

# V&V Reference Report

## L2 ASCDS Version : 10.3.1

Observation 16148 - L2 Version 1  
Chandra X-Ray Center

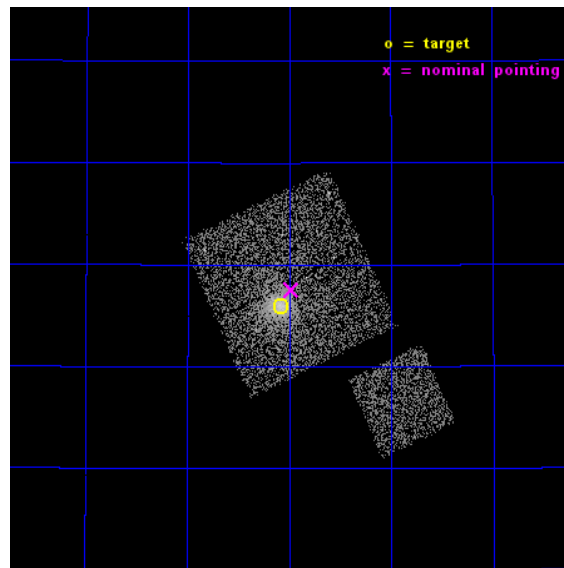
L2 Processing Date : Jan 15 2015

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# 1 Front

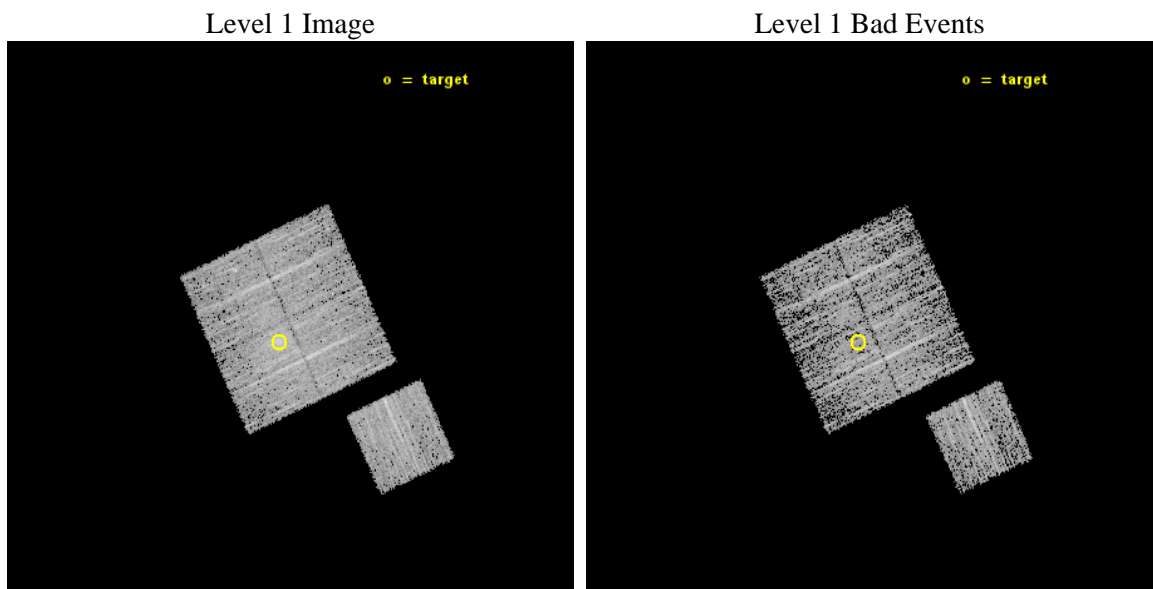
seq_num	801401	Sequence number
obs_id	16148	Observation id
title	Setting the Scale: Supporting precision cluster cosmology with Chandra observations of low-z lensing clusters	Proposal title
observer	Dr Adam Mantz	Principal investigator
object	A667	Source name
dtcycle	0	&#160
cycle	P	events from which exps? Prim/Second/Both
ra_targ	127.019167	Observer's specified target RA [deg]
dec_targ	44.764	Observer's specified target Dec [deg]
ra_nom	126.9946200203	Nominal RA [deg]
dec_nom	44.792294707809	Nominal Dec [deg]
roll_nom	155.25477465778	Nominal Roll [deg]
revision	1	Processing version of data
ontime	5514.858972311	Sum of GTIs [s]
livetime	5442.8032798577	Livetime [s]
ontime0	5518.0000425577	Sum of GTIs [s]
ontime1	5518.0000425577	Sum of GTIs [s]
ontime2	5518.0000425577	Sum of GTIs [s]
ontime3	5514.858972311	Sum of GTIs [s]
ontime6	5518.0000425577	Sum of GTIs [s]
l2events	14509	Number of level 2 events



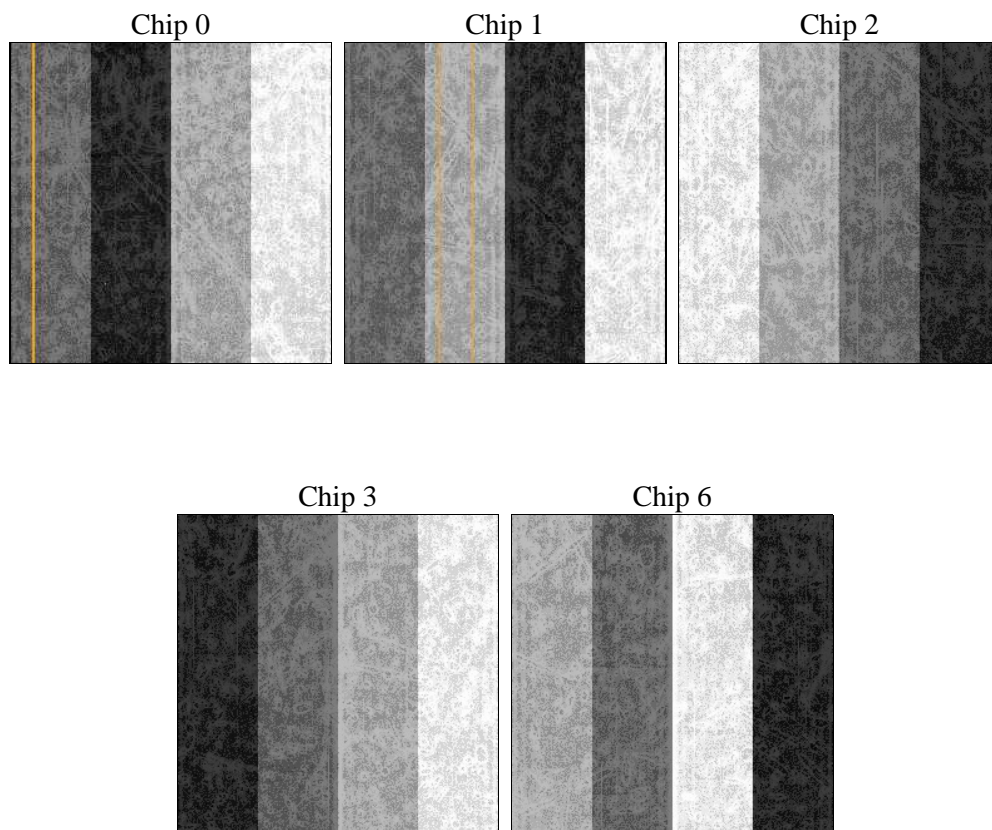
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	5400.000000	[s] Scheduled observation exposure time
ascdsver	10.3.1	Processing system revision	ontime	5514.858972311	Sum of GTIs [s]
caldsver	4.6.5	&#160	ontime0	5518.0000425577	Sum of GTIs [s]
date	2015-01-15T06:09:48	Date and time of file creation	ontime1	5518.0000425577	Sum of GTIs [s]
revision	1	Processing version of data	ontime2	5518.0000425577	Sum of GTIs [s]
			ontime3	5514.858972311	Sum of GTIs [s]
			ontime6	5518.0000425577	Sum of GTIs [s]
			l1events	129142	Number of level 1 events

### 2.1.4 Events

	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
level 1 events	24287	24034	26575	27804	26442
rejected events	21392	20755	23752	22586	23736
rejected %	88%	86%	89%	81%	89%

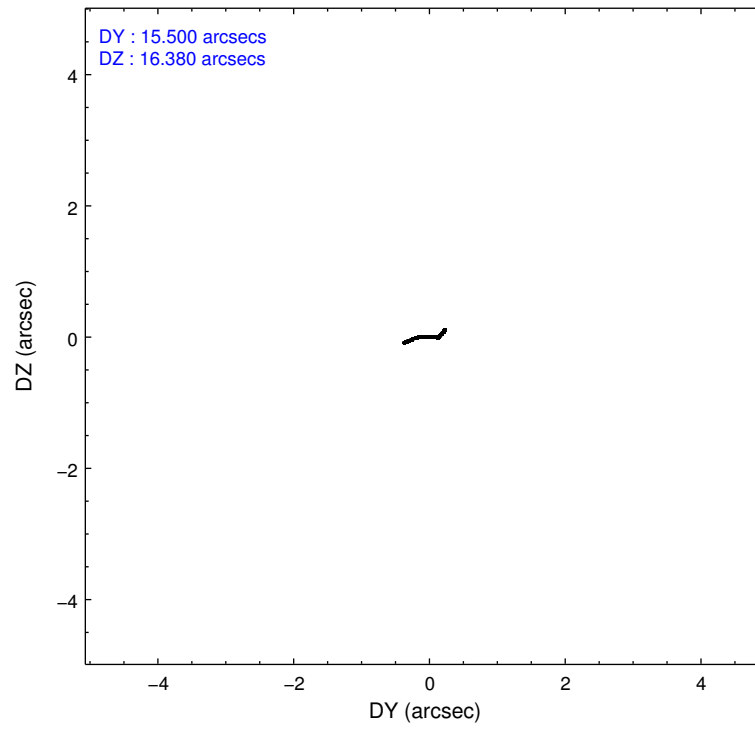
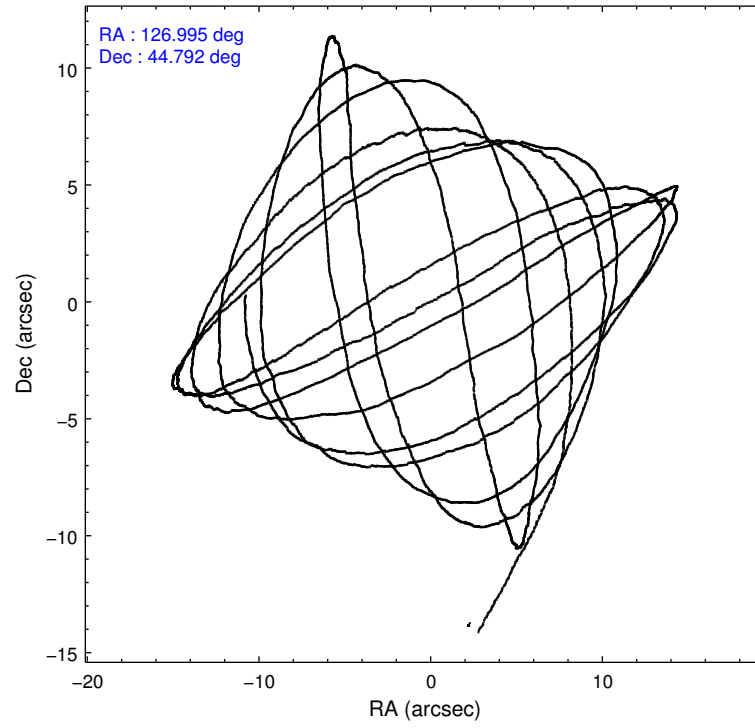
	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
grade 0 events	1151	1346	1160	3174	872
	4%	5%	4%	11%	3%
grade 1 events	9	15	20	21	12
	0%	0%	0%	0%	0%
grade 2 events	706	736	634	805	716
	2%	3%	2%	2%	2%
grade 3 events	283	311	256	370	257
	1%	1%	0%	1%	0%
grade 4 events	273	249	279	343	256
	1%	1%	1%	1%	0%
grade 5 events	718	849	714	908	839
	2%	3%	2%	3%	3%
grade 6 events	485	640	494	534	609
	1%	2%	1%	1%	2%
grade 7 events	20662	19888	23018	21649	22881
	85%	82%	86%	77%	86%

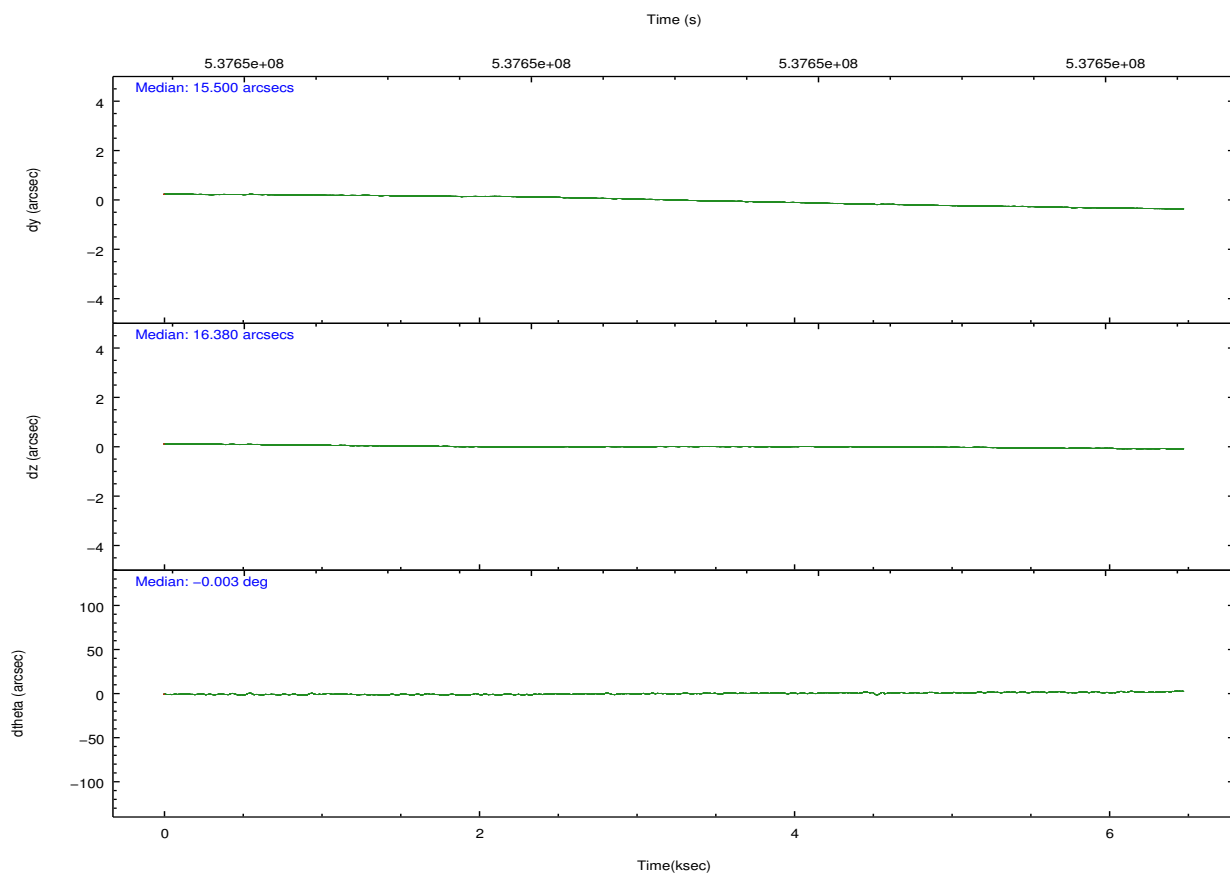
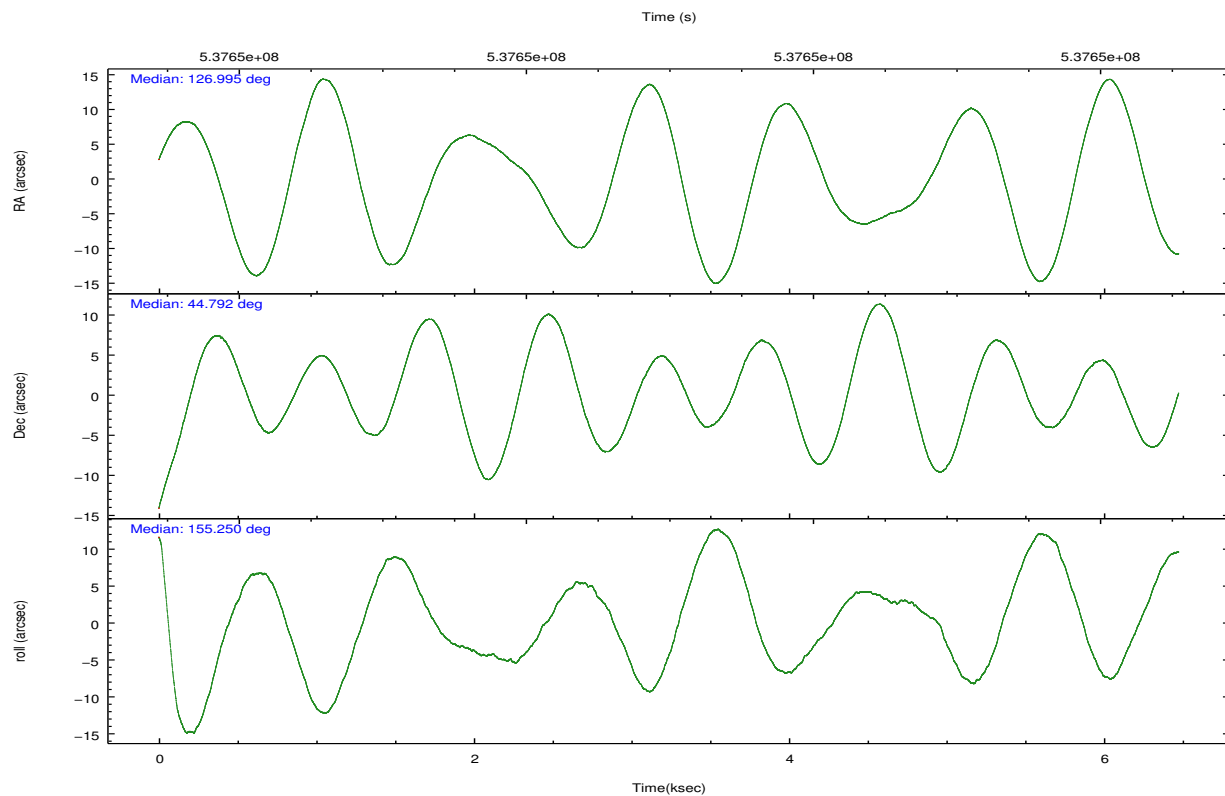


## 2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	7	7
Detector	ACIS-01236	ACIS-01236	Obspar file type	PREDICTED	ACTUAL
Grating	NONE	NONE	Obspar update status	NONE	UPDATED
Data mode	VFAINT	VFAINT	CCD I0 on	Y	Y
Observation mode	POINTING	POINTING	CCD I1 on	Y	Y
[deg] Pointing RA	127.033283	126.9946200202958	CCD I2 on	Y	Y
[deg] Pointing Dec	44.794994	44.792294707809	CCD I3 on	Y	Y
[deg] Pointing Roll	155.018803	155.2547746577819	CCD S0 on	N	N
[mm] SIM focus pos	-0.782348	-0.7809083437167272	CCD S1 on	N	N
[mm] SIM defocus	0	0.001439871863259334	CCD S2 on	O1	Y
[mm] SIM translation stage pos	-233.592463	-233.5874344608287	CCD S3 on	N	N
[mm] SIM translation stage offset	0	-0.005018542100998502	CCD S4 on	N	N
[s] Observation start time (MET)	537646831.184000	537645427.28075	CCD S5 on	N	N
Observation start date	2015-01-14T18:19:24	2015-01-14T17:57:07	Number of optional ACIS chips dropped	0	0
[s] Observation end time (MET)	537652231.184000	537653206.51868	On-chip summing requested	N	N
Observation end date	2015-01-14T19:49:24	2015-01-14T20:06:46	Subarray requested	NONE	NONE
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	3.1

## 2.3 Aspect



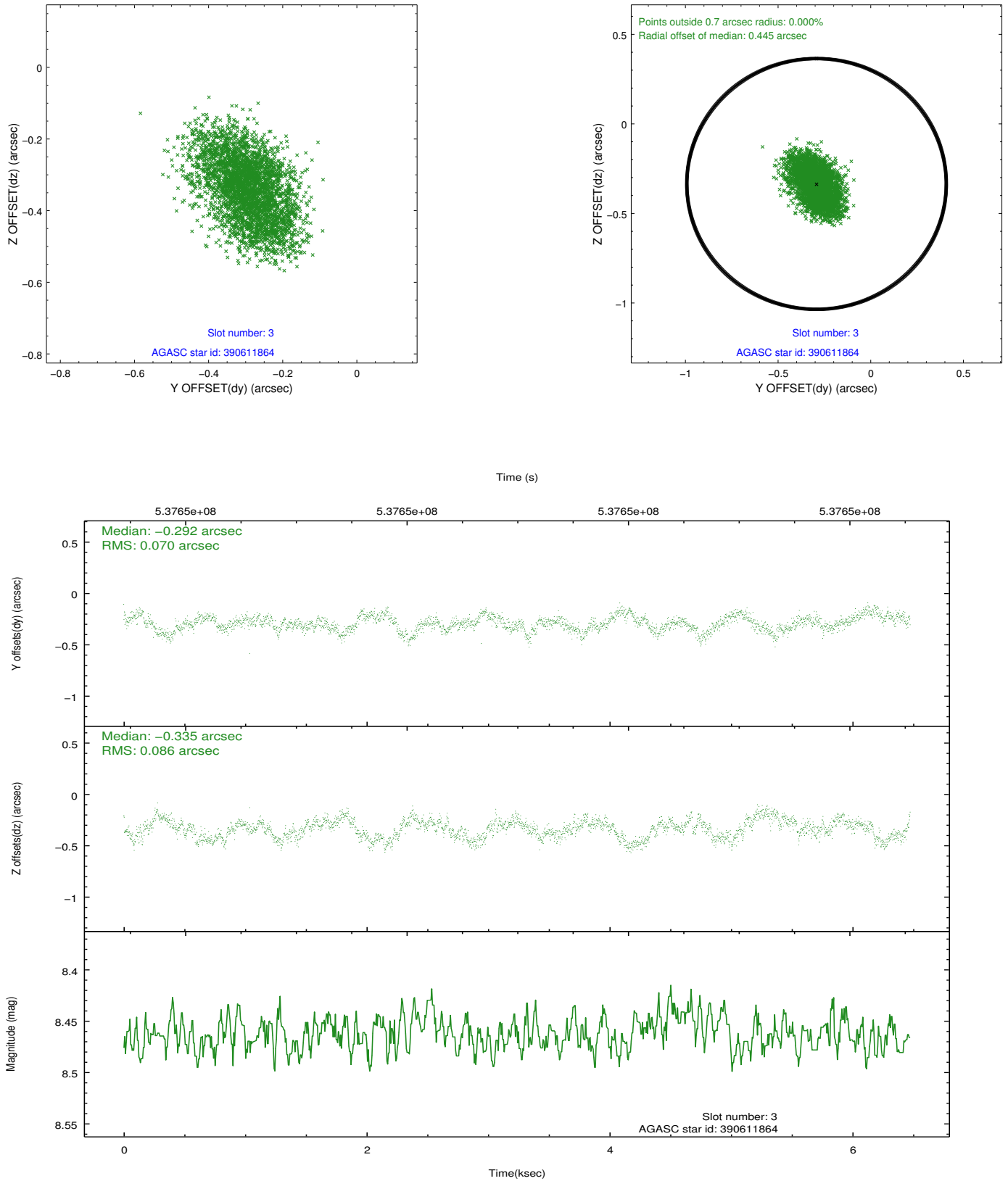


### Slot Statistics

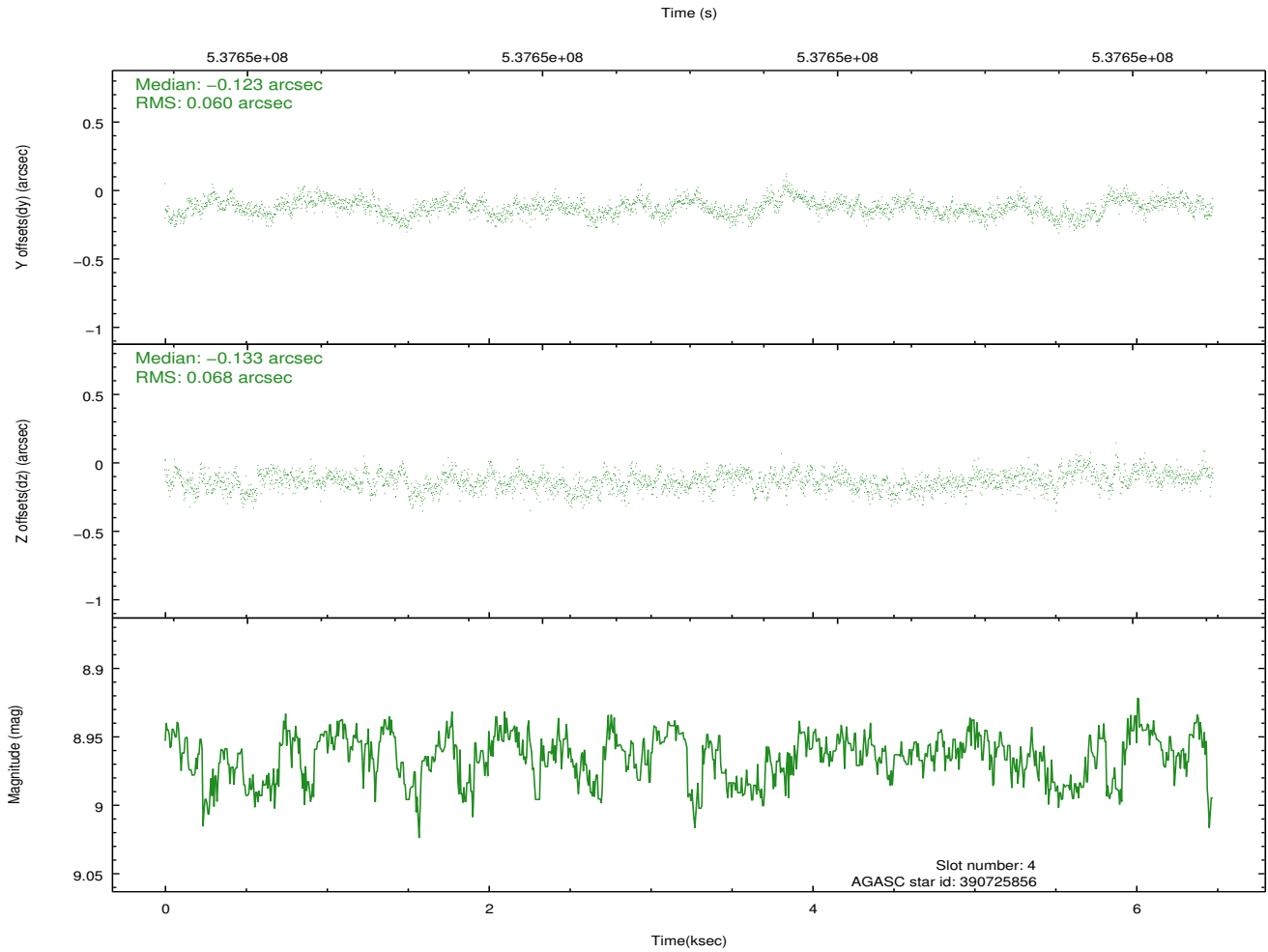
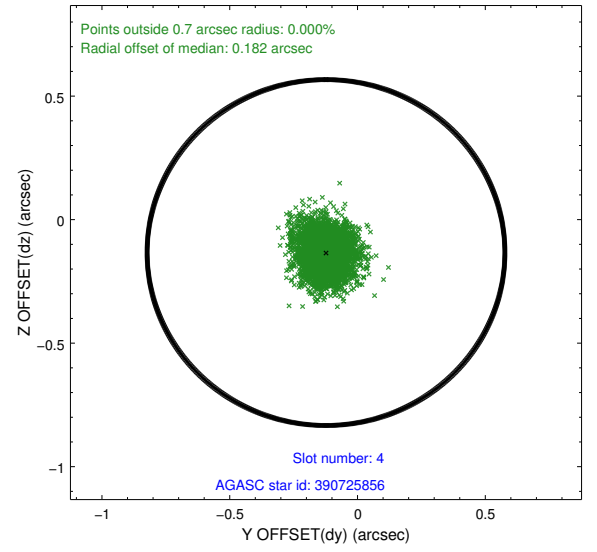
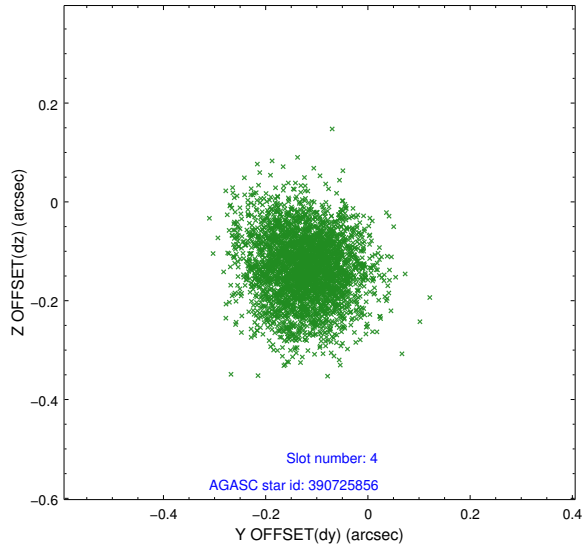
slot	status	used	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID		ACIS-I-1	7.19	1579	0.067	-0.037	0.009	0.022	0.000000	0.000000	924.05	-840.05
1	FID		ACIS-I-5	7.20	1580	-0.260	0.055	0.007	0.013	0.000000	0.000000	-1823.91	1057.04
2	FID		ACIS-I-6	7.19	1580	0.101	0.053	0.008	0.015	0.000000	0.000000	388.61	1702.60
3	GUIDE	used	390611864	8.46	3159	-0.292	-0.335	0.120	0.192	126.035804	44.742179	2238.41	1235.65
4	GUIDE	used	390725856	8.96	3157	-0.123	-0.133	0.097	0.156	126.839216	44.148109	-528.05	2322.41
5	GUIDE	used	390736968	8.79	3159	0.157	0.273	0.135	0.212	128.168376	44.979391	-2330.75	-1838.40
6	GUIDE	used	447628832	9.15	3155	-0.038	0.037	0.132	0.206	126.609646	45.187152	1571.46	-828.61
7	GUIDE	used	447744512	9.30	3156	0.304	0.159	0.138	0.223	127.622462	45.114950	-866.73	-1680.83

## 2.4 Star Slots

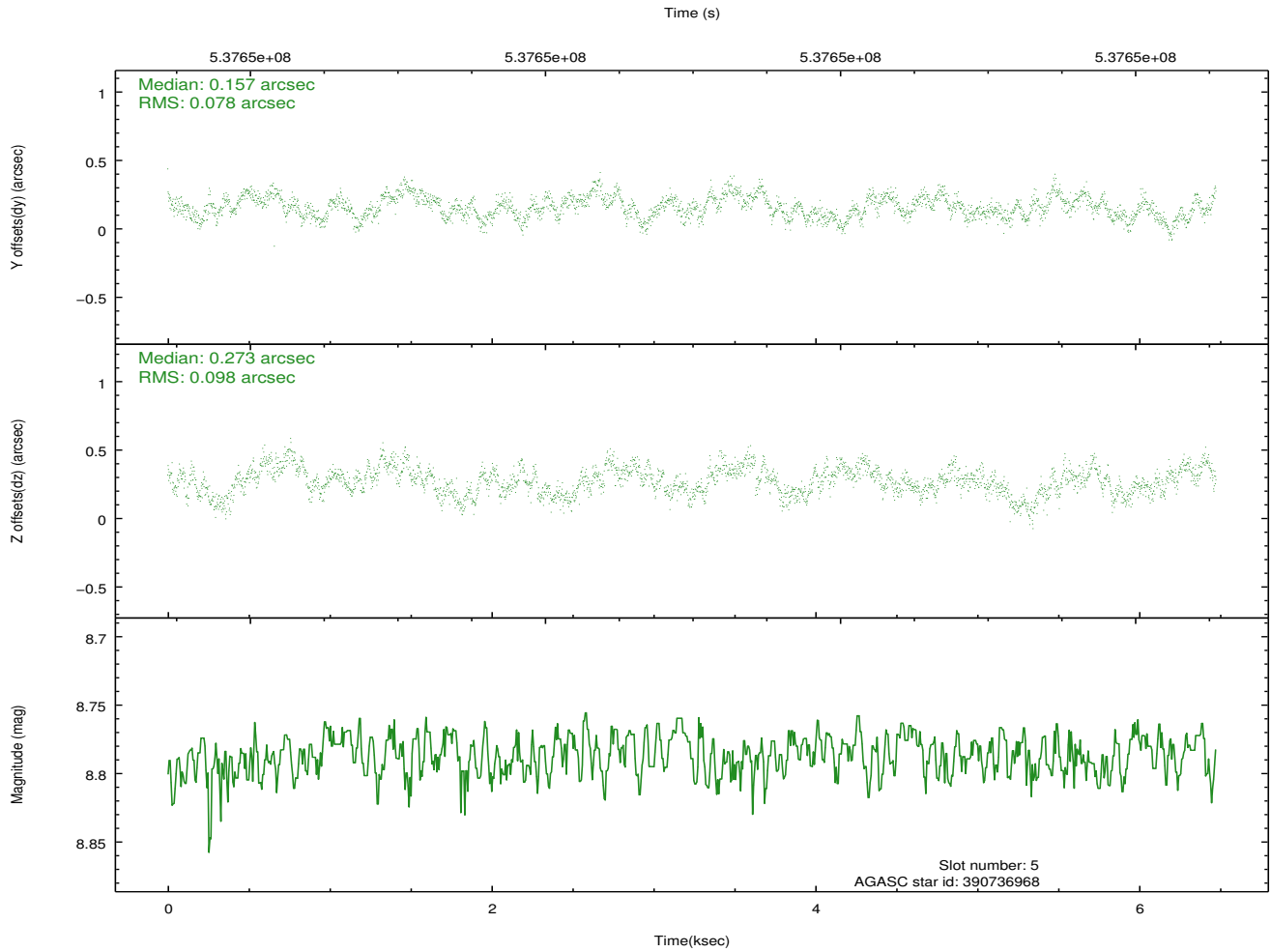
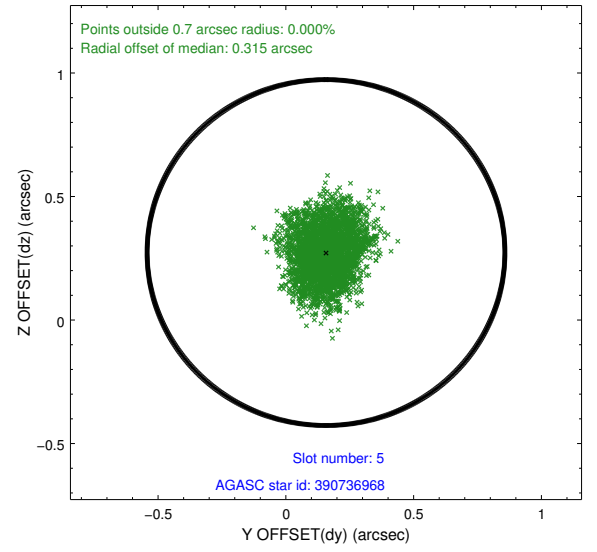
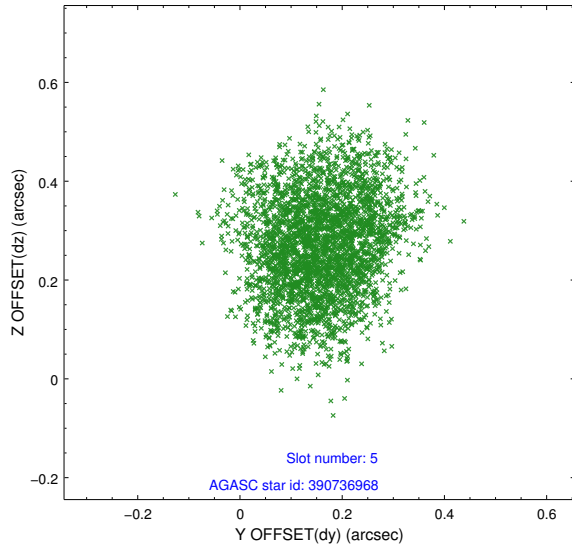
### 2.4.1 Slot 3



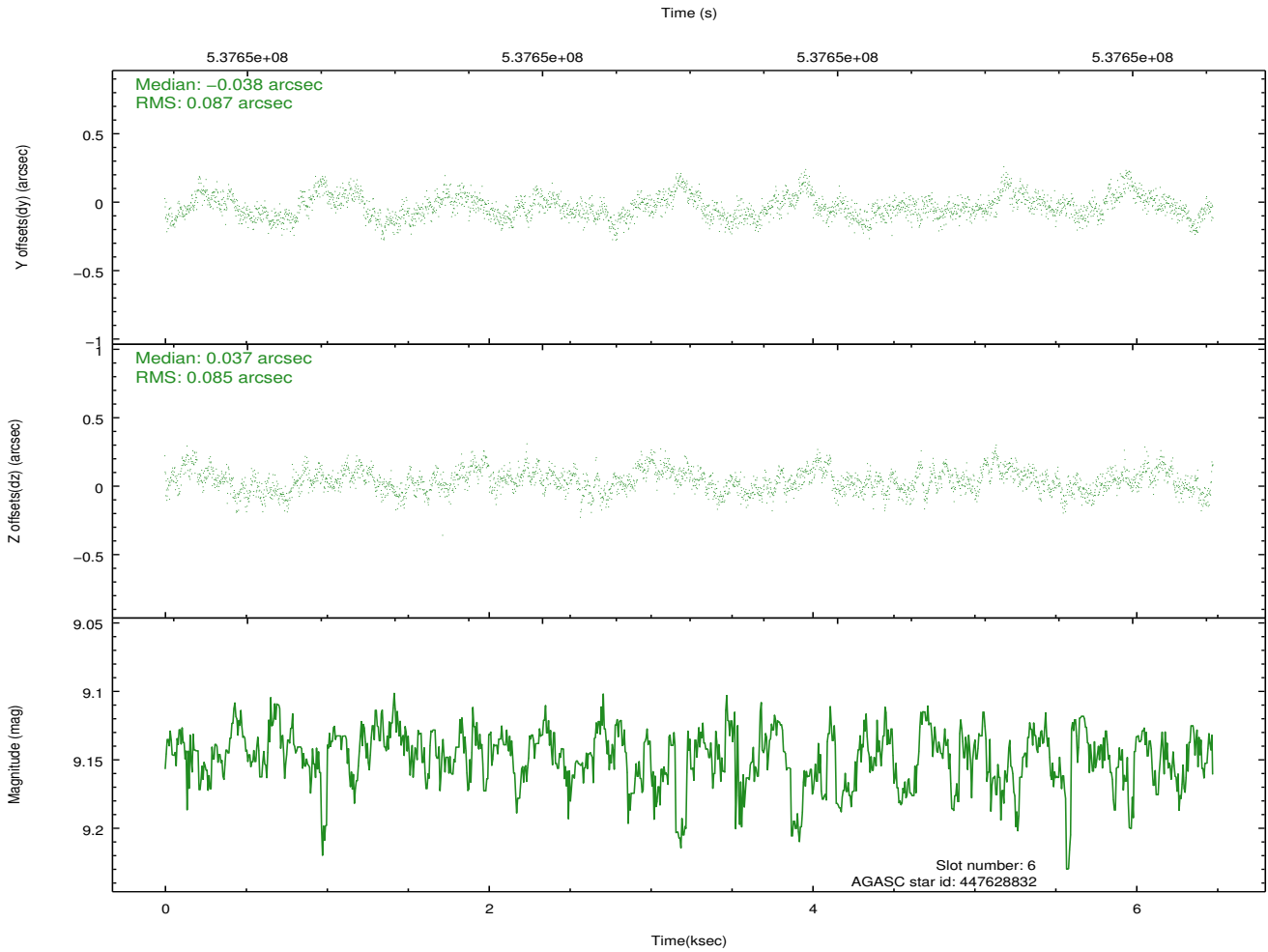
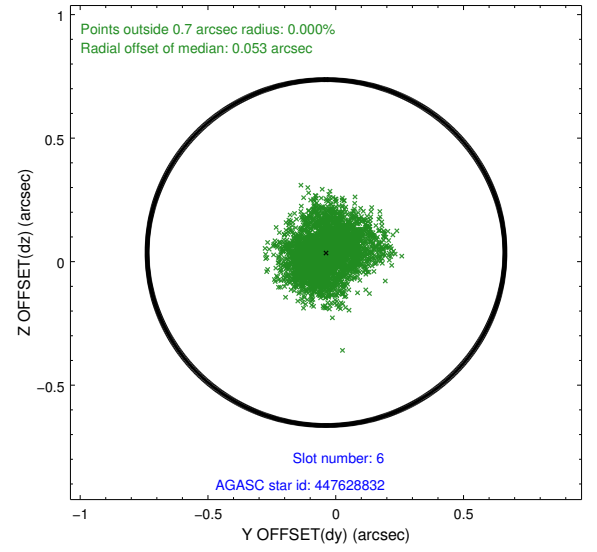
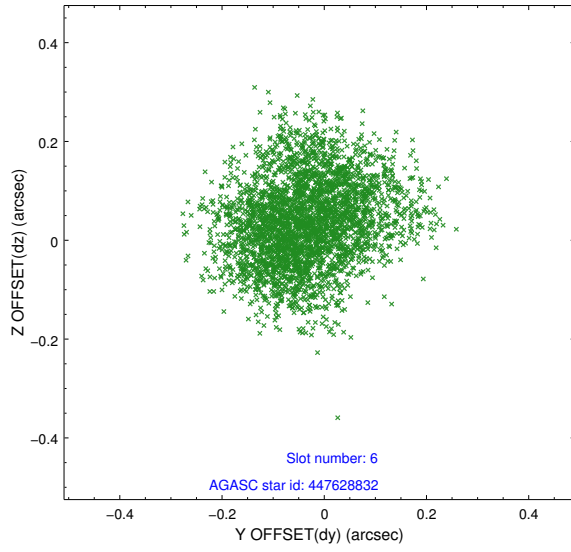
## 2.4.2 Slot 4



### 2.4.3 Slot 5

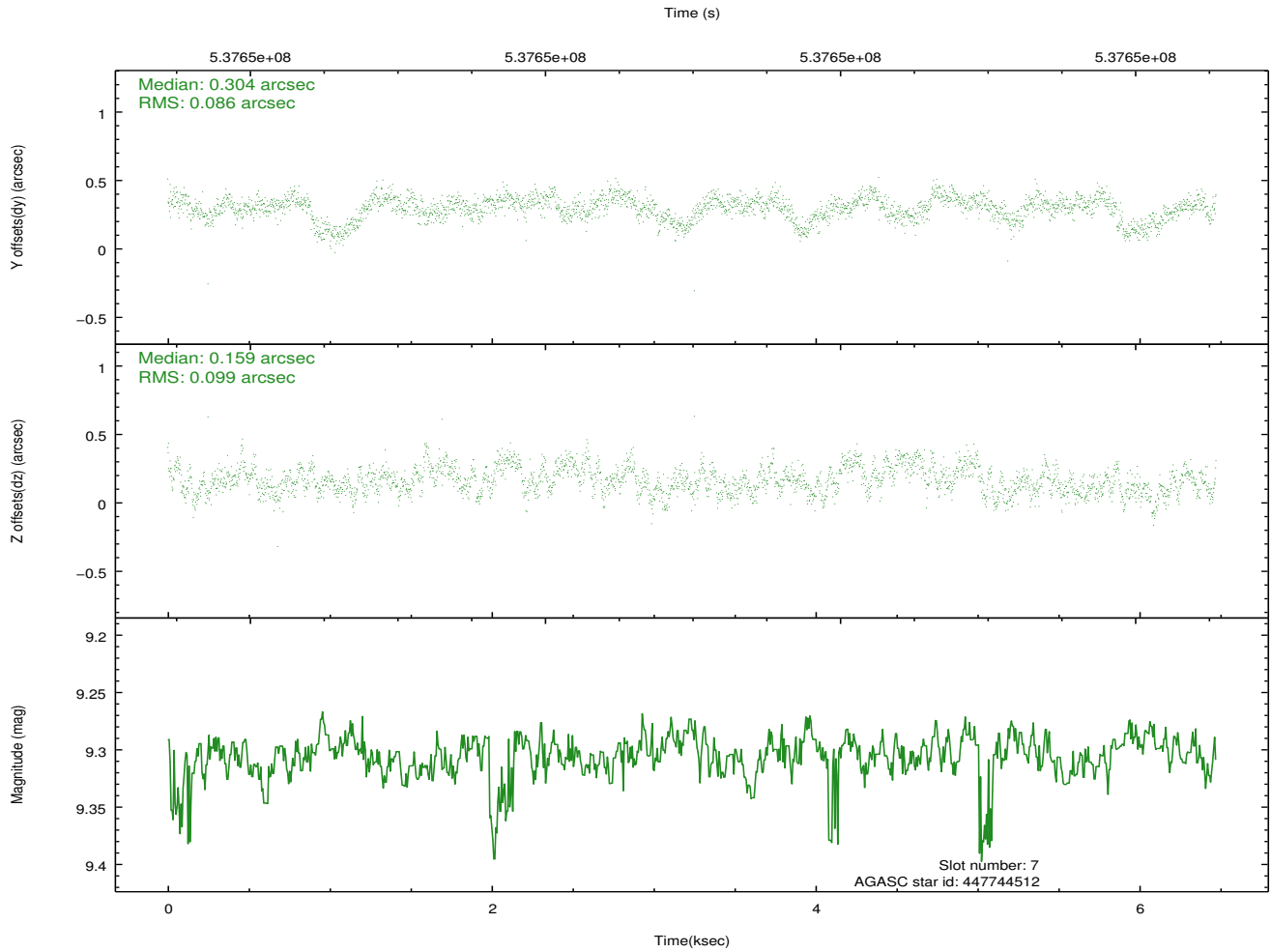
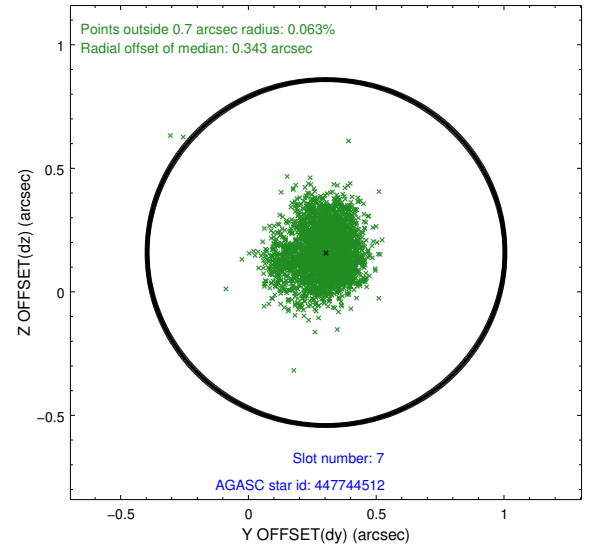
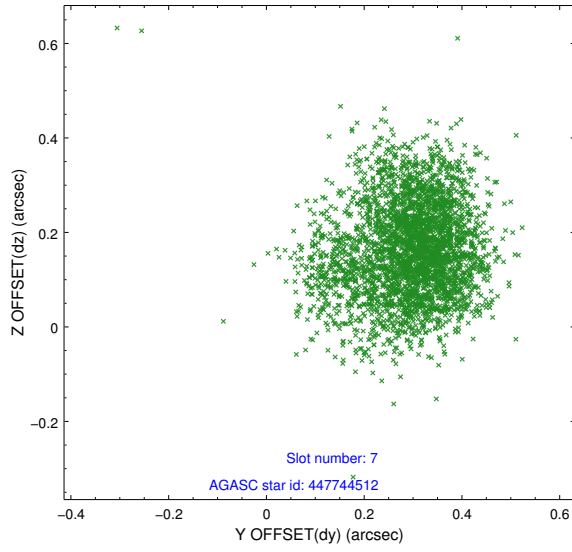


## 2.4.4 Slot 6



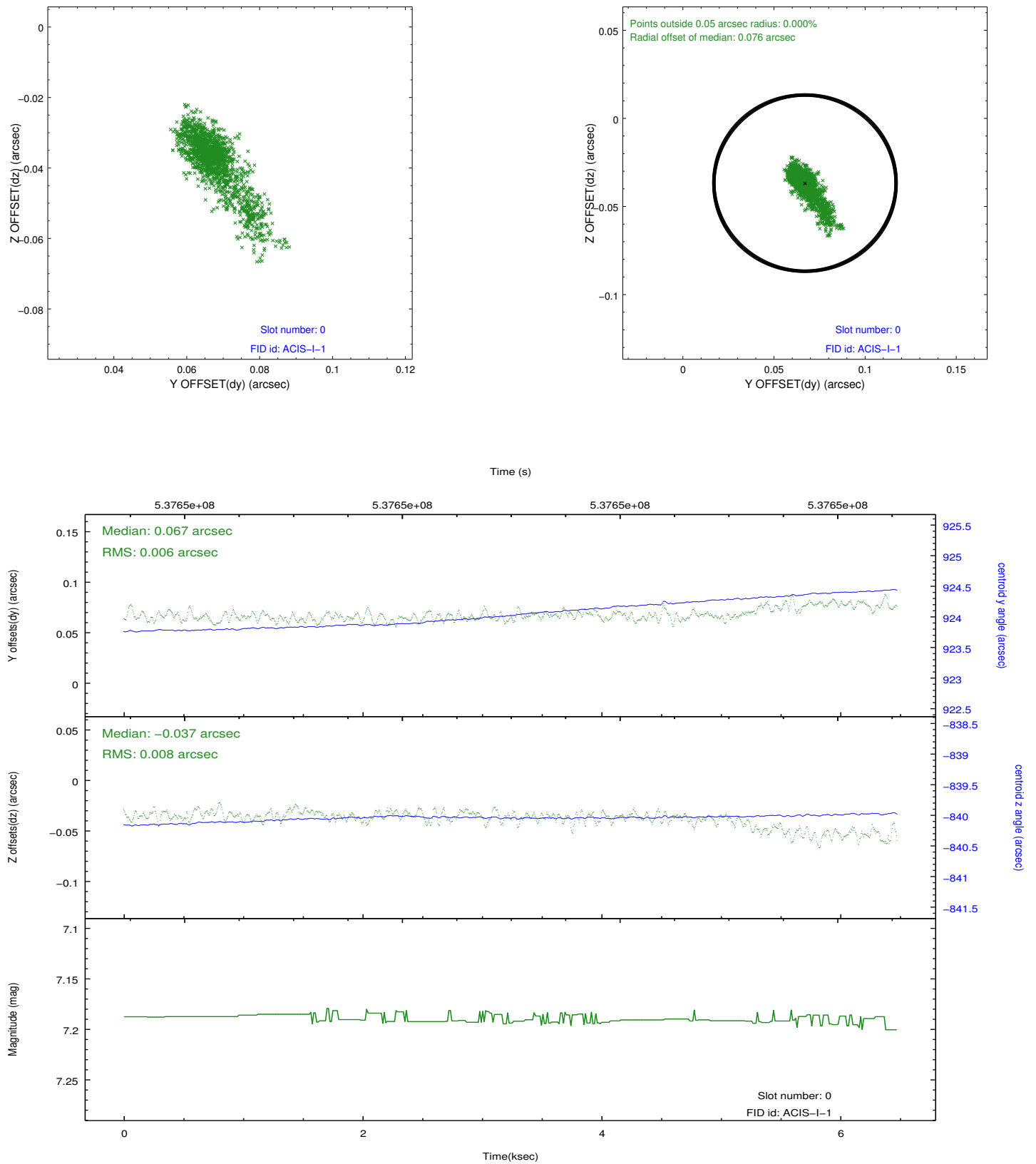


## 2.4.5 Slot 7

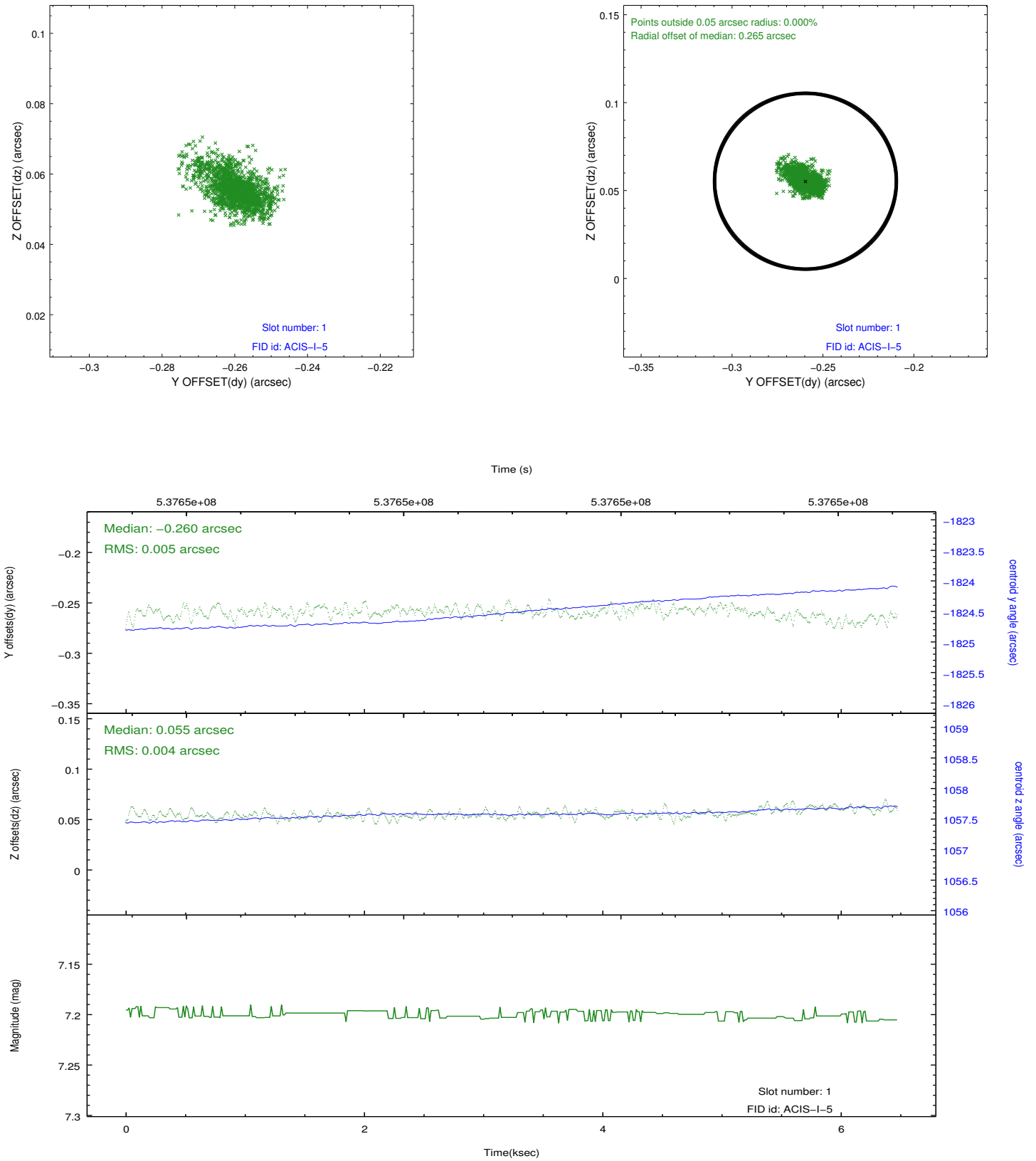


## 2.5 FID Slots

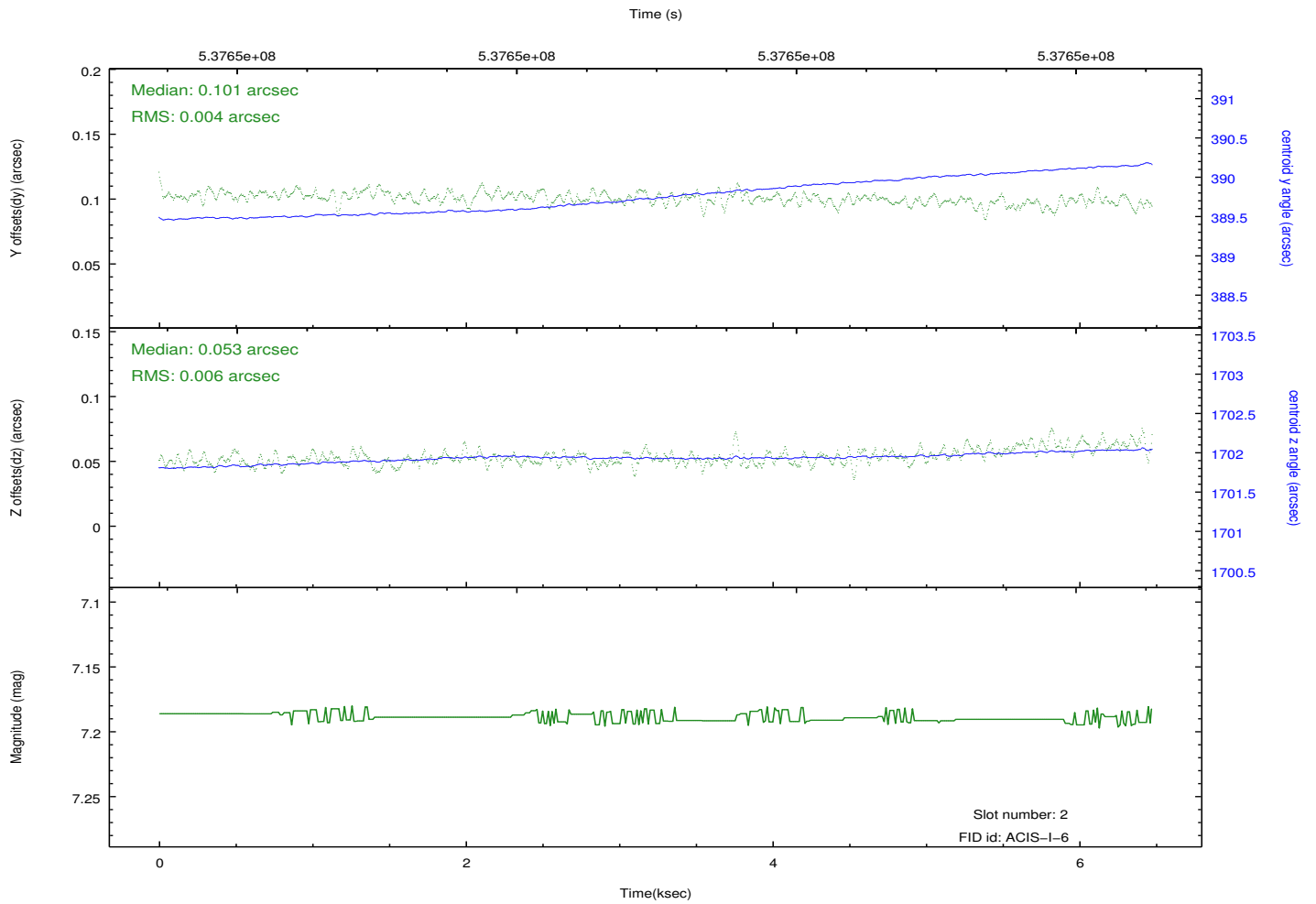
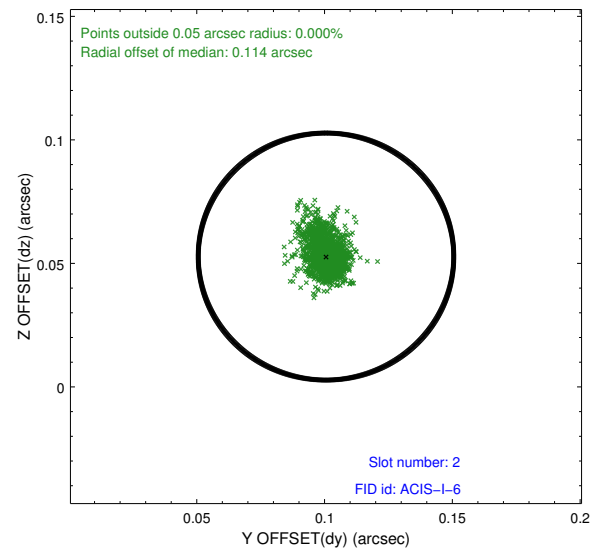
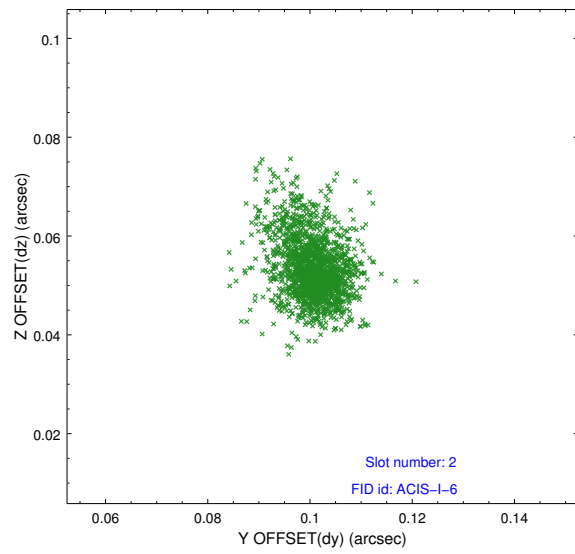
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2



# A Summary

## A.1 Status

V&V Scientist	Beth Sundheim
V&V Date (YYYY-MM-DD)	2018.03.06
V&V Edition	2
V&V Disposition and Status	OK
V&V Charge Time	5.514858972311

## A.2 Comments

The focal plane temperature during part of this observation was warmer than the upper limit for optimum calibration of the ACIS gain and spectral resolution (i.e., -114.0 C for ACIS-I and -112.0 C for ACIS-S).

The Chandra calibration team calibrates the ACIS gain and spectral resolution using data from the external calibration source (ECS). ECS data show that the frontside-illuminated (FI) CCDs are more temperature sensitive than the backside-illuminated (BI) CCDs.

A summary of the current calibration status of the ACIS gain and spectral resolution can be found at:

[http://asc.harvard.edu/cal/Acis/Cal\\_prods/Gain\\_and\\_Spectral\\_Resolution/ACIS\\_response\\_summary.html](http://asc.harvard.edu/cal/Acis/Cal_prods/Gain_and_Spectral_Resolution/ACIS_response_summary.html)

The main points are:

- 1) The gain on BI chips remains within 0.3% (i.e., the systematic uncertainty in the ACIS gain quoted on the Chandra Calibration Status Summary web page) at all measured temperatures.
  - 2) The gain on FI chips remains within 0.3% below row 600 at all measured temperatures.
  - 3) The gain on FI chips above row 600 can be underestimated by as much as 1% for focal plane temperatures exceeding -116 C.
  - 4) The spectral resolution (i.e., FWHM) on BI chips is insensitive to the focal plane temperature.
  - 5) Warmer focal plane temperatures increase the FWHM on FI chips by up to 30 eV near row 512 and by up to 70 eV near the top of the chips.
- In summary, the user should be cautious in the spectral analysis of high S/N emission lines detected on the top half of FI chips in this observation. Default processing with the current version of the CALDB will underestimate photon energies by up to 1% and broaden emission lines by up to 70 eV.