

# V&V Reference Report

## L2 ASCDS Version : 10.7.1

Observation 22028 - L2 Version 1  
Chandra X-Ray Center

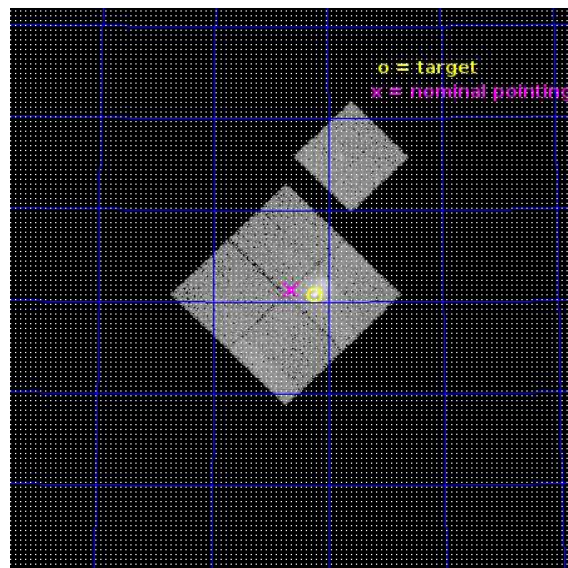
L2 Processing Date : Dec 26 2018

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# 1 Front

|          |                                                                                                     |                                             |
|----------|-----------------------------------------------------------------------------------------------------|---------------------------------------------|
| seq_num  | 801762                                                                                              | Sequence number                             |
| obs_id   | 22028                                                                                               | 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                                                                                                   | &#160                                       |
| cycle    | P                                                                                                   | events from which exps?<br>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   | 239.16031565899                                                                                     | Nominal RA [deg]                            |
| dec_nom  | 66.356013792206                                                                                     | Nominal Dec [deg]                           |
| roll_nom | 45.117965632006                                                                                     | Nominal Roll [deg]                          |
| revision | 1                                                                                                   | Processing version of data                  |
| ontime   | 24065.300185204                                                                                     | Sum of GTIs [s]                             |
| livetime | 23750.869321668                                                                                     | Livetime [s]                                |
| ontime0  | 24065.300185204                                                                                     | Sum of GTIs [s]                             |
| ontime1  | 24065.300185204                                                                                     | Sum of GTIs [s]                             |
| ontime2  | 24065.300185204                                                                                     | Sum of GTIs [s]                             |
| ontime3  | 24065.300185204                                                                                     | Sum of GTIs [s]                             |
| ontime6  | 24065.300185204                                                                                     | Sum of GTIs [s]                             |
| l2events | 98353                                                                                               | Number of level 2 events                    |

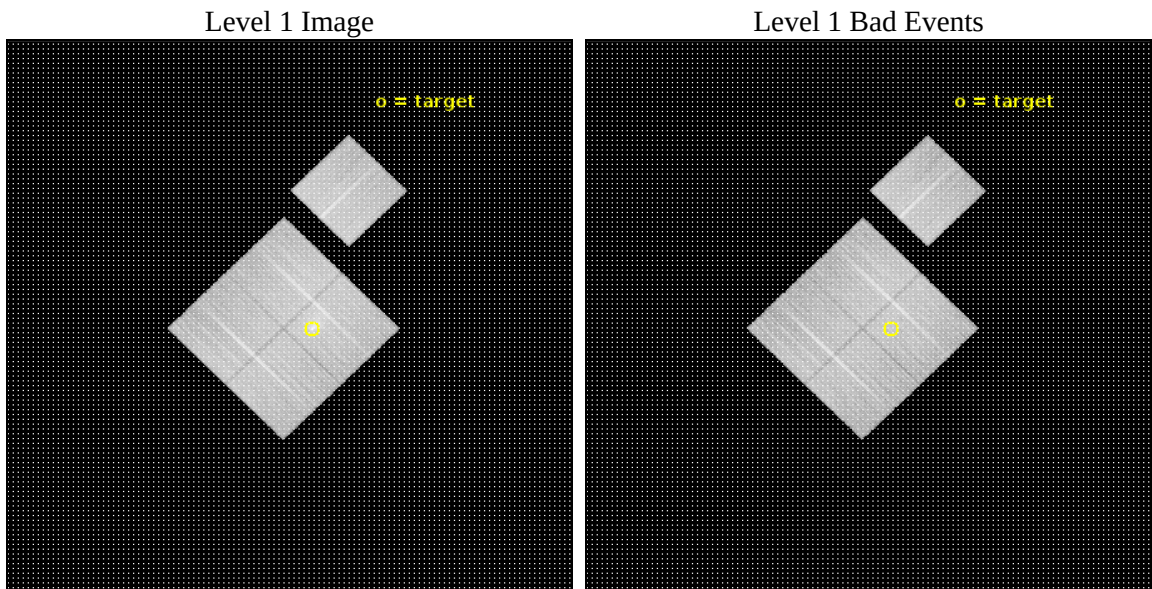




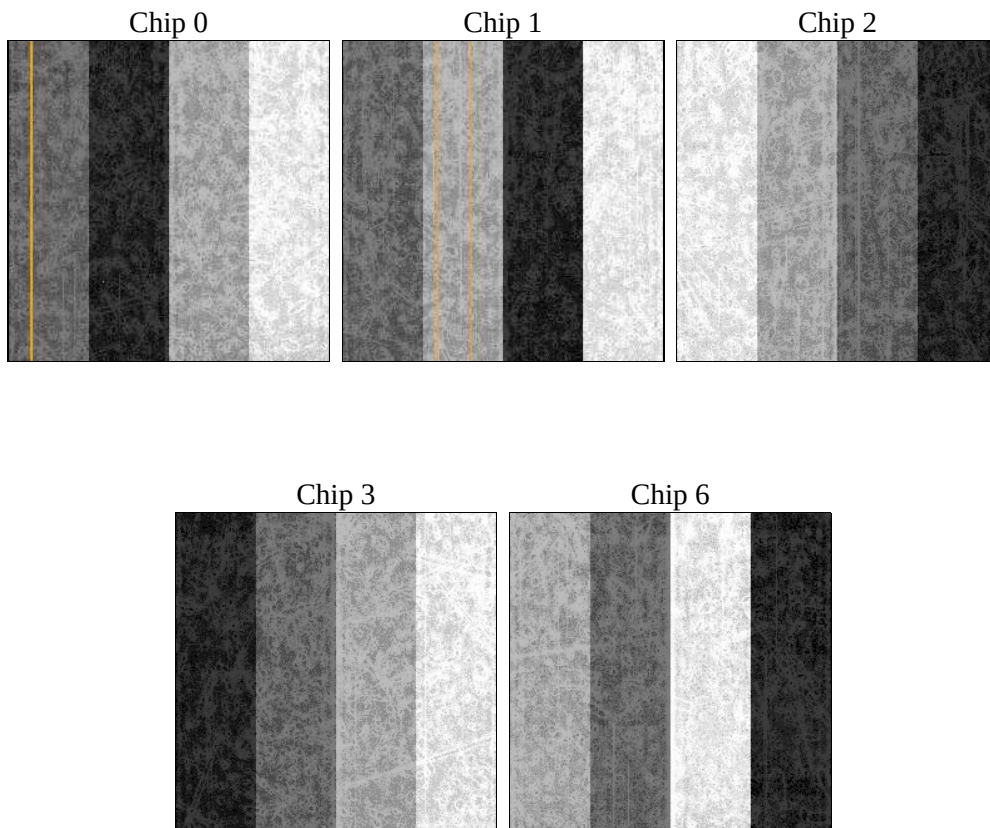
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |                                         |
|----------|---------------------|--------------------------------|----------------|-----------------|-----------------------------------------|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 24000.000000    | [s] Scheduled observation exposure time |
| ascdsver | 10.7.1              | Processing system revision     | ontime         | 24065.300185204 | Sum of GTIs [s]                         |
| caldsver | 4.8.2               | &#160                          | ontime0        | 24065.300185204 | Sum of GTIs [s]                         |
| date     | 2018-12-26T20:53:22 | Date and time of file creation | ontime1        | 24065.300185204 | Sum of GTIs [s]                         |
| revision | 1                   | Processing version of data     | ontime2        | 24065.300185204 | Sum of GTIs [s]                         |
|          |                     |                                | ontime3        | 24065.300185204 | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 24065.300185204 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 909249          | Number of level 1 events                |

### 2.1.4 Events

|                 | ccd 0  | ccd 1  | ccd 2  | ccd 3  | ccd 6  |
|-----------------|--------|--------|--------|--------|--------|
| level 1 events  | 169718 | 173404 | 185598 | 194257 | 186272 |
| rejected events | 149193 | 150928 | 165928 | 162818 | 165561 |
| rejected %      | 87%    | 87%    | 89%    | 83%    | 88%    |

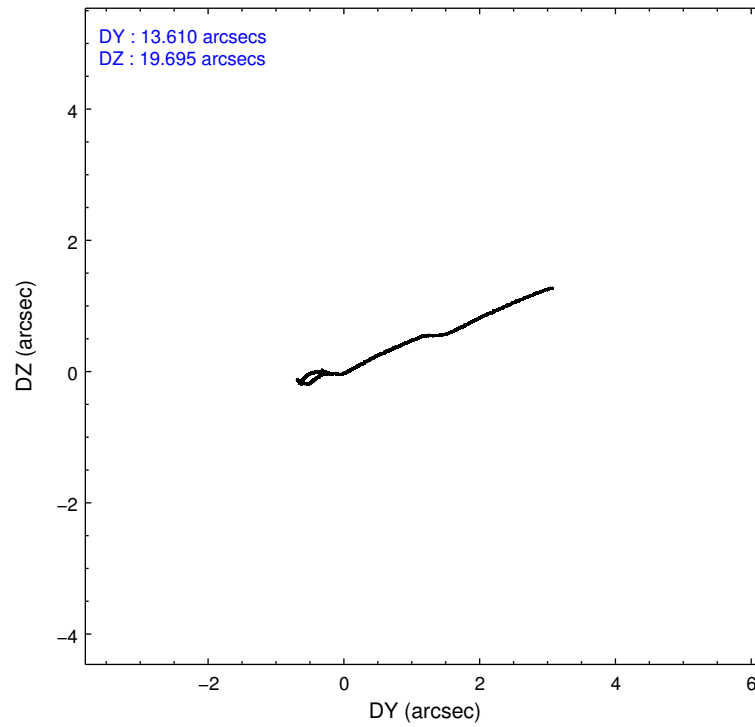
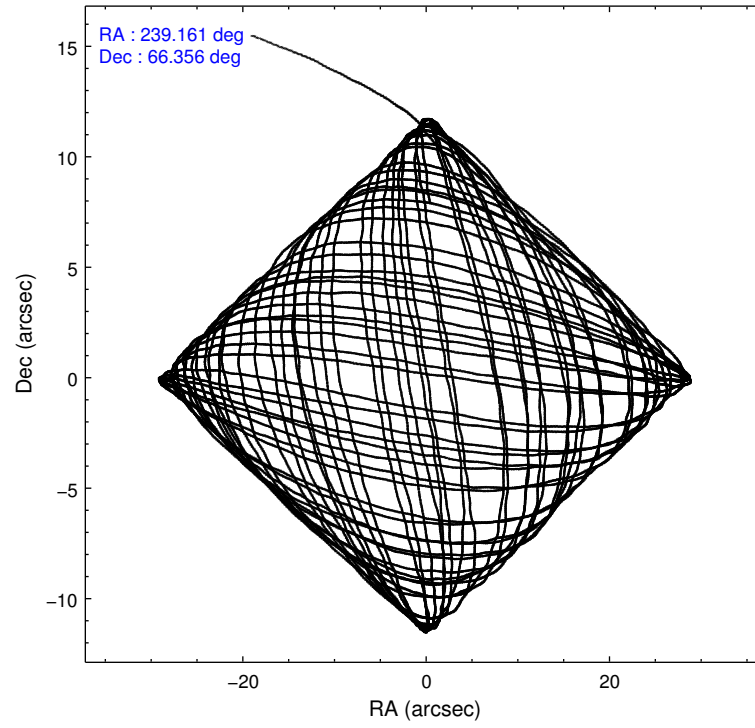
|                | ccd 0  | ccd 1  | ccd 2  | ccd 3  | ccd 6  |
|----------------|--------|--------|--------|--------|--------|
| grade 0 events | 6976   | 7182   | 6880   | 16616  | 6791   |
|                | 4%     | 4%     | 3%     | 8%     | 3%     |
| grade 1 events | 85     | 84     | 98     | 165    | 81     |
|                | 0%     | 0%     | 0%     | 0%     | 0%     |
| grade 2 events | 5317   | 6048   | 4936   | 5452   | 4942   |
|                | 3%     | 3%     | 2%     | 2%     | 2%     |
| grade 3 events | 1986   | 2089   | 1922   | 2385   | 2026   |
|                | 1%     | 1%     | 1%     | 1%     | 1%     |
| grade 4 events | 1932   | 2012   | 2000   | 2322   | 1995   |
|                | 1%     | 1%     | 1%     | 1%     | 1%     |
| grade 5 events | 7662   | 8049   | 7480   | 8917   | 8291   |
|                | 4%     | 4%     | 4%     | 4%     | 4%     |
| grade 6 events | 4314   | 5146   | 3936   | 4671   | 4962   |
|                | 2%     | 2%     | 2%     | 2%     | 2%     |
| grade 7 events | 141446 | 142794 | 158346 | 153729 | 157184 |
|                | 83%    | 82%    | 85%    | 79%    | 84%    |

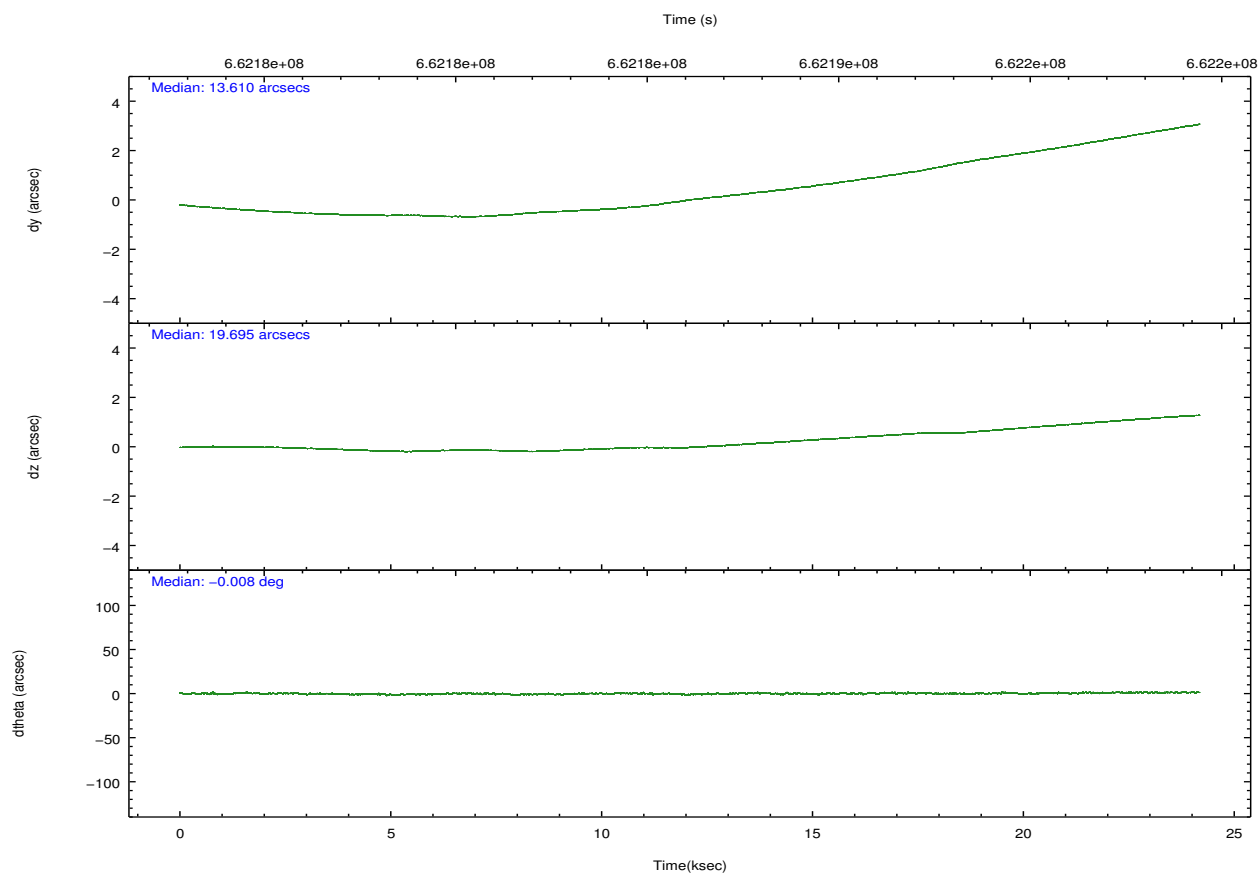
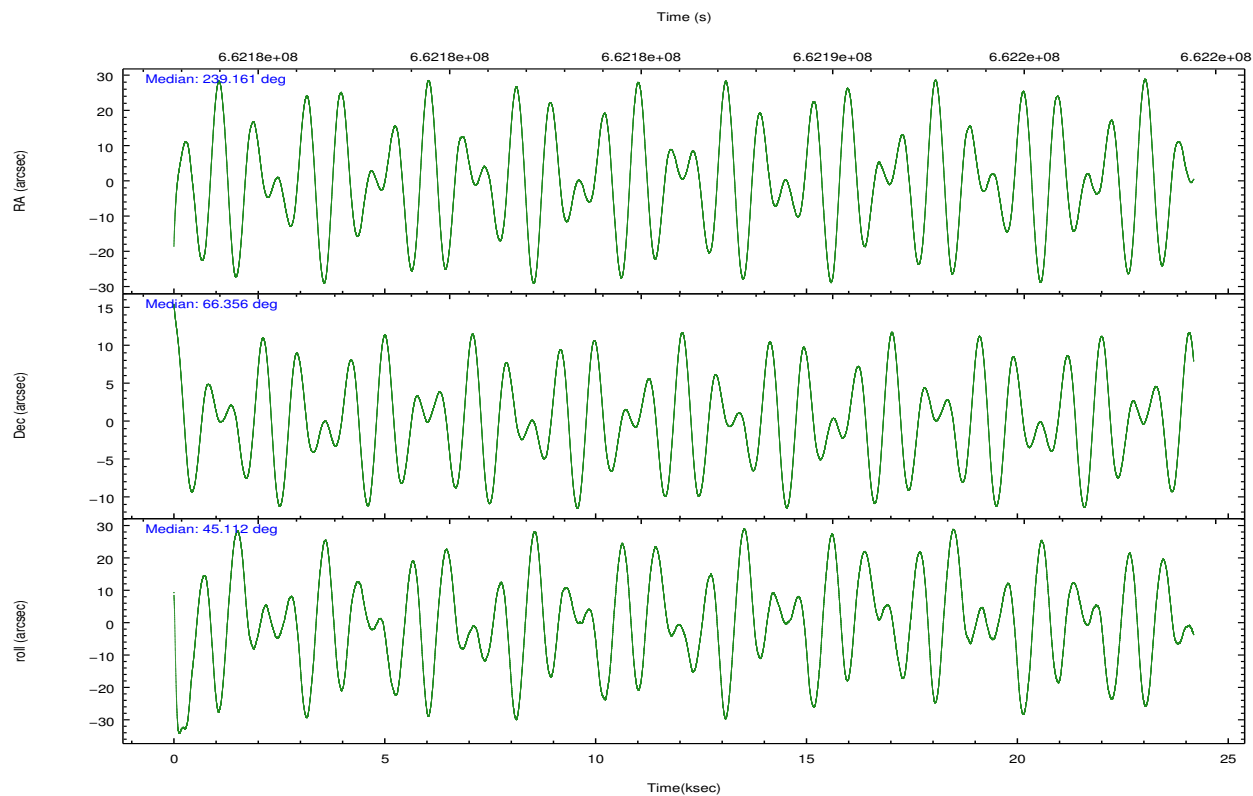
## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual                |
|-----------------------------------|---------------------|-----------------------|
| Instrument                        | ACIS                | ACIS                  |
| Detector                          | ACIS-01236          | ACIS-01236            |
| Grating                           | NONE                | NONE                  |
| Data mode                         | VFAINT              | VFAINT                |
| Observation mode                  | POINTING            | POINTING              |
| [deg] Pointing RA                 | 239.142903          | 239.1603156589875     |
| [deg] Pointing Dec                | 66.329303           | 66.35601379220635     |
| [deg] Pointing Roll               | 44.925206           | 45.11796563200558     |
| [mm] SIM focus pos                | -0.782348           | -0.7809083437167272   |
| [mm] SIM defocus                  | 0                   | 0.001439871863259334  |
| [mm] SIM translation stage pos    | -233.592463         | -233.5874344608287    |
| [mm] SIM translation stage offset | 0                   | -0.005018542100998502 |
| [s] Observation start time (MET)  | 662174215.184000    | 662173306.94394       |
| Observation start date            | 2018-12-26T01:15:46 | 2018-12-26T01:01:46   |
| [s] Observation end time (MET)    | 662198215.184000    | 662199082.6204799     |
| Observation end date              | 2018-12-26T07:55:46 | 2018-12-26T08:11:22   |
| 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                             | Y         | Y       |
| CCD I1 on                             | Y         | Y       |
| CCD I2 on                             | Y         | Y       |
| CCD I3 on                             | Y         | Y       |
| CCD S0 on                             | N         | N       |
| CCD S1 on                             | N         | N       |
| CCD S2 on                             | O1        | Y       |
| CCD S3 on                             | N         | N       |
| CCD S4 on                             | N         | N       |
| CCD S5 on                             | N         | N       |
| 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  | 3.1     |

## 2.3 Aspect



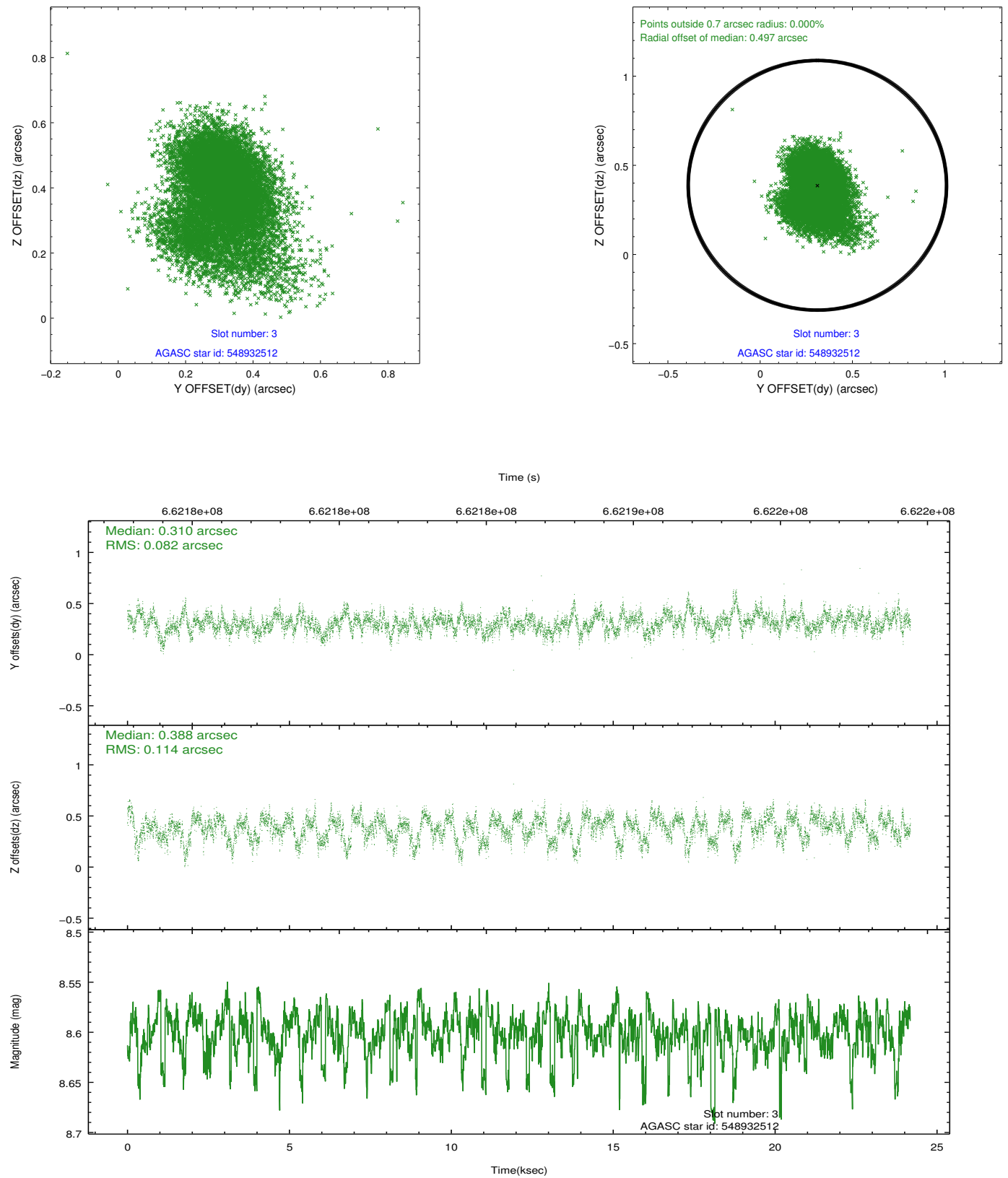


# Slot Statistics

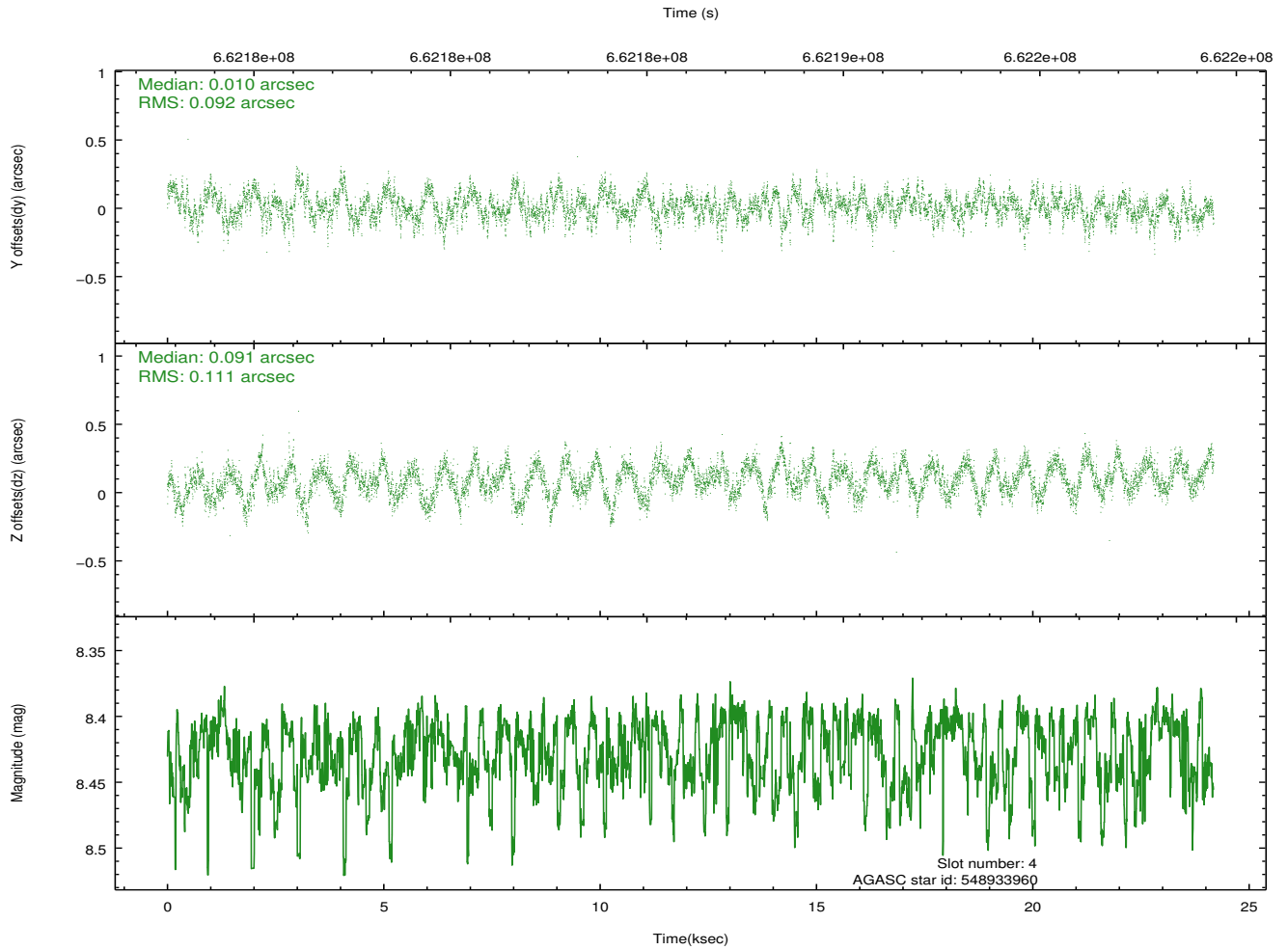
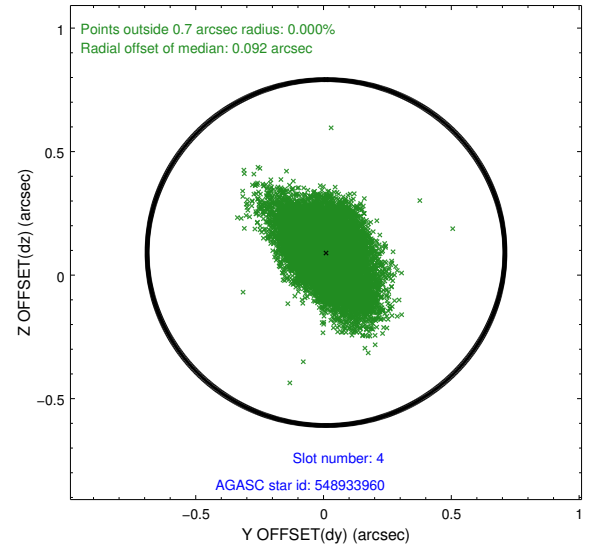
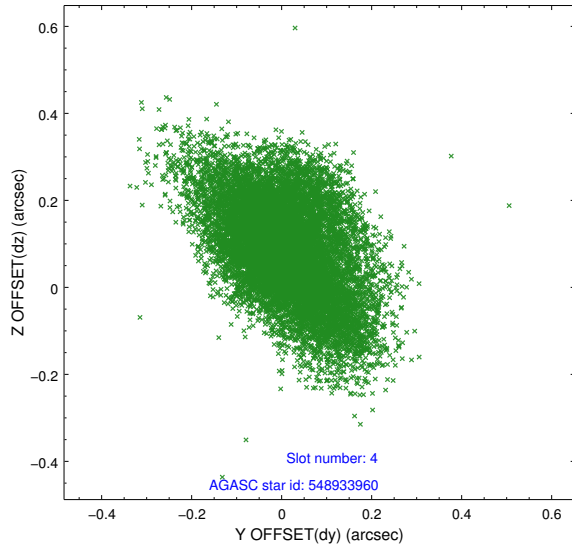
| pt | status | used | id        | mag  | n_pts | frac_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec       | mean_y   | mea   |
|----|--------|------|-----------|------|-------|----------|--------|--------|-------|-------|------------|-----------|----------|-------|
| 0  | FID    |      | ACIS-I-1  | 7.13 | 5897  | 1.000    | 0.070  | -0.055 | 0.018 | 0.055 | 0.000000   | 0.000000  | 925.56   | -843  |
| 1  | FID    |      | ACIS-I-5  | 7.12 | 5897  | 1.000    | -0.462 | -0.004 | 0.017 | 0.048 | 0.000000   | 0.000000  | -1823.21 | 1053  |
| 2  | FID    |      | ACIS-I-6  | 7.13 | 5898  | 1.000    | 0.303  | 0.132  | 0.020 | 0.040 | 0.000000   | 0.000000  | 390.94   | 1698  |
| 3  | GUIDE  | used | 548932512 | 8.60 | 11790 | 1.000    | 0.310  | 0.388  | 0.146 | 0.251 | 239.727627 | 66.054972 | -88.87   | -1298 |
| 4  | GUIDE  | used | 548933960 | 8.43 | 11791 | 1.000    | 0.010  | 0.091  | 0.150 | 0.258 | 237.671184 | 66.428675 | -1230.91 | 1766  |
| 5  | GUIDE  | used | 548937184 | 9.85 | 11717 | 1.000    | -0.314 | -0.240 | 0.226 | 0.400 | 238.771821 | 66.565432 | 224.87   | 978   |
| 6  | GUIDE  | used | 549850840 | 9.29 | 11709 | 1.000    | -0.119 | -0.136 | 0.230 | 0.382 | 241.038865 | 66.468628 | 2312.66  | -1540 |
| 7  | GUIDE  | used | 549850848 | 8.85 | 11776 | 1.000    | 0.109  | -0.119 | 0.199 | 0.423 | 241.459219 | 66.322658 | 2397.97  | -2336 |

## 2.4 Star Slots

### 2.4.1 Slot 3

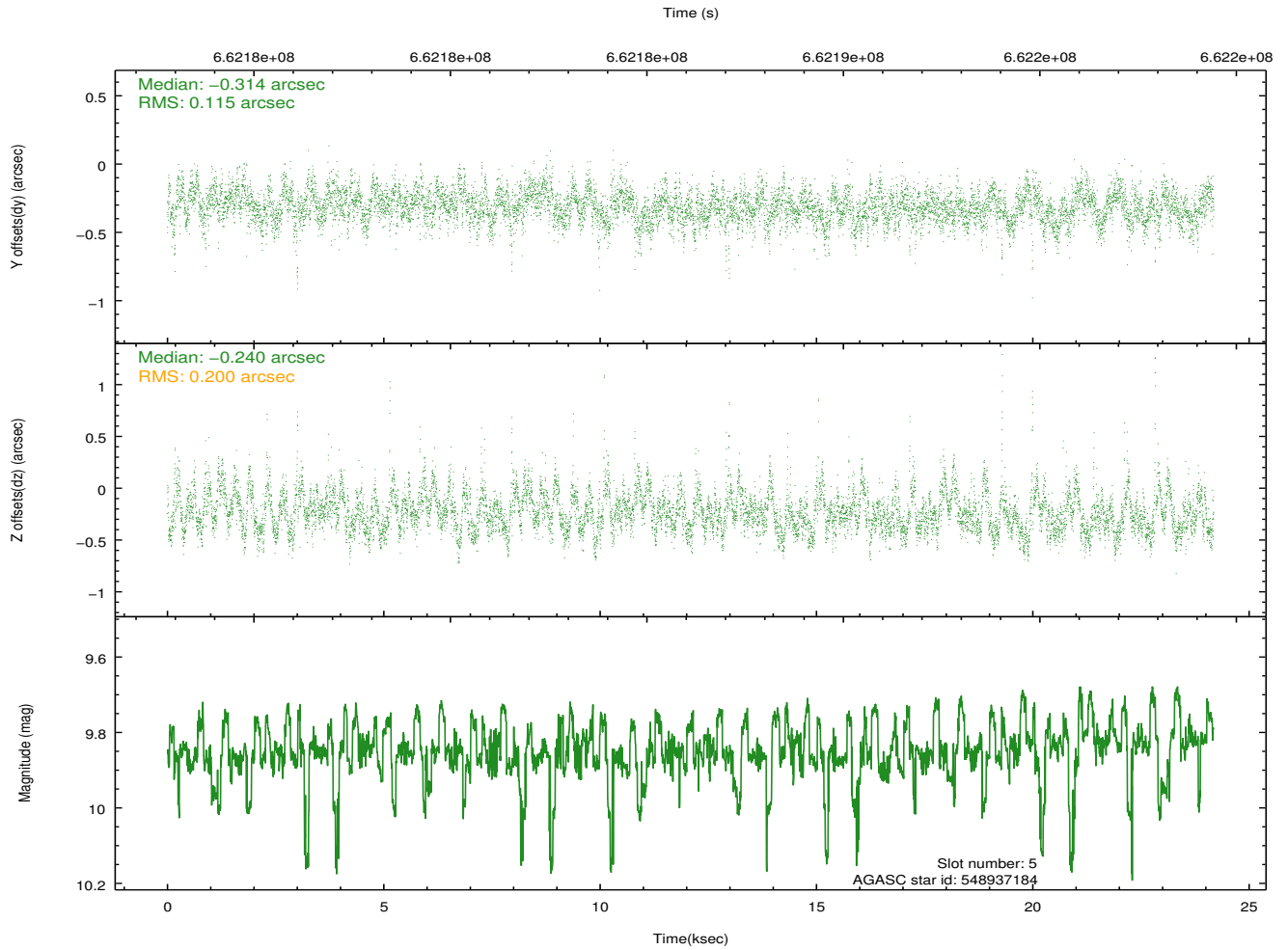
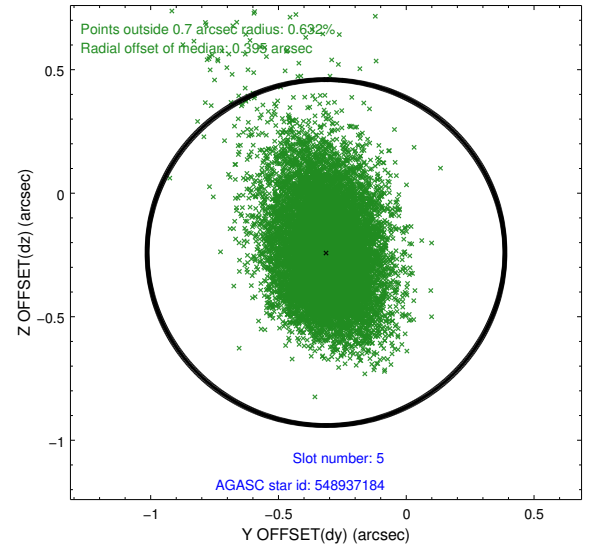
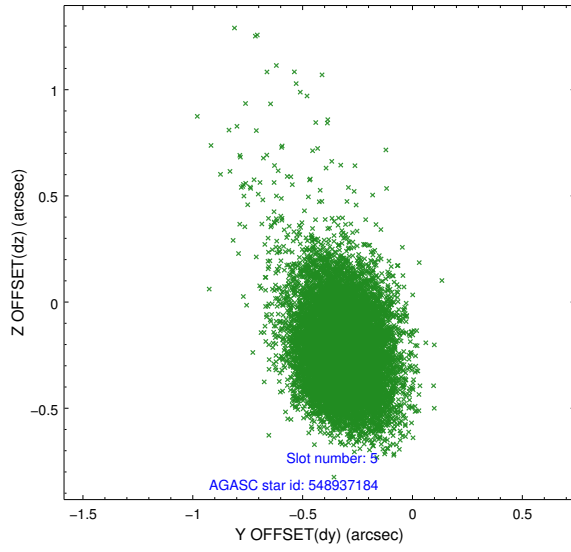


## 2.4.2 Slot 4

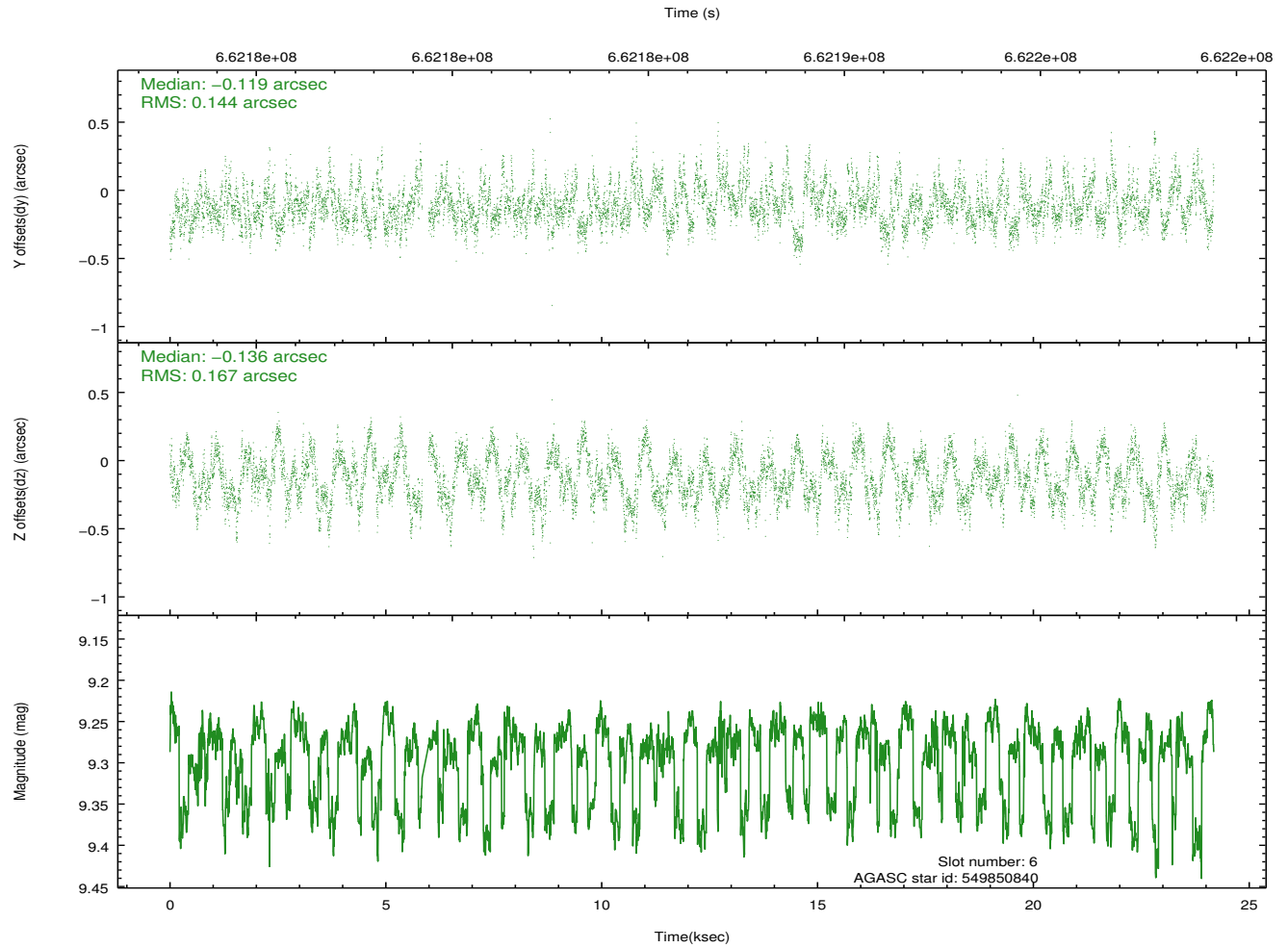
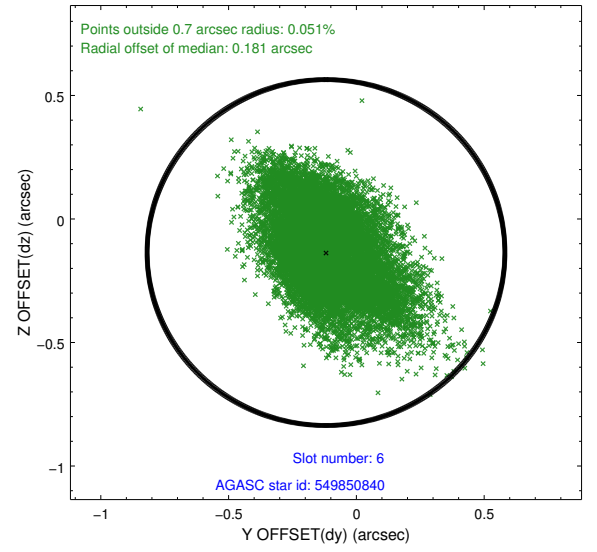
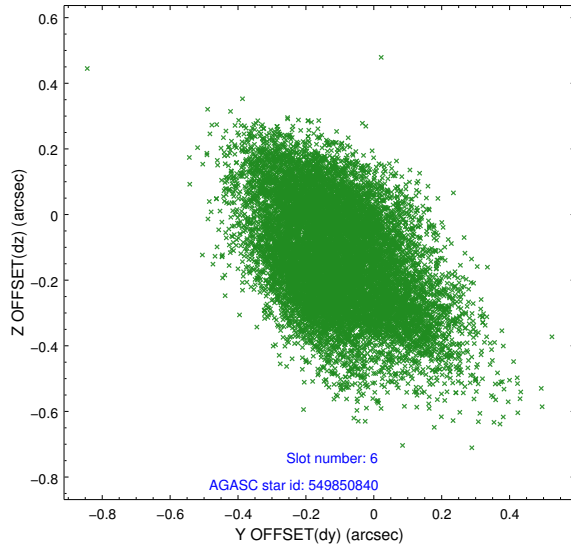




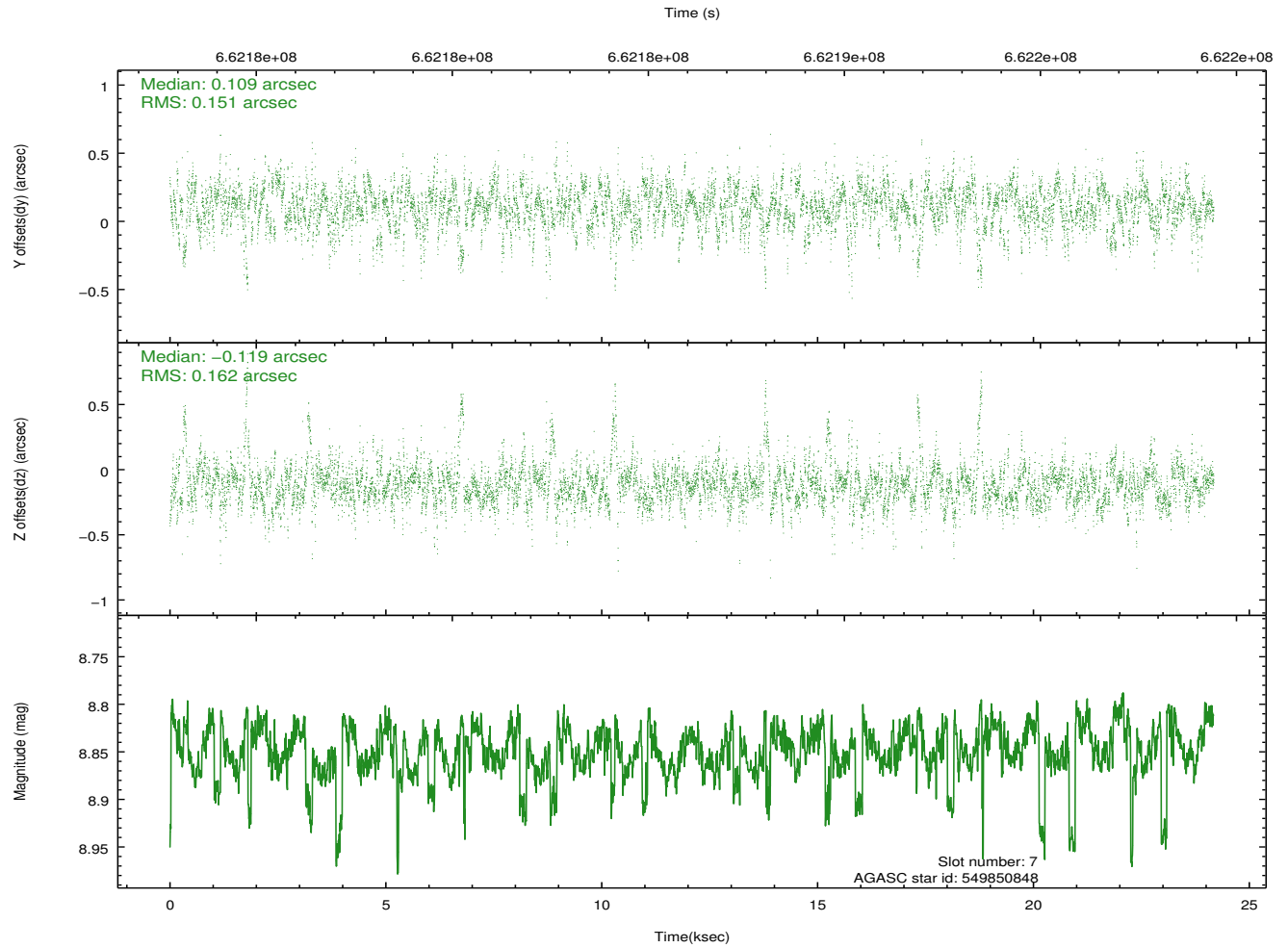
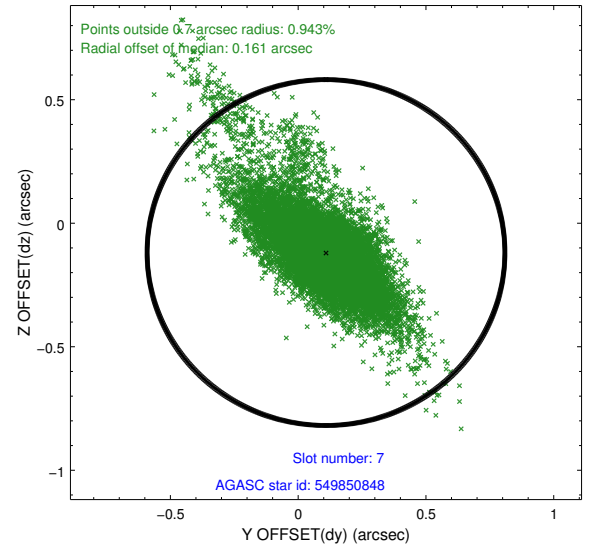
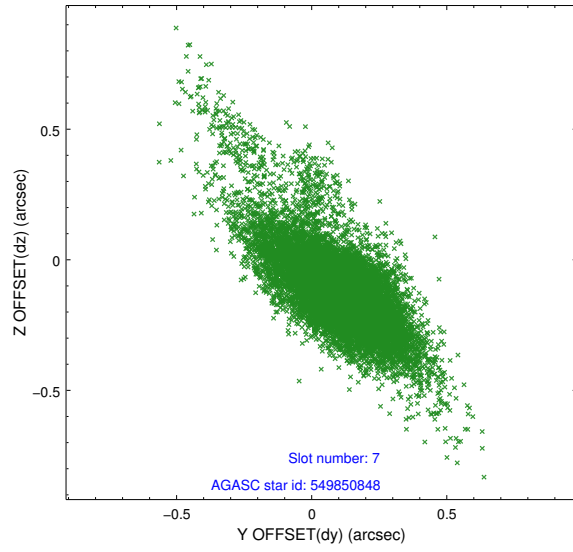
### 2.4.3 Slot 5



## 2.4.4 Slot 6

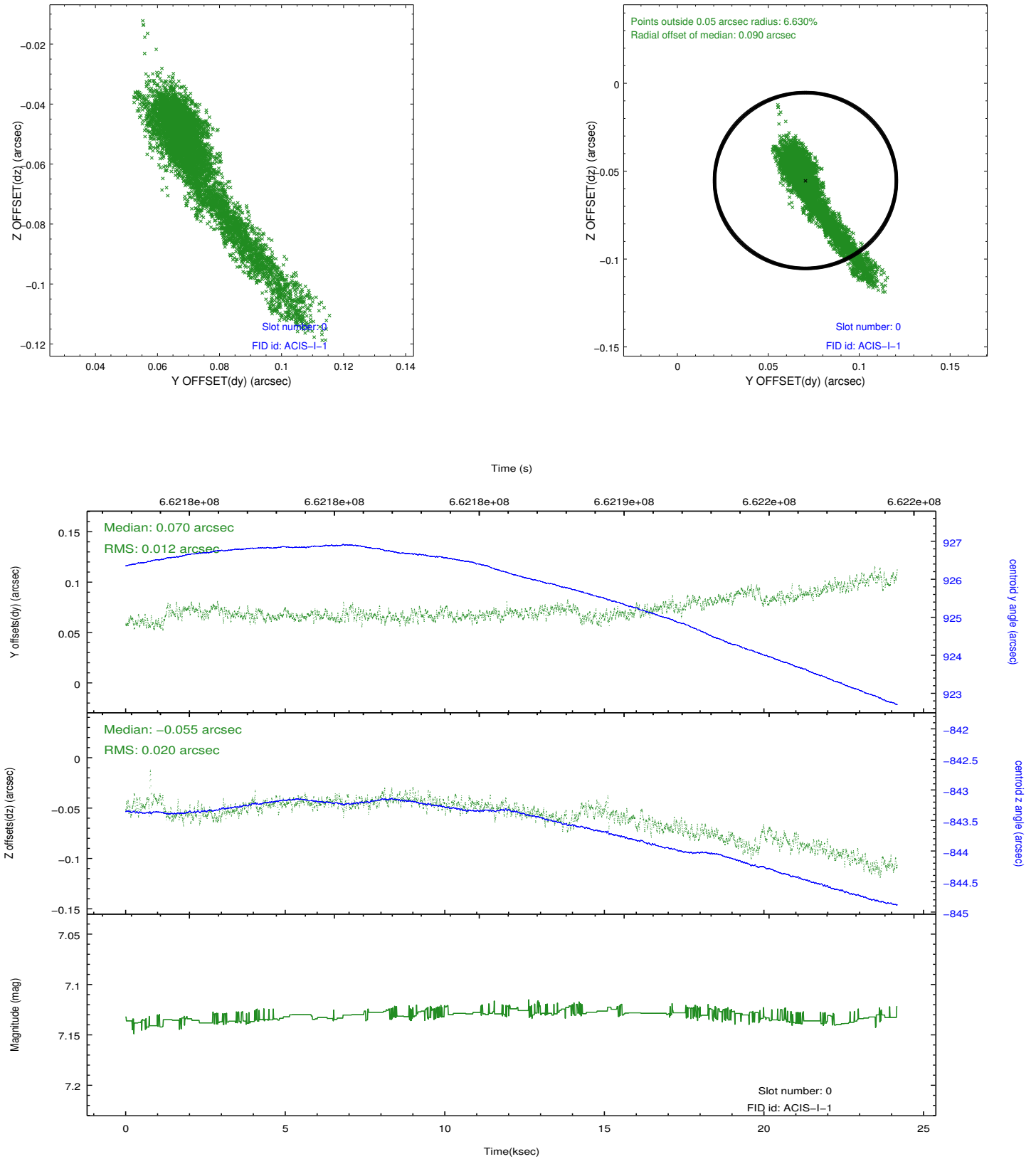


## 2.4.5 Slot 7

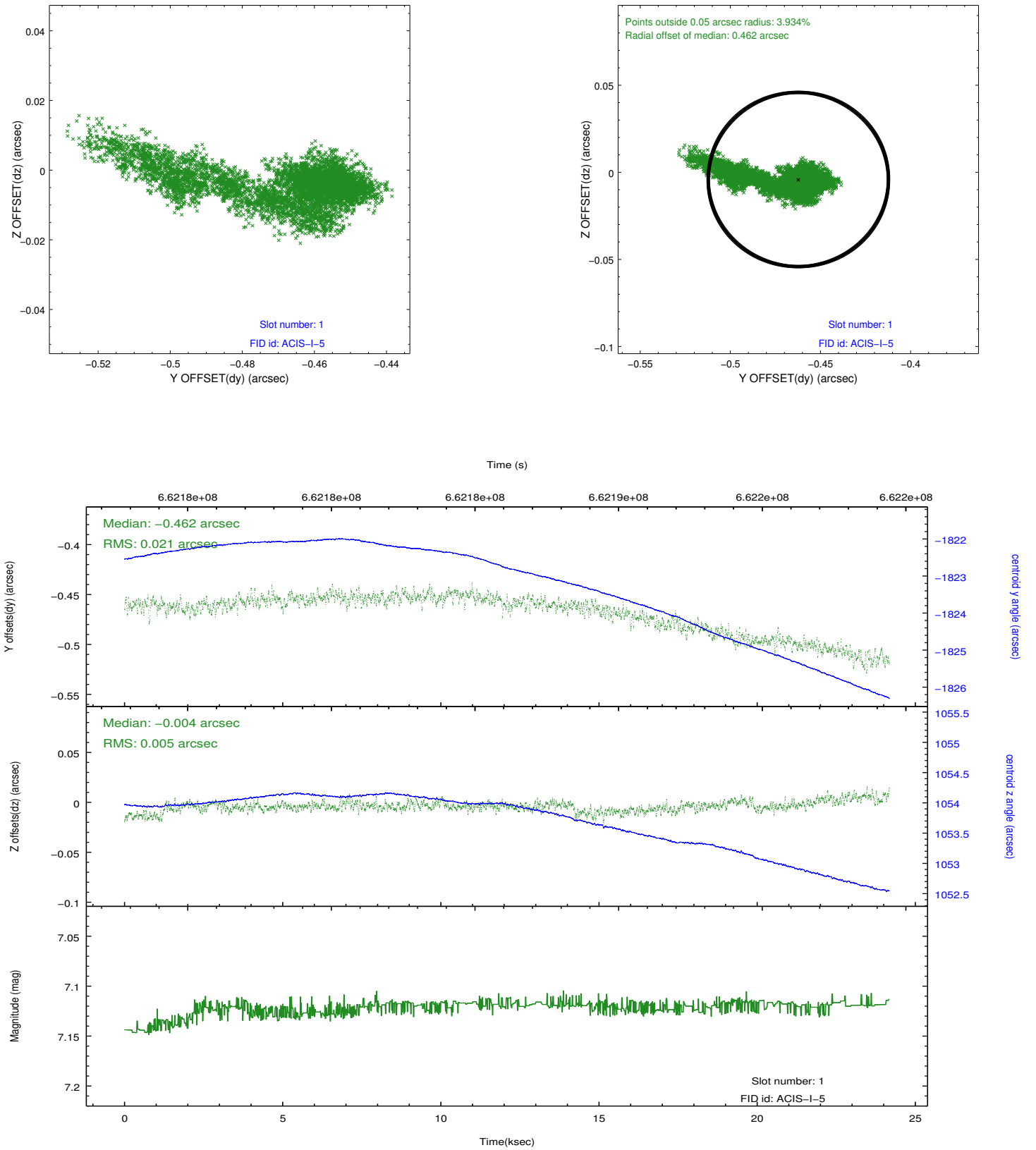


## 2.5 FID Slots

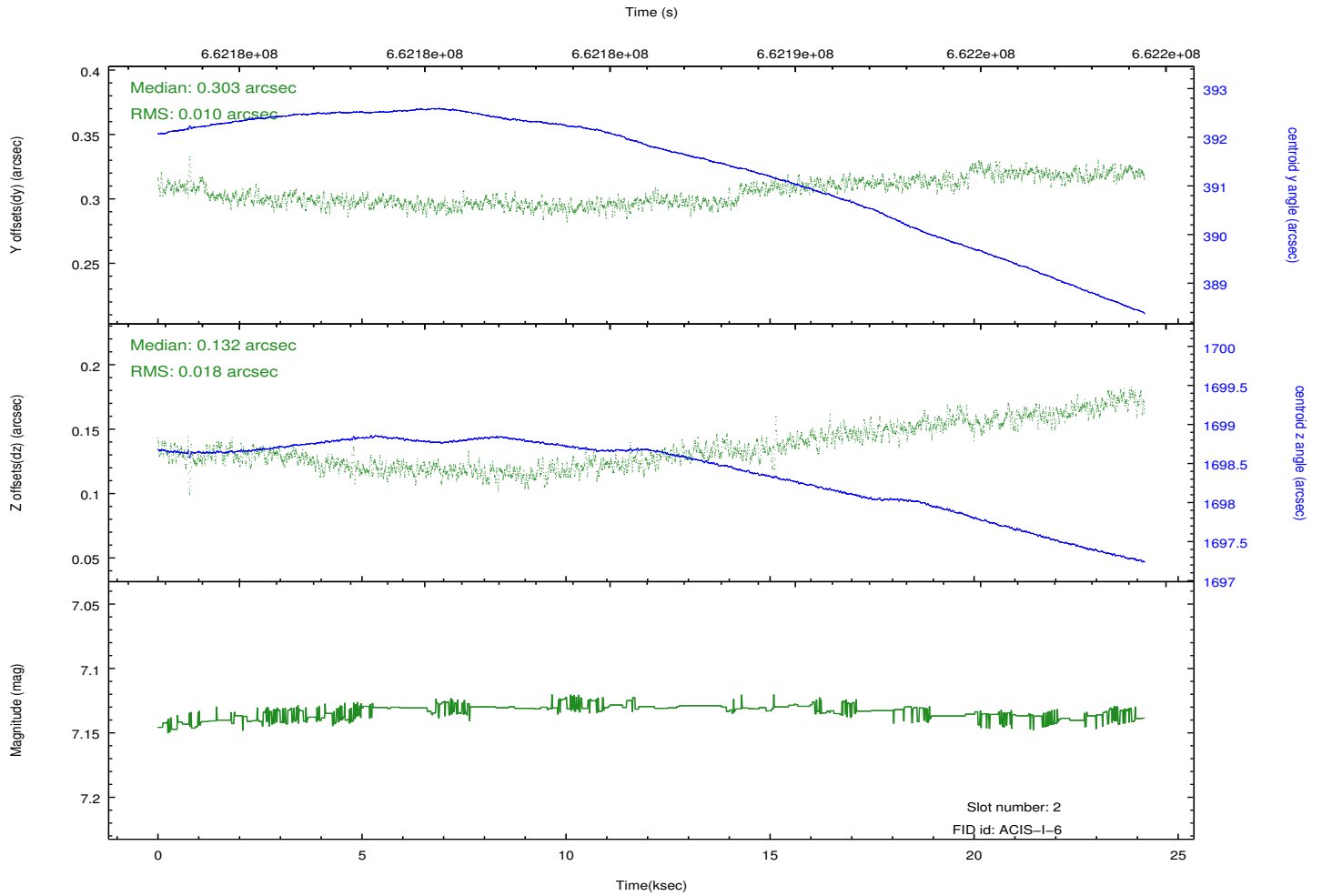
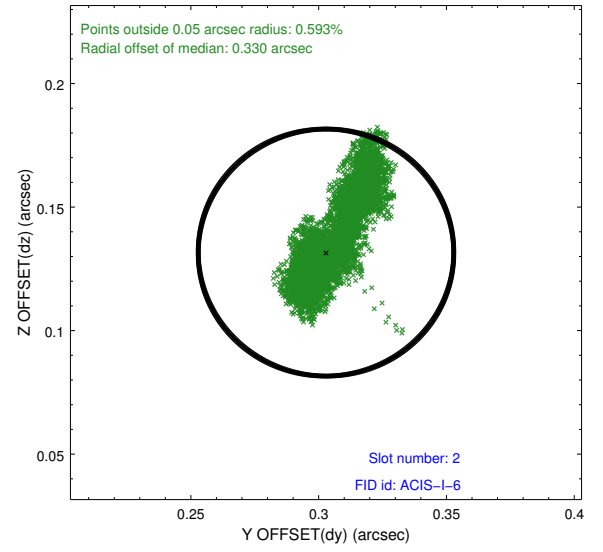
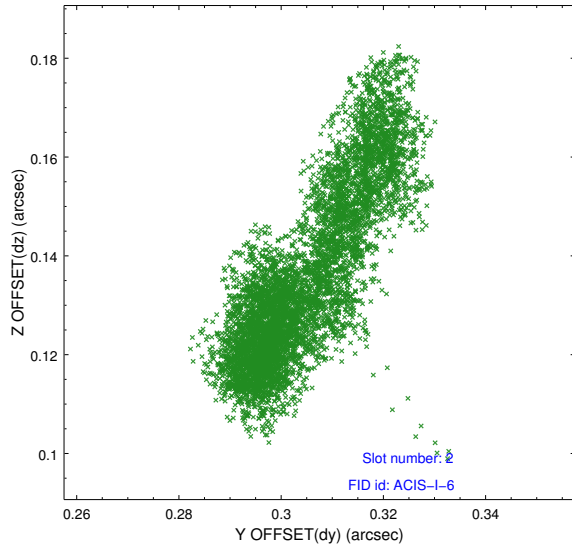
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2



## A Summary

### A.1 Status

|                            |                 |
|----------------------------|-----------------|
| V&V Scientist              | Jen Lauer       |
| V&V Date (YYYY-MM-DD)      | 2018.12.27      |
| V&V Edition                | 1               |
| V&V Disposition and Status | OK              |
| V&V Charge Time            | 24.065300185204 |

### A.2 Comments