

# V&V Reference Report

## L2 ASCDS Version : 8.5.1.1

Observation 15607 - L2 Version 3  
Chandra X-Ray Center

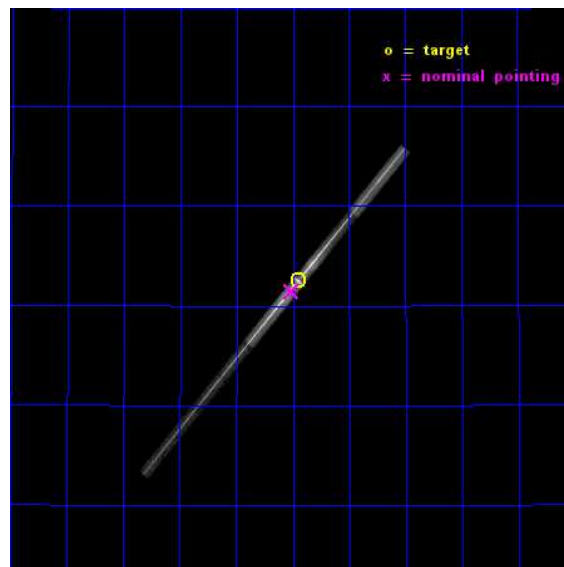
L2 Processing Date : Dec 1 2014

## Contents

<b>1</b>	<b>Front</b>	<b>2</b>
<b>2</b>	<b>OBI</b>	<b>3</b>
2.1	OBI . . . . .	3
2.1.1	Images . . . . .	3
2.1.2	Bias . . . . .	3
2.1.3	Parameters . . . . .	4
2.1.4	Events . . . . .	4
2.2	Compared Parameters . . . . .	5
2.3	Aspect . . . . .	6
2.4	Star Slots . . . . .	9
2.4.1	Slot 3 . . . . .	9
2.4.2	Slot 4 . . . . .	10
2.4.3	Slot 5 . . . . .	11
2.4.4	Slot 6 . . . . .	12
2.4.5	Slot 7 . . . . .	13
2.5	FID Slots . . . . .	14
2.5.1	Slot 0 . . . . .	14
2.5.2	Slot 1 . . . . .	15
2.5.3	Slot 2 . . . . .	16
<b>3</b>	<b>Gratings</b>	<b>17</b>
3.1	LETG Arm . . . . .	17
<b>A</b>	<b>Summary</b>	<b>19</b>
A.1	Status . . . . .	19
A.2	Comments . . . . .	19

# 1 Front

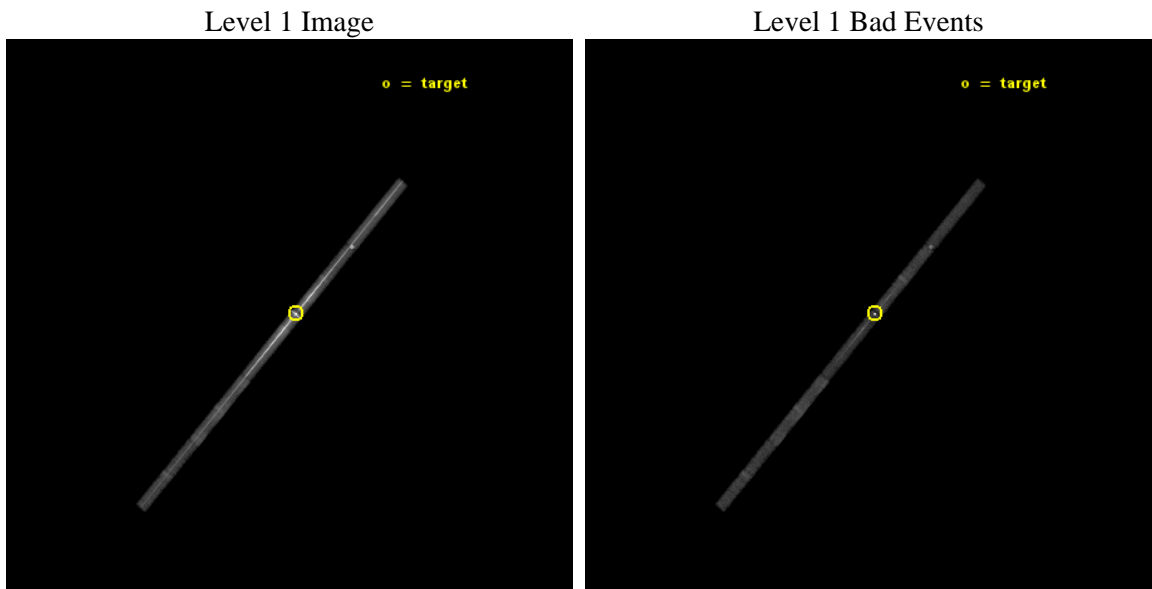
seq_num	790261	Sequence number
obs_id	15607	Observation id
title	AO-13 Calibration Observation of Mkn421 to Monitor the Contaminant on the ACIS Filter	Proposal title
observer	Dr. CXC Calibration	Principal investigator
object	Mkn421	Source name
dtcycle	0	&#160
cycle	P	events from which exps? Prim/Second/Both
ra_targ	166.113333	Observer's specified target RA [deg]
dec_targ	38.208806	Observer's specified target Dec [deg]
ra_nom	166.12782890738	Nominal RA [deg]
dec_nom	38.191111113382	Nominal Dec [deg]
roll_nom	129.92854001097	Nominal Roll [deg]
revision	3	Processing version of data
ontime	30066.001194715	Sum of GTIs [s]
livetime	28141.146756566	Livetime [s]
ontime5	30066.001194715	Sum of GTIs [s]
ontime6	30065.965379179	Sum of GTIs [s]
ontime7	30066.001194715	Sum of GTIs [s]
ontime8	30065.924339175	Sum of GTIs [s]
ontime9	30065.883299172	Sum of GTIs [s]
l2events	697560	Number of level 2 events



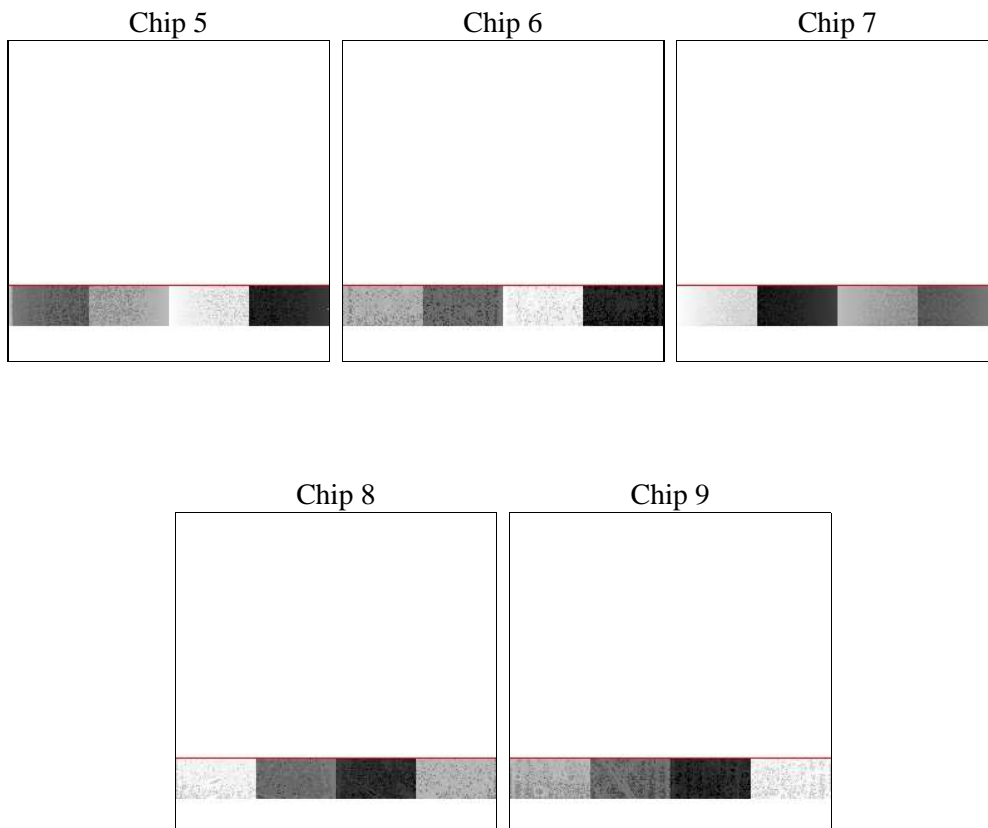
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	30000.000000	[s] Scheduled observation exposure time
ascdsver	10.3	Processing system revision	ontime	30066.001194715	Sum of GTIs [s]
caldbver	4.6.4	&#160	ontime5	30066.001194715	Sum of GTIs [s]
date	2014-12-01T08:48:09	Date and time of file creation	ontime6	30065.965379179	Sum of GTIs [s]
revision	2	Processing version of data	ontime7	30066.001194715	Sum of GTIs [s]
			ontime8	30065.924339175	Sum of GTIs [s]
			ontime9	30065.883299172	Sum of GTIs [s]
			l1events	907157	Number of level 1 events
			tgmethod	FINDZO	Method used to create src1a file
			zo_pos	(4176.91, 4226.16)	src1a sky pixel position
					src1a sky pixel position via

### 2.1.4 Events

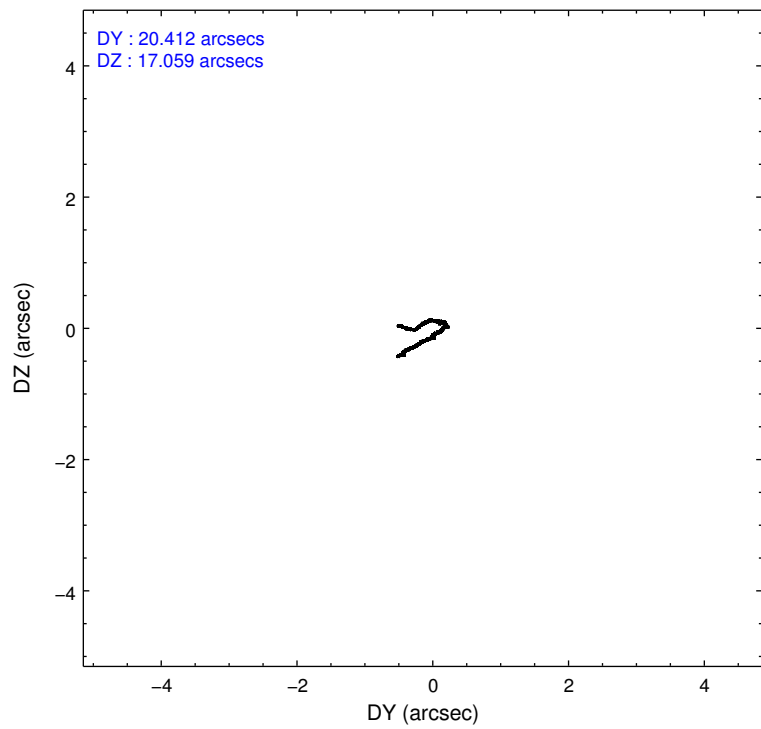
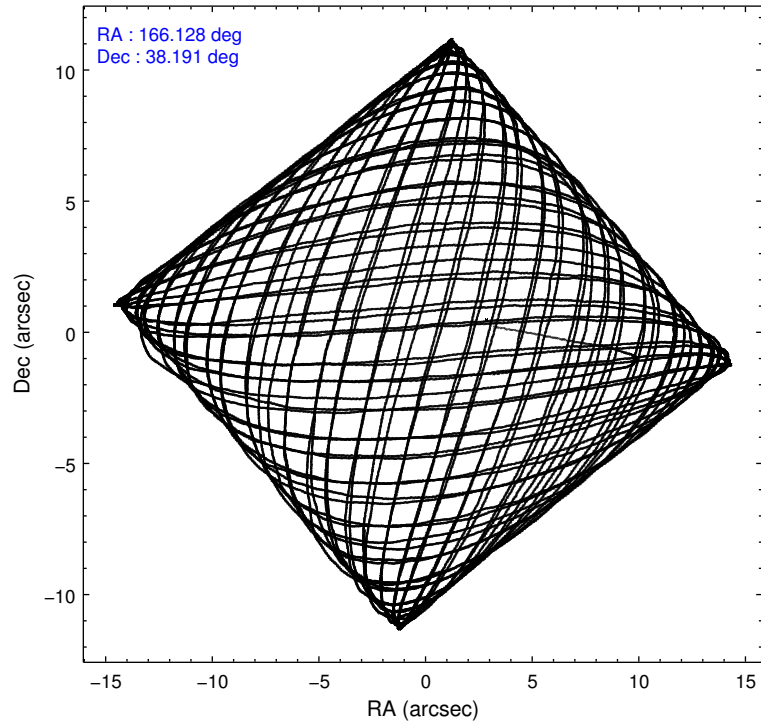
	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	99893	259138	457038	59116	31972
rejected events	20576	26837	69343	30487	21886
rejected %	20%	10%	15%	51%	68%

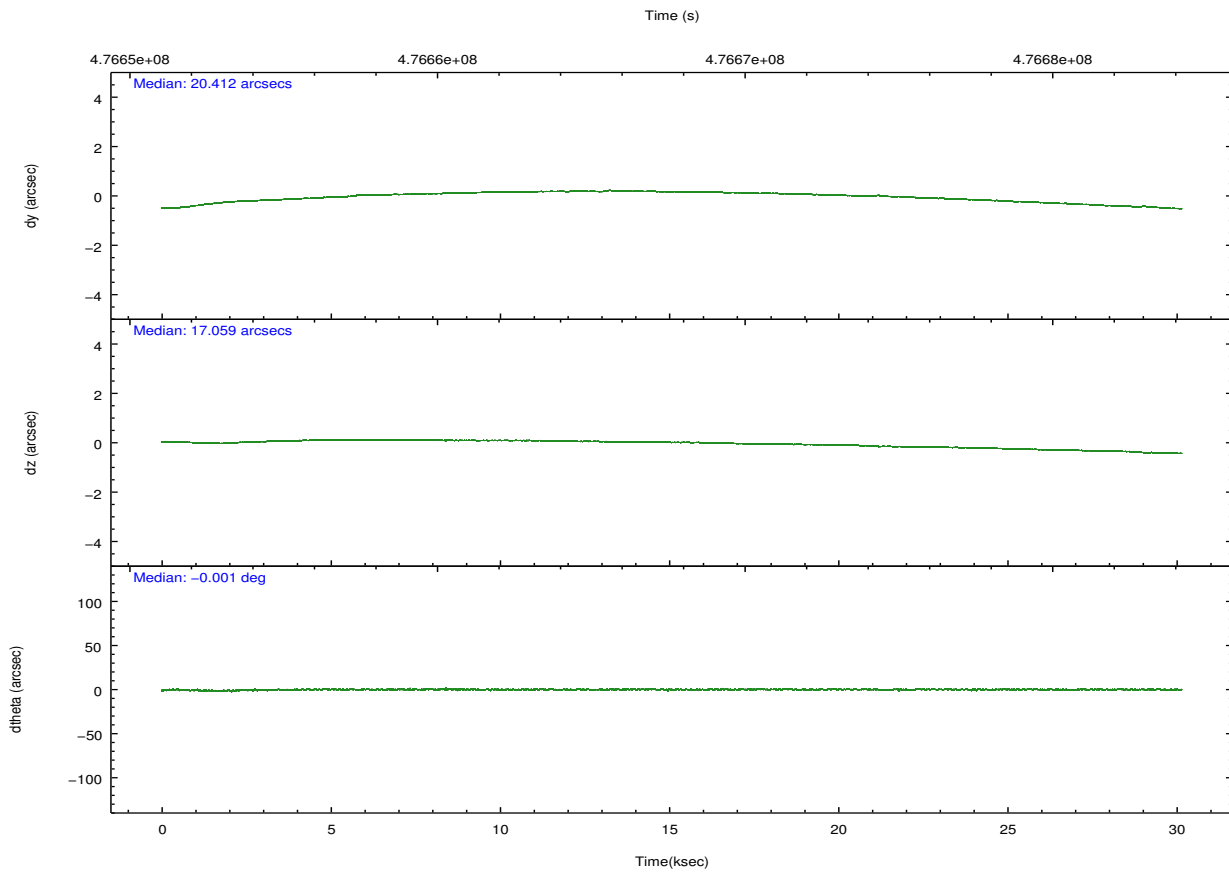
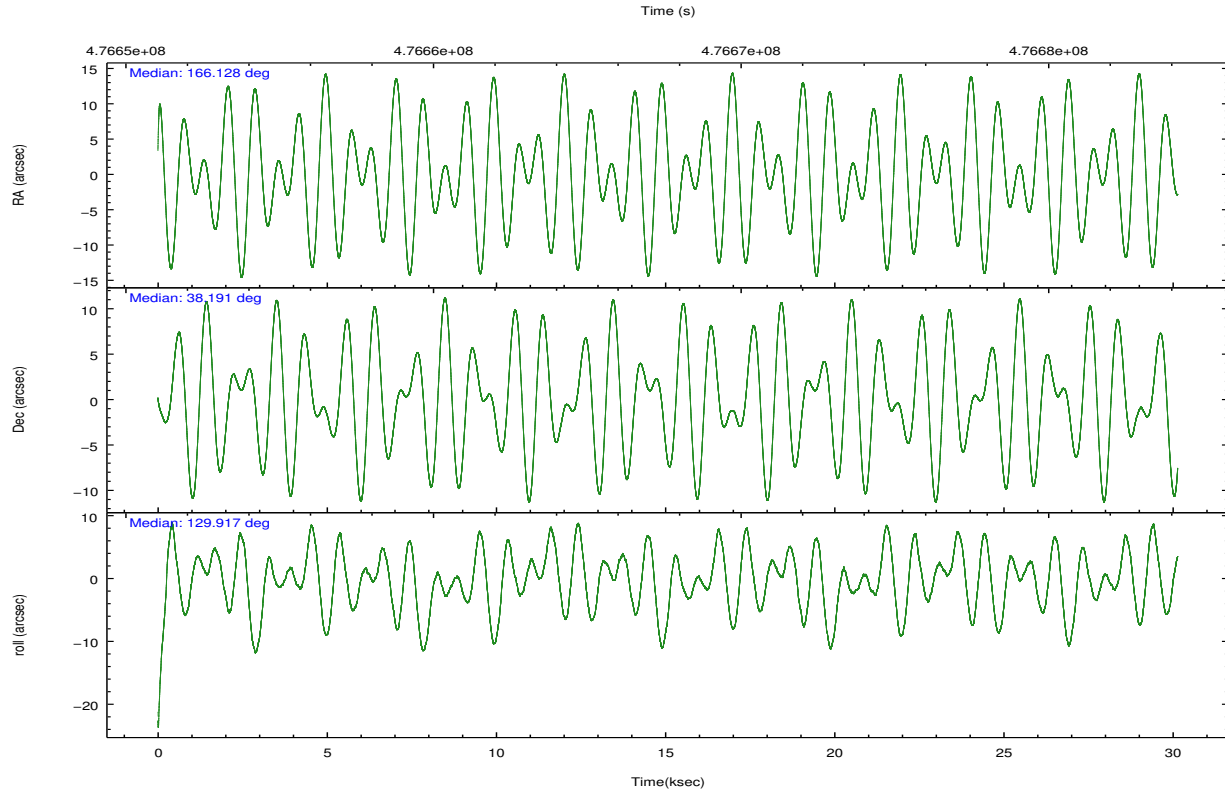
	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
grade 0 events	41476	186454	103542	18311	6602
	41%	71%	22%	30%	20%
grade 1 events	1638	890	2189	41	10
	1%	0%	0%	0%	0%
grade 2 events	14647	23952	98300	3661	1237
	14%	9%	21%	6%	3%
grade 3 events	6198	7906	44614	1659	779
	6%	3%	9%	2%	2%
grade 4 events	4972	7749	44121	1585	731
	4%	2%	9%	2%	2%
grade 5 events	4030	1596	12521	1537	1056
	4%	0%	2%	2%	3%
grade 6 events	12025	6251	97127	3414	737
	12%	2%	21%	5%	2%
grade 7 events	14907	24340	54624	28908	20820
	14%	9%	11%	48%	65%

## 2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	7	7
Detector	ACIS-56789	ACIS-56789	Obspar file type	PREDICTED	ACTUAL
Grating	LETG	LETG	Obspar update status	NONE	UPDATED
Data mode	FAINT	FAINT	CCD I0 on	N	N
Observation mode	POINTING	POINTING	CCD I1 on	N	N
[deg] Pointing RA	166.160674	166.127828907376	CCD I2 on	N	N
[deg] Pointing Dec	38.182087	38.19111111338154	CCD I3 on	N	N
[deg] Pointing Roll	129.751609	129.9285400109723	CCD S0 on	O1	N
[s] Window start time (MET)	474595267.184000	474595267.184000	CCD S1 on	Y	Y
[s] Window stop time (MET)	477273667.184000	477273667.184000	CCD S2 on	Y	Y
[mm] SIM focus pos	-0.684267	-0.6828225247311905	CCD S3 on	Y	Y
[mm] SIM defocus	0	0.001444936568705701	CCD S4 on	Y	Y
[mm] SIM translation stage pos	-182.132523	-182.1370004450064	CCD S5 on	Y	Y
[mm] SIM translation stage offset	-8	-7.995522138001405	Number of optional ACIS chips dropped	1	1
[s] Observation start time (MET)	476652678.184000	476651785.71746	On-chip summing requested	N	N
Observation start date	2013-02-07T19:30:11	2013-02-07T19:16:25	Subarray requested	CUSTOM	1/8
[s] Observation end time (MET)	476682678.184000	476683383.90667	Subarray start row	113	113
Observation end date	2013-02-08T03:50:11	2013-02-08T04:03:03	Subarray row count	128	128
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	0.6

## 2.3 Aspect



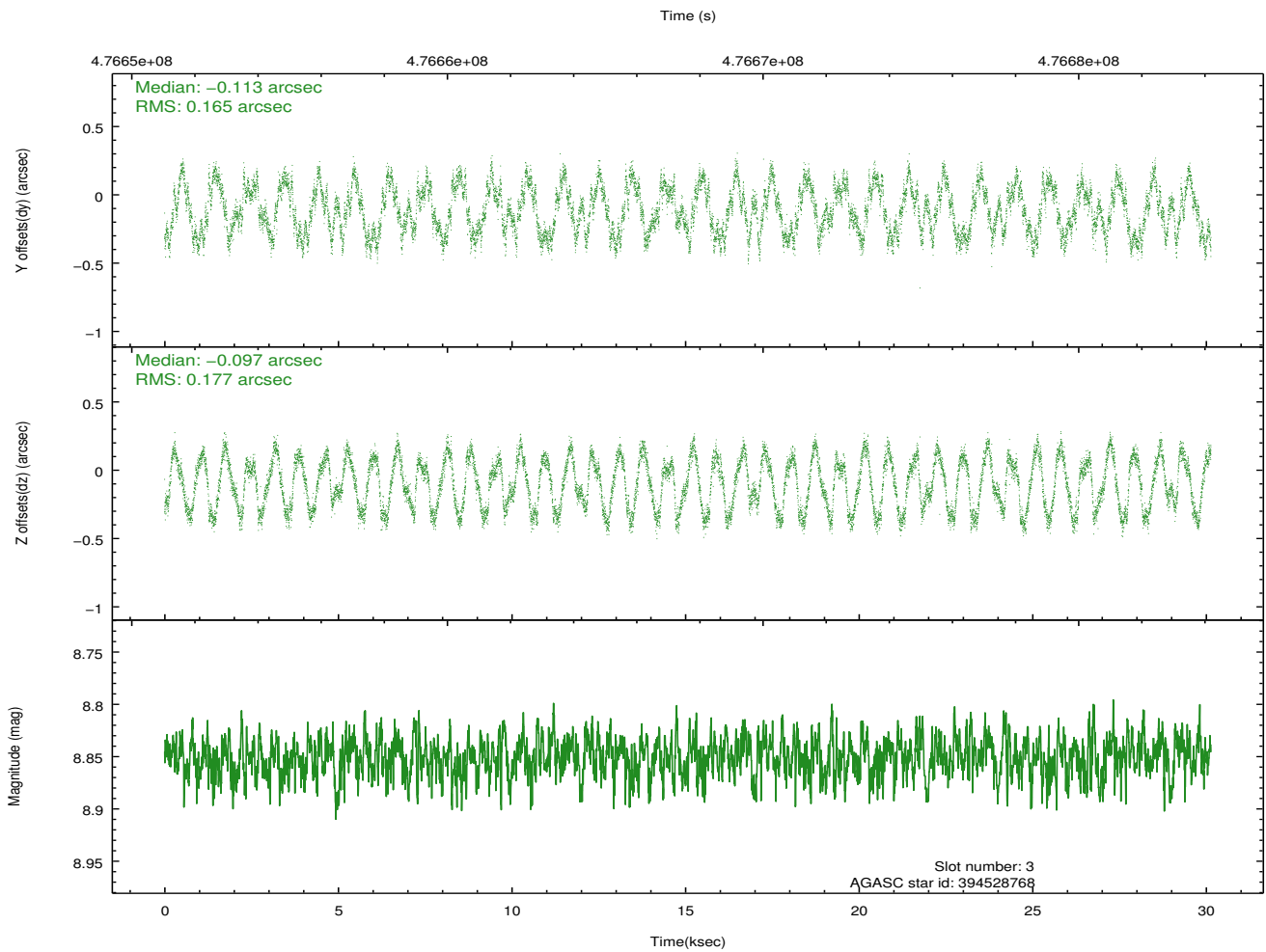
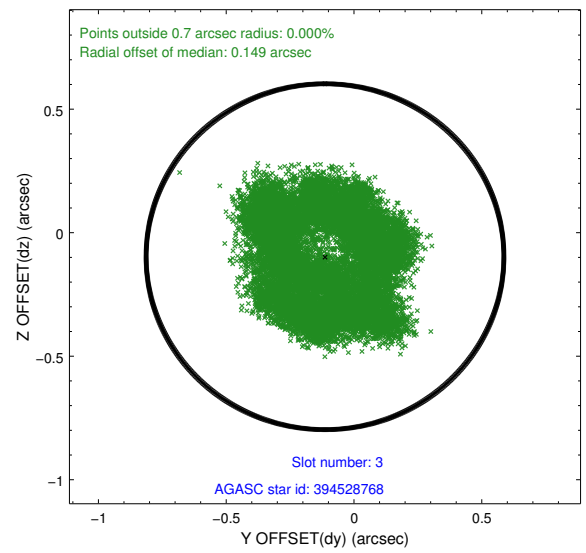
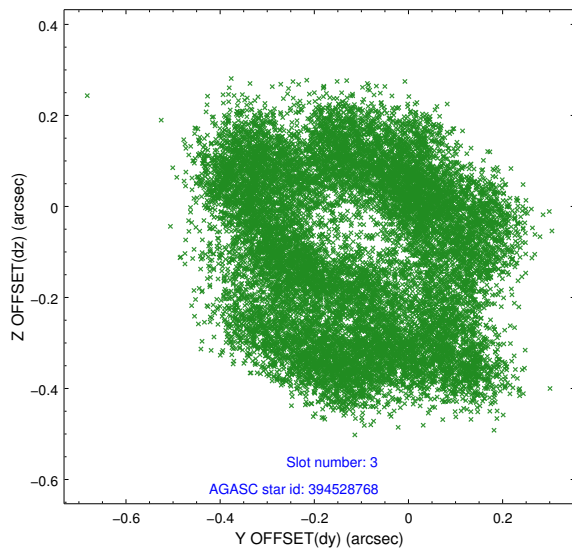


### Slot Statistics

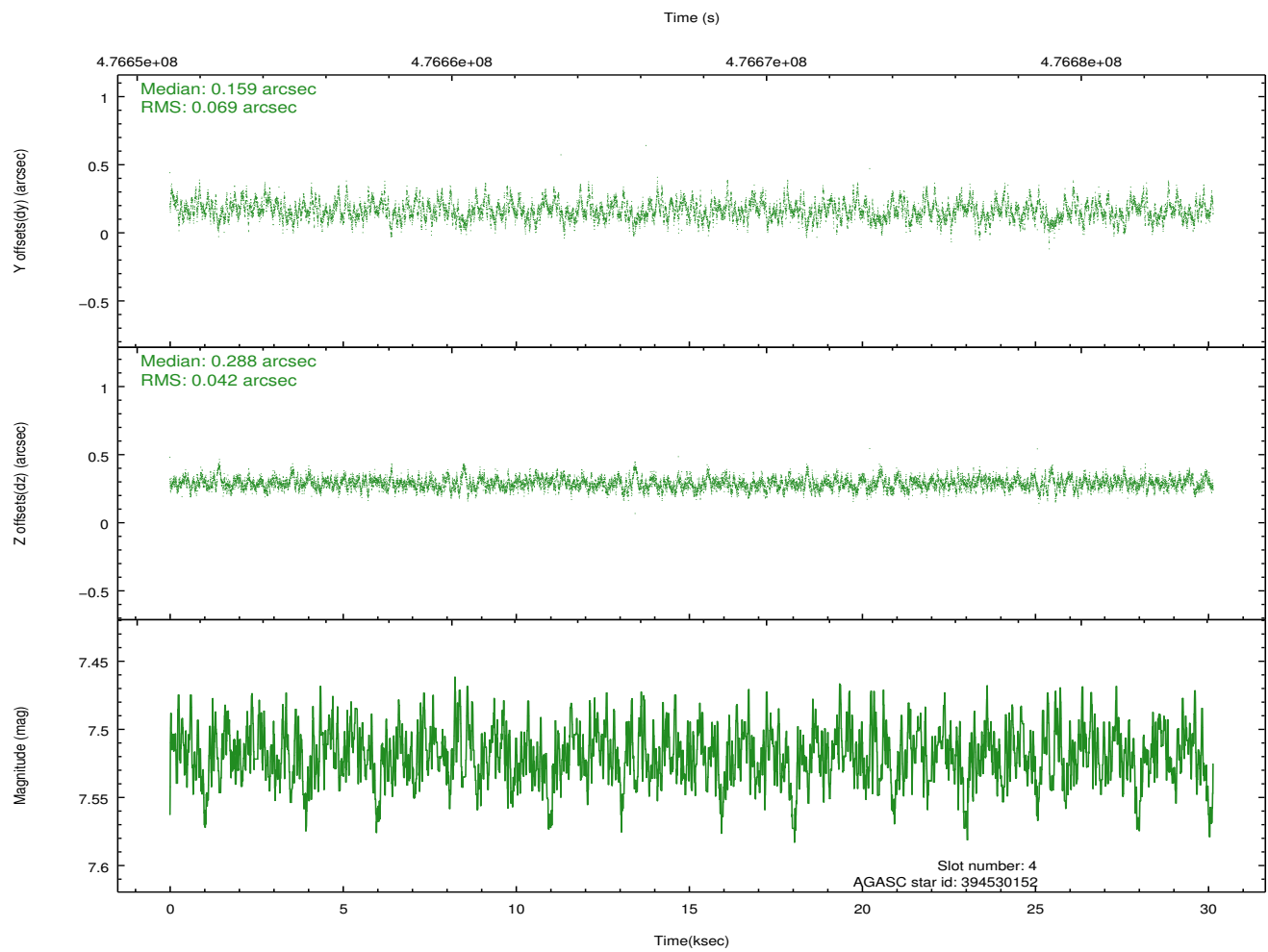
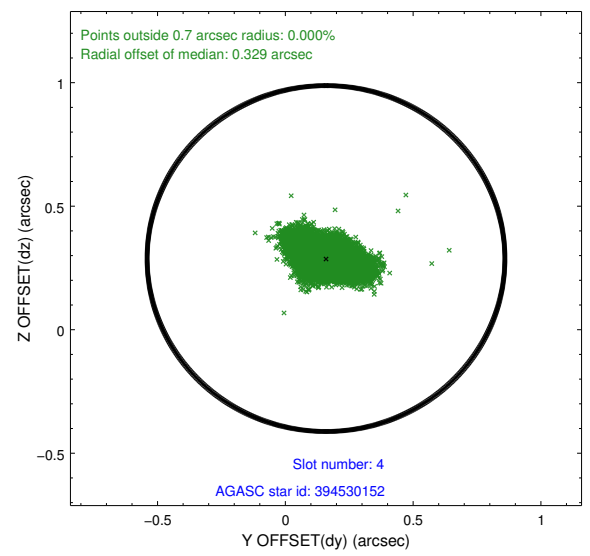
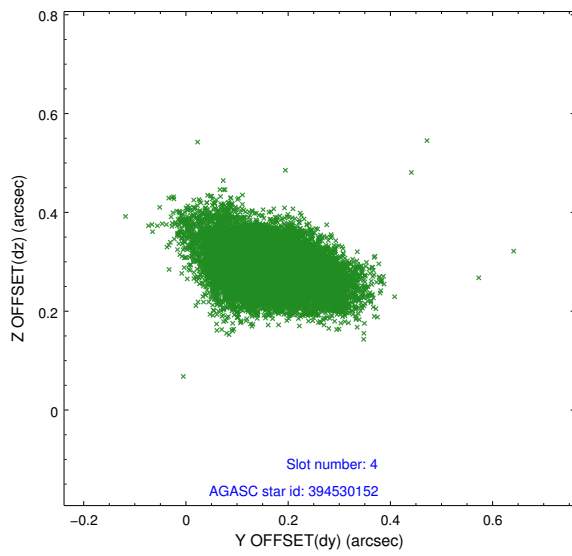
slot	status	used	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID		ACIS-S-2	6.97	7352	-0.246	-0.191	0.007	0.012	0.000000	0.000000	-773.24	-1903.30
1	FID		ACIS-S-4	7.05	7352	0.217	0.141	0.007	0.011	0.000000	0.000000	2140.56	5.26
2	FID		ACIS-S-6	7.27	7351	0.002	0.056	0.008	0.014	0.000000	0.000000	389.21	642.74
3	GUIDE	used	394528768	8.85	14694	-0.113	-0.097	0.268	0.351	166.180365	38.952248	2096.80	-1814.89
4	GUIDE	used	394530152	7.52	14701	0.159	0.288	0.083	0.150	166.075805	38.868252	2052.13	-1396.27
5	GUIDE	used	394533744	8.90	14682	-0.314	-0.138	0.141	0.220	167.094985	37.988717	-2219.80	-1602.17
6	GUIDE	used	394533848	8.73	14701	0.096	0.030	0.101	0.156	166.382906	38.276007	-137.40	-696.81
7	GUIDE	used	394543960	9.81	14671	0.166	-0.092	0.158	0.254	165.802757	37.787371	-439.83	1690.06

## 2.4 Star Slots

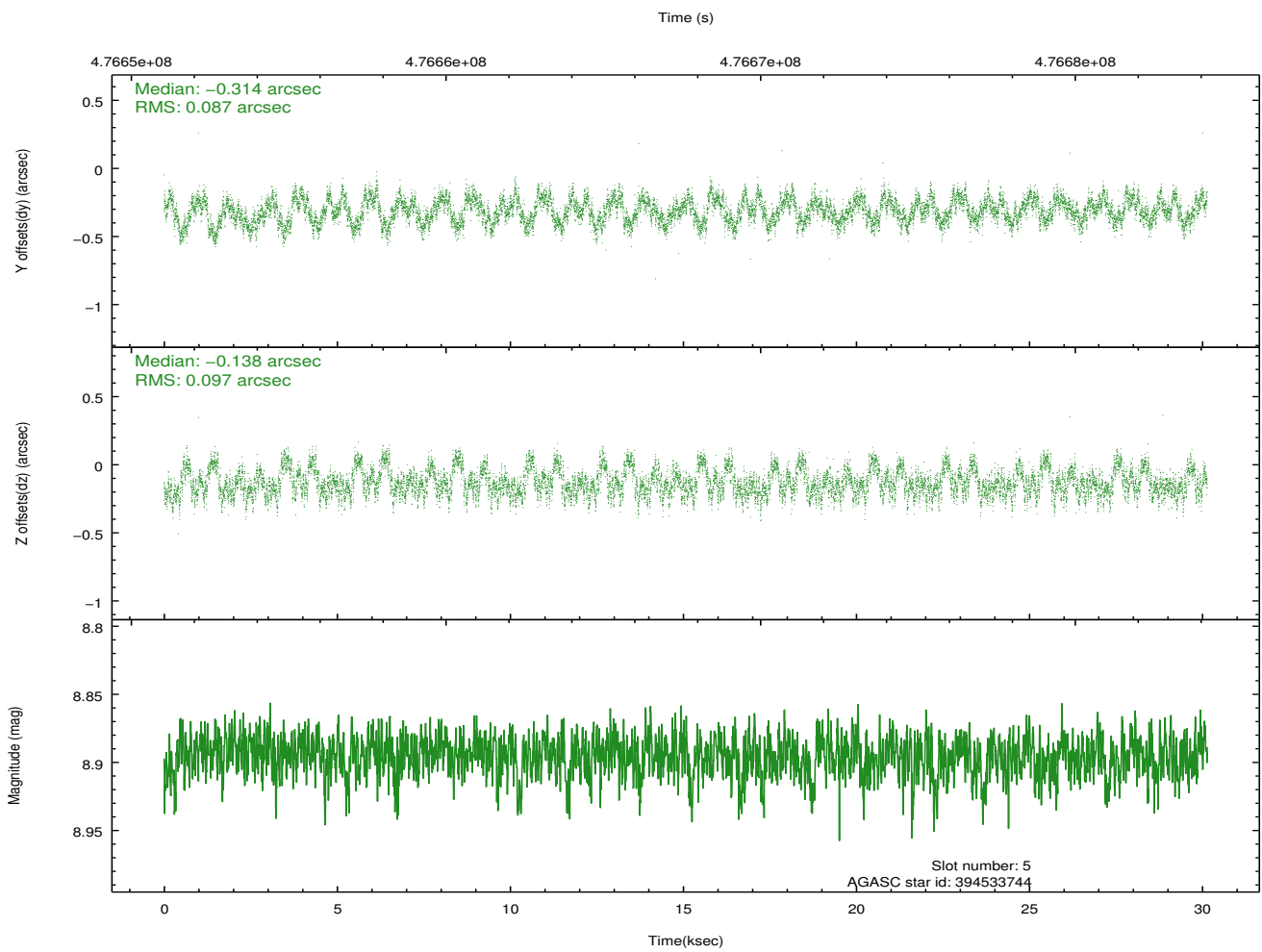
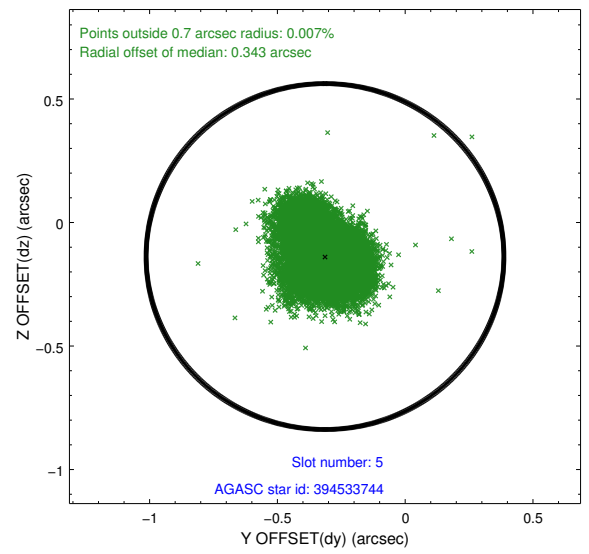
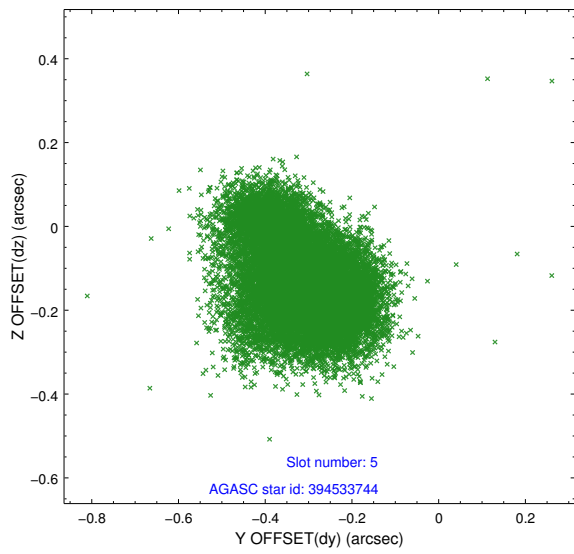
### 2.4.1 Slot 3



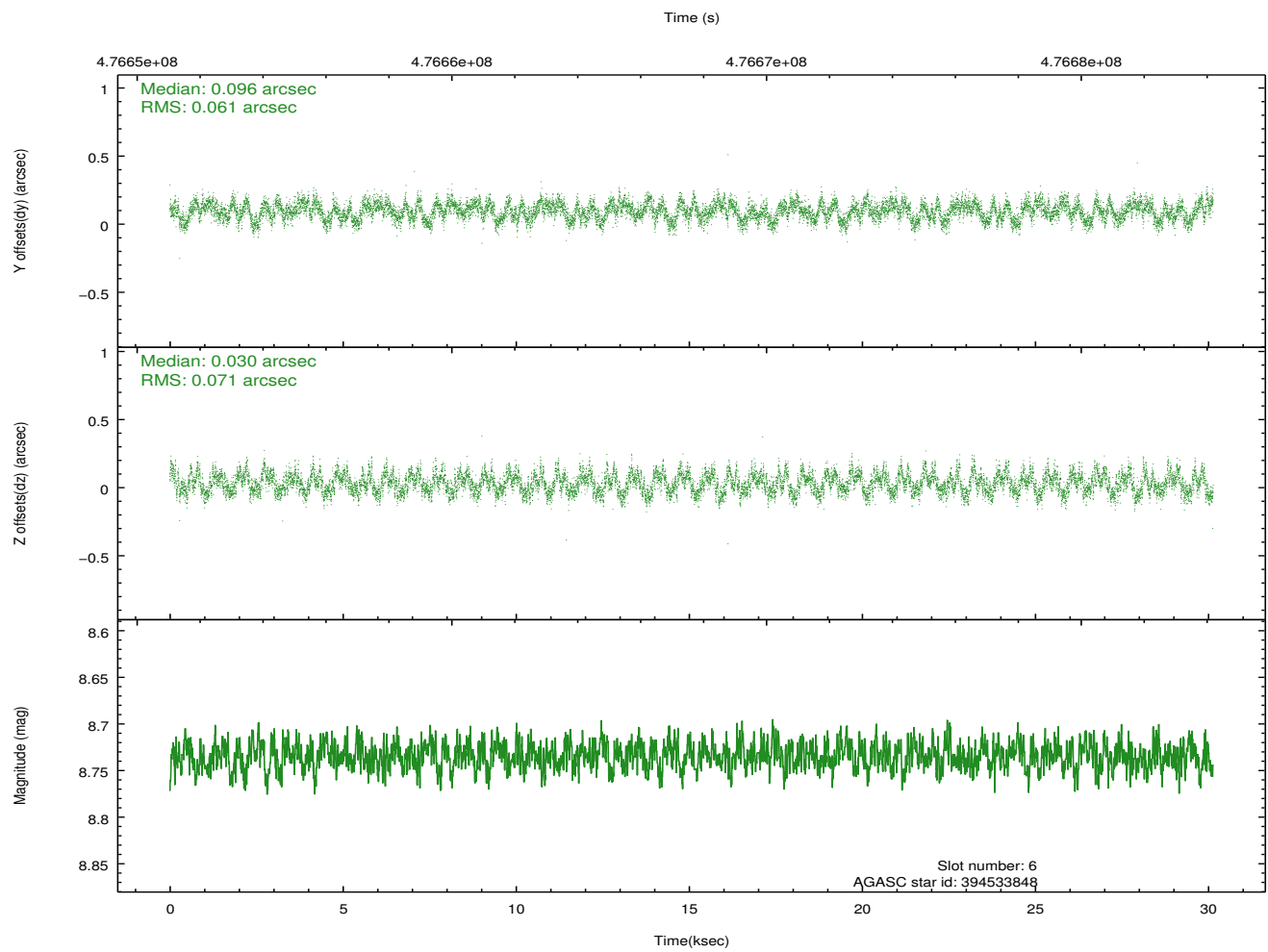
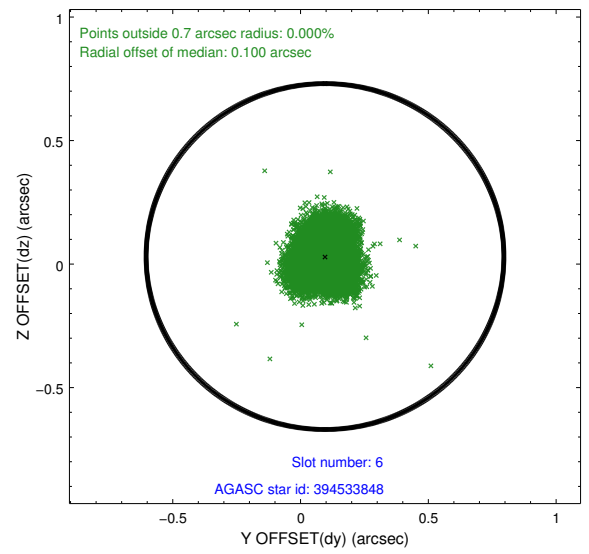
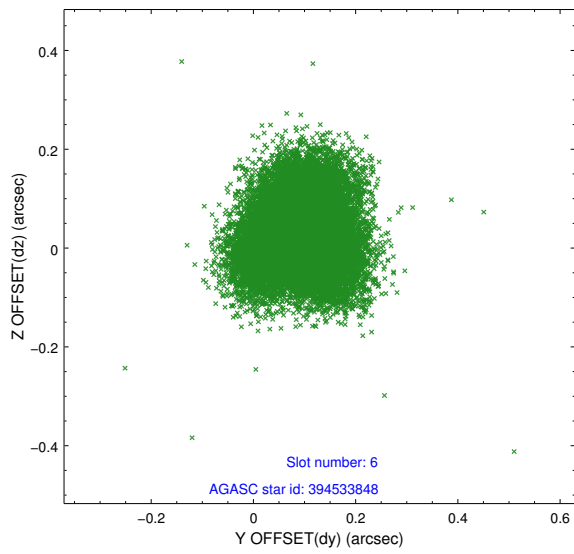
## 2.4.2 Slot 4



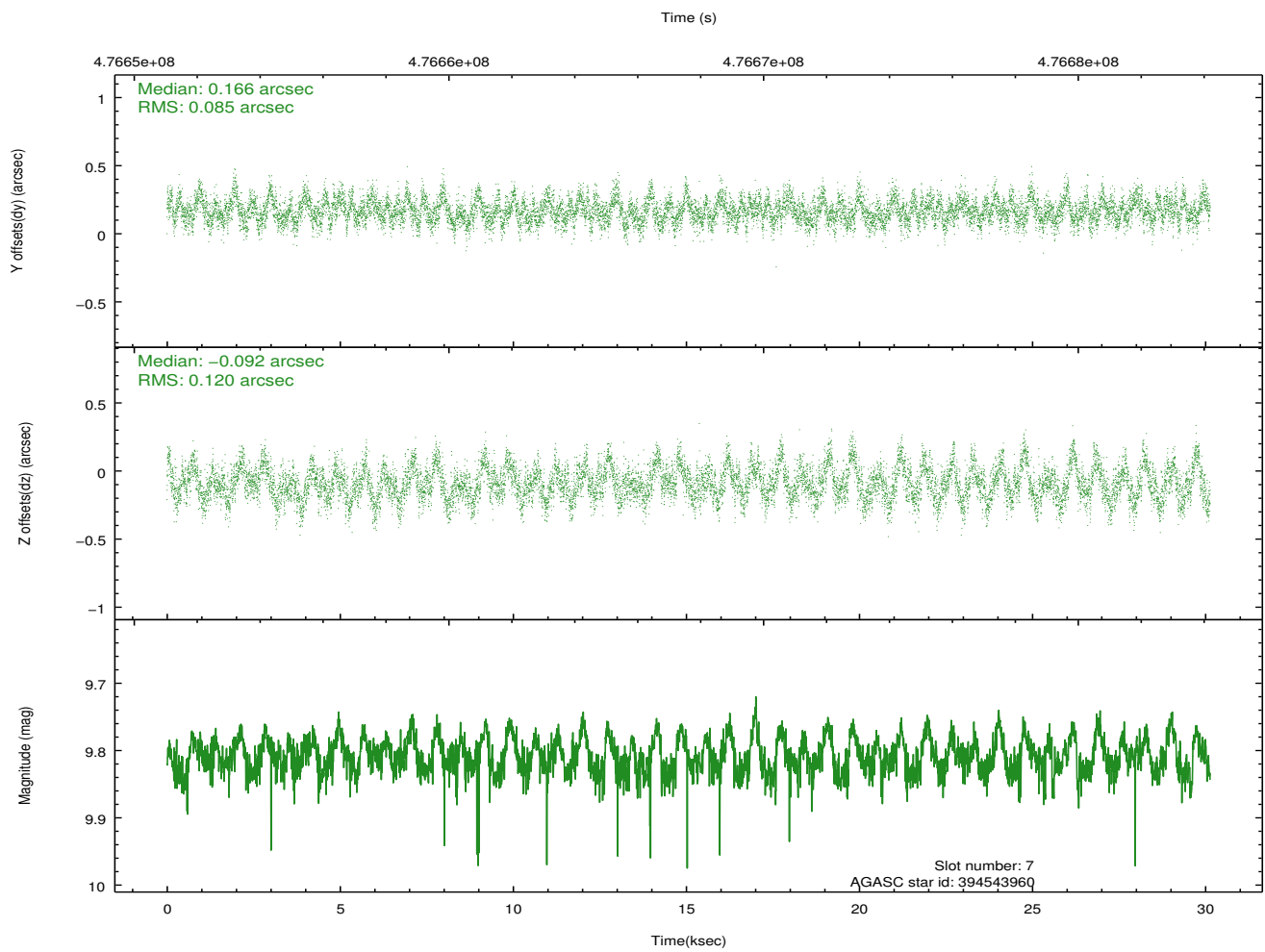
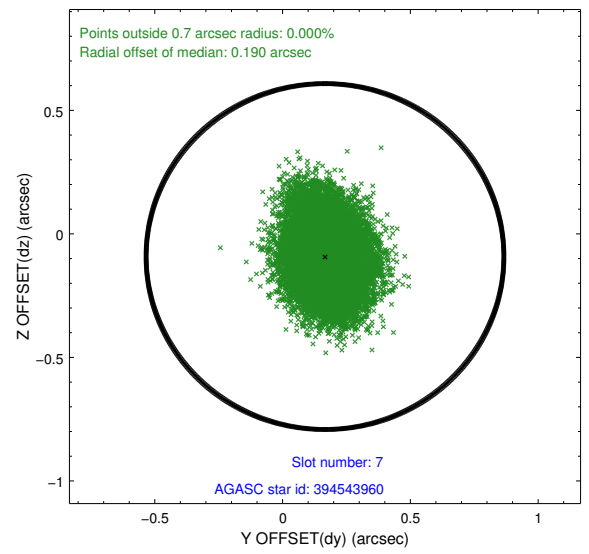
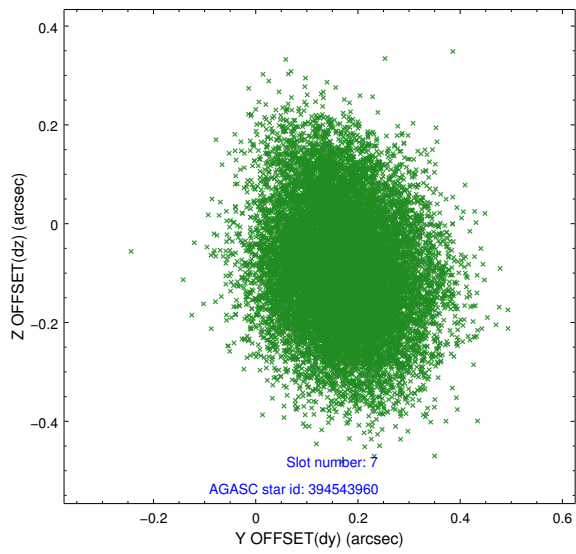
### 2.4.3 Slot 5



## 2.4.4 Slot 6

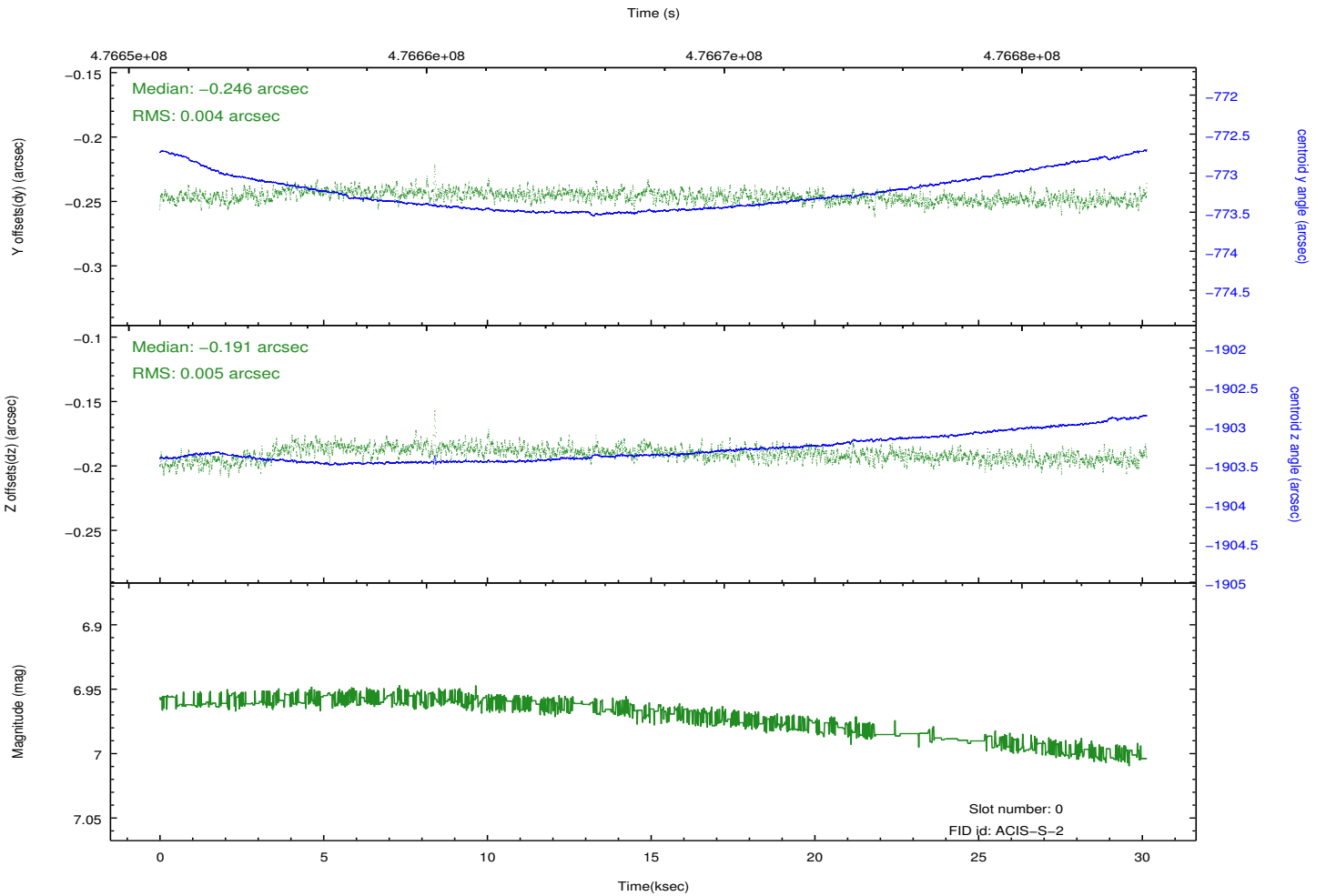
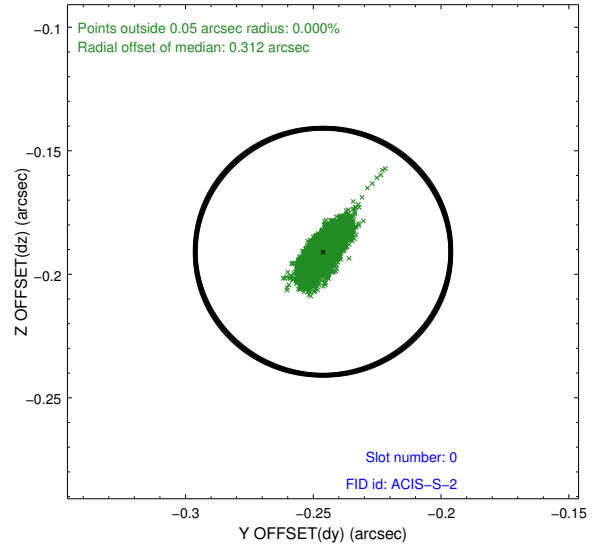
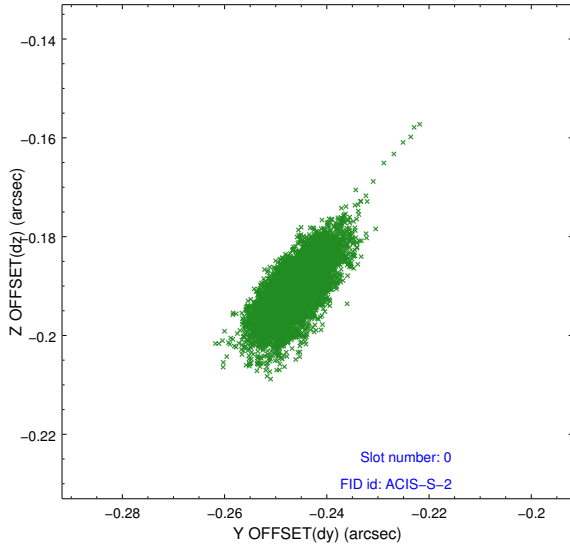


## 2.4.5 Slot 7

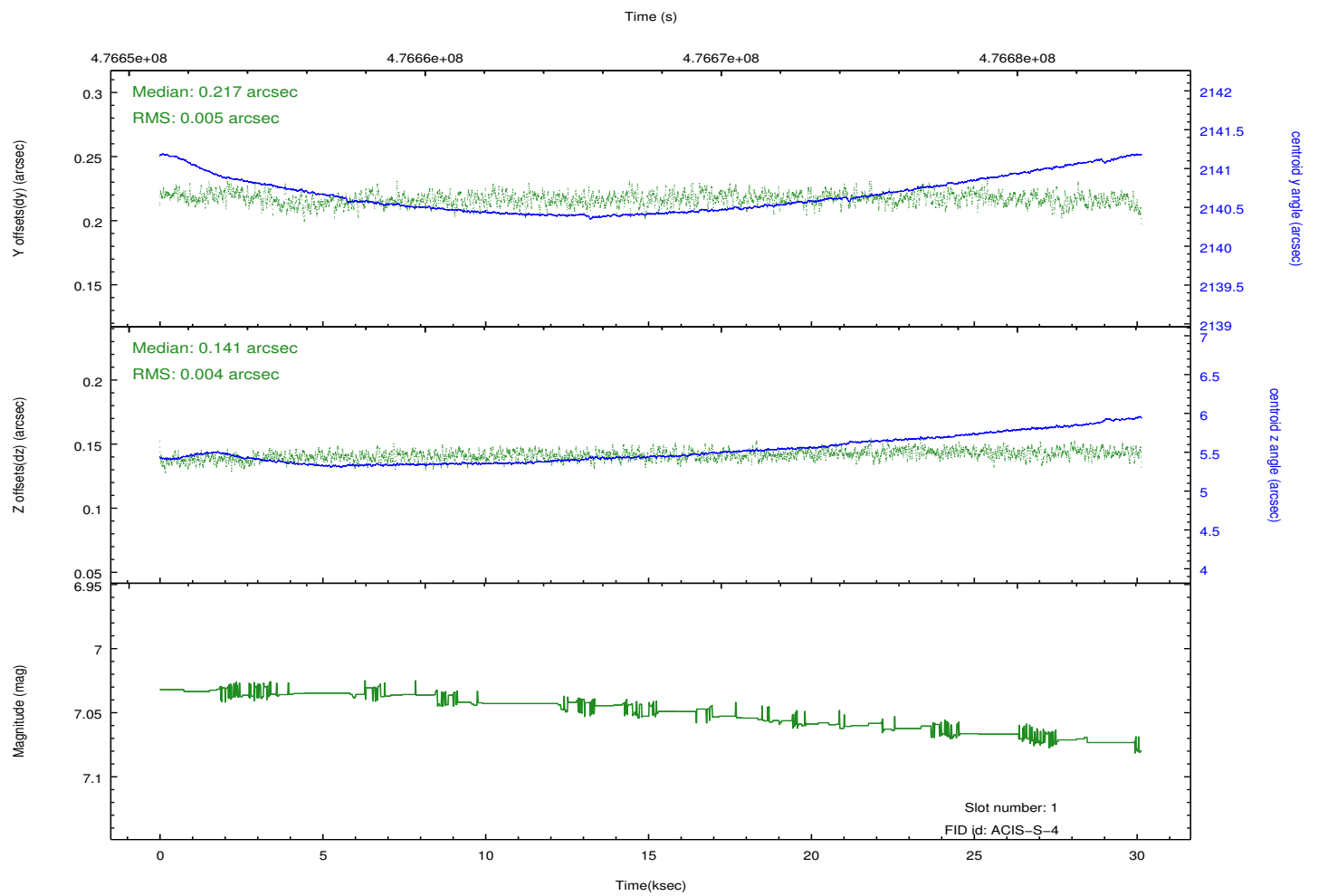
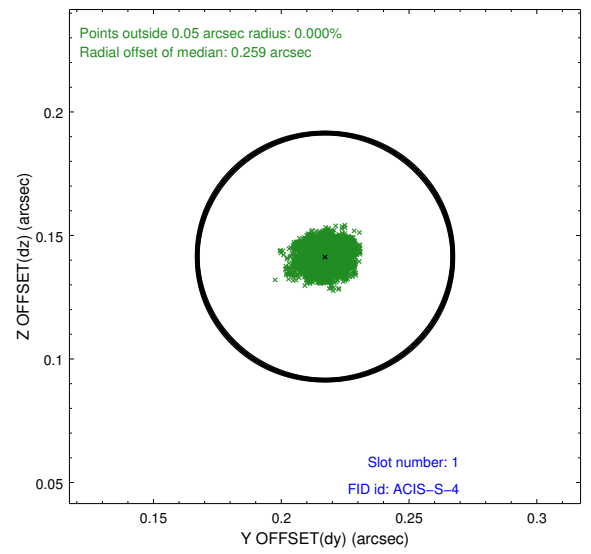
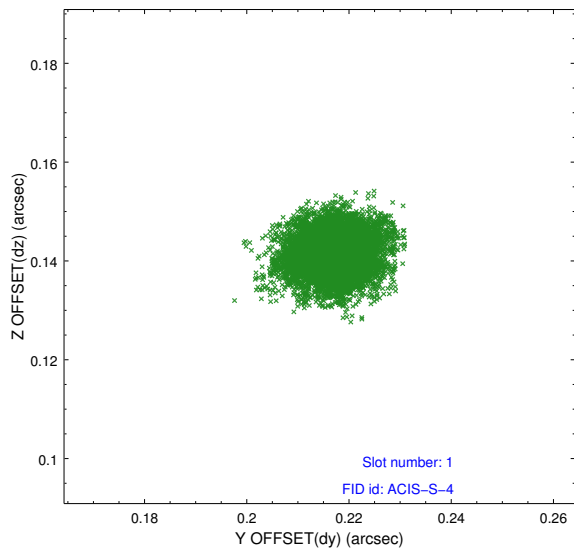


## 2.5 FID Slots

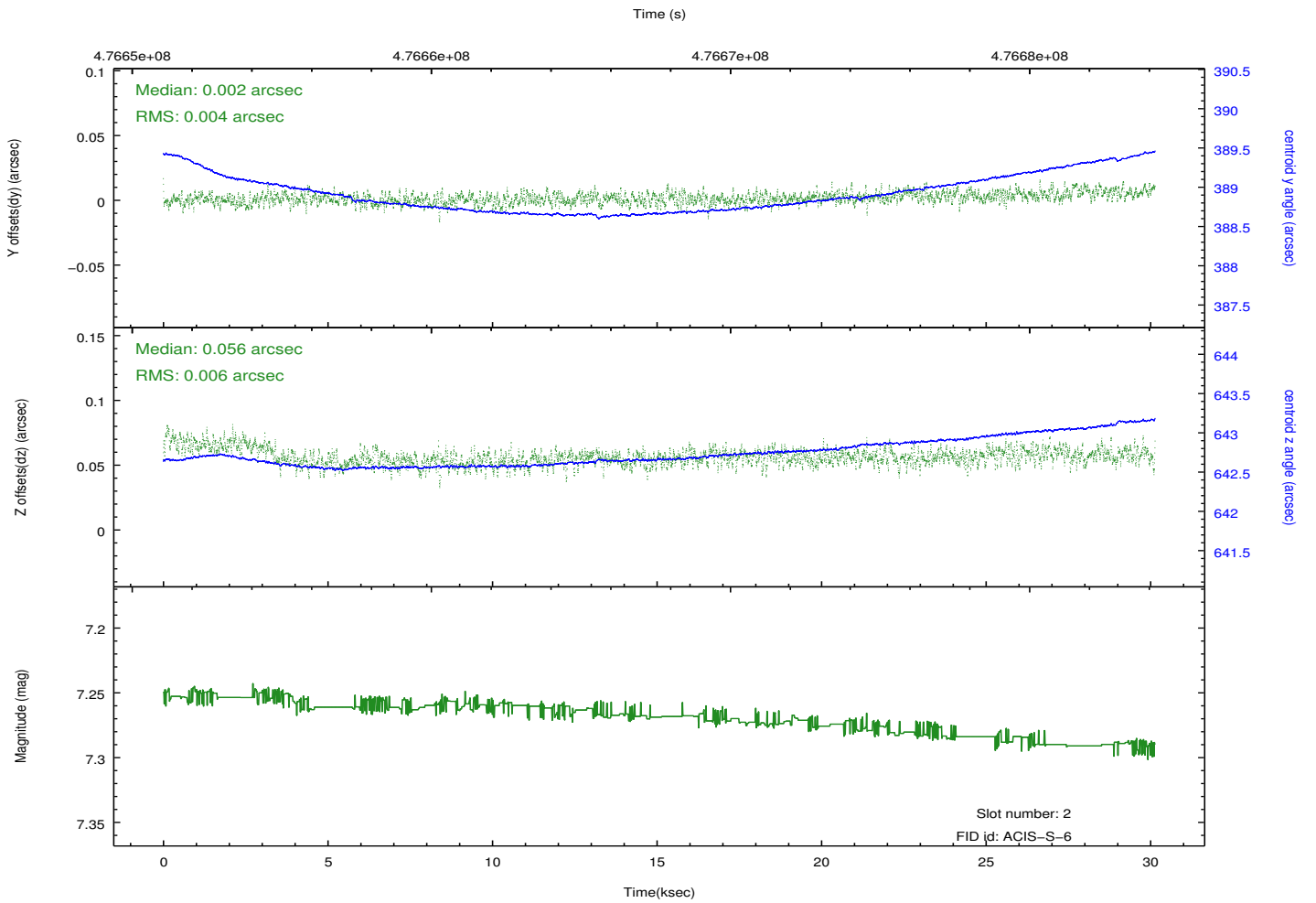
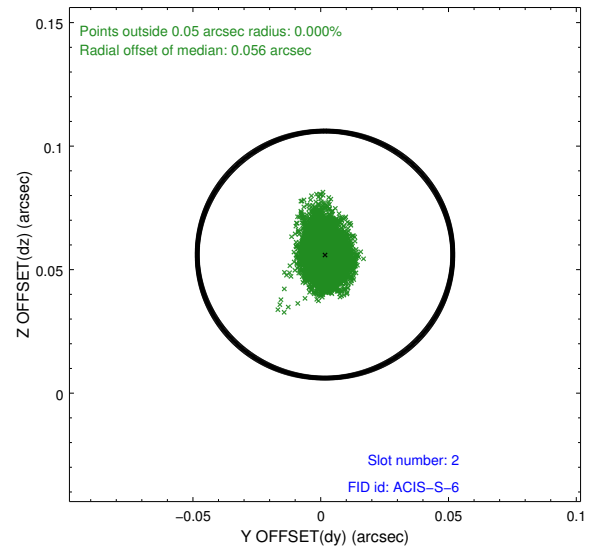
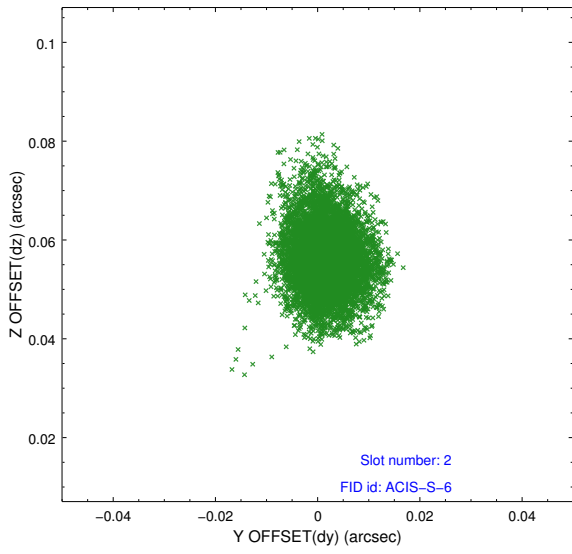
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2

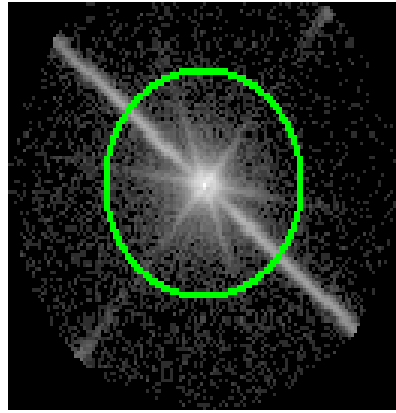


### 3 Gratings

#### 3.1 LETG Arm



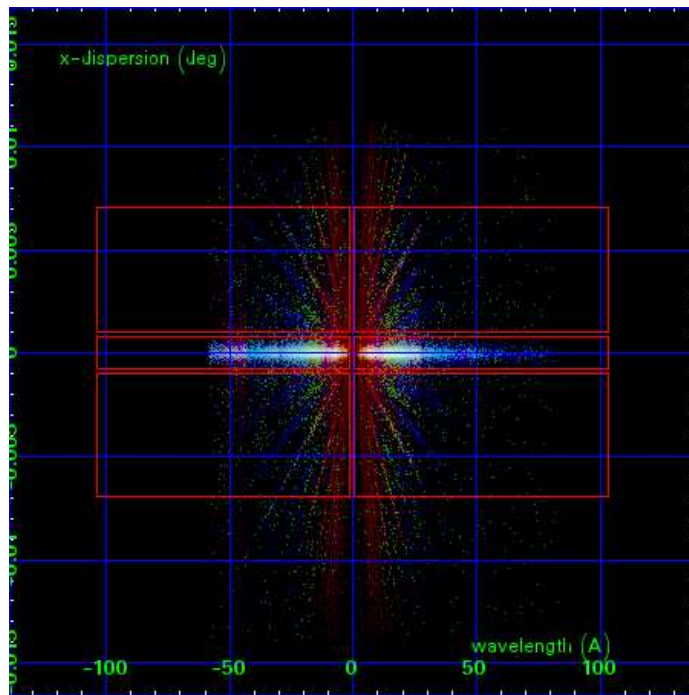
LETG Order Sort 123



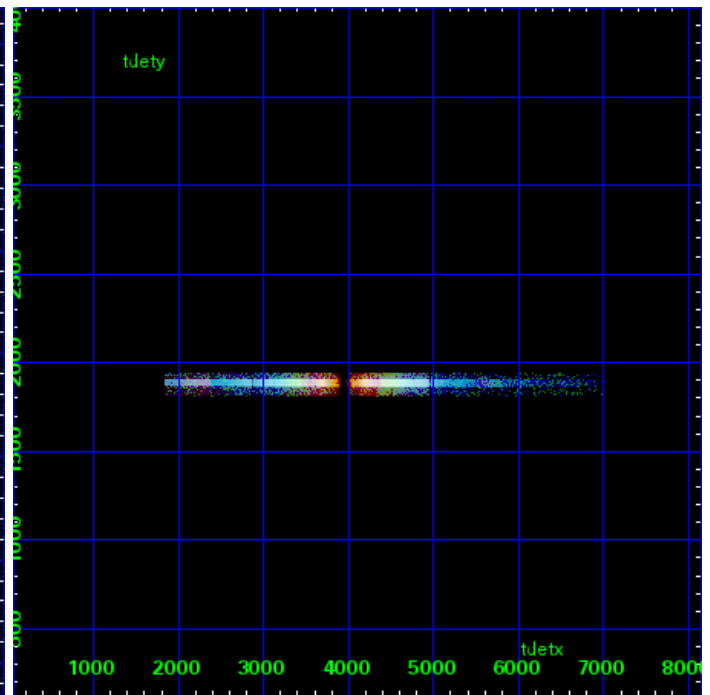
LETG Zero Order



LETG Order Sort ALL

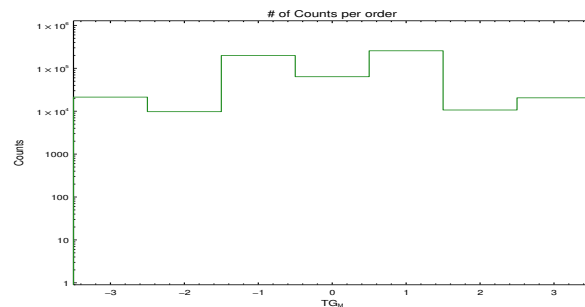


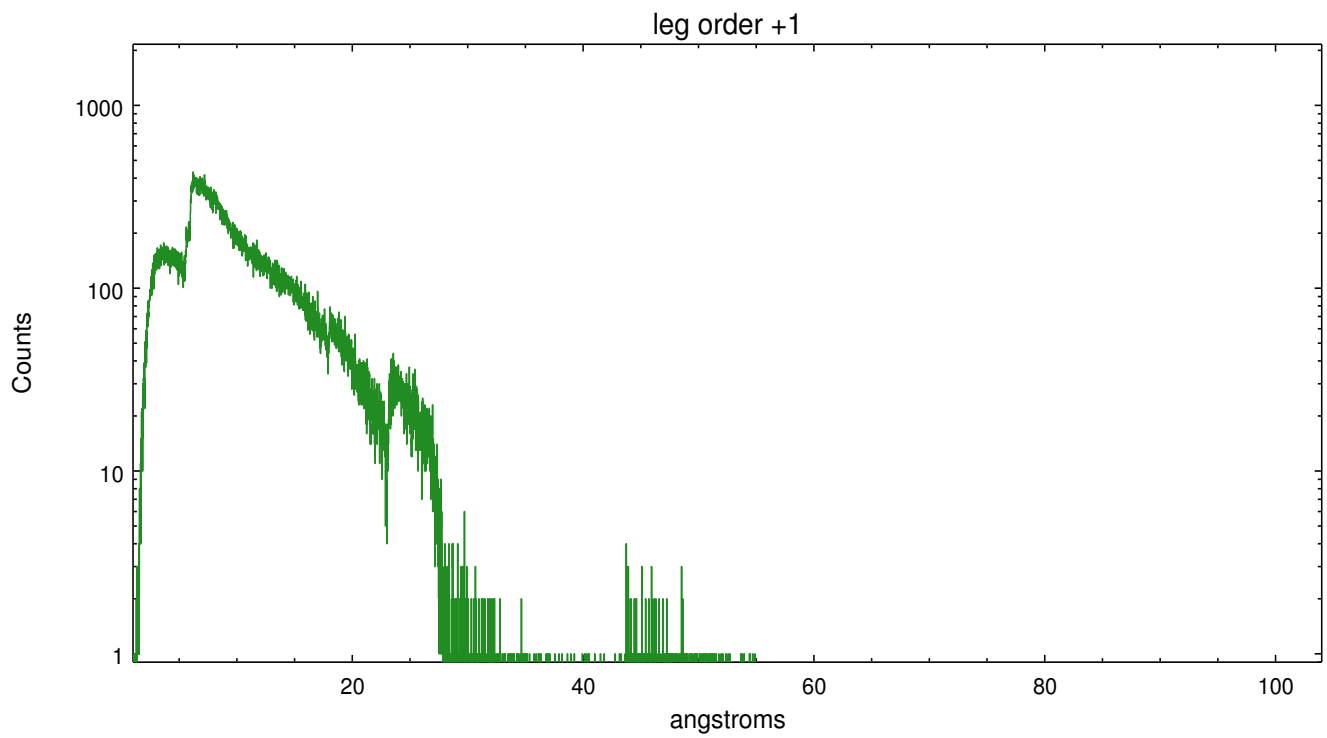
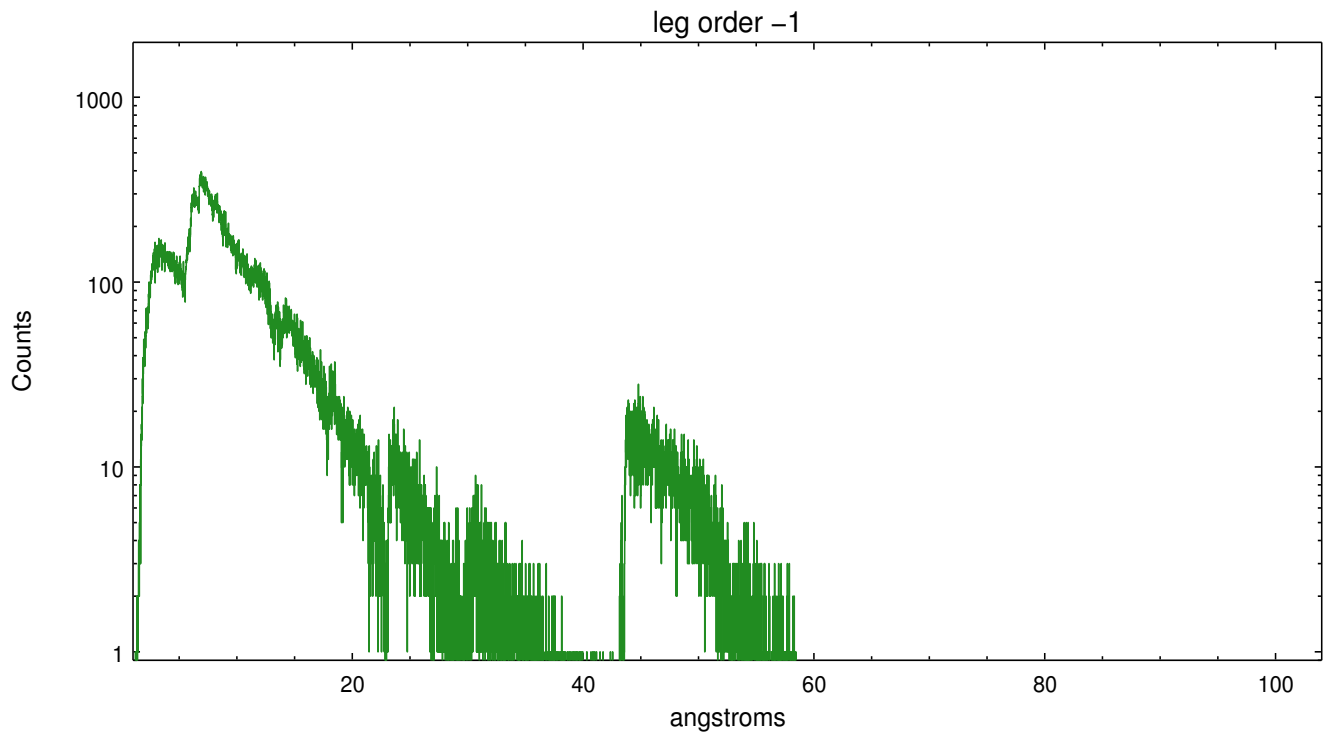
Spot Image LETG



Full Detector LETG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	21299	9755	198028	63685	256019	10664	20505





# A Summary

## A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2015.11.03
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	30.066

## A.2 Comments

These data have been reprocessed with new aspect alignment calibration files that correct small mean offsets (up to 0.4 arcsecs) and improve overall astrometric accuracy. The new calibration was determined using data from the time period being reprocessed and was performed using cross-correlation of X-ray sources with radio and optical counterparts.

====

Zeroth order piled up. The zeroth order sky position was determined using a software tool developed by CXC called findzero, which is available in CIAO as part of the tgdetect2 tool. The tool calculates the point of intersection of the readout streak on the ACIS CCD and the meg dispersed spectral arm, rather than using a centroid position of the source. The findzero results are more accurate than source centroid in this case.

====

Faint grating spectra can be seen in an image of bad events. This is probably due to pileup in the spectrum, causing migration to bad grades. This should be considered in analysis.