

V&V Reference Report

L2 ASCDS Version : 10.7.1

Observation 22171 - L2 Version 2
Chandra X-Ray Center

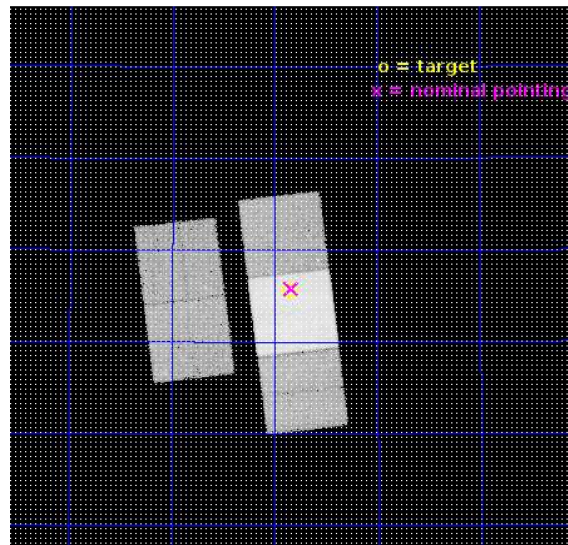
L2 Processing Date : Apr 18 2019

Contents

1	Front	2
2	OBI	3
2.1	OBI	3
2.1.1	Images	3
2.1.2	Bias	3
2.1.3	Parameters	4
2.1.4	Events	4
2.2	Compared Parameters	5
2.3	Aspect	6
2.4	Star Slots	9
2.4.1	Slot 3	9
2.4.2	Slot 4	10
2.4.3	Slot 5	11
2.4.4	Slot 6	12
2.4.5	Slot 7	13
2.5	FID Slots	14
2.5.1	Slot 0	14
2.5.2	Slot 1	15
2.5.3	Slot 2	16
A	Summary	17
A.1	Status	17
A.2	Comments	17

1 Front

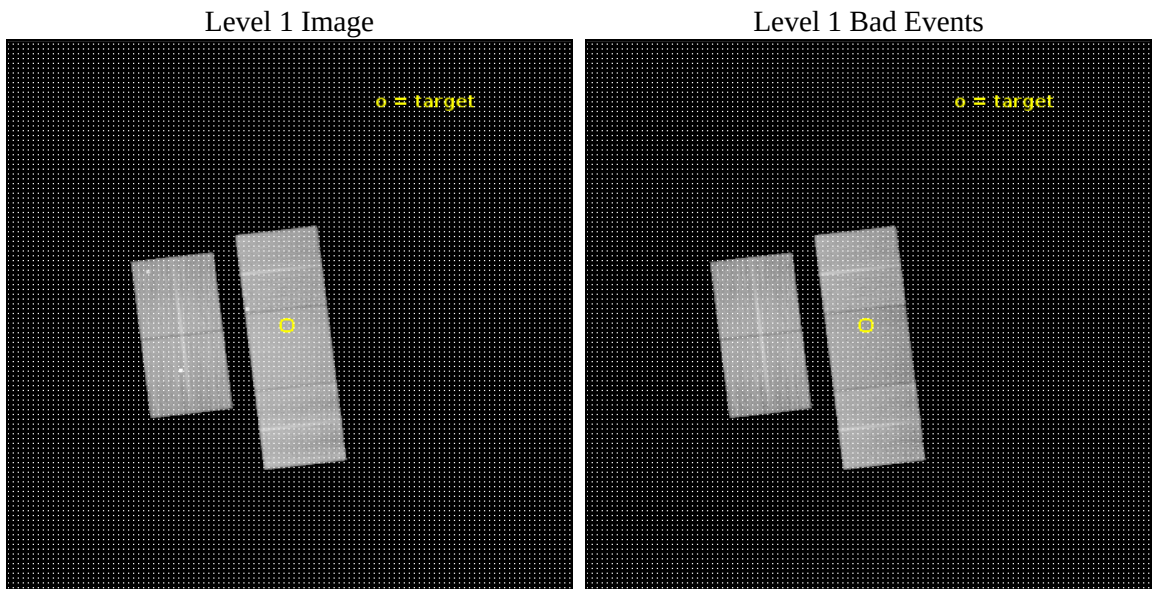
seq_num	502997	Sequence number
obs_id	22171	Observation id
title	PSR J2030+4415: A Breakthrough Target for Bowshock Studies	Proposa
observer	Roger Romani	Principal investigator
object	PSR J2030+4415	Source name
dtcycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	307.714167	Observer's specified target RA [deg]
dec_targ	44.260861	Observer's specified target Dec [deg]
ra_nom	307.70961682054	Nominal RA [deg]
dec_nom	44.263029246936	Nominal Dec [deg]
roll_nom	83.159813457868	Nominal Roll [deg]
revision	2	Processing version of data
ontime	40048.900308132	Sum of GTIs [s]
livetime	39525.631942035	Livetime [s]
ontime2	40048.900308132	Sum of GTIs [s]
ontime3	40042.618347645	Sum of GTIs [s]
ontime6	40048.900308132	Sum of GTIs [s]
ontime7	40048.900308132	Sum of GTIs [s]
ontime8	40033.195485592	Sum of GTIs [s]
l2events	287265	Number of level 2 events



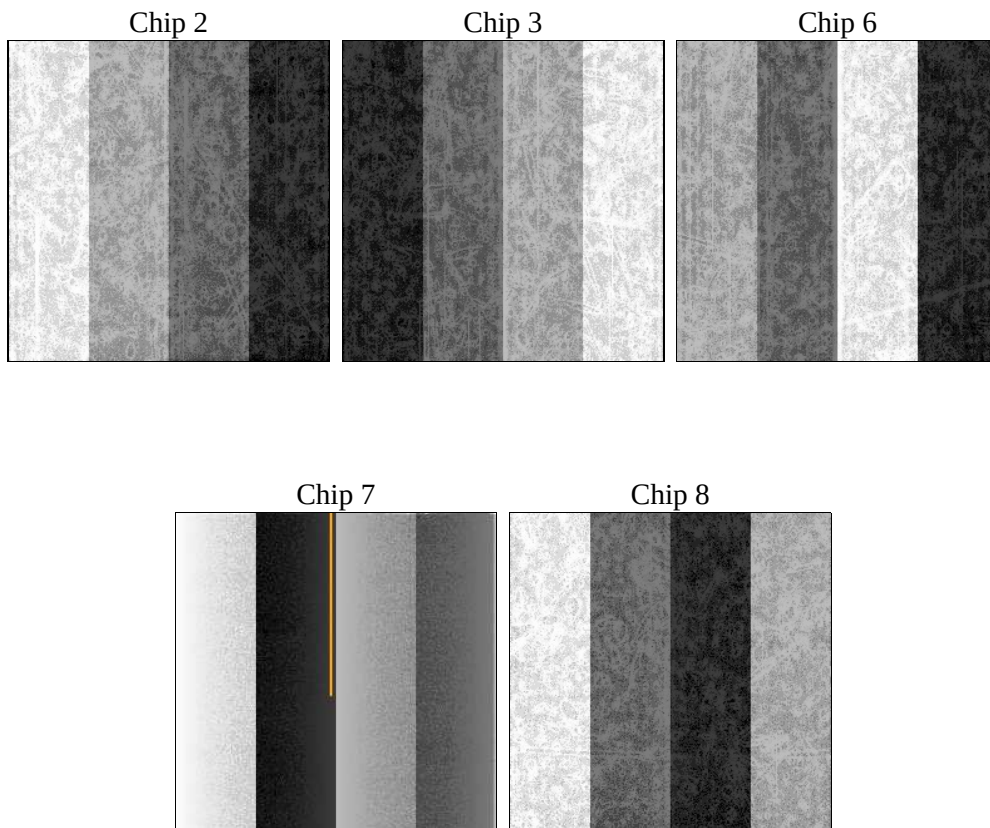
2 OBI

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	10.7.1	Processing system revision	ontime	40048.900308132	Sum of GTIs [s]
caldsver	4.8.2	 	ontime2	40048.900308132	Sum of GTIs [s]
date	2019-04-18T19:46:46	Date and time of file creation	ontime3	40042.618347645	Sum of GTIs [s]
revision	2	Processing version of data	ontime6	40048.900308132	Sum of GTIs [s]
			ontime7	40048.900308132	Sum of GTIs [s]
			ontime8	40033.195485592	Sum of GTIs [s]
			l1events	1762863	Number of level 1 events

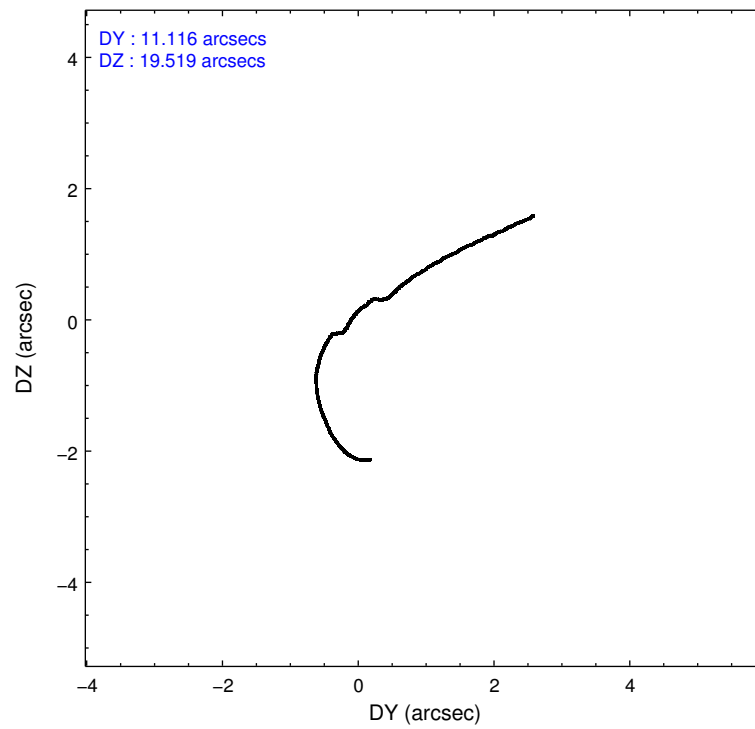
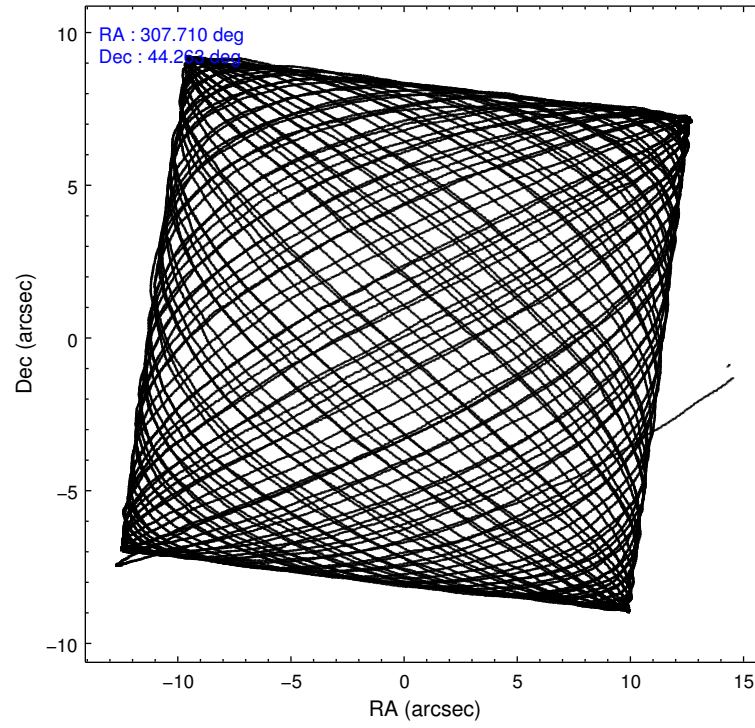
2.1.4 Events

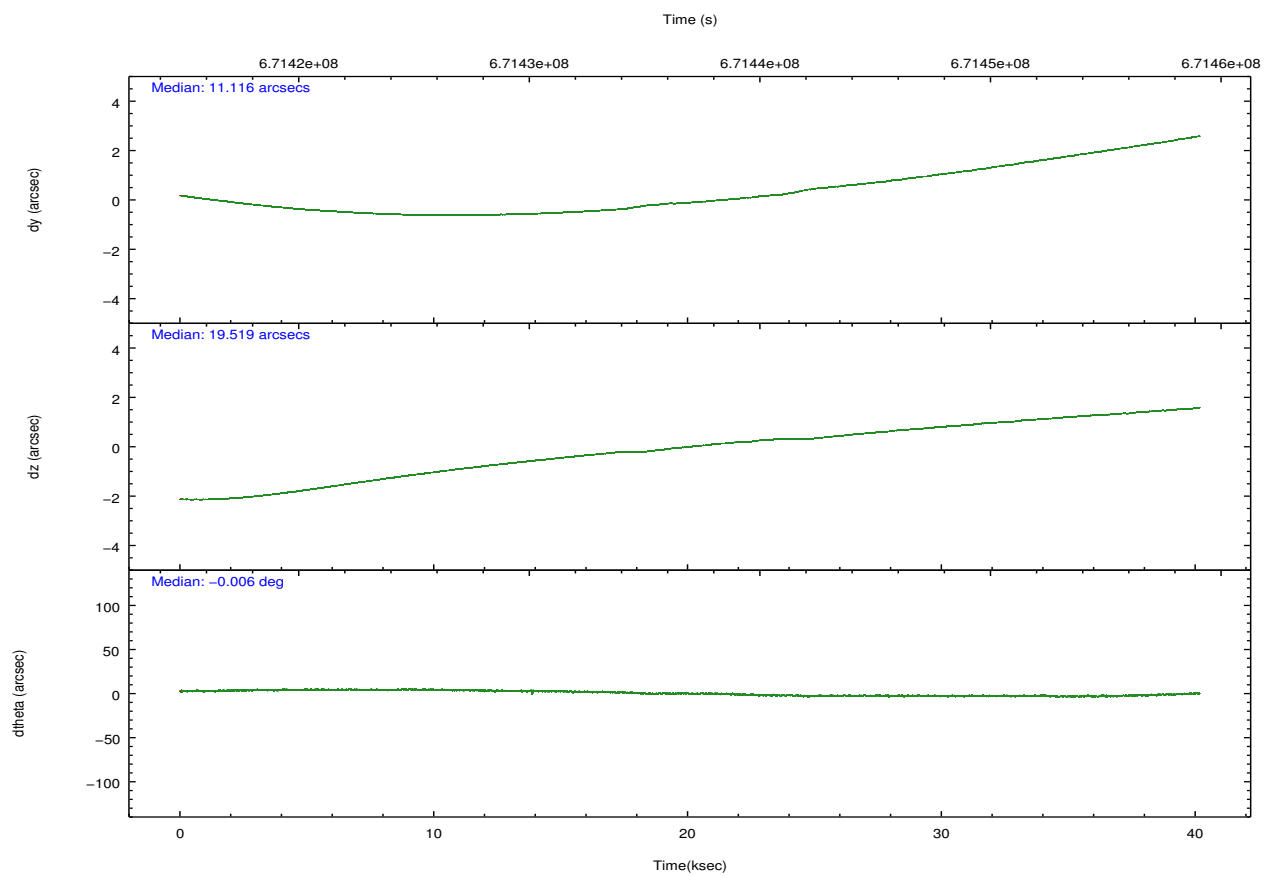
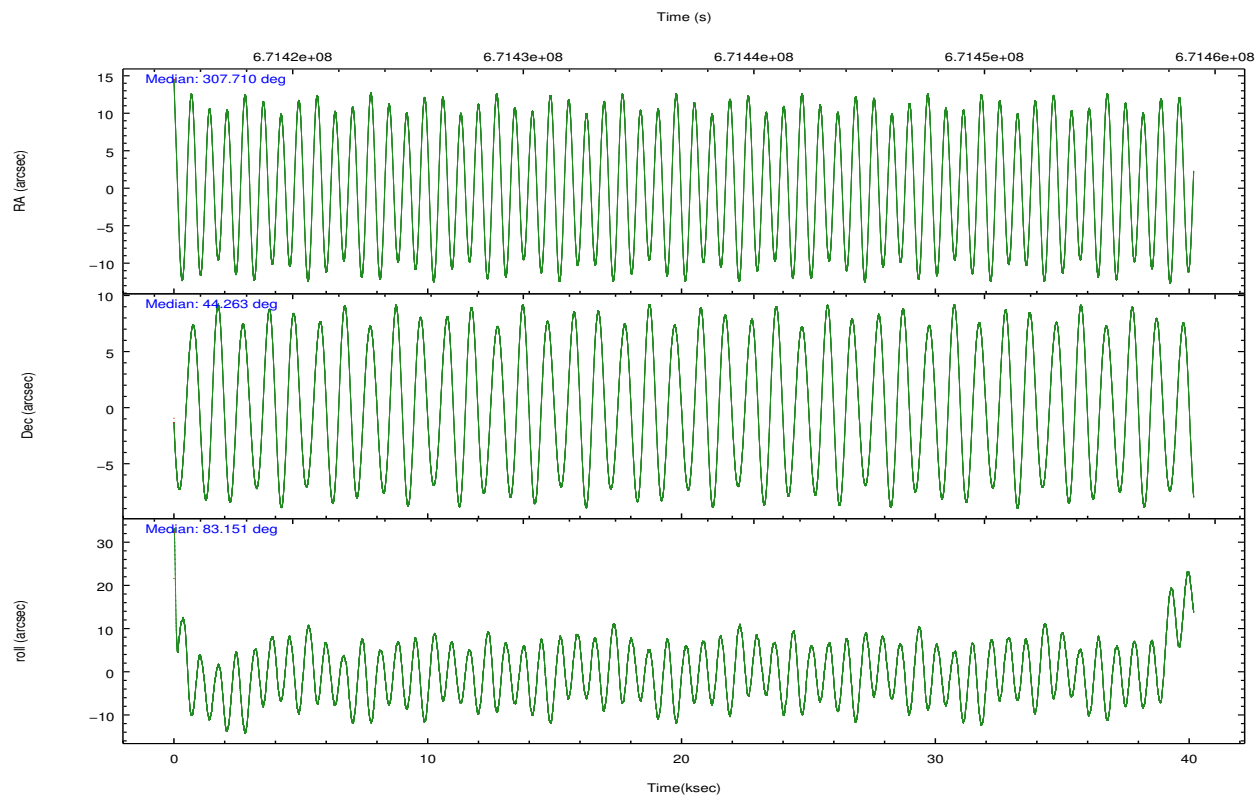
	ccd 2	ccd 3	ccd 6	ccd 7	ccd 8		ccd 2	ccd 3	ccd 6	ccd 7	ccd 8
level 1 events	310041	319313	333009	394373	406127	grade 0 events	14311	23673	16630	14097	29909
rejected events	275015	274991	291542	224156	300177		4%	7%	4%	3%	7%
rejected %	88%	86%	87%	56%	73%	grade 1 events	158	294	301	628	300
							0%	0%	0%	0%	0%
						grade 2 events	7864	7144	9469	35714	26375
							2%	2%	2%	9%	6%
						grade 3 events	3101	3229	3155	13320	10495
							1%	1%	0%	3%	2%
						grade 4 events	3096	3278	3026	13017	9655
							0%	1%	0%	3%	2%
						grade 5 events	11360	13615	13468	38364	21177
							3%	4%	4%	9%	5%
						grade 6 events	6657	7000	9188	94082	29534
							2%	2%	2%	23%	7%
						grade 7 events	263494	261080	277772	185151	278682
							84%	81%	83%	46%	68%

2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	7	7
Detector	ACIS-23678	ACIS-23678	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	307.725163	307.7096168205443	CCD I2 on	O1	Y
[deg] Pointing Dec	44.237944	44.26302924693558	CCD I3 on	O2	Y
[deg] Pointing Roll	82.992326	83.15981345786805	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	O4	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	O3	Y
[s] Observation start time (MET)	671417035.184000	671415831.40879	CCD S5 on	N	N
Observation start date	2019-04-12T00:42:46	2019-04-12T00:23:51	Number of optional ACIS chips dropped	0	0
[s] Observation end time (MET)	671457035.184000	671458012.72381	On-chip summing requested	N	N
Observation end date	2019-04-12T11:49:26	2019-04-12T12:06:52	Subarray requested	NONE	NONE
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	3.1

2.3 Aspect



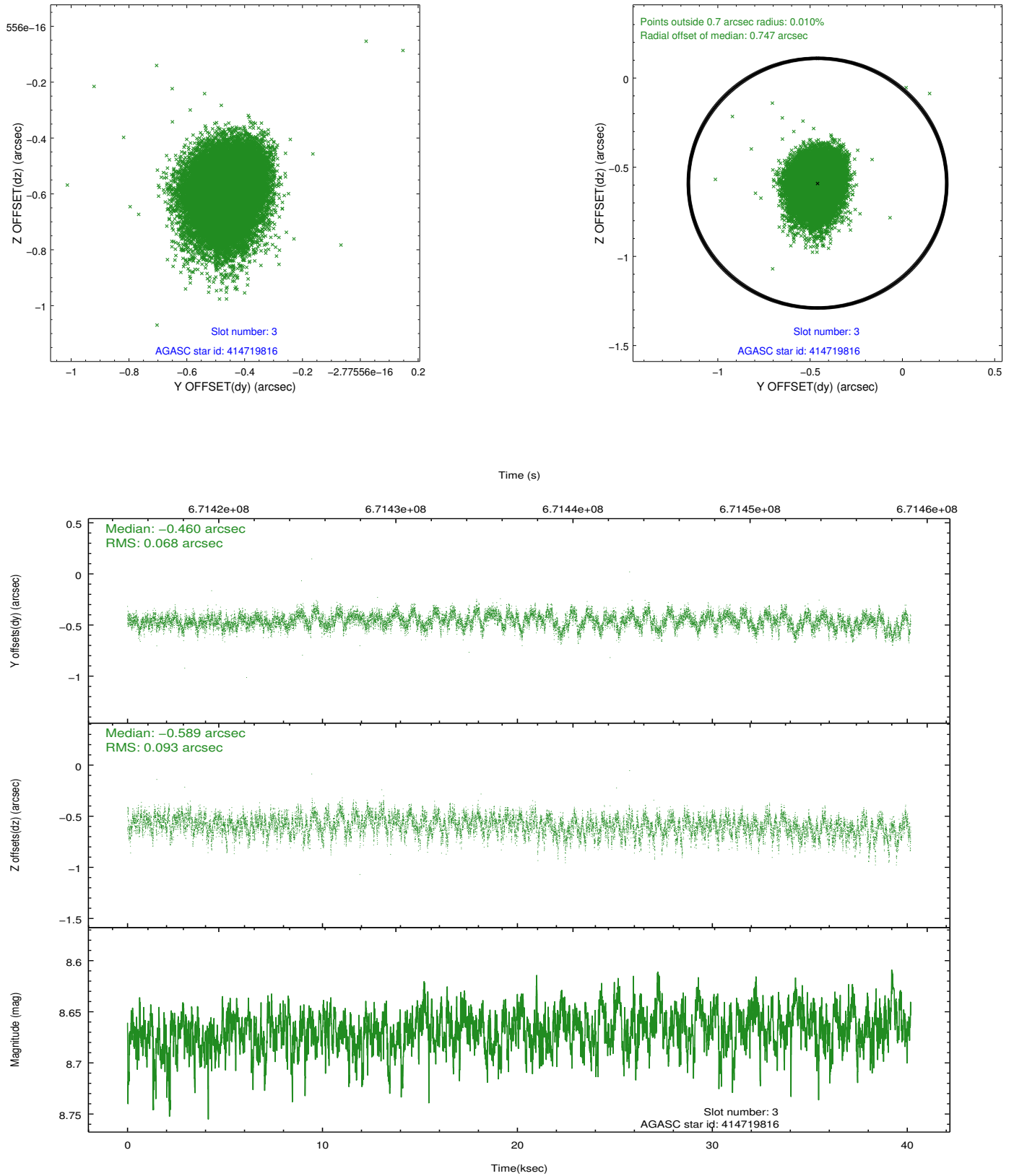


Slot Statistics

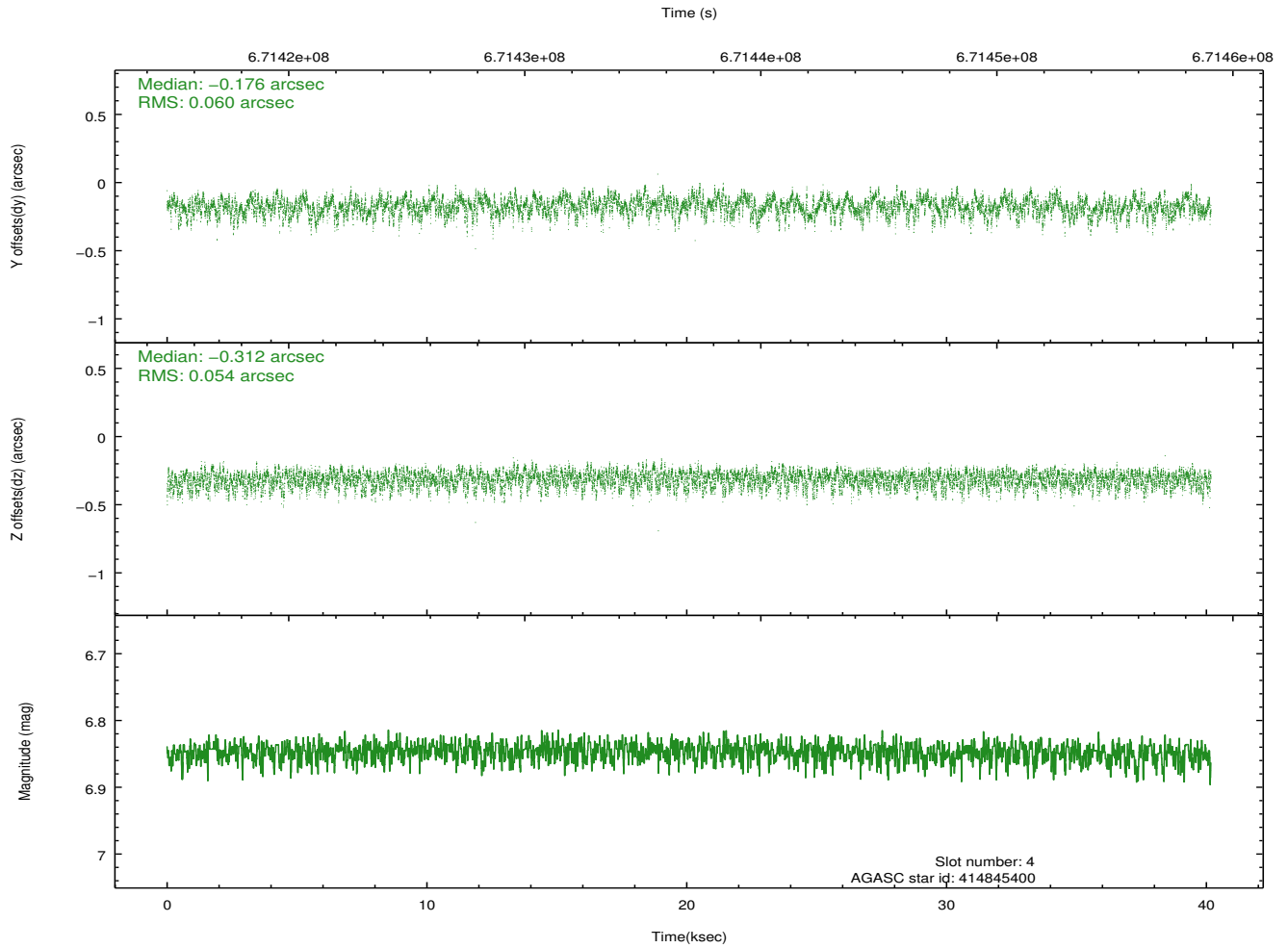
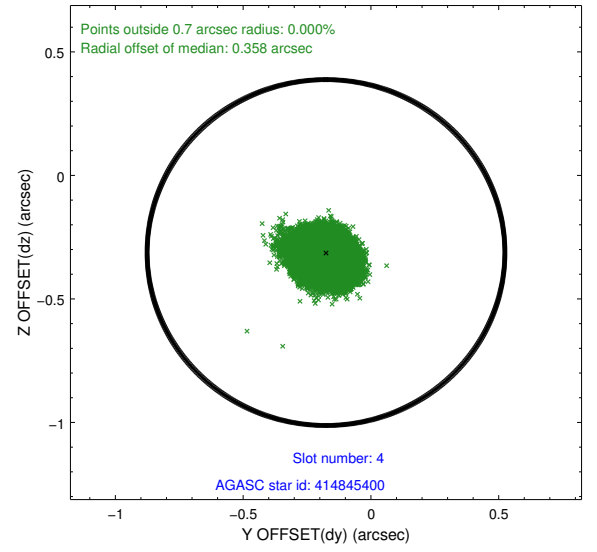
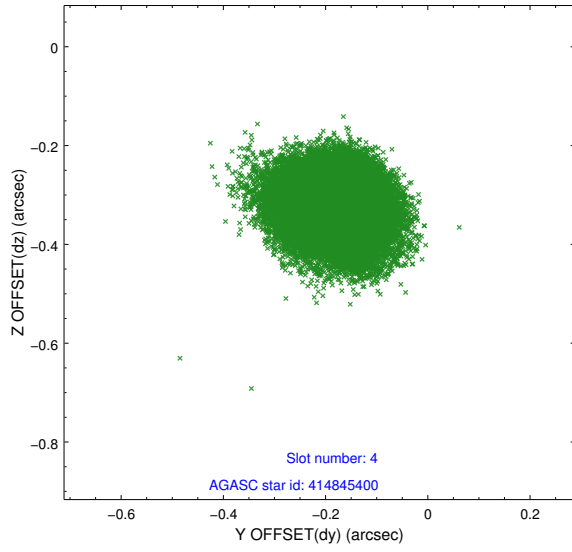
pt	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-S-2	7.11	9800	1.000	-0.281	-0.158	0.036	0.053	0.000000	0.000000	-764.58	-1741
1	FID		ACIS-S-4	7.25	9799	1.000	0.687	0.180	0.017	0.042	0.000000	0.000000	2149.60	167
2	FID		ACIS-S-5	7.23	9800	1.000	-0.439	-0.012	0.035	0.050	0.000000	0.000000	-1817.62	161
3	GUIDE	used	414719816	8.67	19581	1.000	-0.460	-0.589	0.122	0.197	306.965041	44.477406	626.27	2043
4	GUIDE	used	414845400	6.85	19595	1.000	-0.176	-0.312	0.088	0.138	307.645708	44.315241	251.33	237
5	GUIDE	used	414850000	8.37	19590	1.000	0.339	0.275	0.120	0.190	307.967222	44.111985	-372.14	-675
6	GUIDE	used	414844656	8.34	19585	1.000	0.397	0.852	0.160	0.239	308.466261	43.520199	-2319.18	-2233
7	GUIDE	used	414721960	8.52	19579	1.000	-0.098	-0.208	0.103	0.169	306.992291	43.980466	-1143.53	1771

2.4 Star Slots

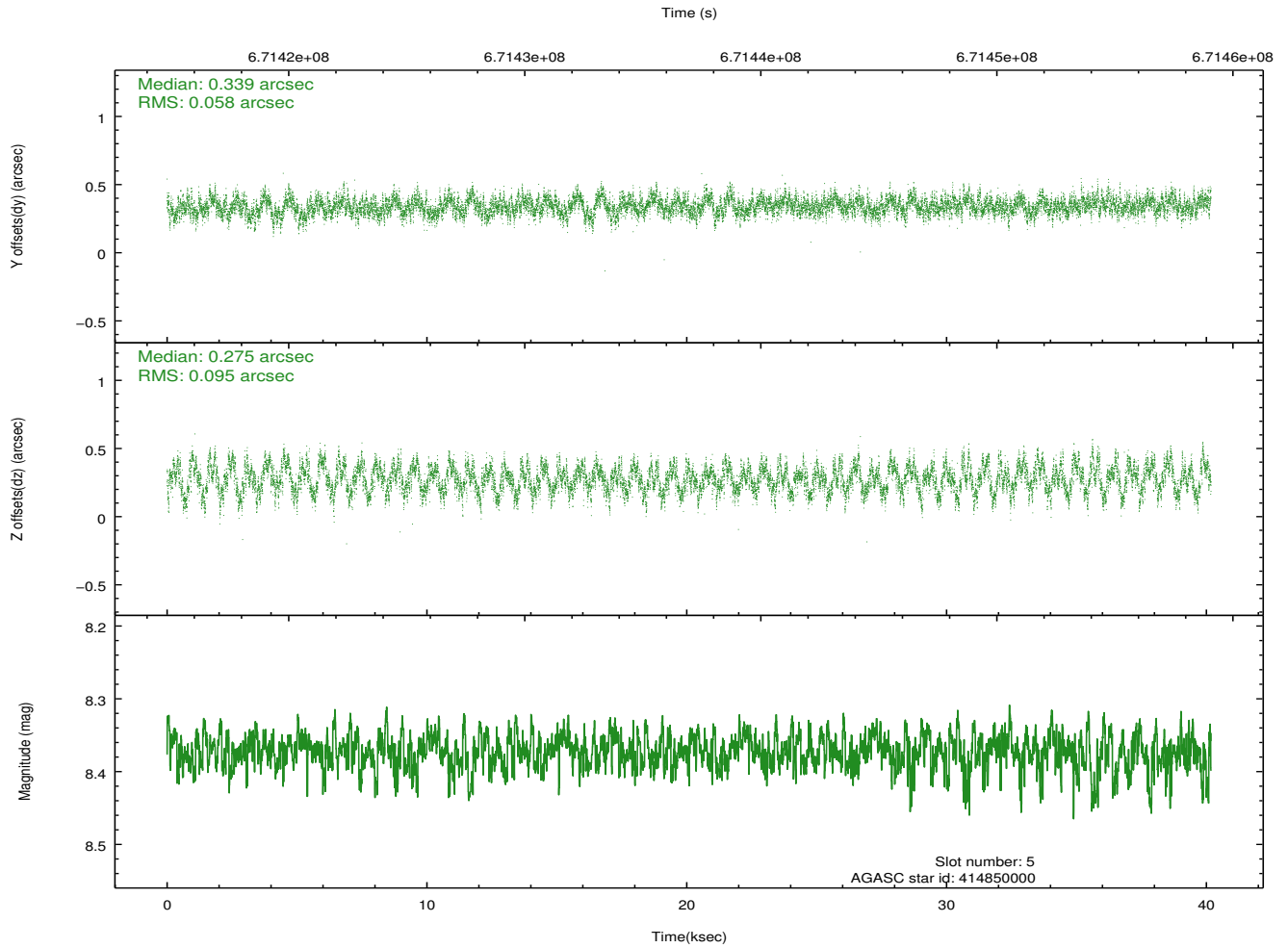
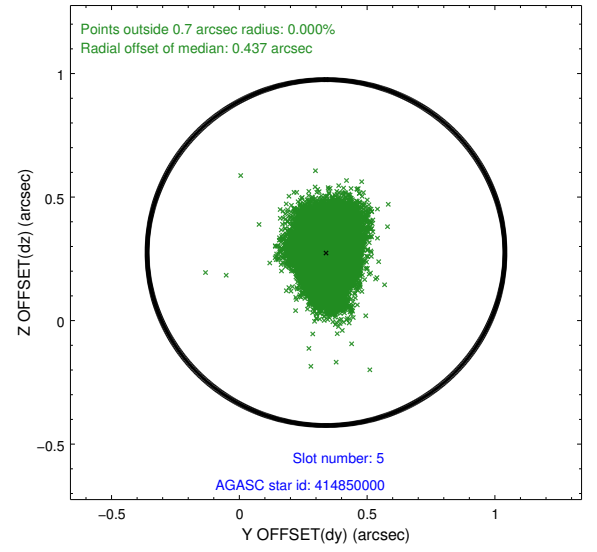
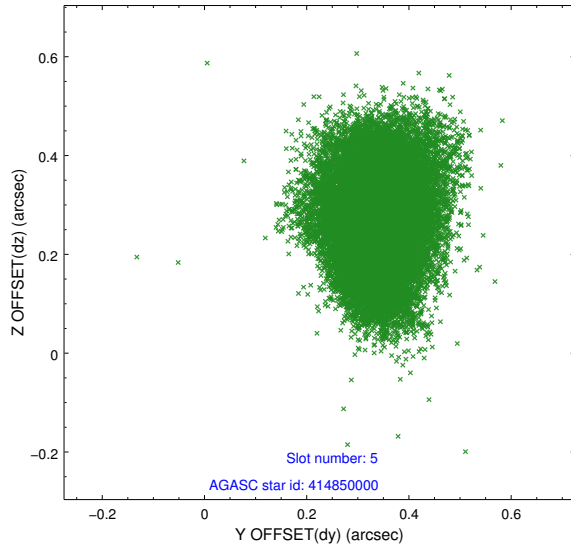
2.4.1 Slot 3



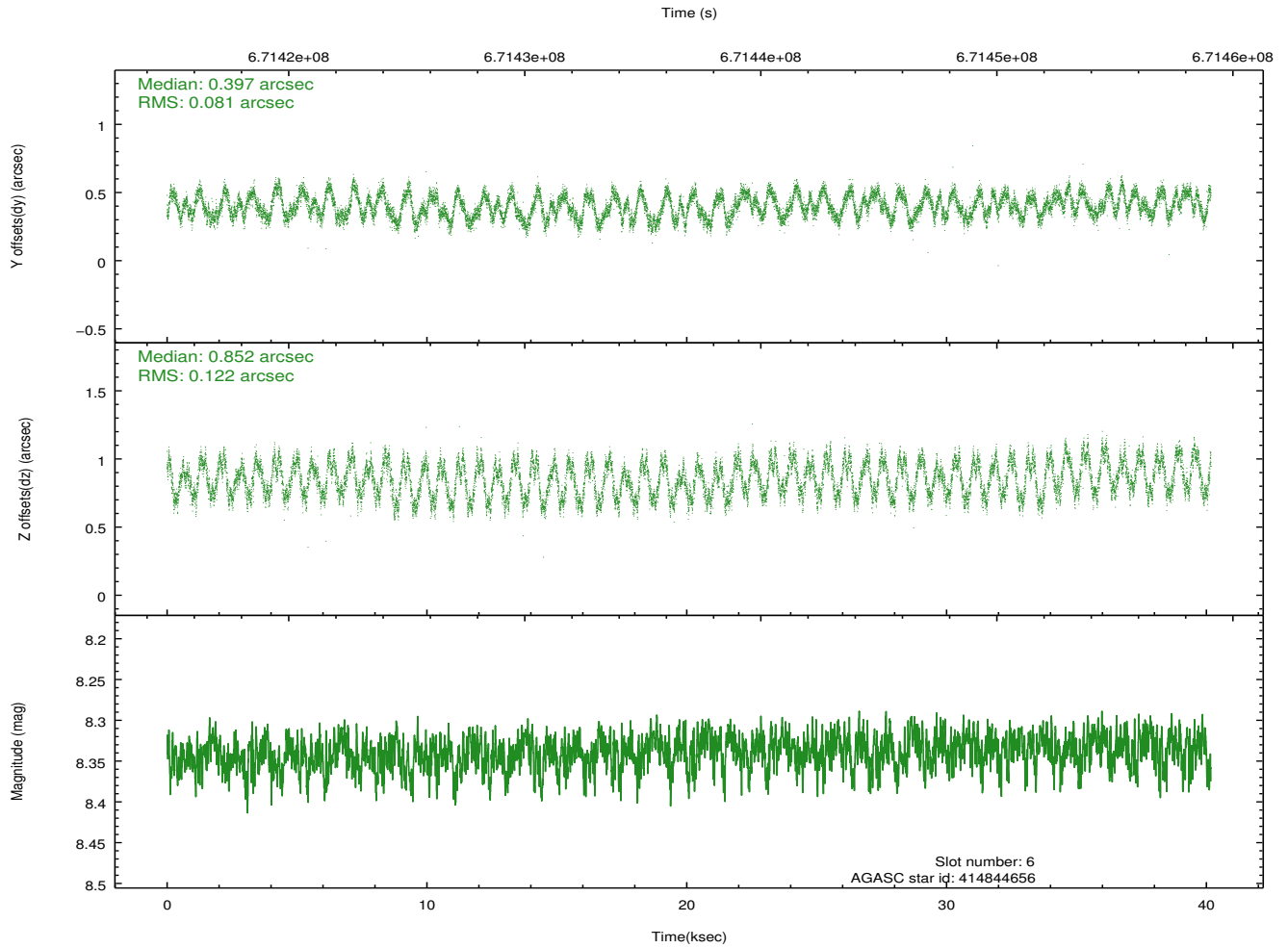
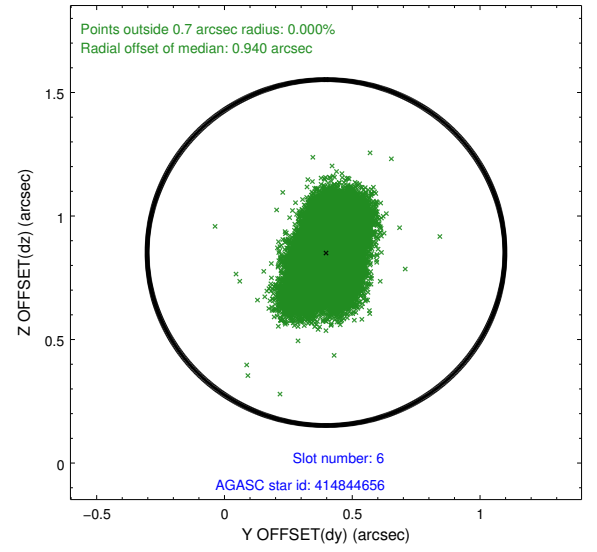
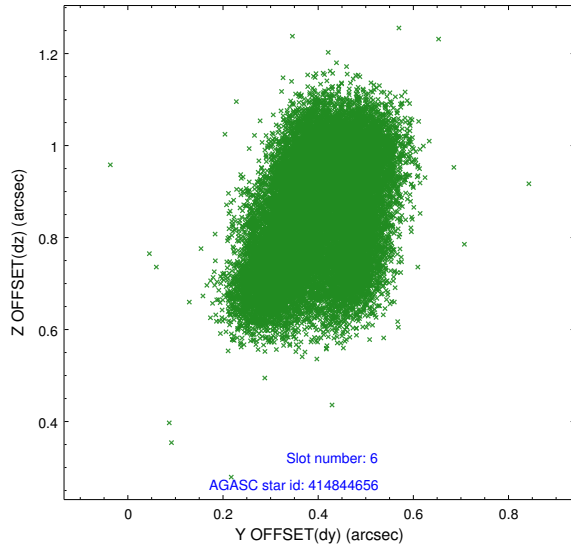
2.4.2 Slot 4



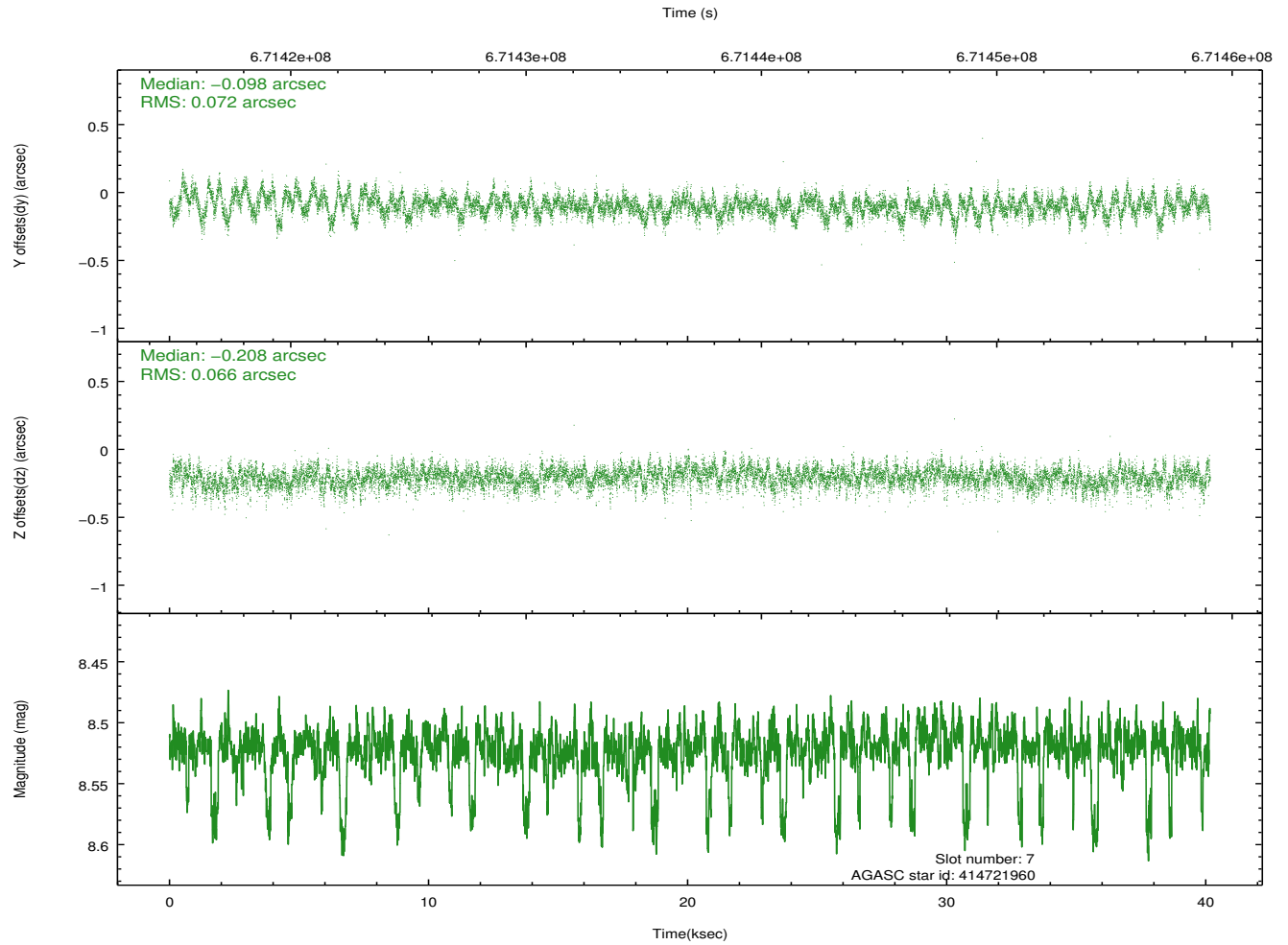
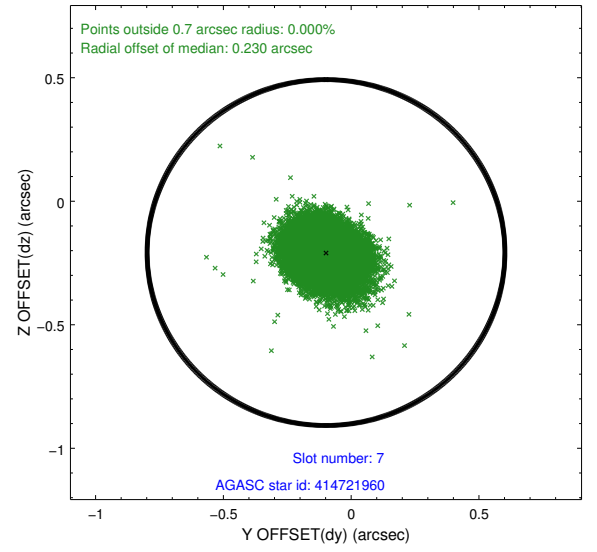
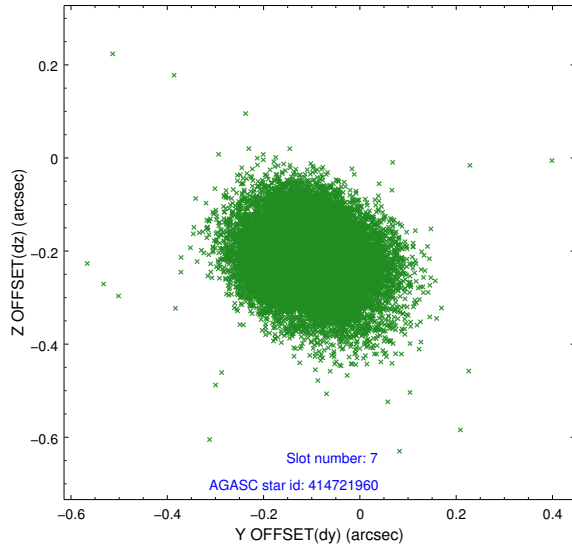
2.4.3 Slot 5



2.4.4 Slot 6

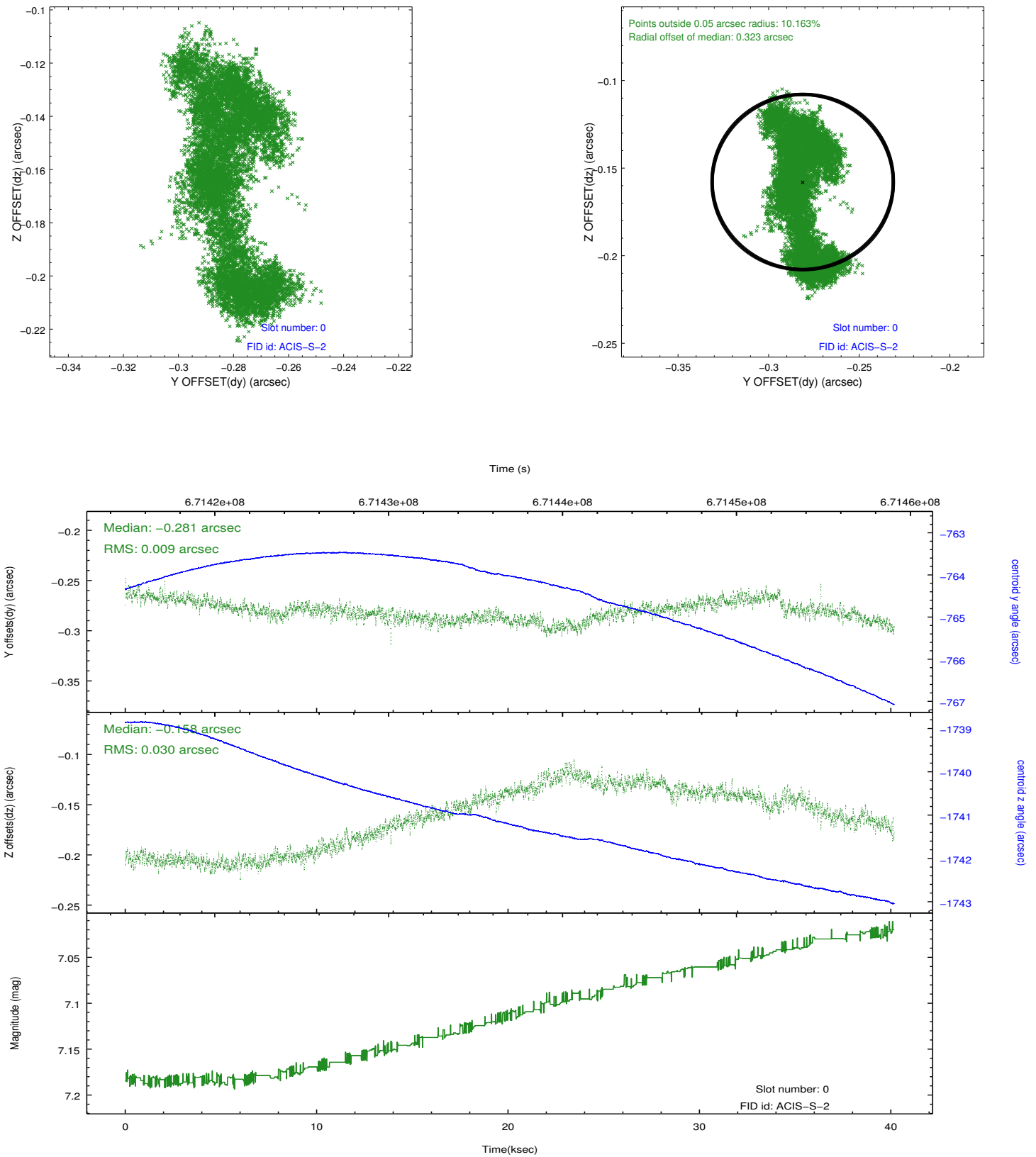


2.4.5 Slot 7

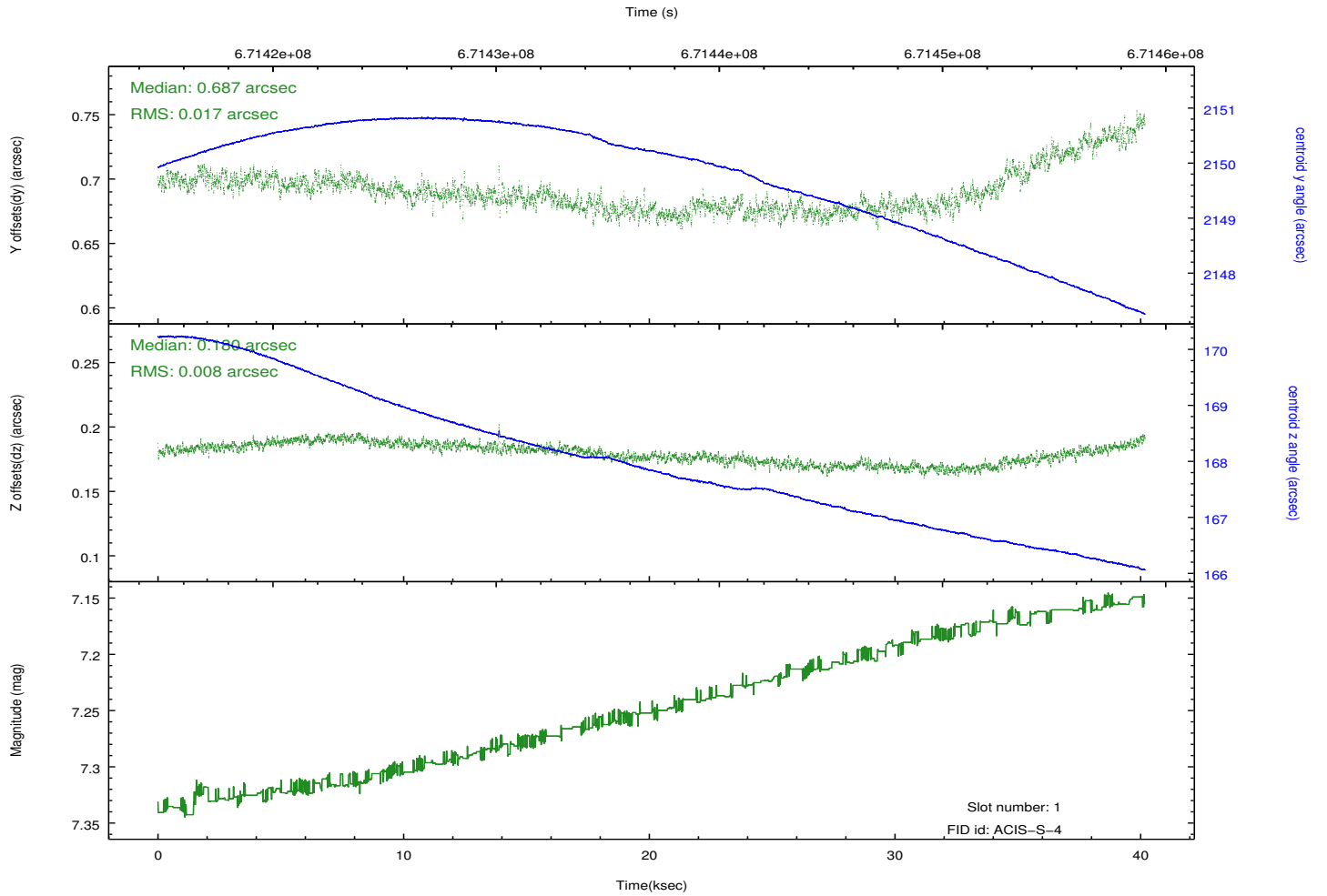
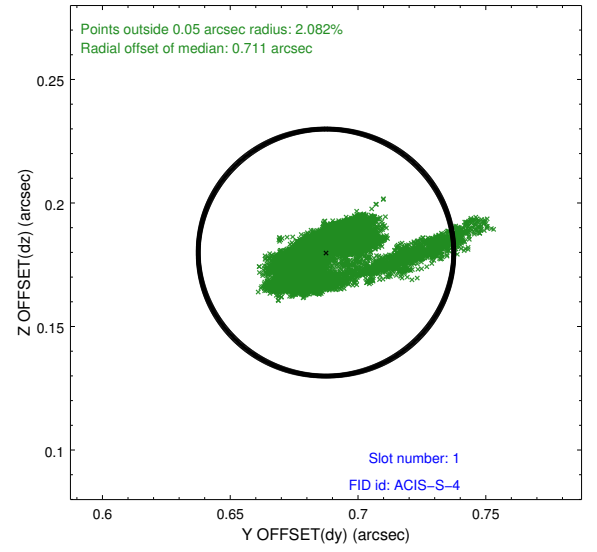
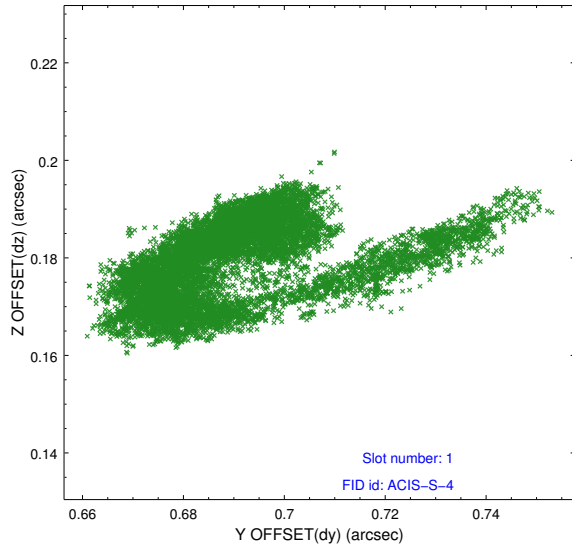


2.5 FID Slots

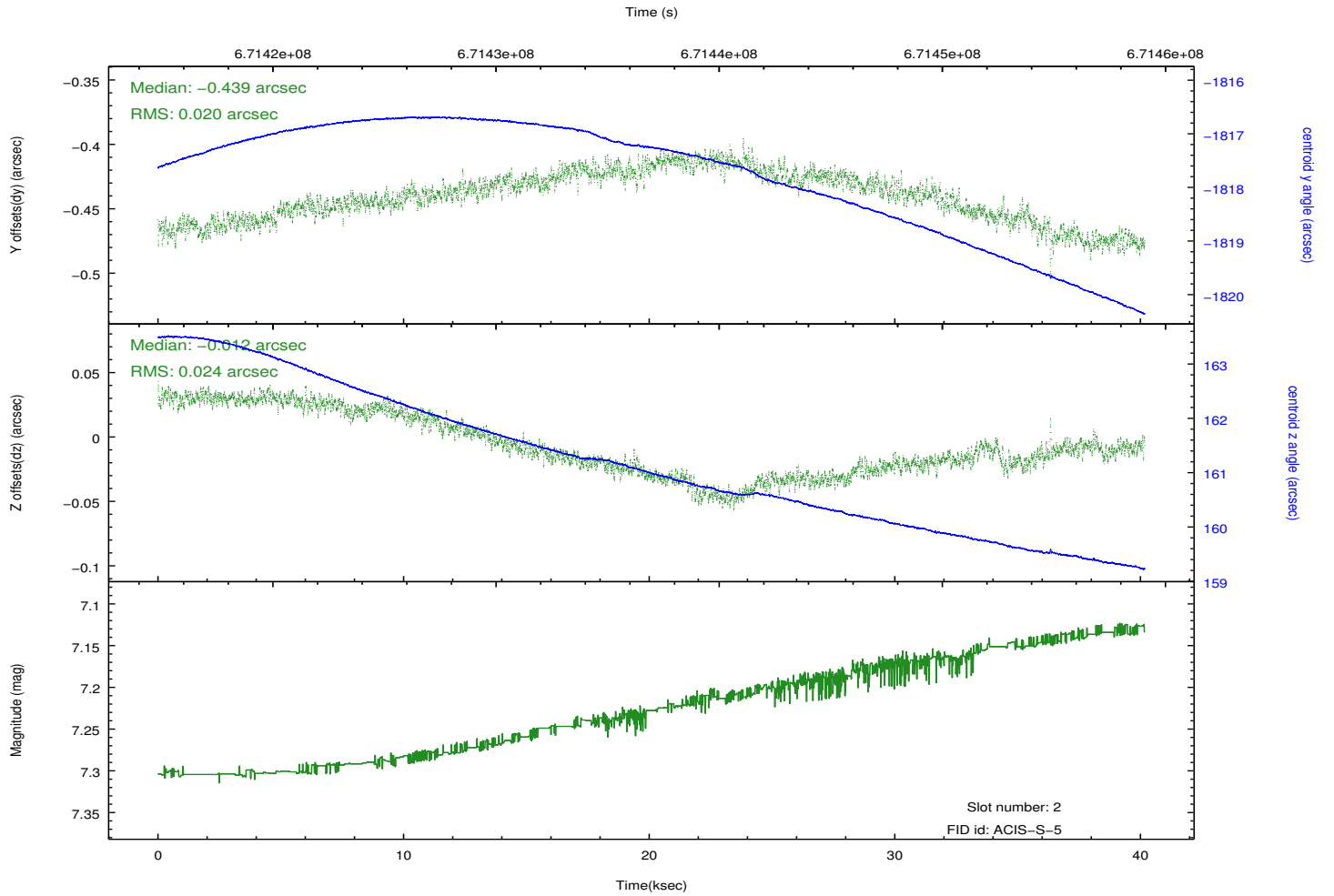
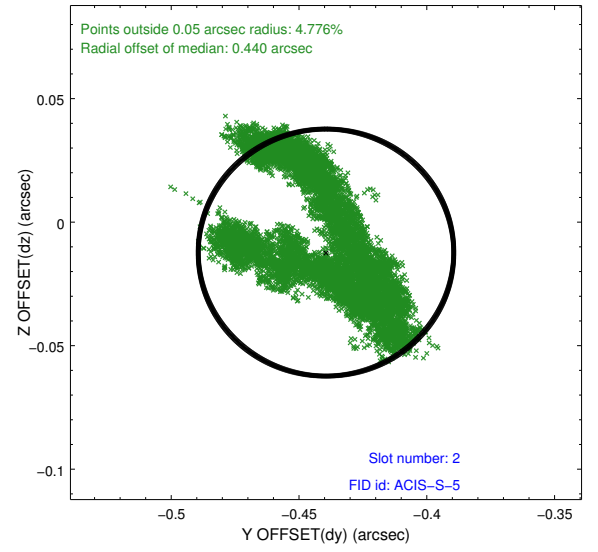
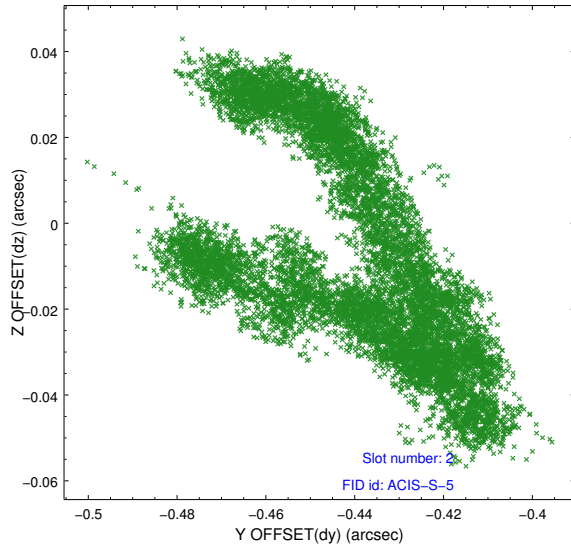
2.5.1 Slot 0



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)	2019.04.18
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	40.048900308132

A.2 Comments

A spatial region of the original bias maps for CCD = 6 and CCD = 8 suffered from anomalously high data values. Pixels in the event data that were bias-corrected by one of the original affected bias pixels may have an apparent energy shift. While the change in energy is expected to be small (~ 20 eV), it depends on many parameters that have not yet been fully explored for this bias anomaly. The bias maps for CCD = 6 and CCD = 8 have been reconstructed for this processing to remove this anomaly using scaled data from a comparable bias map from another observation. The pixels on CCD = 6 affected by the anomaly are bounded by sky coords:

(307.64245,44.42640), (307.63908,44.40607), (307.70984,44.40008),
(307.70716,44.42092).

The pixels on CCD = 8 affected by the anomaly are bounded by sky coords:

(307.58768,44.09432), (307.58648,44.08700), (307.77947,44.07050),
(307.78070,44.07782).

==

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.