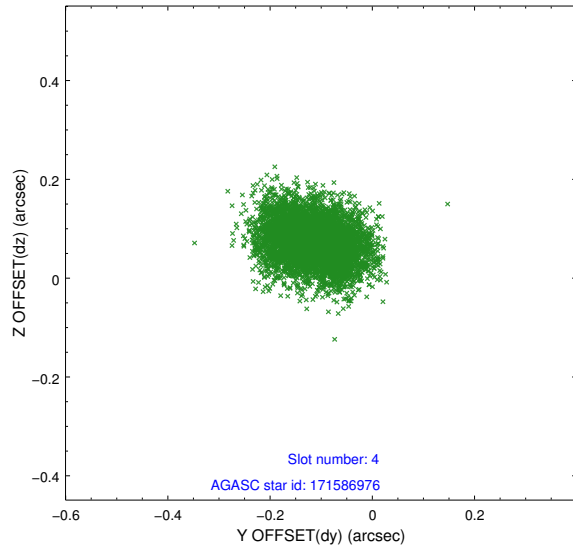
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	7.11	2517	-0.031	-0.006	0.009	0.014	0.000000	0.000000	-753.93	-1726.07
1	FID	ACIS-S-4	7.21	2518	0.010	0.017	0.005	0.010	0.000000	0.000000	2159.17	181.89
2	FID	ACIS-S-5	7.23	2518	-0.009	-0.002	0.008	0.013	0.000000	0.000000	-1806.08	176.15
3	GUIDE	243941560	8.28	5038	-0.186	0.005	0.054	0.087	83.733264	22.568598	-1906.18	488.29
4	GUIDE	171586976	8.46	5036	-0.114	0.074	0.073	0.115	83.857953	22.438065	-1416.68	879.47
5	GUIDE	171597832	9.17	5038	0.199	-0.107	0.087	0.139	83.183230	21.366702	2320.35	-1568.71
6	GUIDE	171721904	9.22	5035	0.020	0.176	0.100	0.163	84.272676	22.116922	-195.12	2204.14
7	GUIDE	171600224	9.67	5034	0.073	-0.148	0.103	0.165	82.941815	21.636094	1308.29	-2323.41

2.4 Star Slots

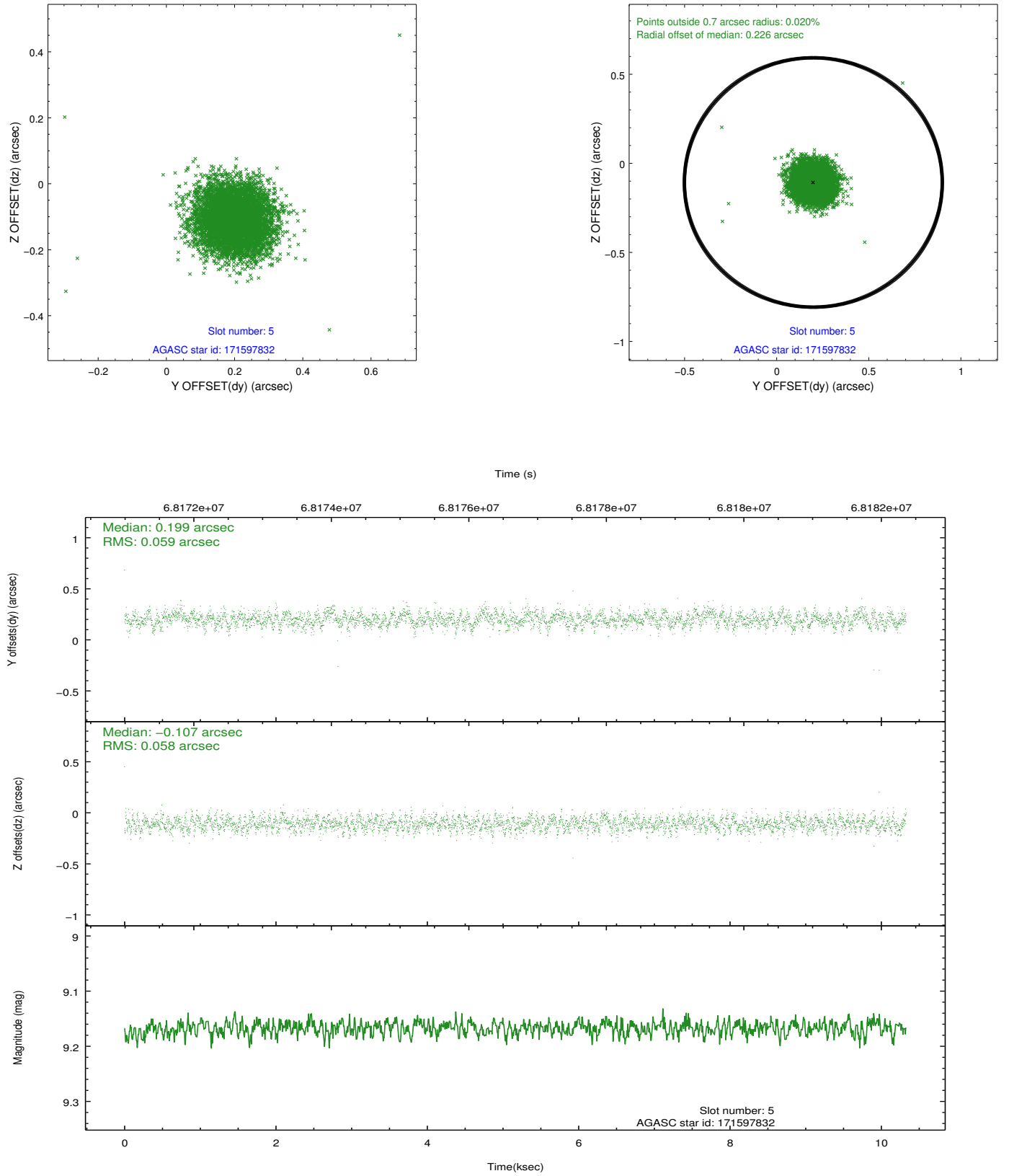
2.4.1 Slot 3



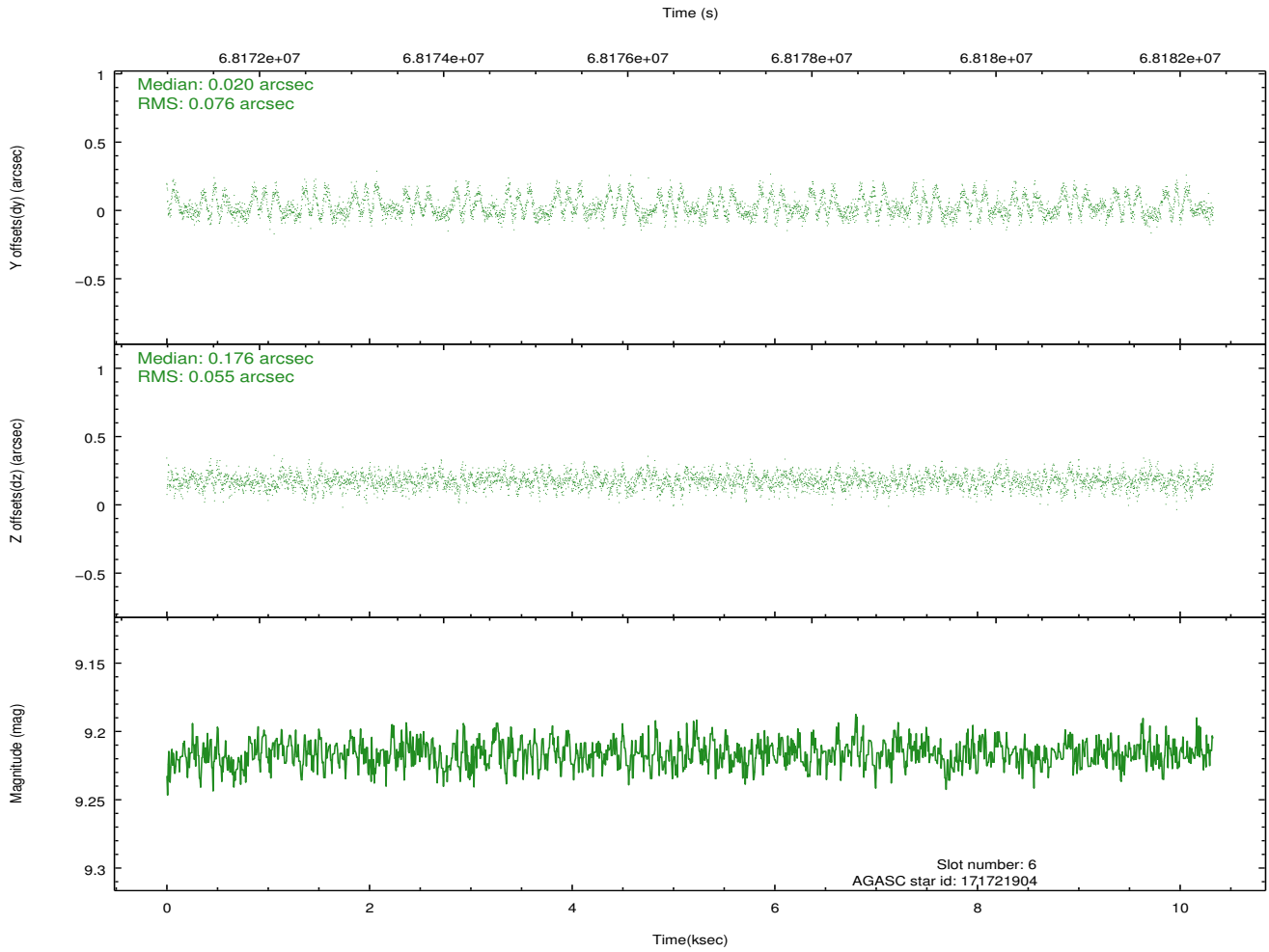
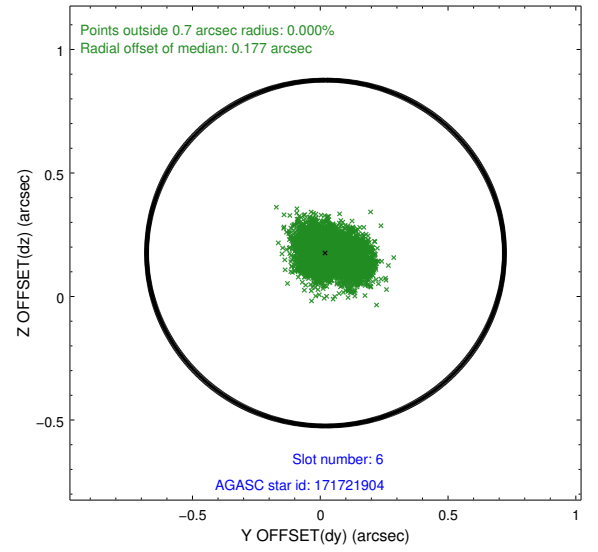
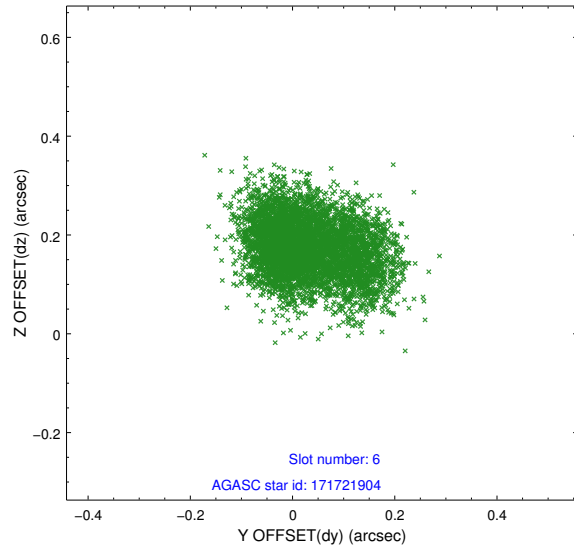
2.4.2 Slot 4



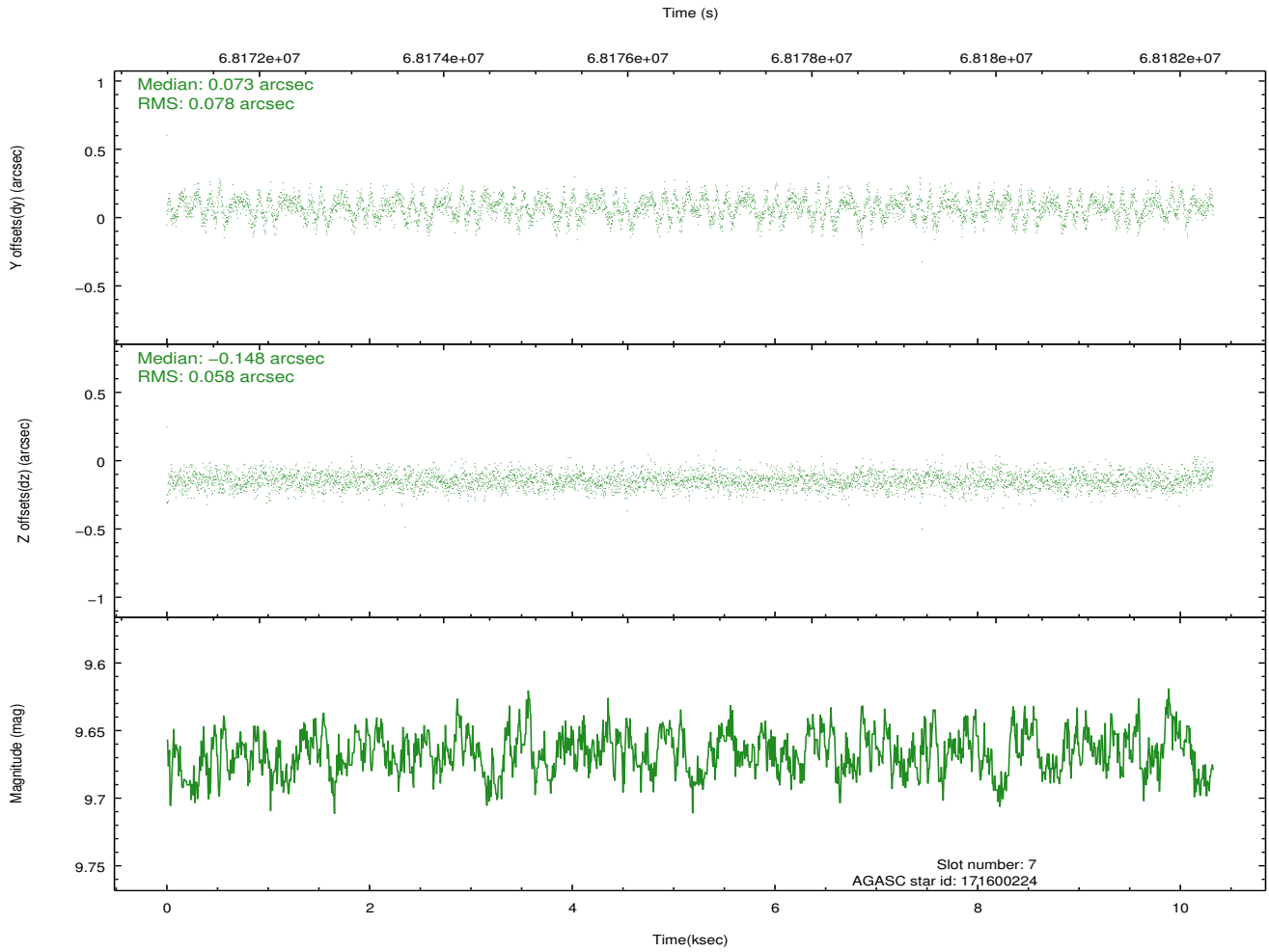
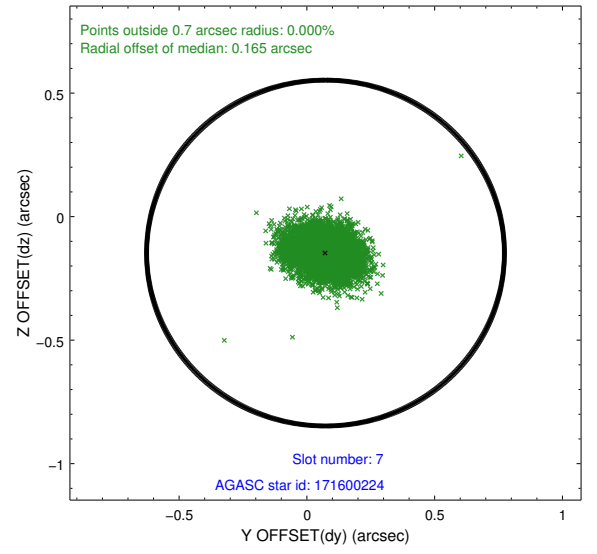
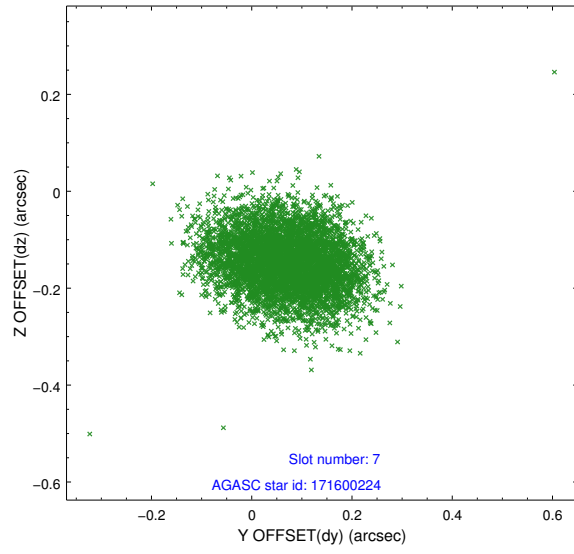
2.4.3 Slot 5



2.4.4 Slot 6

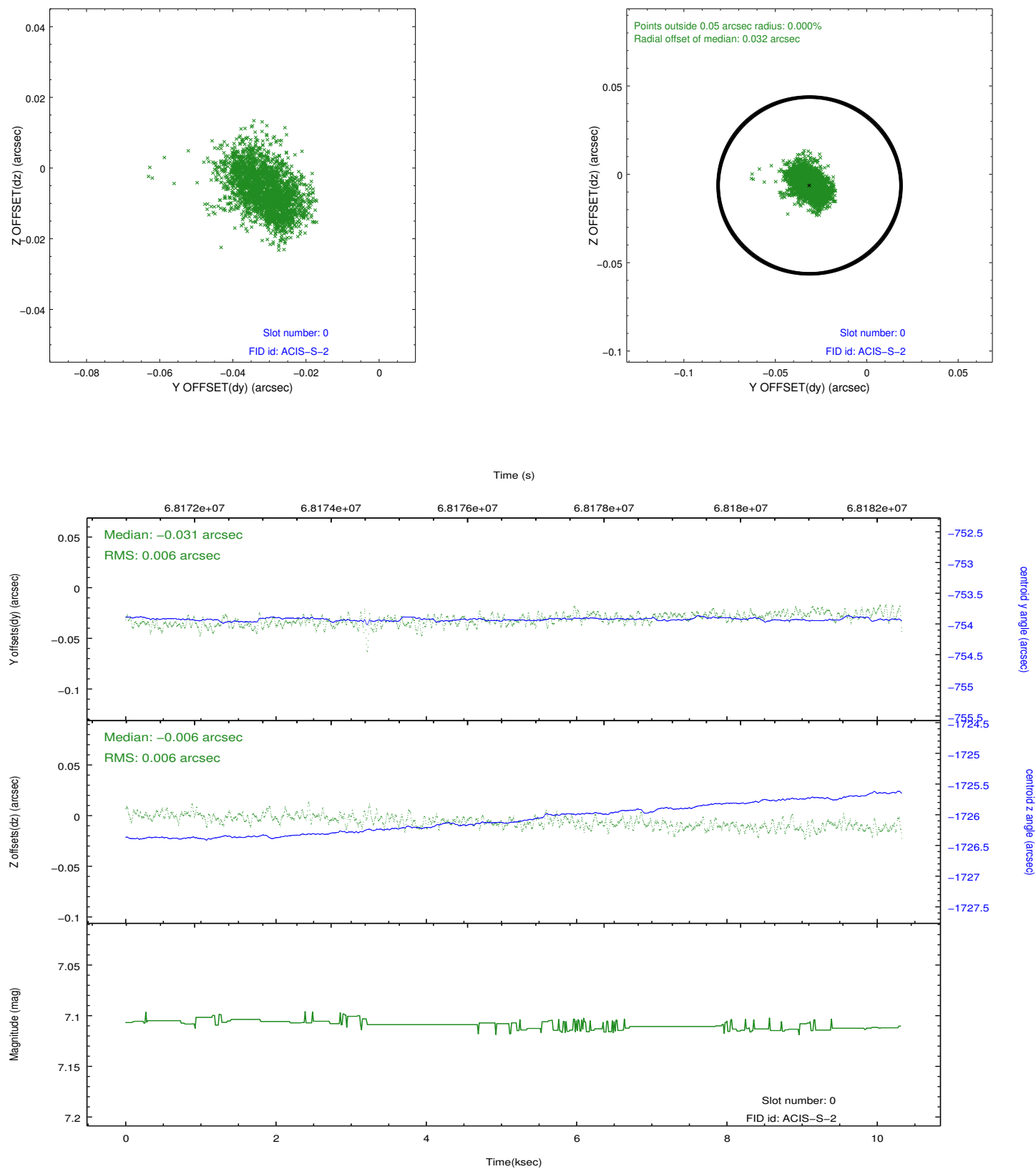


2.4.5 Slot 7

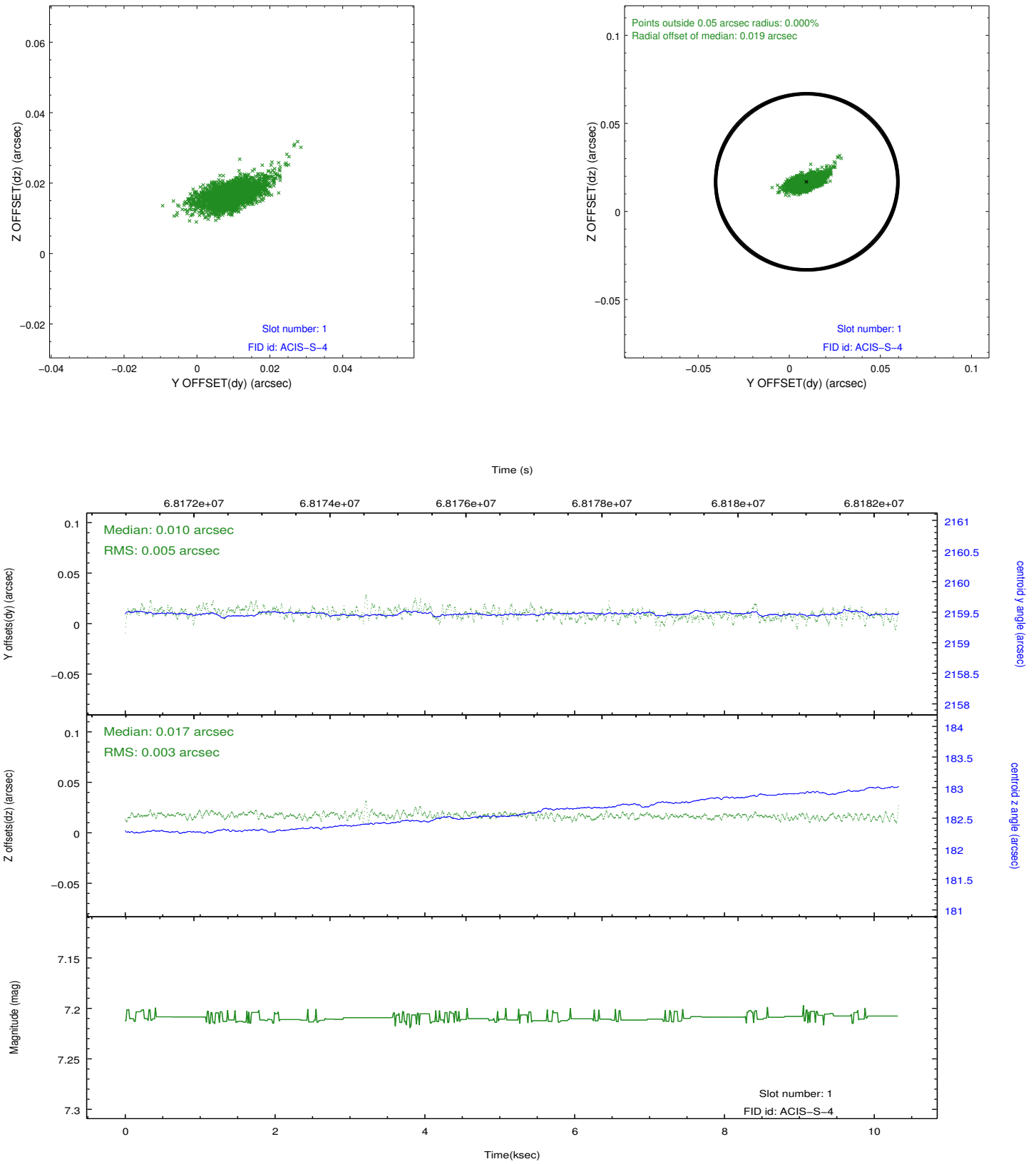


2.5 FID Slots

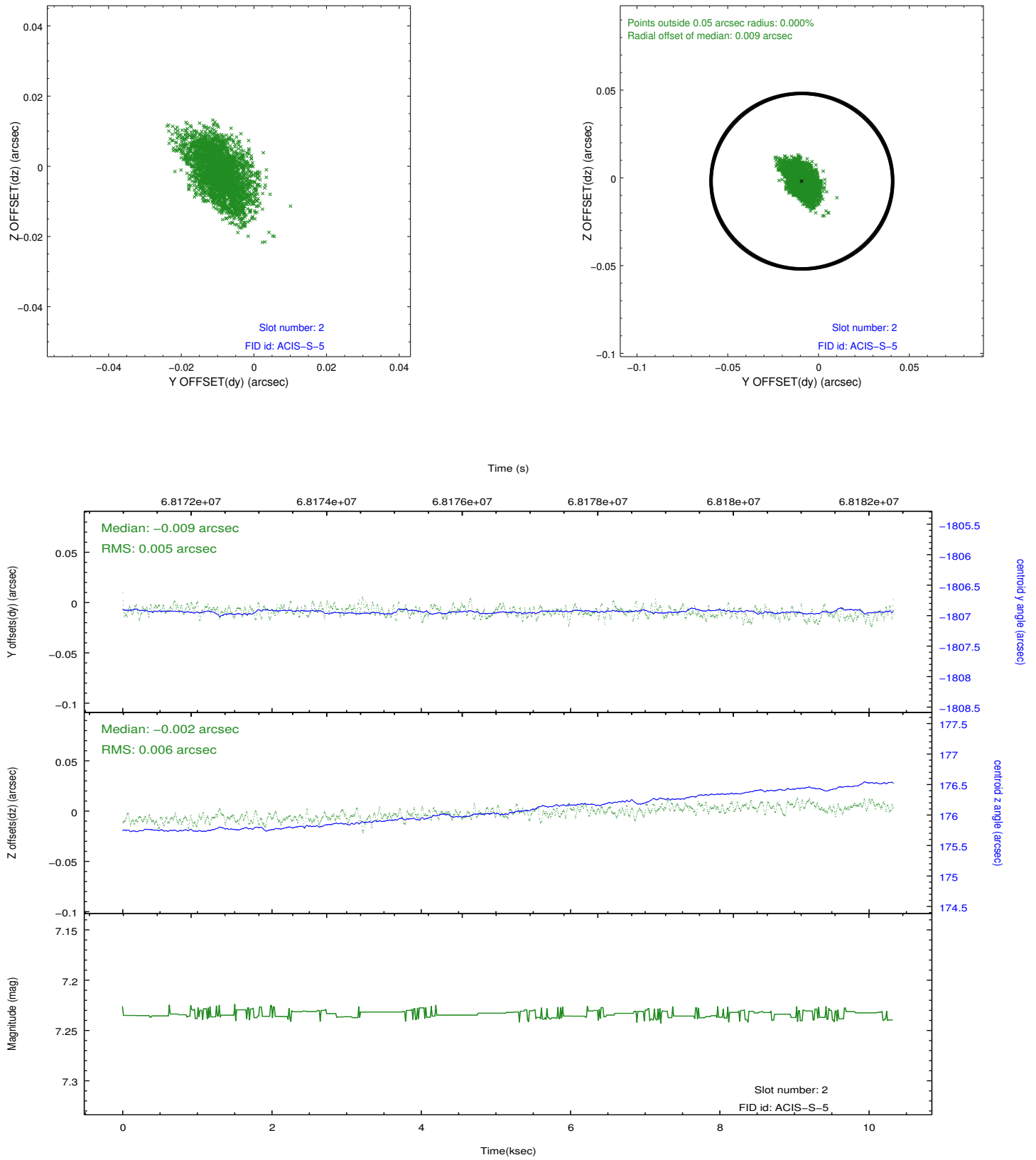
2.5.1 Slot 0



2.5.2 Slot 1



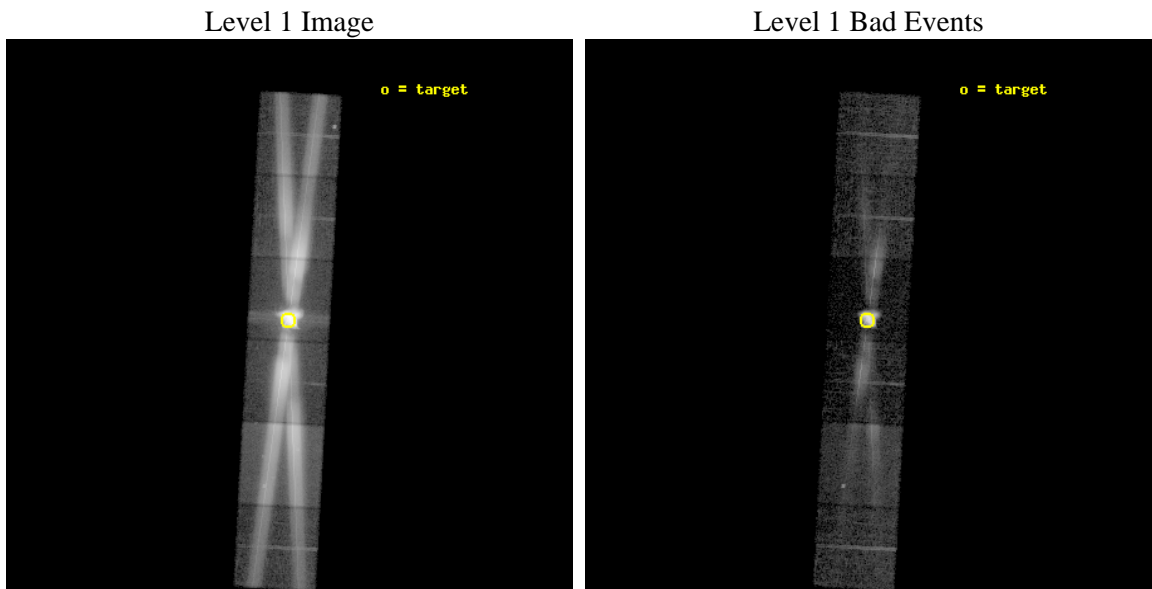
2.5.3 Slot 2



3 OBI Secondary

3.1 OBI

3.1.1 Images



3.1.2 Parameters

obi_num	0	Obi number	sched_exp_time	9900.000000	[s] Scheduled observation exposure time
ascdsver	8.4.5	Processing system revision	ontime	1803.8467960507	Sum of GTIs [s]
caldsver	4.5.1.1	 	ontime4	4443.6391855031	Sum of GTIs [s]
date	2012-08-23T14:09:26	Date and time of file creation	ontime5	6537.3142299801	Sum of GTIs [s]
revision	6	Processing version of data	ontime6	2374.3518646806	Sum of GTIs [s]
			ontime7	1803.8467960507	Sum of GTIs [s]
			ontime8	3230.0235242844	Sum of GTIs [s]
			ontime9	5004.3287055343	Sum of GTIs [s]
			l1events	3451057	Number of level 1 events

3.1.3 Events

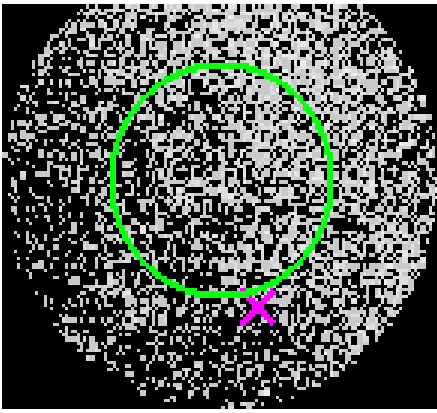
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9		ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	130971	623734	721842	1170608	591475	212427	grade 0 events	77819	167293	531696	197226	453913	144813
rejected events	34582	50446	39415	178688	38306	35539		59%	26%	73%	16%	76%	68%
rejected %	26%	8%	5%	15%	6%	16%	grade 1 events	304	1256	7749	15905	4330	567
								0%	0%	1%	1%	0%	0%
							grade 2 events	11249	218527	82473	274657	57062	18691
								8%	35%	11%	23%	9%	8%
							grade 3 events	2560	41521	24212	101834	16213	4886
								1%	6%	3%	8%	2%	2%
							grade 4 events	2662	41599	24085	99859	16045	5010
								2%	6%	3%	8%	2%	2%
							grade 5 events	1170	9576	5556	50782	3343	1758
								0%	1%	0%	4%	0%	0%
							grade 6 events	2169	105223	20846	320121	10445	3728
								1%	16%	2%	27%	1%	1%
							grade 7 events	33038	38739	25225	110224	30124	32974
								25%	6%	3%	9%	5%	15%

4 Gratings

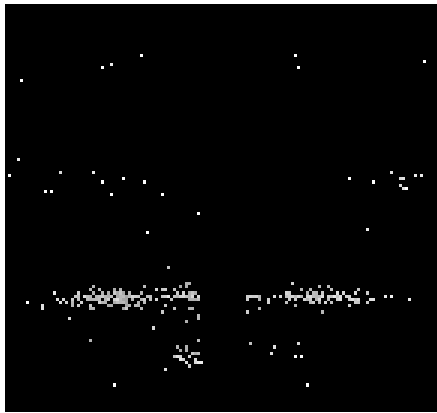
4.1 HEG Arm



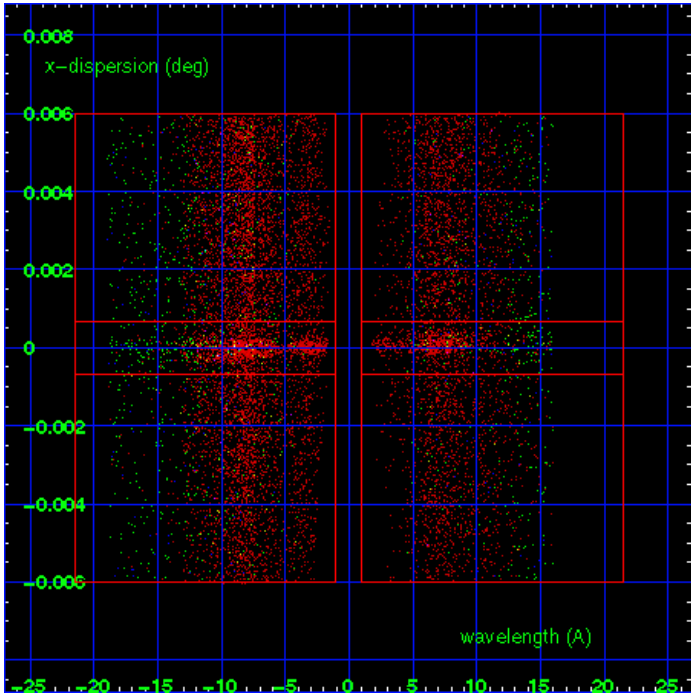
HEG Order Sort 123



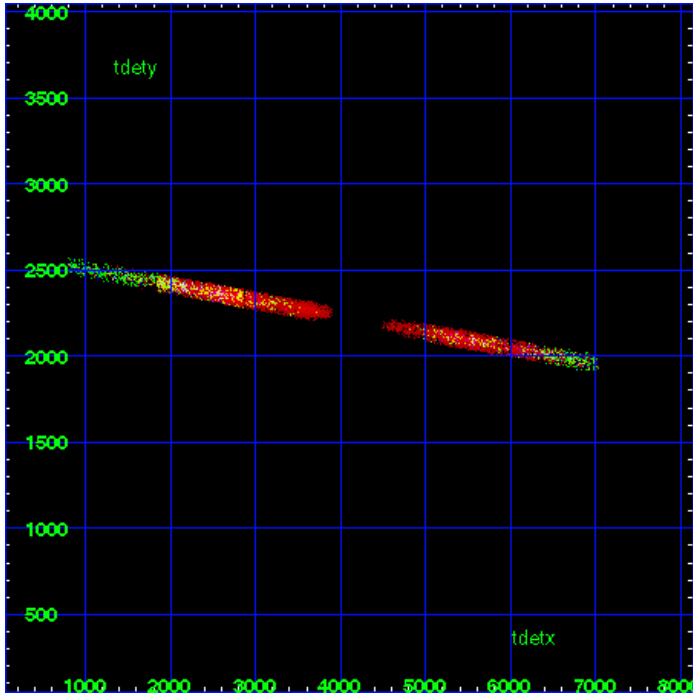
HEG Zero Order



HEG Order Sort ALL

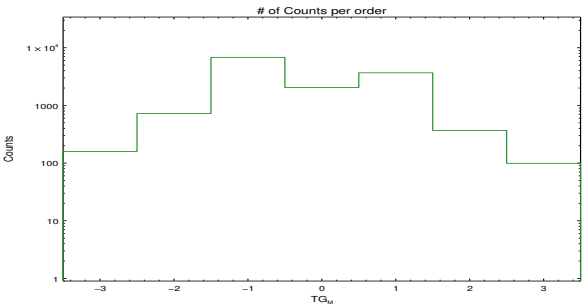


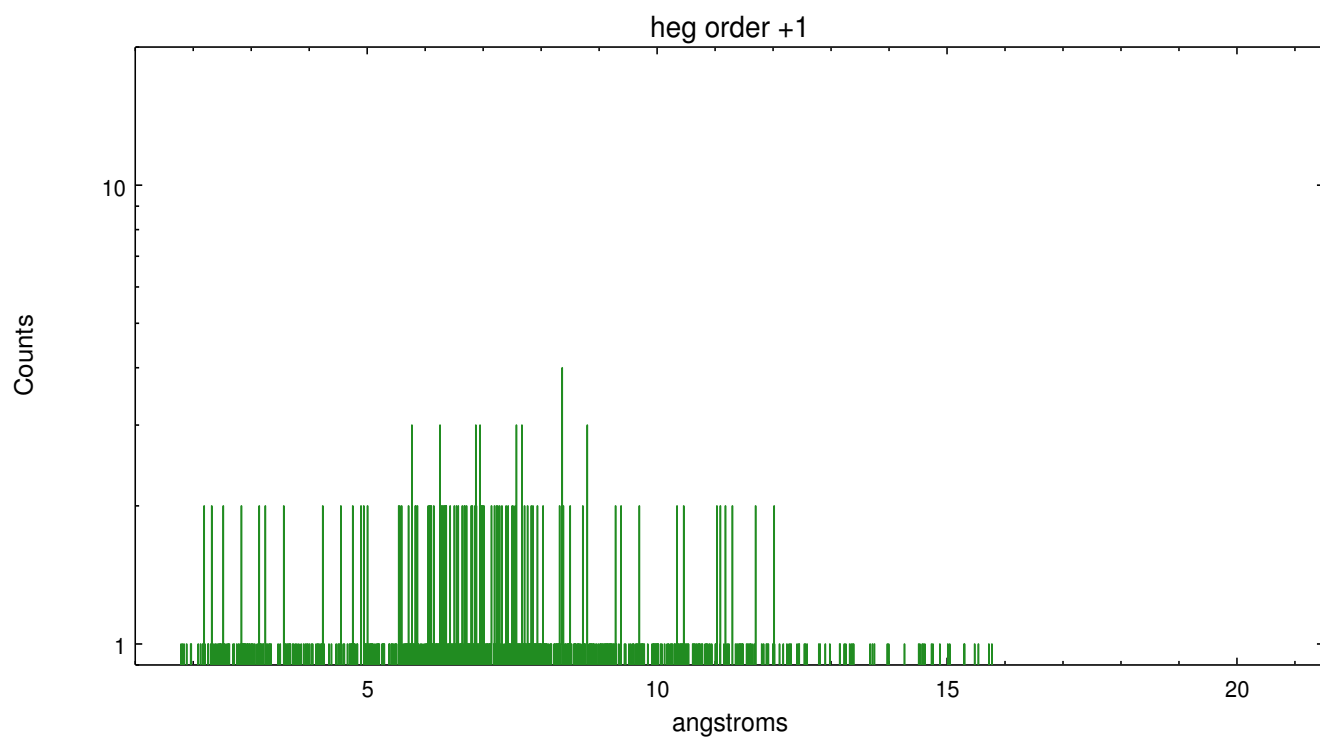
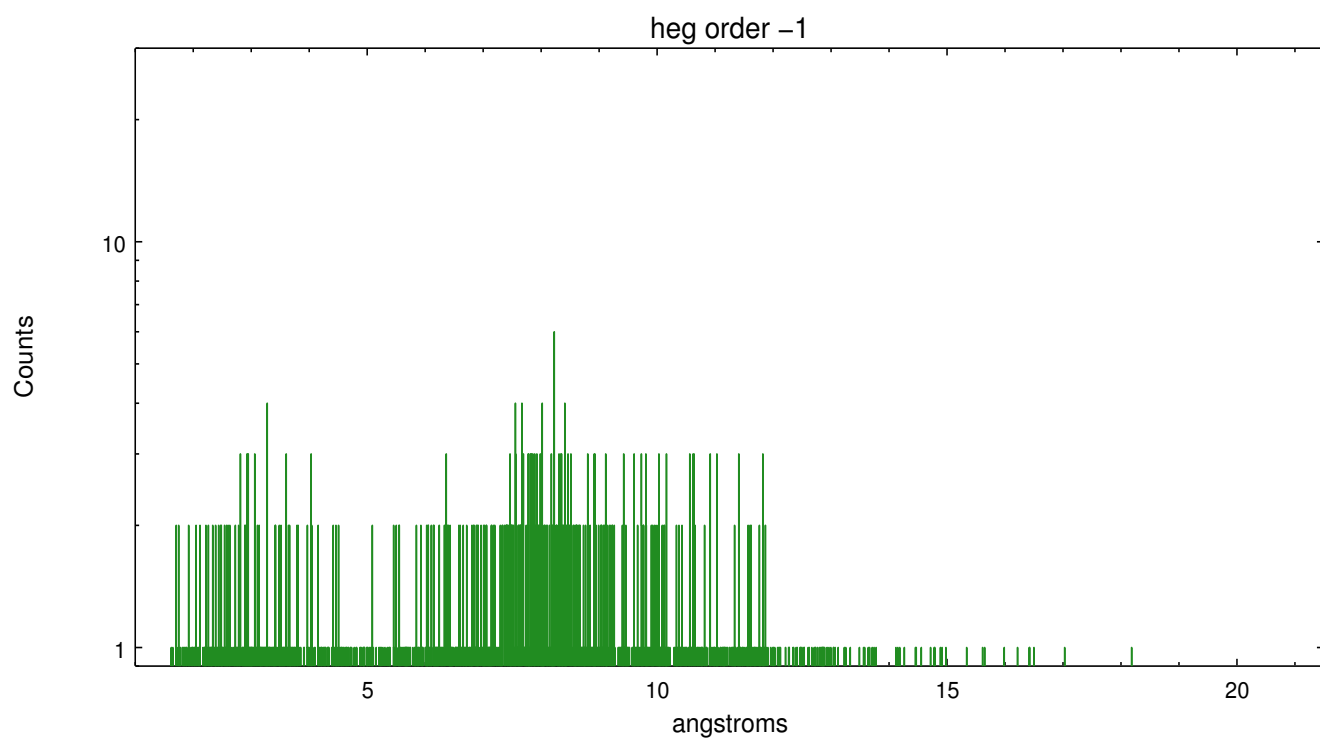
Spot Image HEG



Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	159	721	6808	2045	3673	368	99

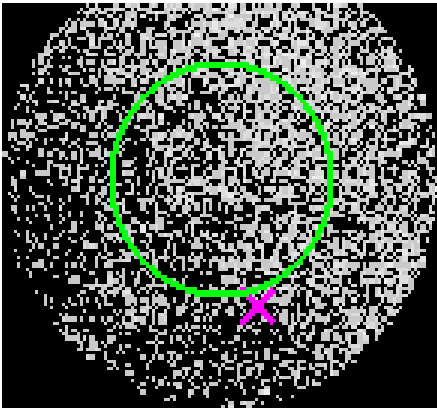




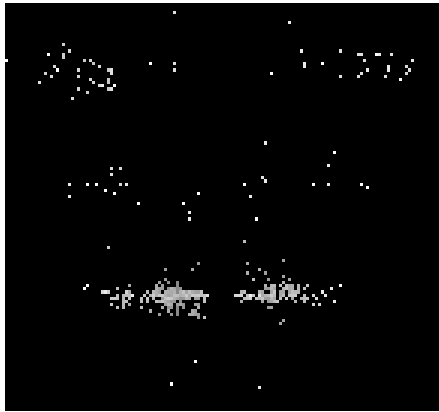
4.2 MEG Arm



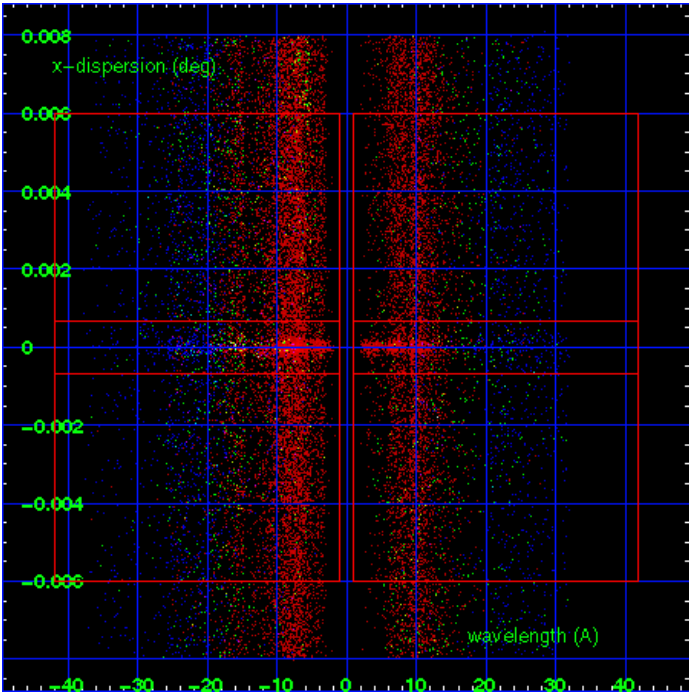
MEG Order Sort 123



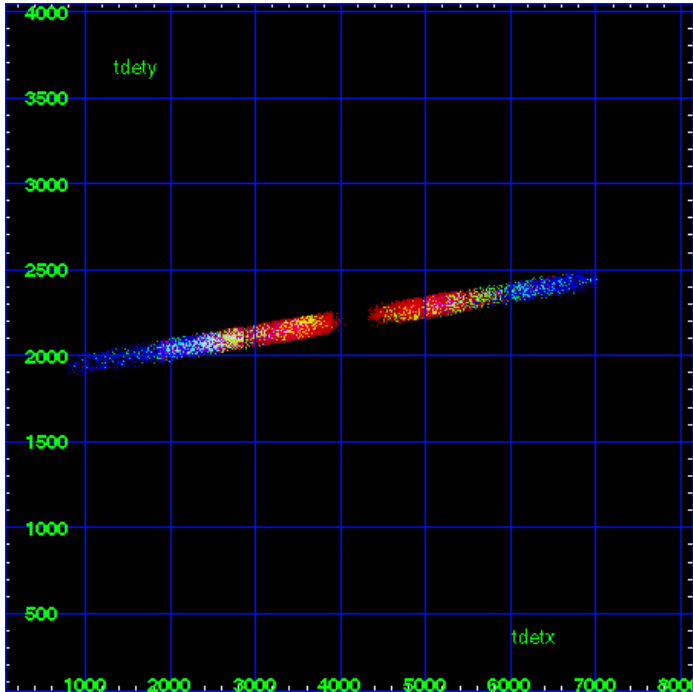
MEG Zero Order



MEG Order Sort ALL

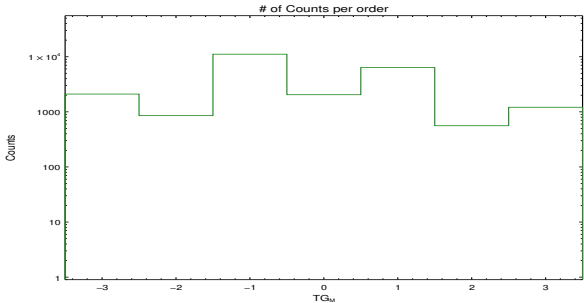


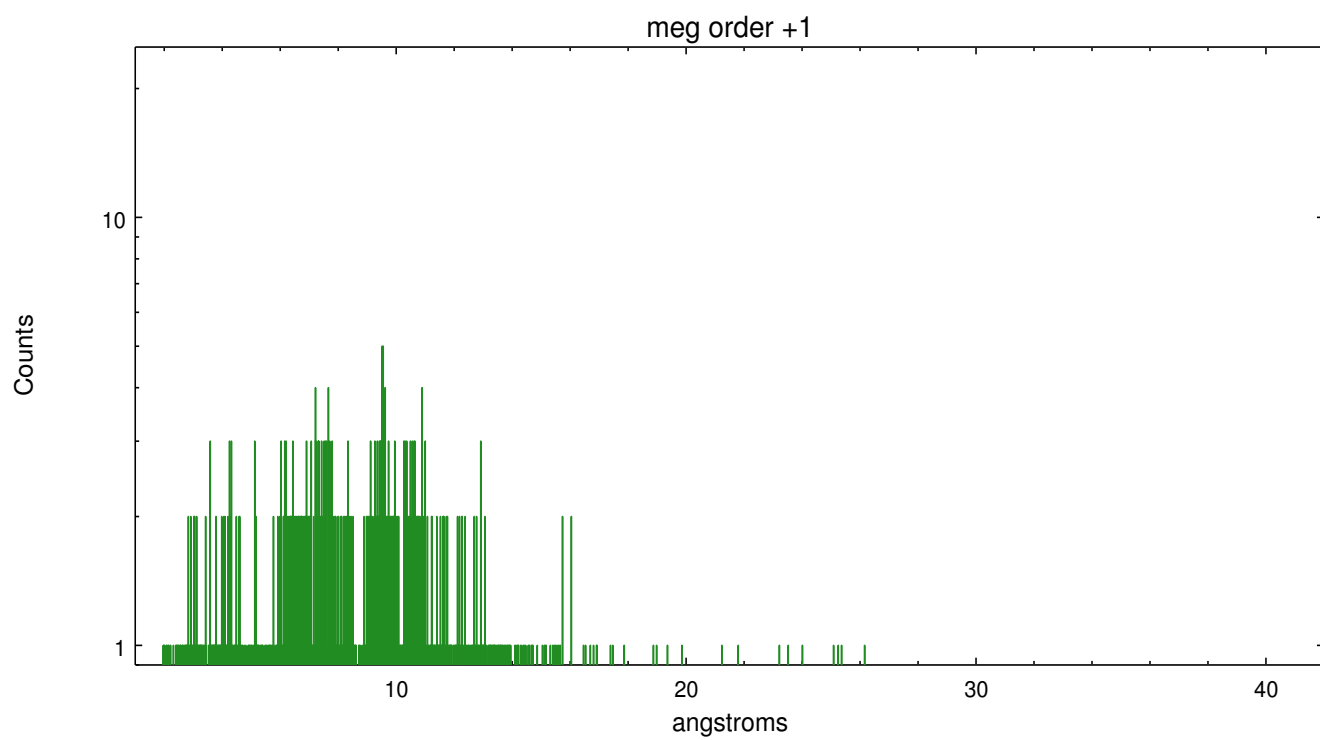
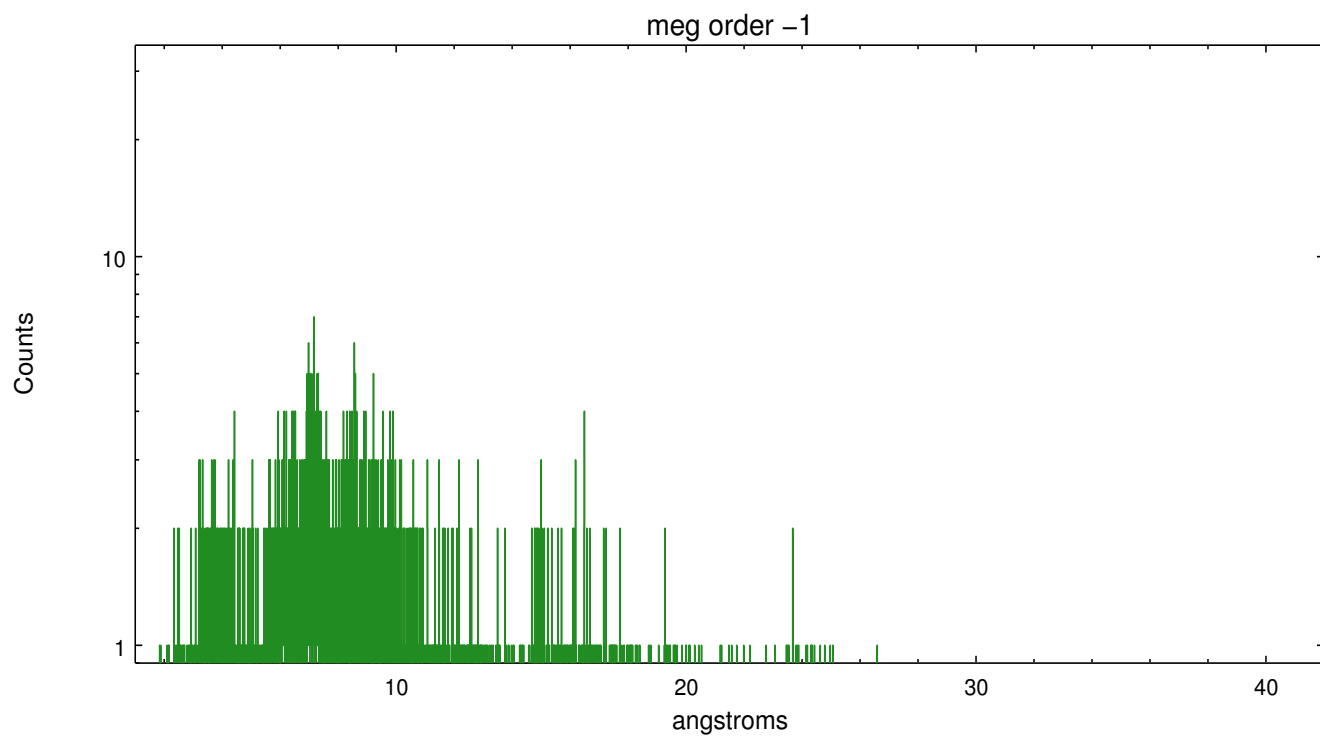
Spot Image MEG



Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	2102	854	11112	2045	6388	560	1210





A Summary

A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2012.09.06
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	8.9

A.2 Comments

This is an interleaved-mode observation. The primary exposure (e1) is shorter than the secondary exposure (e2). Therefore the longer exposure was used to determine the zeroth order position, then that position was applied to both exposures.

====

Zeroth order in the secondary exposure piled up. Standard data processing software did not correctly locate the zeroth order due to pileup. Manual intervention was used to input the correct sky coordinates (x=4086.3, y=4129.16) into the *src1a.fits file table. These corrected coordinates were determined using a software tool developed by CXC called findzero, which is expected to be released in CIAO as tg_findzo (currently in ISIS as findzo). The tool calculates the point of intersection of the readout streak and the meg arm. The zeroth order source position determined by the standard pipeline processing using the tool tgdetect was not used in this processing. The newly determined zeroth order coordinates have been placed in the *src1a.fits file, replacing the coordinates determined by tgdetect. Note that these corrected coordinates of the zeroth order cannot be reproduced by running tgdetect on the data.

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Charge time: Used ontime5 sum of P and S. The high count rate resulted in telemetry saturation and a large number of dropped exposures. The ONTIME value reflects the lost exposure time for each chip. This is an extended source and will require custom processing with parameters dependent upon the analysis goals. Standard processing used the position of the zeroth order and extraction regions smaller than the nebular extent. The bad-events image (of Secondary exposure frames) shows the grating arms, indicating that there is pileup in the dispersed spectrum.