

V&V Reference Report

L2 ASCDS Version : 10.8

Observation 22678 - L2 Version 1
Chandra X-Ray Center

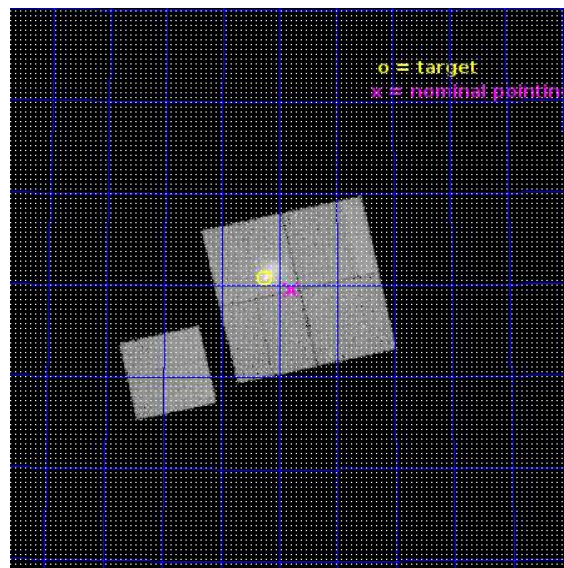
L2 Processing Date : Aug 4 2019

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1 Front

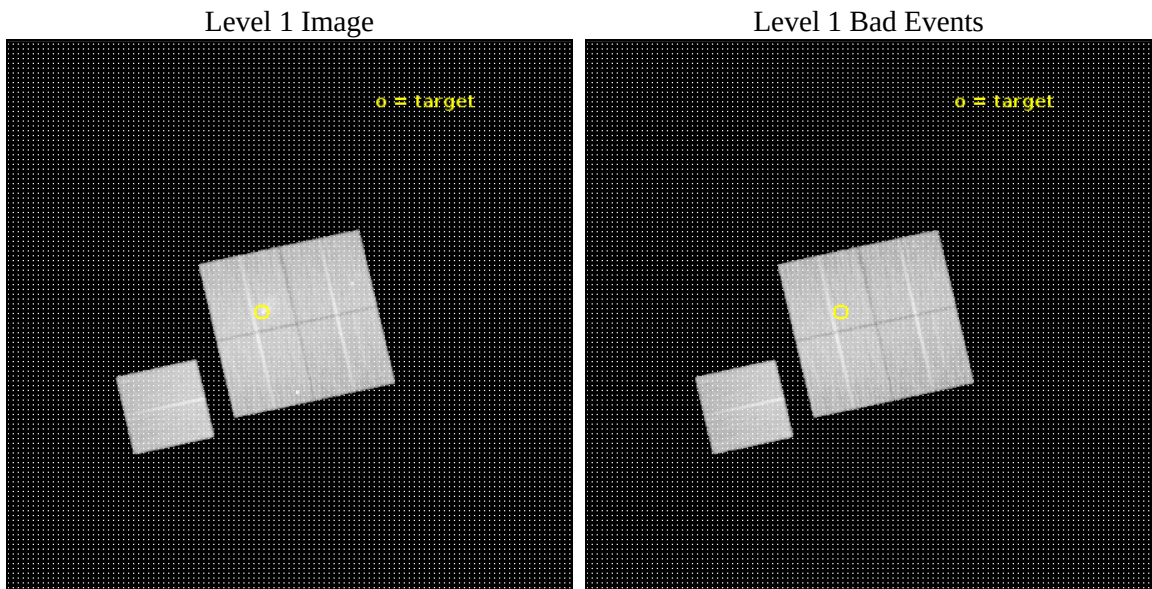
seq_num	801762	Sequence number
obs_id	22678	Observation id
title	Shock structure, the electron-ion equilibration timescale and the disintegrating cool core in A2146	Proposal title
observer	Helen Russell	Principal investigator
object	Abell 2146	Source name
dtcycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	239.06125	Observer's specified target RA [deg]
dec_targ	66.346917	Observer's specified target Dec [deg]
ra_nom	238.9465572926	Nominal RA [deg]
dec_nom	66.326064277713	Nominal Dec [deg]
roll_nom	257.31375587646	Nominal Roll [deg]
revision	1	Processing version of data
ontime	40058.118417263	Sum of GTIs [s]
livetime	39534.729609784	Livetime [s]
ontime0	40061.259248018	Sum of GTIs [s]
ontime1	40061.259208083	Sum of GTIs [s]
ontime2	40058.118237138	Sum of GTIs [s]
ontime3	40058.118417263	Sum of GTIs [s]
ontime6	40061.259238005	Sum of GTIs [s]
l2events	164172	Number of level 2 events



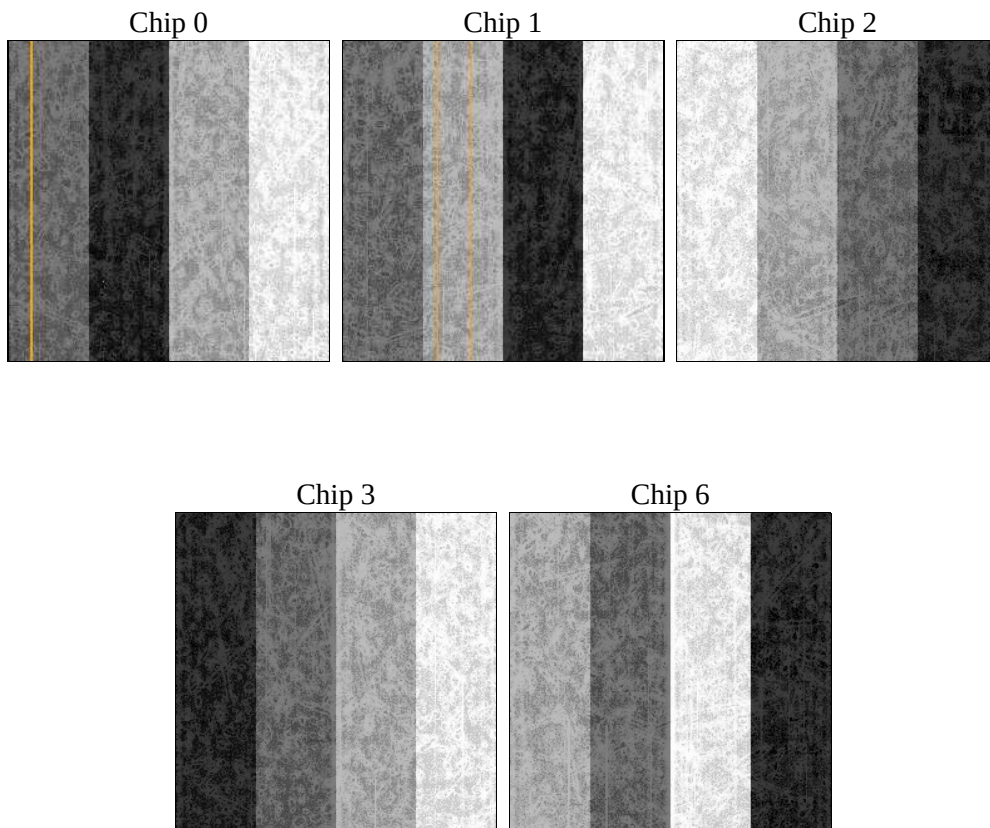
2 OBI

2.1 OBI

2.1.1 Images



2.1.2 Bias



2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	40000.000000	[s] Scheduled observation exposure time
ascdsver	10.8	Processing system revision	ontime	40058.118417263	Sum of GTIs [s]
caldsver	4.8.3.1	 	ontime0	40061.259248018	Sum of GTIs [s]
date	2019-08-04T05:11:42	Date and time of file creation	ontime1	40061.259208083	Sum of GTIs [s]
revision	1	Processing version of data	ontime2	40058.118237138	Sum of GTIs [s]
			ontime3	40058.118417263	Sum of GTIs [s]
			ontime6	40061.259238005	Sum of GTIs [s]
			l1events	1560188	Number of level 1 events

2.1.4 Events

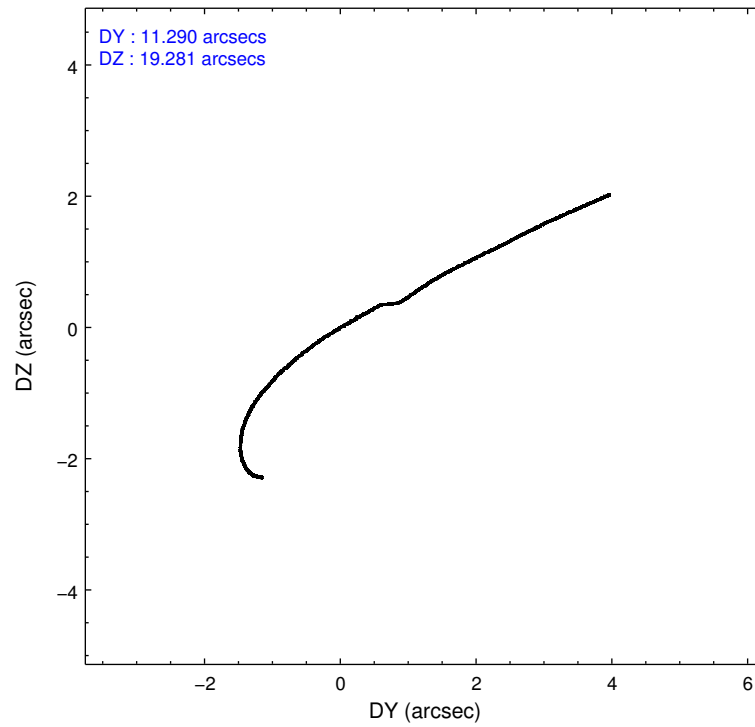
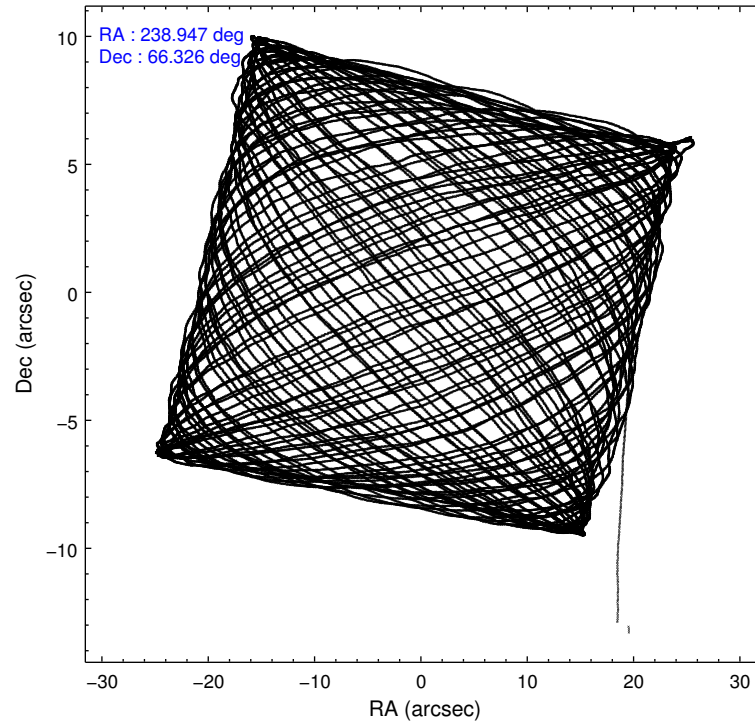
	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
level 1 events	283793	291771	329207	334208	321209
rejected events	248934	252330	294069	283195	286775
rejected %	87%	86%	89%	84%	89%

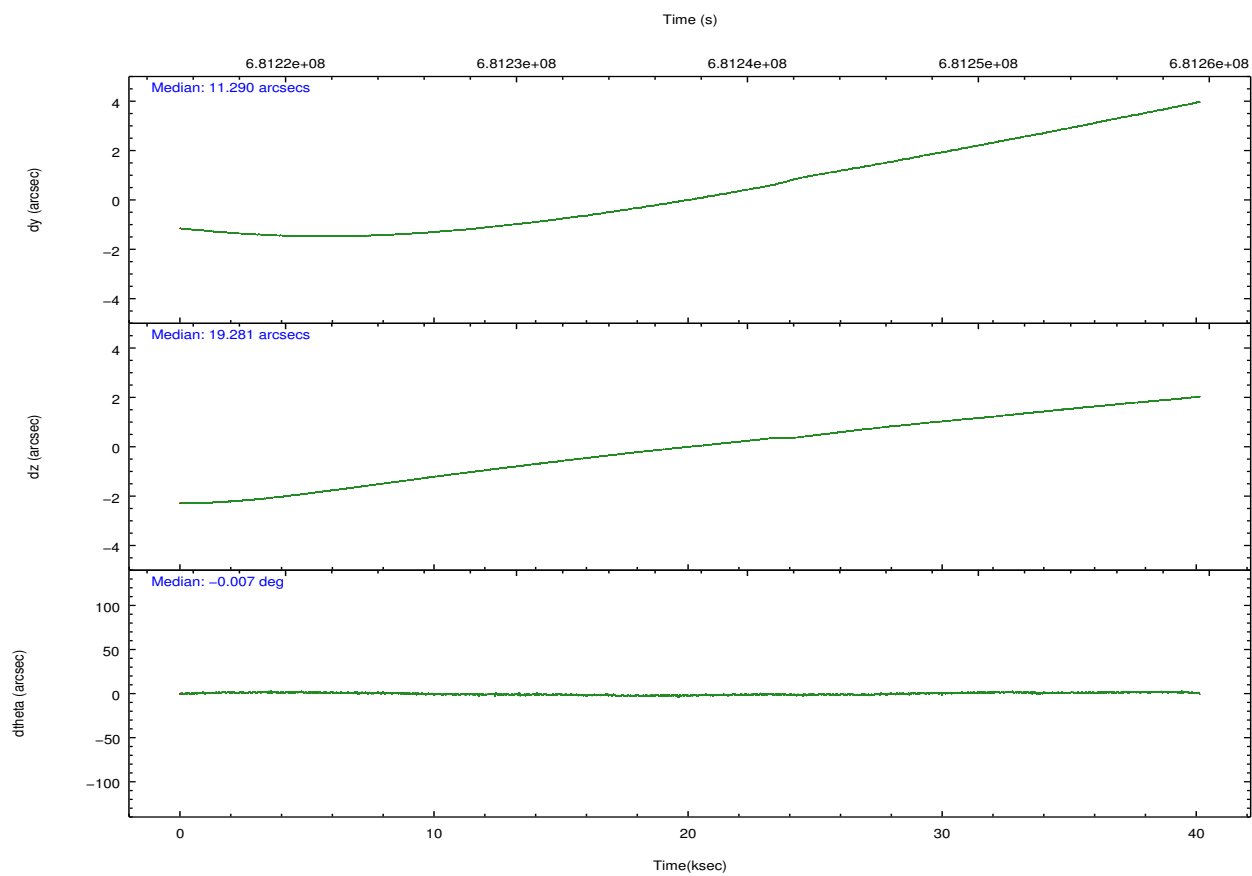
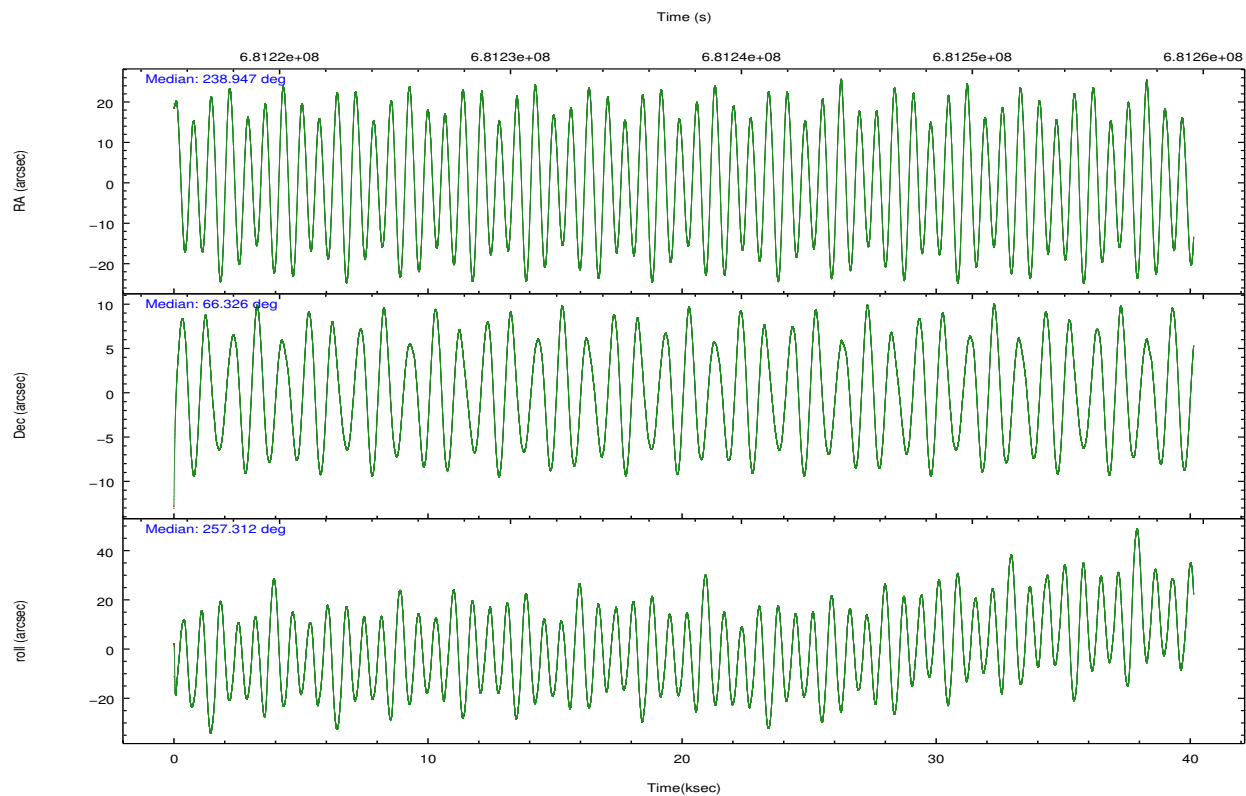
	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
grade 0 events	11743	13311	13754	26177	10368
	4%	4%	4%	7%	3%
grade 1 events	157	119	213	275	161
	0%	0%	0%	0%	0%
grade 2 events	9159	10746	8360	9392	9093
	3%	3%	2%	2%	2%
grade 3 events	3395	3291	3109	3839	2969
	1%	1%	0%	1%	0%
grade 4 events	3121	3199	3235	3957	3076
	1%	1%	0%	1%	0%
grade 5 events	12216	13009	11548	14472	13306
	4%	4%	3%	4%	4%
grade 6 events	7447	8900	6685	7660	8934
	2%	3%	2%	2%	2%
grade 7 events	236555	239196	282303	268436	273302
	83%	81%	85%	80%	85%

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	238.925834	238.9465572925957	CCD I2 on	Y	Y
[deg] Pointing Dec	66.352384	66.32606427771293	CCD I3 on	Y	Y
[deg] Pointing Roll	257.124043	257.3137558764587	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)	681217595.184000	681216308.5091	CCD S5 on	N	N
Observation start date	2019-08-03T11:05:26	2019-08-03T10:45:08	Number of optional ACIS chips dropped	0	0
[s] Observation end time (MET)	681257595.184000	681258306.8616199	On-chip summing requested	N	N
Observation end date	2019-08-03T22:12:06	2019-08-03T22:25:06	Subarray requested	NONE	NONE
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	3.1

2.3 Aspect



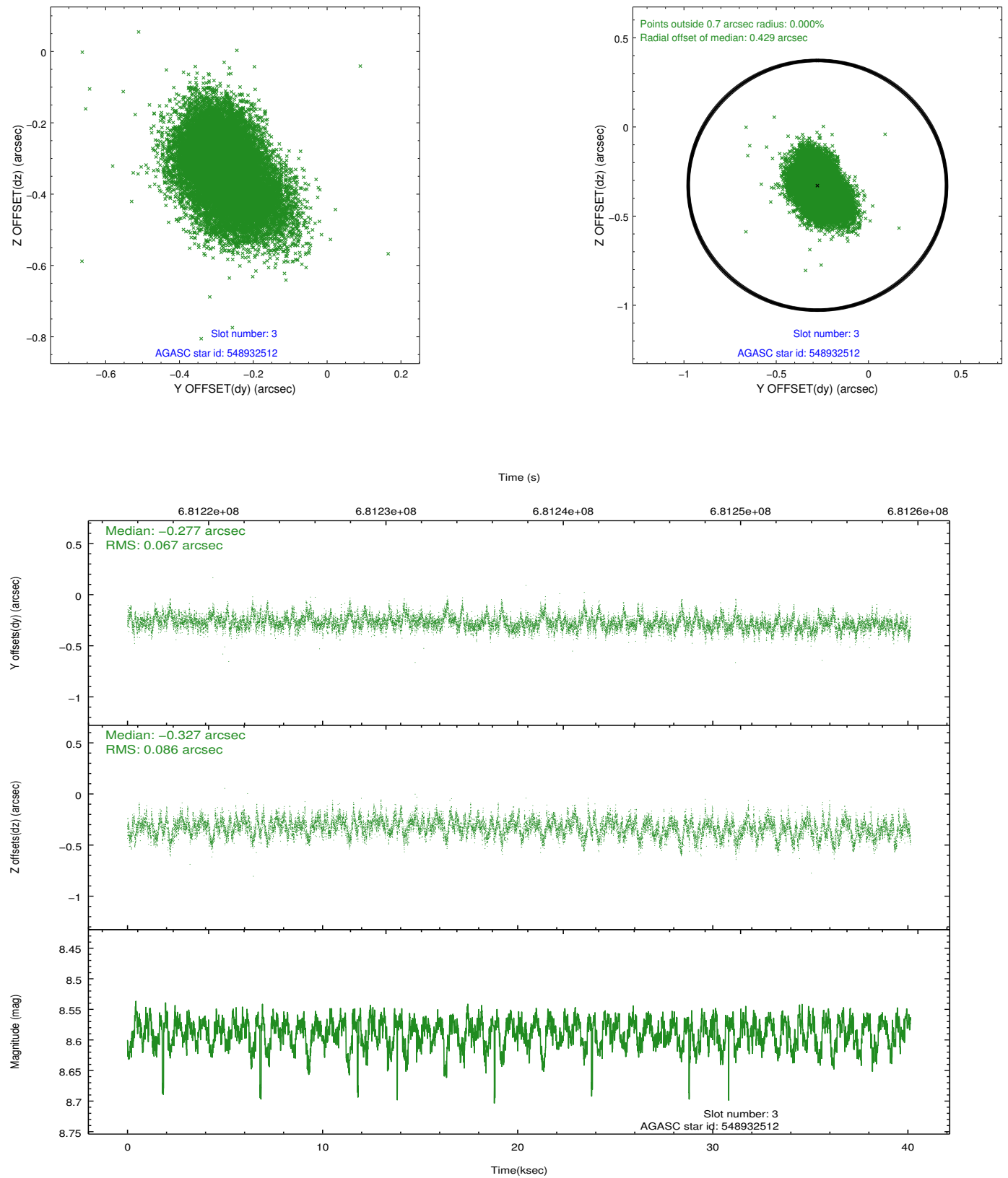


Slot Statistics

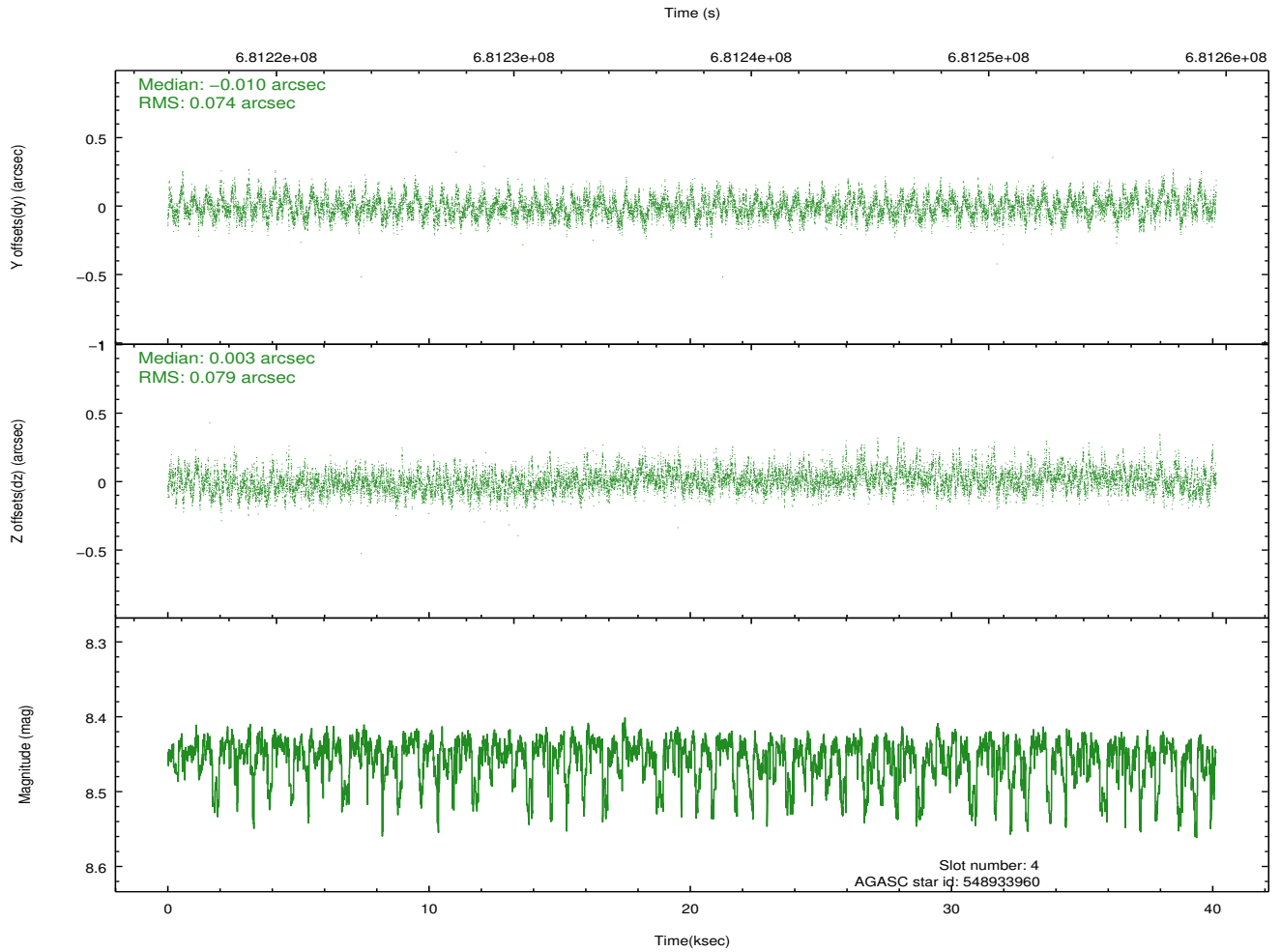
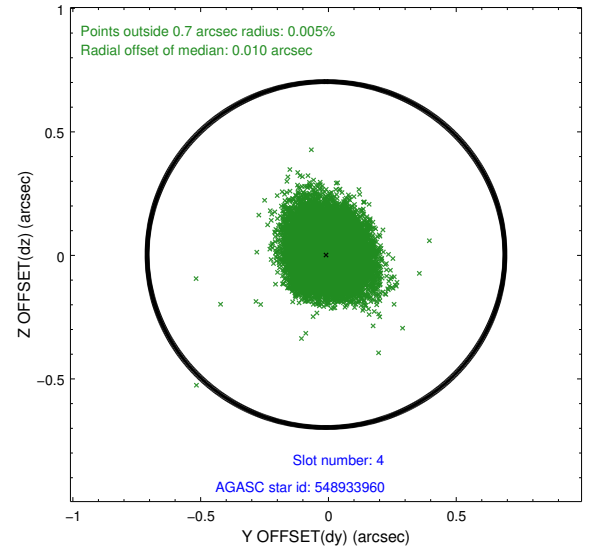
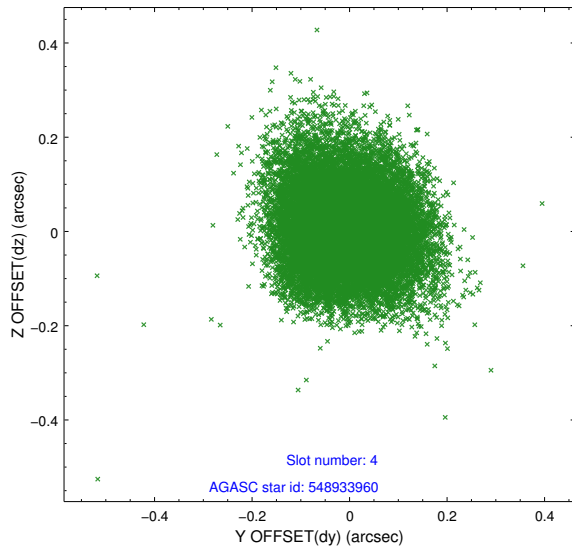
pt	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-I-1	7.29	9790	1.000	0.118	-0.097	0.036	0.057	0.000000	0.000000	927.99	-842
1	FID		ACIS-I-5	7.25	9788	1.000	-0.474	0.035	0.017	0.032	0.000000	0.000000	-1820.86	1054
2	FID		ACIS-I-6	7.26	9787	1.000	0.264	0.133	0.036	0.056	0.000000	0.000000	393.46	1699
3	GUIDE	used	548932512	8.59	19564	1.000	-0.277	-0.327	0.114	0.195	239.727627	66.054972	775.06	1378
4	GUIDE	used	548933960	8.45	19565	1.000	-0.010	0.003	0.114	0.188	237.671184	66.428675	118.87	-1825
5	OMITTED			0.00	0	0.000	0.000	0.000	0.000	0.000	0.000000	0.000000	0.00	0
6	GUIDE	used	548937184	9.84	19540	1.000	0.324	0.256	0.239	0.394	238.771821	66.565432	-698.09	-385
7	GUIDE	used	549849072	9.16	19564	1.000	-0.038	0.058	0.151	0.252	240.420863	66.802816	-2077.48	1699

2.4 Star Slots

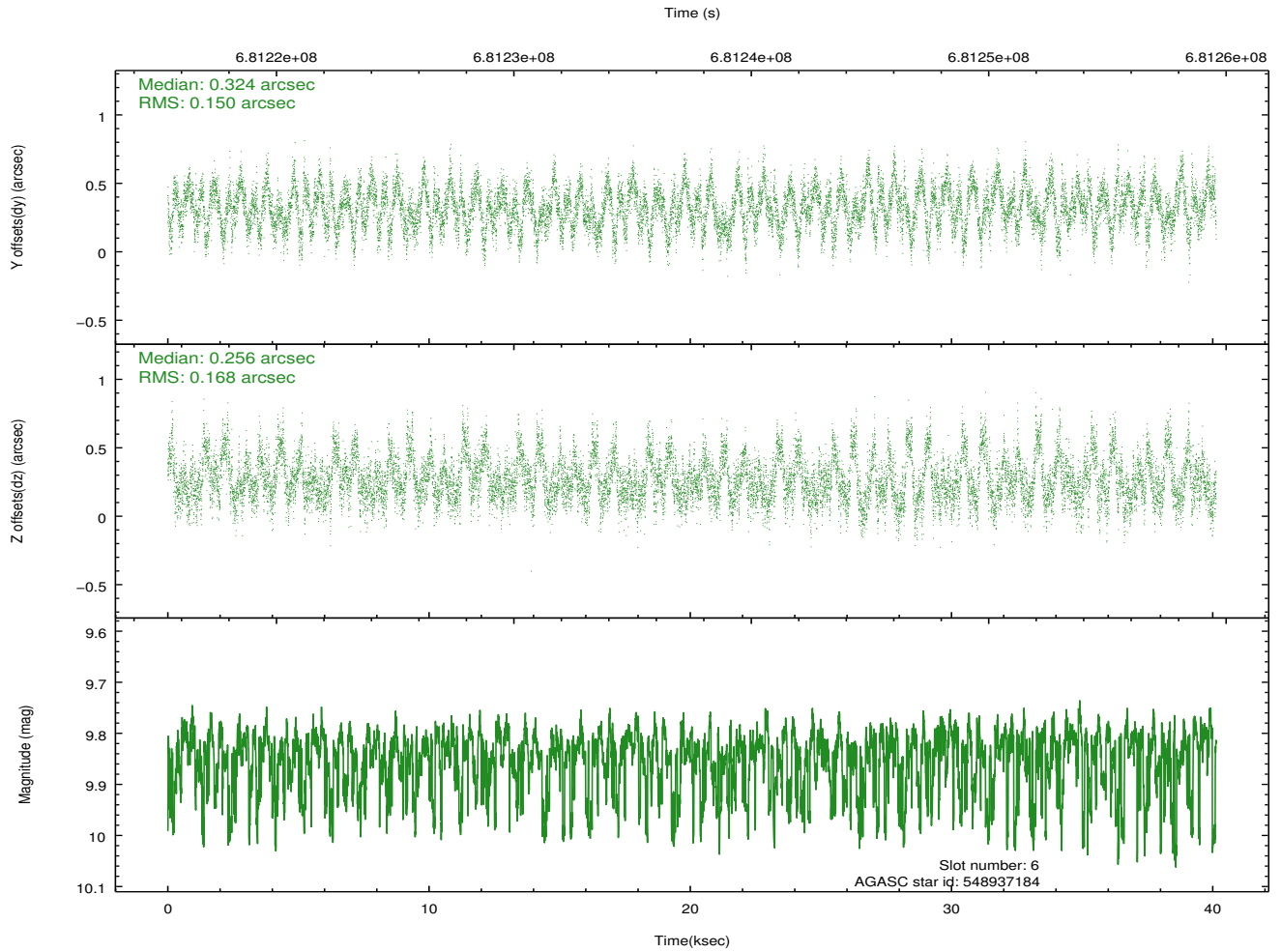
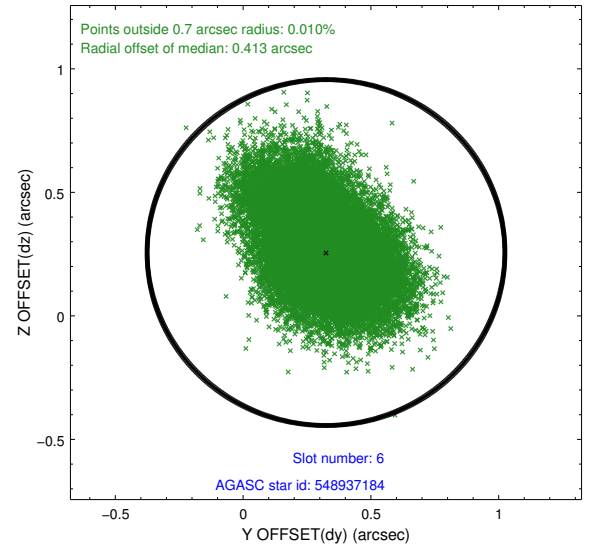
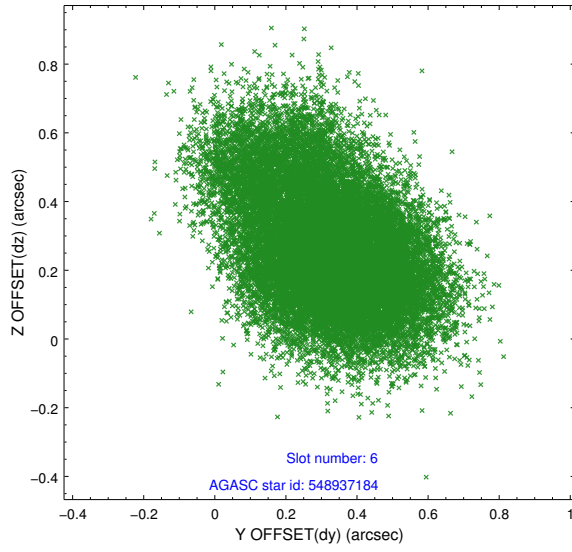
2.4.1 Slot 3



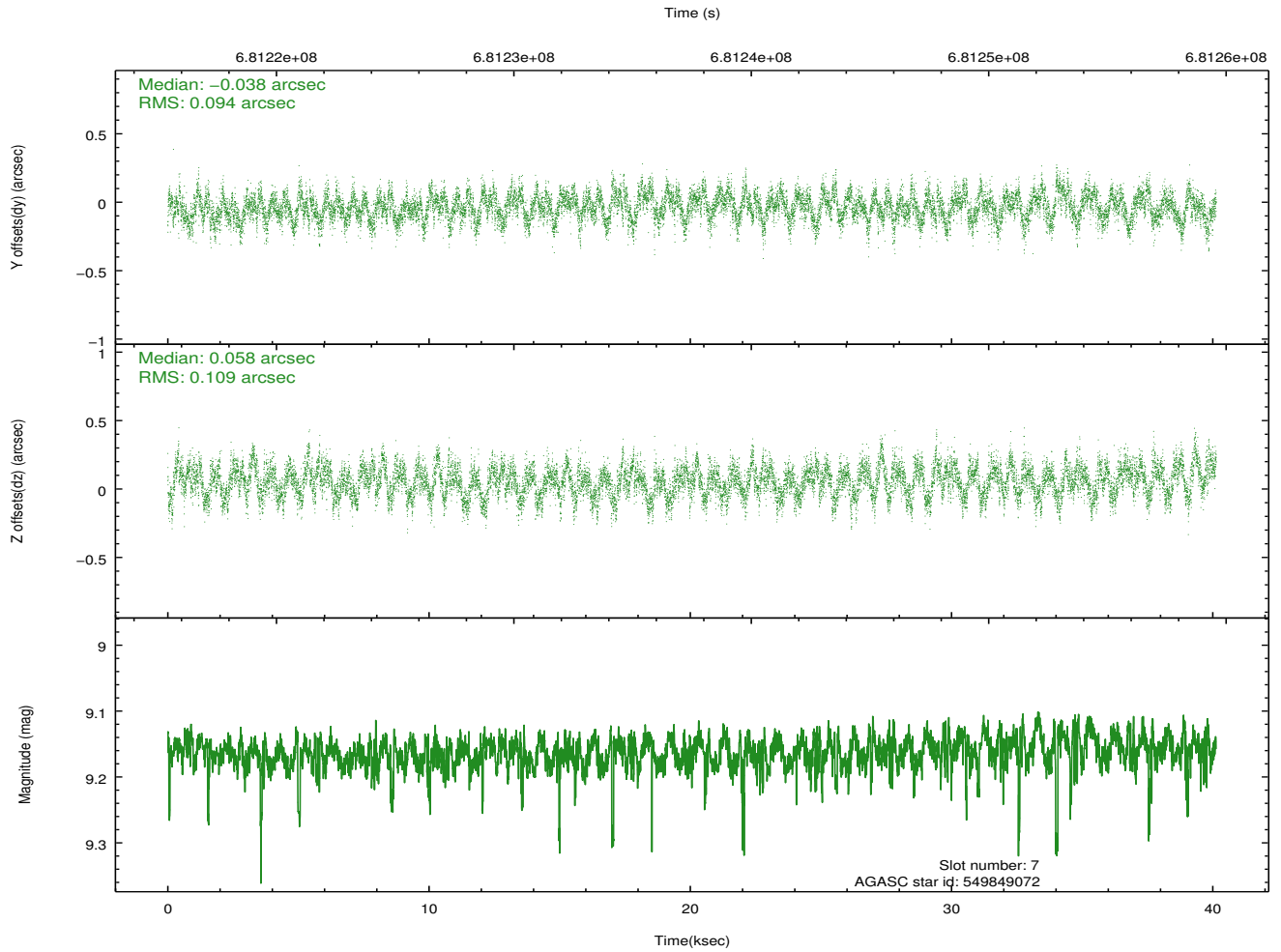
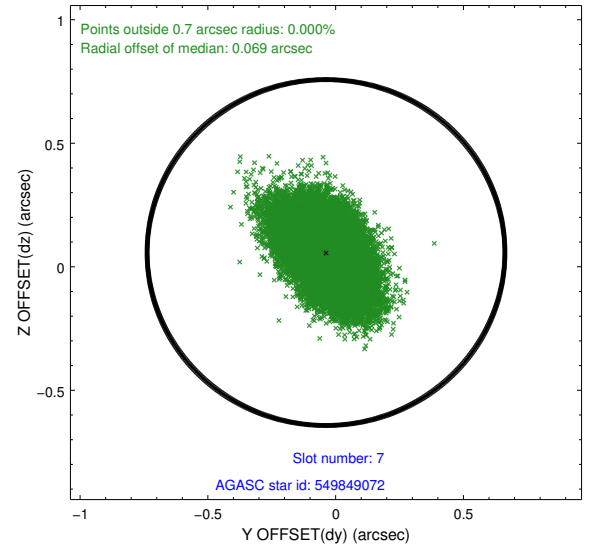
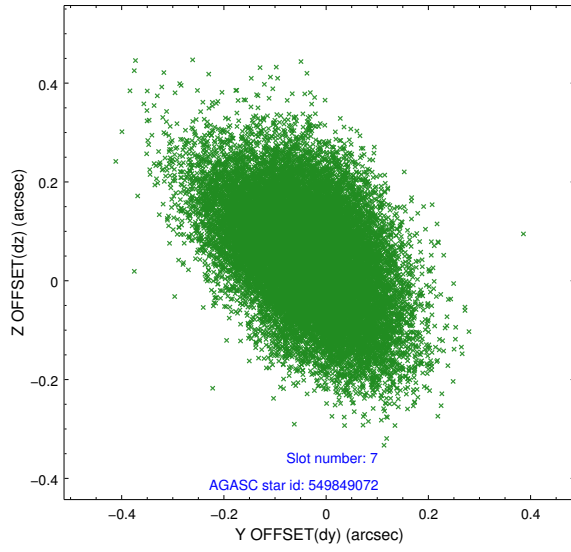
2.4.2 Slot 4



2.4.3 Slot 6

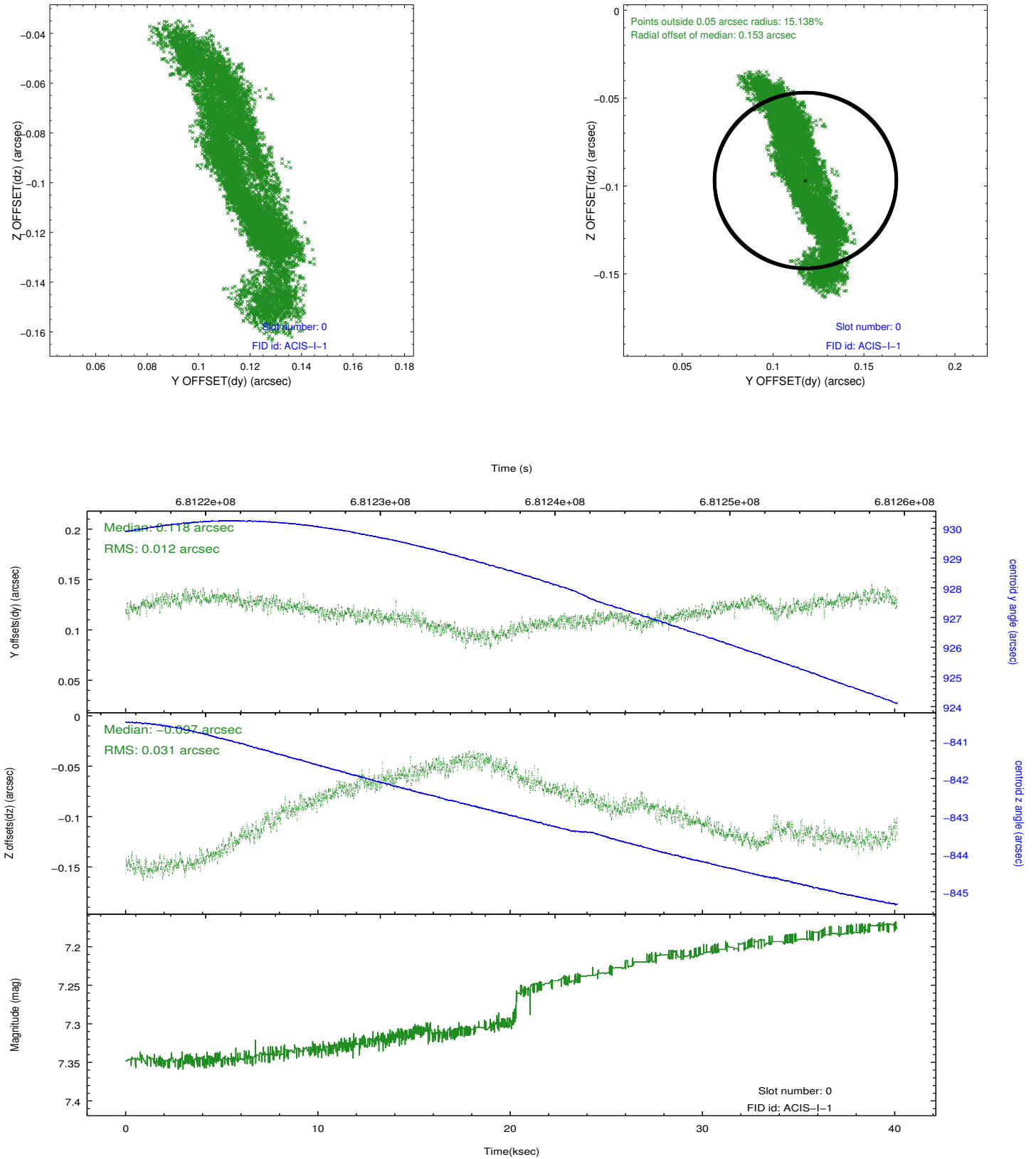


2.4.4 Slot 7

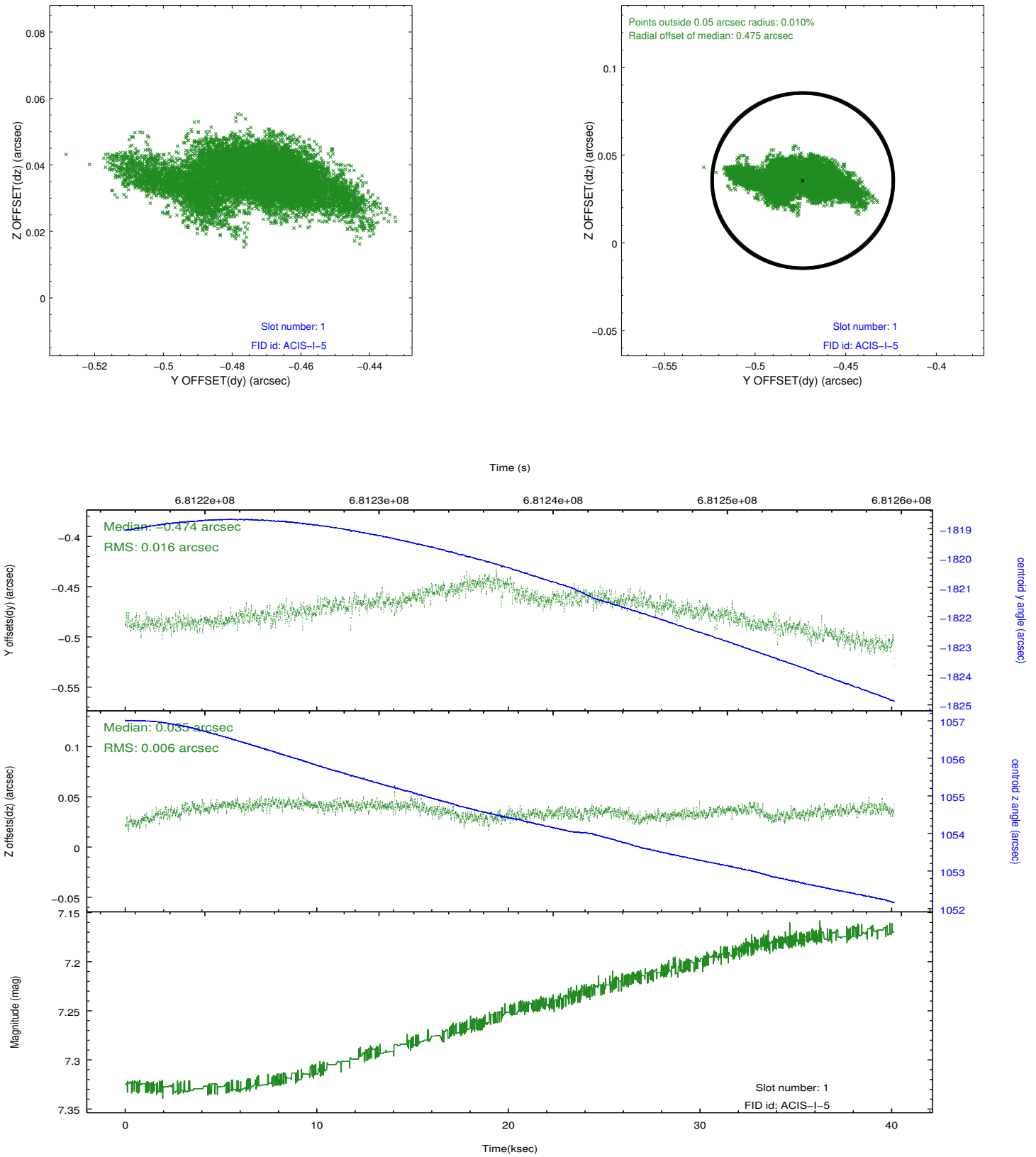


2.5 FID Slots

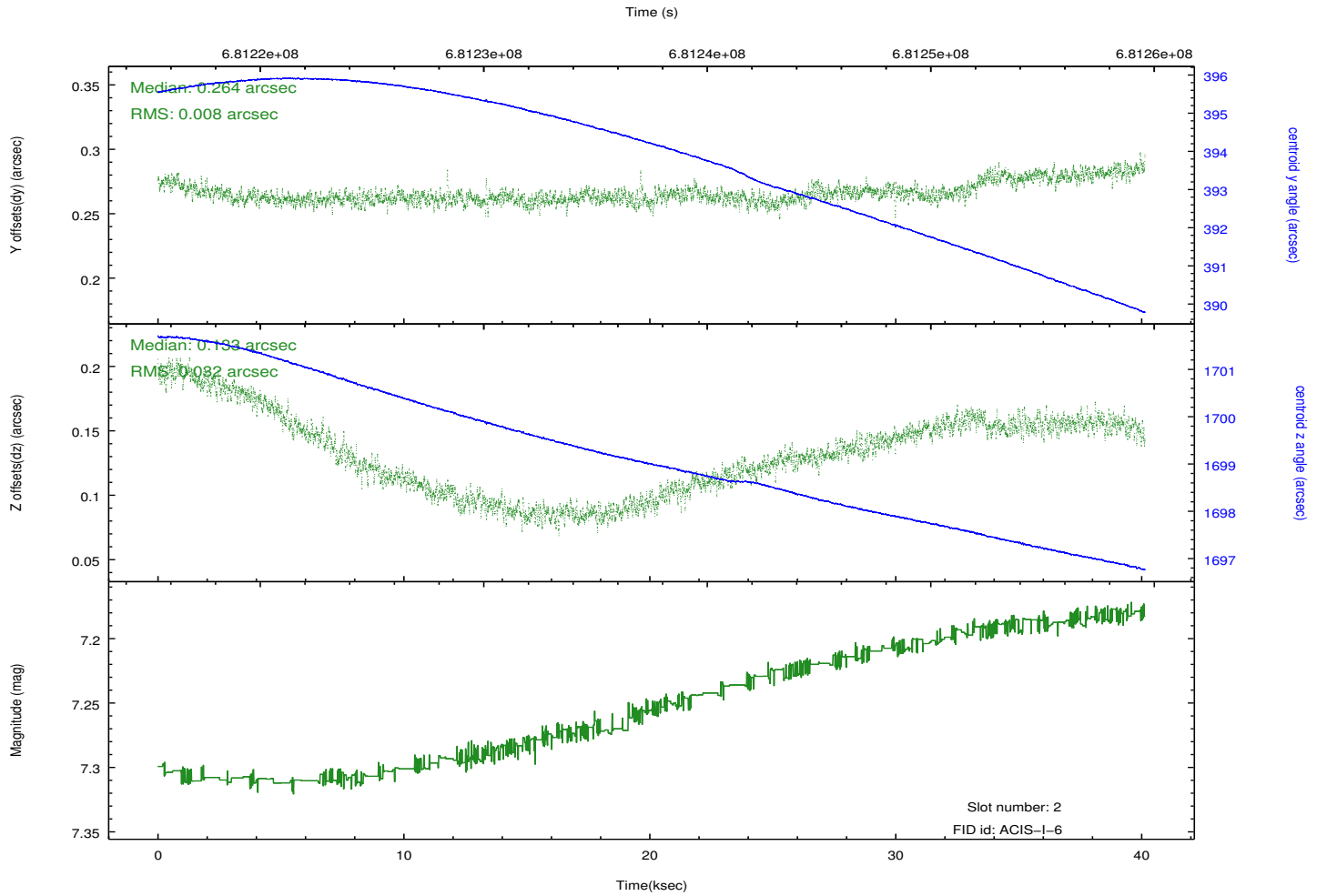
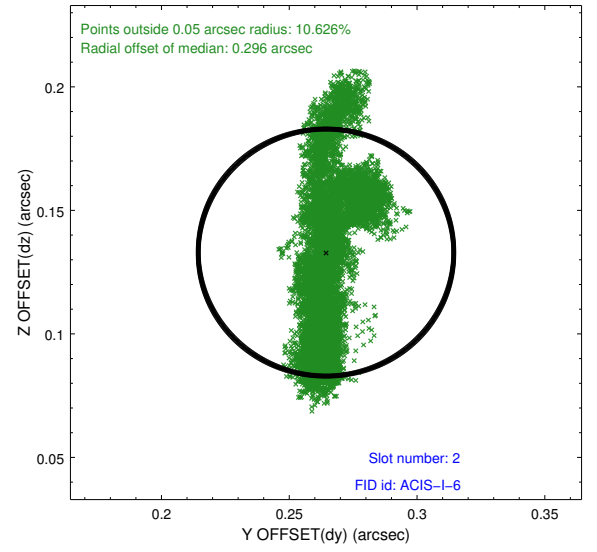
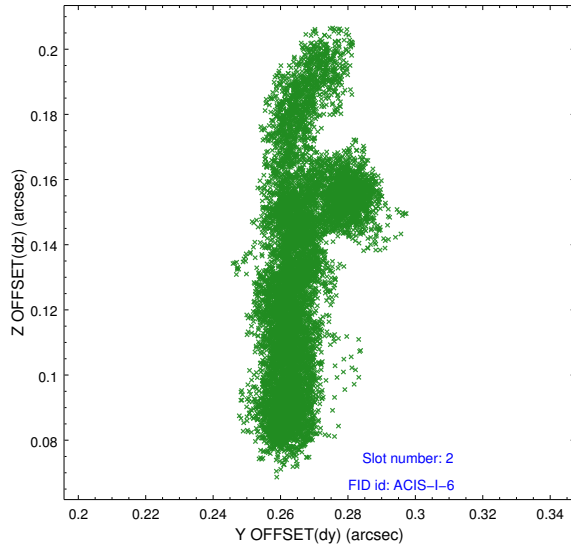
2.5.1 Slot 0



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)	2020.04.02
V&V Edition	2
V&V Disposition and Status	OK
V&V Charge Time	40.058118417263

A.2 Comments

The guide star in slot 5 was removed from the aspect solution due to poor data quality. The aspect solution is improved by the removal of this slot from the solution.

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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., -112.0 C for ACIS-I).

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/A_CIS_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.