# V&V Reference Report
# L2 ASCDS Version : 8.5.1.1

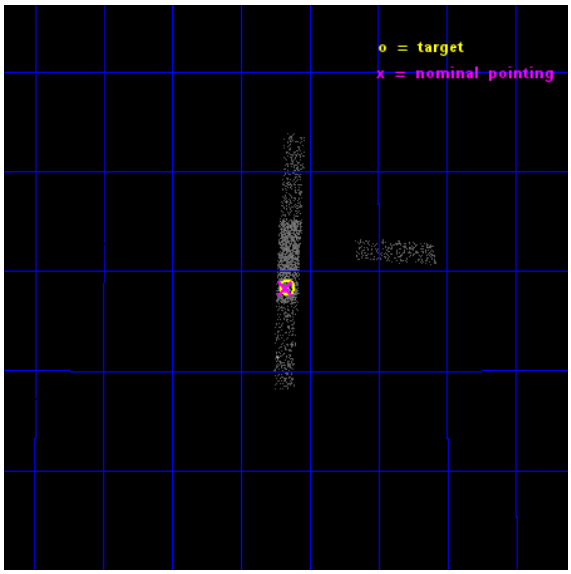
Observation 14996 - L2 Version 2
Chandra X-Ray Center

L2 Processing Date : Dec 2 2014

## Contents

# 1 Front

| | | |
|---|---|---|
| seq_num | 702804 | Sequence number |
| obs_id | 14996 | Observation id |
| title | The Herschel Legacy of powerful 3C radio galaxies and quasars II: observing Proposal. | Proposal title |
| observer | Dr Joanna Kuraszkiewicz | Principal investigator |
| object | 3C138 | Source name |
| dtycycle | 0 |   |
| cycle | P | events from which exps? Prim/Second/Both |
| ra_targ | 80.29125 | Observer's specified target RA [deg] |
| dec_targ | 16.639444 | Observer's specified target Dec [deg] |
| ra_nom | 80.294010003594 | Nominal RA [deg] |
| dec_nom | 16.638153506903 | Nominal Dec [deg] |
| roll_nom | 272.77874591057 | Nominal Roll [deg] |
| revision | 2 | Processing version of data |
| ontime | 2084.612811923 | Sum of GTIs [s] |
| livetime | 2002.4329631167 | Livetime [s] |
| ontime3 | 2084.5307319164 | Sum of GTIs [s] |
| ontime6 | 2084.5717719197 | Sum of GTIs [s] |
| ontime7 | 2084.612811923 | Sum of GTIs [s] |
| ontime8 | 2084.4896919131 | Sum of GTIs [s] |
| l2events | 3101 | Number of level 2 events |

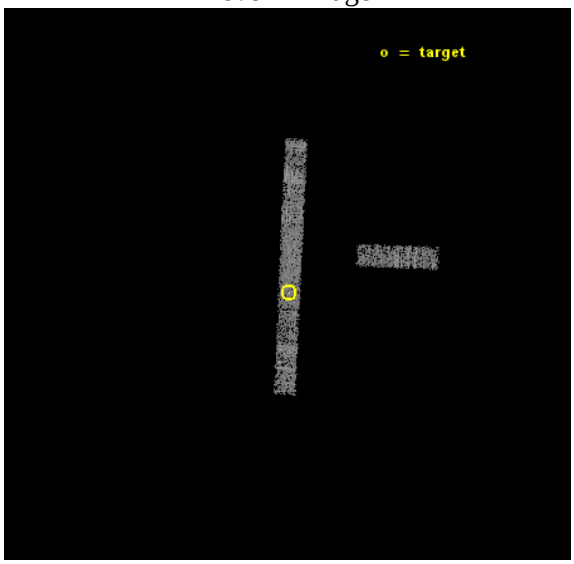


# 2 OBI

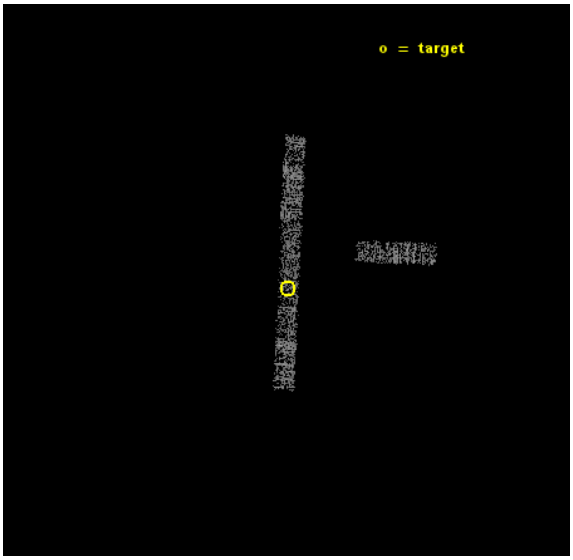
## 2.1 OBI

### 2.1.1 Images

Level 1 Image

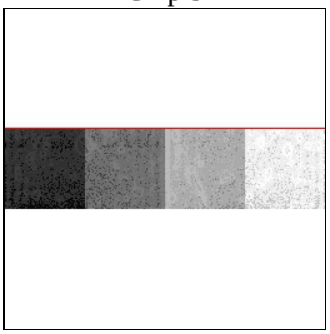



Level 1 Bad Events

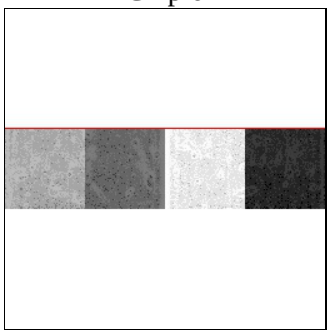



### 2.1.2 Bias

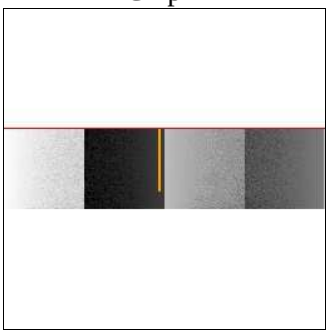
Chip 3



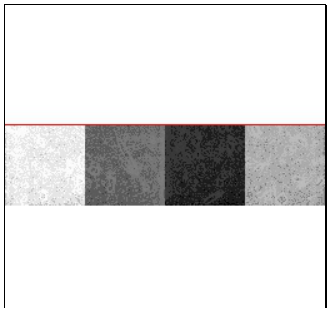
Chip 6



Chip 7



Chip 8



### 2.1.3 Parameters

| | | |
|---|---|---|
| obi_num | 1 | Obi number |
| ascdsver | 10.3 | Processing system revision |
| caldbver | 4.6.4 |   |
| date | 2014-12-02T07:46:17 | Date and time of file creation |
| revision | 2 | Processing version of data |

| | | |
|---|---|---|
| sched_exp_time | 2000.000000 | [s] Scheduled observation exposure time |
| ontime | 2084.612811923 | Sum of GTIs [s] |
| ontime3 | 2084.5307319164 | Sum of GTIs [s] |
| ontime6 | 2084.5717719197 | Sum of GTIs [s] |
| ontime7 | 2084.612811923 | Sum of GTIs [s] |
| ontime8 | 2084.4896919131 | Sum of GTIs [s] |
| l1events | 14548 | Number of level 1 events |

### 2.1.4 Events

| | **ccd 3** | **ccd 6** | **ccd 7** | **ccd 8** |
|---|---|---|---|---|
| level 1 events | 2963 | 3223 | 4240 | 4122 |
| rejected events | 2619 | 2779 | 2101 | 3080 |
| rejected % | 88% | 86% | 49% | 74% |

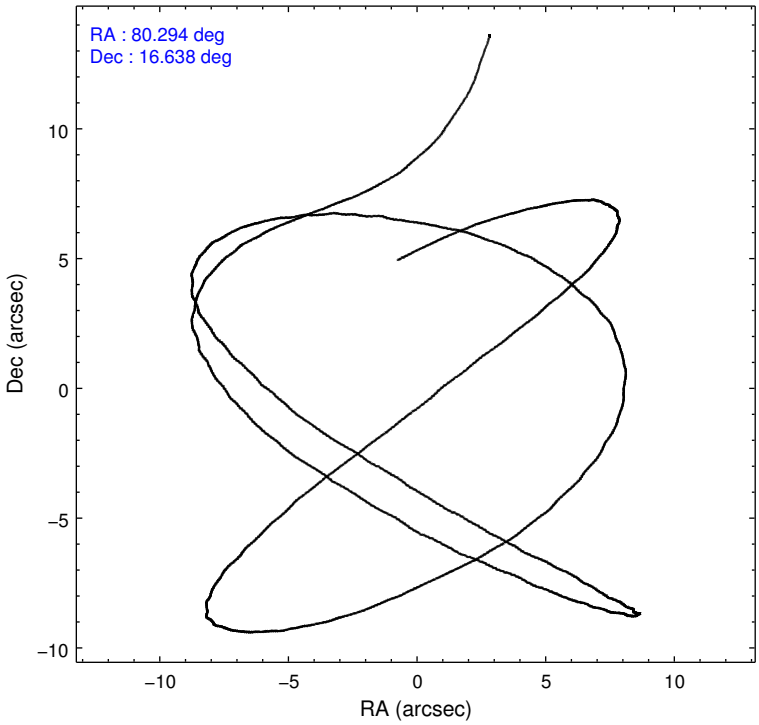
| | **ccd 3** | **ccd 6** | **ccd 7** | **ccd 8** |
|---|---|---|---|---|
| grade 0 events | 100 | 159 | 295 | 266 |
| | 3% | 4% | 6% | 6% |
| grade 1 events | 1 | 0 | 4 | 4 |
| | 0% | 0% | 0% | 0% |
| grade 2 events | 64 | 77 | 435 | 235 |
| | 2% | 2% | 10% | 5% |
| grade 3 events | 57 | 64 | 267 | 130 |
| | 1% | 1% | 6% | 3% |
| grade 4 events | 59 | 58 | 250 | 97 |
| | 1% | 1% | 5% | 2% |
| grade 5 events | 148 | 129 | 429 | 217 |
| | 4% | 4% | 10% | 5% |
| grade 6 events | 65 | 86 | 895 | 314 |
| | 2% | 2% | 21% | 7% |
| grade 7 events | 2469 | 2650 | 1665 | 2859 |
| | 83% | 82% | 39% | 69% |

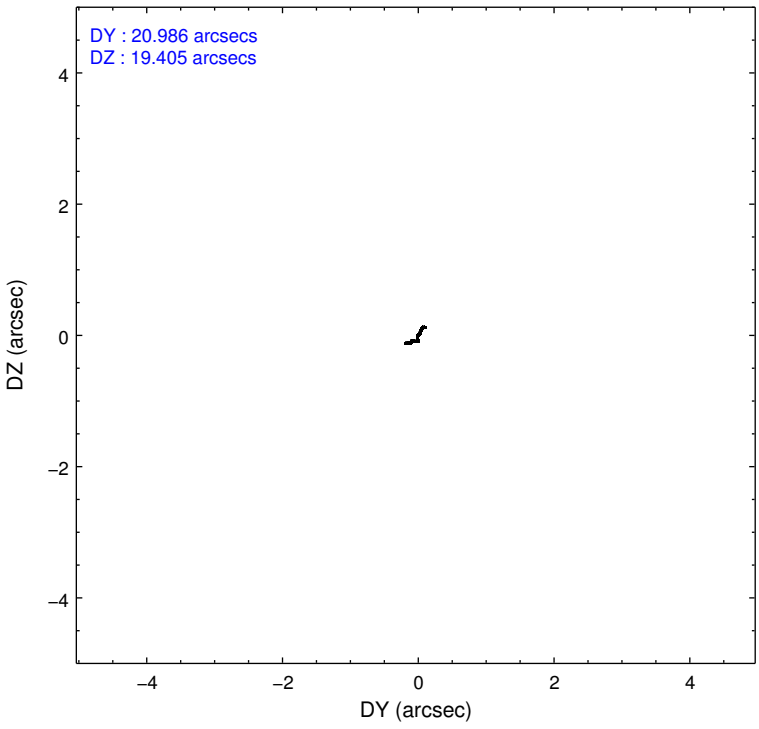
## 2.2 Compared Parameters

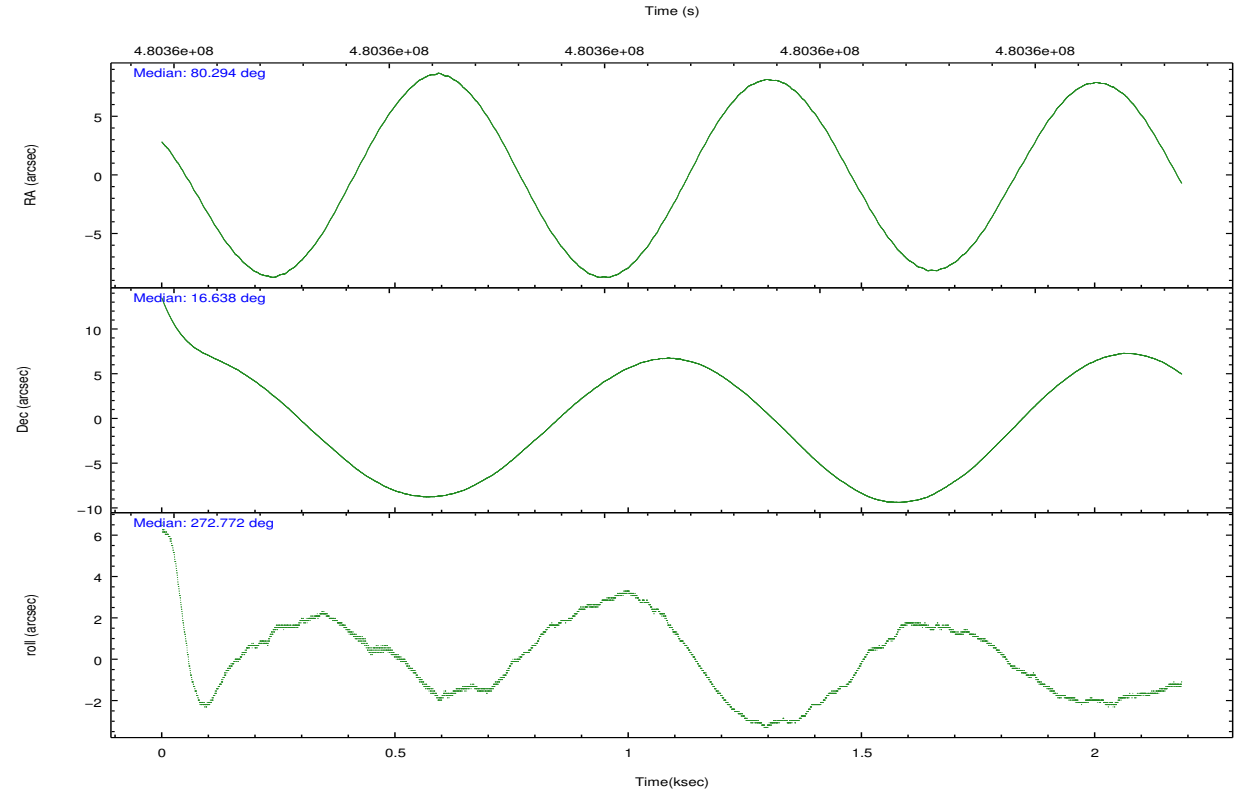
| Parameter | Planned | Actual |
|---|---|---|
| Instrument | ACIS | ACIS |
| Detector | ACIS-3678 | ACIS-3678 |
| Grating | NONE | NONE |
| Data mode | FAINT | FAINT |
| Observation mode | POINTING | POINTING |
| [deg] Pointing RA | 80.278215 | 80.29401000359444 |
| [deg] Pointing Dec | 16.660722 | 16.63815350690254 |
| [deg] Pointing Roll | 272.626591 | 272.7787459105735 |
| [mm] SIM focus pos | -0.684267 | -0.6828225247311905 |
| [mm] SIM defocus | 0 | 0.001444936568705701 |
| [mm] SIM translation stage pos | -190.132523 | -190.1400660498719 |
| [mm] SIM translation stage offset | 0 | 0.00754346686406393 |
| [s] Observation start time (MET) | 480357755.184000 | 480356592.55526 |
| Observation start date | 2013-03-22T16:41:28 | 2013-03-22T16:23:12 |
| [s] Observation end time (MET) | 480359755.184000 | 480360564.43047 |
| Observation end date | 2013-03-22T17:14:48 | 2013-03-22T17:29:24 |
| Read mode | TIMED | TIMED |

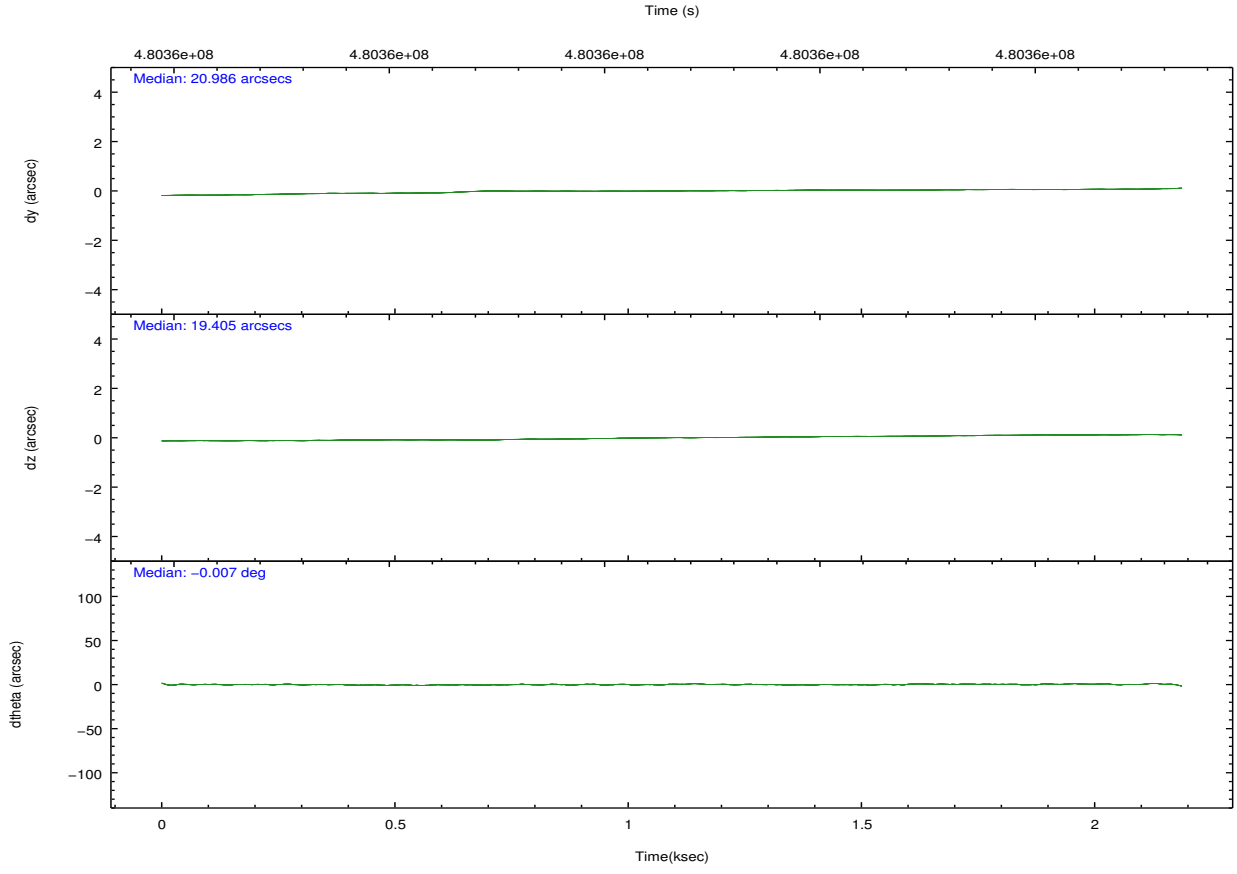
| Parameter | Planned | Actual |
|---|---|---|
| Obspar format version number | 7 | 7 |
| Obspar file type | PREDICTED | ACTUAL |
| Obspar update status | NONE | UPDATED |
| CCD I0 on | N | N |
| CCD I1 on | N | N |
| CCD I2 on | N | N |
| CCD I3 on | O1 | Y |
| CCD S0 on | N | N |
| CCD S1 on | N | N |
| CCD S2 on | O3 | Y |
| CCD S3 on | Y | Y |
| CCD S4 on | O2 | Y |
| CCD S5 on | N | N |
| Number of optional ACIS chips dropped | 0 | 0 |
| On-chip summing requested | N | N |
| Subarray requested | CUSTOM | 1/4 |
| Subarray start row | 385 | 385 |
| Subarray row count | 256 | 256 |
| Alternating exposures requested | N | N |
| [s] Primary exposure time | 0.000000 | 1 |

## 2.3 Aspect


RA : 80.294 deg
Dec : 16.638 deg
Dec (arcsec)
RA (arcsec)
10
5
0
−5
−10
−10
−5
0
5
10


DY : 20.986 arcsecs
DZ : 19.405 arcsecs
DZ (arcsec)
DY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
4.8036e+08
4.8036e+08
4.8036e+08
4.8036e+08
4.8036e+08
Median: 80.294 deg
RA (arcsec)
Median: 16.638 deg
Dec (arcsec)
Median: 272.772 deg
roll (arcsec)
Time(ksec)

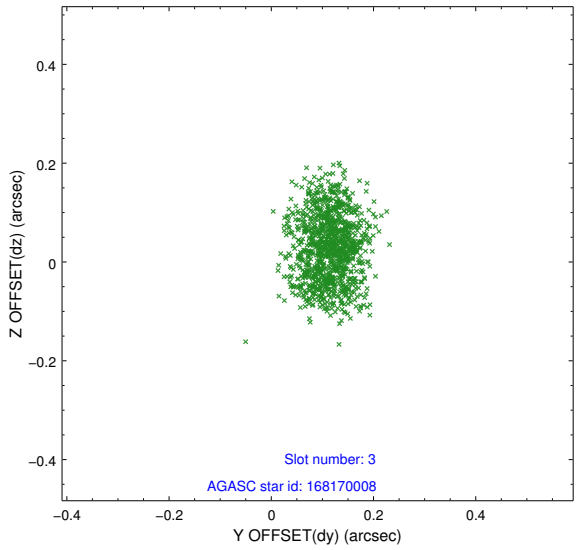

Time (s)
4.8036e+08
4.8036e+08
4.8036e+08
4.8036e+08
4.8036e+08
Median: 20.986 arcsecs
dy (arcsec)
Median: 19.405 arcsecs
dz (arcsec)
Median: −0.007 deg
dtheta (arcsec)
Time(ksec)

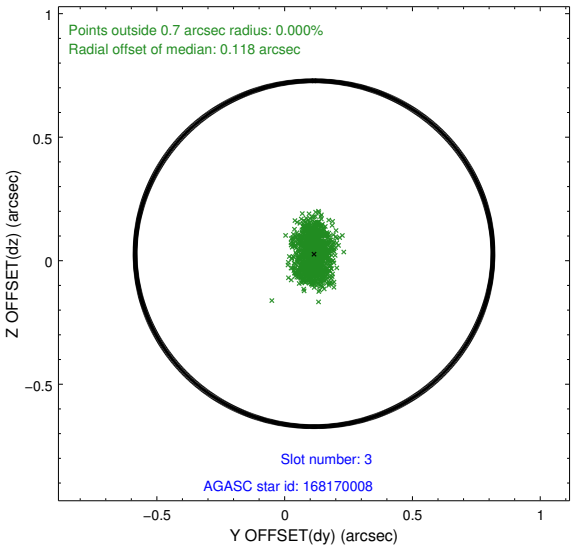
Slot Statistics

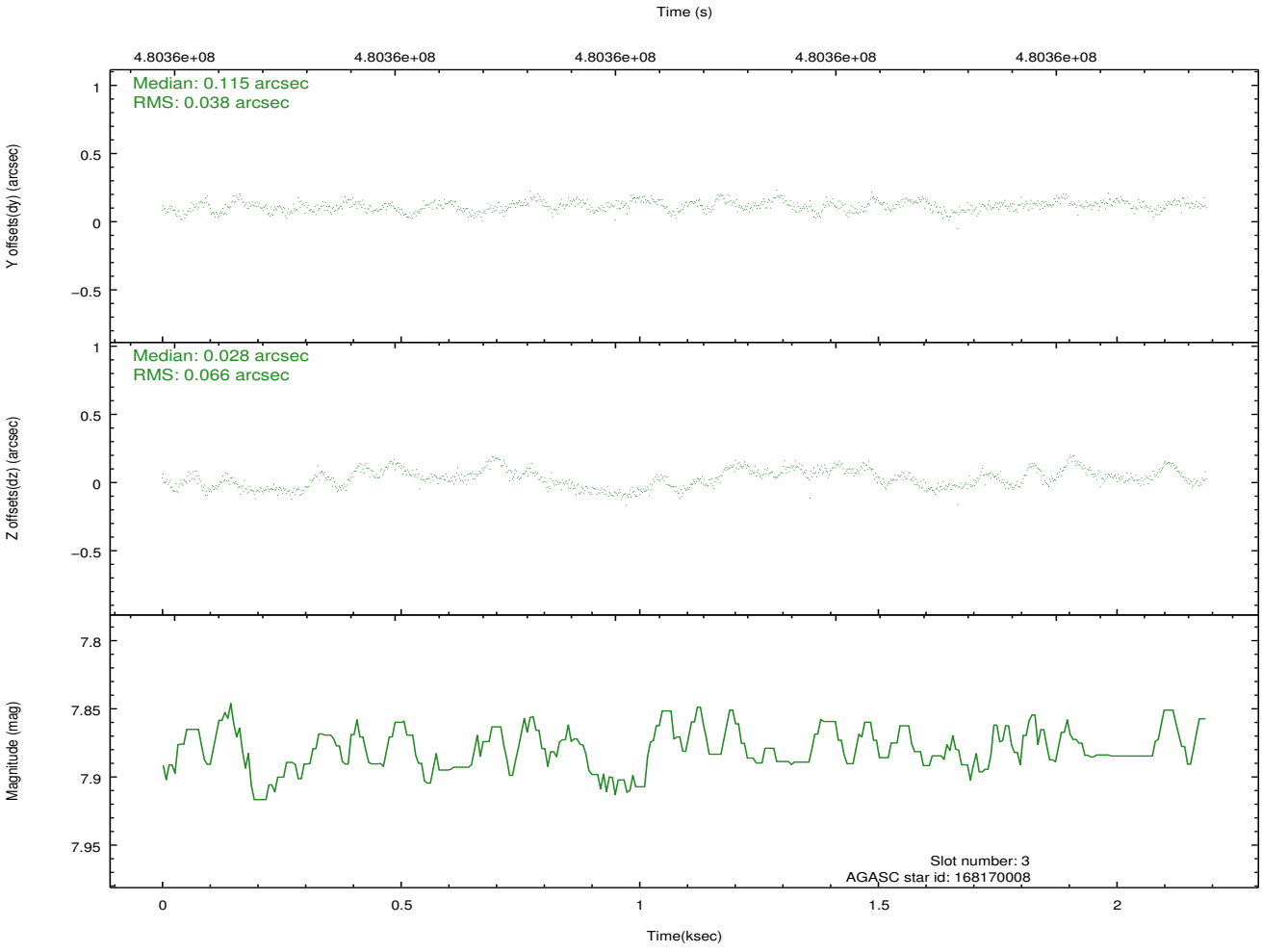
| slot | status | used | id | mag | n_pts | med_dy | med_dz | dr1 | dr2 | ra | dec | mean_y | mean_z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FID | | ACIS-S-1 | 6.99 | 534 | 0.064 | -0.031 | 0.008 | 0.013 | 0.000000 | 0.000000 | 922.04 | -1736.54 |
| 1 | FID | | ACIS-S-5 | 7.04 | 534 | -0.144 | 0.038 | 0.006 | 0.009 | 0.000000 | 0.000000 | -1825.57 | 157.94 |
| 2 | FID | | ACIS-S-6 | 7.13 | 534 | 0.058 | 0.005 | 0.008 | 0.013 | 0.000000 | 0.000000 | 384.28 | 805.28 |
| 3 | GUIDE | used | 168170008 | 7.88 | 1068 | 0.115 | 0.028 | 0.084 | 0.128 | 79.994364 | 16.730836 | -296.54 | -966.03 |
| 4 | GUIDE | used | 168173904 | 9.17 | 1065 | 0.123 | -0.047 | 0.117 | 0.193 | 79.871784 | 16.367969 | 987.96 | -1451.59 |
| 5 | GUIDE | used | 169879712 | 7.71 | 1068 | -0.020 | -0.109 | 0.067 | 0.112 | 80.597780 | 16.122736 | 1986.98 | 1014.26 |
| 6 | GUIDE | used | 170394912 | 8.20 | 1067 | -0.156 | -0.063 | 0.084 | 0.136 | 80.860564 | 16.981486 | -1060.04 | 2056.89 |
| 7 | GUIDE | used | 170396344 | 8.20 | 1067 | -0.072 | 0.187 | 0.069 | 0.110 | 80.181290 | 17.242949 | -2109.17 | -234.89 |

## 2.4 Star Slots

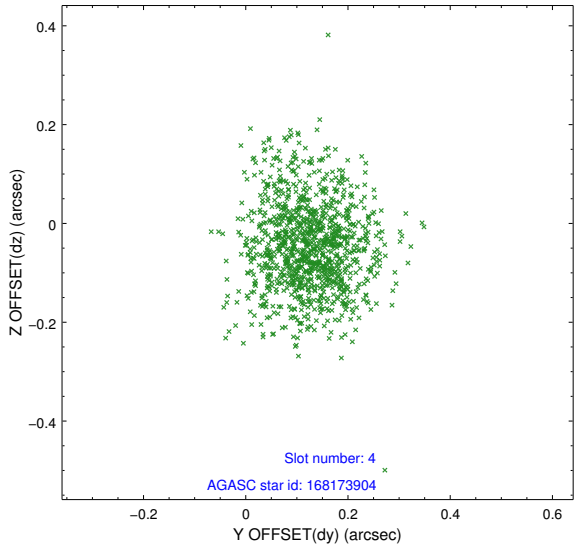
### 2.4.1 Slot 3

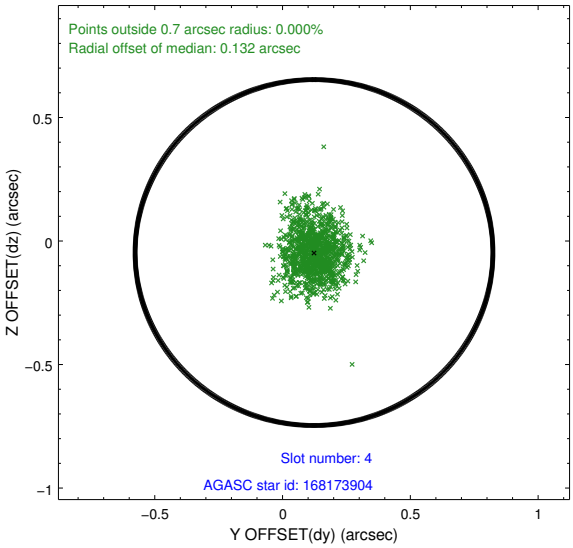


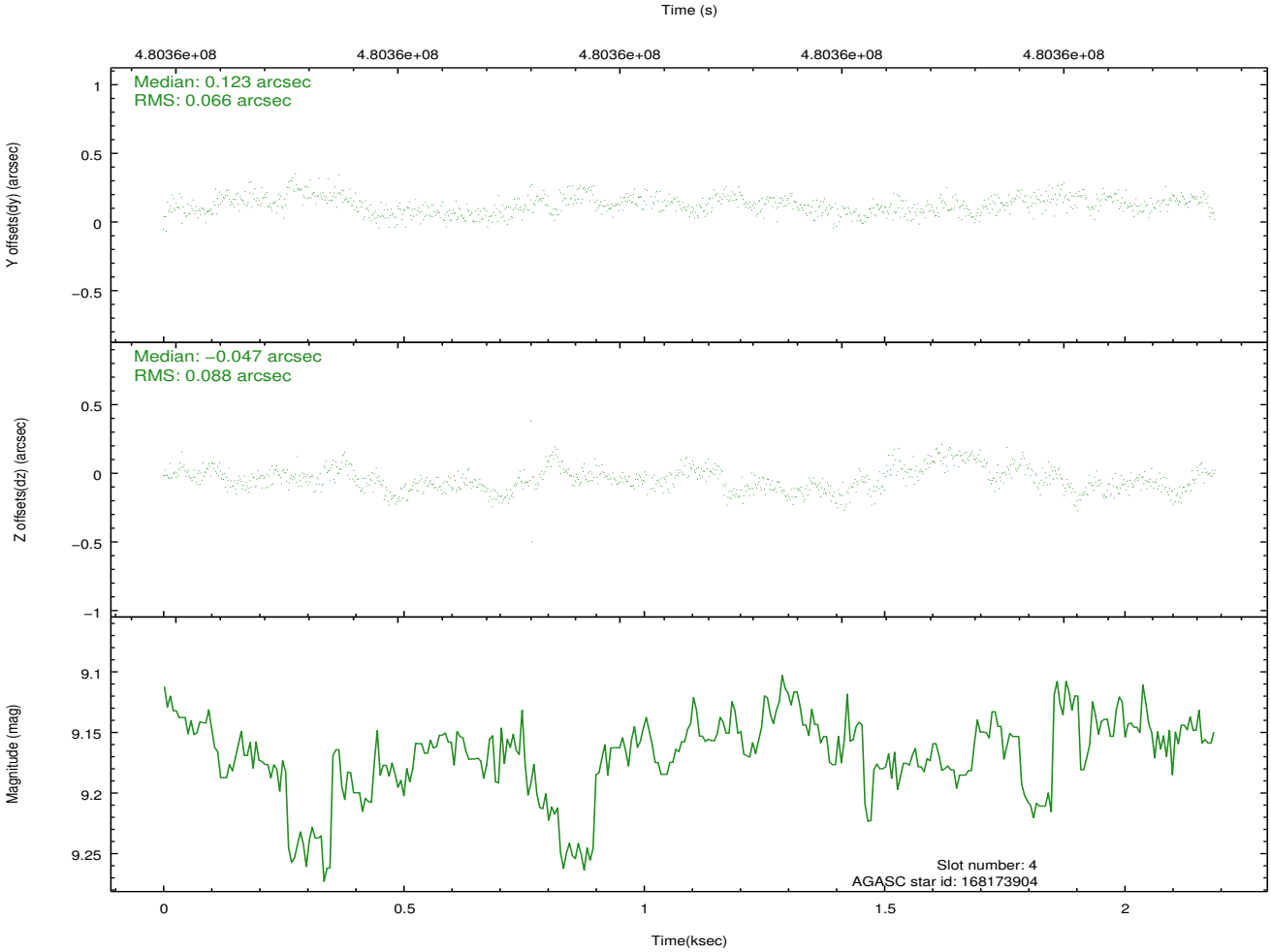



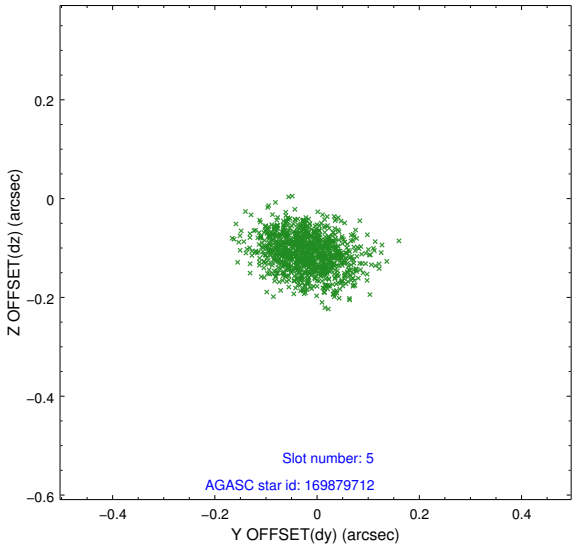
### 2.4.2 Slot 4

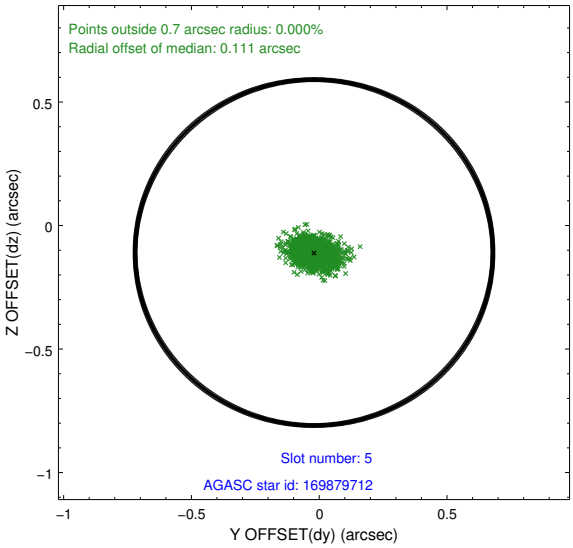

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 168173904

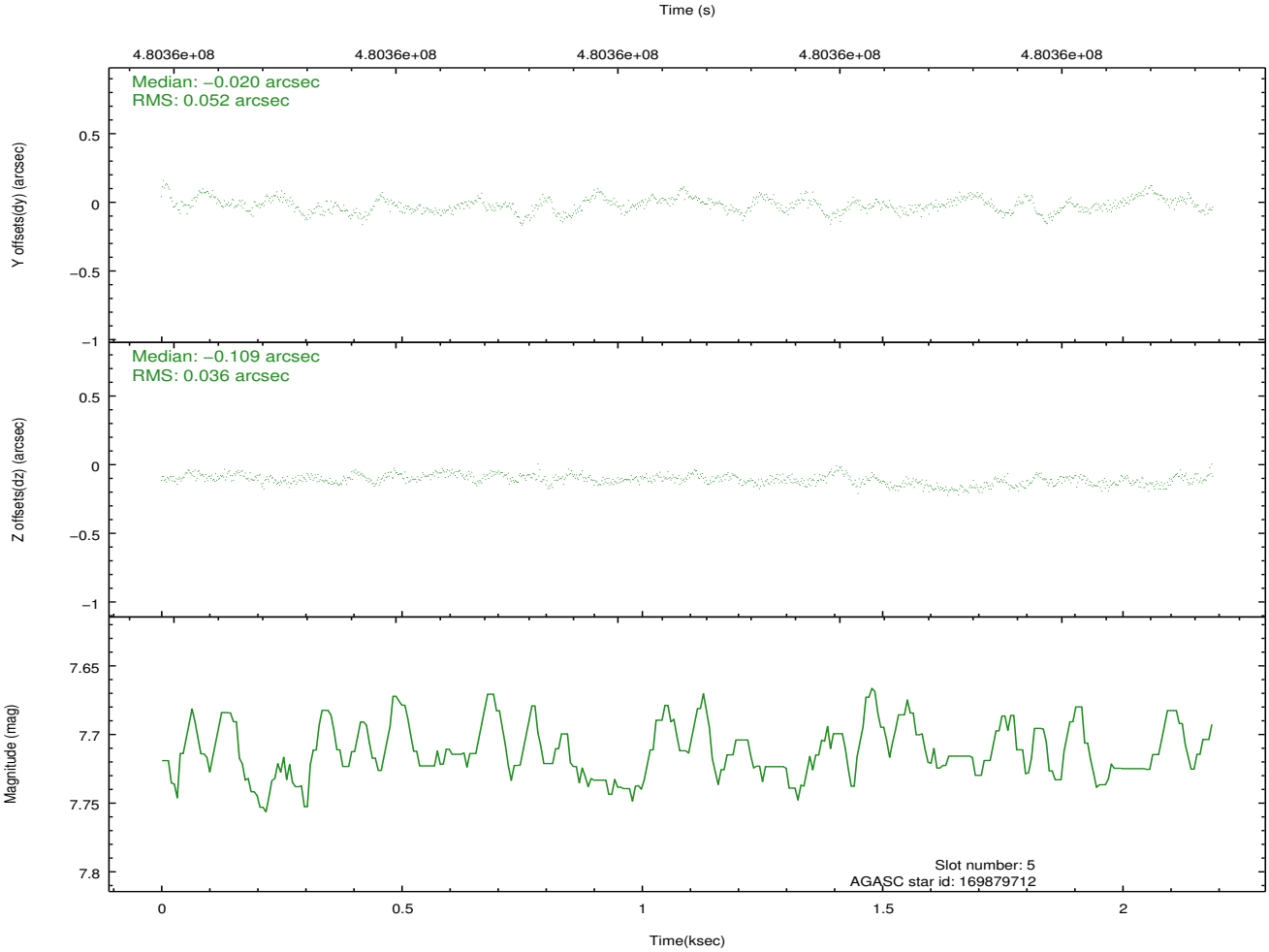

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.132 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 168173904


Time (s)
4.8036e+08
Median: 0.123 arcsec
RMS: 0.066 arcsec
Y offsets(dy) (arcsec)
Median: −0.047 arcsec
RMS: 0.088 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 4
AGASC star id: 168173904
Time(ksec)

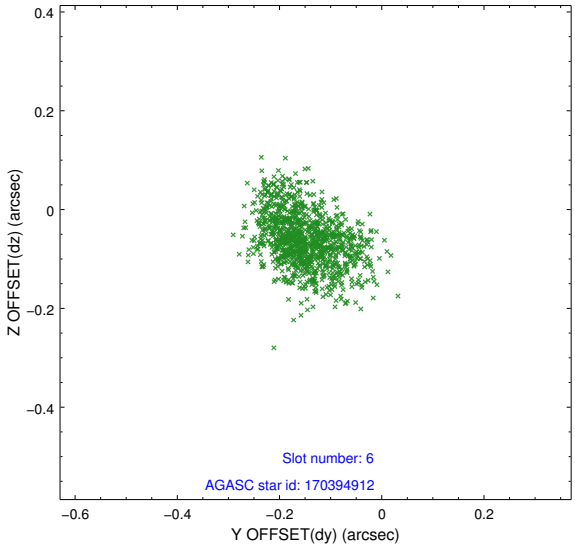
### 2.4.3 Slot 5

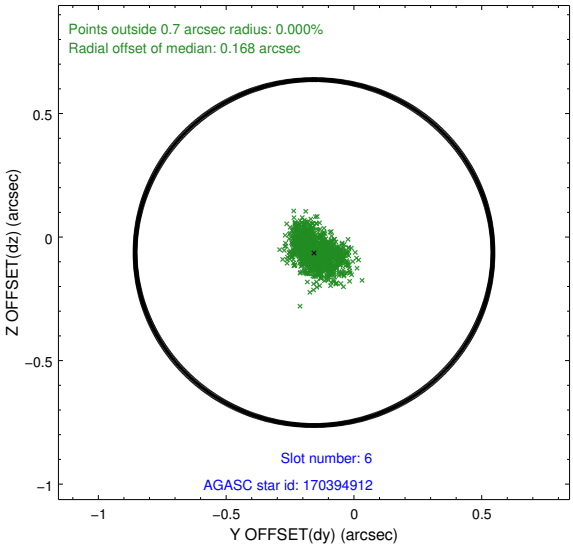

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 169879712

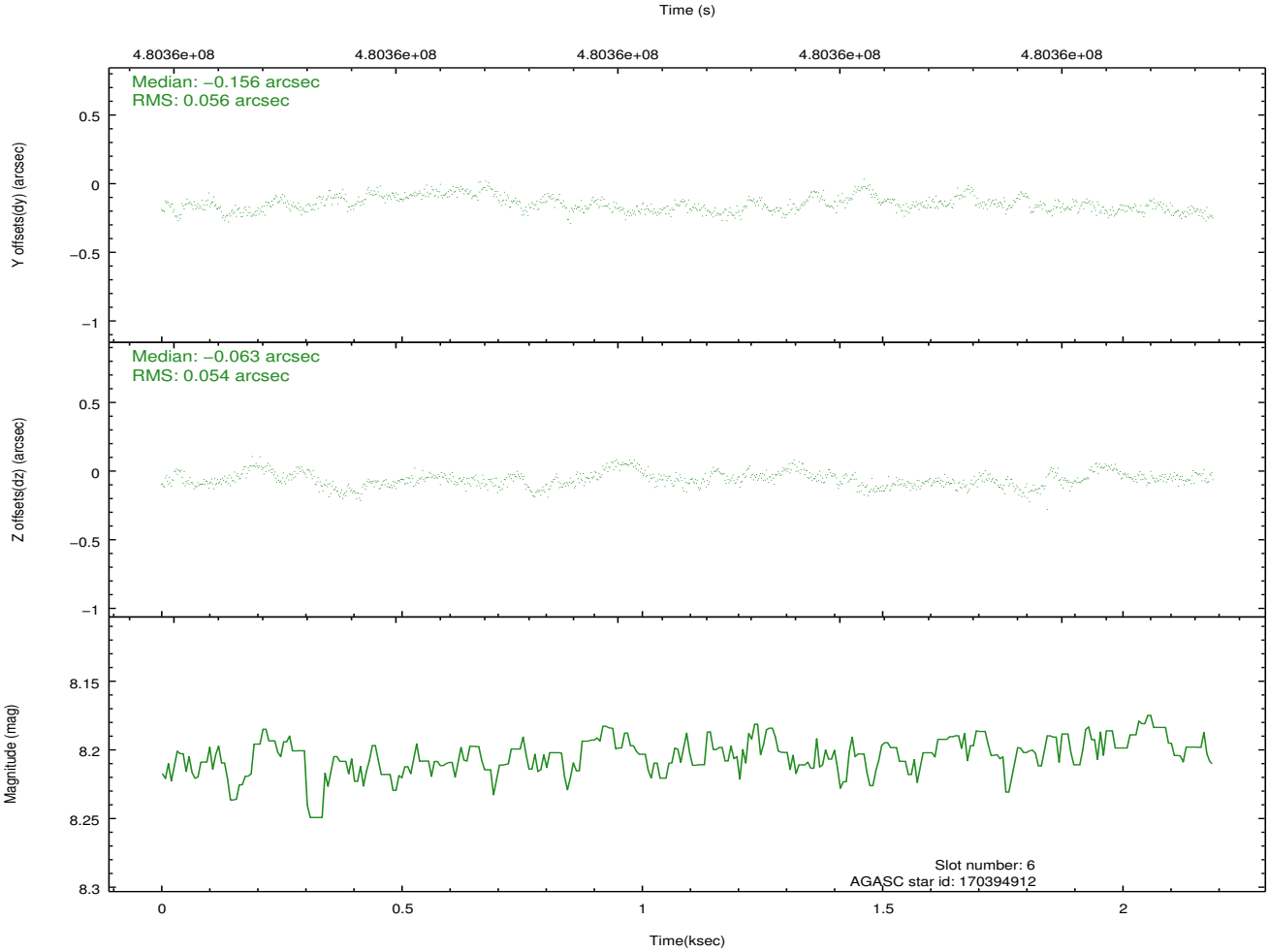

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.111 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 169879712


Time (s)
4.8036e+08
Median: −0.020 arcsec
RMS: 0.052 arcsec
Y offsets(dy) (arcsec)
Median: −0.109 arcsec
RMS: 0.036 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 5
AGASC star id: 169879712
Time(ksec)

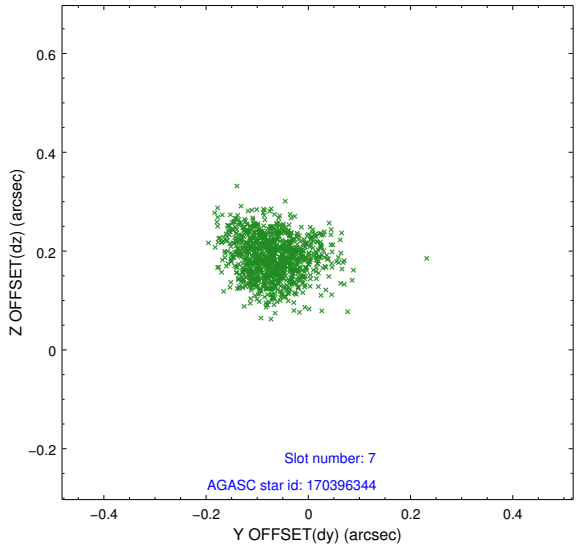
### 2.4.4 Slot 6

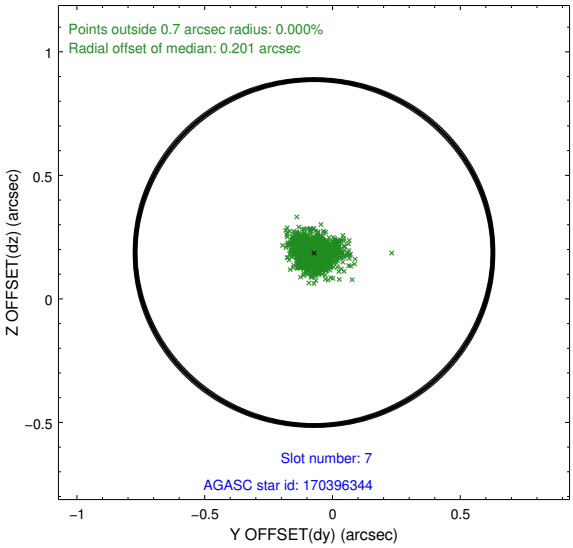

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 170394912

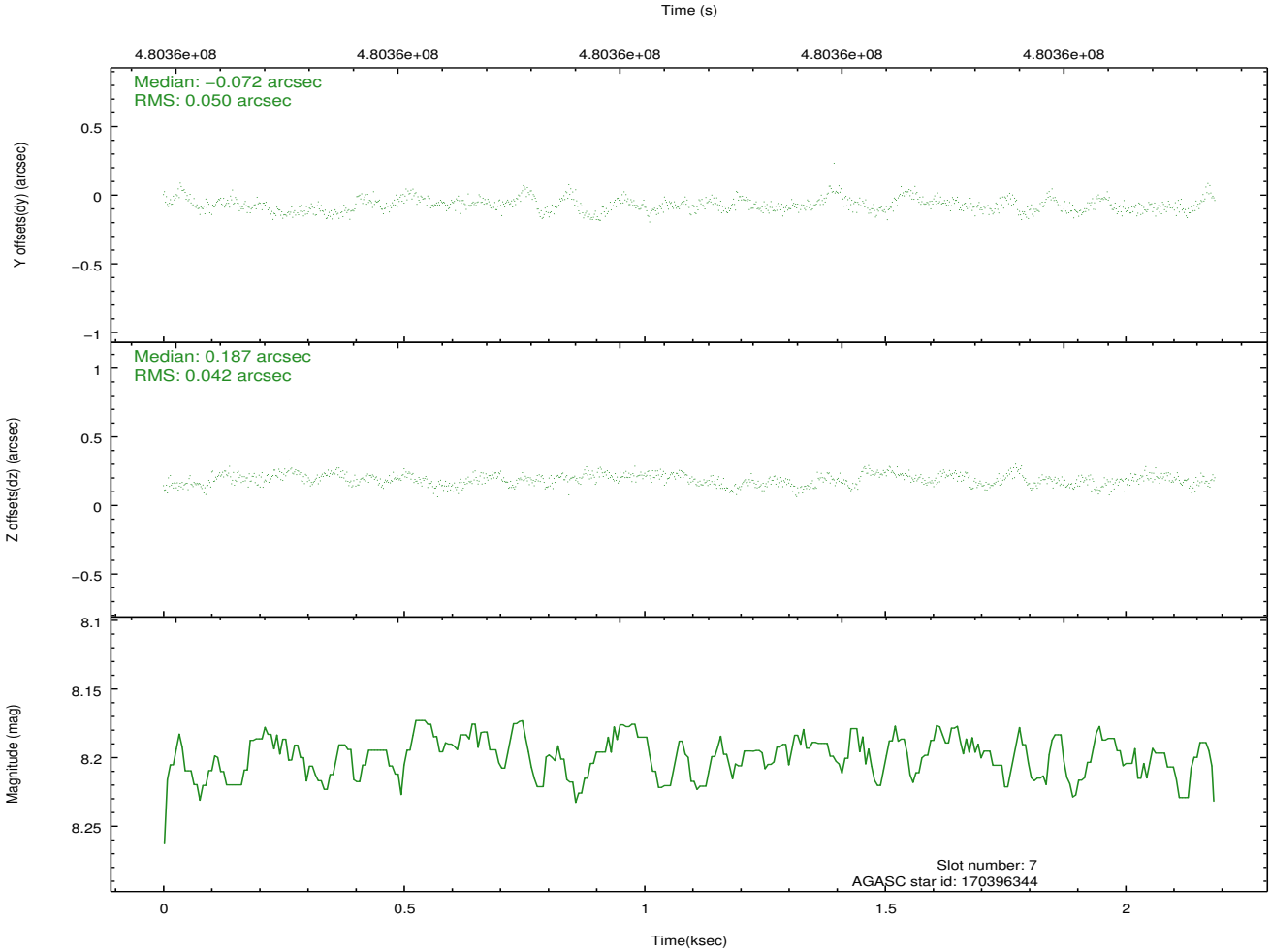

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.168 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 170394912


Time (s)
Median: −0.156 arcsec
RMS: 0.056 arcsec
Y offsets(dy) (arcsec)
Median: −0.063 arcsec
RMS: 0.054 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 6
AGASC star id: 170394912
Time(ksec)

### 2.4.5 Slot 7

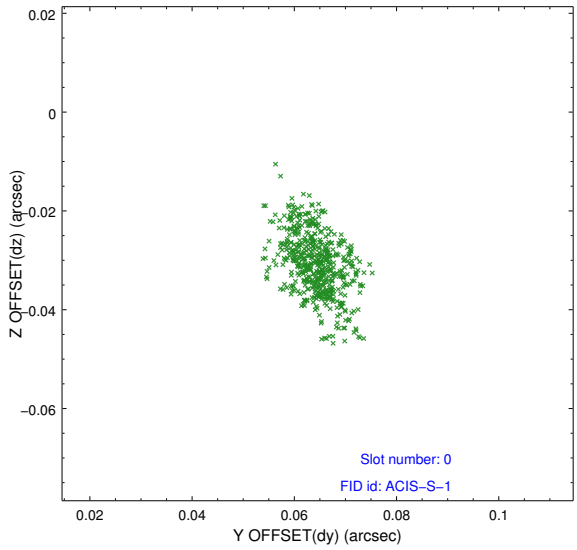

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 170396344

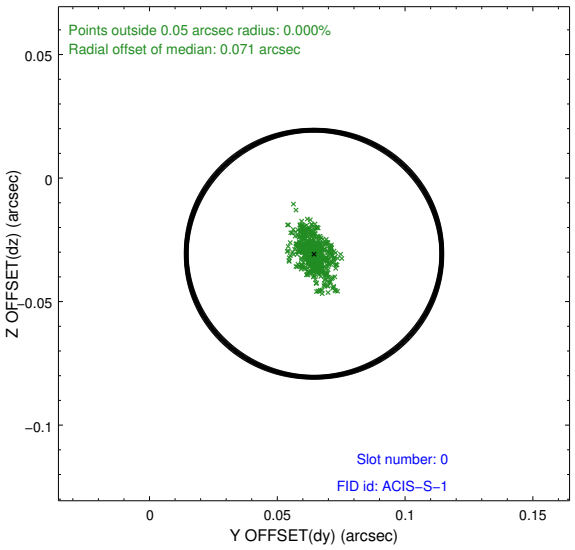

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.201 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 170396344

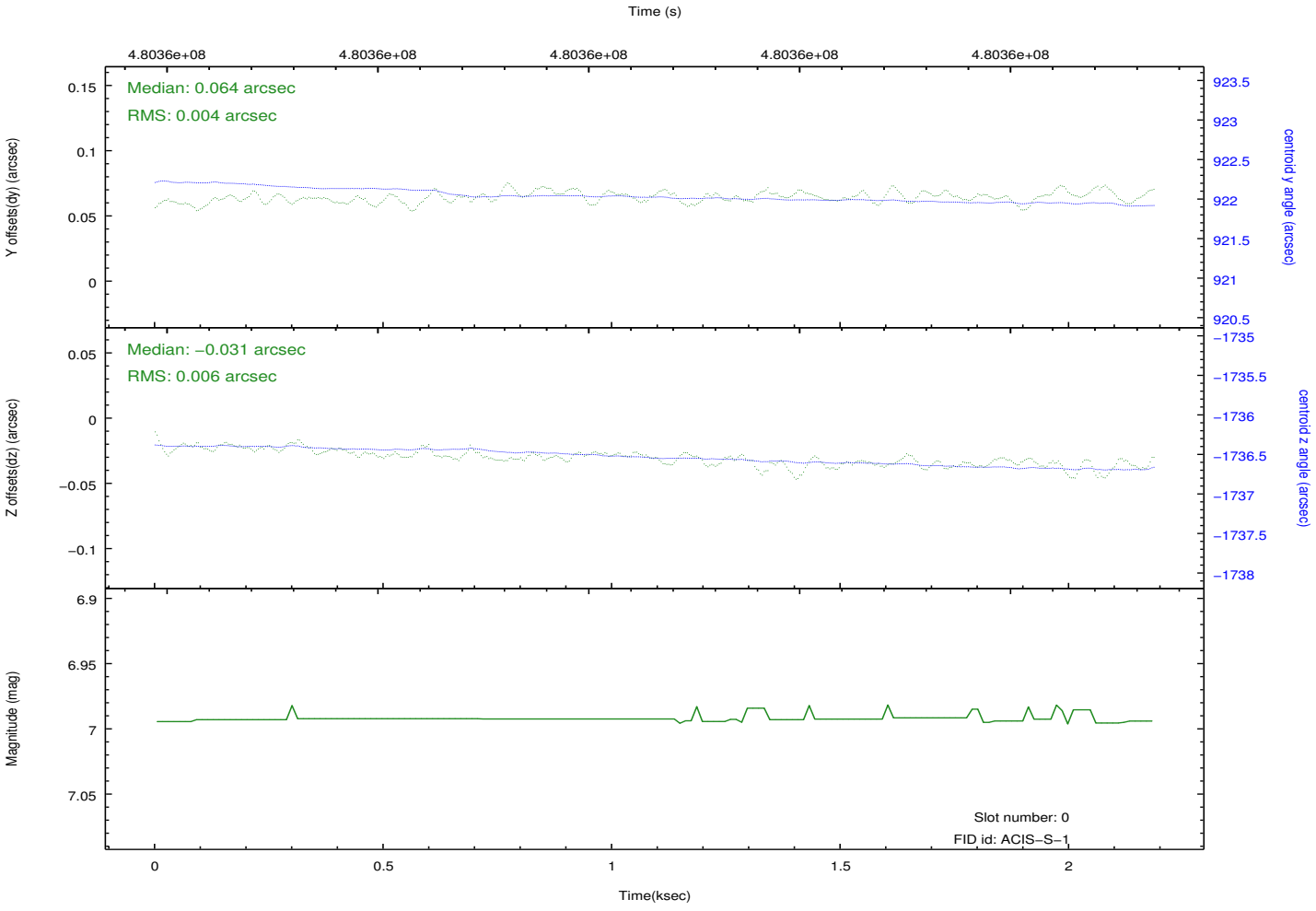

Time (s)
4.8036e+08
Median: −0.072 arcsec
RMS: 0.050 arcsec
Y offsets(dy) (arcsec)
Median: 0.187 arcsec
RMS: 0.042 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 7
AGASC star id: 170396344
Time(ksec)

## 2.5 FID Slots

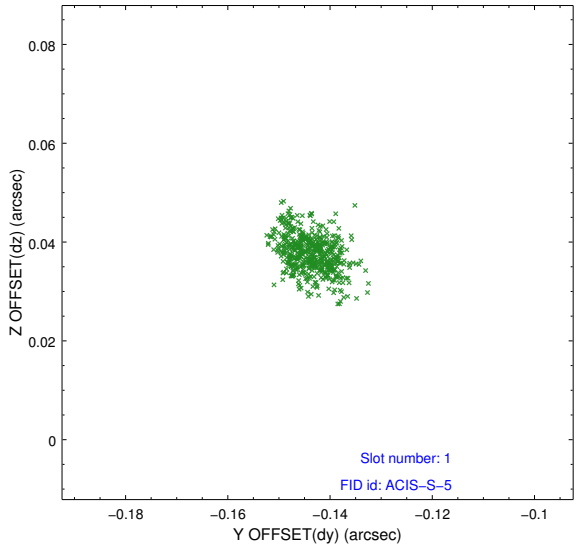
### 2.5.1 Slot 0

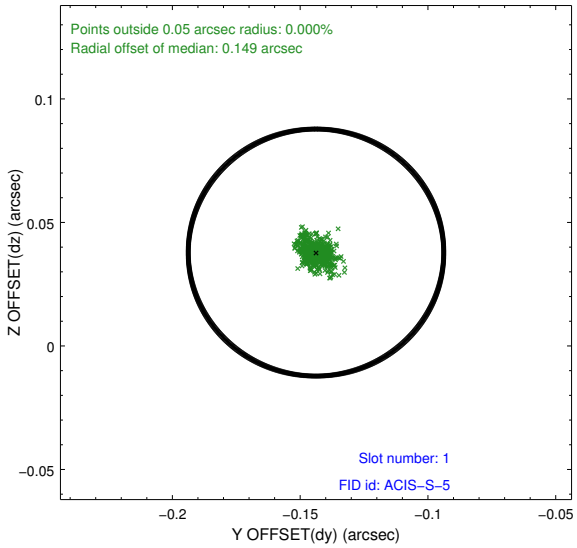


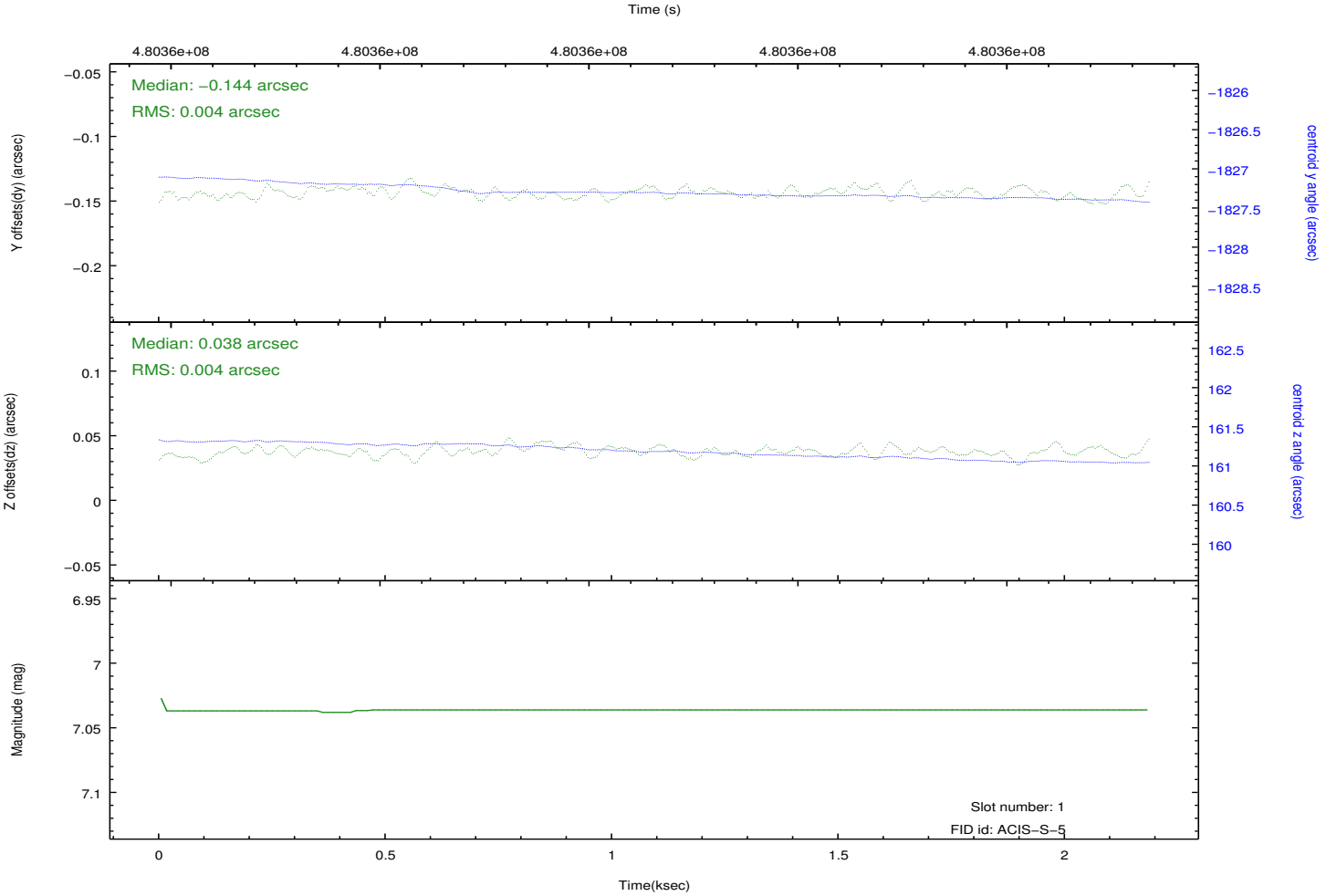



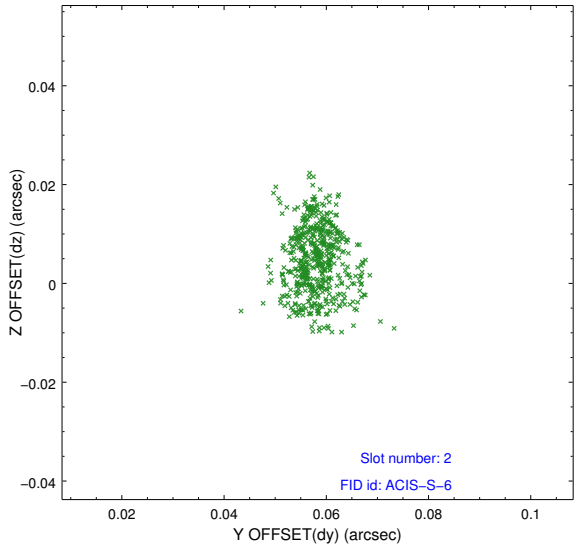
### 2.5.2 Slot 1

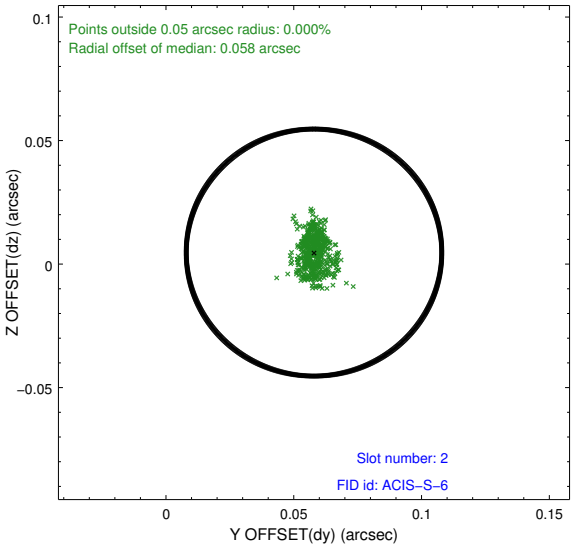

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−5

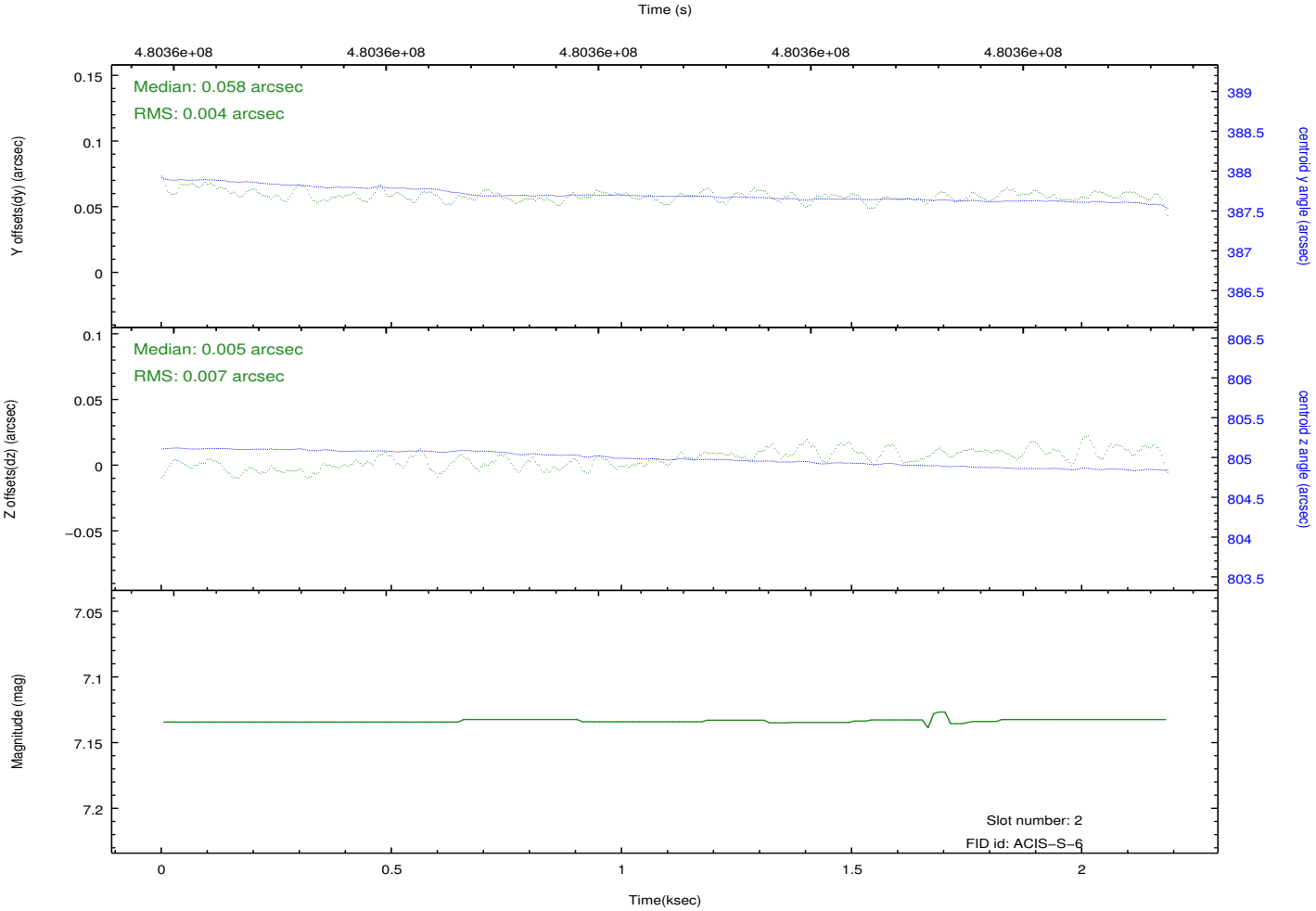

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.149 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−5


Time (s)
Median: −0.144 arcsec
RMS: 0.004 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.038 arcsec
RMS: 0.004 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 1
FID id: ACIS−S−5
Time(ksec)

### 2.5.3 Slot 2


Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−6


Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.058 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−6


Time (s)
Median: 0.058 arcsec
RMS: 0.004 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.005 arcsec
RMS: 0.007 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 2
FID id: ACIS−S−6
Time(ksec)

# A Summary

## A.1 Status

| | |
|---|---|
| V&V Scientist | Jen Lauer |
| V&V Date (YYYY-MM-DD) | 2014.12.10 |
| V&V Edition | 1 |
| V&V Disposition and Status | OK |
| V&V Charge Time | 2.084612811923 |

## A.2 Comments

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.