

# V&V Reference Report

## L2 ASCDS Version : 10.9.2

Observation 20586 - L2 Version 2  
Chandra X-Ray Center

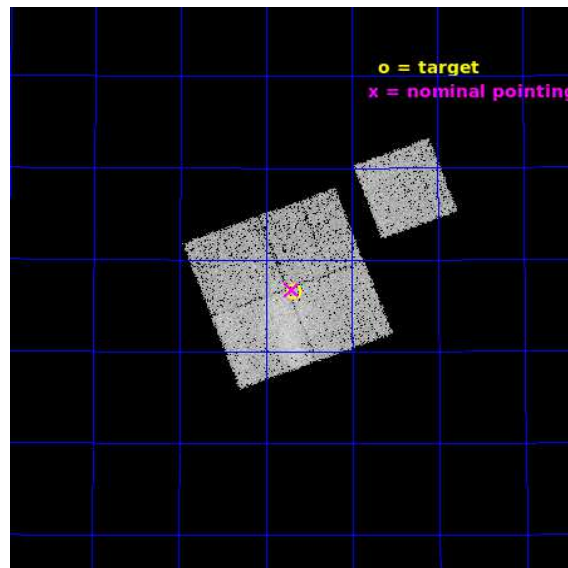
L2 Processing Date : Oct 25 2020

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# 1 Front

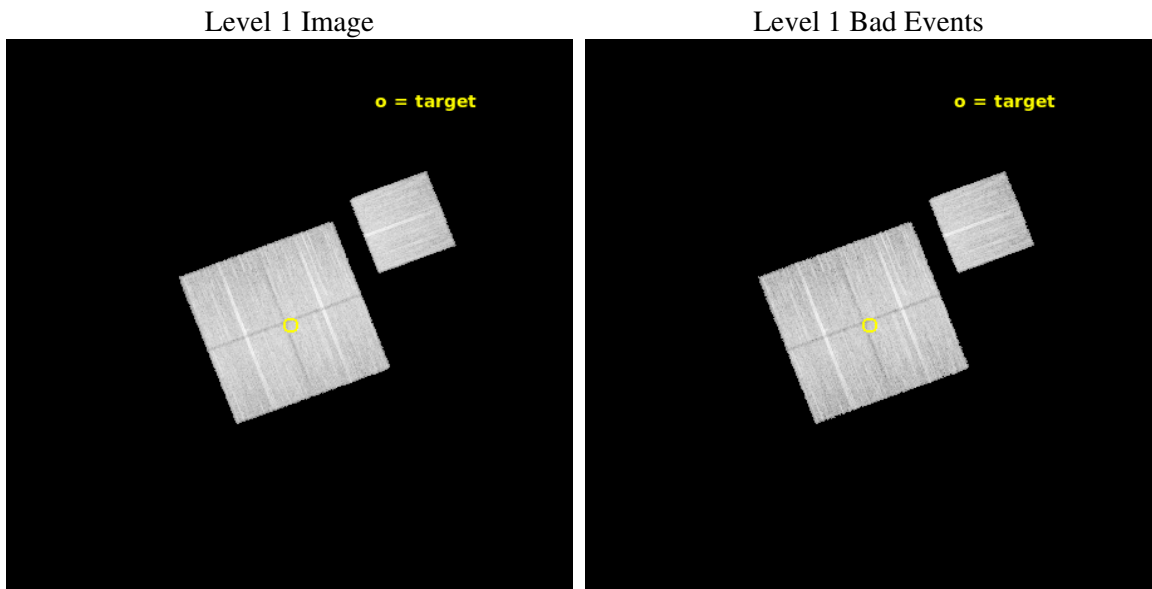
|          |                                                                              |                                             |
|----------|------------------------------------------------------------------------------|---------------------------------------------|
| seq_num  | 801784                                                                       | Sequence number                             |
| obs_id   | 20586                                                                        | Observation id                              |
| title    | A POSSIBLE FIRST DETECTION OF INVERSE COMPTON EMISSION FROM A GALAXY CLUSTER | Proposal title                              |
| observer | Maxim Markevitch                                                             | Principal investigator                      |
| object   | CIZA J2242.8+5301                                                            | Source name                                 |
| dtcycle  | 0                                                                            | &#160                                       |
| cycle    | P                                                                            | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 340.67                                                                       | Observer's specified target RA [deg]        |
| dec_targ | 53.11                                                                        | Observer's specified target Dec [deg]       |
| ra_nom   | 340.67465789664                                                              | Nominal RA [deg]                            |
| dec_nom  | 53.112710886758                                                              | Nominal Dec [deg]                           |
| roll_nom | 69.198340811414                                                              | Nominal Roll [deg]                          |
| revision | 2                                                                            | Processing version of data                  |
| ontime   | 15065.565540195                                                              | Sum of GTIs [s]                             |
| livetime | 14868.722835304                                                              | Livetime [s]                                |
| ontime0  | 15068.583430648                                                              | Sum of GTIs [s]                             |
| ontime1  | 15068.624470592                                                              | Sum of GTIs [s]                             |
| ontime2  | 15068.665510654                                                              | Sum of GTIs [s]                             |
| ontime3  | 15065.565540195                                                              | Sum of GTIs [s]                             |
| ontime6  | 15065.401390553                                                              | Sum of GTIs [s]                             |
| l2events | 59527                                                                        | Number of level 2 events                    |



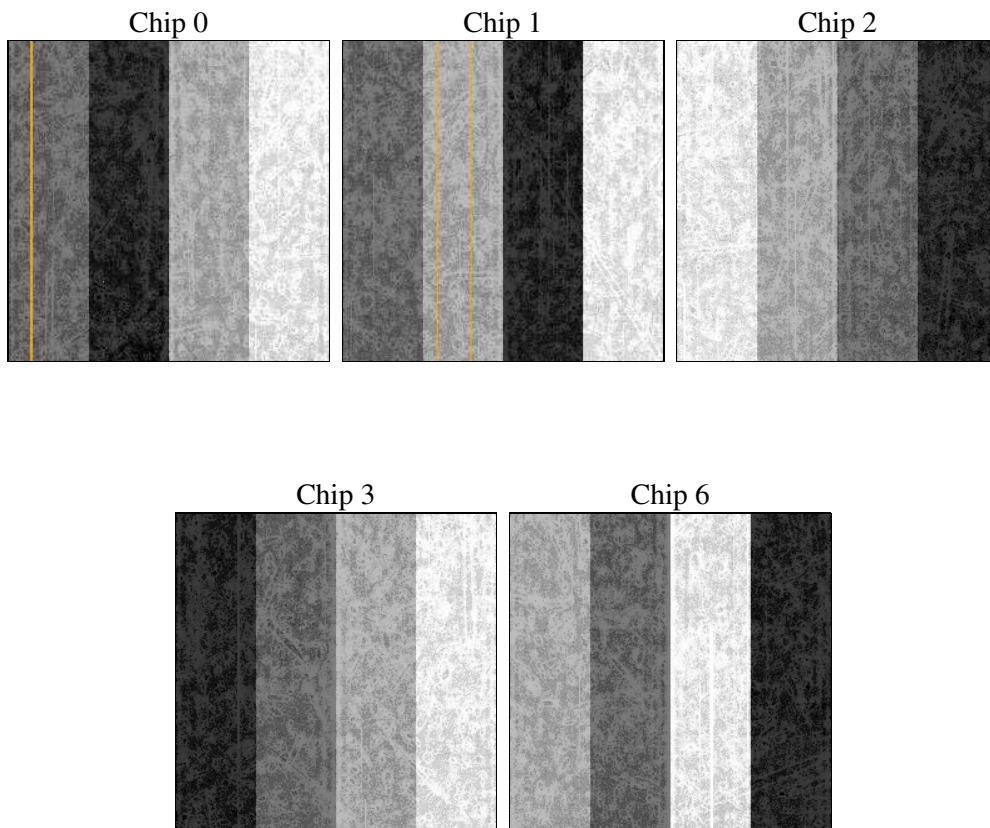
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |                                         |
|----------|---------------------|--------------------------------|----------------|-----------------|-----------------------------------------|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 15000.000000    | [s] Scheduled observation exposure time |
| ascdsver | 10.9.2              | Processing system revision     | ontime         | 15065.565540195 | Sum of GTIs [s]                         |
| caldsver | 4.9.3               | &#160                          | ontime0        | 15068.583430648 | Sum of GTIs [s]                         |
| date     | 2020-10-25T16:05:10 | Date and time of file creation | ontime1        | 15068.624470592 | Sum of GTIs [s]                         |
| revision | 2                   | Processing version of data     | ontime2        | 15068.665510654 | Sum of GTIs [s]                         |
|          |                     |                                | ontime3        | 15065.565540195 | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 15065.401390553 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 565564          | Number of level 1 events                |

### 2.1.4 Events

|                 | ccd 0  | ccd 1  | ccd 2  | ccd 3  | ccd 6  |
|-----------------|--------|--------|--------|--------|--------|
| level 1 events  | 106346 | 112015 | 118714 | 112652 | 115837 |
| rejected events | 93801  | 92429  | 106870 | 99203  | 103556 |
| rejected %      | 88%    | 82%    | 90%    | 88%    | 89%    |

|                | ccd 0 | ccd 1 | ccd 2  | ccd 3 | ccd 6 |
|----------------|-------|-------|--------|-------|-------|
| grade 0 events | 4476  | 8867  | 4177   | 5590  | 3854  |
|                | 4%    | 7%    | 3%     | 4%    | 3%    |
| grade 1 events | 57    | 60    | 61     | 56    | 51    |
|                | 0%    | 0%    | 0%     | 0%    | 0%    |
| grade 2 events | 3194  | 4506  | 2900   | 2758  | 2964  |
|                | 3%    | 4%    | 2%     | 2%    | 2%    |
| grade 3 events | 1189  | 1414  | 1158   | 1316  | 1176  |
|                | 1%    | 1%    | 0%     | 1%    | 1%    |
| grade 4 events | 1160  | 1412  | 1194   | 1235  | 1178  |
|                | 1%    | 1%    | 1%     | 1%    | 1%    |
| grade 5 events | 4537  | 4835  | 4278   | 5191  | 4825  |
|                | 4%    | 4%    | 3%     | 4%    | 4%    |
| grade 6 events | 2533  | 3397  | 2421   | 2558  | 3116  |
|                | 2%    | 3%    | 2%     | 2%    | 2%    |
| grade 7 events | 89200 | 87524 | 102525 | 93948 | 98673 |
|                | 83%   | 78%   | 86%    | 83%   | 85%   |

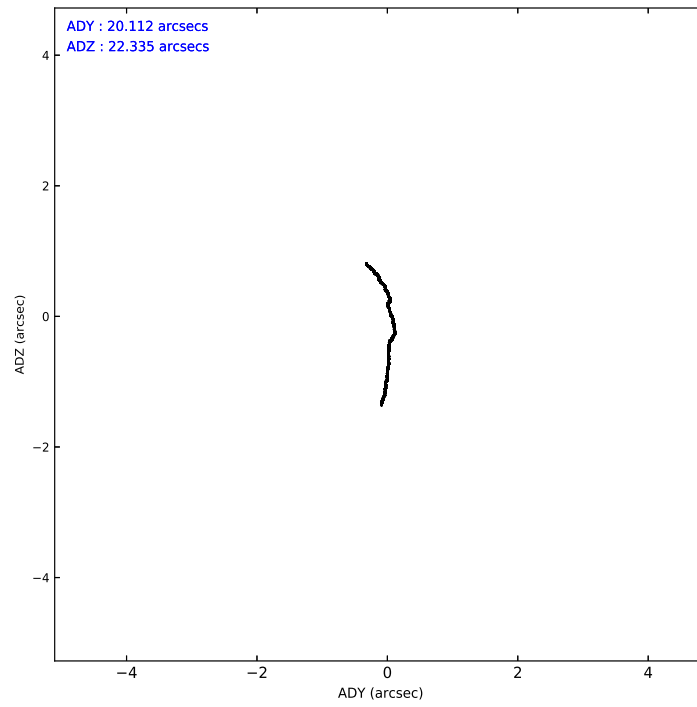
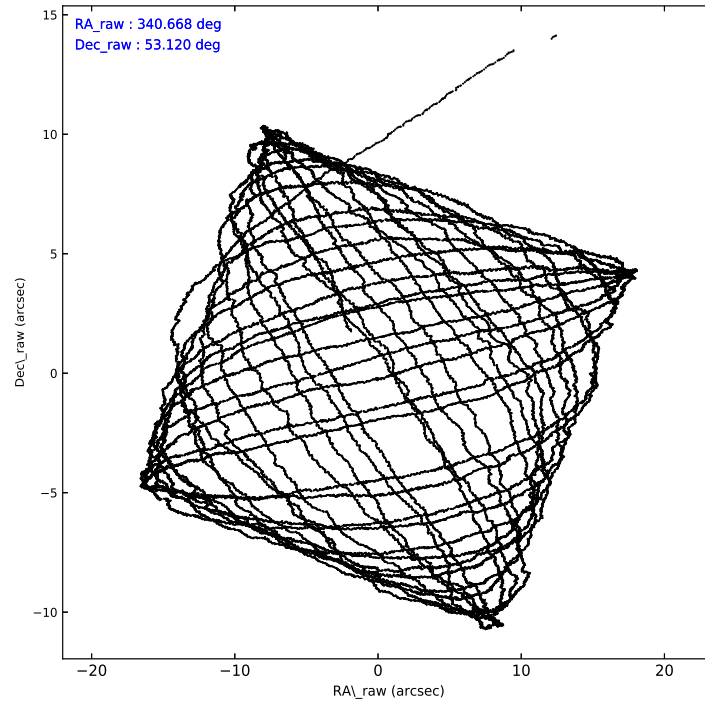


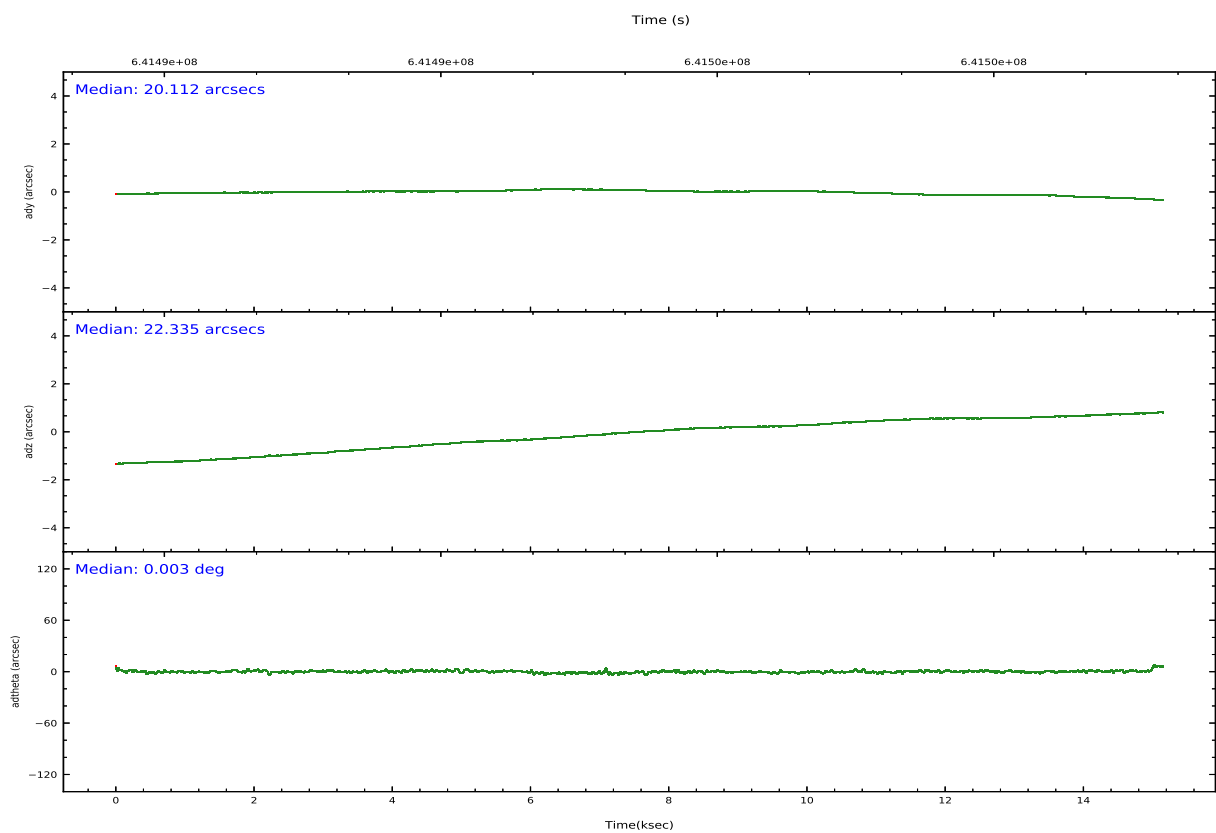
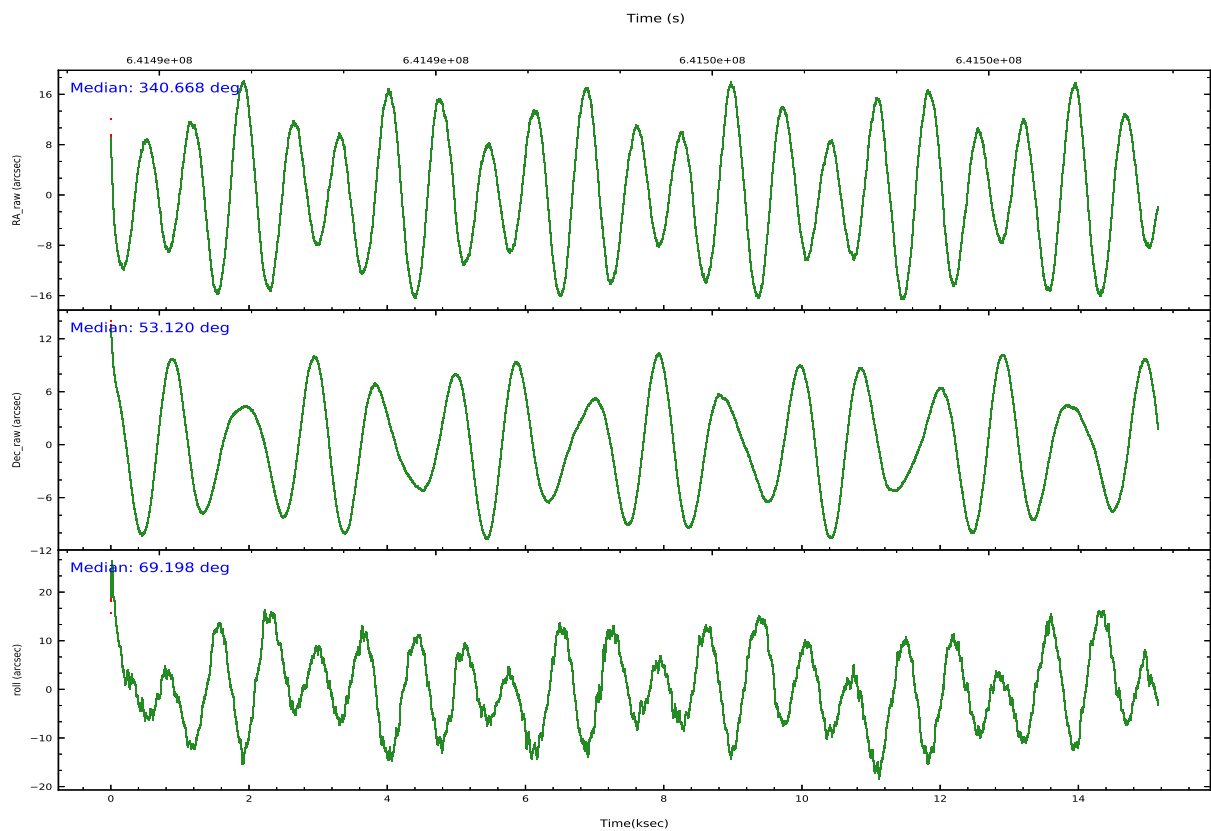
## 2.2 Compared Parameters

| 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                 | 340.675646          | 340.67465789664       |
| [deg] Pointing Dec                | 53.093129           | 53.112710886758       |
| [deg] Pointing Roll               | 68.995487           | 69.198340811414       |
| [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)  | 641487451.184000    | 641486135.51114       |
| Observation start date            | 2018-04-30T14:56:22 | 2018-04-30T14:35:35   |
| [s] Observation end time (MET)    | 641502451.184000    | 641503541.0371701     |
| Observation end date              | 2018-04-30T19:06:22 | 2018-04-30T19:25:41   |
| Read mode                         | TIMED               | TIMED                 |

| Parameter                             | Planned   | Actual  |
|---------------------------------------|-----------|---------|
| Obspar version number                 | 8         | 8       |
| 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



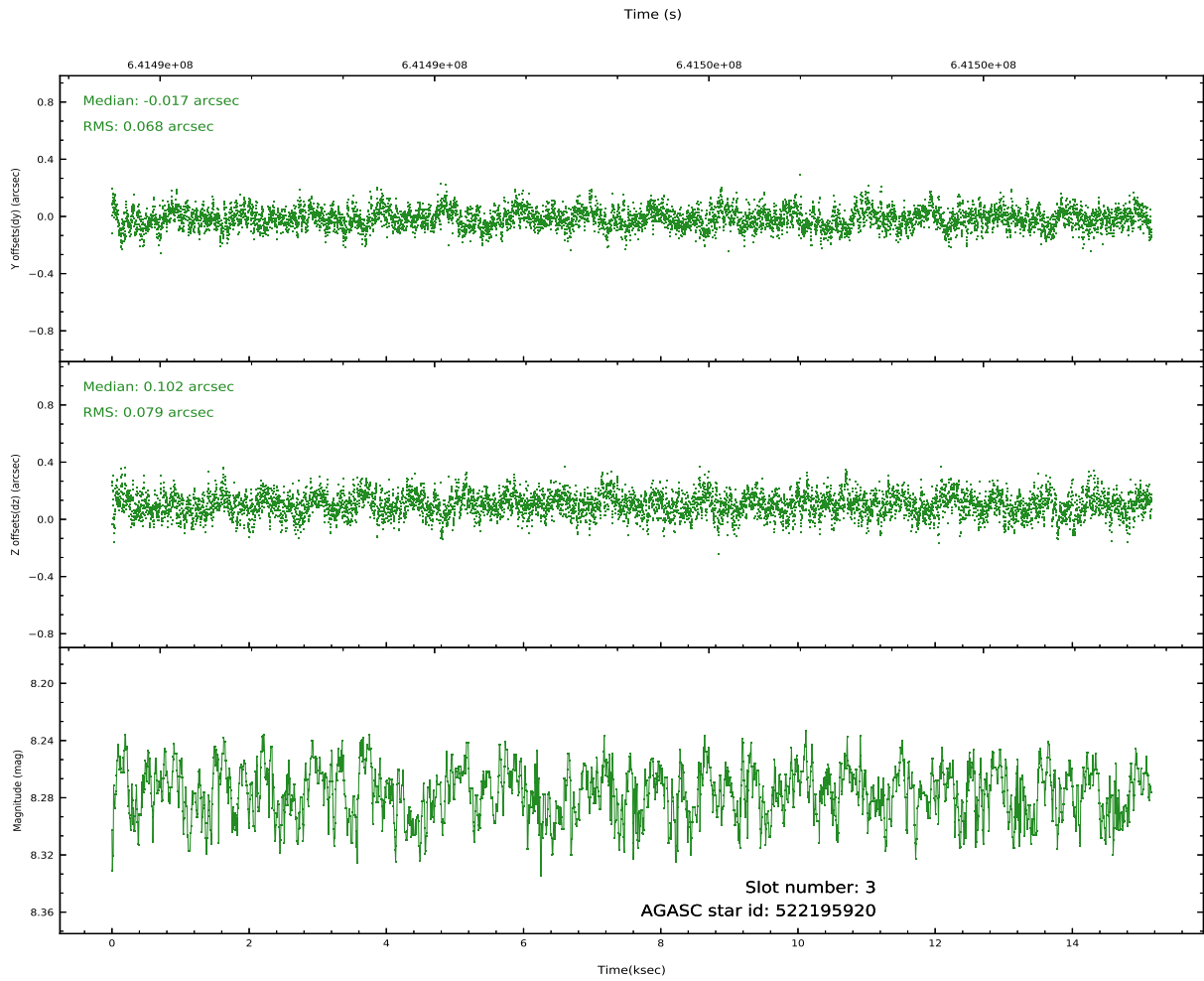
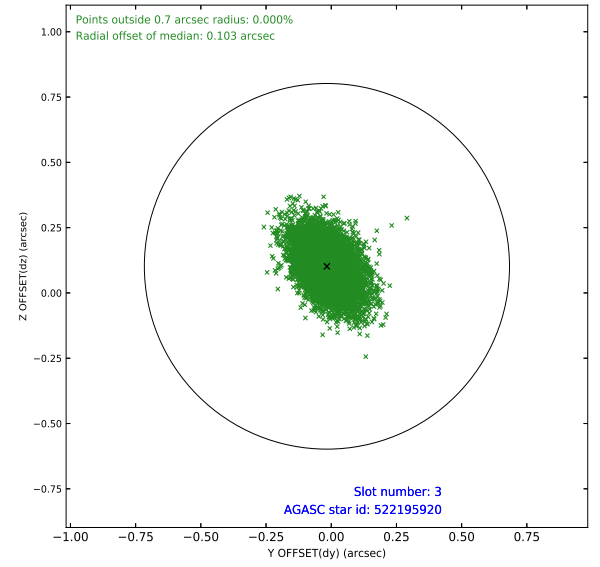
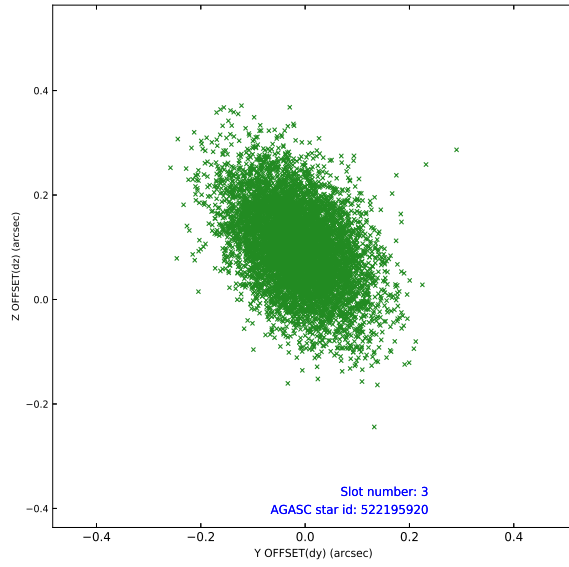


Slot Statistics

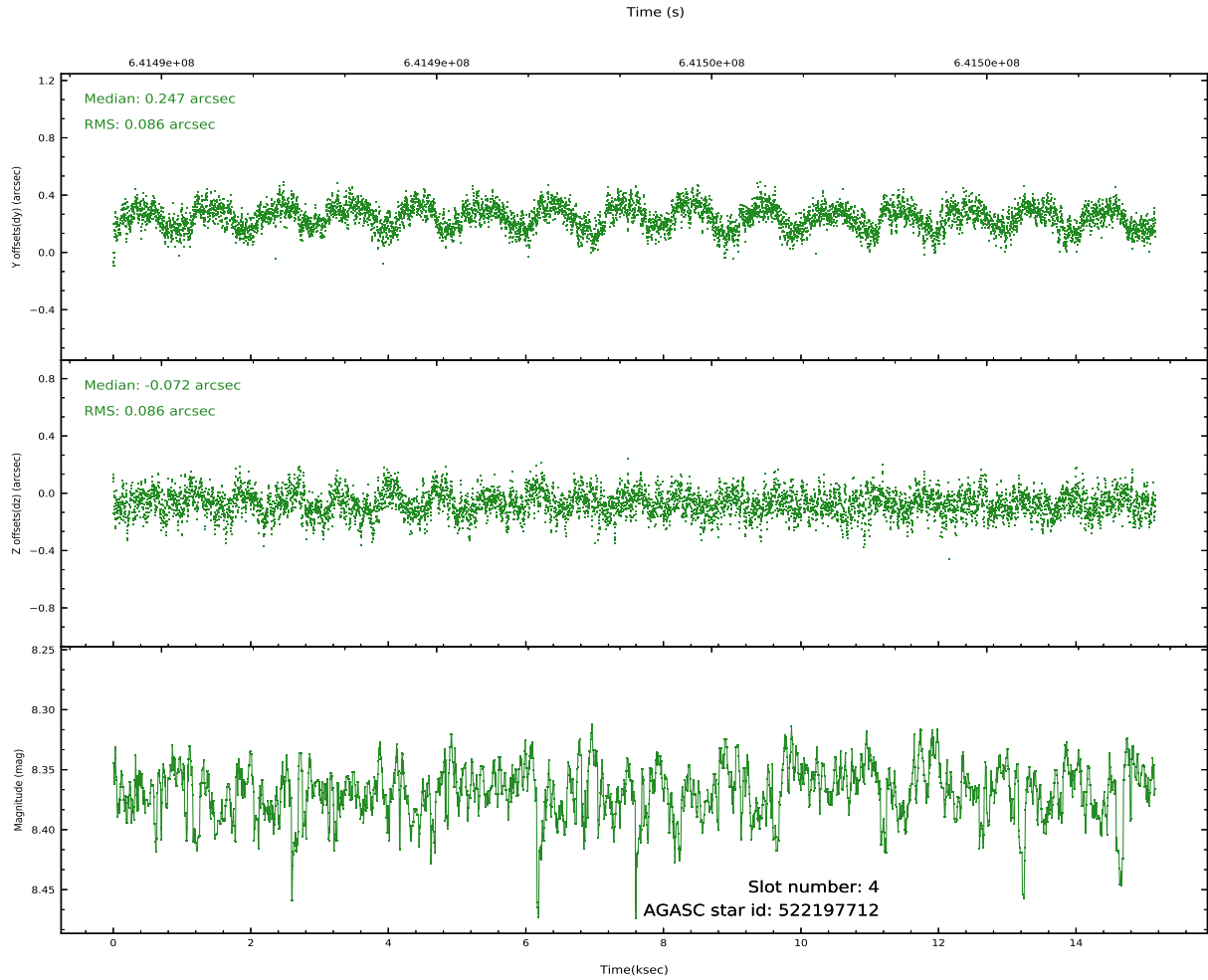
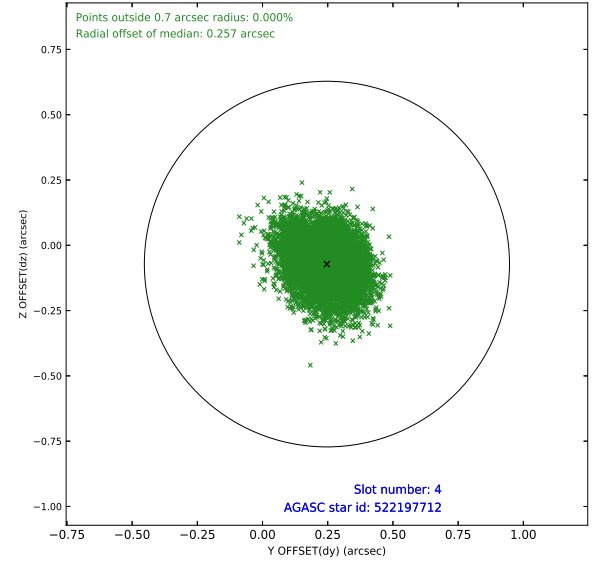
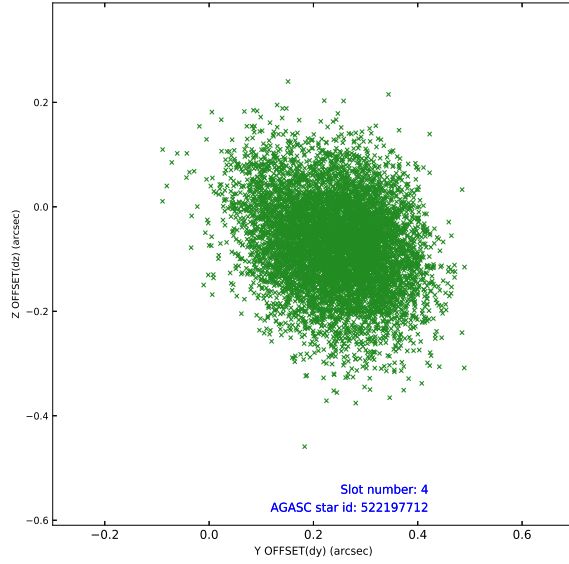
| pt | status | used | id        | mag  | n_pts | frac_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec       | mean_y   | mea   |
|----|--------|------|-----------|------|-------|----------|--------|--------|-------|-------|------------|-----------|----------|-------|
| 0  | FID    |      | ACIS-I-1  | 7.23 | 3697  | 1.000    | 0.012  | -0.080 | 0.027 | 0.039 | 0.000000   | 0.000000  | 919.17   | -846  |
| 1  | FID    |      | ACIS-I-2  | 7.12 | 3696  | 1.000    | -0.060 | 0.076  | 0.017 | 0.028 | 0.000000   | 0.000000  | -774.83  | -852  |
| 2  | FID    |      | ACIS-I-4  | 7.17 | 3695  | 1.000    | -0.049 | 0.071  | 0.016 | 0.030 | 0.000000   | 0.000000  | 2139.02  | 1053  |
| 3  | GUIDE  | used | 522195920 | 8.28 | 7390  | 1.000    | -0.017 | 0.102  | 0.108 | 0.186 | 340.534111 | 52.561582 | -1896.95 | -396  |
| 4  | GUIDE  | used | 522197712 | 8.37 | 7385  | 1.000    | 0.247  | -0.072 | 0.129 | 0.211 | 341.160967 | 52.624062 | -1192.54 | -1594 |
| 5  | GUIDE  | used | 522204136 | 7.19 | 7393  | 1.000    | -0.144 | 0.088  | 0.106 | 0.187 | 341.384669 | 53.374616 | 1498.97  | -1055 |
| 6  | GUIDE  | used | 522200440 | 8.89 | 7386  | 1.000    | -0.024 | -0.088 | 0.131 | 0.222 | 340.183364 | 53.917345 | 2398.97  | 2038  |
| 7  | GUIDE  | used | 522202320 | 6.95 | 7390  | 1.000    | -0.063 | -0.028 | 0.094 | 0.164 | 341.199728 | 53.302639 | 1112.43  | -779  |

## 2.4 Star Slots

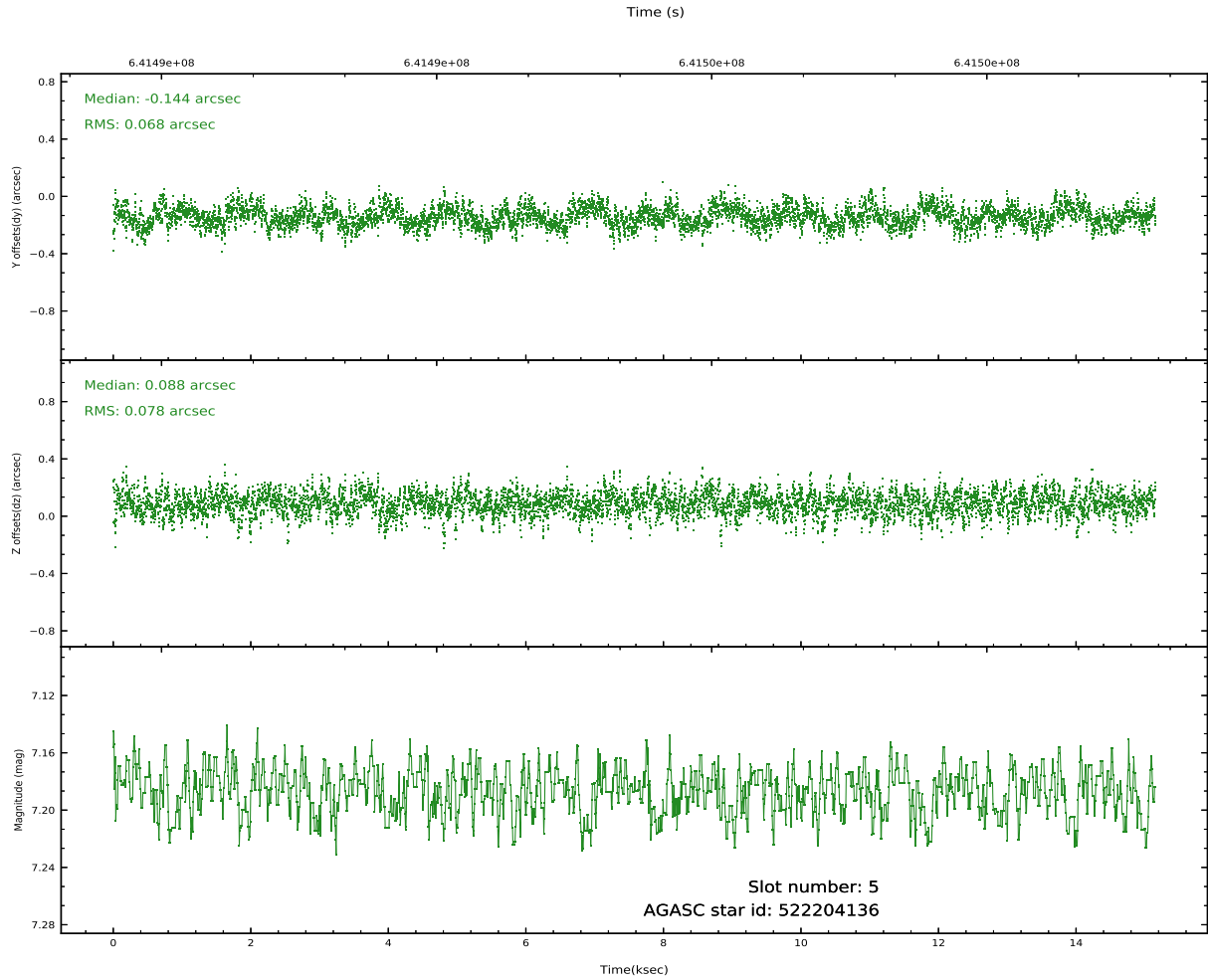
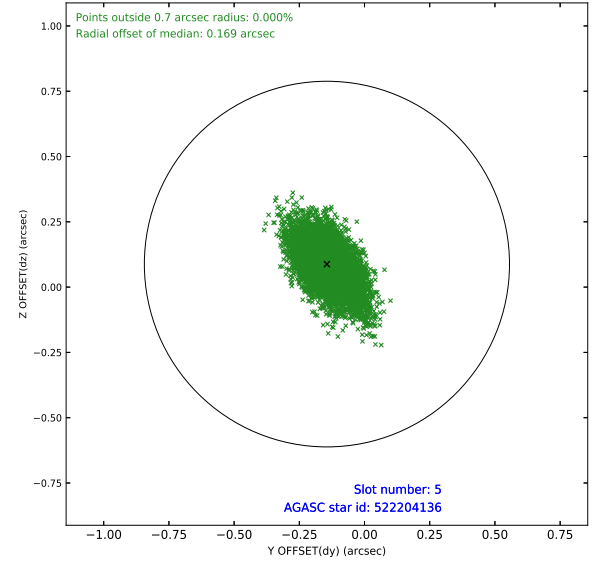
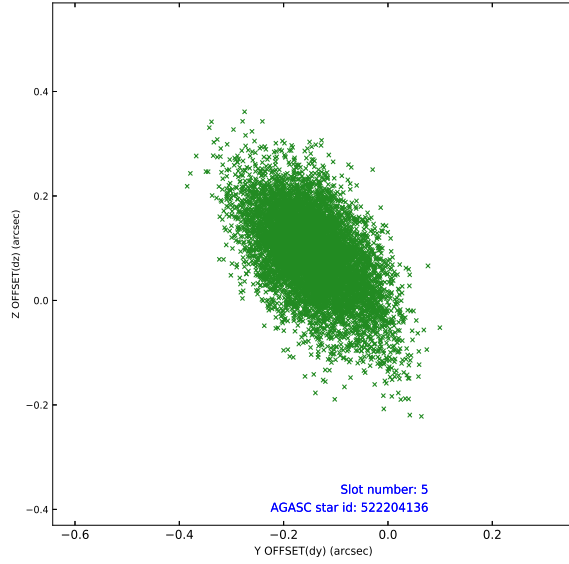
### 2.4.1 Slot 3



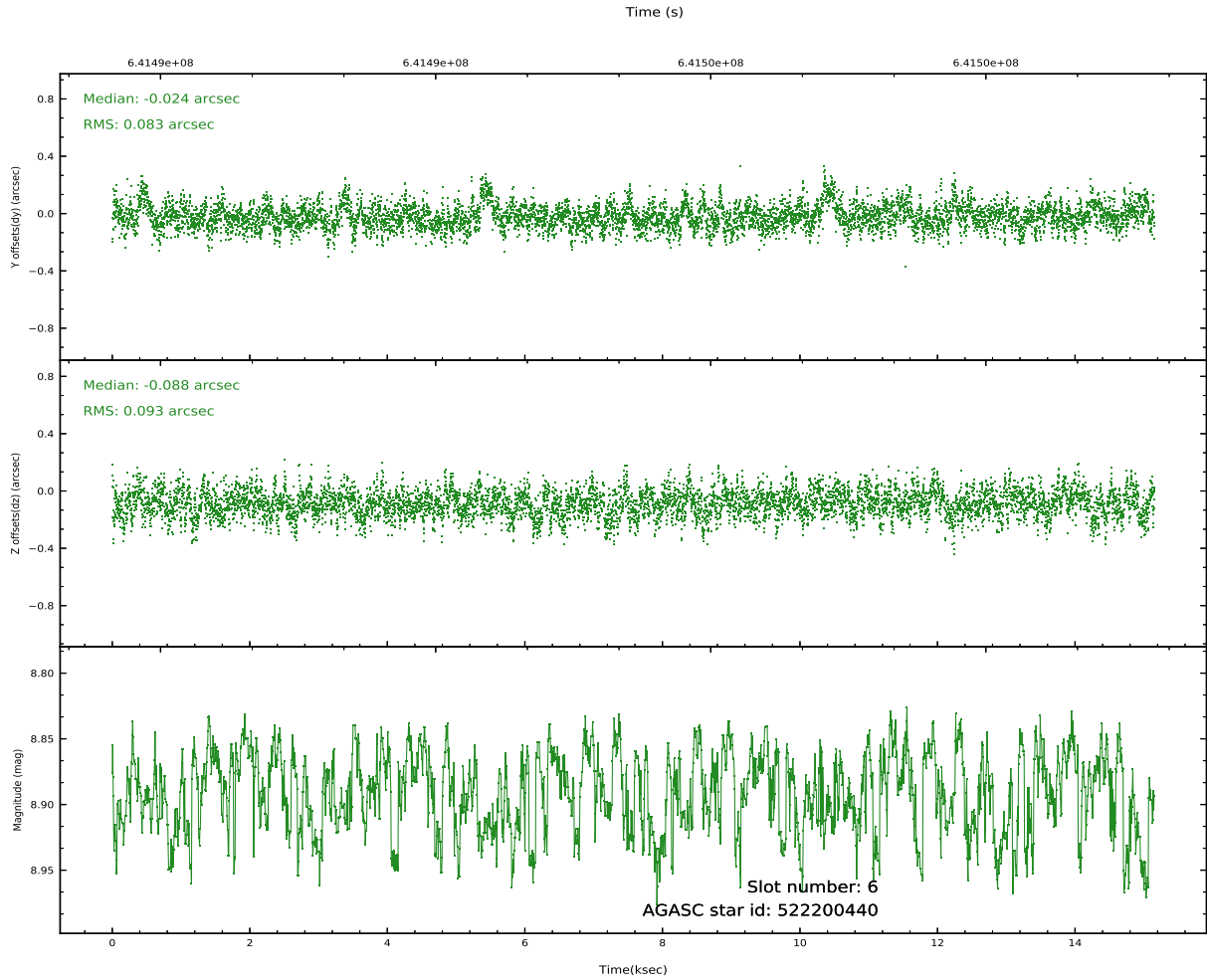
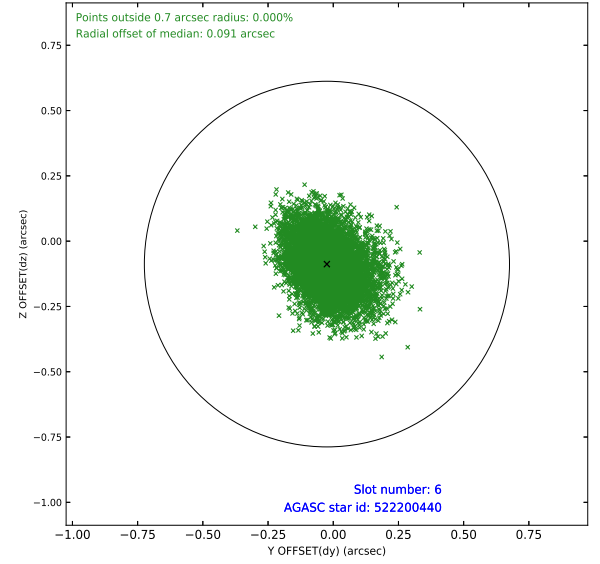
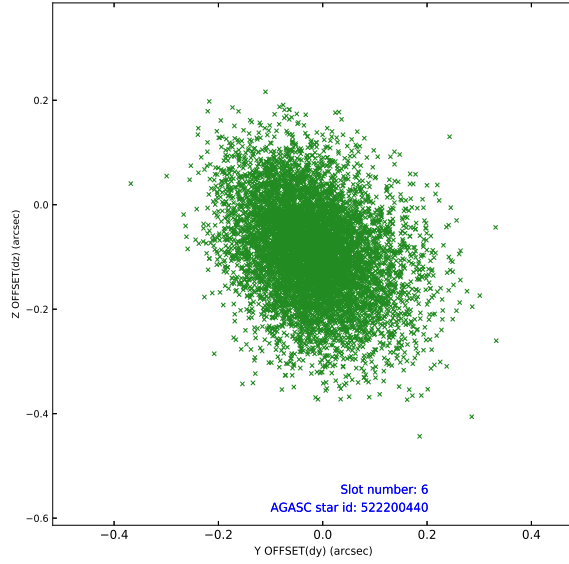
## 2.4.2 Slot 4



### 2.4.3 Slot 5

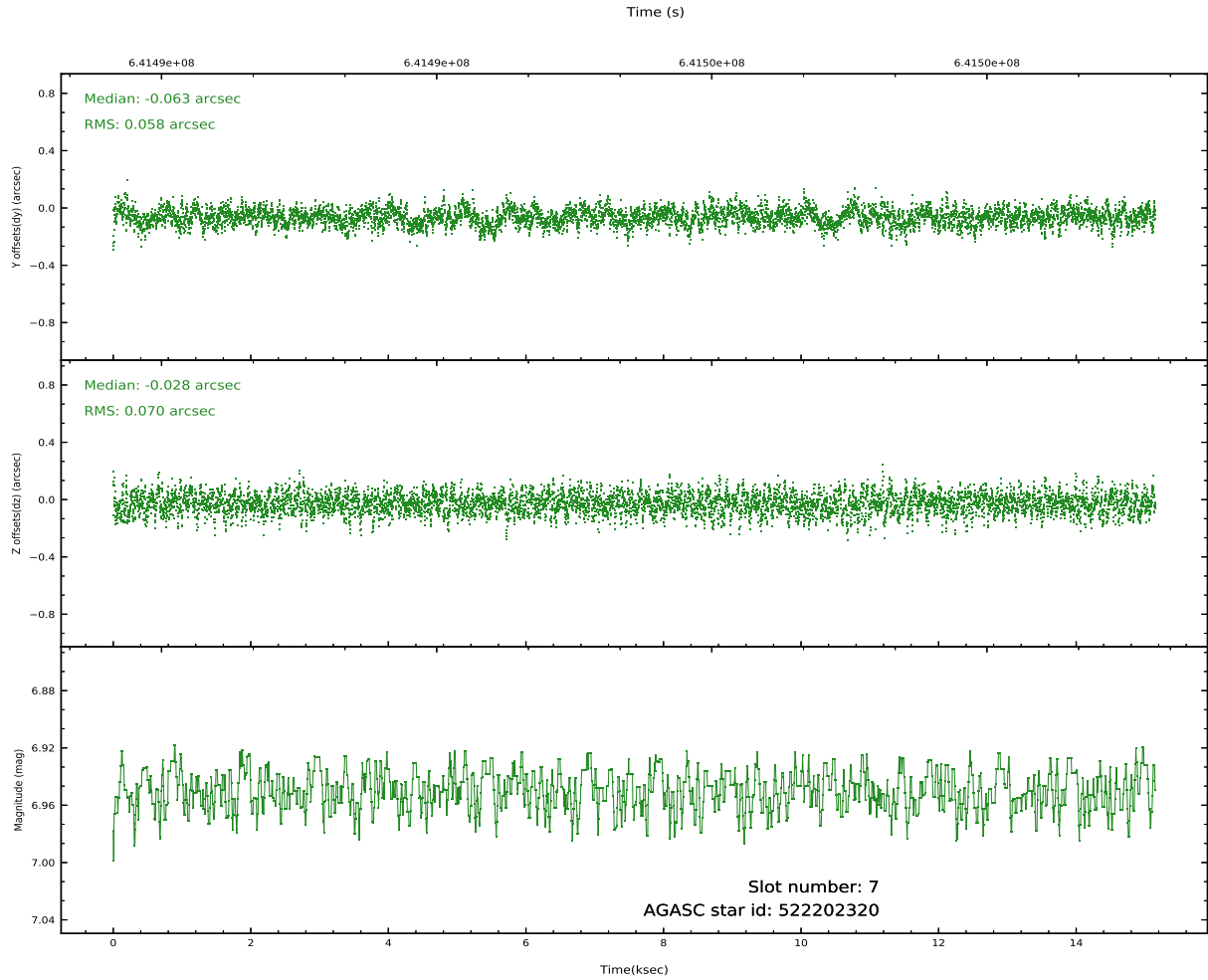
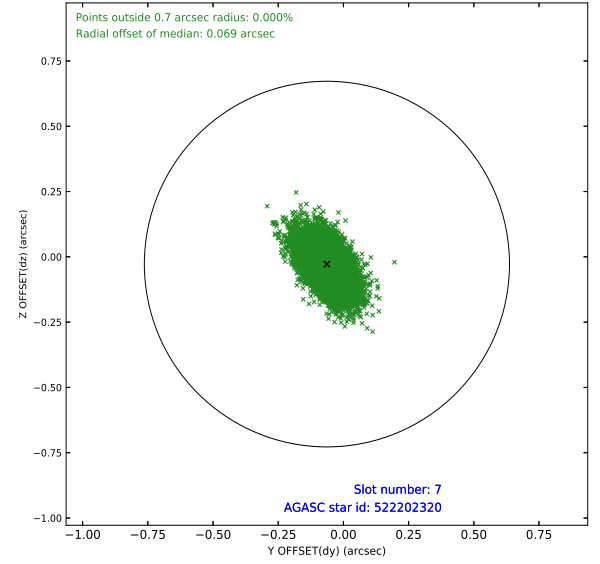
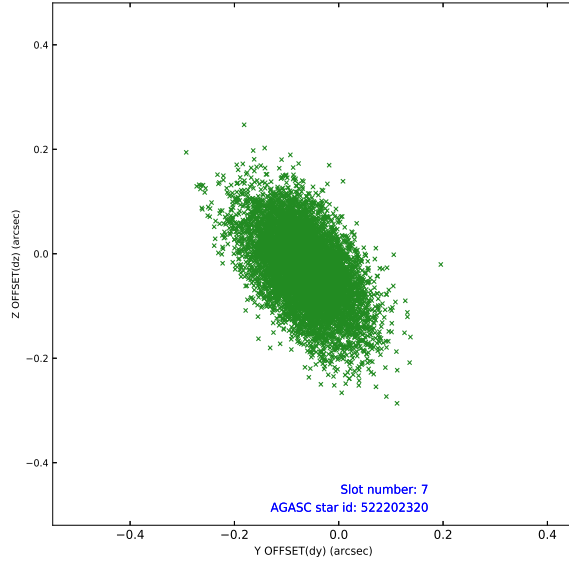


## 2.4.4 Slot 6



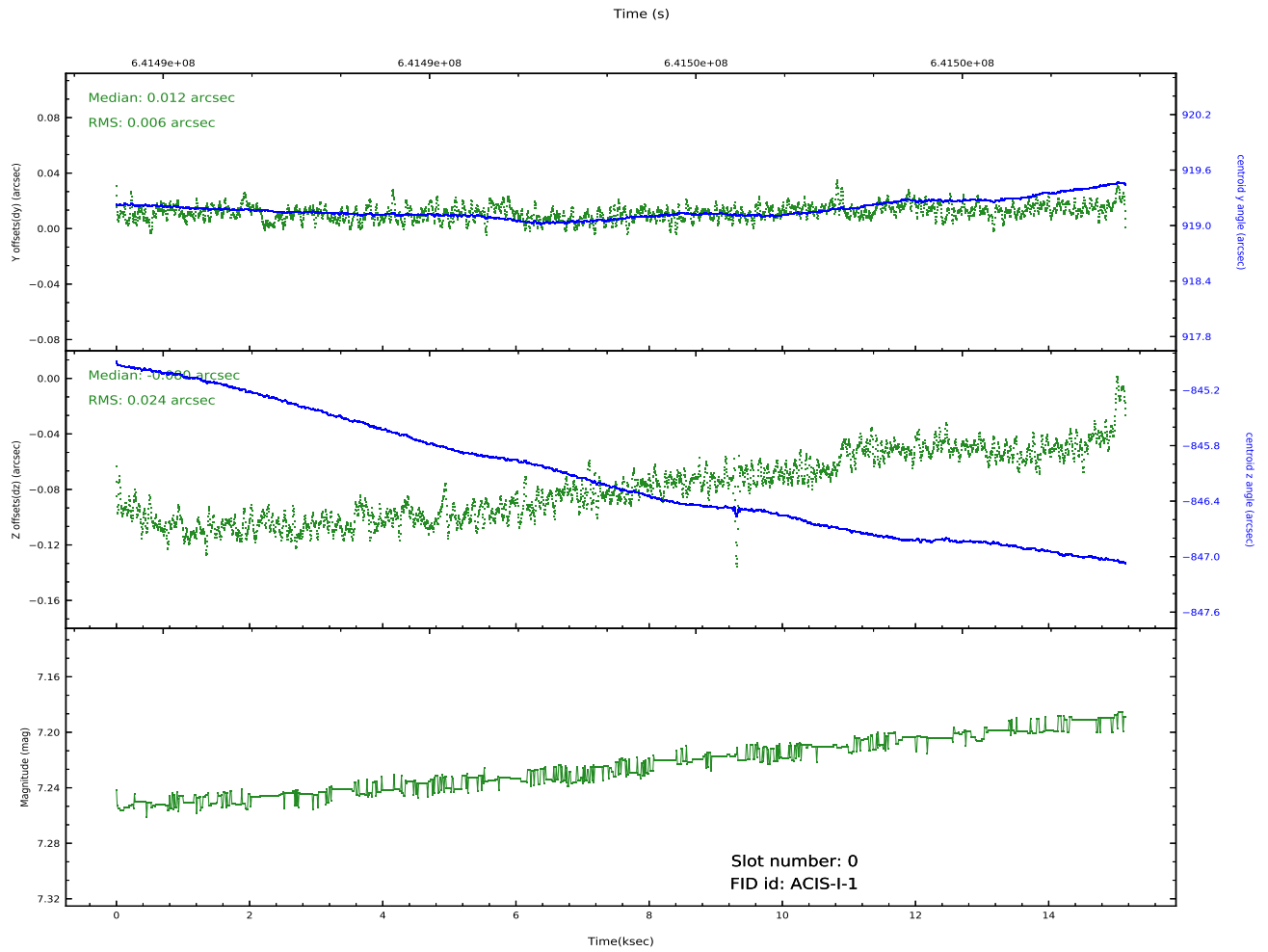
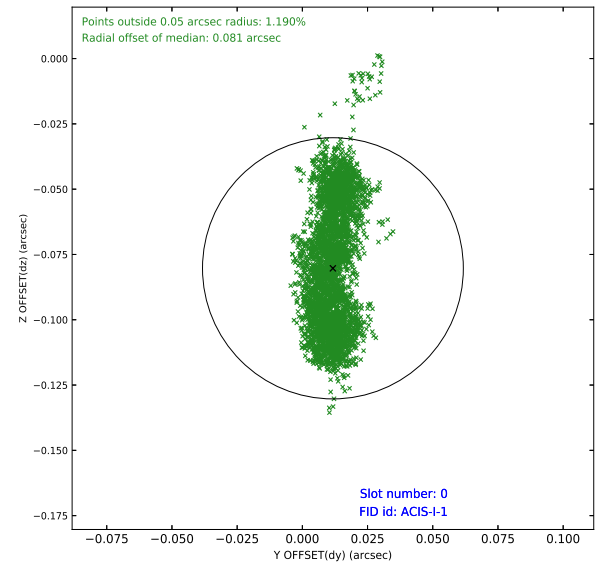
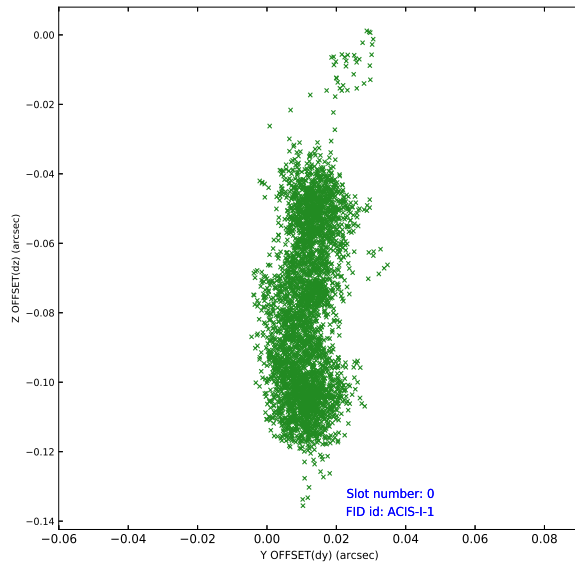


## 2.4.5 Slot 7

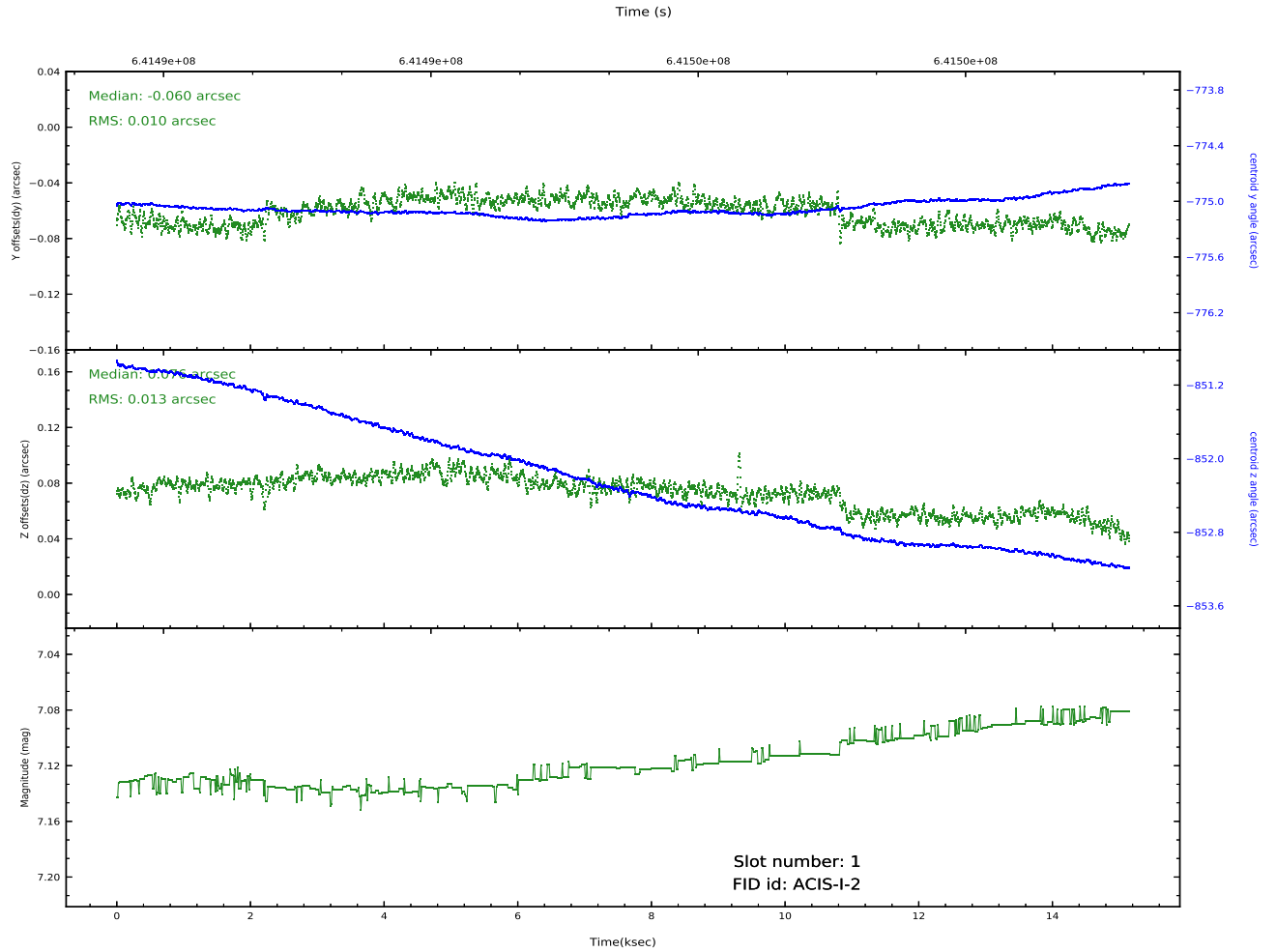
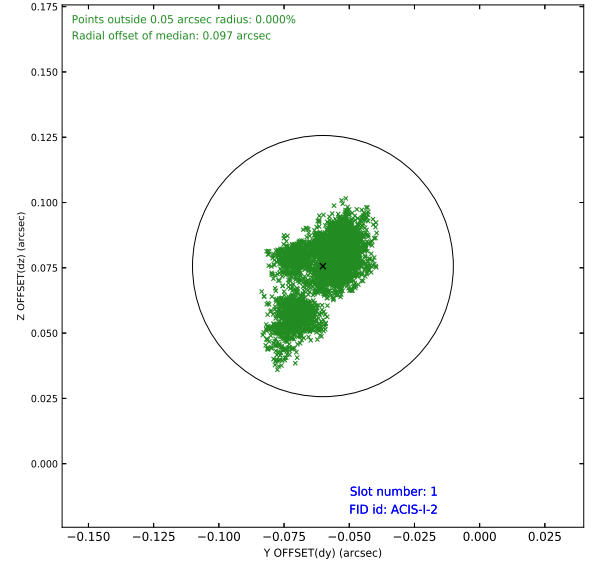
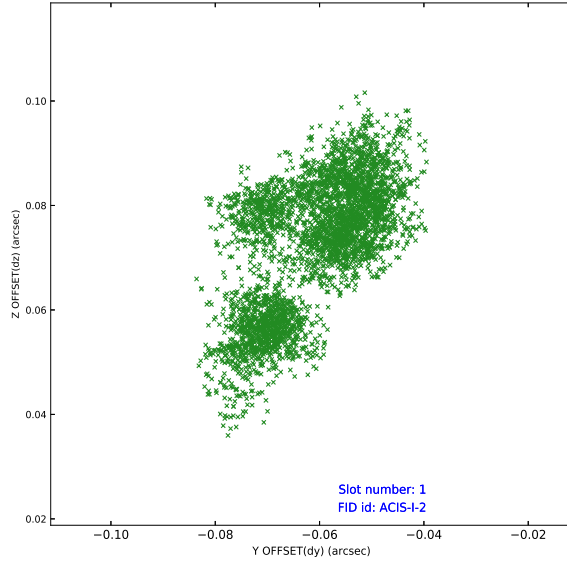


## 2.5 FID Slots

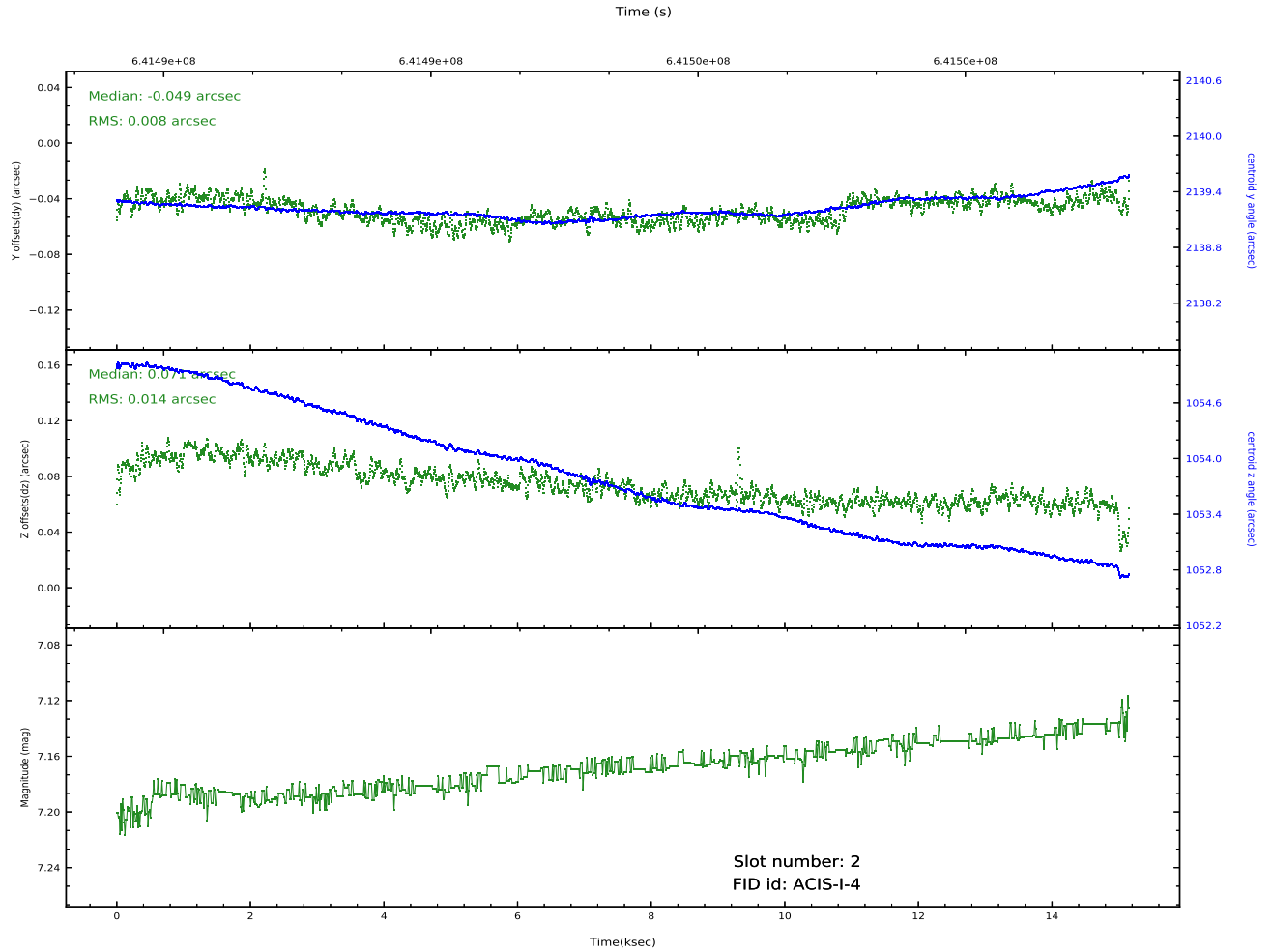
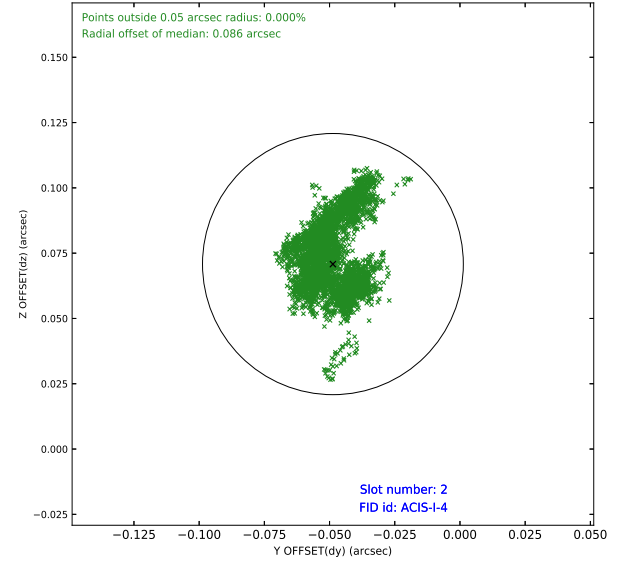
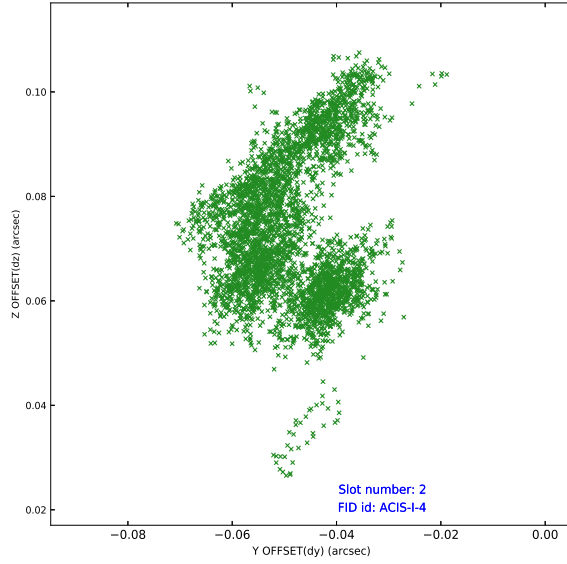
### 2.5.1 Slot 0



## 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)      | 2020.10.28      |
| V&V Edition                | 1               |
| V&V Disposition and Status | Repr+DD         |
| V&V Charge Time            | 15.065565544605 |

## A.2 Comments

SAP Team: Please reprocess using replacement bias file for chip 1.

===

The bias map for CCD\_ID = 1 suffers from anomalously high bias values in an 'exacto-knife'-shaped area of the bias file. Pixels in the event data that have been bias-corrected by one of the affected bias pixels may have an apparent energy shift. While the change in energy is expected to be small ( $\sim 20$  eV), it depends on many parameters that have not yet been fully explored for this bias anomaly. The bias map for CCD\_ID = 1 will be recreated to remove this anomaly and the data will be reprocessed.