

# V&V Reference Report

## L2 ASCDS Version : 10.7.1

Observation 22071 - L2 Version 1  
Chandra X-Ray Center

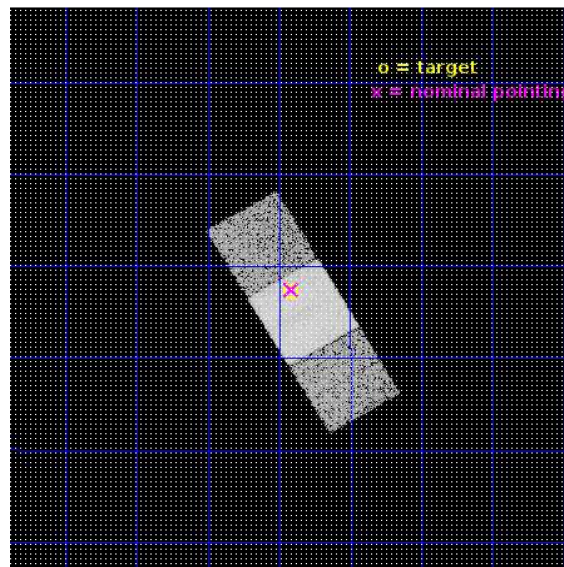
L2 Processing Date : Jan 31 2019

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# 1 Front

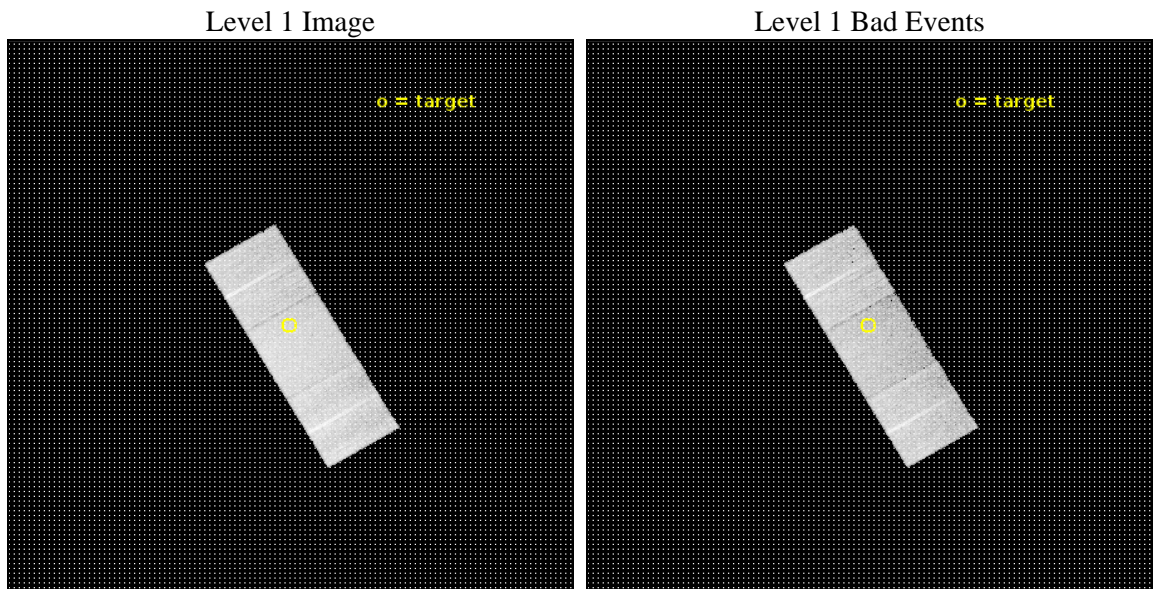
seq_num	703772	Sequence number
obs_id	22071	Observation id
title	RUNAWAY TIDAL CAPTURE IN NUCLEAR STAR CLUSTERS AS A FORMATION PATHWAY FOR MASSIVE BLACK HOLES	Proposal title
observer	Vivienne Baldassare	Principal investigator
object	NGC 6509	Source name
dtcycle	0	&#160
cycle	P	events from which exps? Prim/Second/Both
ra_targ	269.855417	Observer's specified target RA [deg]
dec_targ	6.287	Observer's specified target Dec [deg]
ra_nom	269.85337744632	Nominal RA [deg]
dec_nom	6.2910567278653	Nominal Dec [deg]
roll_nom	59.656868750466	Nominal Roll [deg]
revision	1	Processing version of data
ontime	11107.300085545	Sum of GTIs [s]
livetime	10962.175032852	Livetime [s]
ontime6	11107.300085545	Sum of GTIs [s]
ontime7	11107.300085545	Sum of GTIs [s]
ontime8	11104.159015179	Sum of GTIs [s]
l2events	64001	Number of level 2 events



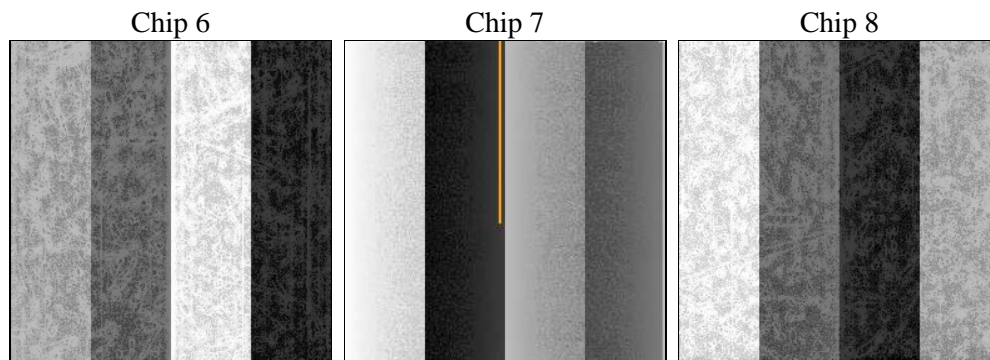
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	11000.000000	[s] Scheduled observation exposure time
ascdsver	10.7.1	Processing system revision	ontime	11107.300085545	Sum of GTIs [s]
caldsver	4.8.2	&#160	ontime6	11107.300085545	Sum of GTIs [s]
date	2019-01-31T12:29:08	Date and time of file creation	ontime7	11107.300085545	Sum of GTIs [s]
revision	1	Processing version of data	ontime8	11104.159015179	Sum of GTIs [s]
			l1events	314375	Number of level 1 events

### 2.1.4 Events

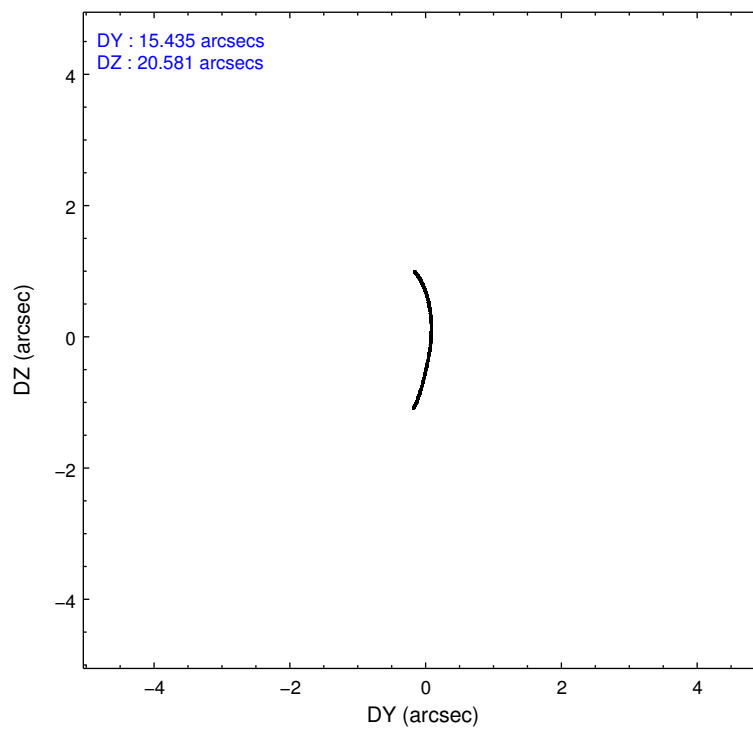
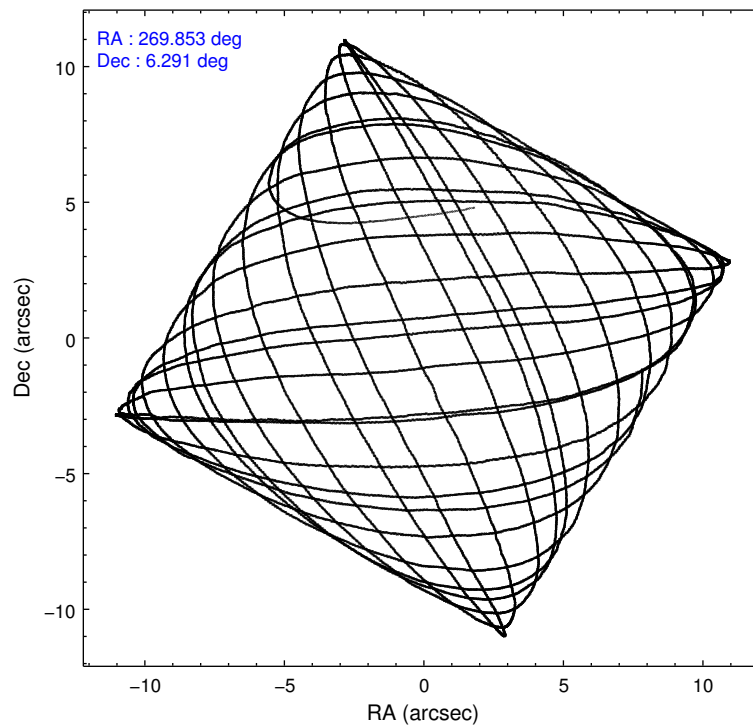
	ccd 6	ccd 7	ccd 8
level 1 events	92279	109208	112888
rejected events	82705	61963	84686
rejected %	89%	56%	75%

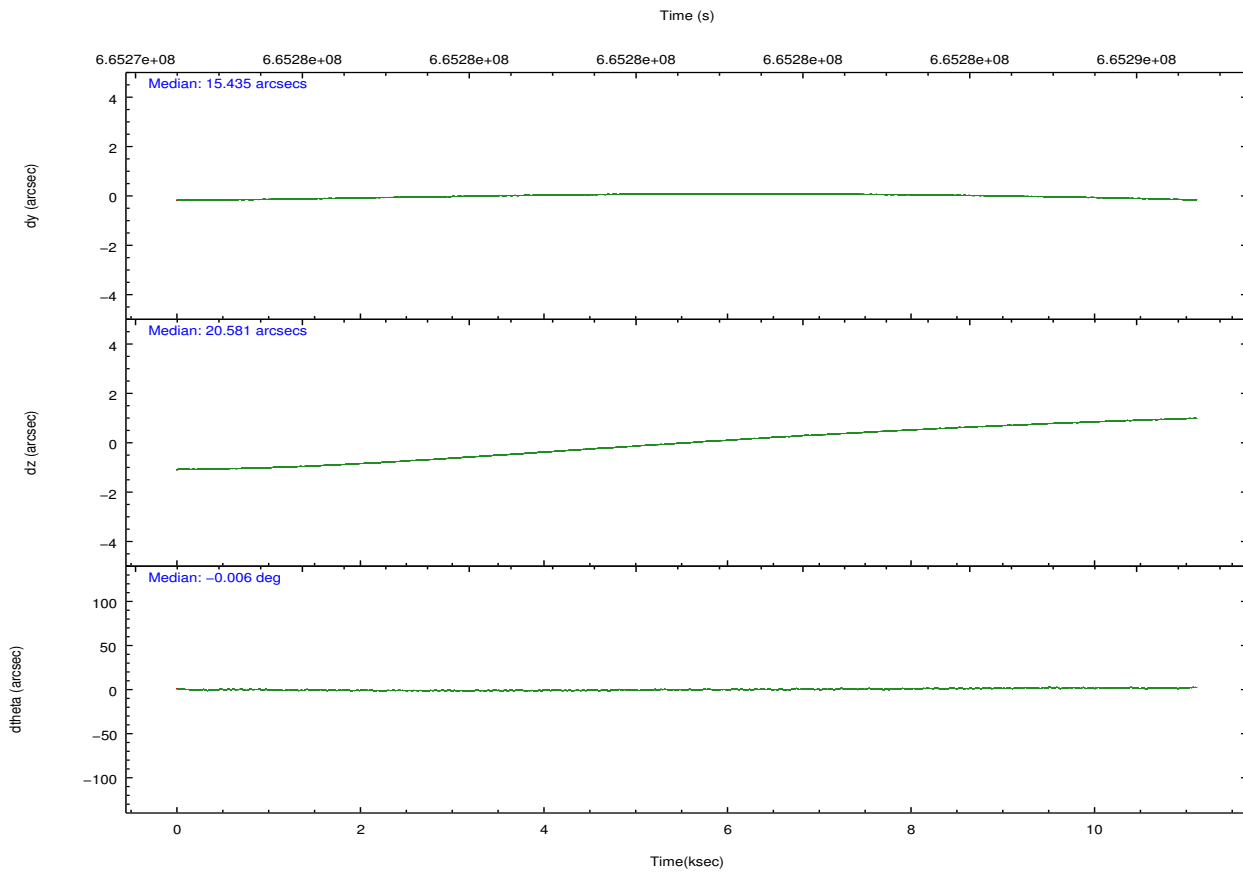
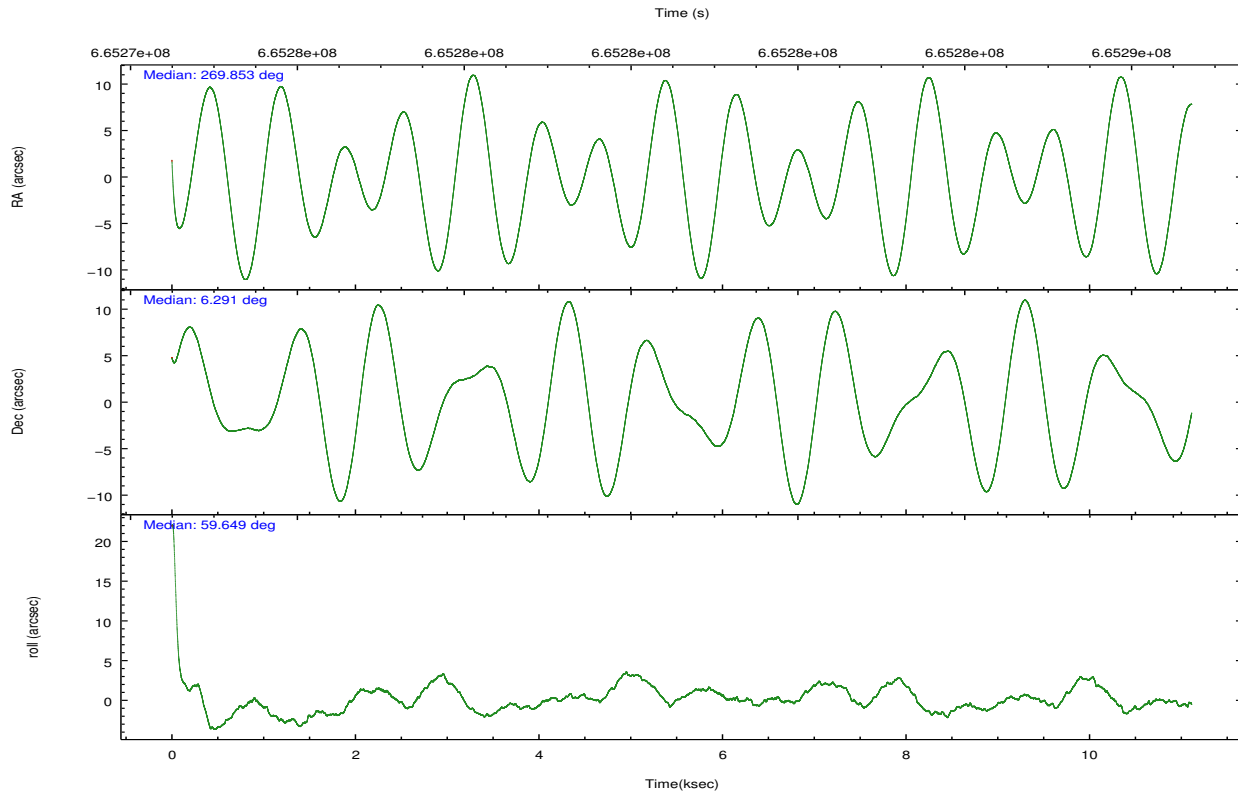
	ccd 6	ccd 7	ccd 8
grade 0 events	2562	3977	7834
	2%	3%	6%
grade 1 events	28	159	88
	0%	0%	0%
grade 2 events	2840	9606	6999
	3%	8%	6%
grade 3 events	760	3760	2870
	0%	3%	2%
grade 4 events	745	3684	2722
	0%	3%	2%
grade 5 events	3426	10341	5554
	3%	9%	4%
grade 6 events	2673	26225	7780
	2%	24%	6%
grade 7 events	79245	51456	79041
	85%	47%	70%

## 2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	7	7
Detector	ACIS-678	ACIS-678	Obspar file type	PREDICTED	ACTUAL
Grating	NONE	NONE	Obspar update status	NONE	UPDATED
Data mode	VFAINT	VFAINT	CCD I0 on	N	N
Observation mode	POINTING	POINTING	CCD I1 on	N	N
[deg] Pointing RA	269.853576	269.853377446316	CCD I2 on	N	N
[deg] Pointing Dec	6.263604	6.29105672786527	CCD I3 on	N	N
[deg] Pointing Roll	59.500199	59.65686875046638	CCD S0 on	N	N
[mm] SIM focus pos	-0.684267	-0.6828225247311905	CCD S1 on	N	N
[mm] SIM defocus	0	0.001444936568705701	CCD S2 on	Y	Y
[mm] SIM translation stage pos	-190.132523	-190.1400660498719	CCD S3 on	Y	Y
[mm] SIM translation stage offset	0	0.00754346686406393	CCD S4 on	O1	Y
[s] Observation start time (MET)	665275196.184000	665273965.44157	CCD S5 on	N	N
Observation start date	2019-01-30T22:38:47	2019-01-30T22:19:25	Number of optional ACIS chips dropped	0	0
[s] Observation end time (MET)	665286196.184000	665287184.86736	On-chip summing requested	N	N
Observation end date	2019-01-31T01:42:07	2019-01-31T01:59:44	Subarray requested	NONE	NONE
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	3.1

## 2.3 Aspect



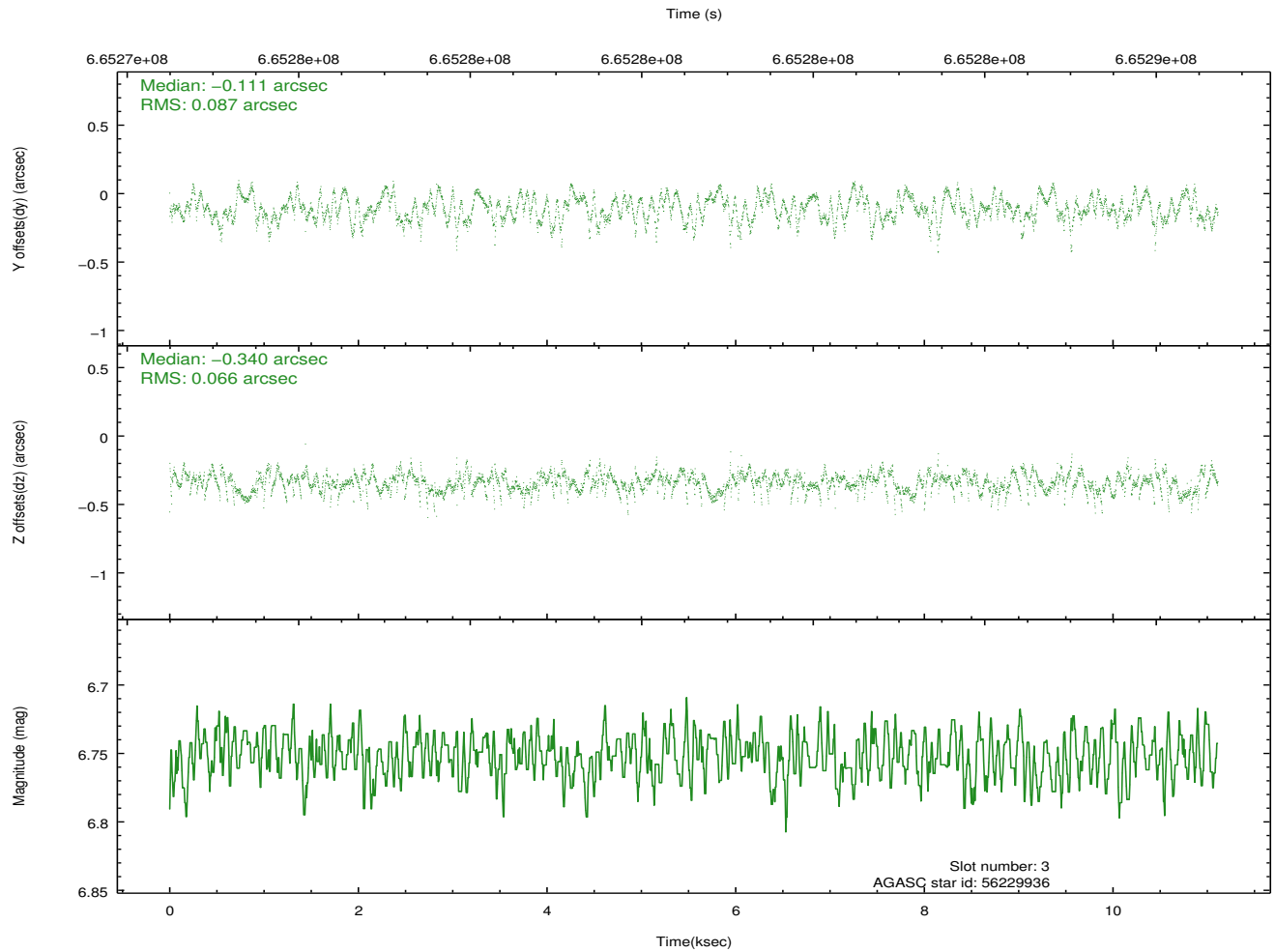
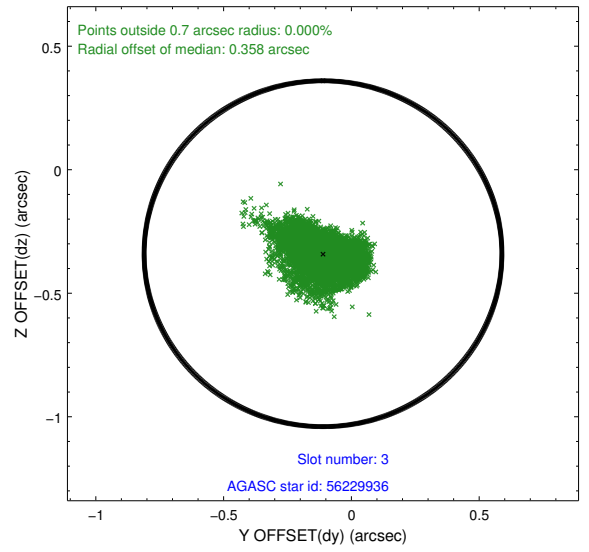
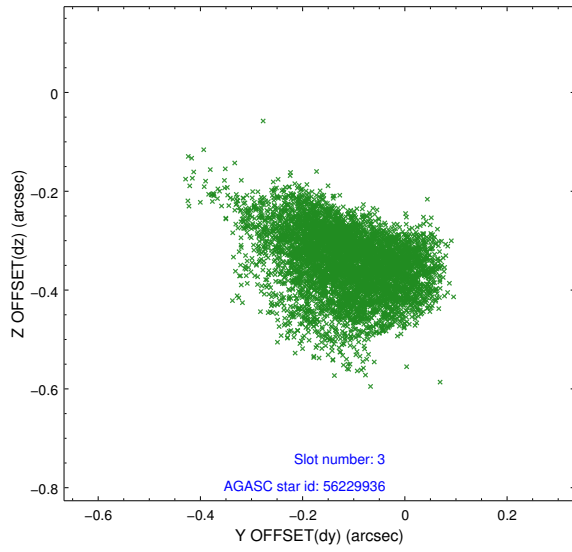


### Slot Statistics

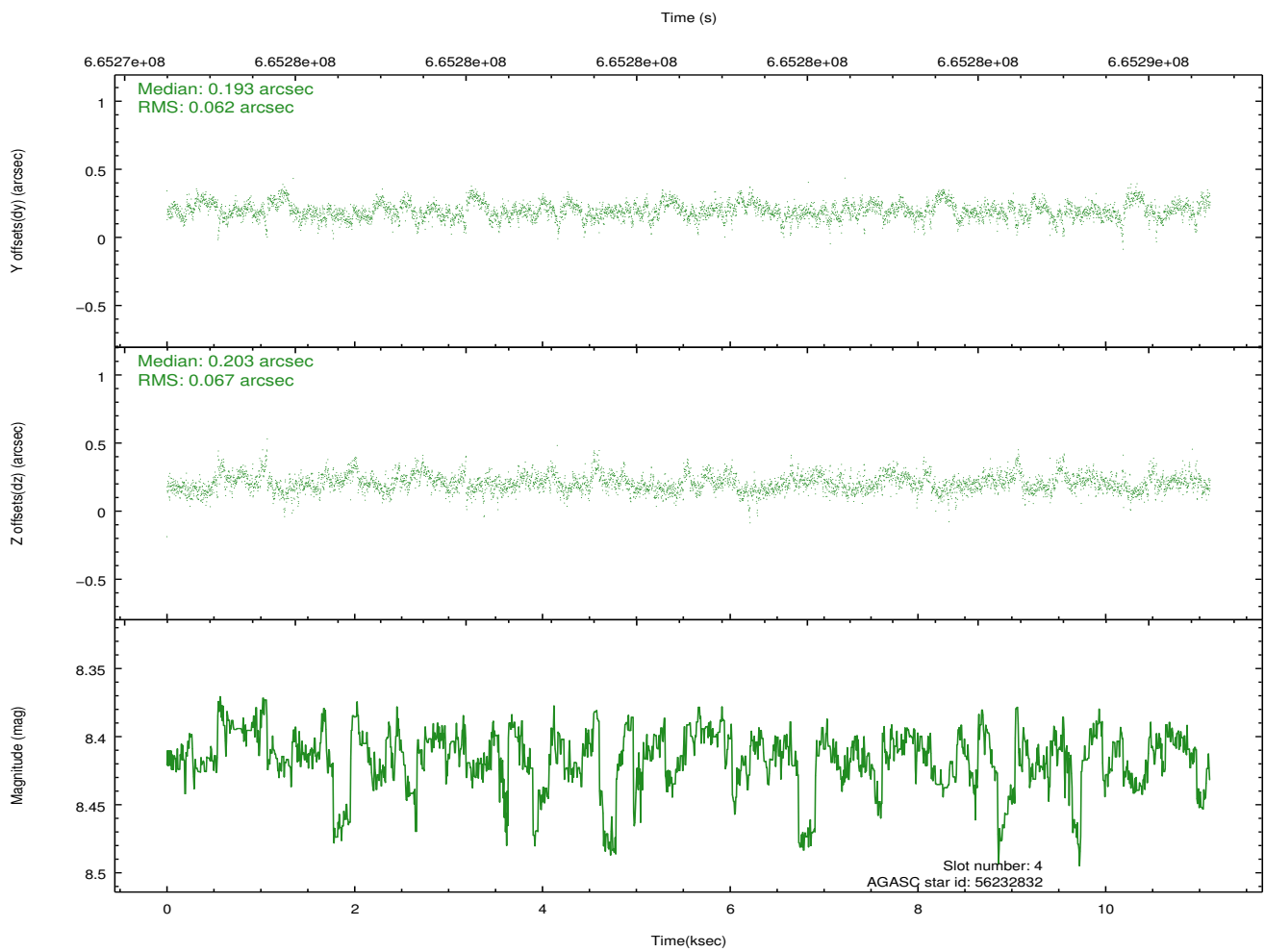
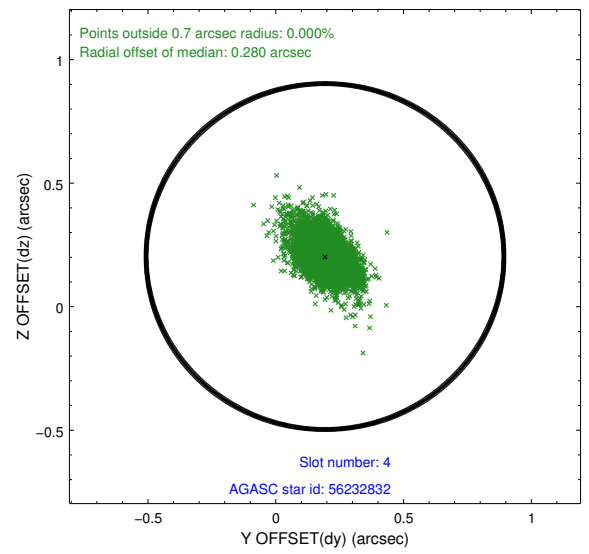
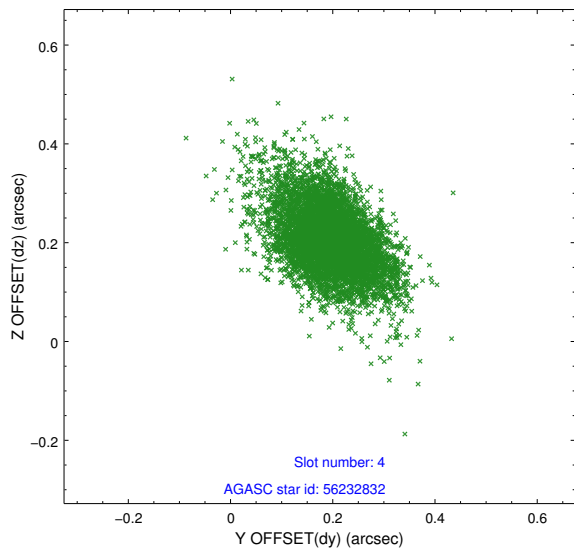
slot	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_x
0	FID		ACIS-S-2	7.20	2711	1.000	-0.362	-0.230	0.011	0.019	0.000000	0.000000	-768.70	-1742
1	FID		ACIS-S-4	7.32	2711	1.000	0.838	0.236	0.018	0.027	0.000000	0.000000	2145.50	166
2	FID		ACIS-S-5	7.29	2711	1.000	-0.507	0.003	0.019	0.029	0.000000	0.000000	-1821.16	160
3	GUIDE	used	56229936	6.75	5422	1.000	-0.111	-0.340	0.117	0.184	269.233233	6.487734	-429.91	2320
4	GUIDE	used	56232832	8.41	5419	1.000	0.193	0.203	0.091	0.165	269.227022	6.173619	-1418.78	1768
5	GUIDE	used	56232928	7.39	5422	1.000	-0.208	-0.042	0.107	0.168	269.862805	6.418954	498.23	254
6	GUIDE	used	57938472	6.85	5422	1.000	0.158	0.377	0.140	0.222	270.220243	6.268291	681.32	-1121
7	GUIDE	used	57948128	7.18	5419	1.000	-0.028	-0.181	0.136	0.222	270.030486	6.553920	1221.91	-15

## 2.4 Star Slots

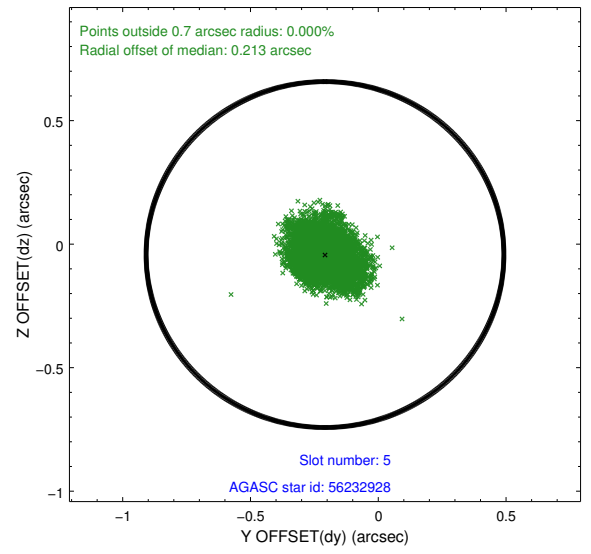
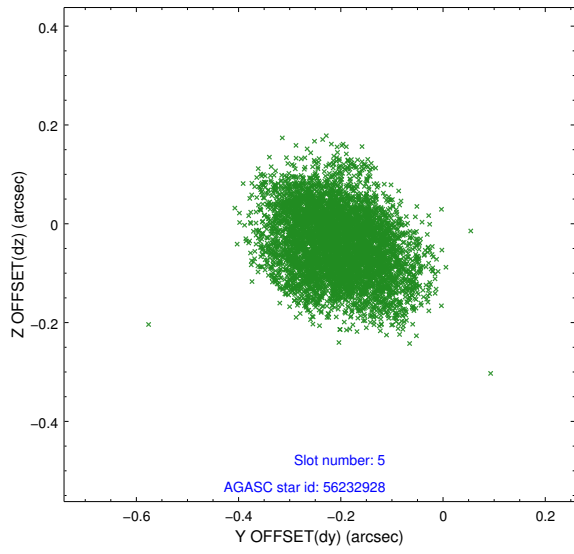
### 2.4.1 Slot 3



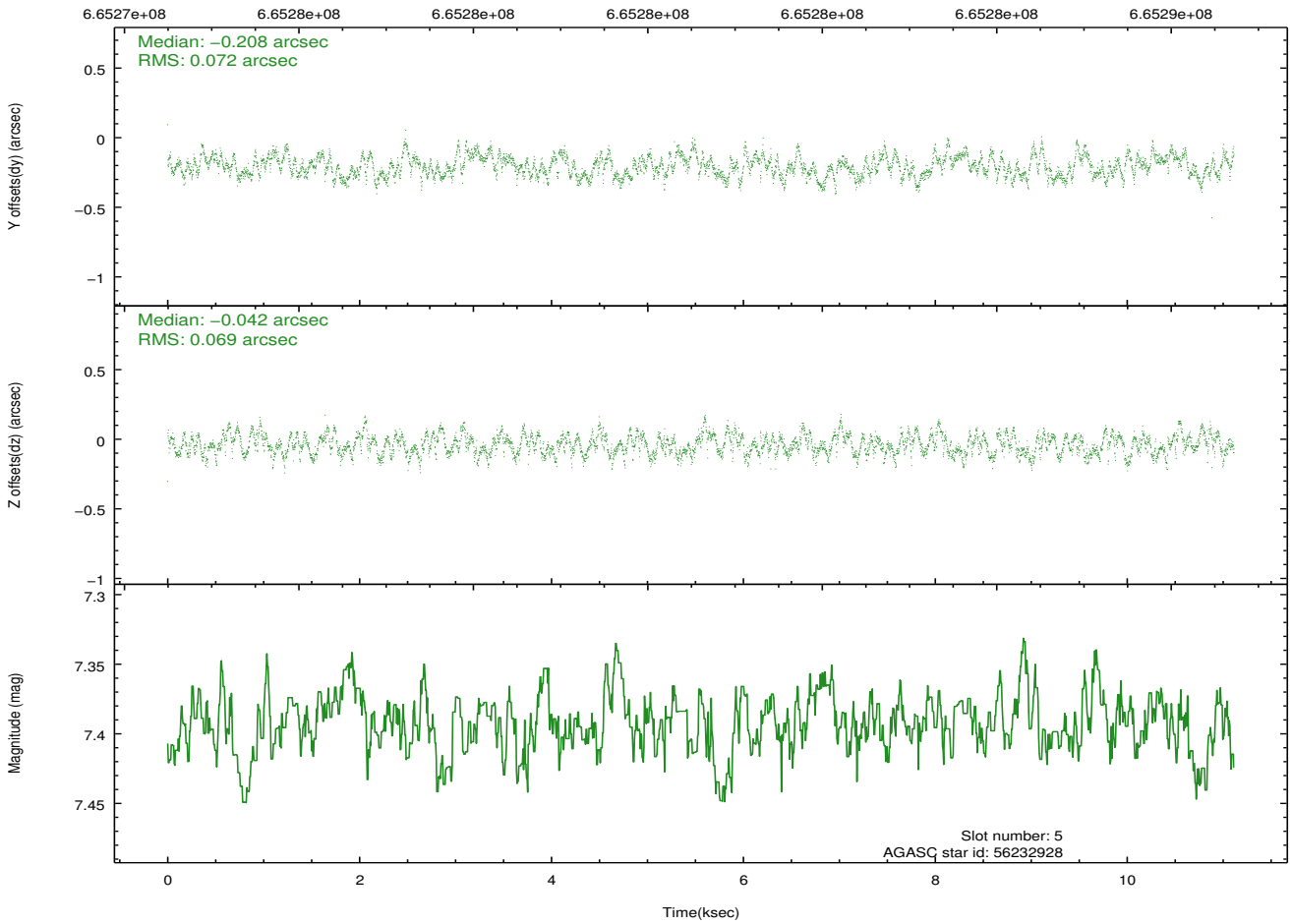
## 2.4.2 Slot 4



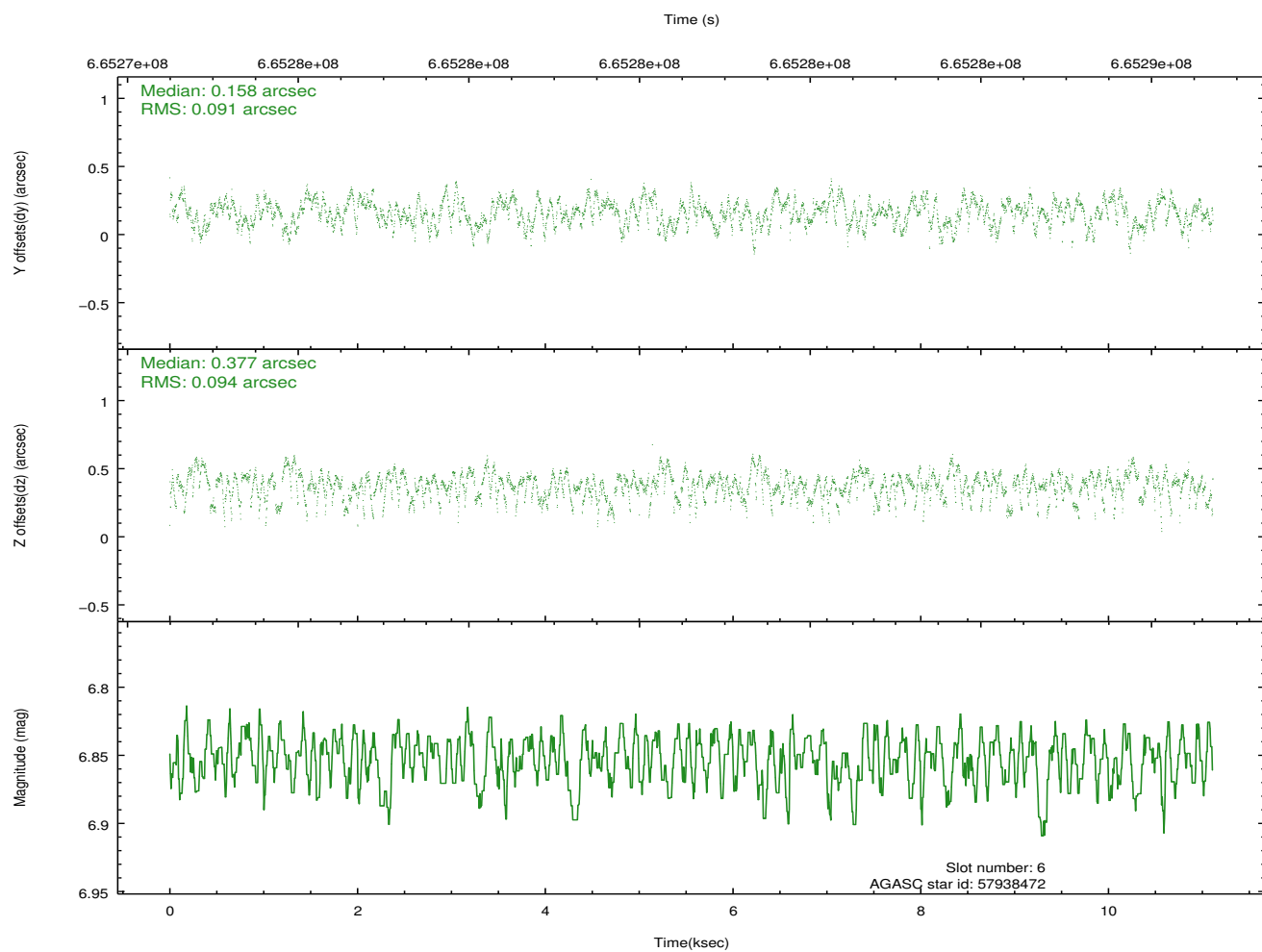
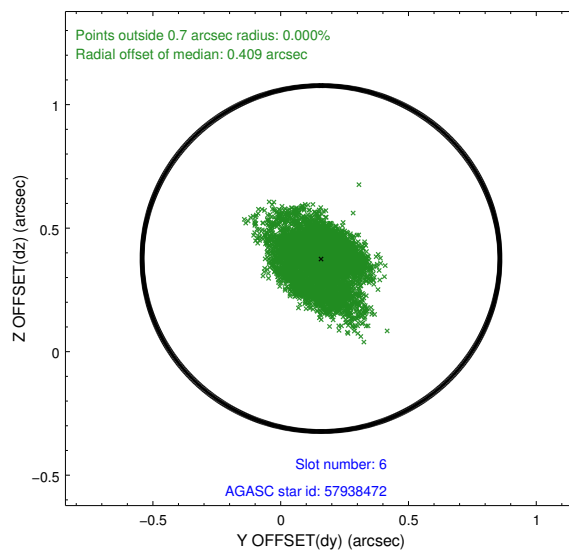
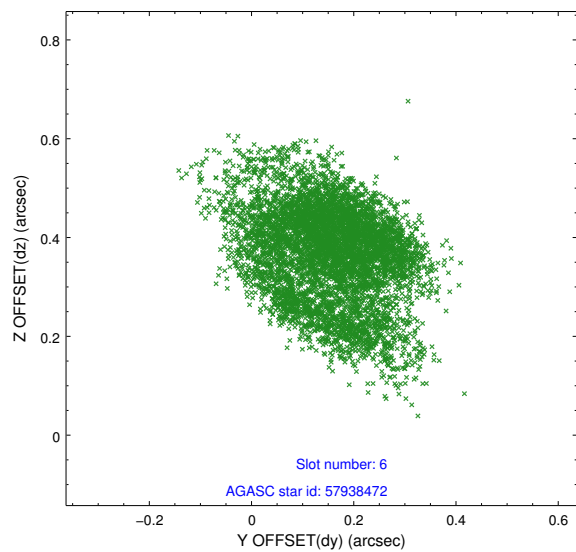
### 2.4.3 Slot 5



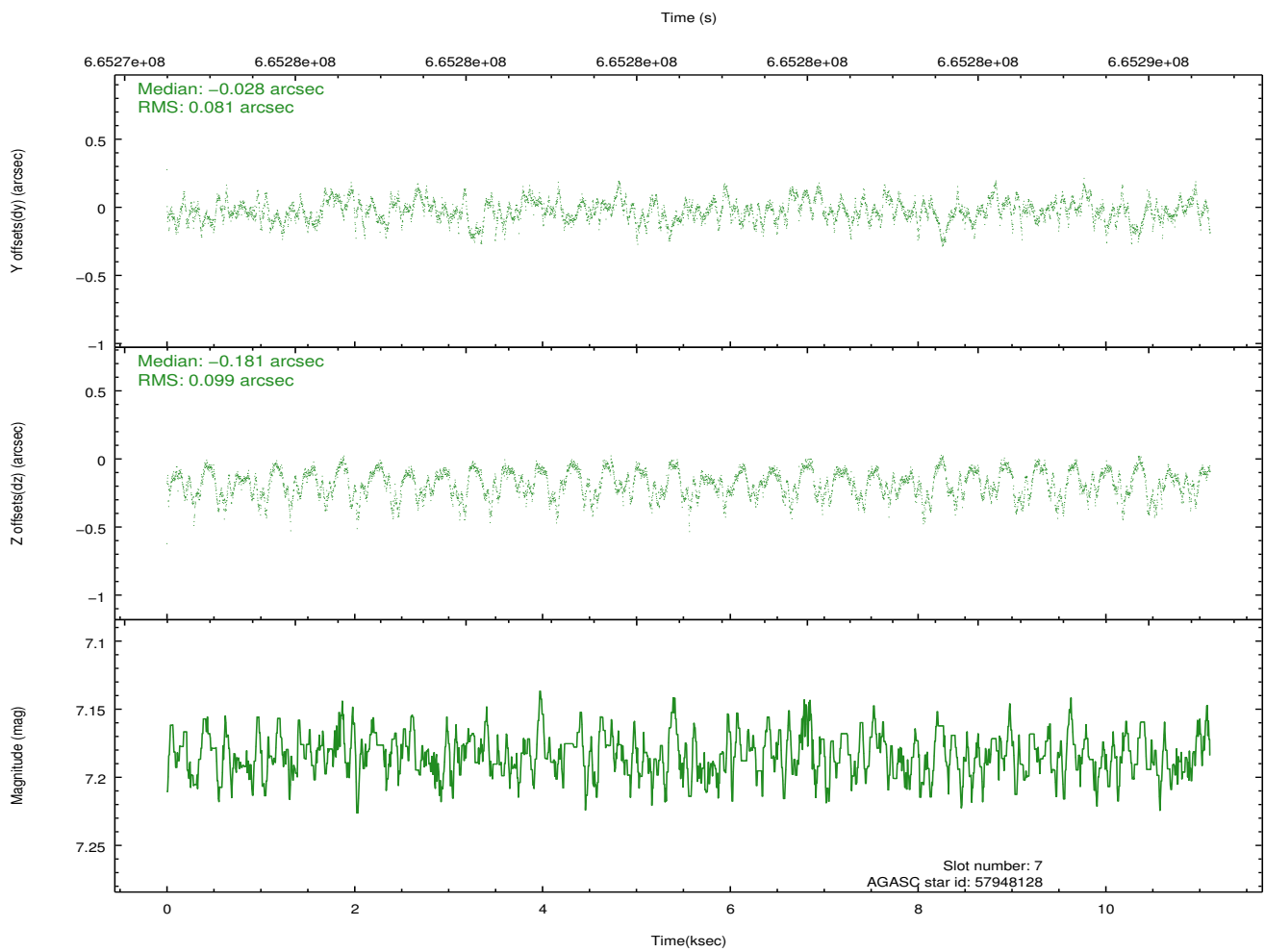
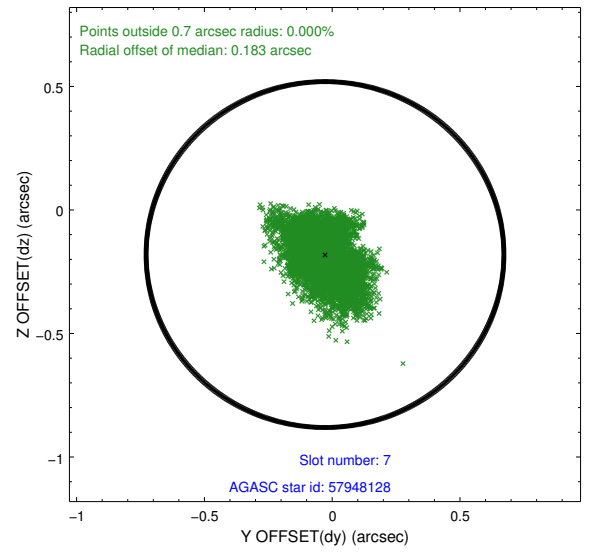
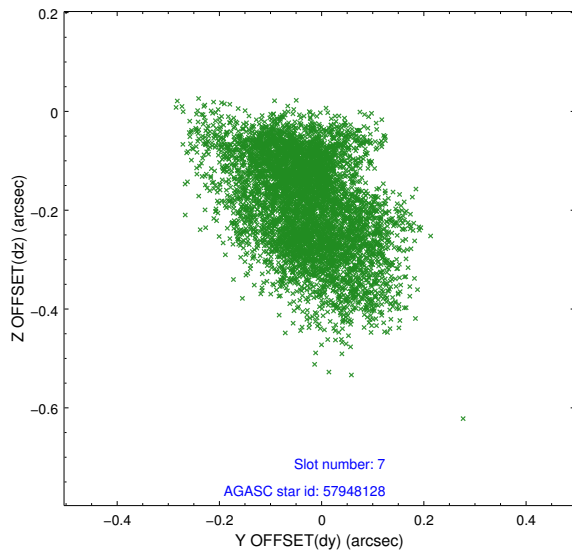
Time (s)



## 2.4.4 Slot 6

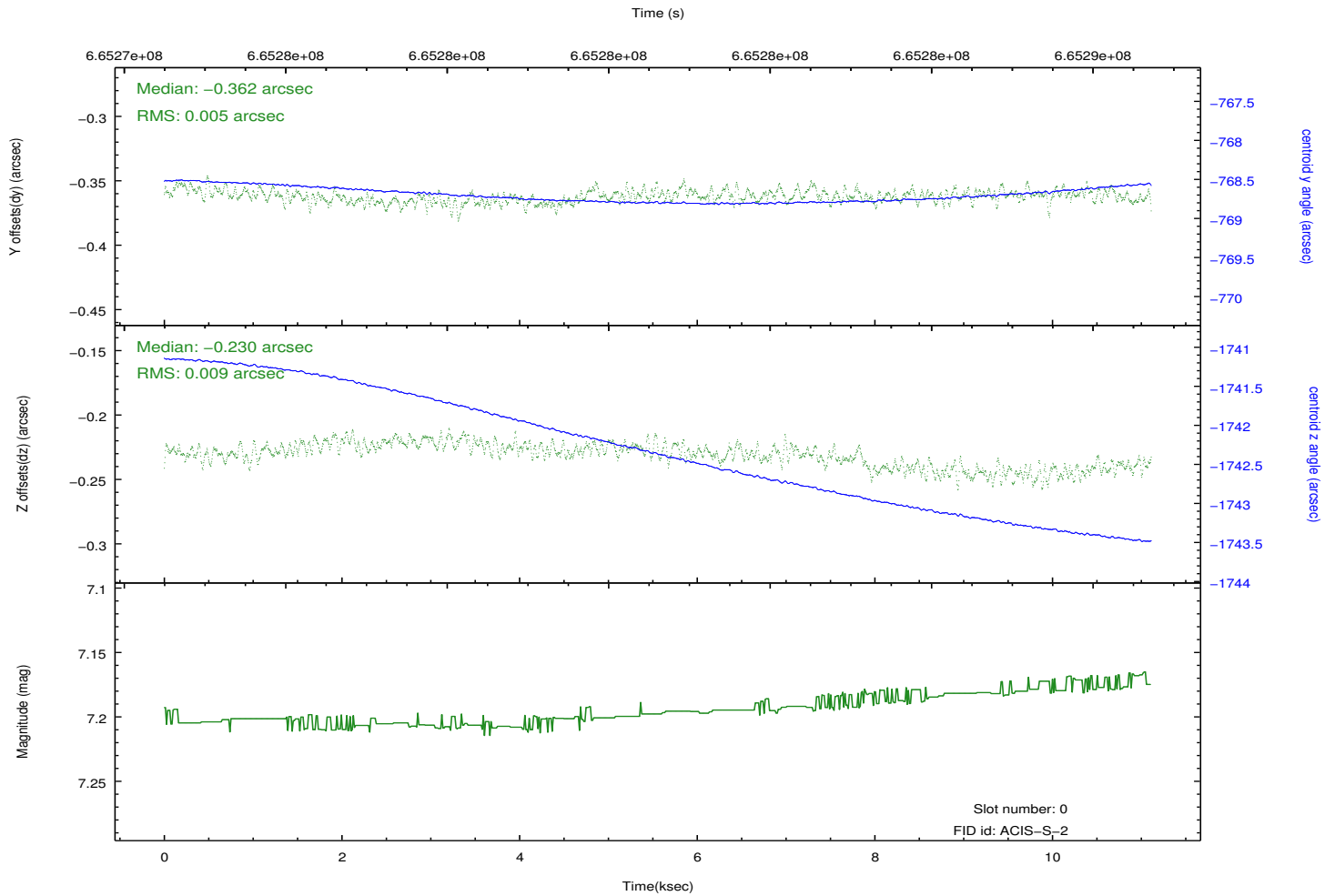
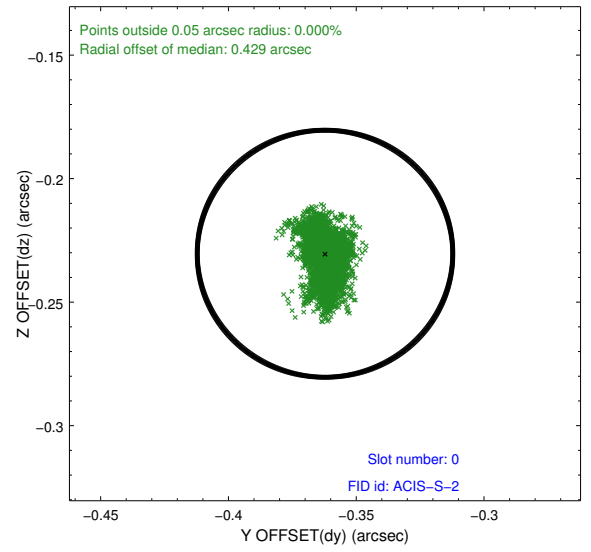
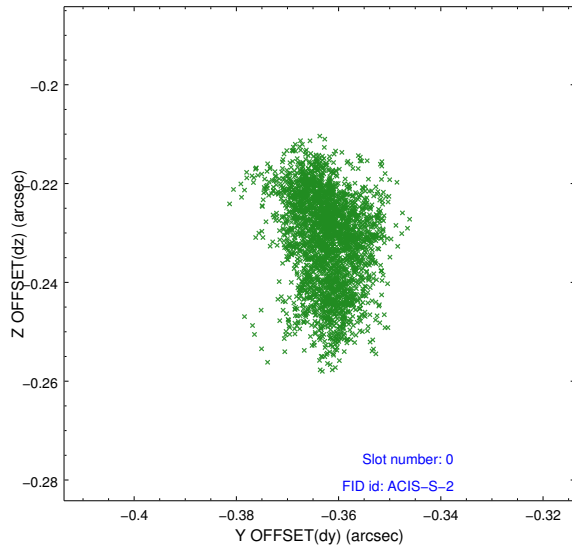


## 2.4.5 Slot 7

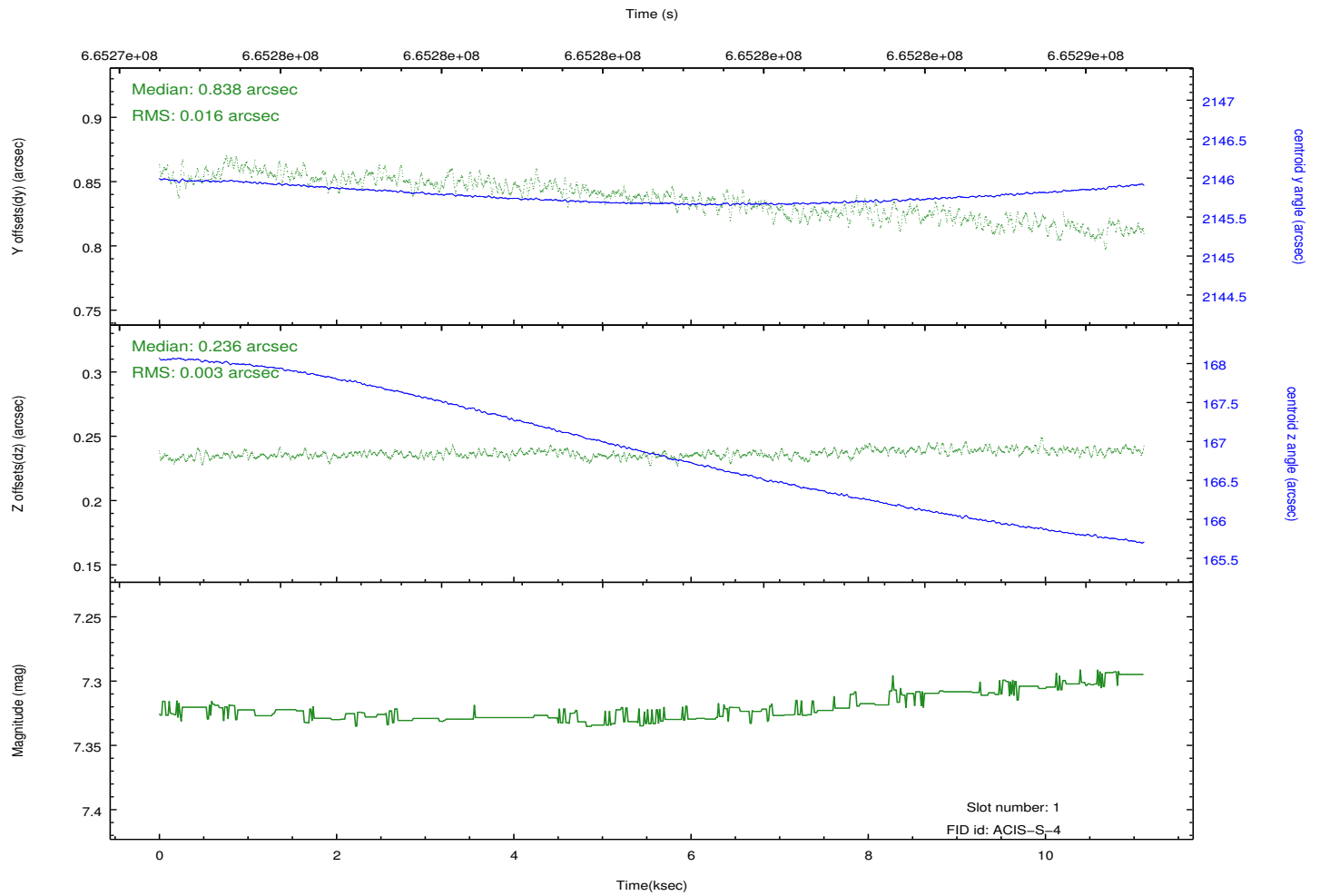
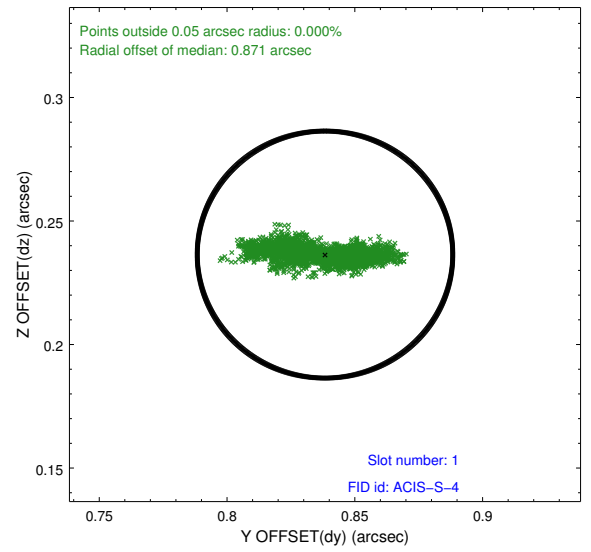
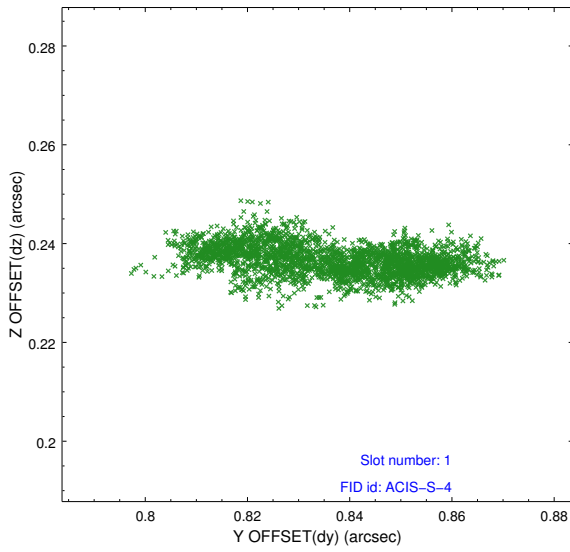


## 2.5 FID Slots

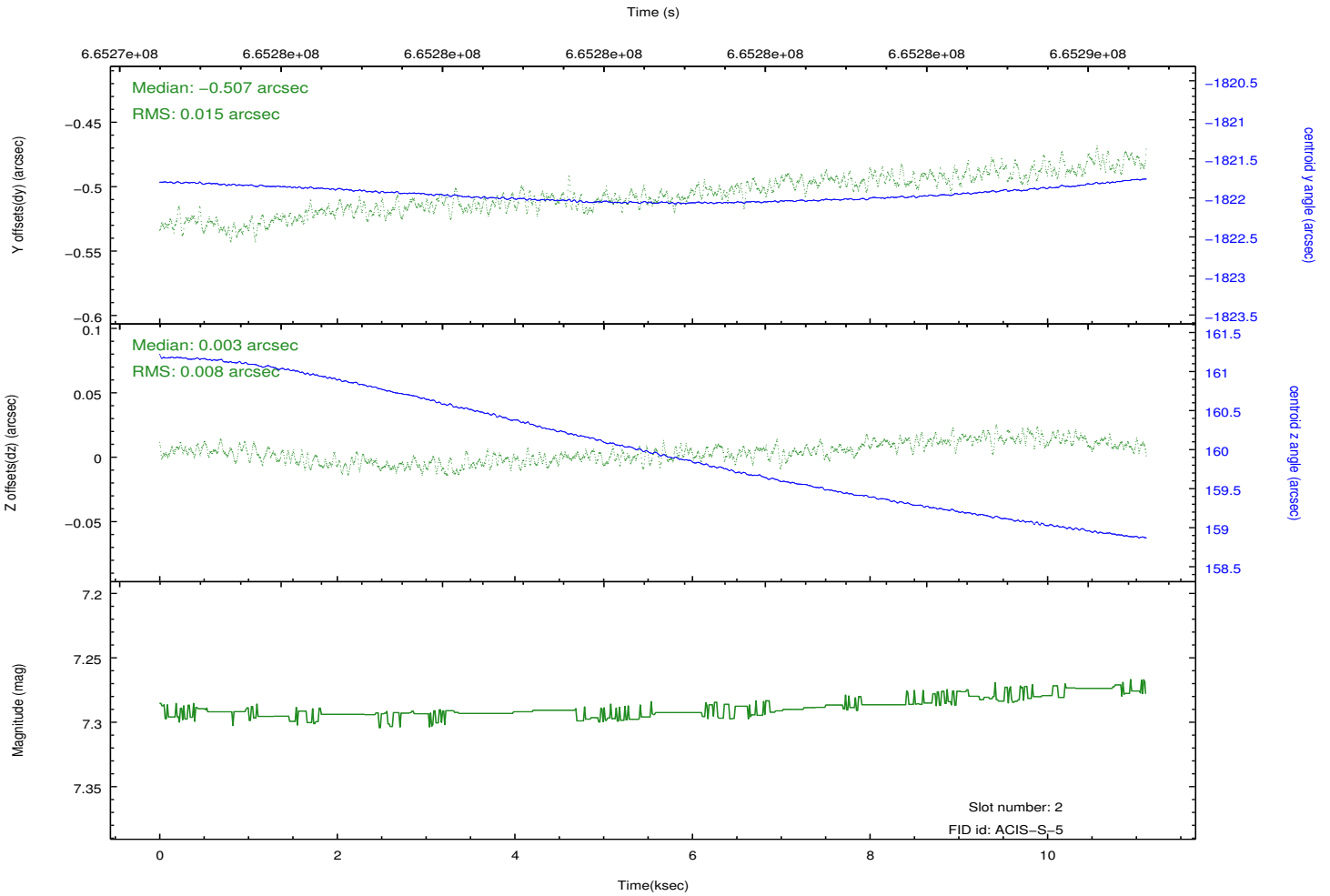
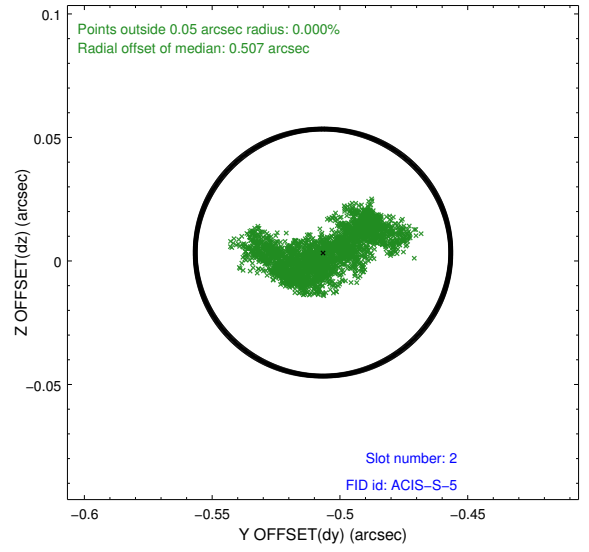
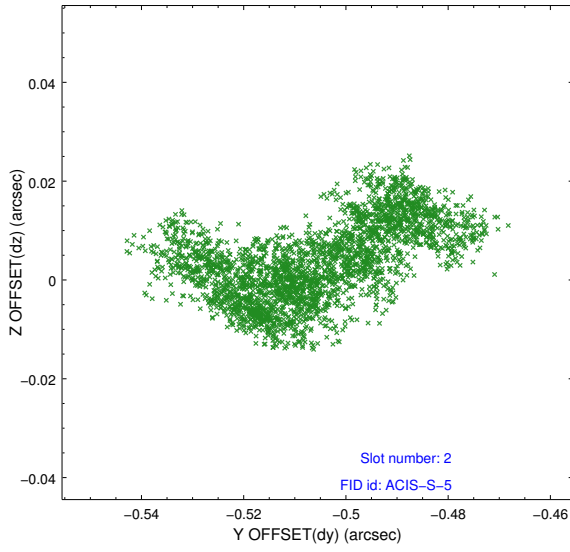
### 2.5.1 Slot 0



## 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)	2019.02.01
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	11.107300085545

## 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.