

V&V Reference Report

L2 ASCDS Version : 10.7.1

Observation 20915 - L2 Version 1
Chandra X-Ray Center

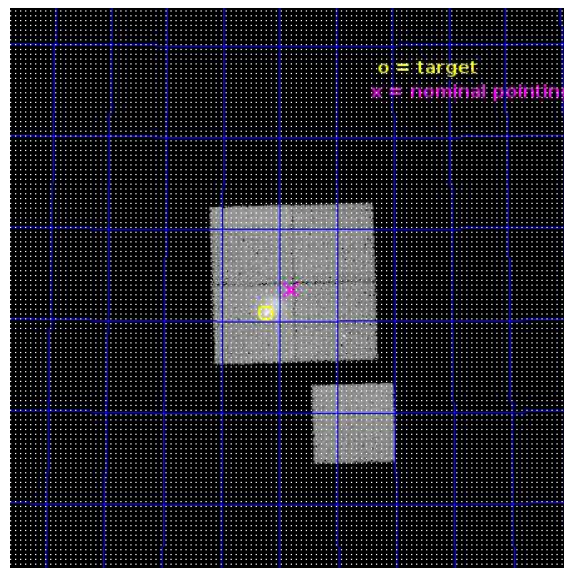
L2 Processing Date : May 21 2019

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1 Front

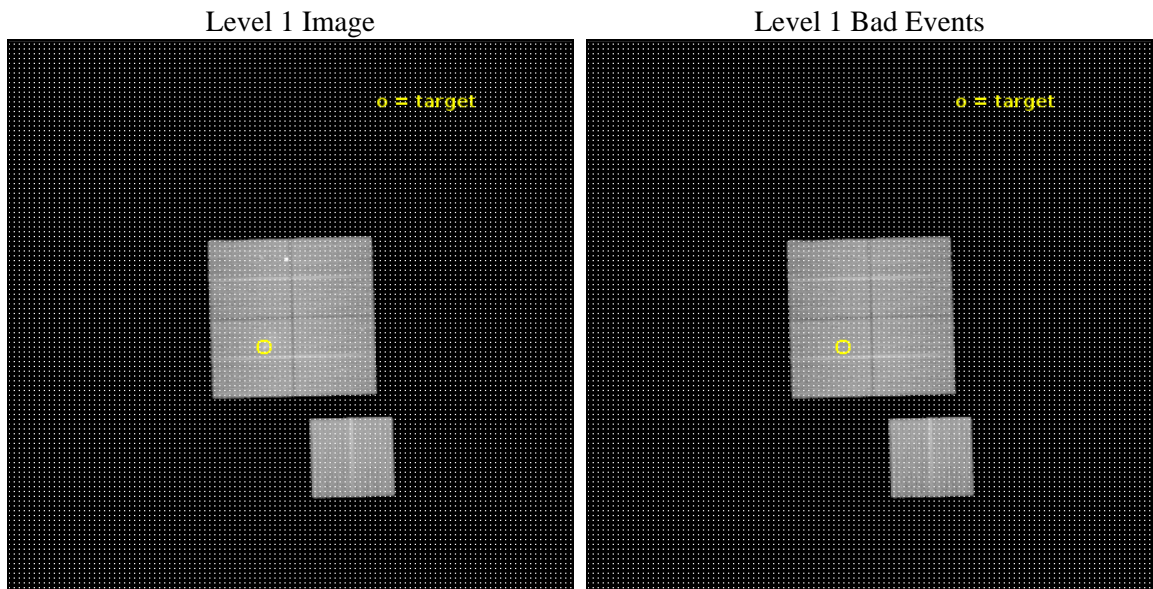
seq_num	801762	Sequence number
obs_id	20915	Observation id
title	Shock structure, the electron-ion equilibration timescale and the disintegrating cool core in A2146	Proposal title
observer	Helen Russell	Principal investigator
object	Abell 2146	Source name
dtcycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	239.06125	Observer's specified target RA [deg]
dec_targ	66.346917	Observer's specified target Dec [deg]
ra_nom	238.94788446982	Nominal RA [deg]
dec_nom	66.390536218528	Nominal Dec [deg]
roll_nom	178.31257851647	Nominal Roll [deg]
revision	1	Processing version of data
ontime	37066.700285196	Sum of GTIs [s]
livetime	36582.396557862	Livetime [s]
ontime0	37060.418224335	Sum of GTIs [s]
ontime1	37066.700285196	Sum of GTIs [s]
ontime2	37050.995203733	Sum of GTIs [s]
ontime3	37066.700285196	Sum of GTIs [s]
ontime6	37060.418294787	Sum of GTIs [s]
l2events	145790	Number of level 2 events



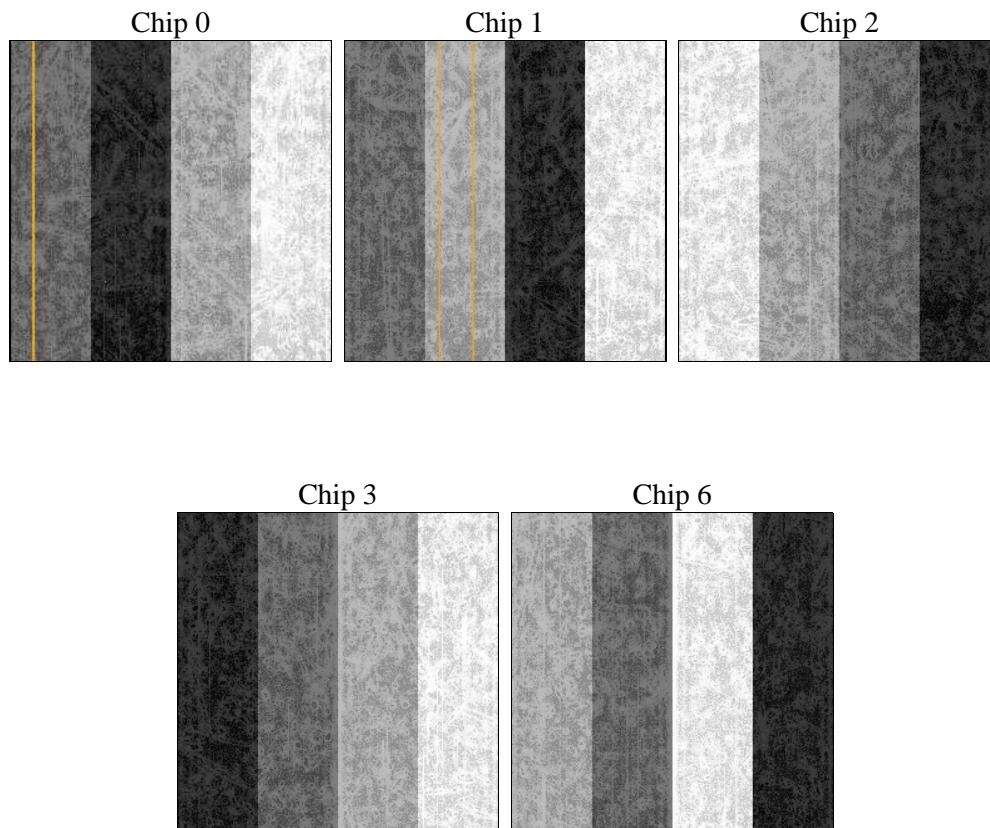
2 OBI

2.1 OBI

2.1.1 Images



2.1.2 Bias



2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	37000.000000	[s] Scheduled observation exposure time
ascdsver	10.7.1	Processing system revision	ontime	37066.700285196	Sum of GTIs [s]
caldbver	4.8.2	 	ontime0	37060.418224335	Sum of GTIs [s]
date	2019-05-21T05:43:18	Date and time of file creation	ontime1	37066.700285196	Sum of GTIs [s]
revision	1	Processing version of data	ontime2	37050.995203733	Sum of GTIs [s]
			ontime3	37066.700285196	Sum of GTIs [s]
			ontime6	37060.418294787	Sum of GTIs [s]
			l1events	1379988	Number of level 1 events

2.1.4 Events

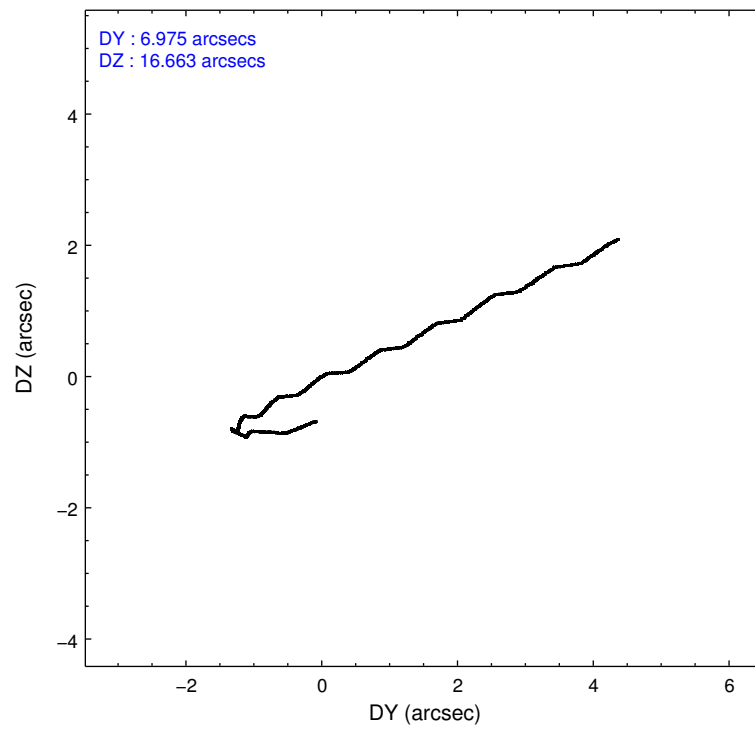
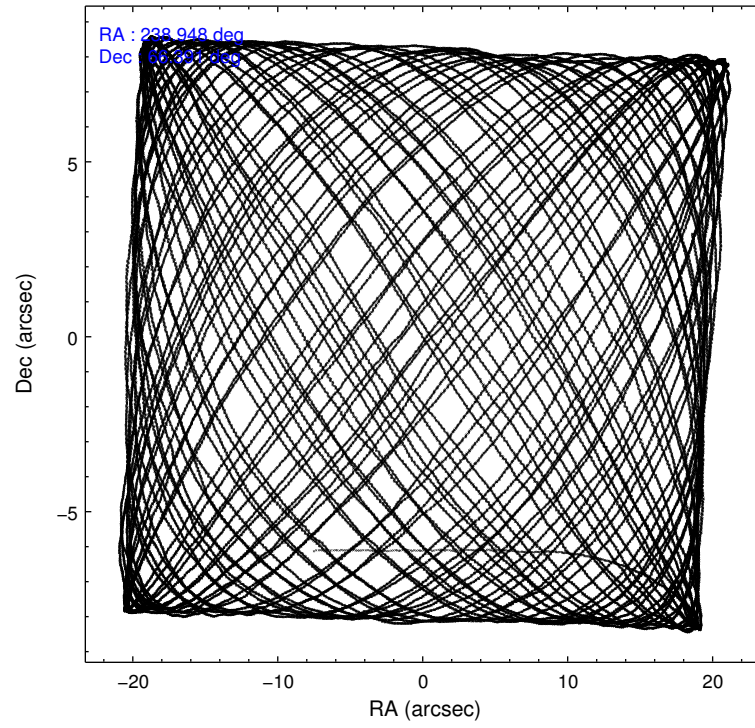
	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
level 1 events	254915	272005	285310	288137	279621
rejected events	224627	226363	254861	242216	249347
rejected %	88%	83%	89%	84%	89%

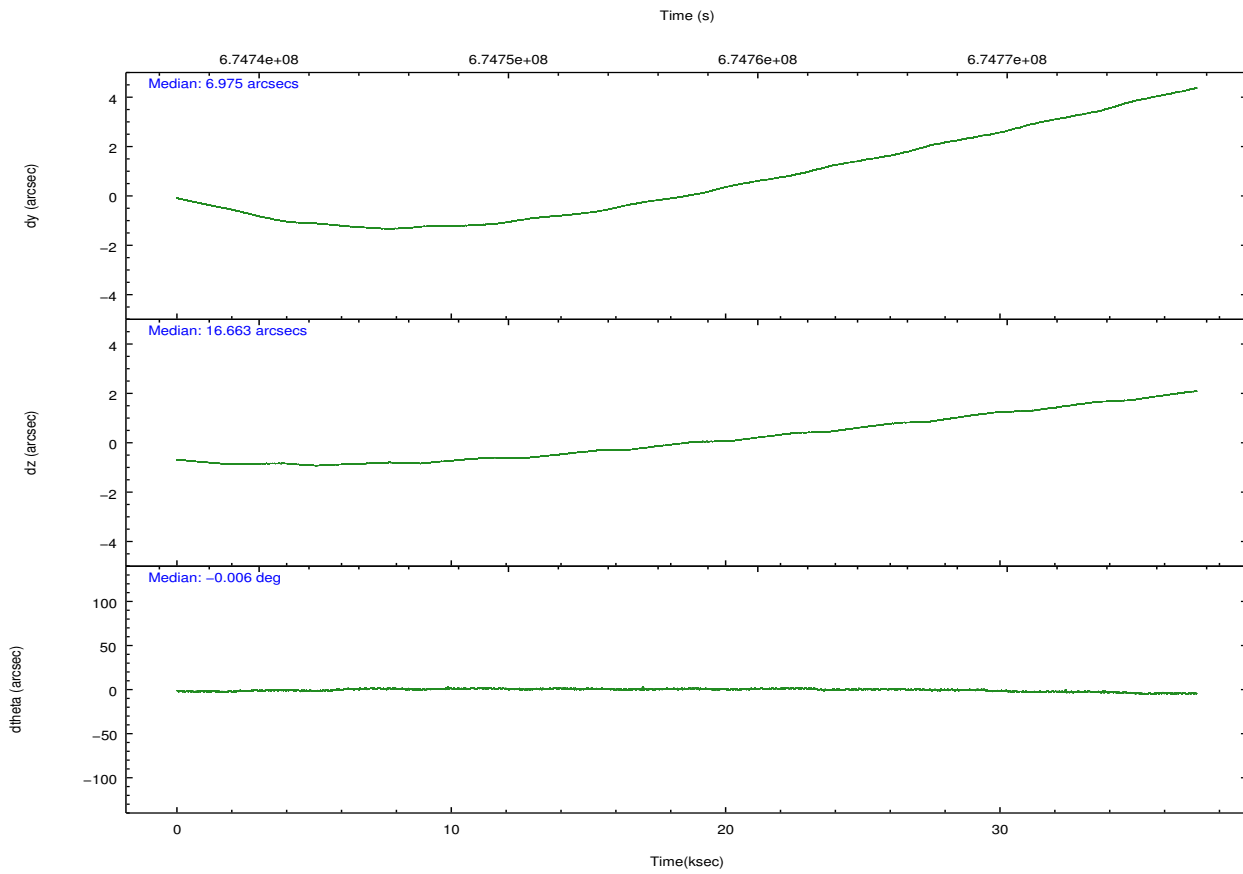
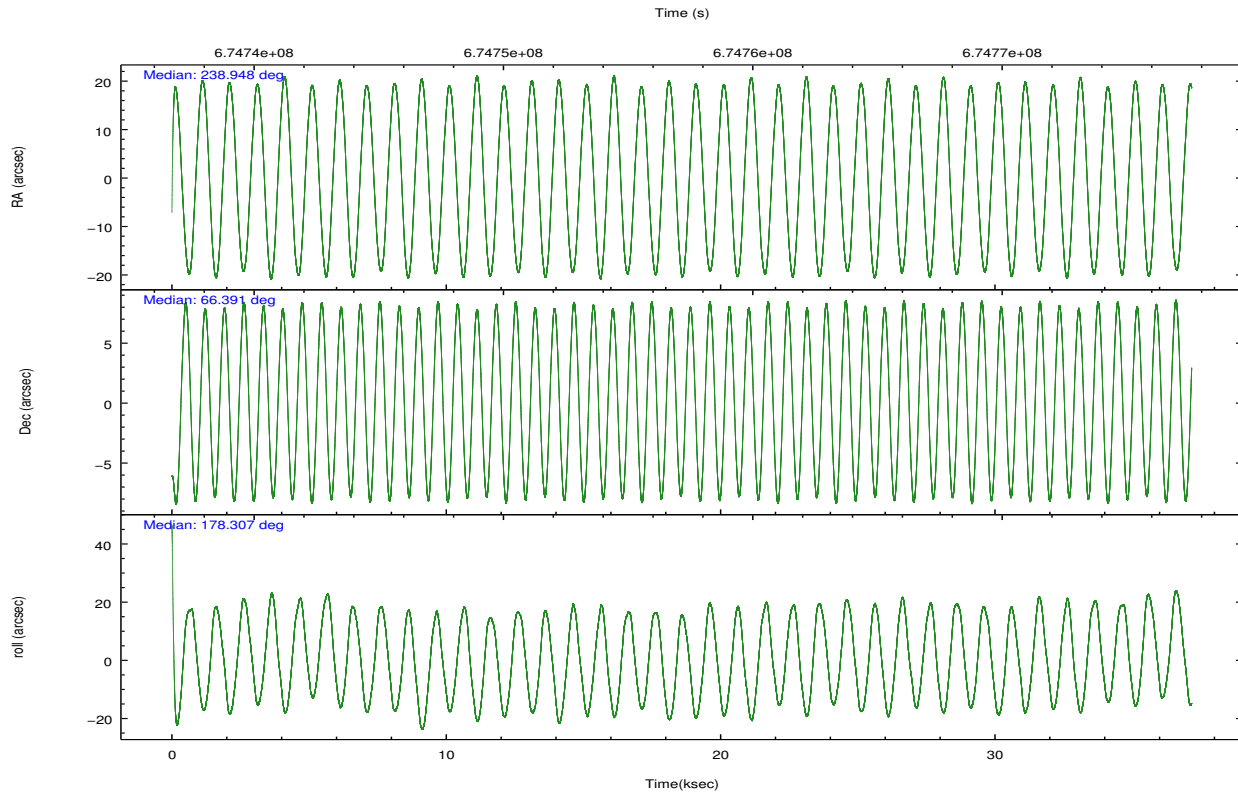
	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
grade 0 events	10099	22405	11120	23792	9552
	3%	8%	3%	8%	3%
grade 1 events	134	171	179	231	134
	0%	0%	0%	0%	0%
grade 2 events	7803	9365	7510	8339	7518
	3%	3%	2%	2%	2%
grade 3 events	3013	3163	2960	3533	2898
	1%	1%	1%	1%	1%
grade 4 events	2878	3008	2962	3513	2745
	1%	1%	1%	1%	0%
grade 5 events	11440	11864	10975	13020	12179
	4%	4%	3%	4%	4%
grade 6 events	6499	7704	5900	6749	7562
	2%	2%	2%	2%	2%
grade 7 events	213049	214325	243704	228960	237033
	83%	78%	85%	79%	84%

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	239.008461	238.9478844698233	CCD I2 on	Y	Y
[deg] Pointing Dec	66.403723	66.39053621852761	CCD I3 on	Y	Y
[deg] Pointing Roll	178.048363	178.3125785164671	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)	674738729.184000	674737713.10777	CCD S5 on	N	N
Observation start date	2019-05-20T11:24:20	2019-05-20T11:08:33	Number of optional ACIS chips dropped	0	0
[s] Observation end time (MET)	674775729.184000	674776382.77259	On-chip summing requested	N	N
Observation end date	2019-05-20T21:41:00	2019-05-20T21:53:02	Subarray requested	NONE	NONE
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	3.1

2.3 Aspect





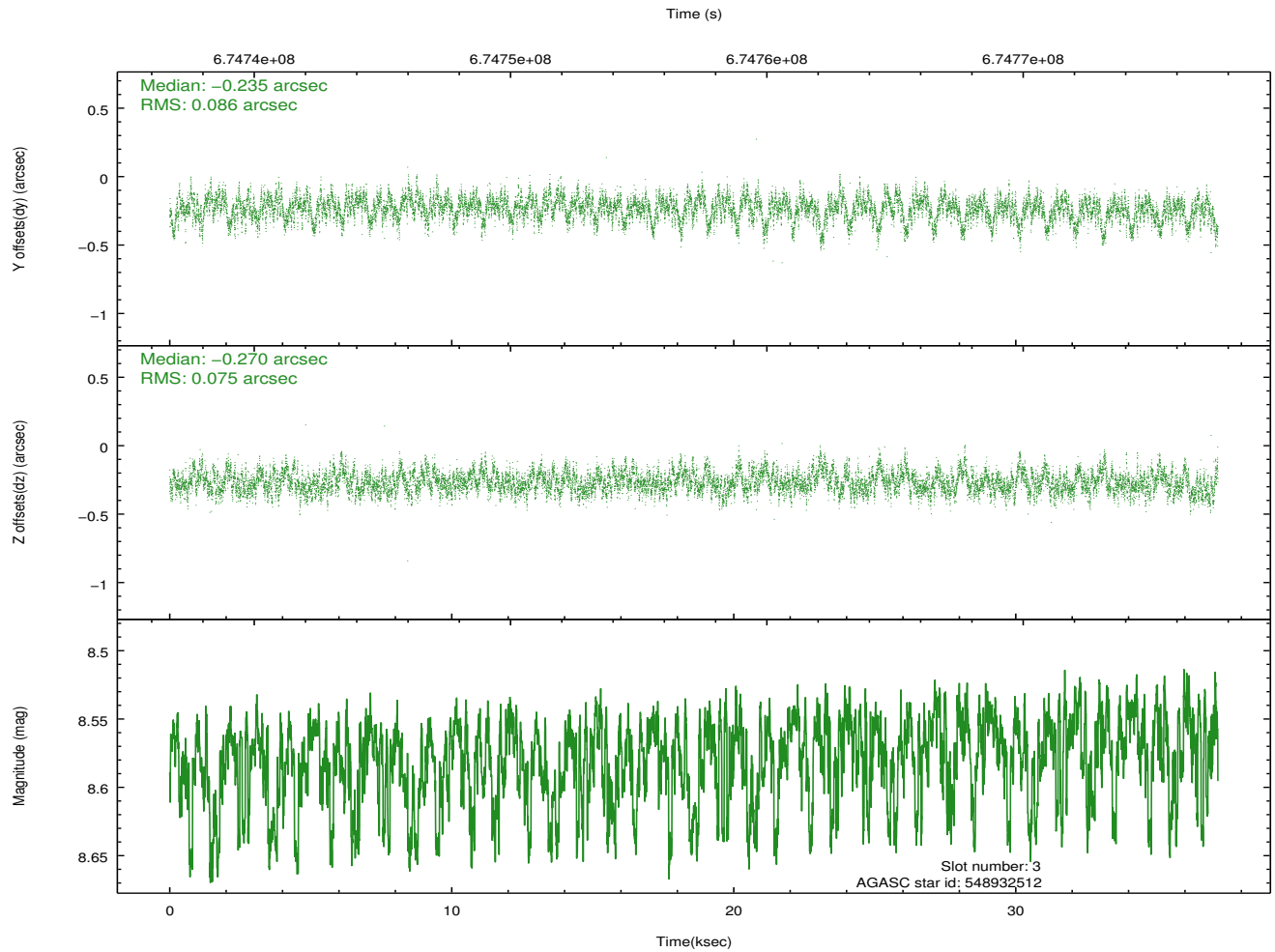
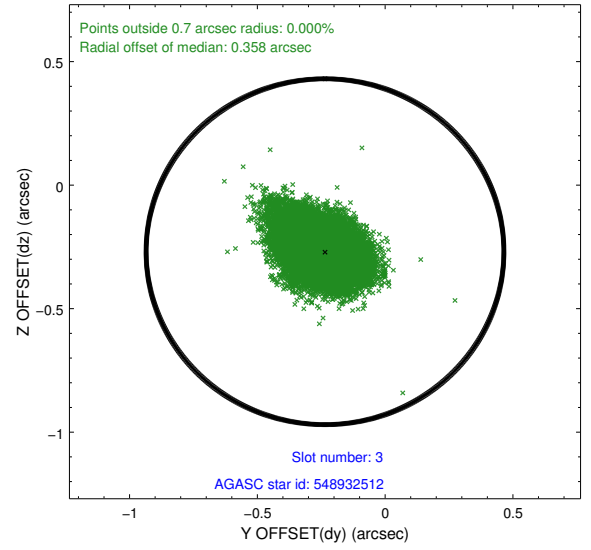
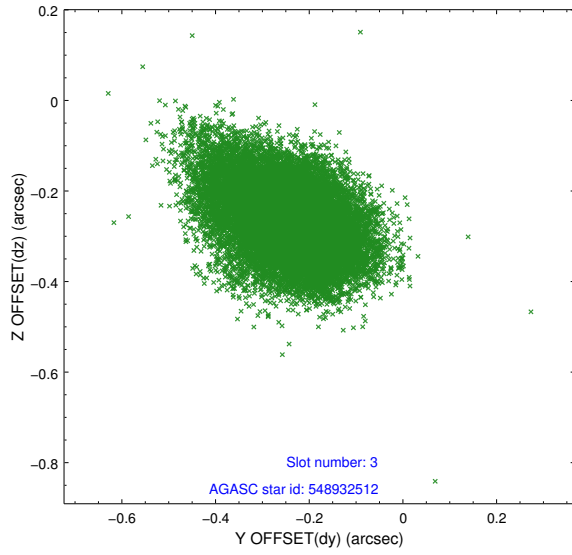
Slot Statistics

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	7.19	9066	1.000	0.120	-0.147	0.032	0.120	0.000000	0.000000	932.22	-840
1	FID		ACIS-I-5	7.15	9065	1.000	-0.447	0.037	0.015	0.025	0.000000	0.000000	-1816.58	1056
2	FID		ACIS-I-6	7.15	9065	1.000	0.235	0.174	0.034	0.091	0.000000	0.000000	397.65	1701
3	GUIDE	used	548932512	8.58	18117	1.000	-0.235	-0.270	0.118	0.202	239.727627	66.054972	-1092.71	1212
4	GUIDE	used	548933960	8.46	18123	1.000	0.010	-0.112	0.111	0.180	237.671184	66.428675	1928.18	-43
5	GUIDE	used	548937184	9.88	17958	1.000	0.012	0.013	0.203	0.336	238.771821	66.565432	358.90	-570
6	OMITTED			0.00	0	0.000	0.000	0.000	0.000	0.000	0.000000	0.000000	0.00	0
7	GUIDE	used	549849072	9.11	18115	1.000	0.217	0.363	0.134	0.226	240.420863	66.802816	-1950.87	-1526

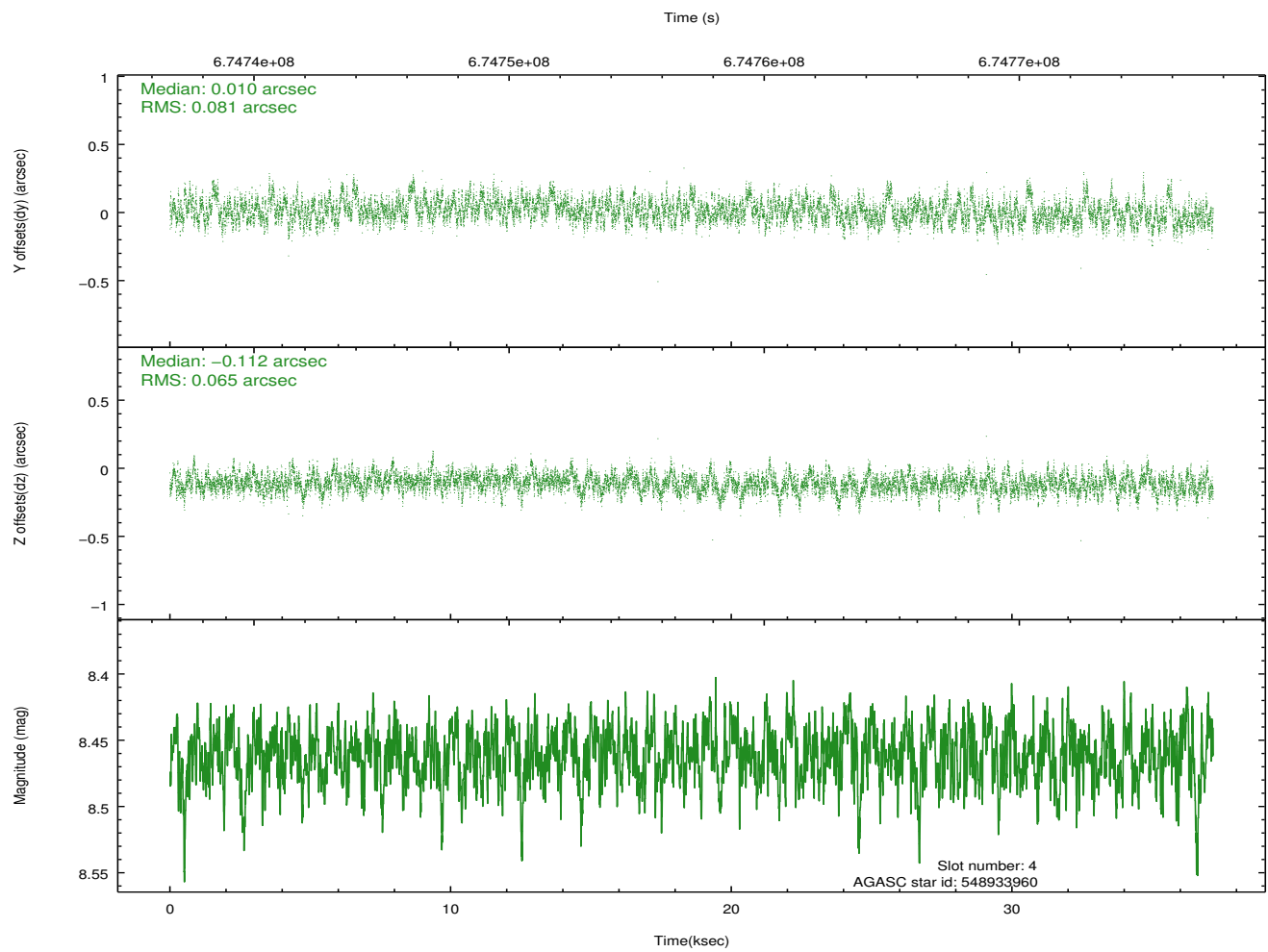
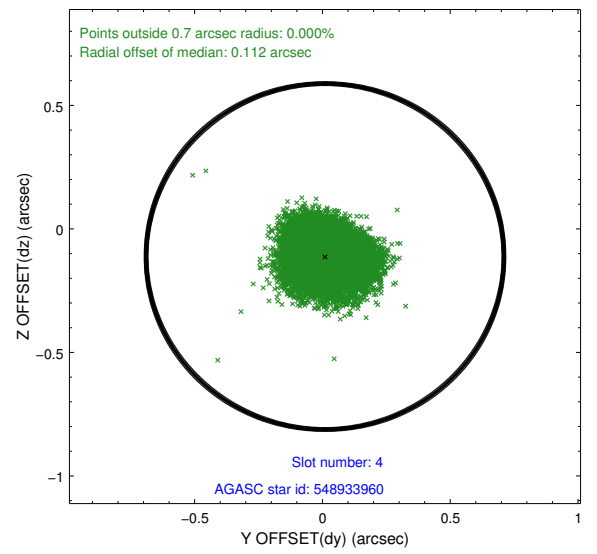
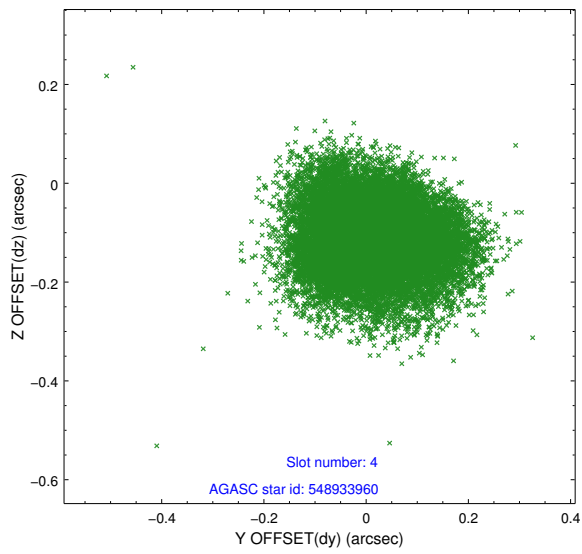
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2.4 Star Slots

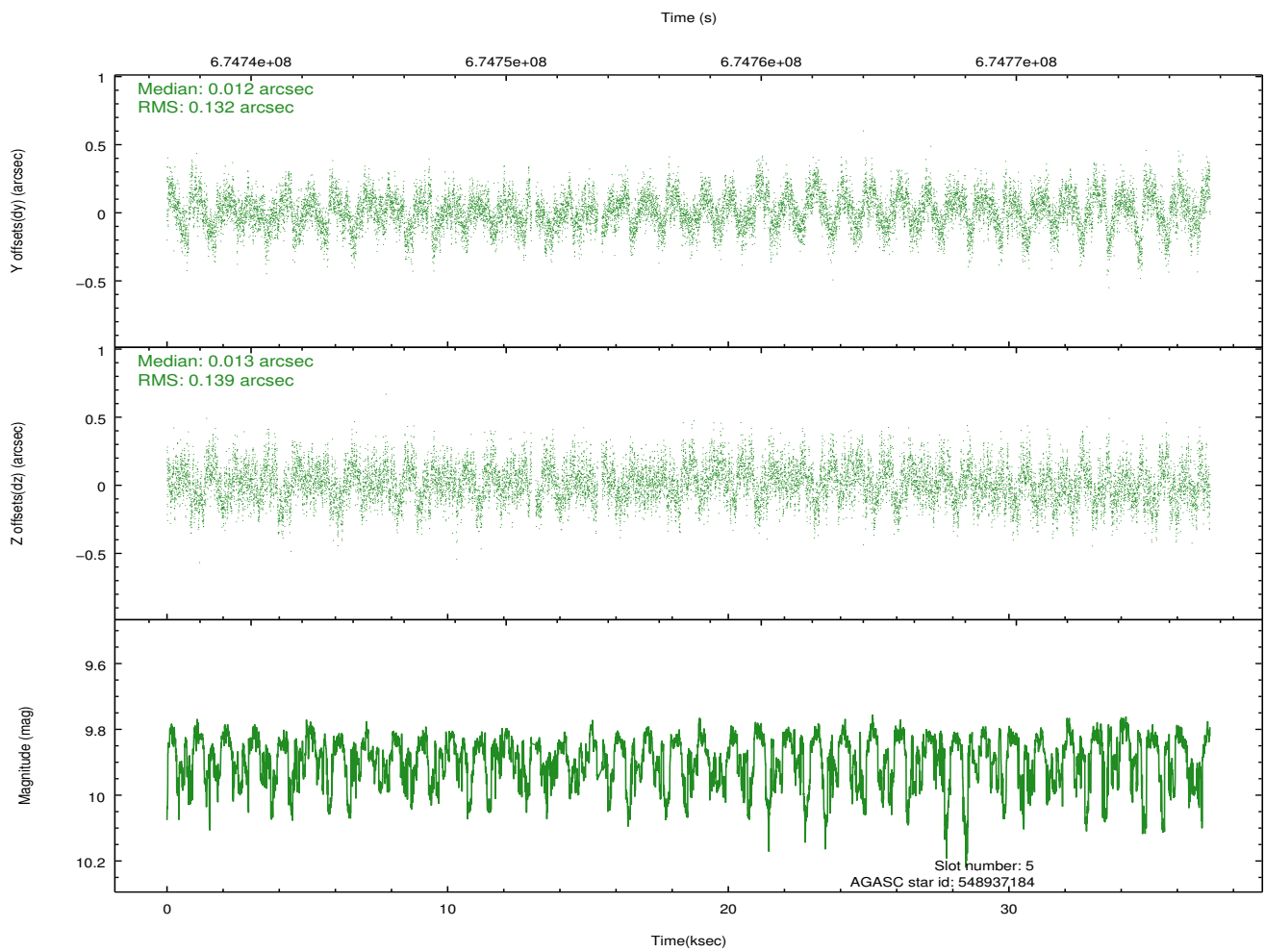
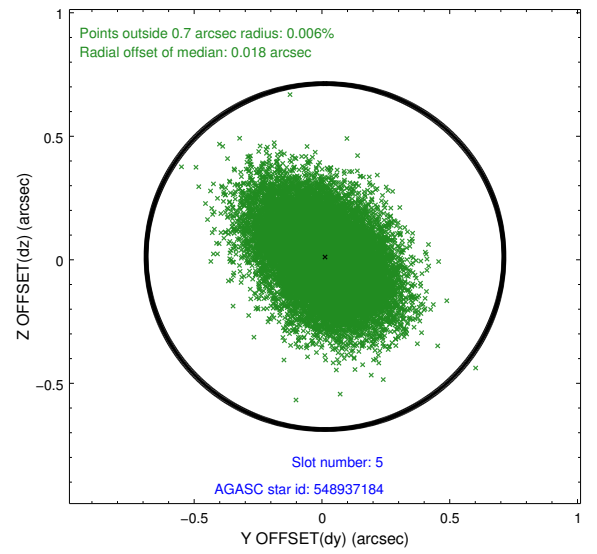
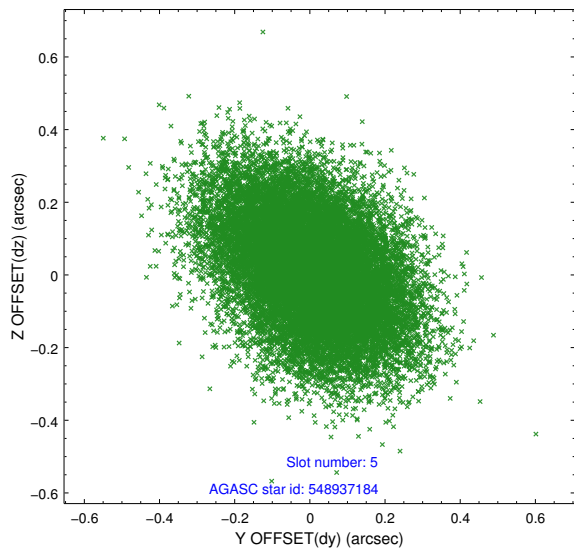
2.4.1 Slot 3



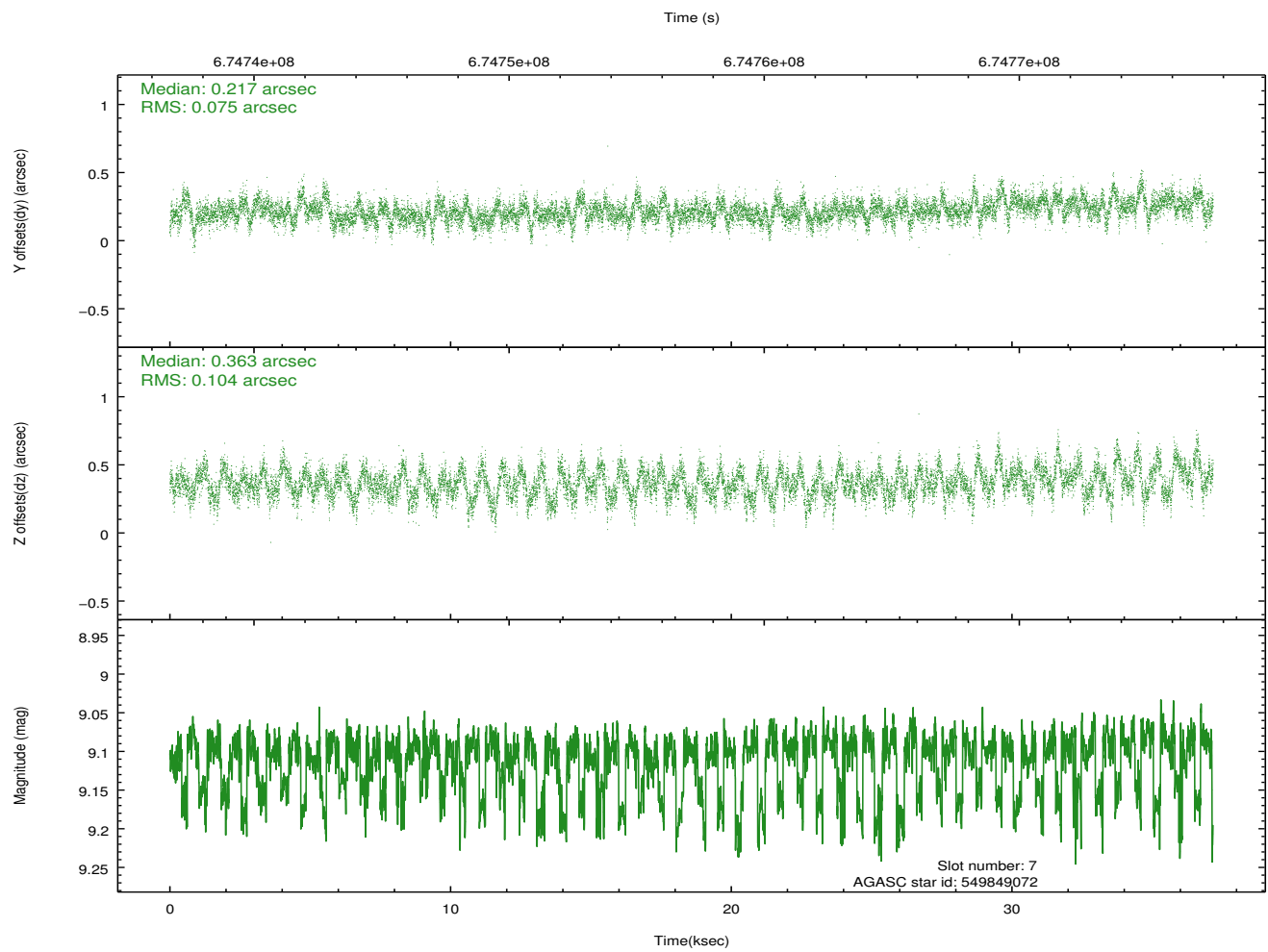
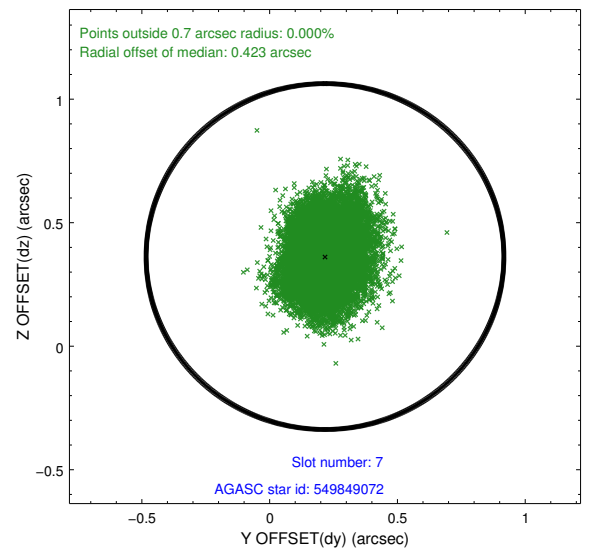
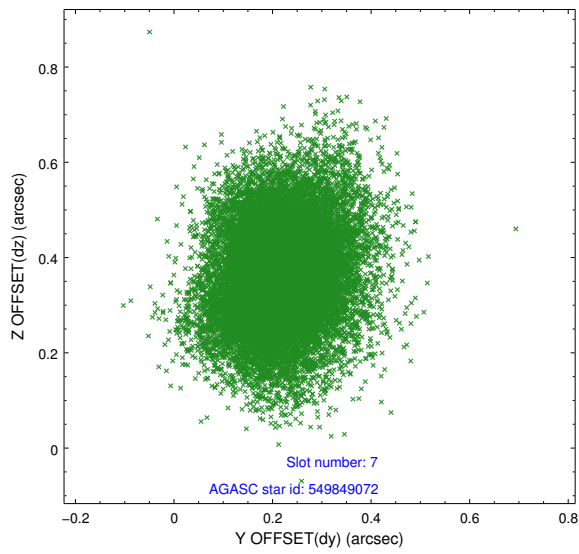
2.4.2 Slot 4



2.4.3 Slot 5

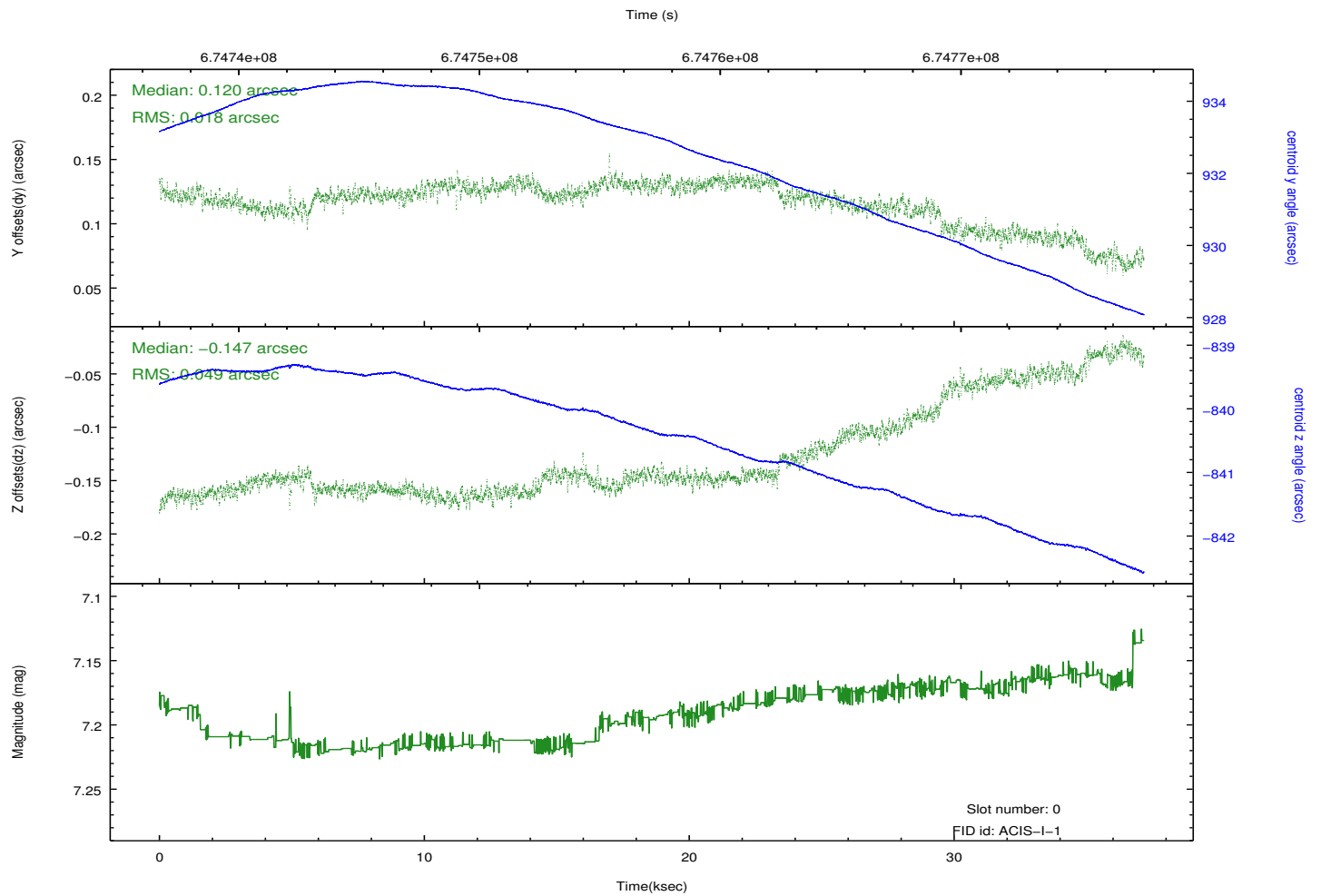
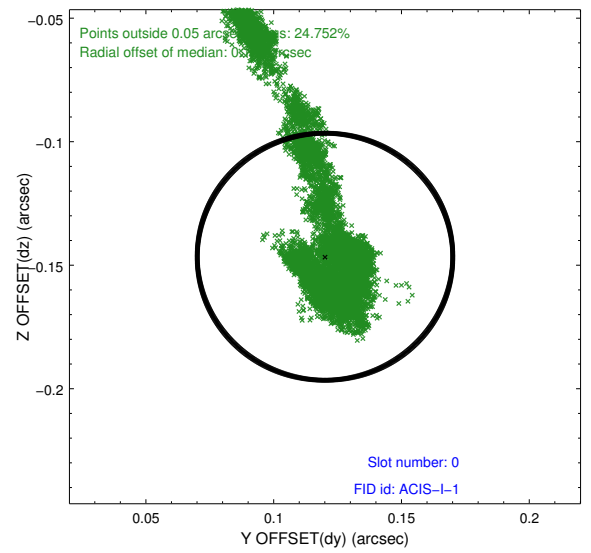
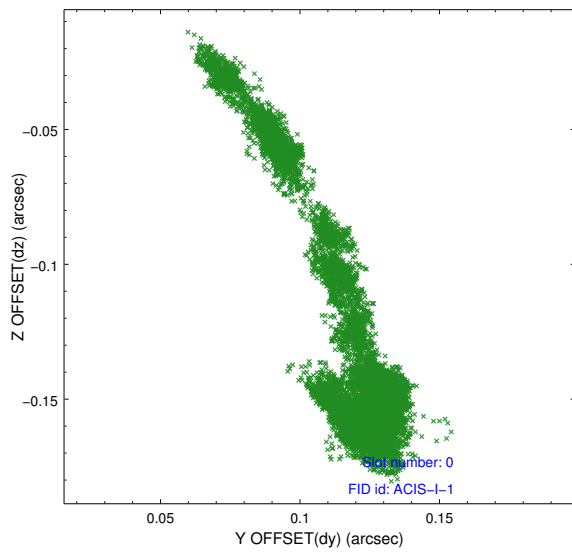


2.4.4 Slot 7

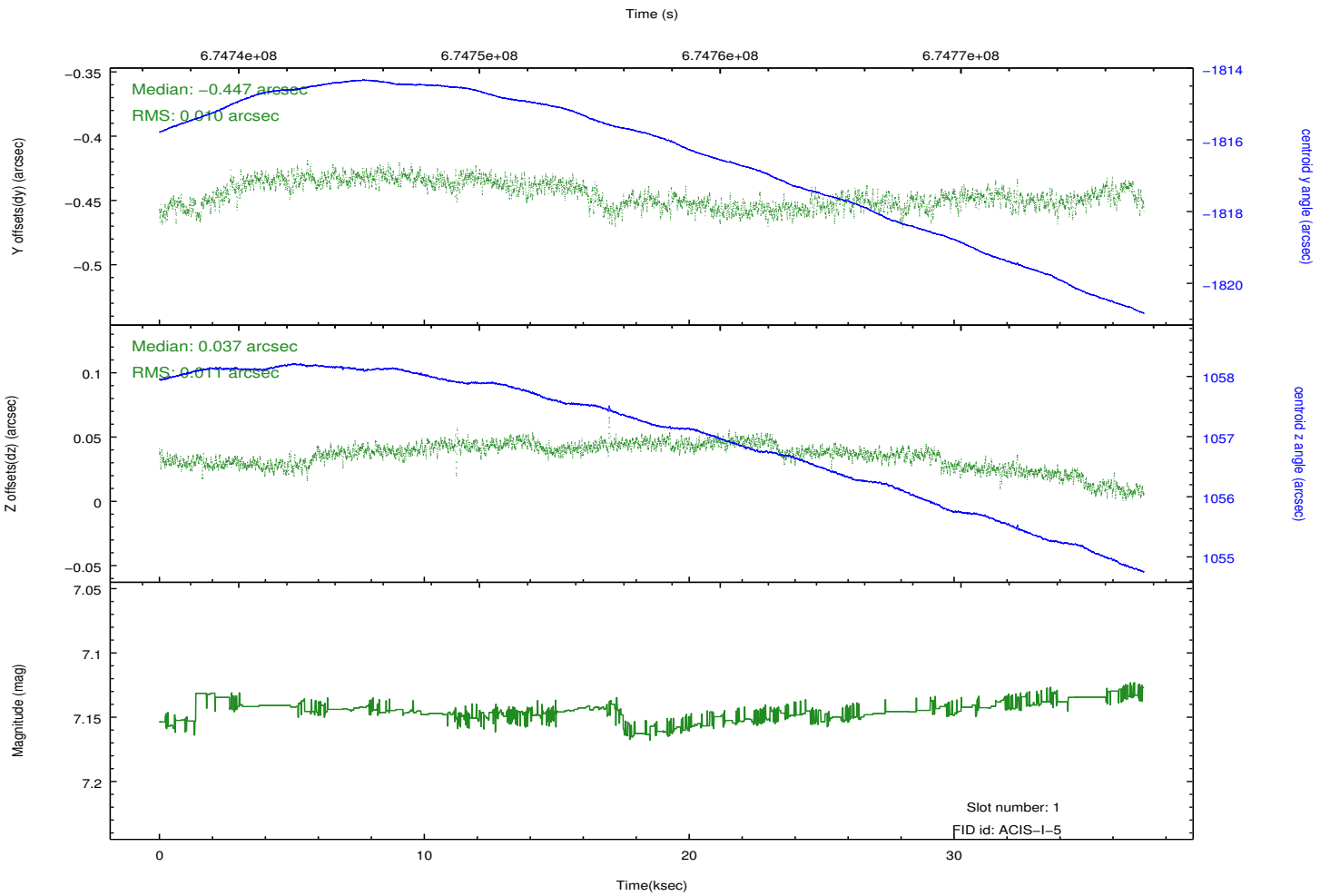
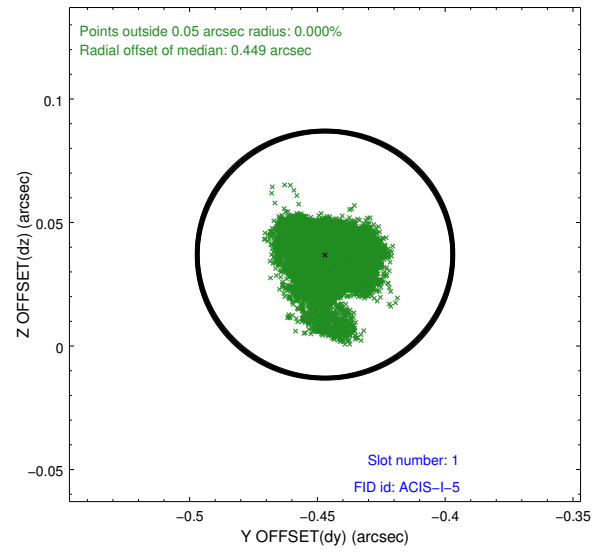
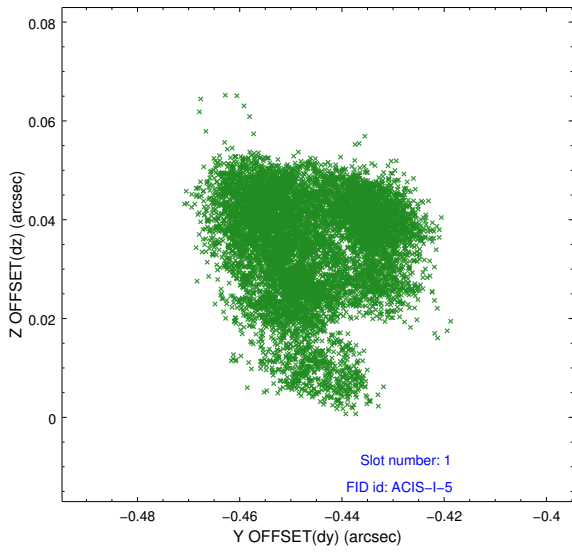


2.5 FID Slots

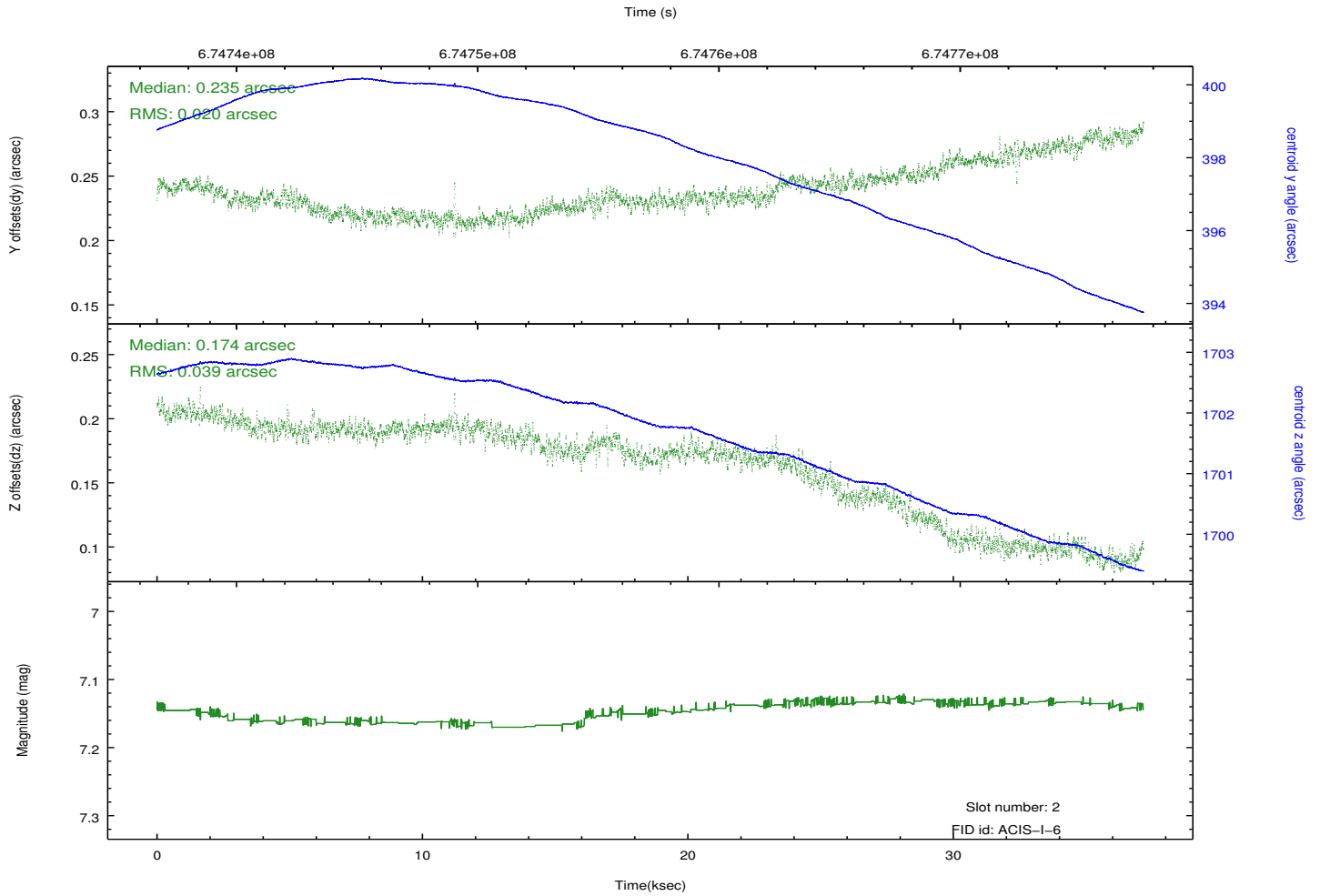
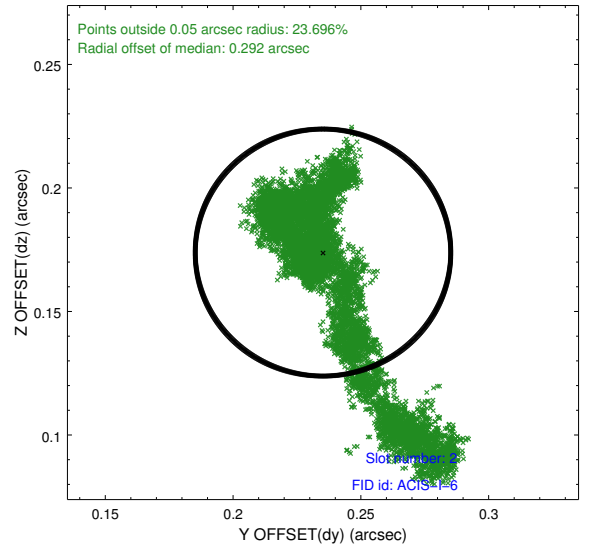
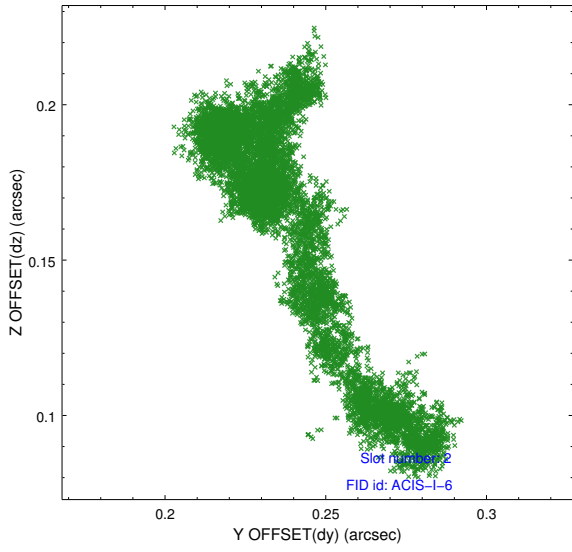
2.5.1 Slot 0



2.5.2 Slot 1



2.5.3 Slot 2



A Summary

A.1 Status

V&V Scientist	Jen Lauer
V&V Date (YYYY-MM-DD)	2019.05.21
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	37.066700285196

A.2 Comments

The guide star in slot 6 was removed from the aspect solution due to poor data quality. The aspect solution is improved by the removal of this guide star 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., -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/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.