V&V Reference Report
L2 ASCDS Version : 10

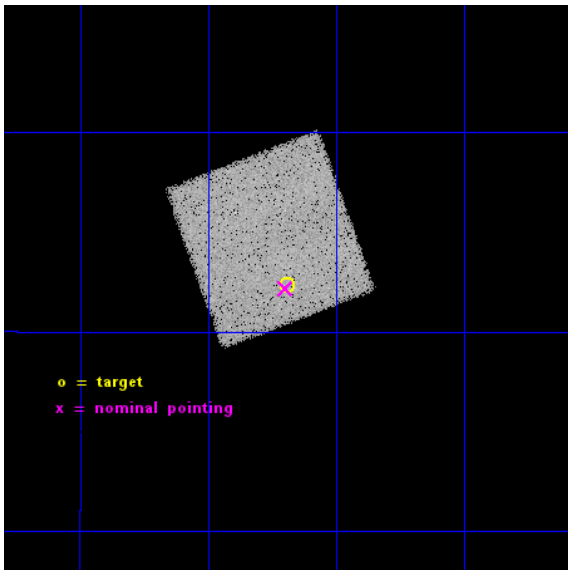
Observation 15536 - L2 Version 2
Chandra X-Ray Center

L2 Processing Date : Dec 4 2014

Contents

1 Front

seq_num	200908	Sequence number
obs_id	15536	Observation id
title	Properties and dynamics of the upper atmosphere of the hot-Neptune GJ 436b	Proposal title
observer	Dr David Ehrenreich	Principal investigator
object	GJ 436	Source name
dtycycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	175.5475	Observer's specified target RA [deg]
dec_targ	26.705528	Observer's specified target Dec [deg]
ra_nom	175.54952747307	Nominal RA [deg]
dec_nom	26.703111114161	Nominal Dec [deg]
roll_nom	249.52483069022	Nominal Roll [deg]
revision	2	Processing version of data
ontime	20022.0	Sum of GTIs [s]
livetime	19751.795438403	Livetime [s]
ontime7	20022.0	Sum of GTIs [s]
l2events	55826	Number of level 2 events

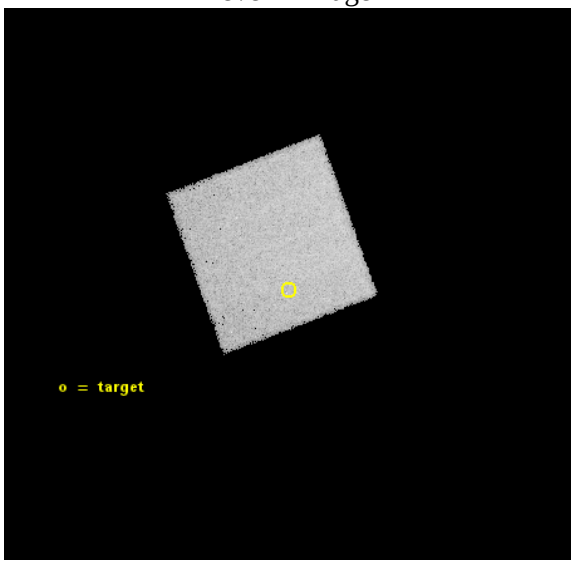


2 OBI

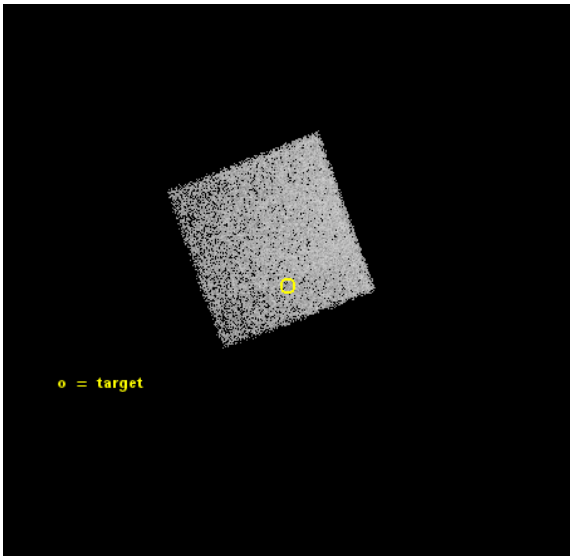
2.1 OBI

2.1.1 Images

Level 1 Image

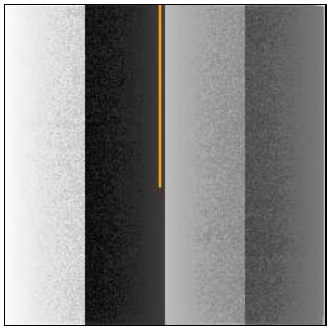


Level 1 Bad Events



2.1.2 Bias

Chip 7



2.1.3 Parameters

obi_num	1	Obi number
ascdsver	10.3	Processing system revision
caldbver	4.6.4	
date	2014-12-04T07:21:21	Date and time of file creation
revision	2	Processing version of data

sched_exp_time	20000.000000	[s] Scheduled observation exposure time
ontime	20022.0	Sum of GTIs [s]
ontime7	20022.0	Sum of GTIs [s]
l1events	131670	Number of level 1 events

2.1.4 Events

	ccd 7
level 1 events	131670
rejected events	74444
rejected %	56%

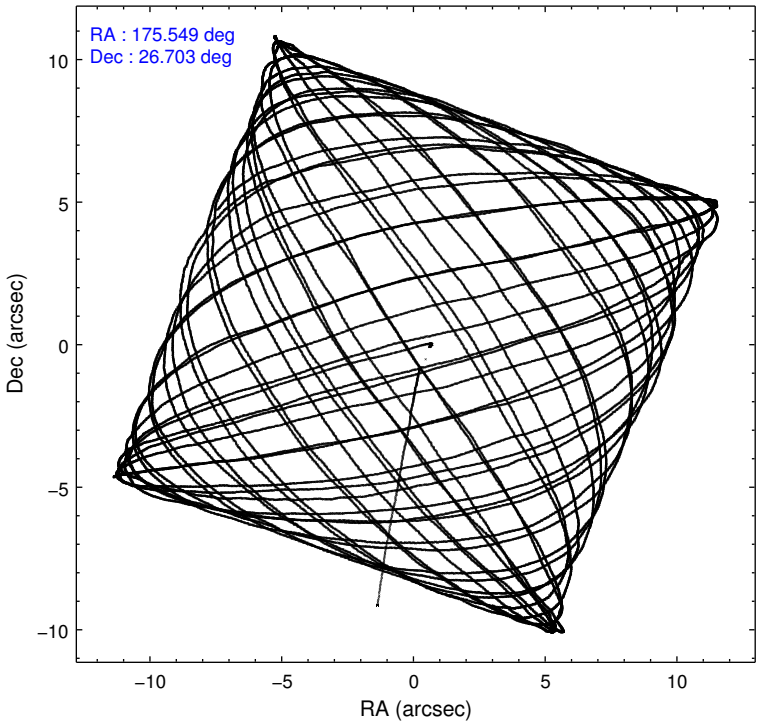
	ccd 7
grade 0 events	5168
	3%
grade 1 events	128
	0%
grade 2 events	11713
	8%
grade 3 events	4924
	3%
grade 4 events	4937
	3%
grade 5 events	13761
	10%
grade 6 events	31417
	23%
grade 7 events	59622
	45%

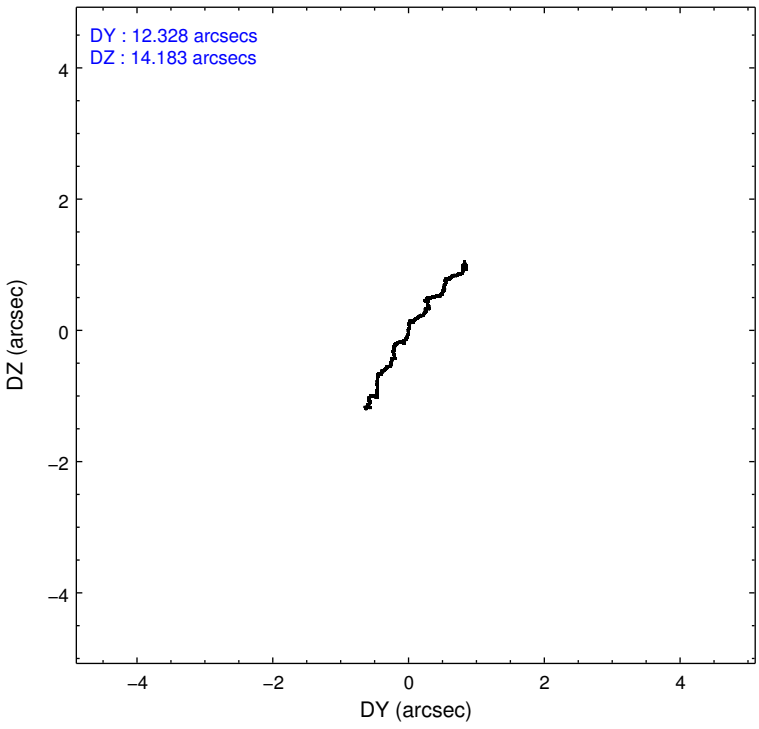
2.2 Compared Parameters

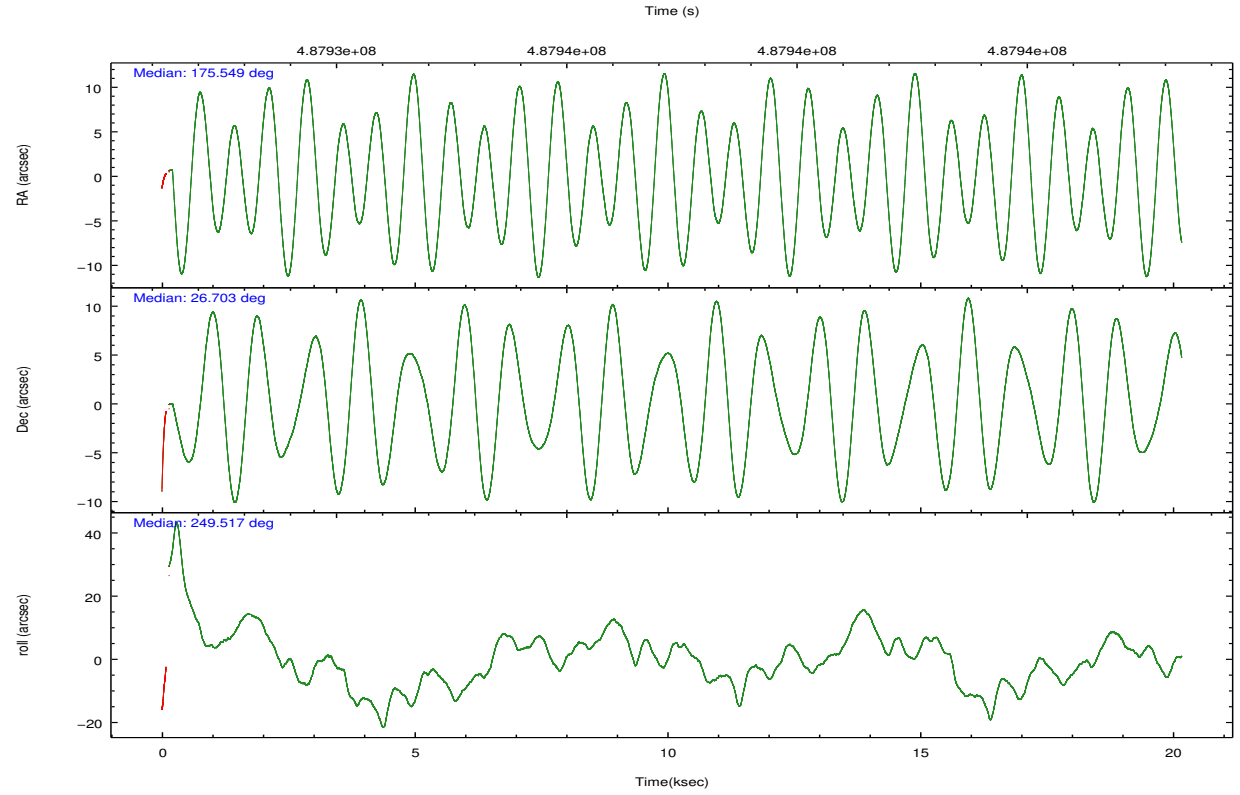
Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-7	ACIS-7
Grating	NONE	NONE
Data mode	VFAINT	VFAINT
Observation mode	POINTING	POINTING
[deg] Pointing RA	175.544067	175.5495274730666
[deg] Pointing Dec	26.730017	26.7031111141611
[deg] Pointing Roll	249.370668	249.5248306902195
[mm] SIM focus 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
Phase constraints	Y	Y
[d] Phase period	2.643898	2.643898
[d] Phase epoch (MJD)	54864.583210	54864.583210
Phase start	0.900000	0.900000
Phase end	0.990000	0.990000
Phase start error	0.030000	0.030000
Phase end error	0.030000	0.030000
[s] Observation start time (MET)	487927362.184000	487925798.74048
Observation start date	2013-06-18T07:21:35	2013-06-18T06:56:38
[s] Observation end time (MET)	487947362.184000	487947720.41664
Observation end date	2013-06-18T12:54:55	2013-06-18T13:02:00
Read mode	TIMED	TIMED

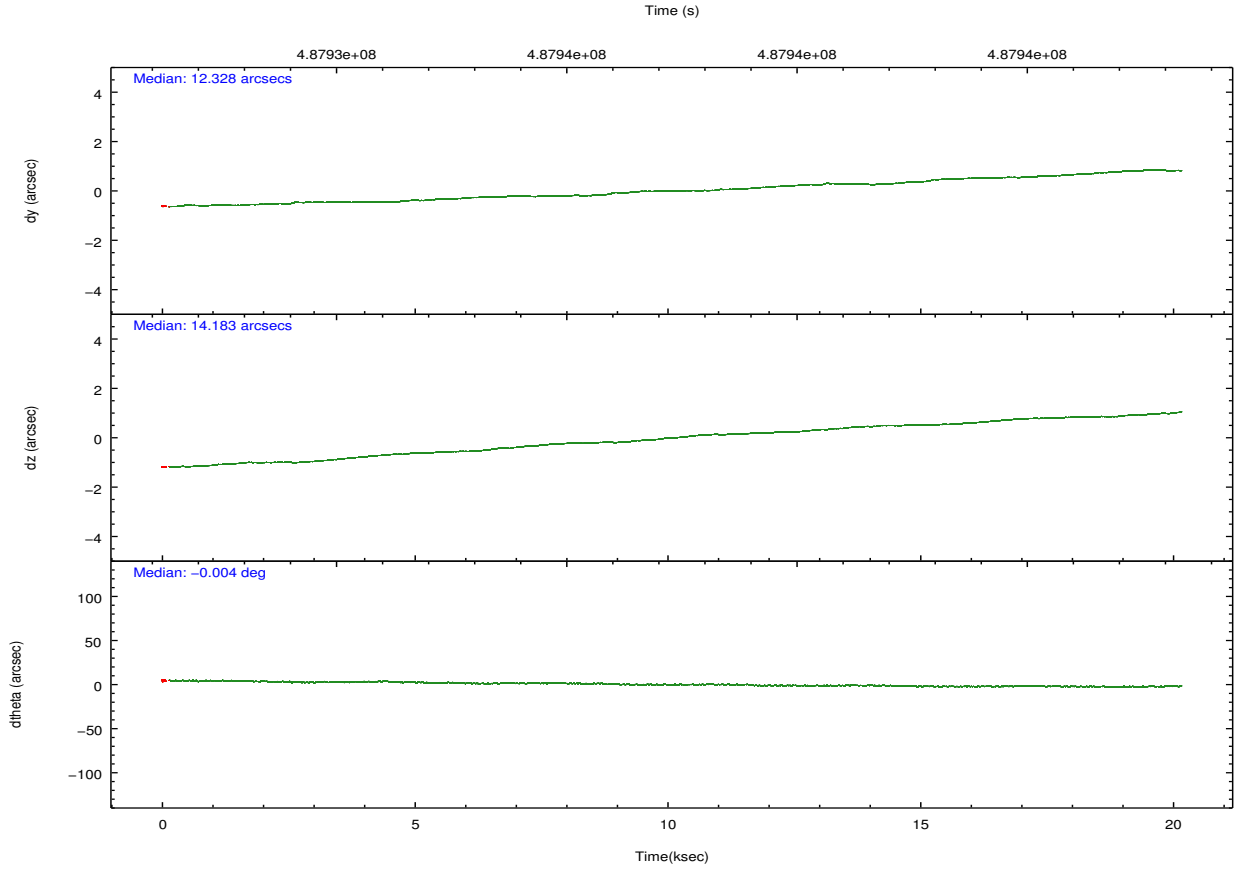
Parameter	Planned	Actual
Obspar format version number	7	7
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	NONE	NONE
Alternating exposures requested	N	N
[s] Primary exposure time	0.000000	3

2.3 Aspect


RA : 175.549 deg
Dec : 26.703 deg
Dec (arcsec)
RA (arcsec)
10
5
0
−5
−10
−10
−5
0
5
10


DY : 12.328 arcsecs
DZ : 14.183 arcsecs
DZ (arcsec)
DY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
4.8793e+08
4.8794e+08
4.8794e+08
4.8794e+08
Median: 175.549 deg
RA (arcsec)
Median: 26.703 deg
Dec (arcsec)
Median: 249.517 deg
roll (arcsec)
Time(ksec)

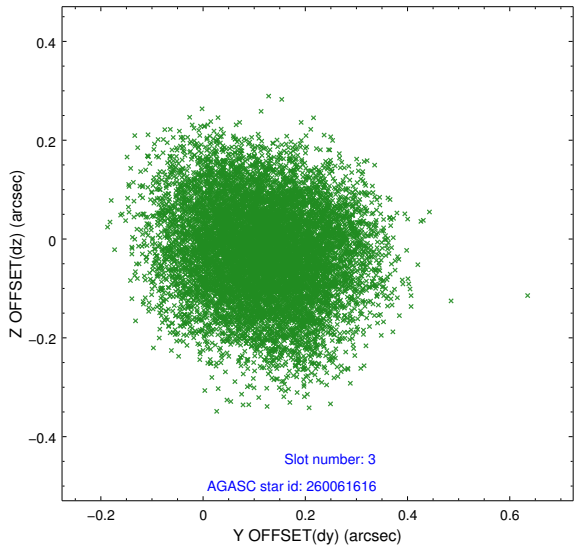

Time (s)
4.8793e+08
4.8794e+08
4.8794e+08
4.8794e+08
Median: 12.328 arcsecs
dy (arcsec)
Median: 14.183 arcsecs
dz (arcsec)
Median: −0.004 deg
dtheta (arcsec)
Time(ksec)

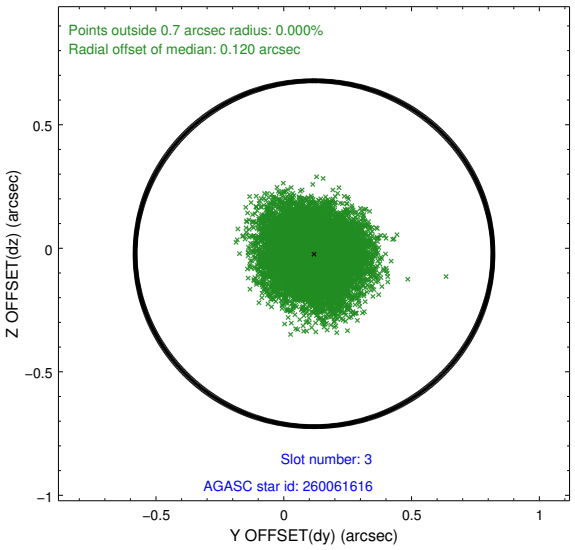
Slot Statistics

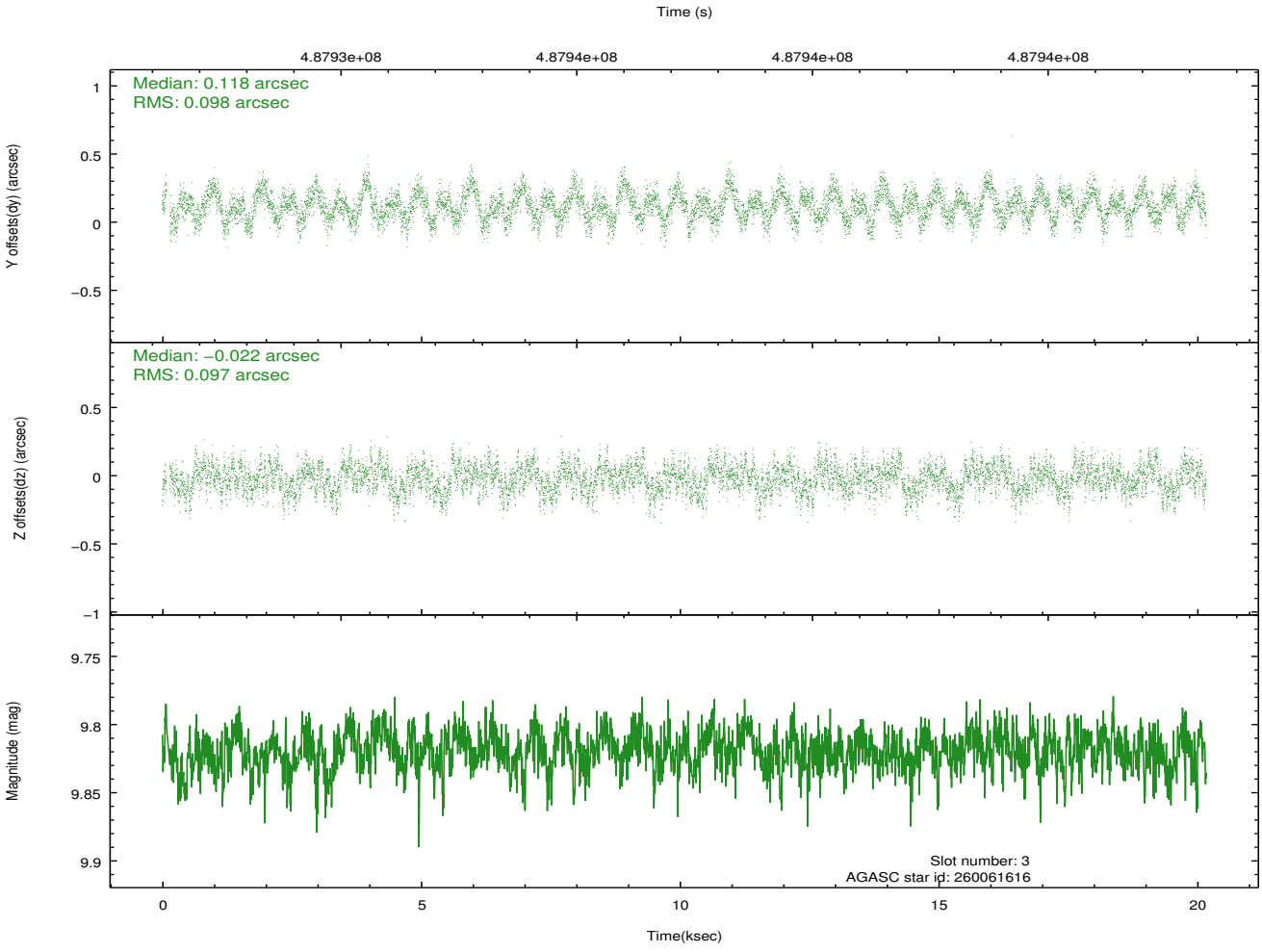
slot	status	used	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID		ACIS-S-2	7.02	4905	-0.050	-0.036	0.014	0.031	0.000000	0.000000	-765.30	-1735.47
1	FID		ACIS-S-4	7.11	4905	0.177	0.034	0.021	0.037	0.000000	0.000000	2148.12	172.89
2	FID		ACIS-S-5	7.14	4904	-0.158	0.011	0.018	0.034	0.000000	0.000000	-1818.02	166.74
3	GUIDE	used	260061616	9.82	9803	0.118	-0.022	0.151	0.234	175.767684	26.863293	-702.39	503.26
4	GUIDE	used	260064728	9.04	9806	-0.118	0.212	0.111	0.185	175.679144	27.248869	-1898.93	-254.87
5	GUIDE	used	260064920	9.85	9761	0.075	-0.123	0.208	0.310	175.209684	27.211295	-1244.15	-1612.40
6	GUIDE	used	260449032	10.10	9757	-0.087	-0.071	0.241	0.371	176.116728	26.411643	417.97	2130.78
7	MONITOR	unused		0.00	0	0.000	0.000	0.000	0.000	0.000000	0.000000	0.00	0.00

2.4 Star Slots

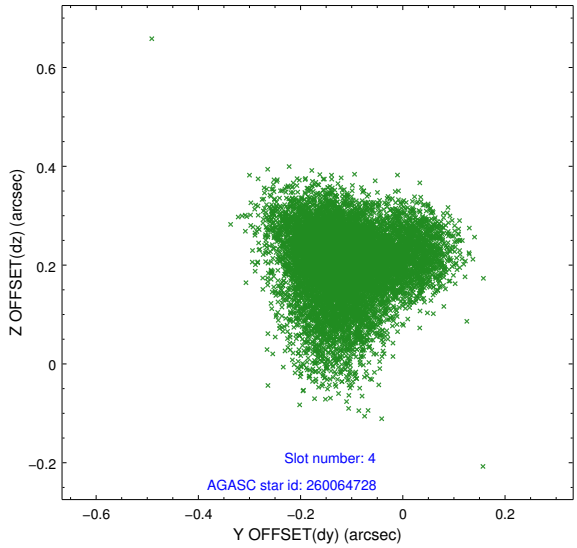
2.4.1 Slot 3

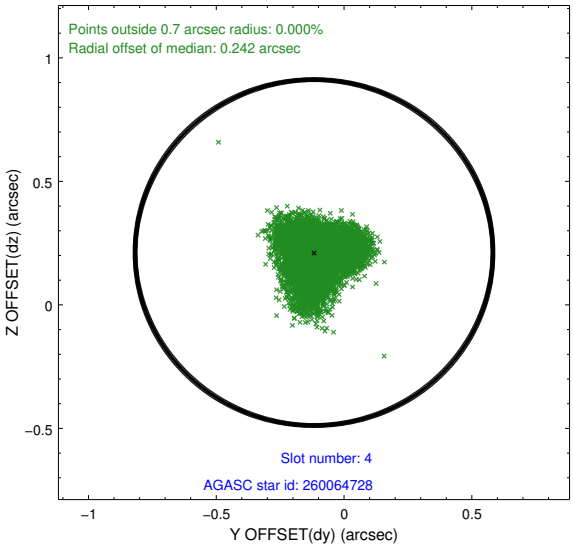


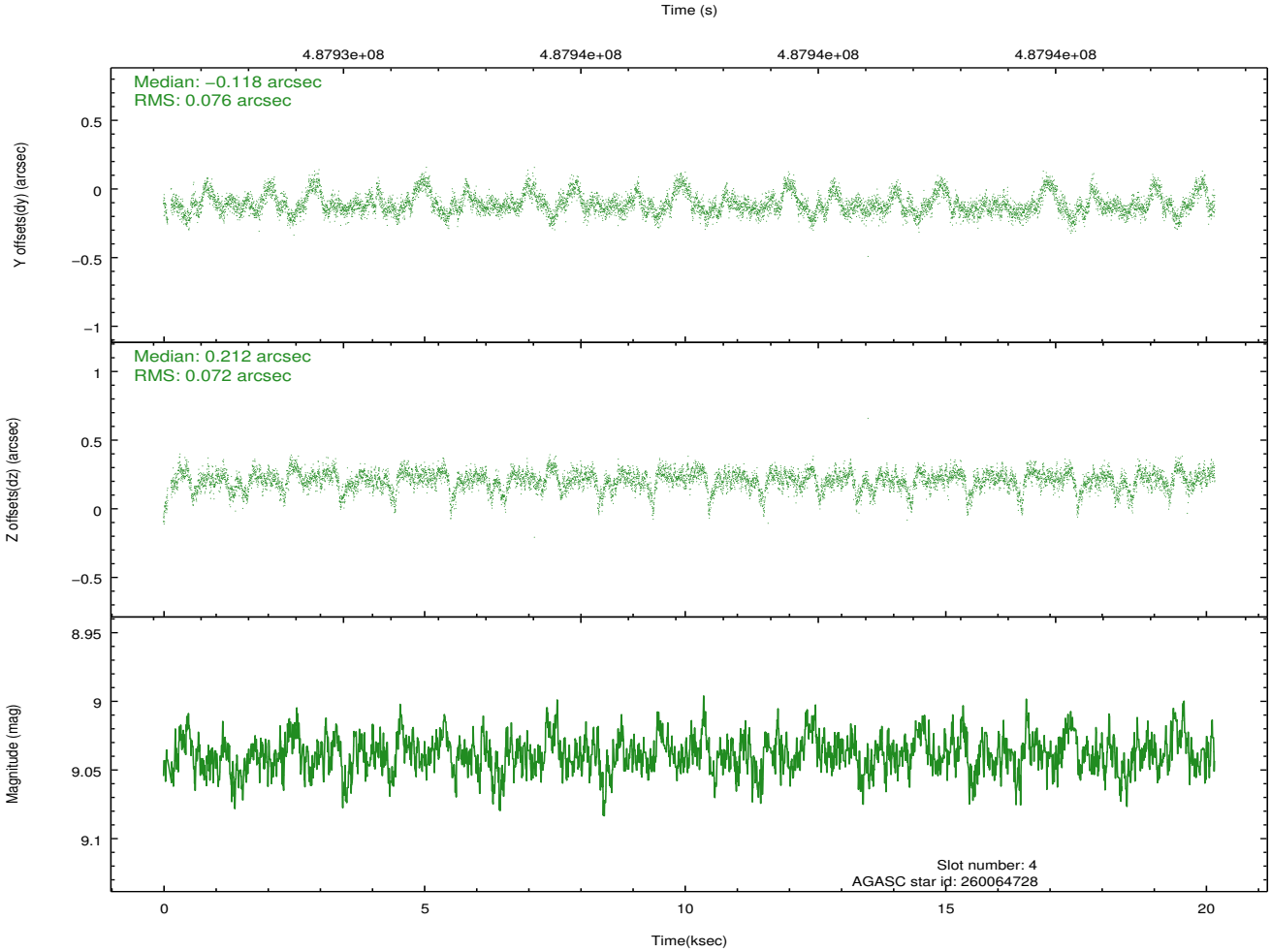




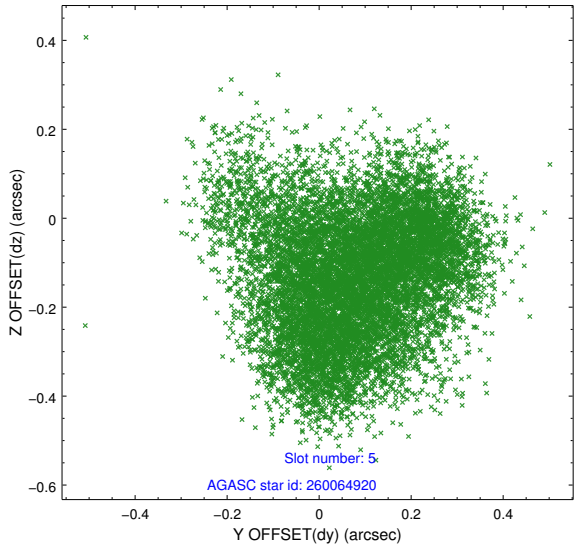
2.4.2 Slot 4

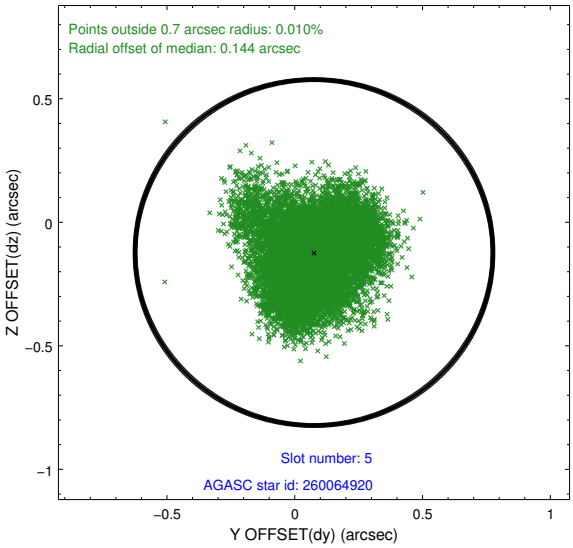

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 260064728

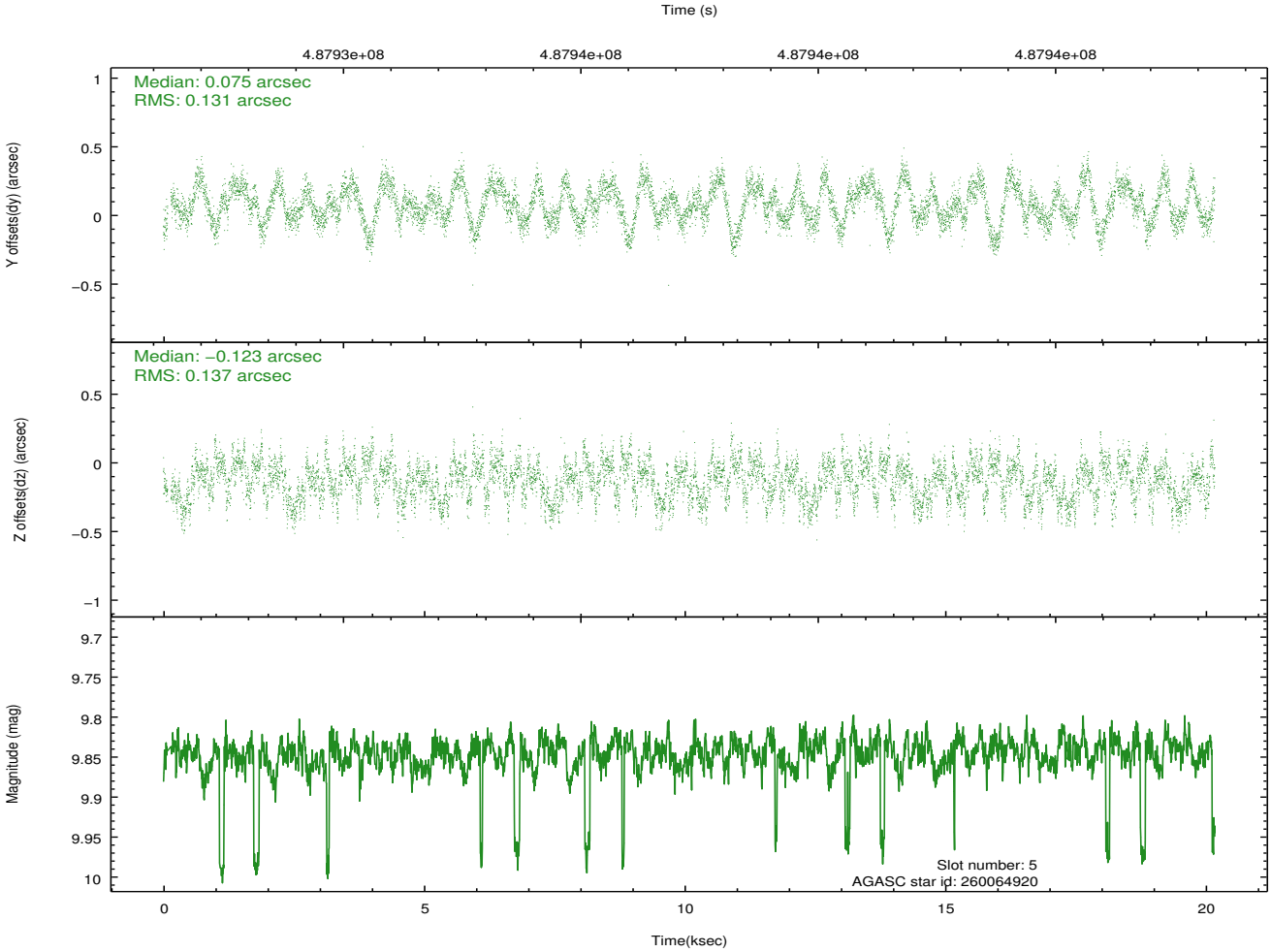

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.242 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 260064728


Time (s)
4.8793e+08
4.8794e+08
4.8794e+08
4.8794e+08
Median: −0.118 arcsec
RMS: 0.076 arcsec
Y offsets(dy) (arcsec)
Median: 0.212 arcsec
RMS: 0.072 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 4
AGASC star id: 260064728
Time(ksec)

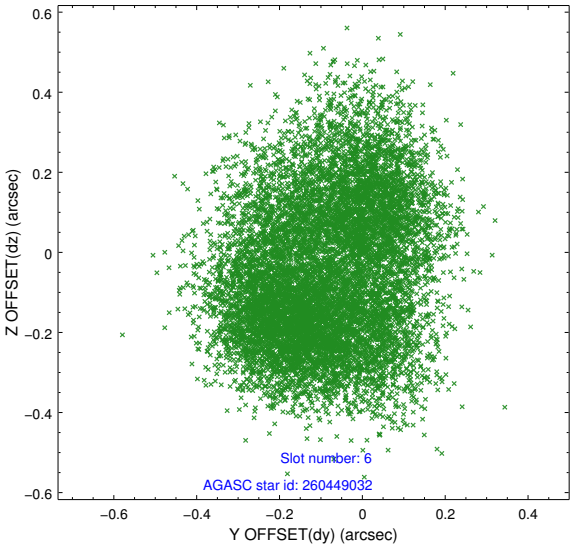
2.4.3 Slot 5

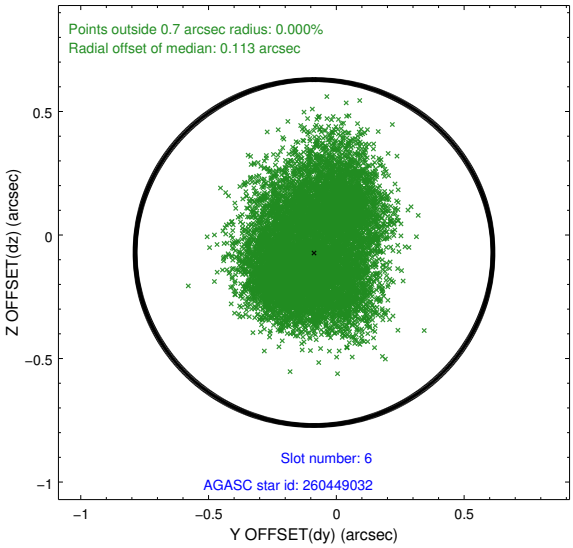

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 260064920

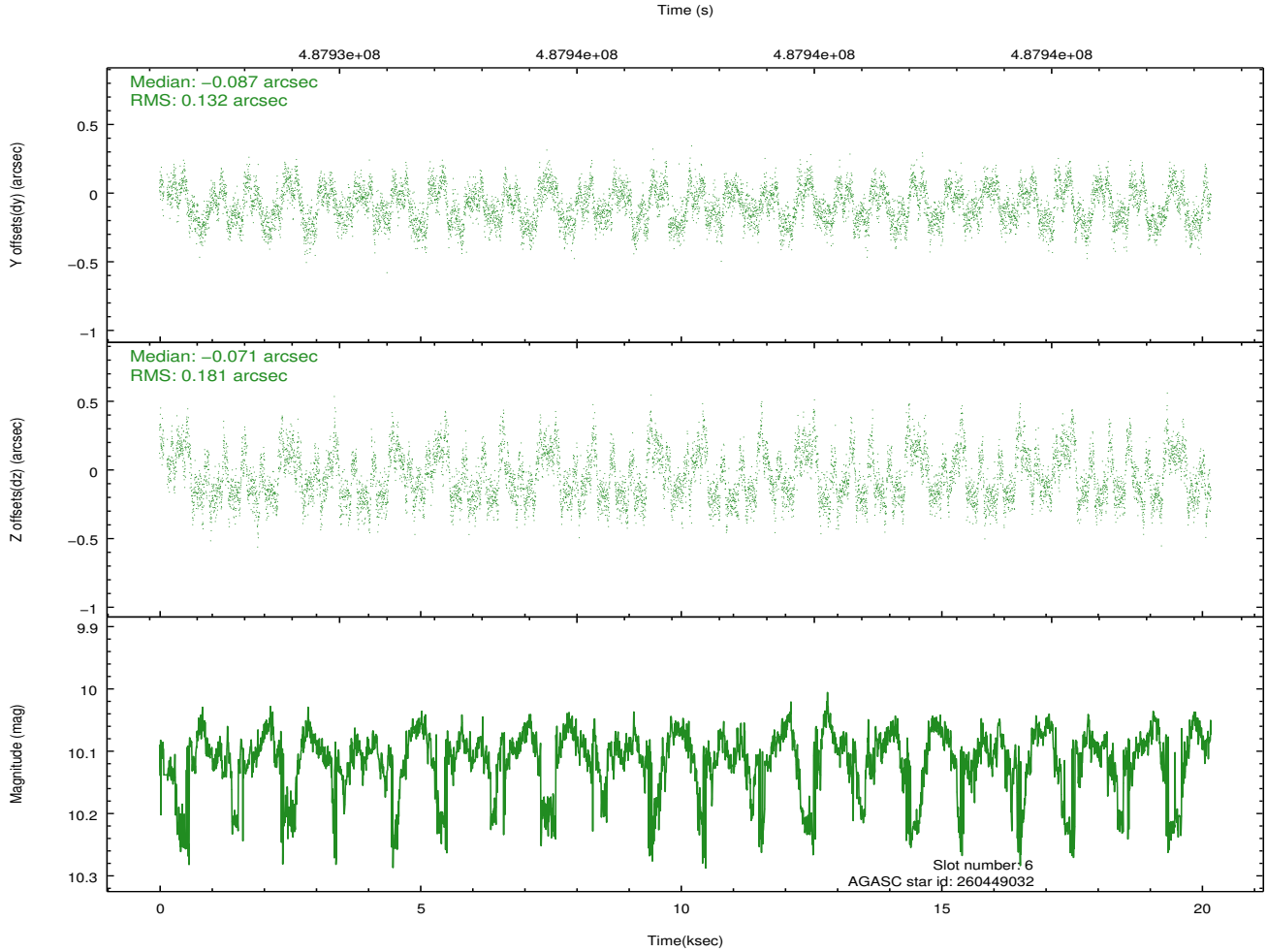

Points outside 0.7 arcsec radius: 0.010%
Radial offset of median: 0.144 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 260064920


Time (s)
4.8793e+08
4.8794e+08
4.8794e+08
4.8794e+08
Median: 0.075 arcsec
RMS: 0.131 arcsec
Y offsets(dy) (arcsec)
Median: −0.123 arcsec
RMS: 0.137 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 5
AGASC star id: 260064920
Time(ksec)

2.4.4 Slot 6

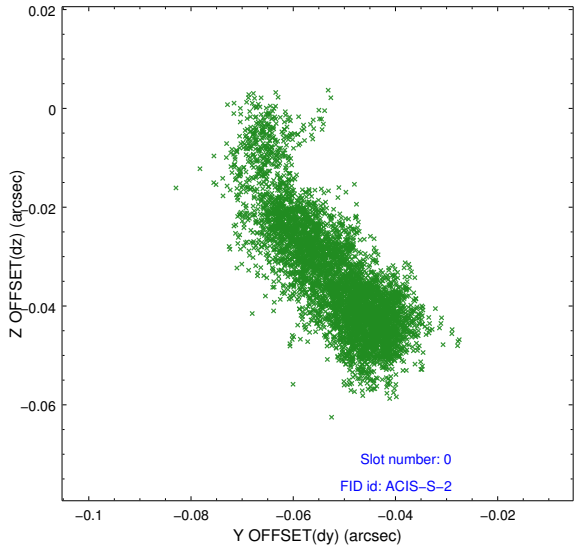

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 260449032

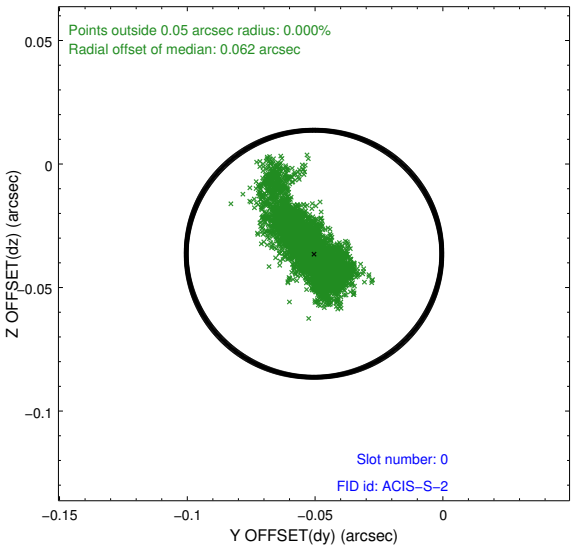

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.113 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 260449032

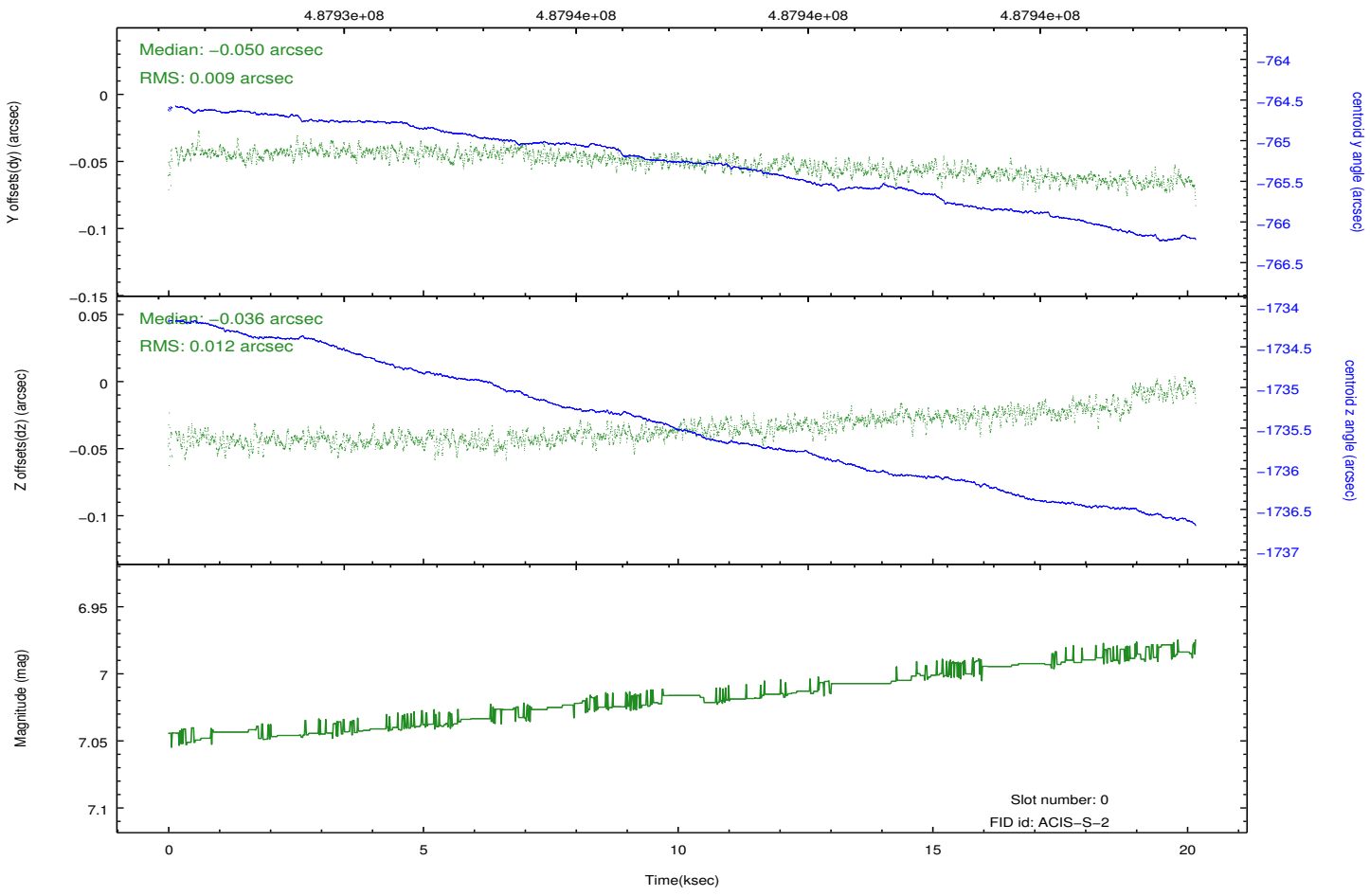

Time (s)
4.8793e+08
4.8794e+08
4.8794e+08
4.8794e+08
Median: −0.087 arcsec
RMS: 0.132 arcsec
Y offsets(dy) (arcsec)
Median: −0.071 arcsec
RMS: 0.181 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 6
AGASC star id: 260449032
Time(ksec)

2.5 FID Slots

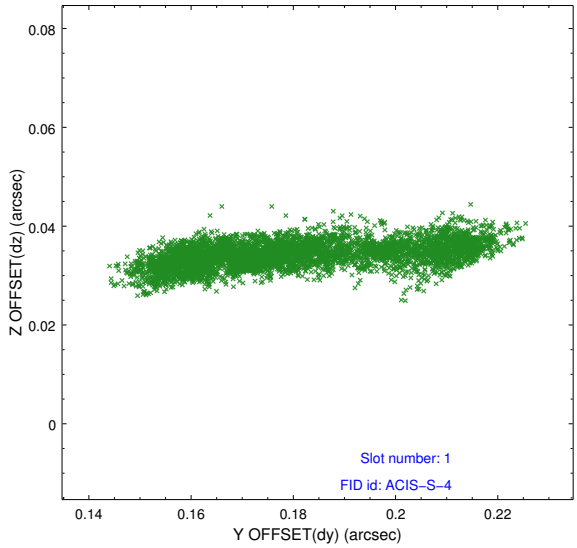
2.5.1 Slot 0

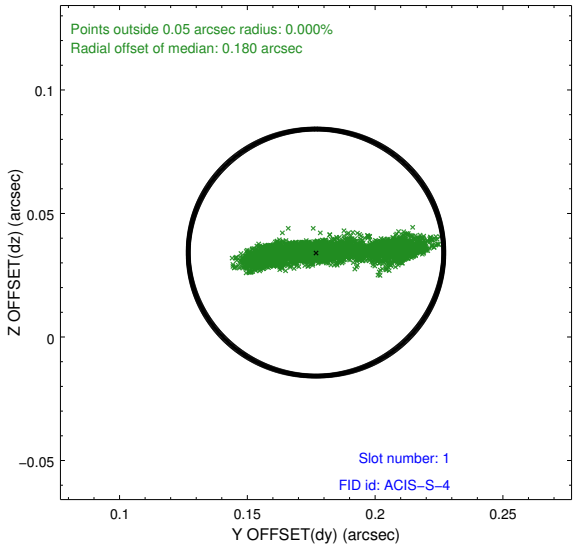


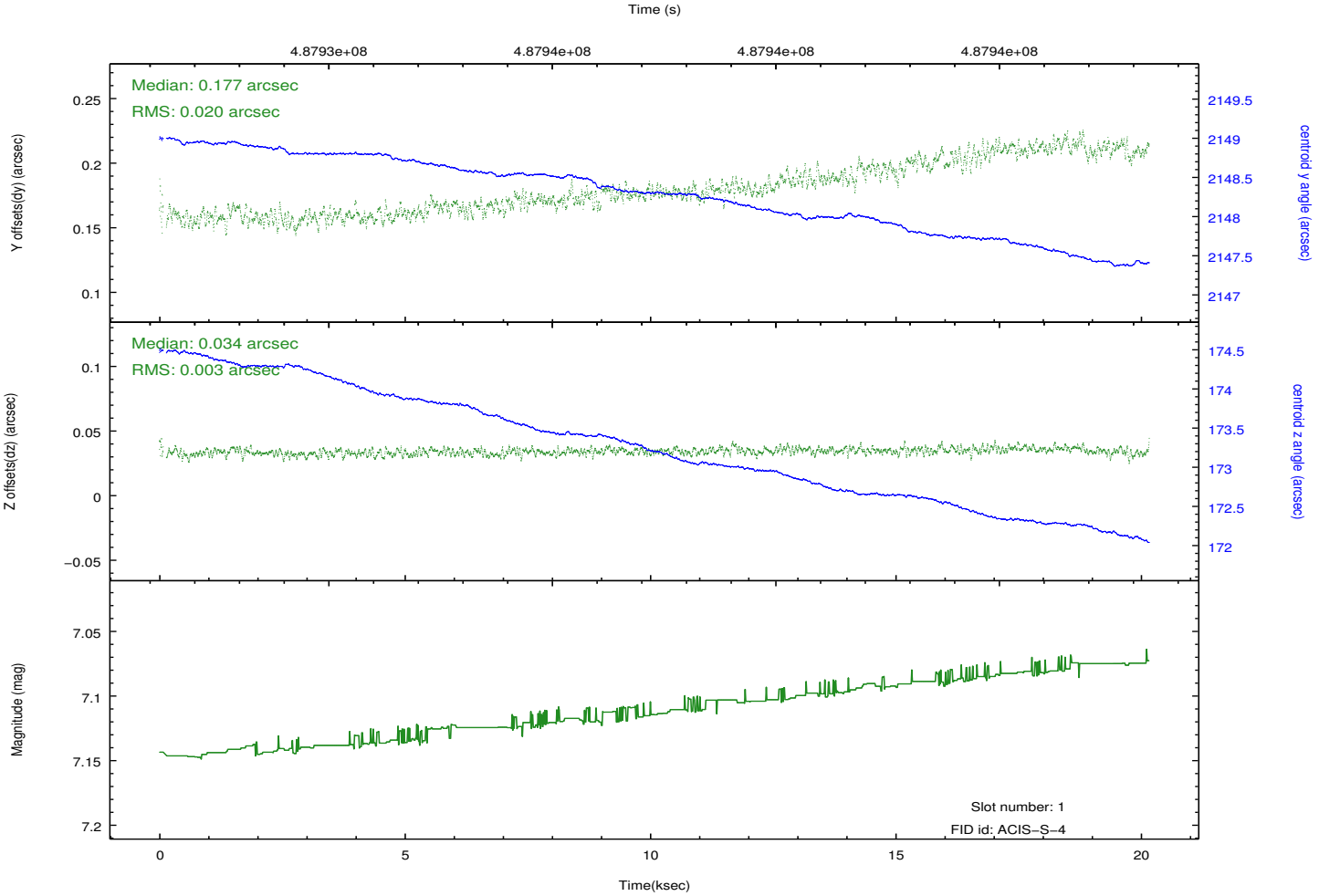




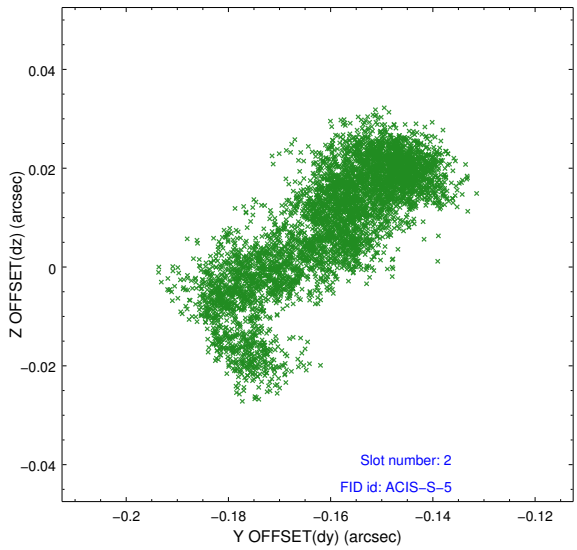
2.5.2 Slot 1

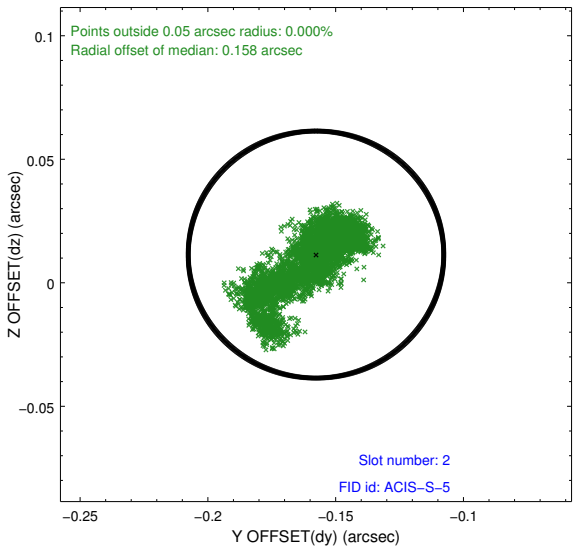

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−4

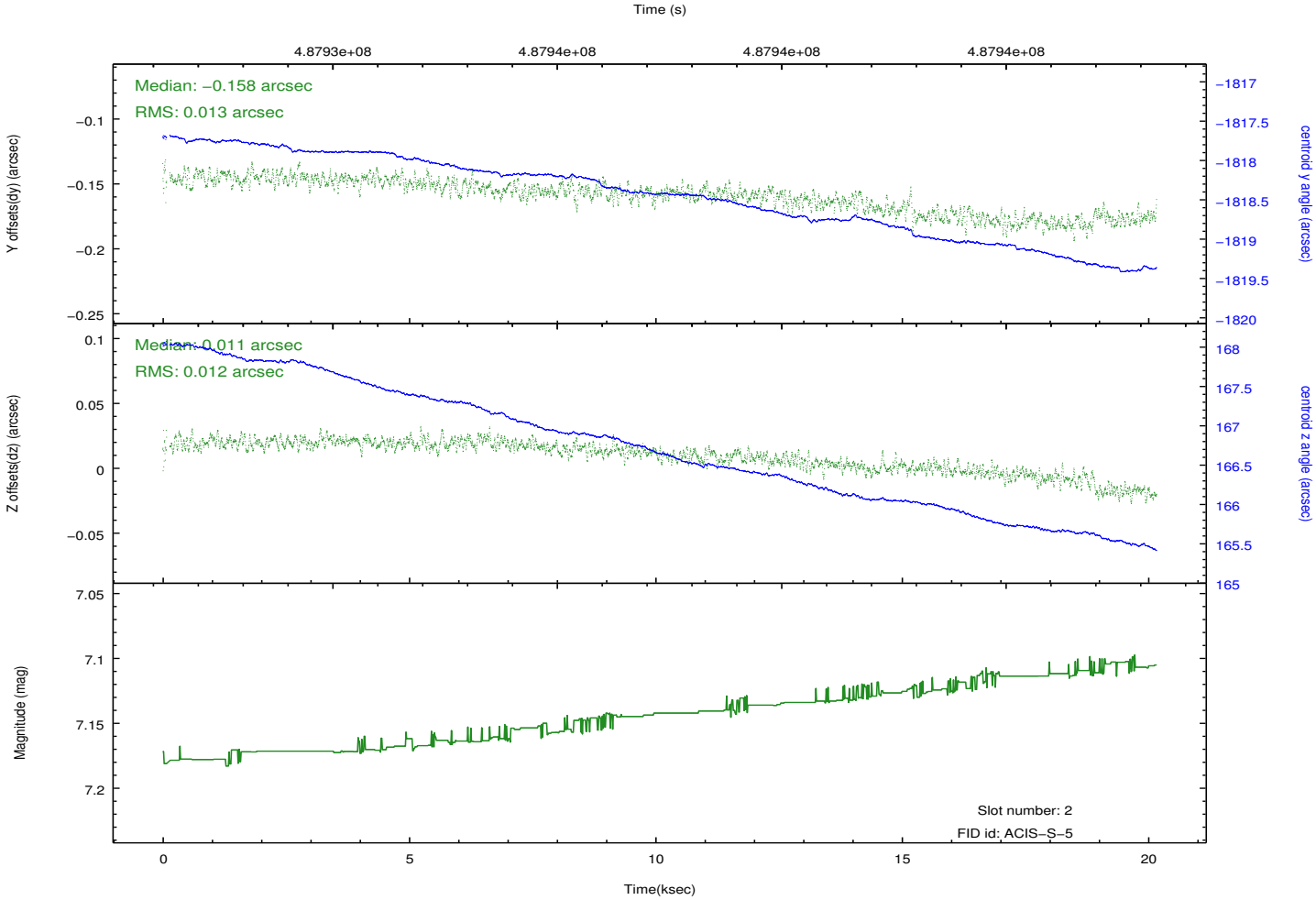

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.180 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−4


Time (s)
Median: 0.177 arcsec
RMS: 0.020 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.034 arcsec
RMS: 0.003 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 1
FID id: ACIS−S−4
Time(ksec)

2.5.3 Slot 2


Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−5


Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.158 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−5


Time (s)
Median: −0.158 arcsec
RMS: 0.013 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.011 arcsec
RMS: 0.012 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 2
FID id: ACIS−S−5
Time(ksec)

A Summary

A.1 Status

V&V Scientist	Jen Lauer
V&V Date (YYYY-MM-DD)	2014.12.11
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	20.022

A.2 Comments

```
Joint proposal with HST. Optical photometry of target in slot 7. Phase
constraint met.
=======
These data have been reprocessed with new aspect alignment calibration
files that correct small mean offsets (up to 0.4 arcsecs) and improve
overall astrometric accuracy. The new calibration was determined using
data from the time period being reprocessed and was performed using
cross-correlation of X-ray sources with radio and optical counterparts.
```