

# V&V Reference Report

## L2 ASCDS Version : 10.9.1

Observation 6105 - L2 Version 4  
Chandra X-Ray Center

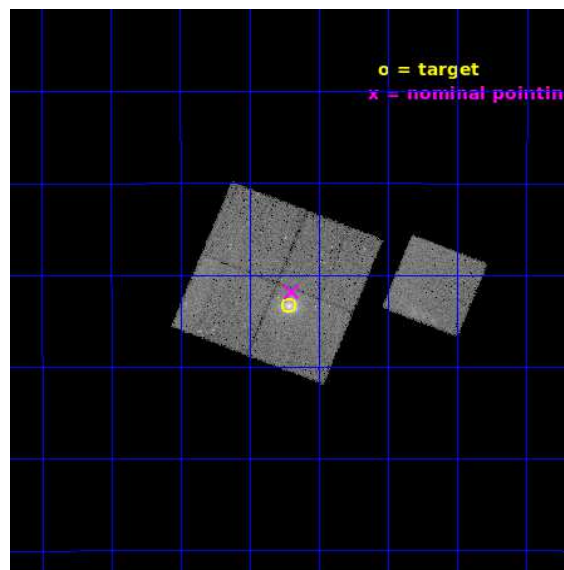
L2 Processing Date : Oct 8 2020

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# 1 Front

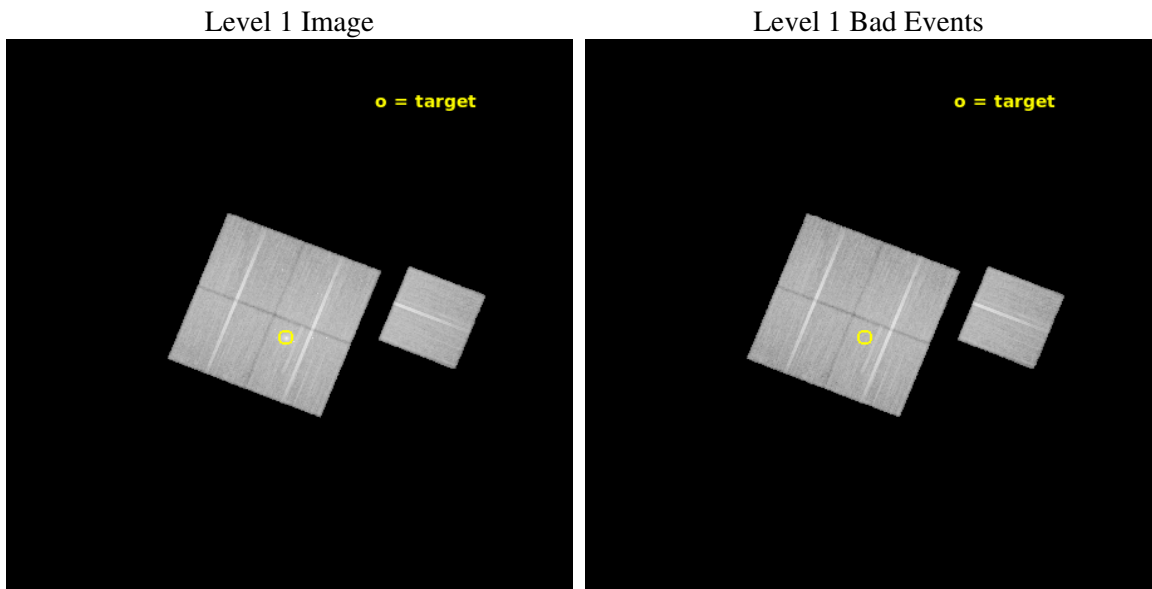
|          |  |   |
|----------|--|---|
| seq_num  | 800553   | Sequence number                             |
| obs_id   | 6105   | Observation id                              |
| title    | Probing dark energy using the X-ray gas mass fraction in dynamically relaxed galaxy clusters | Proposal title                              |
| observer | Steve Allen  | Principal investigator                      |
| object   | MACS0011.7-1523  | Source name                                 |
| dtcycle  | 0  | &#160                                       |
| cycle    | P  | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 2.92875  | Observer's specified target RA [deg]        |
| dec_targ | -15.389444   | Observer's specified target Dec [deg]       |
| ra_nom   | 2.9233822032228  | Nominal RA [deg]                            |
| dec_nom  | -15.36362849023  | Nominal Dec [deg]                           |
| roll_nom | 111.72594673838  | Nominal Roll [deg]                          |
| revision | 4  | Processing version of data                  |
| ontime   | 37770.358957082  | Sum of GTIs [s]                             |
| livetime | 37276.861411174  | Livetime [s]                                |
| ontime0  | 37763.971627593  | Sum of GTIs [s]                             |
| ontime1  | 37757.730707109  | Sum of GTIs [s]                             |
| ontime2  | 37767.194687843  | Sum of GTIs [s]                             |
| ontime3  | 37770.358957082  | Sum of GTIs [s]                             |
| ontime6  | 37767.071577758  | Sum of GTIs [s]                             |
| l2events | 116436   | Number of level 2 events                    |



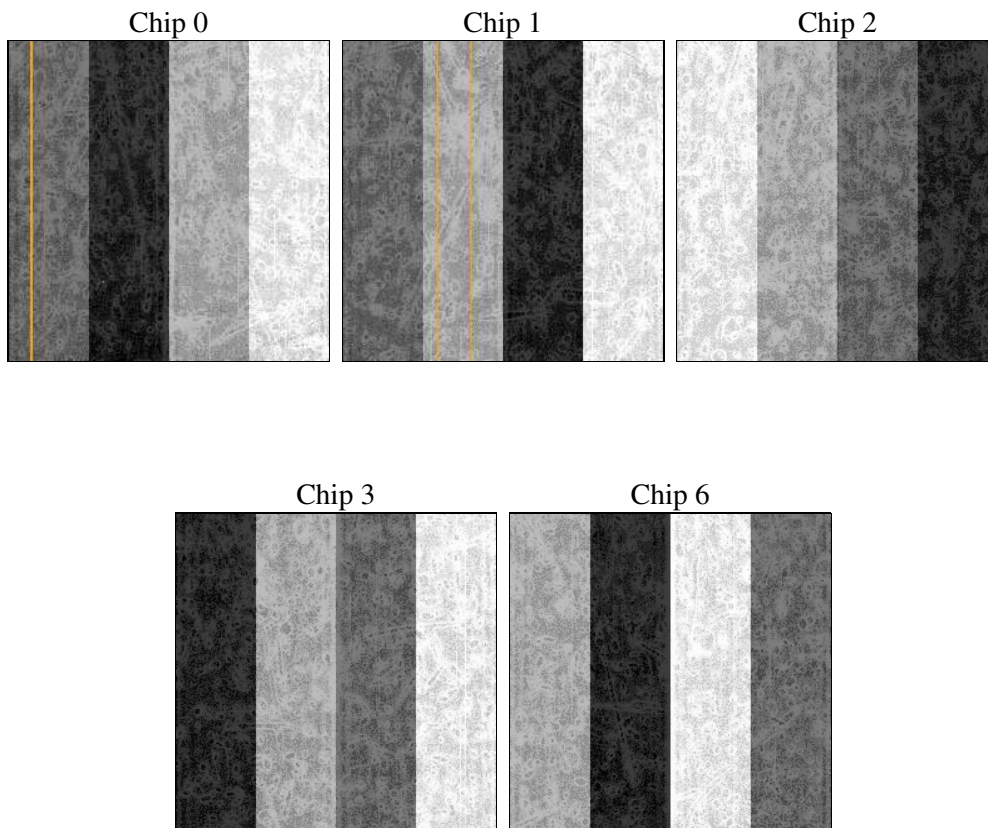
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |   |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num  | 3                   | Obi number                     | sched_exp_time | 38000.000000    | [s] Scheduled observation exposure time |
| ascdsver | 10.9.1              | Processing system revision     | ontime         | 37770.358957082 | Sum of GTIs [s]                         |
| caldbver | 4.9.2               | &#160                          | ontime0        | 37763.971627593 | Sum of GTIs [s]                         |
| date     | 2020-10-09T02:11:52 | Date and time of file creation | ontime1        | 37757.730707109 | Sum of GTIs [s]                         |
| revision | 4                   | Processing version of data     | ontime2        | 37767.194687843 | Sum of GTIs [s]                         |
|          |                     |                                | ontime3        | 37770.358957082 | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 37767.071577758 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 1237831         | Number of level 1 events                |

### 2.1.4 Events

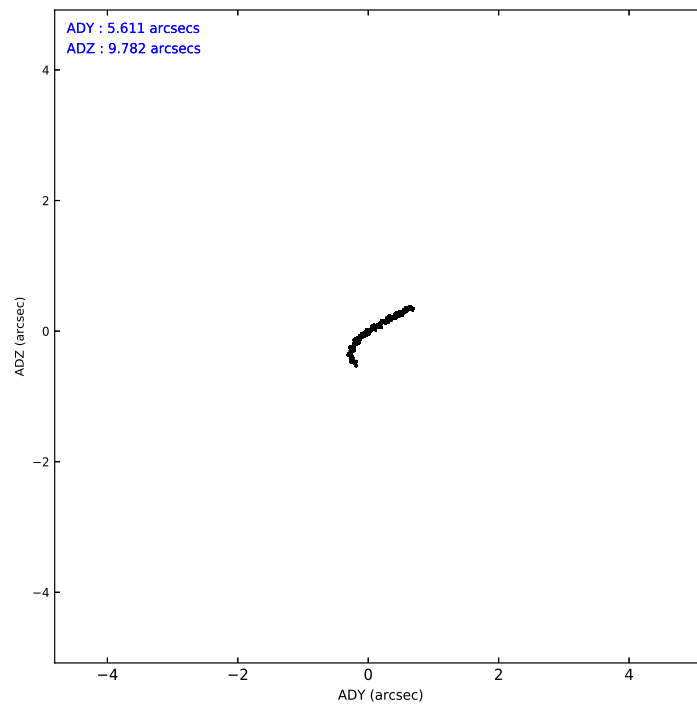
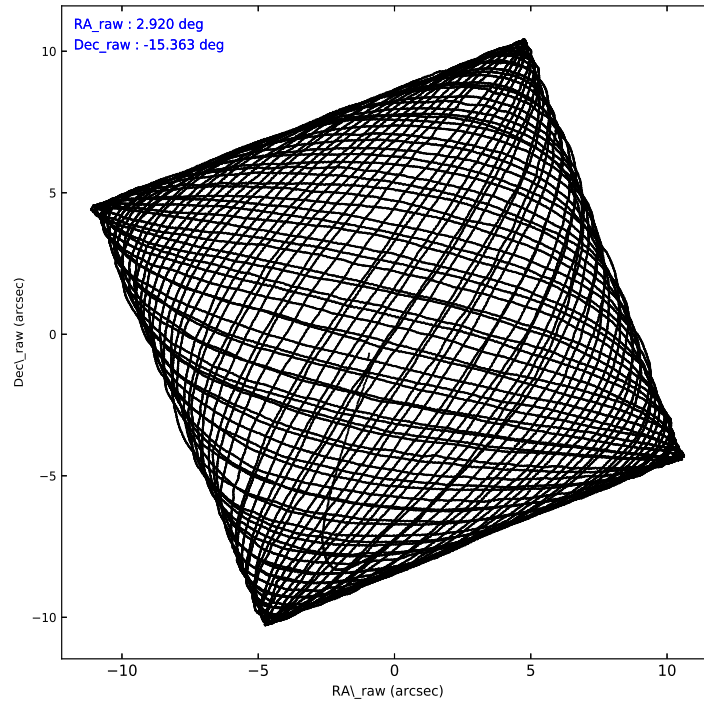
|                 | ccd 0  | ccd 1  | ccd 2  | ccd 3  | ccd 6  |
|-----------------|--------|--------|--------|--------|--------|
| level 1 events  | 228259 | 235383 | 260820 | 265785 | 247584 |
| rejected events | 203457 | 207476 | 236298 | 230041 | 221971 |
| rejected %      | 89%    | 88%    | 90%    | 86%    | 89%    |

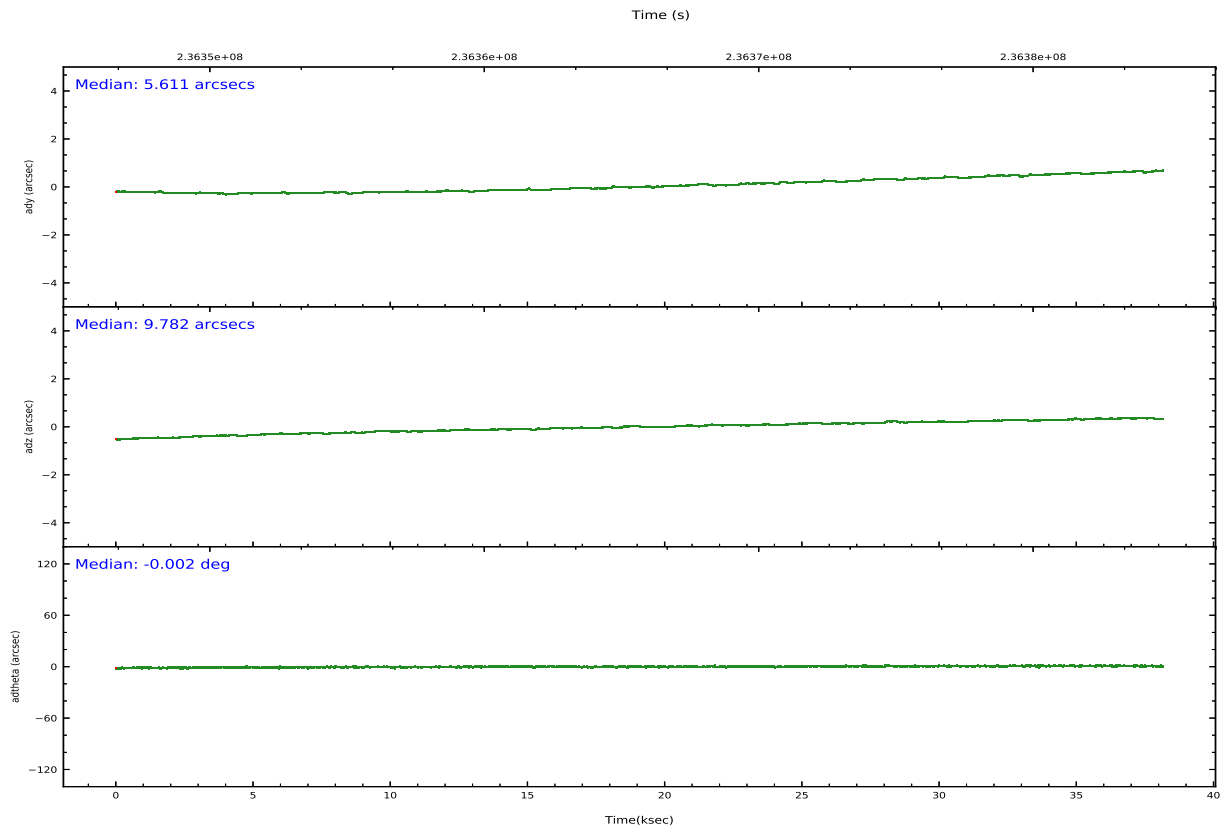
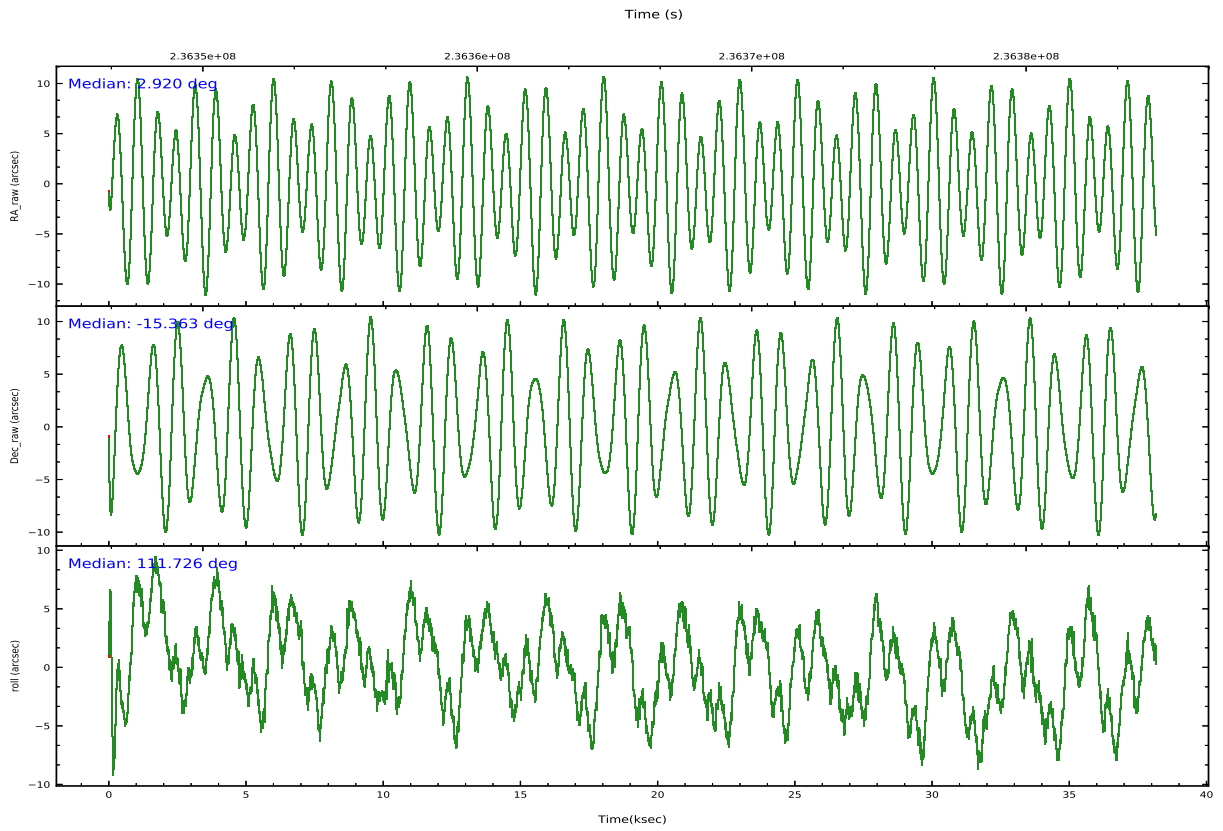
|                | ccd 0  | ccd 1  | ccd 2  | ccd 3  | ccd 6  |
|----------------|--------|--------|--------|--------|--------|
| grade 0 events | 8512   | 10293  | 8993   | 18455  | 9122   |
|                | 3%     | 4%     | 3%     | 6%     | 3%     |
| grade 1 events | 107    | 133    | 150    | 192    | 103    |
|                | 0%     | 0%     | 0%     | 0%     | 0%     |
| grade 2 events | 5986   | 5944   | 5866   | 6373   | 5465   |
|                | 2%     | 2%     | 2%     | 2%     | 2%     |
| grade 3 events | 2873   | 3121   | 2561   | 3020   | 2855   |
|                | 1%     | 1%     | 0%     | 1%     | 1%     |
| grade 4 events | 2594   | 3013   | 2679   | 2965   | 2810   |
|                | 1%     | 1%     | 1%     | 1%     | 1%     |
| grade 5 events | 8756   | 9530   | 8261   | 9999   | 9658   |
|                | 3%     | 4%     | 3%     | 3%     | 3%     |
| grade 6 events | 4840   | 5541   | 4426   | 4934   | 5362   |
|                | 2%     | 2%     | 1%     | 1%     | 2%     |
| grade 7 events | 194591 | 197808 | 227884 | 219847 | 212209 |
|                | 85%    | 84%    | 87%    | 82%    | 85%    |

## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                 | Obspar version number                 | 8         | 8       |
| Detector                          | ACIS-01236          | ACIS-01236           | Obspar file type                      | PREDICTED | ACTUAL  |
| Grating                           | NONE                | NONE                 | Obspar update status                  | NONE      | UPDATED |
| Data mode                         | VFAINT              | VFAINT               | Number of optional ACIS chips dropped | 0         | 0       |
| Observation mode                  | POINTING            | POINTING             | On-chip summing requested             | N         | N       |
| [deg] Pointing RA                 | 2.942343            | 2.9233822032228      | Subarray requested                    | NONE      | NONE    |
| [deg] Pointing Dec                | -15.379975          | -15.36362849023      | Alternating exposures requested       | N         | N       |
| [deg] Pointing Roll               | 111.526395          | 111.72594673838      | [s] Primary exposure time             | 0.000000  | 3.1     |
| [mm] SIM focus pos                | -0.782348           | -0.7809083437167272  |                                       |           |         |
| [mm] SIM defocus                  | 0                   | 0.001439871863259334 |                                       |           |         |
| [mm] SIM translation stage pos    | -229.442463         | -229.4438428438578   |                                       |           |         |
| [mm] SIM translation stage offset | -4.15               | -4.148610159071865   |                                       |           |         |
| [s] Observation start time (MET)  | 236346739.184000    | 236345815.61202      |                                       |           |         |
| Observation start date            | 2005-06-28T11:51:15 | 2005-06-28T11:36:55  |                                       |           |         |
| [s] Observation end time (MET)    | 236384739.184000    | 236385654.80135      |                                       |           |         |
| Observation end date              | 2005-06-28T22:24:35 | 2005-06-28T22:40:54  |                                       |           |         |
| Read mode                         | TIMED               | TIMED                |                                       |           |         |

## 2.3 Aspect





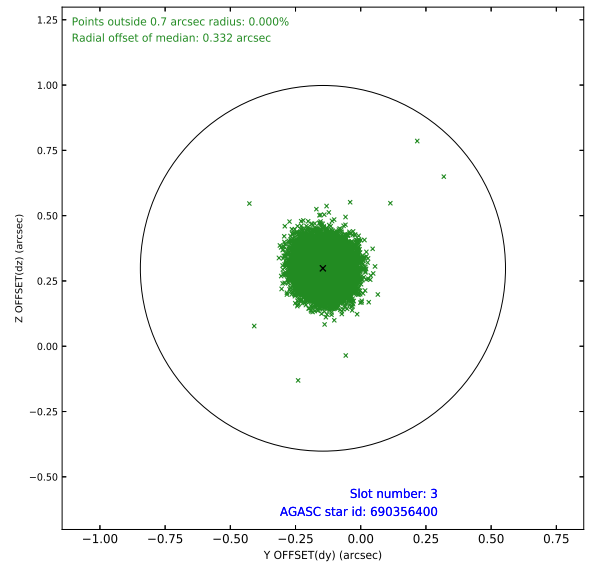
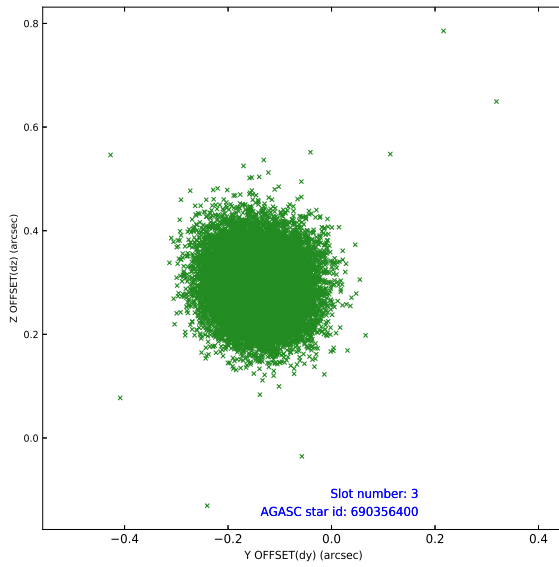
### Slot Statistics

| slot | status | used | id        | mag  | n_pts | frac_pts | med_dy | med_dz | dr1   | dr2   | ra       | dec        | mean_y   | mean_x |
|------|--------|------|-----------|------|-------|----------|--------|--------|-------|-------|----------|------------|----------|--------|
| 0    | FID    |      | ACIS-I-1  | 7.24 | 9308  | 1.000    | 0.077  | -0.049 | 0.016 | 0.026 | 0.000000 | 0.000000   | 934.03   | -918   |
| 1    | FID    |      | ACIS-I-5  | 7.22 | 9307  | 1.000    | -0.265 | 0.063  | 0.013 | 0.021 | 0.000000 | 0.000000   | -1814.40 | 979    |
| 2    | FID    |      | ACIS-I-6  | 7.25 | 9306  | 1.000    | 0.096  | 0.055  | 0.018 | 0.026 | 0.000000 | 0.000000   | 399.58   | 1623   |
| 3    | GUIDE  | used | 690356400 | 9.25 | 18541 | 1.000    | -0.145 | 0.298  | 0.079 | 0.129 | 3.405177 | -14.944552 | 866.31   | -2071  |
| 4    | GUIDE  | used | 765199024 | 9.27 | 18592 | 1.000    | -0.060 | -0.111 | 0.087 | 0.141 | 2.209547 | -15.114434 | 1819.27  | 2020   |
| 5    | GUIDE  | used | 765332824 | 8.73 | 18597 | 1.000    | 0.004  | 0.071  | 0.057 | 0.096 | 3.058070 | -15.164622 | 574.03   | -657   |
| 6    | GUIDE  | used | 765334176 | 8.96 | 18600 | 1.000    | 0.183  | -0.161 | 0.073 | 0.118 | 3.031719 | -15.842479 | -1662.29 | 322    |
| 7    | GUIDE  | used | 765203584 | 9.51 | 18605 | 1.000    | 0.021  | -0.089 | 0.128 | 0.208 | 2.532852 | -15.177110 | 1200.21  | 1056   |

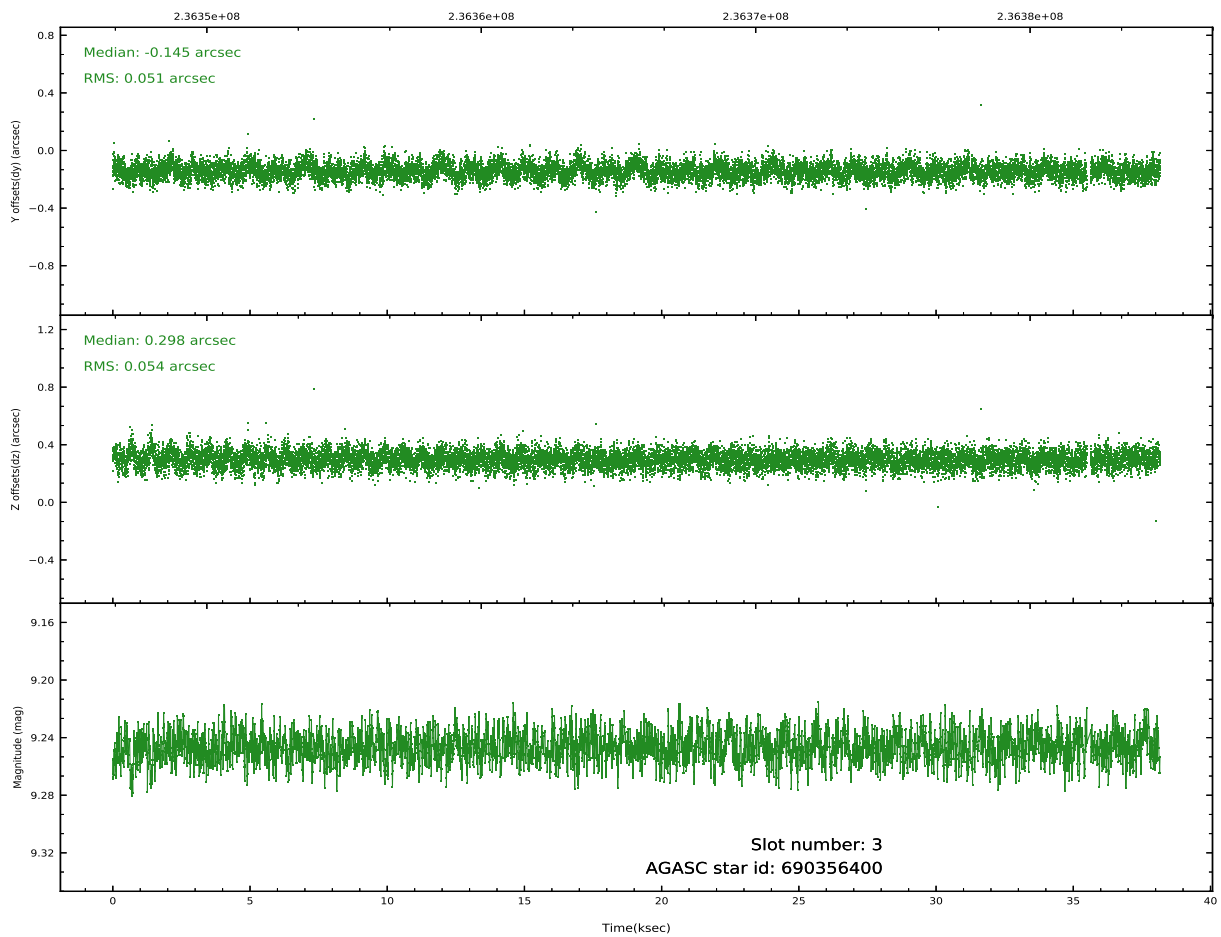
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## 2.4 Star Slots

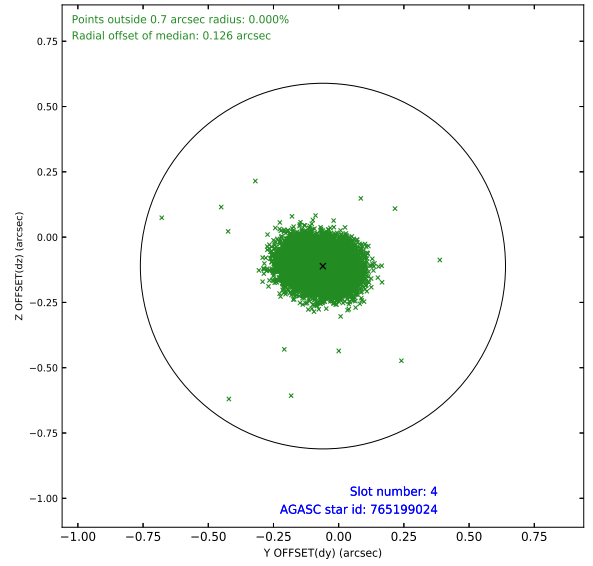
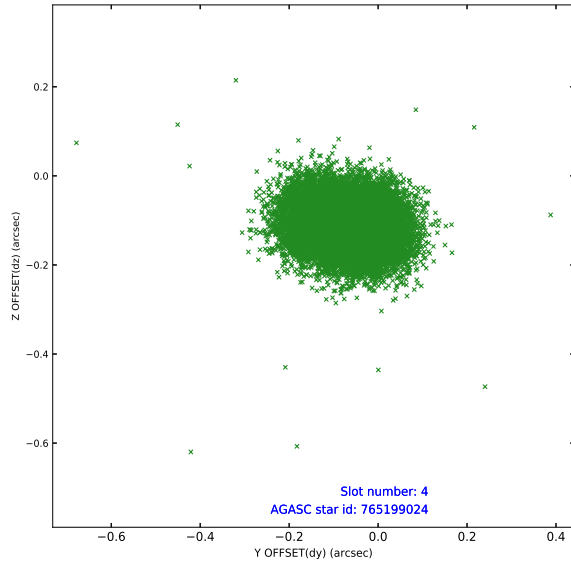
### 2.4.1 Slot 3



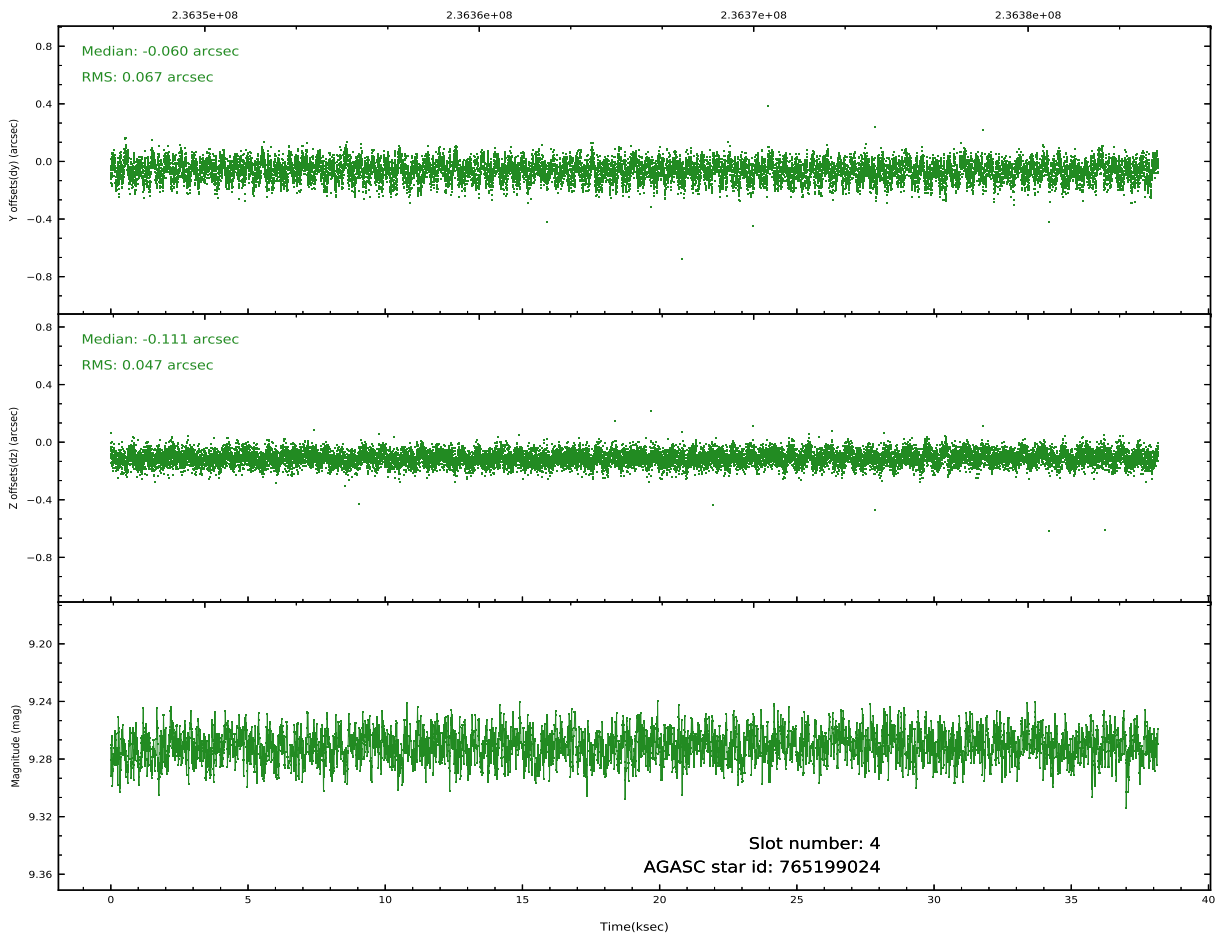
Time (s)



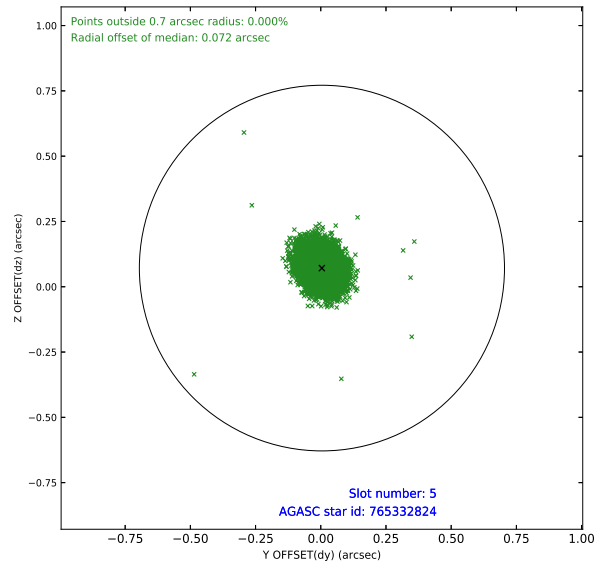
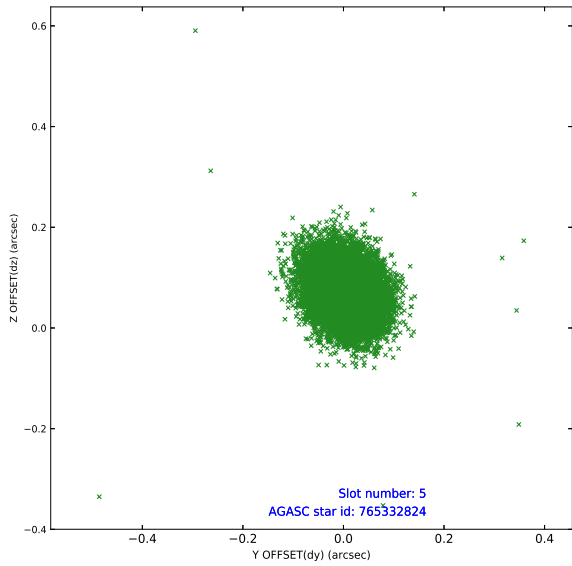
## 2.4.2 Slot 4



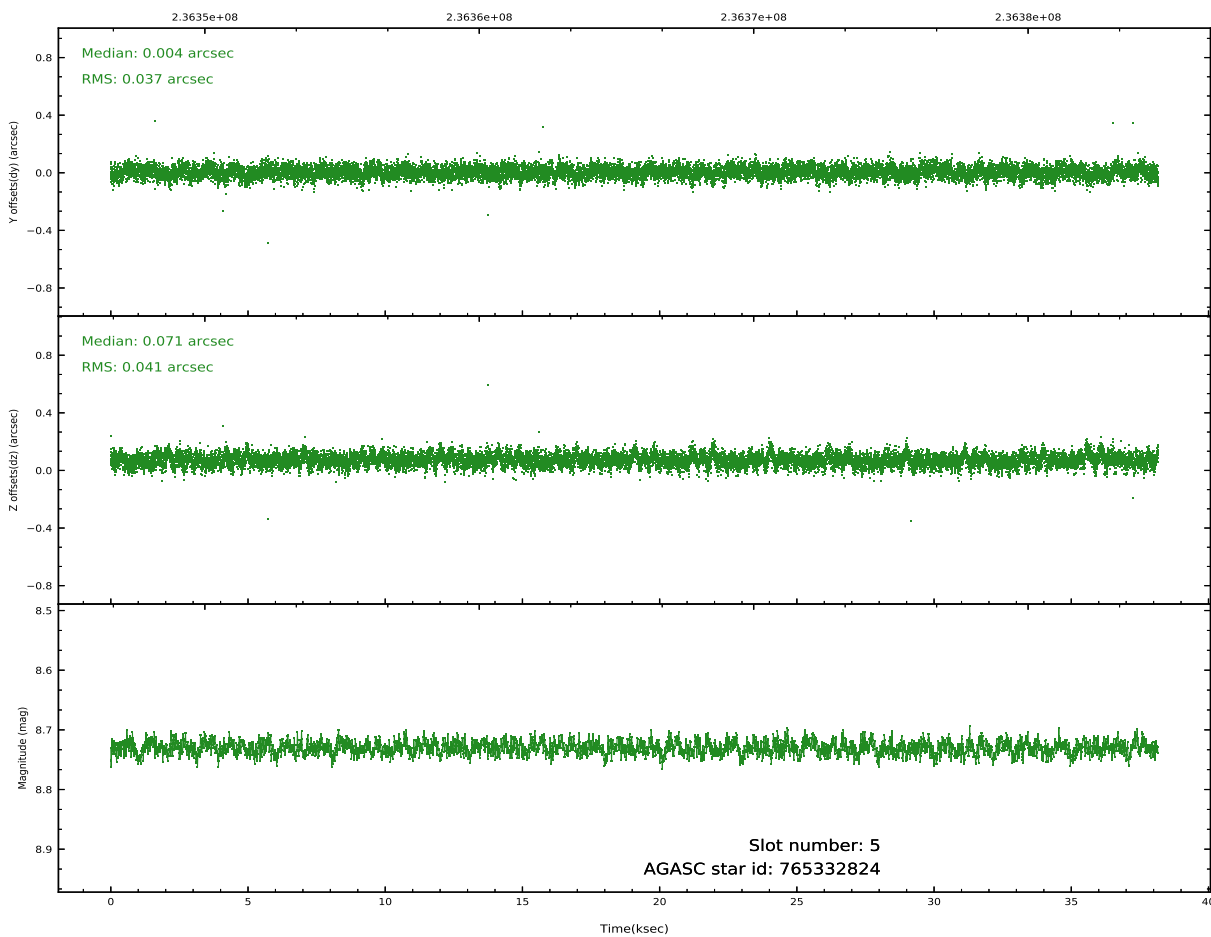
Time (s)



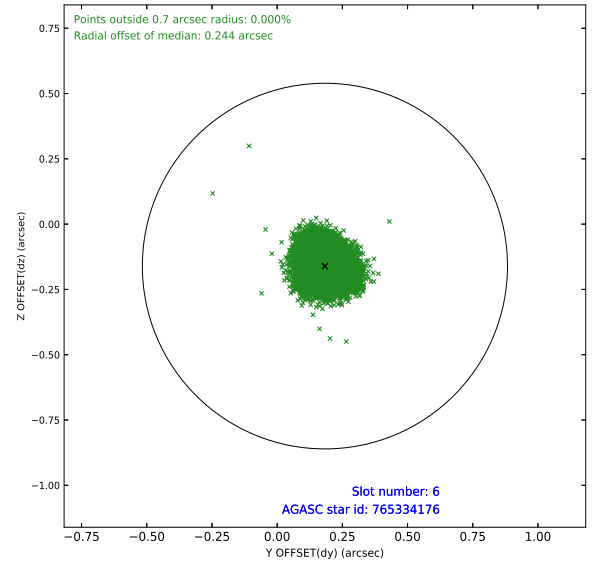
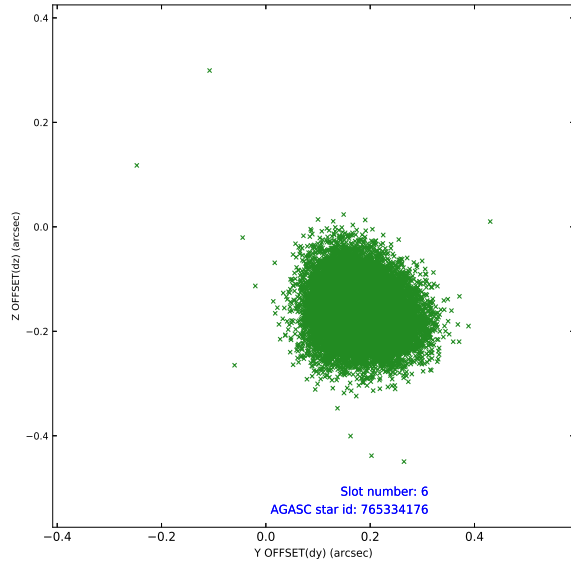
### 2.4.3 Slot 5



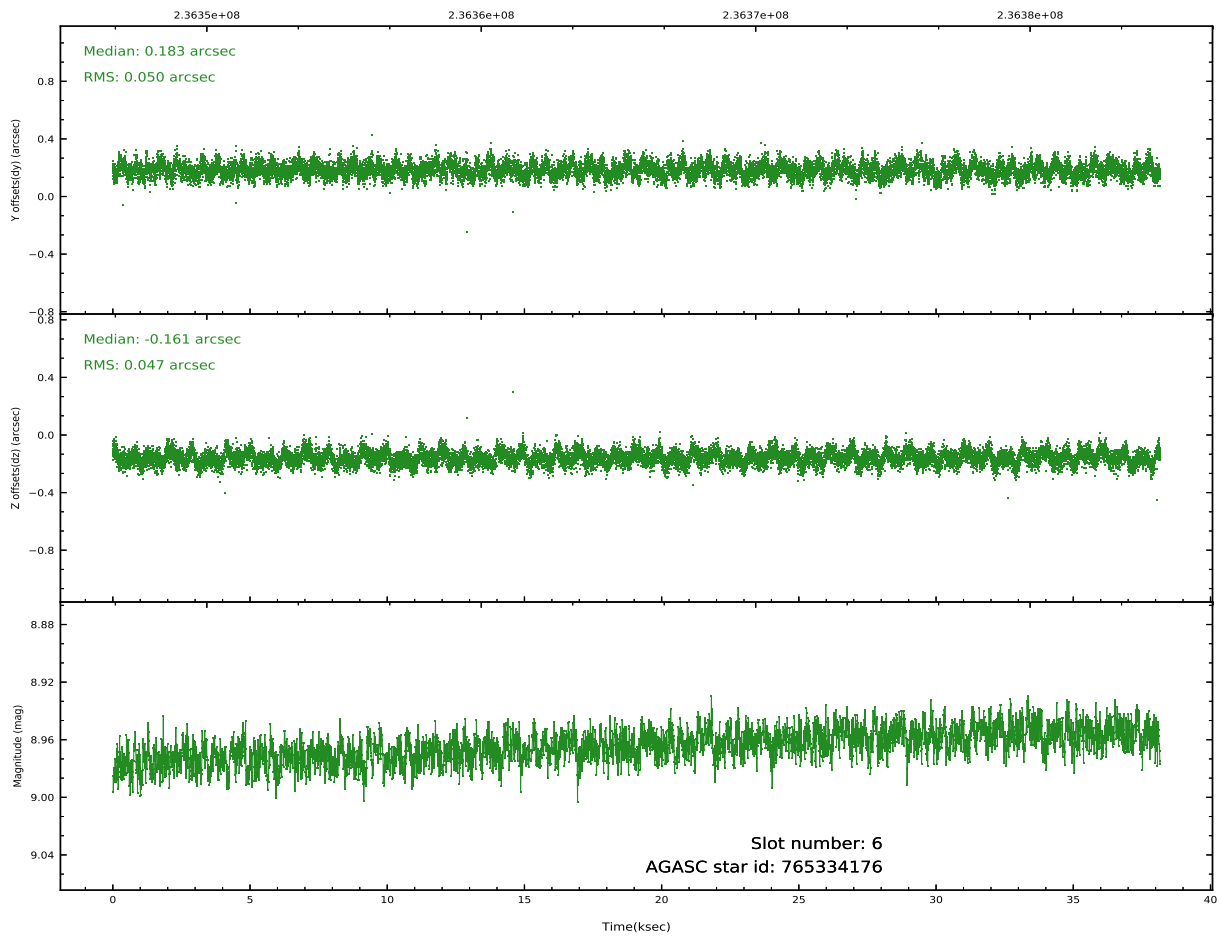
Time (s)



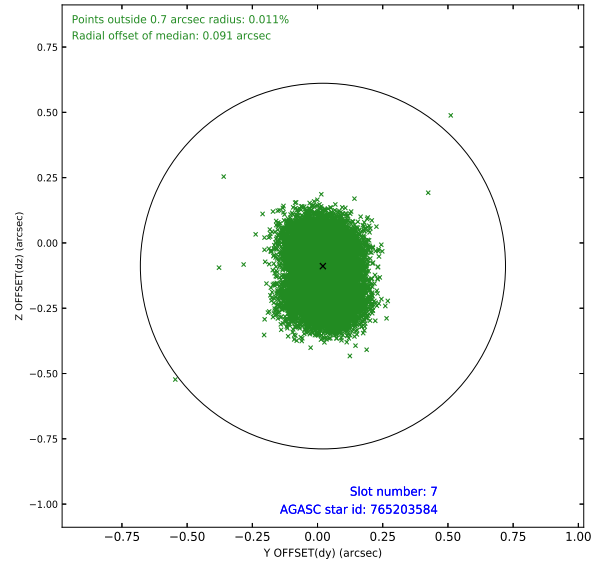
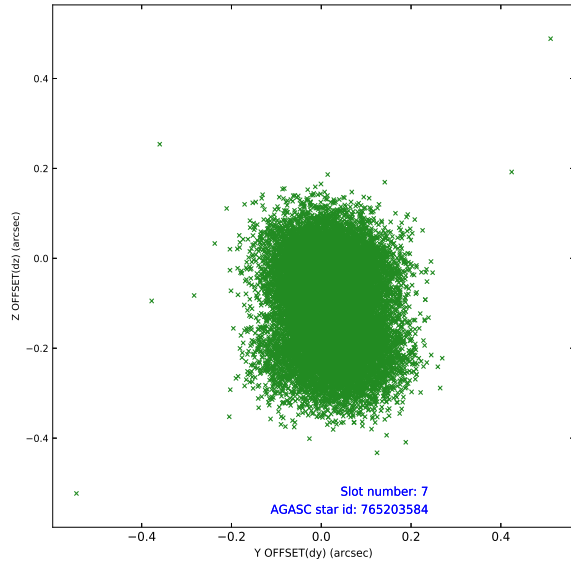
## 2.4.4 Slot 6



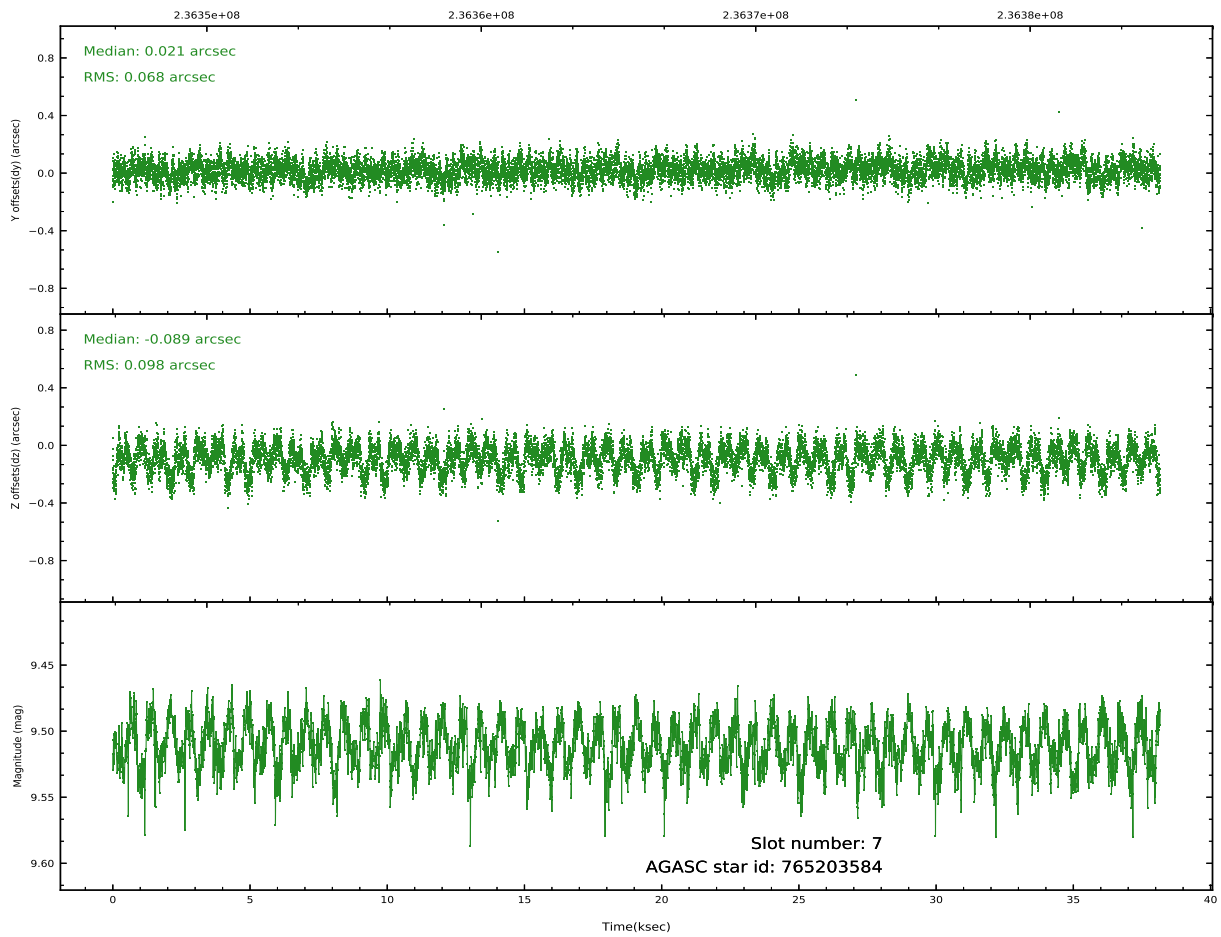
Time (s)



## 2.4.5 Slot 7

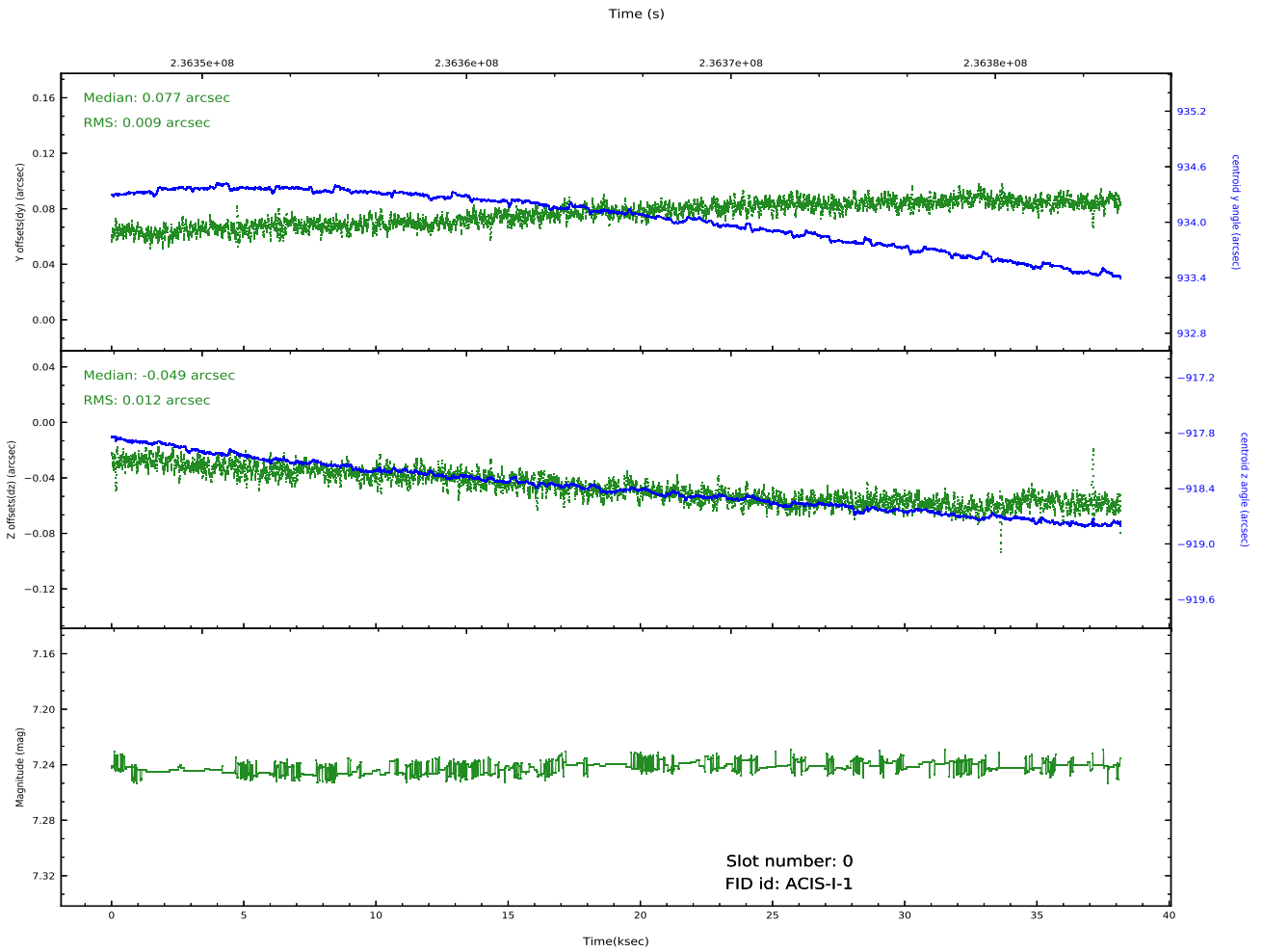
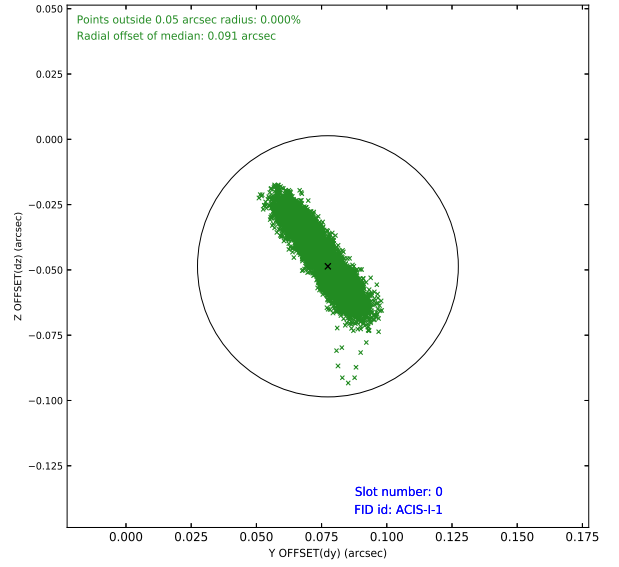
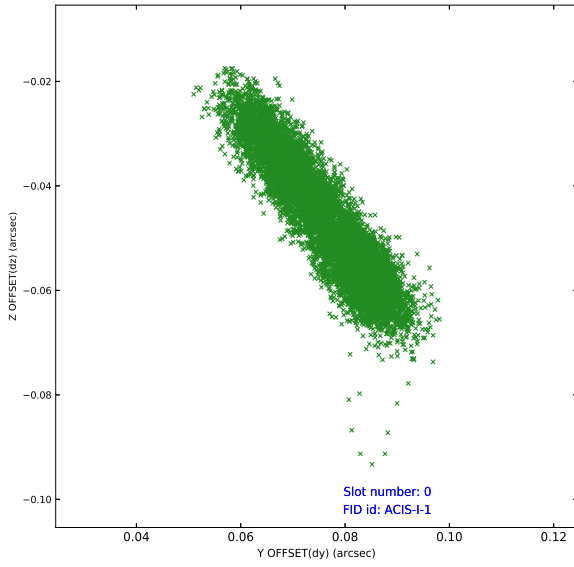


Time (s)

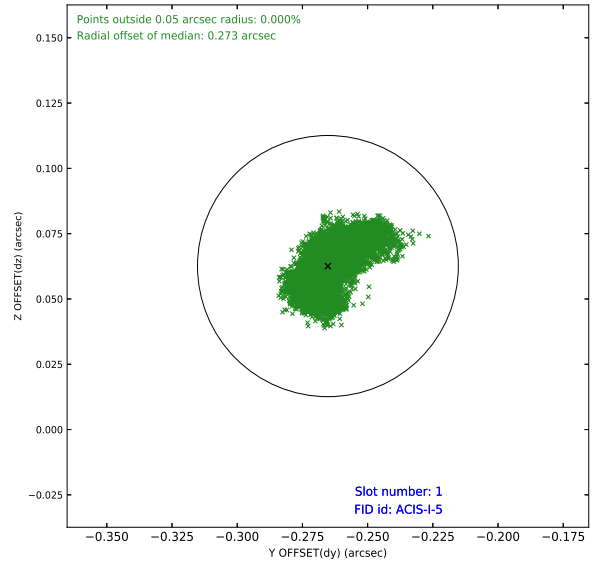
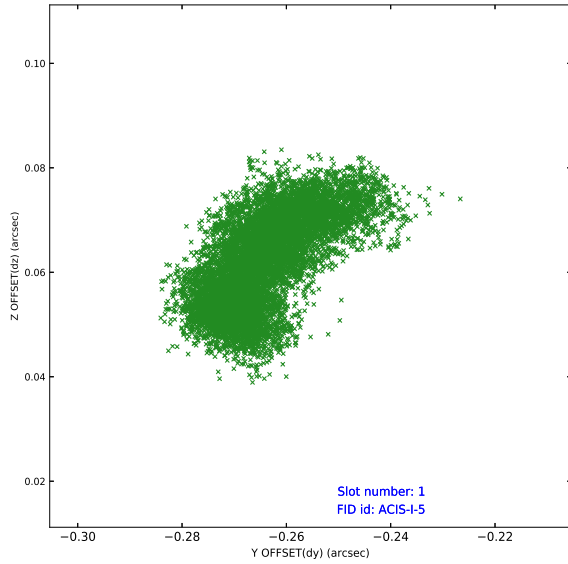


## 2.5 FID Slots

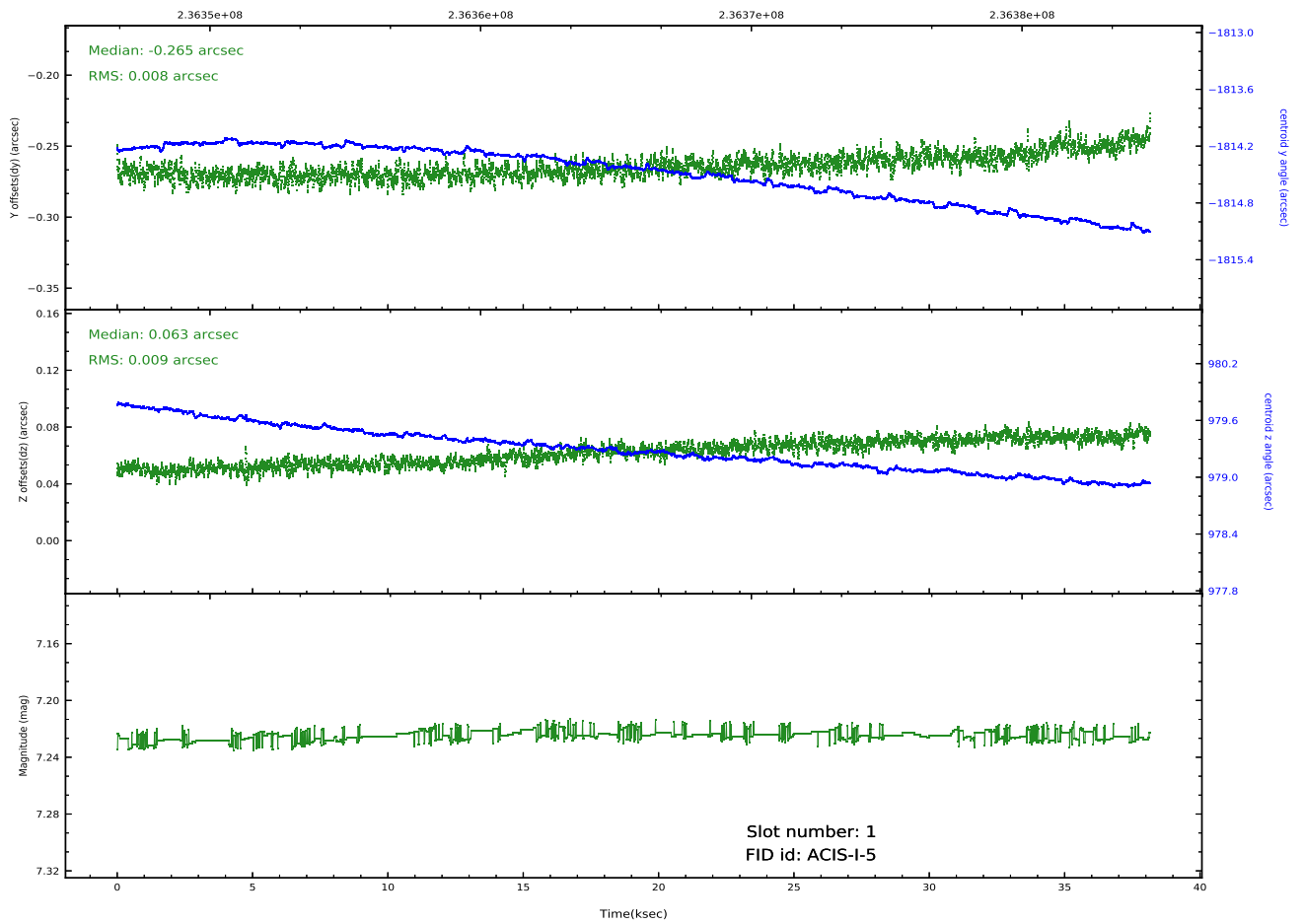
### 2.5.1 Slot 0



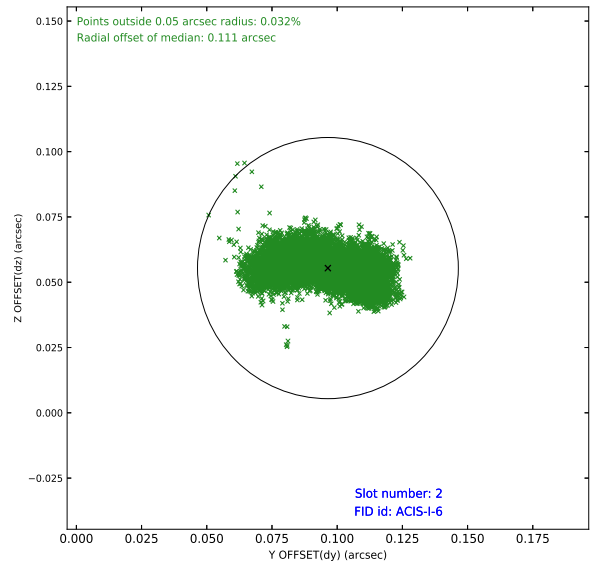
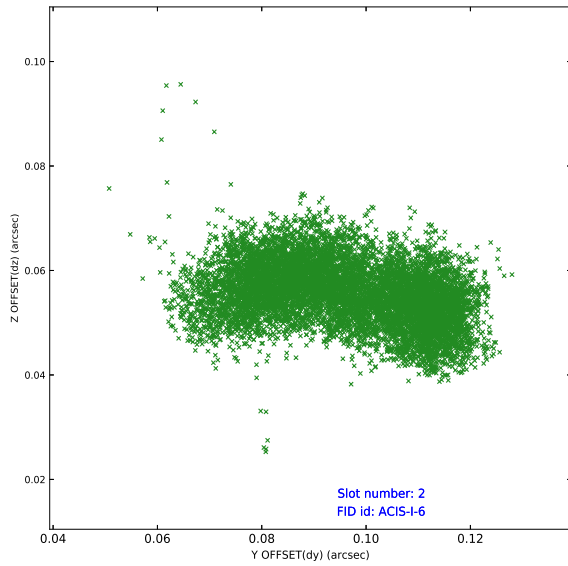
## 2.5.2 Slot 1



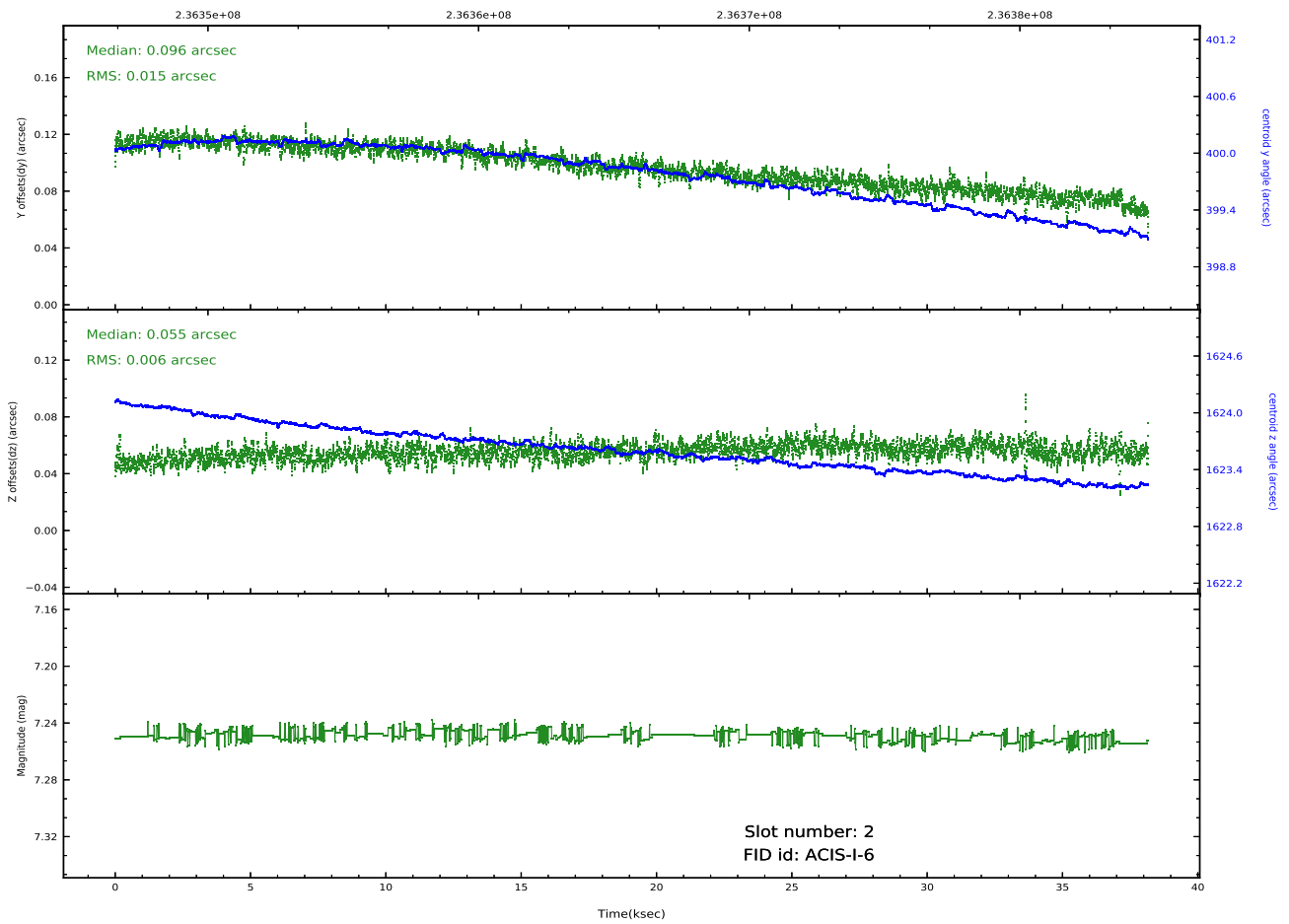
Time (s)



### 2.5.3 Slot 2



Time (s)



# A Summary

## A.1 Status

|                            |               |
|----------------------------|---------------|
| V&V Scientist              | Beth Sundheim |
| V&V Date (YYYY-MM-DD)      | 2020.10.13    |
| V&V Edition                | 1             |
| V&V Disposition and Status | OK            |
| V&V Charge Time            | 37.77035      |

## A.2 Comments