

# V&V Reference Report

## L2 ASCDS Version : 10.7.1

Observation 21315 - L2 Version 1  
Chandra X-Ray Center

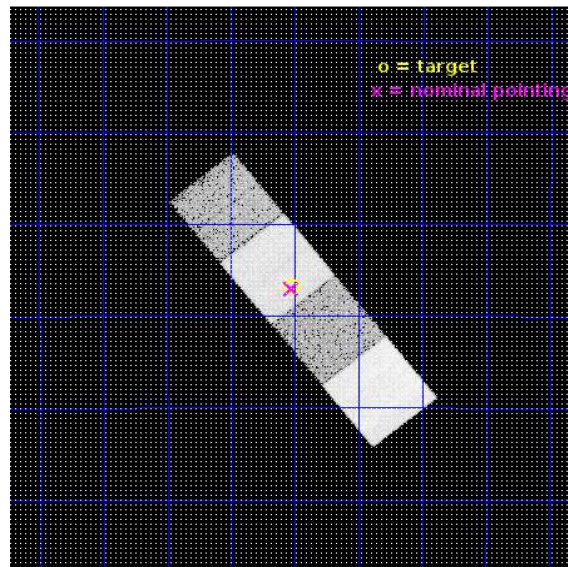
L2 Processing Date : Apr 10 2019

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# 1 Front

seq_num	503087	Sequence number
obs_id	21315	Observation id
title	Late-time X-rays to map the Zoo of Engine-driven Stellar Explosions	&#160
observer	Aprajita Hajela	Principal investigator
object	GRB190114C	Source name
dtcycle	0	&#160
cycle	P	events from which exps? Prim/Second/Both
ra_targ	54.504962	Observer's specified target RA [deg]
dec_targ	-26.946314	Observer's specified target Dec [deg]
ra_nom	54.506633636018	Nominal RA [deg]
dec_nom	-26.950504240965	Nominal Dec [deg]
roll_nom	231.31656343827	Nominal Roll [deg]
revision	1	Processing version of data
ontime	15056.700115919	Sum of GTIs [s]
livetime	14859.973244323	Livetime [s]
ontime5	15056.700115919	Sum of GTIs [s]
ontime6	15056.700115919	Sum of GTIs [s]
ontime7	15056.700115919	Sum of GTIs [s]
ontime8	15056.700115919	Sum of GTIs [s]
l2events	170052	Number of level 2 events

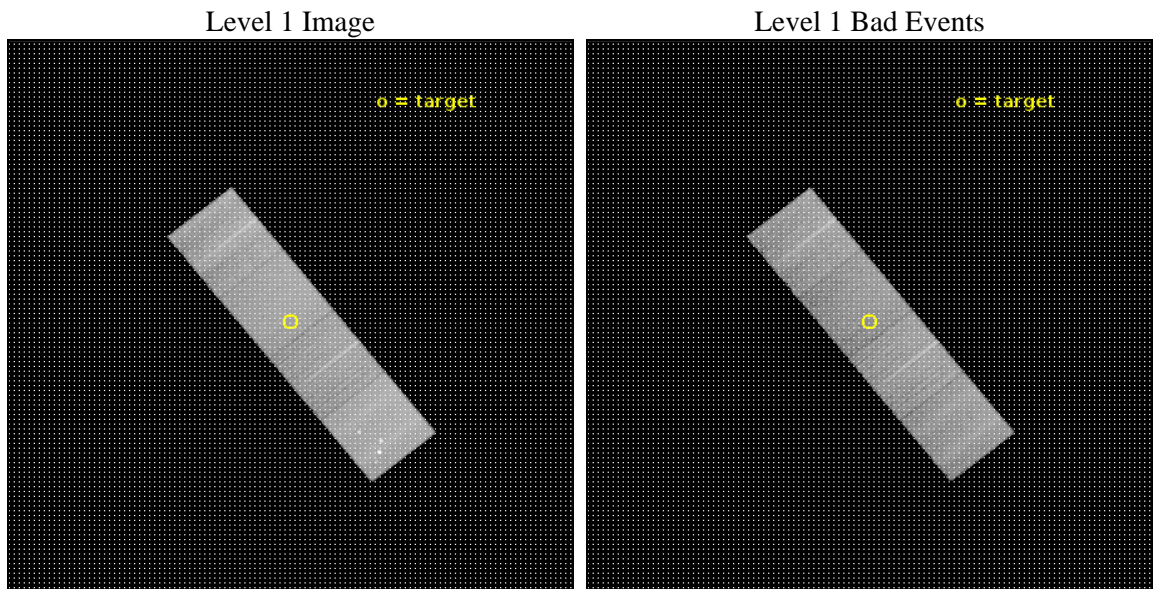




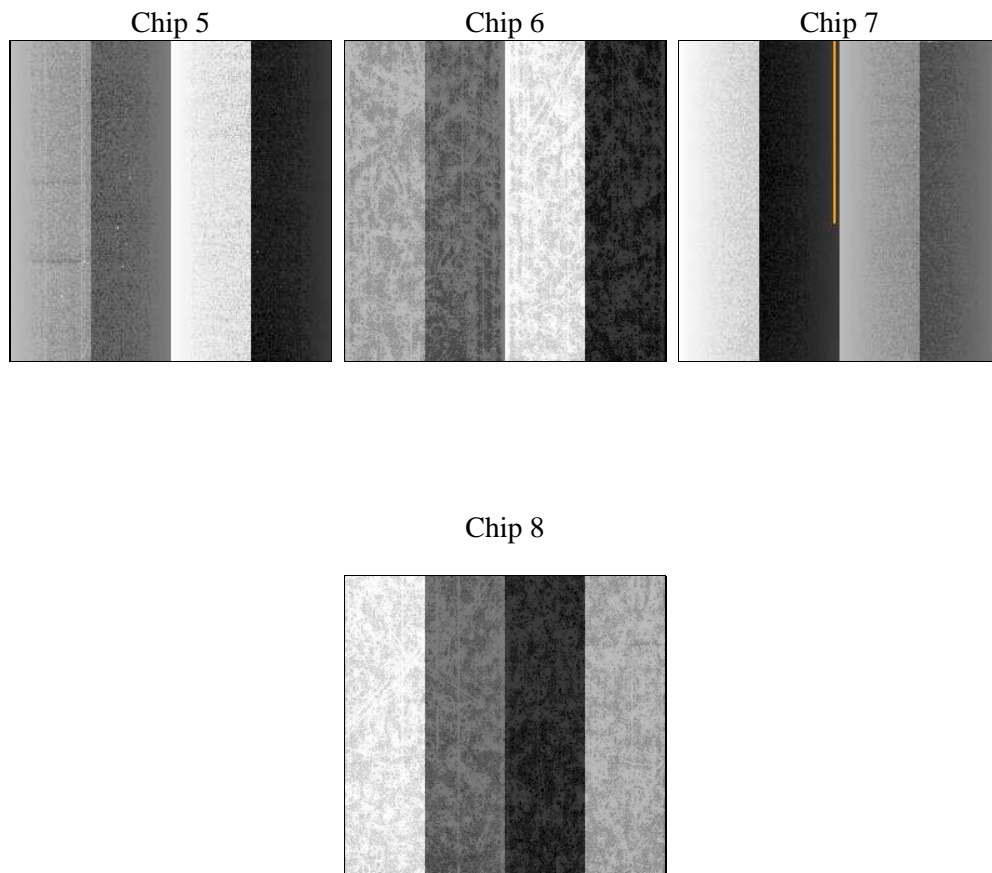
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	15000.000000	[s] Scheduled observation exposure time
ascdsver	10.7.1	Processing system revision	ontime	15056.700115919	Sum of GTIs [s]
caldsver	4.8.2	&#160	ontime5	15056.700115919	Sum of GTIs [s]
date	2019-04-10T05:33:40	Date and time of file creation	ontime6	15056.700115919	Sum of GTIs [s]
revision	1	Processing version of data	ontime7	15056.700115919	Sum of GTIs [s]
			ontime8	15056.700115919	Sum of GTIs [s]
			l1events	620532	Number of level 1 events

### 2.1.4 Events

	ccd 5	ccd 6	ccd 7	ccd 8
level 1 events	195416	127003	148480	149633
rejected events	99485	113824	85026	112908
rejected %	50%	89%	57%	75%

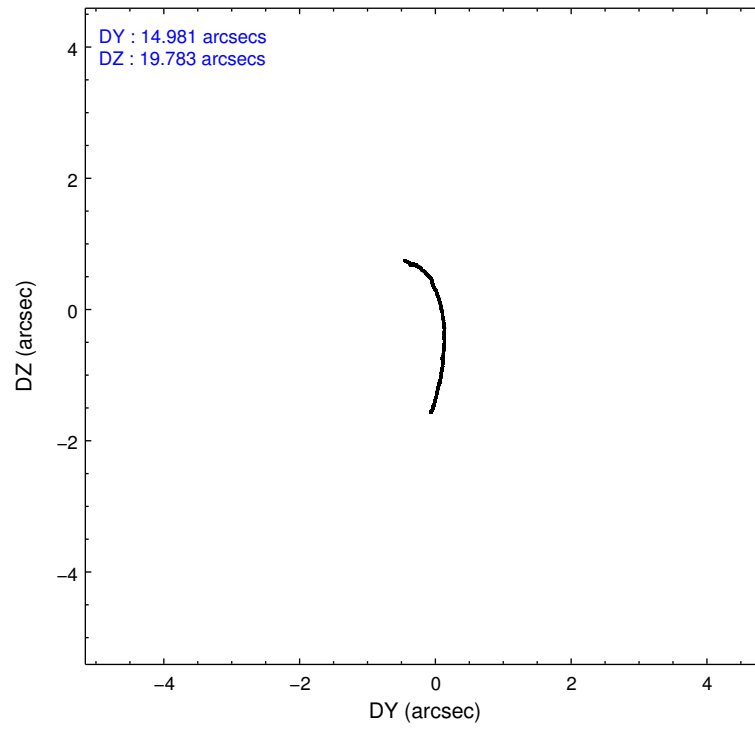
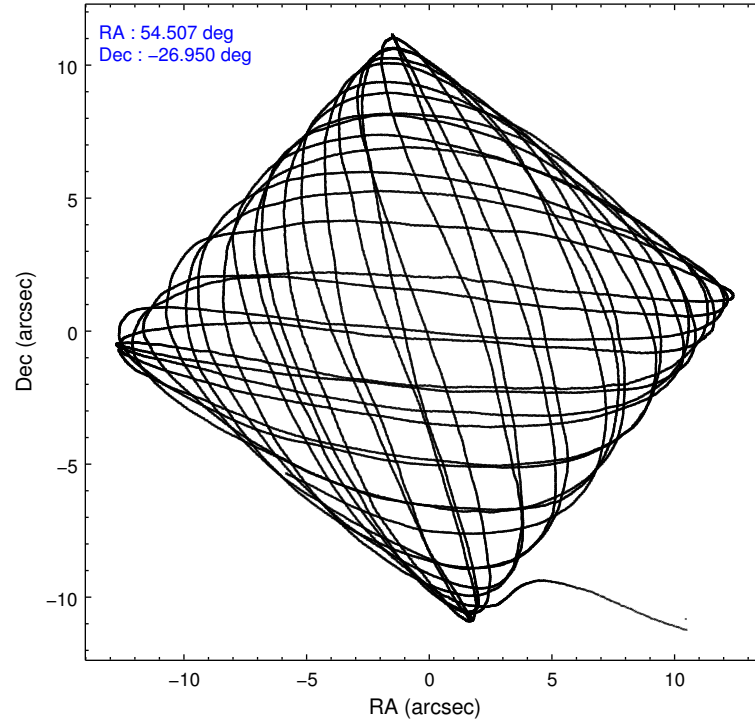
	ccd 5	ccd 6	ccd 7	ccd 8
grade 0 events	12430	3491	5266	10122
	6%	2%	3%	6%
grade 1 events	615	58	244	115
	0%	0%	0%	0%
grade 2 events	27463	3854	13238	9336
	14%	3%	8%	6%
grade 3 events	3039	1035	4913	3676
	1%	0%	3%	2%
grade 4 events	2826	1057	4857	3274
	1%	0%	3%	2%
grade 5 events	11641	4532	14144	7659
	5%	3%	9%	5%
grade 6 events	50213	3748	35218	10343
	25%	2%	23%	6%
grade 7 events	87189	109228	70600	105108
	44%	86%	47%	70%

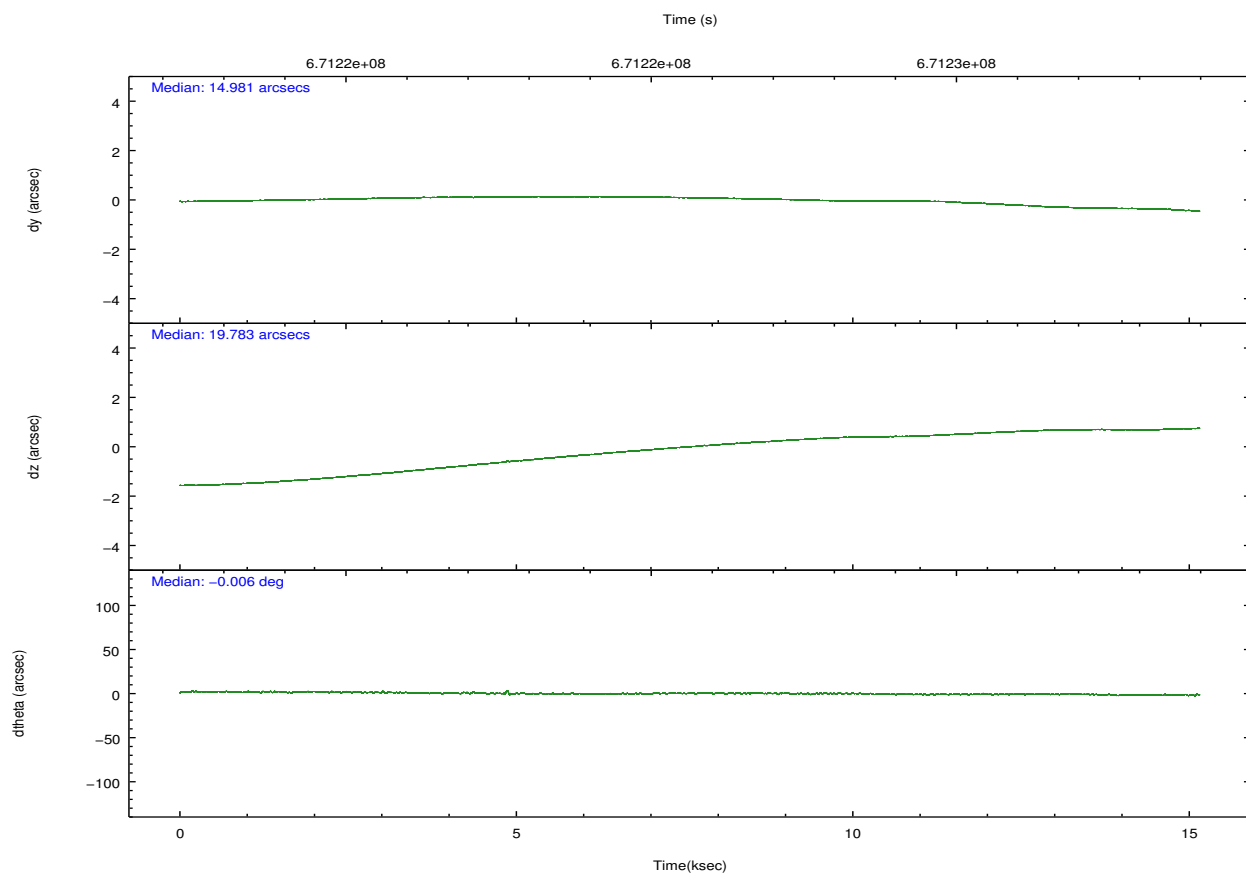
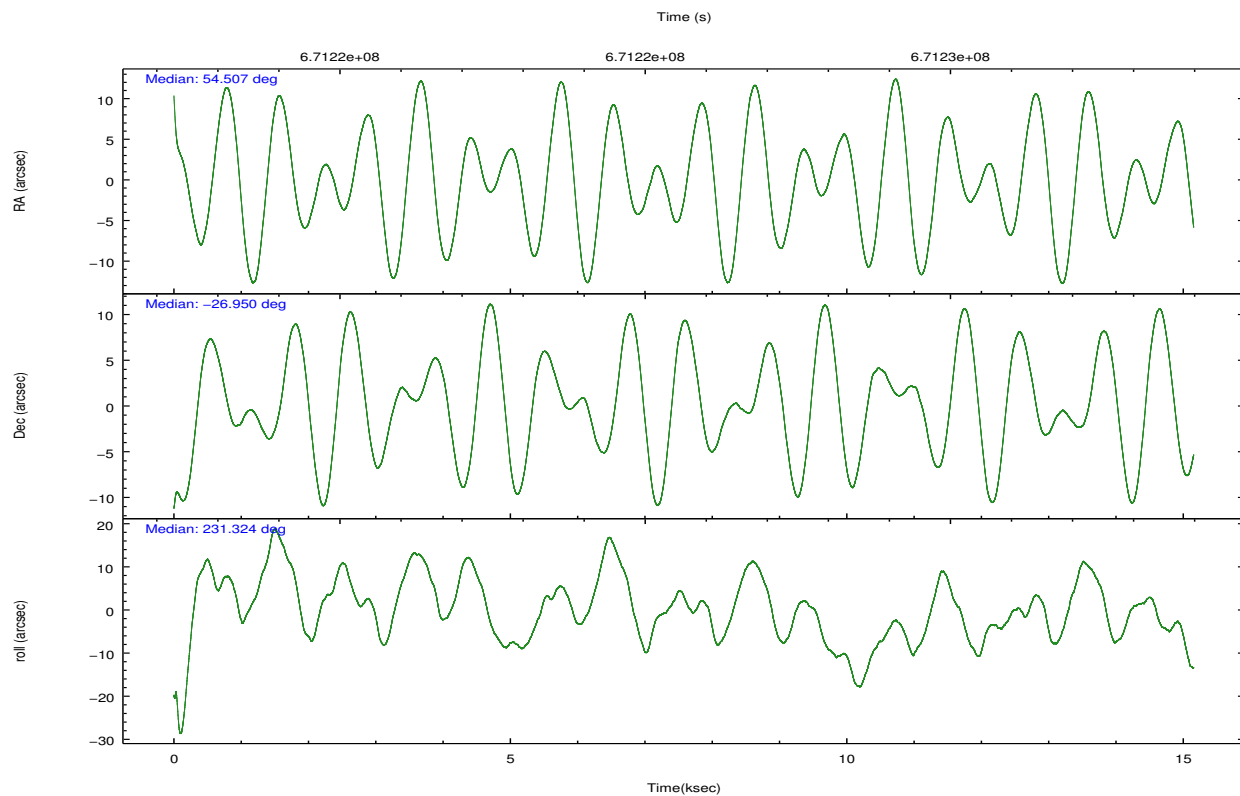
## 2.2 Compared Parameters

Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-5678	ACIS-5678
Grating	NONE	NONE
Data mode	VFAINT	VFAINT
Observation mode	POINTING	POINTING
[deg] Pointing RA	54.510853	54.5066336360181
[deg] Pointing Dec	-26.923284	-26.95050424096501
[deg] Pointing Roll	231.161845	231.3165634382714
[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)	671218199.184000	671216993.69686
Observation start date	2019-04-09T17:28:50	2019-04-09T17:09:53
[s] Observation end time (MET)	671233199.184000	671234222.9228899
Observation end date	2019-04-09T21:38:50	2019-04-09T21:57:02
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	N	N
[s] Primary exposure time	0.000000	3.1

## 2.3 Aspect



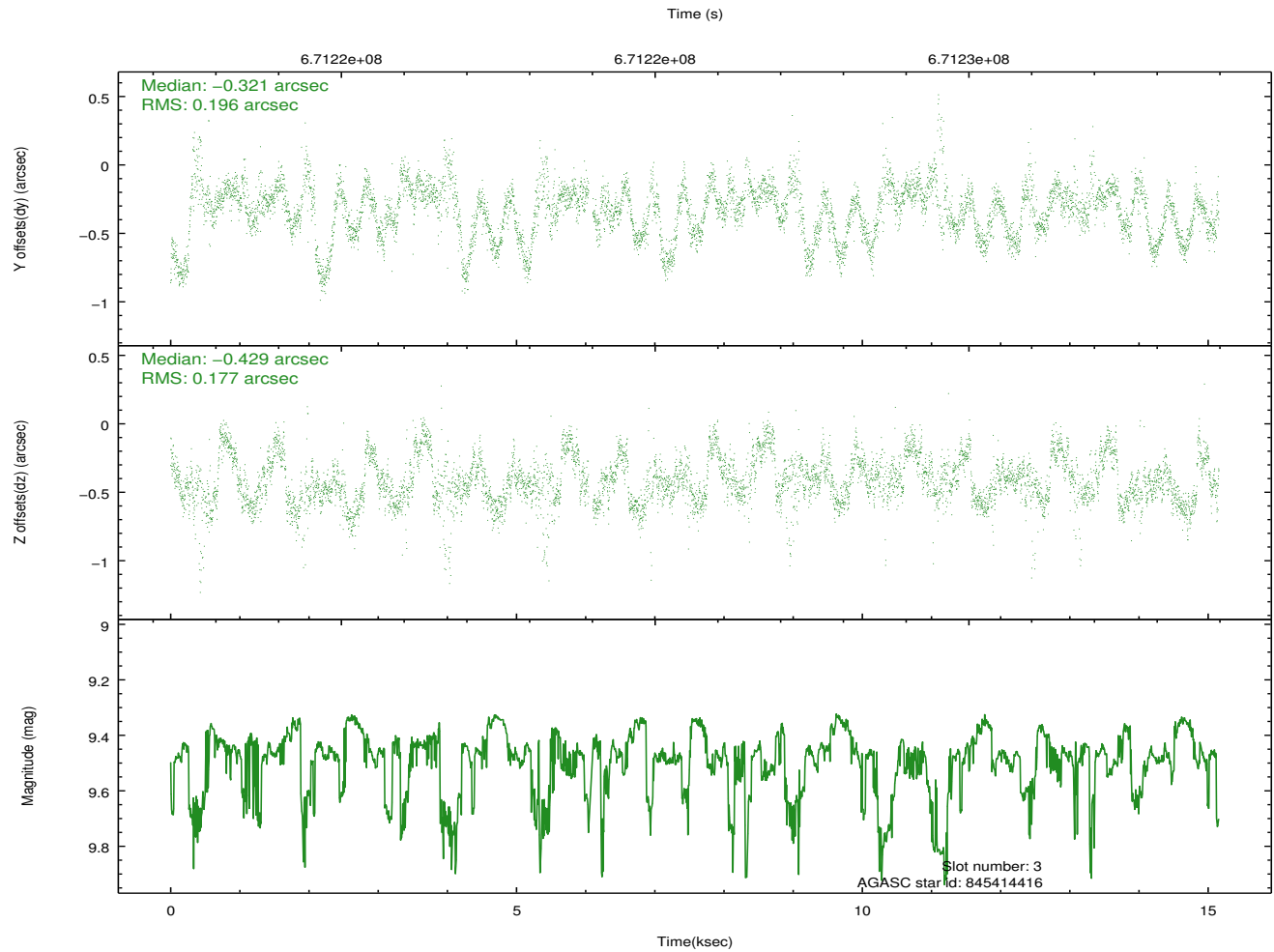
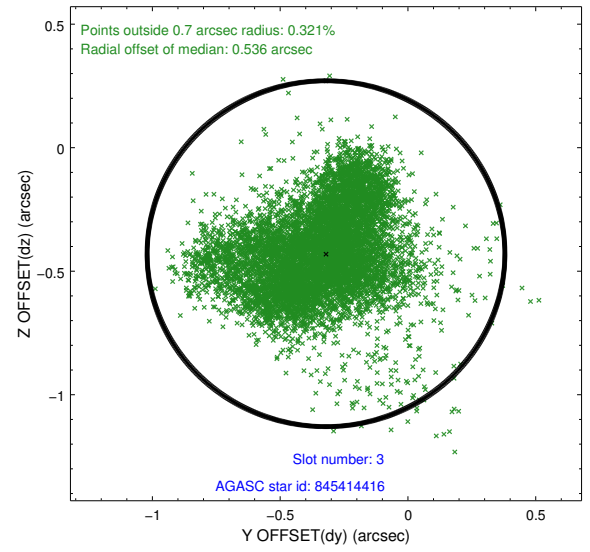
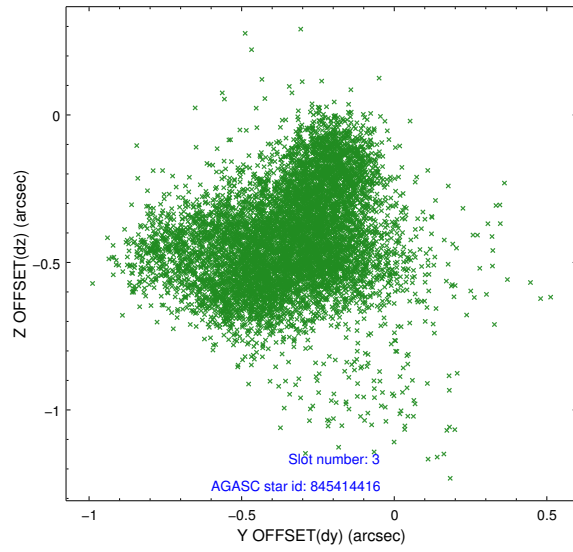


Slot Statistics

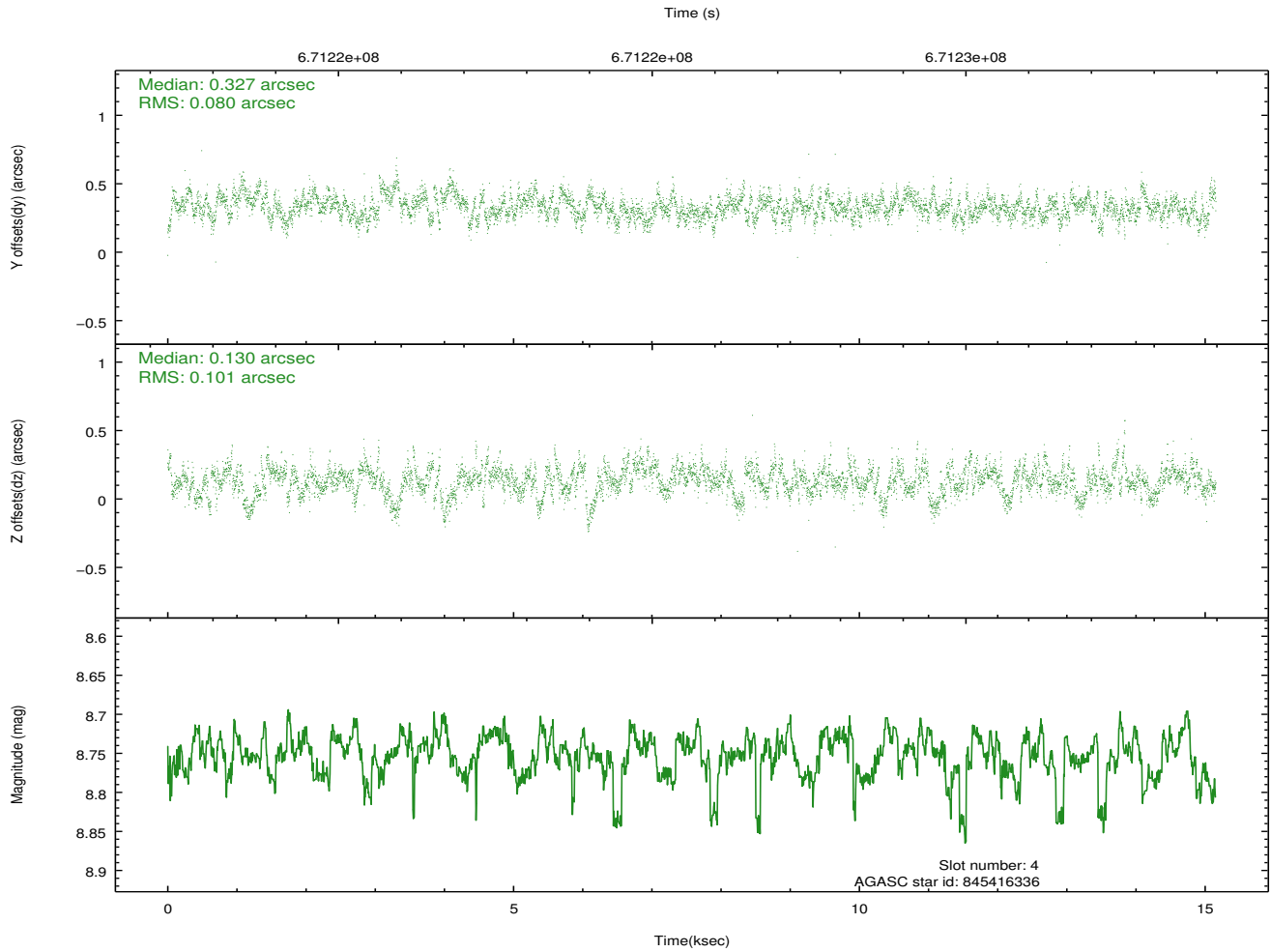
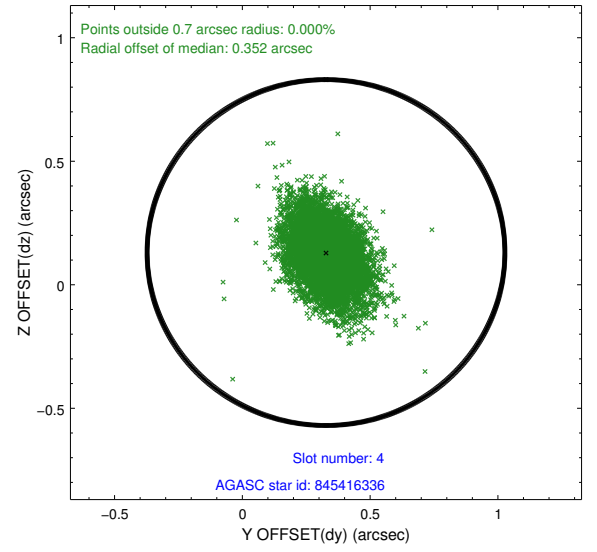
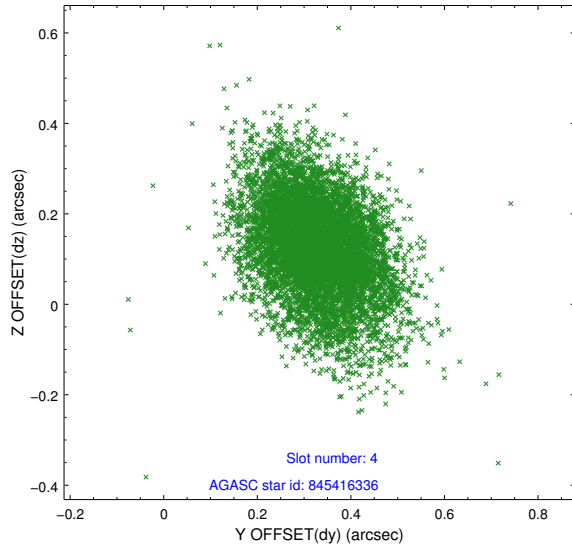
pt	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-S-2	7.17	3696	1.000	-0.340	-0.232	0.023	0.037	0.000000	0.000000	-768.18	-1741
1	FID		ACIS-S-4	7.29	3696	1.000	0.841	0.225	0.015	0.027	0.000000	0.000000	2146.06	167
2	FID		ACIS-S-5	7.26	3696	1.000	-0.535	0.014	0.031	0.042	0.000000	0.000000	-1820.91	161
3	GUIDE	used	845414416	9.47	7170	1.000	-0.321	-0.429	0.280	0.455	54.588168	-27.488950	1431.94	1469
4	GUIDE	used	845416336	8.75	7388	1.000	0.327	0.130	0.133	0.229	53.960749	-26.787384	731.19	-1680
5	GUIDE	used	845416488	9.34	7382	1.000	0.049	-0.130	0.258	0.406	54.760774	-26.814417	-807.75	380
6	GUIDE	used	845417688	9.86	7349	1.000	-0.114	0.000	0.353	0.529	54.025245	-27.354040	2184.07	-235
7	GUIDE	used	845417696	9.74	7296	1.000	0.069	0.411	0.230	0.380	54.588053	-26.366447	-1717.16	-1062

## 2.4 Star Slots

### 2.4.1 Slot 3

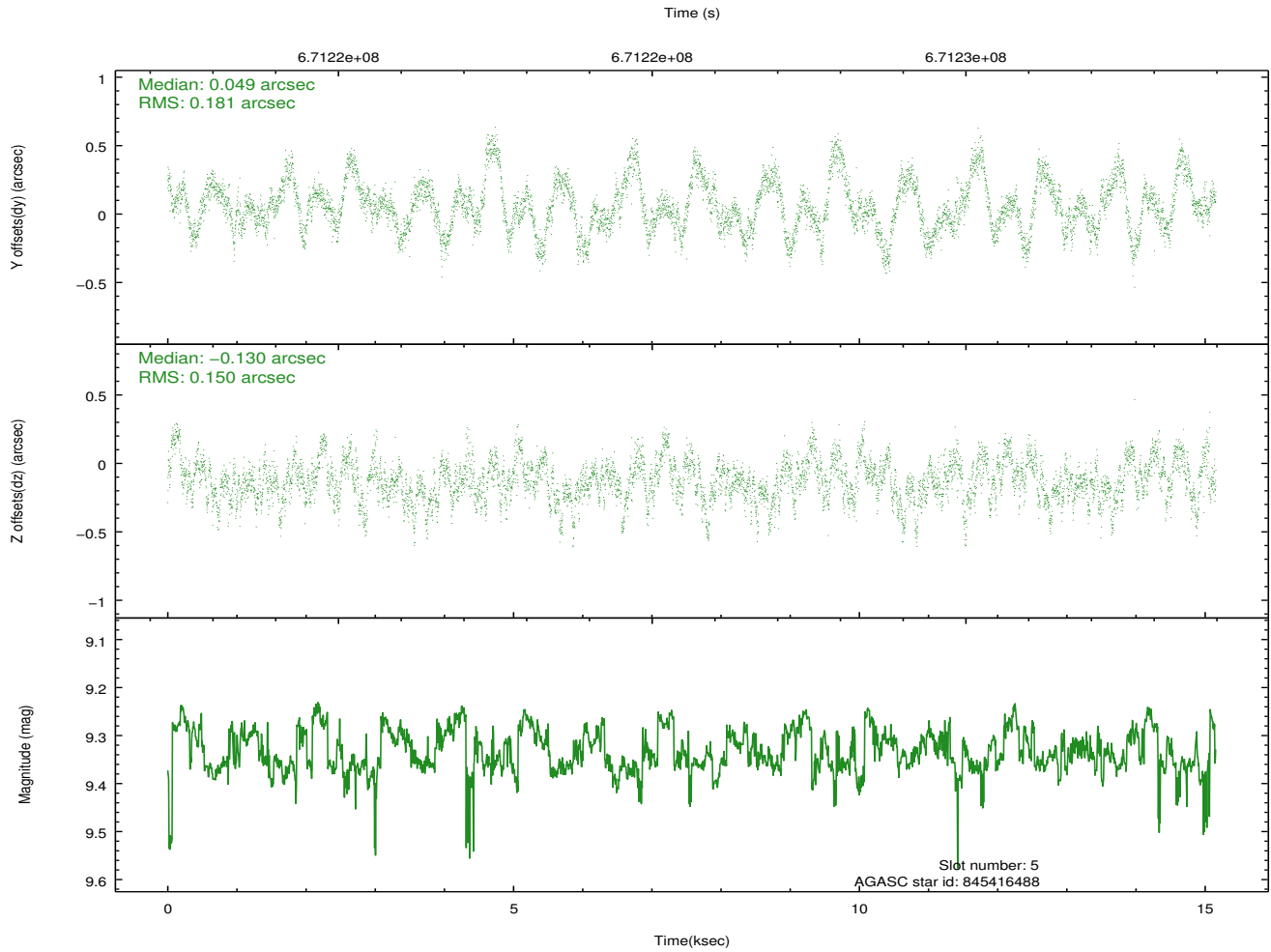
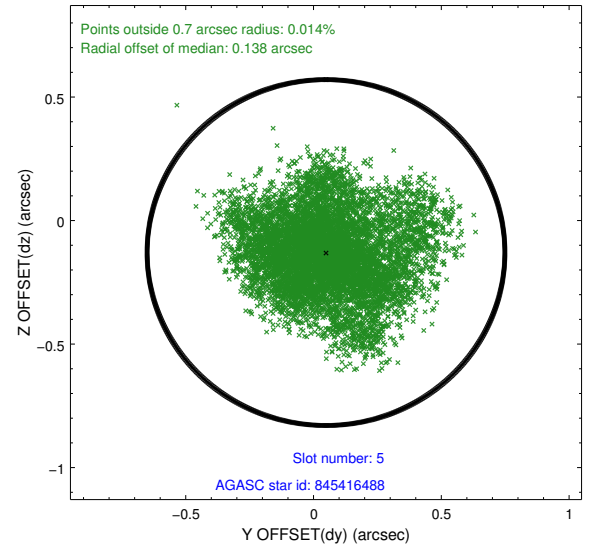
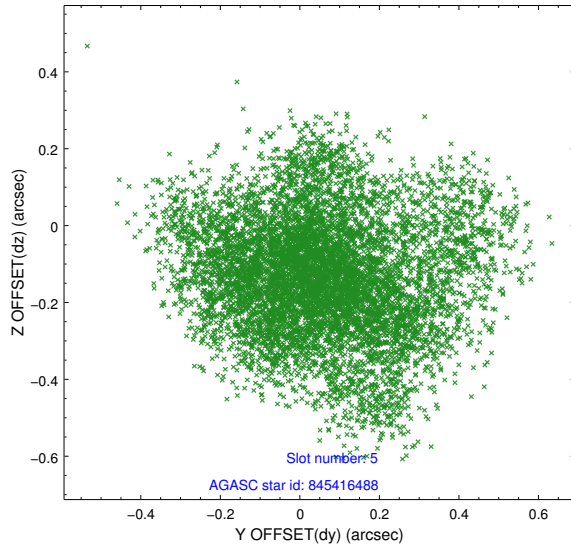


## 2.4.2 Slot 4

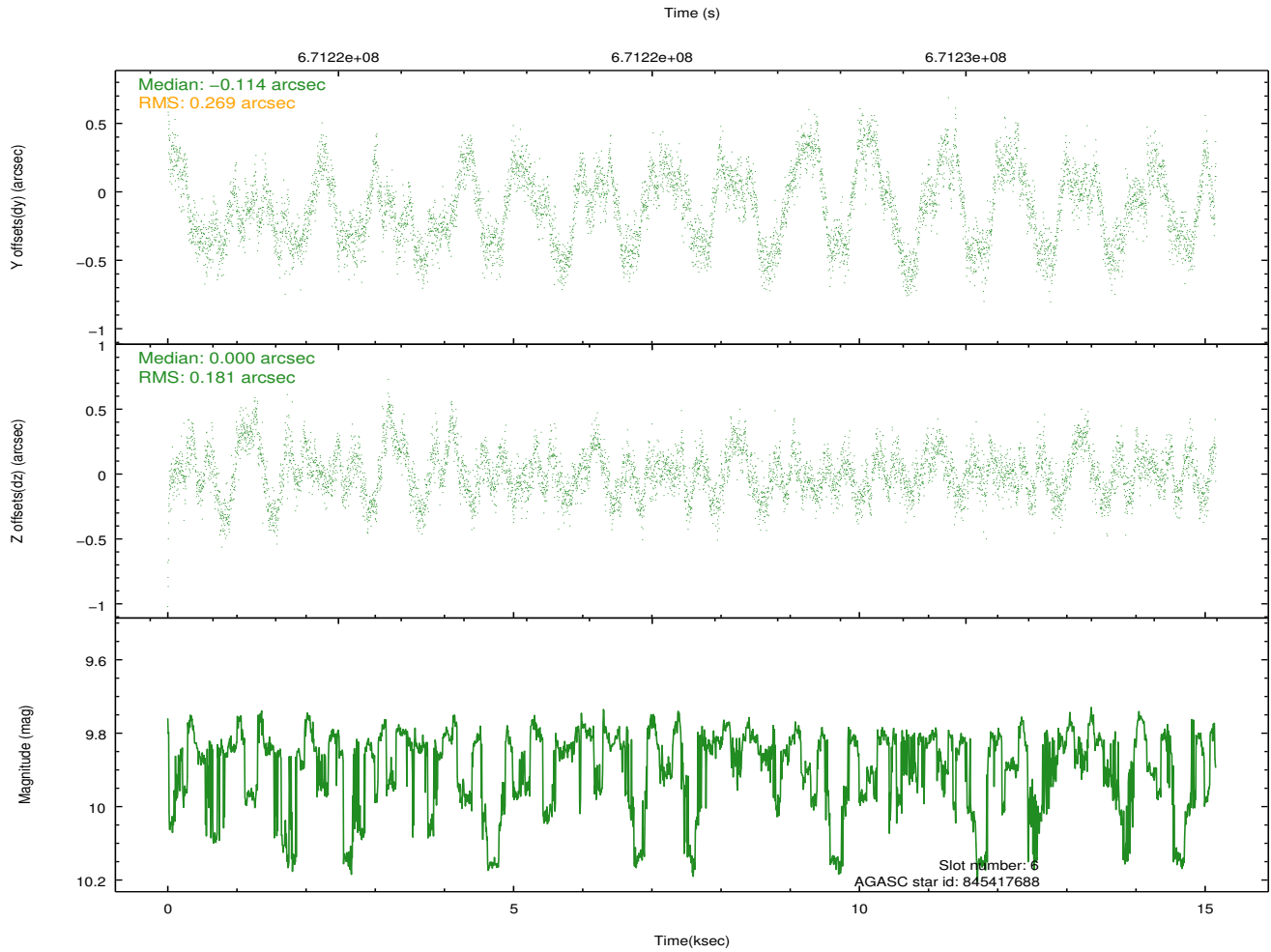
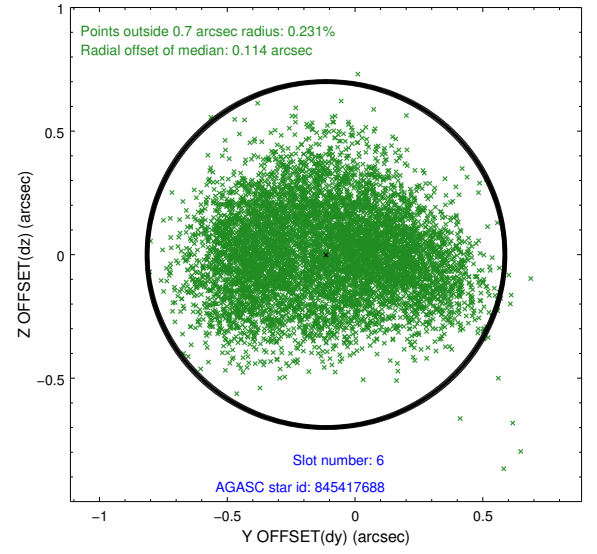
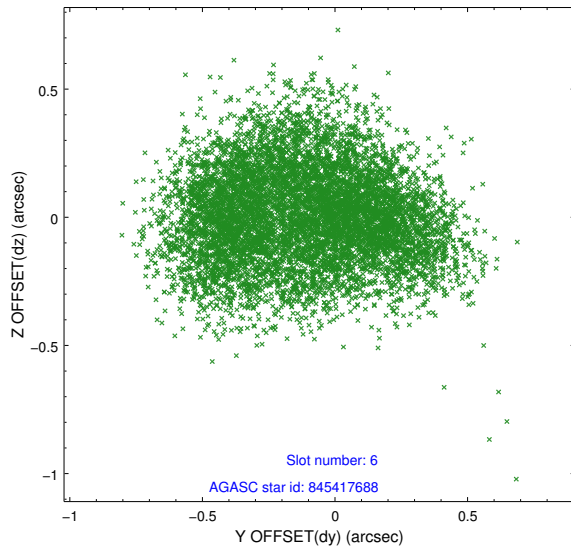




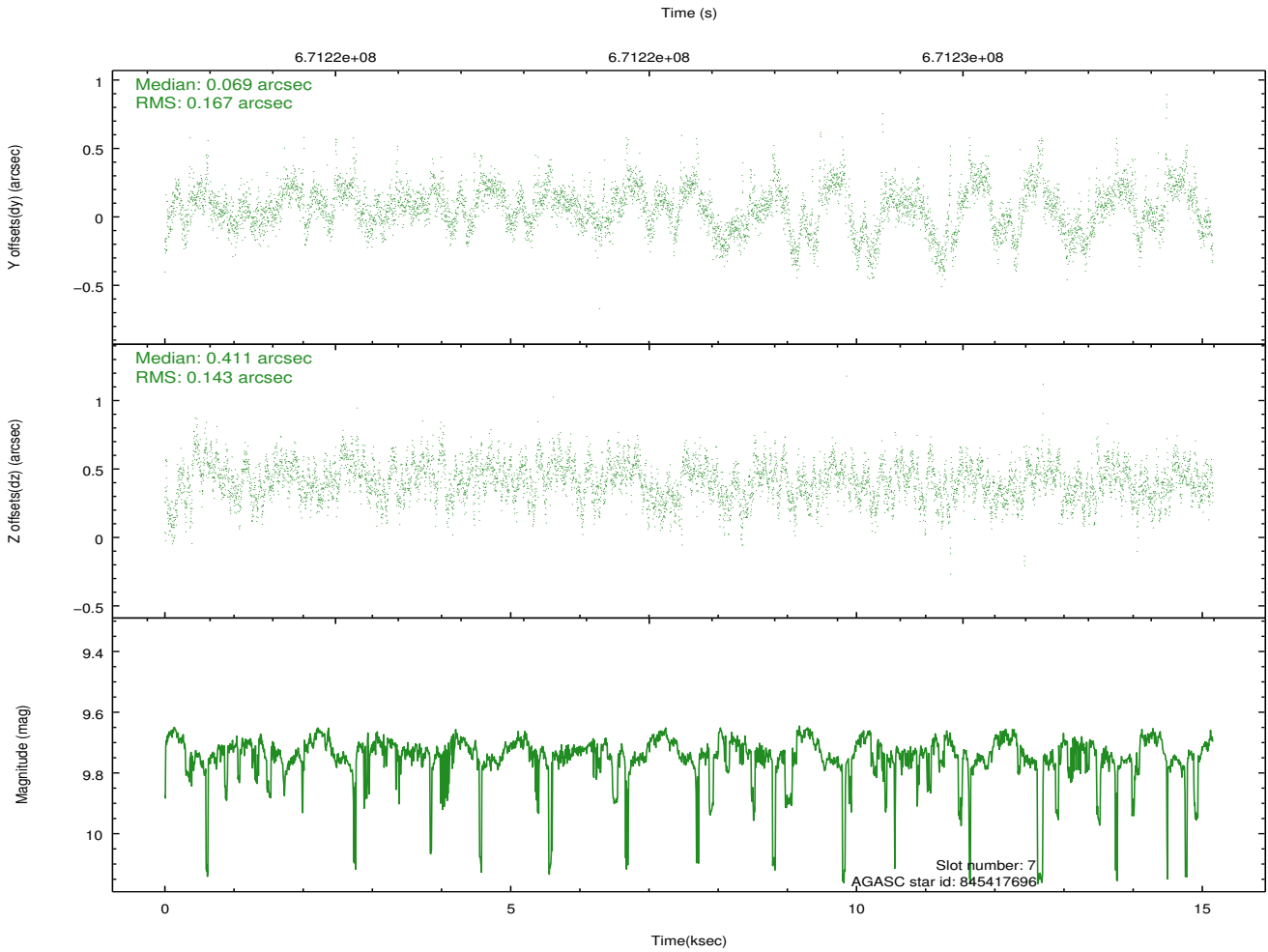
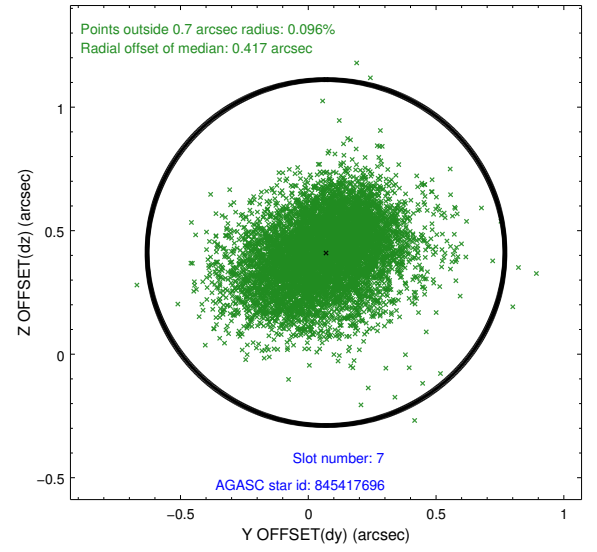
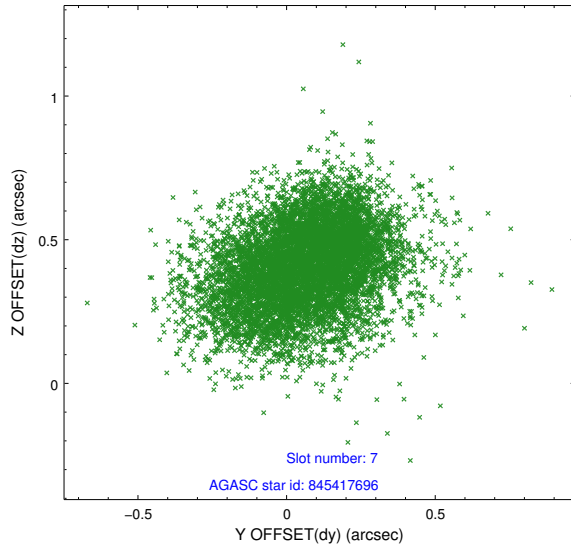
### 2.4.3 Slot 5



## 2.4.4 Slot 6

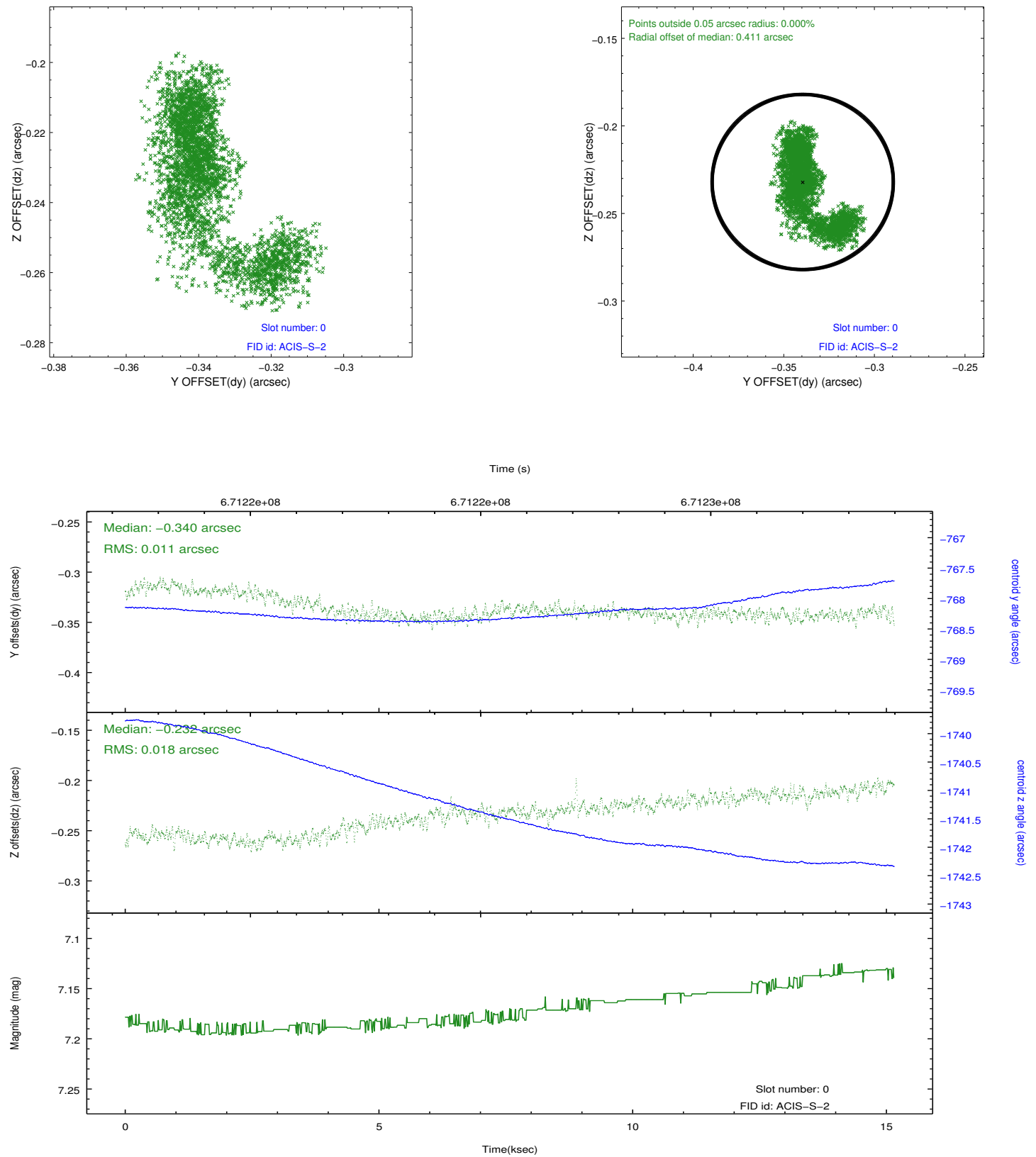


## 2.4.5 Slot 7

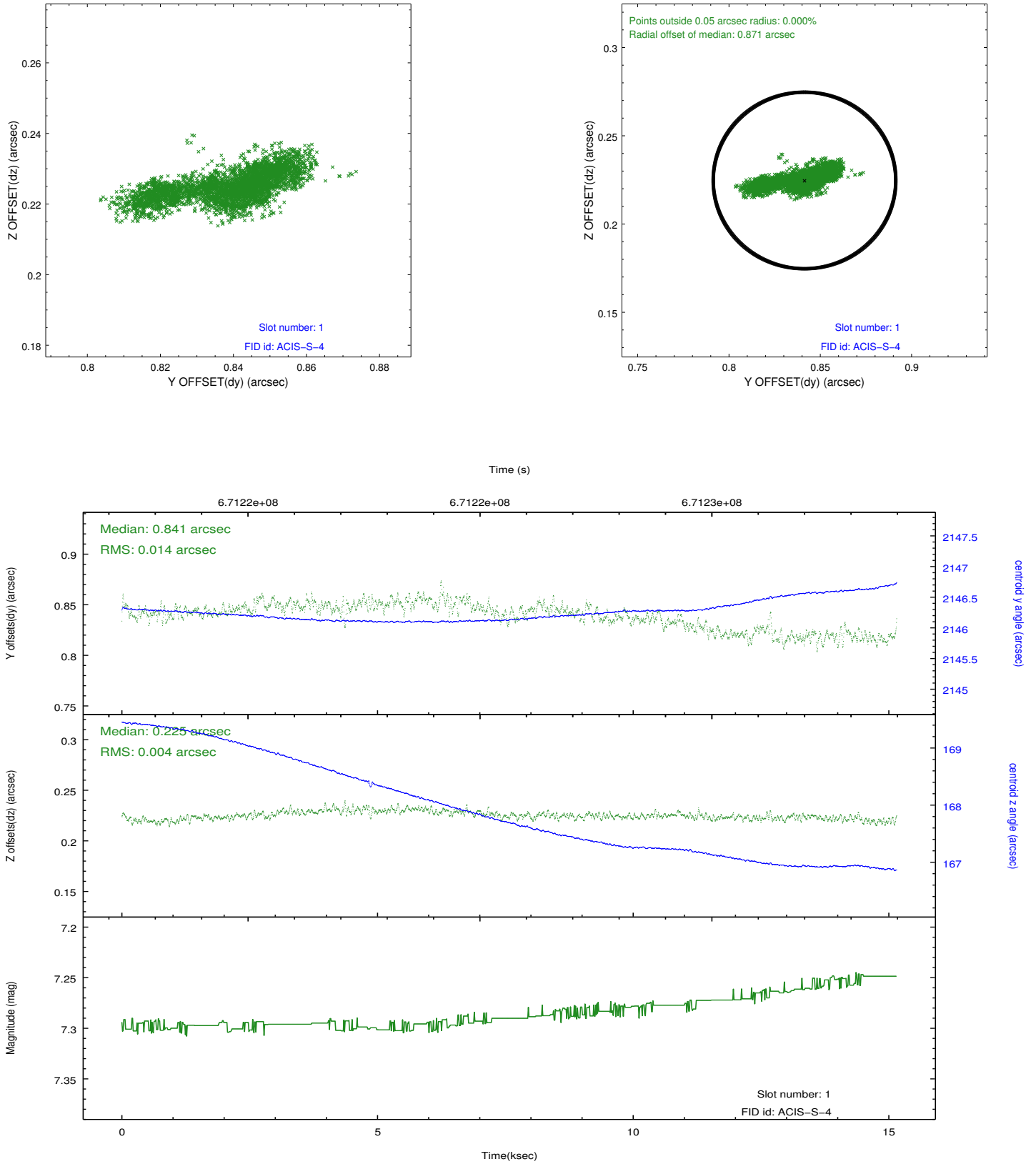


## 2.5 FID Slots

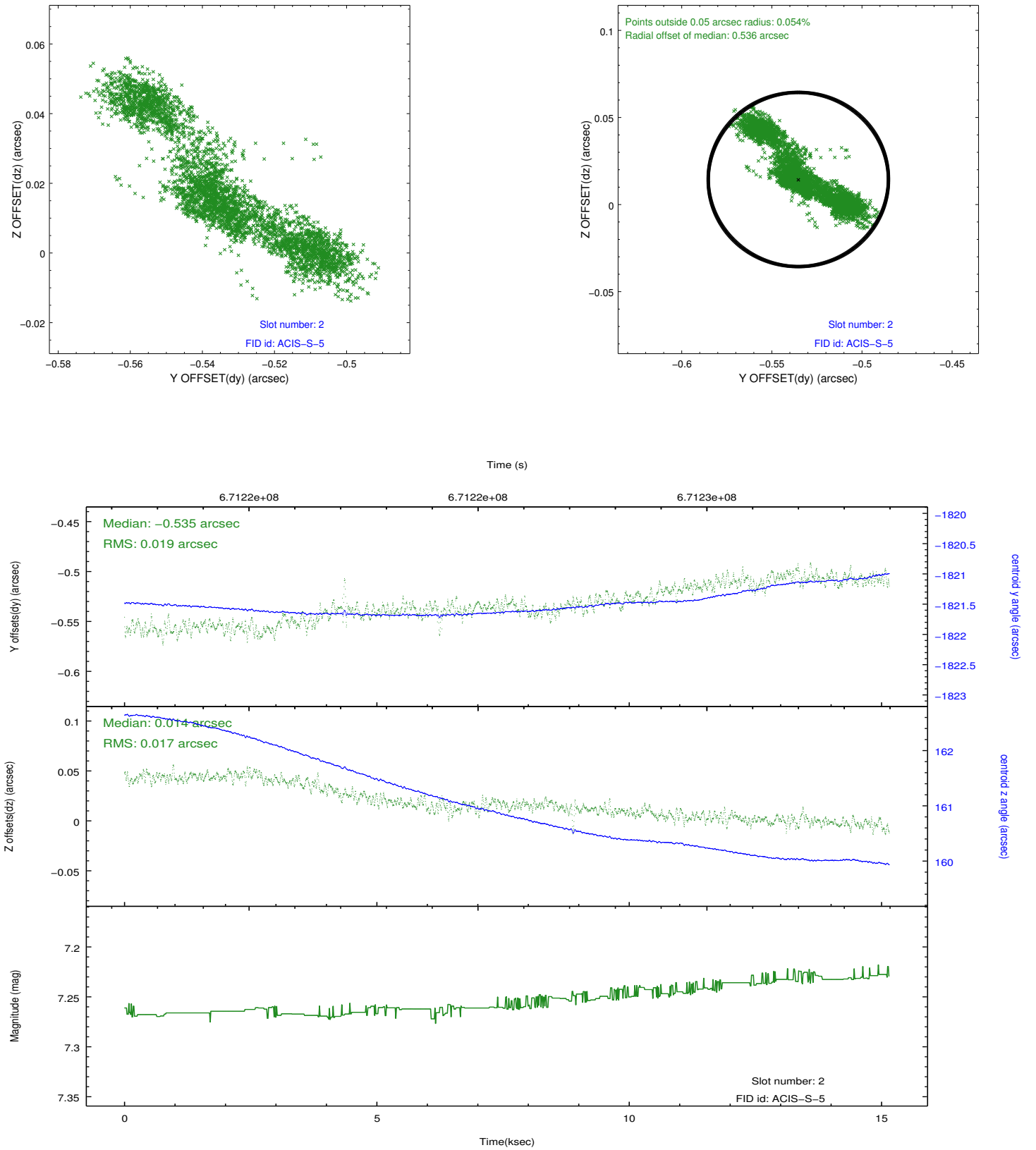
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2



# A Summary

## A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2019.04.11
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	15.056700115919

## A.2 Comments

The focal plane temperature is warmer than -112.0 C during the interval 671218132.95 - 671223985.75 (MET s) of this observation. 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.