

# V&V Reference Report

## L2 ASCDS Version : 10.9.2

Observation 20994 - L2 Version 2  
Chandra X-Ray Center

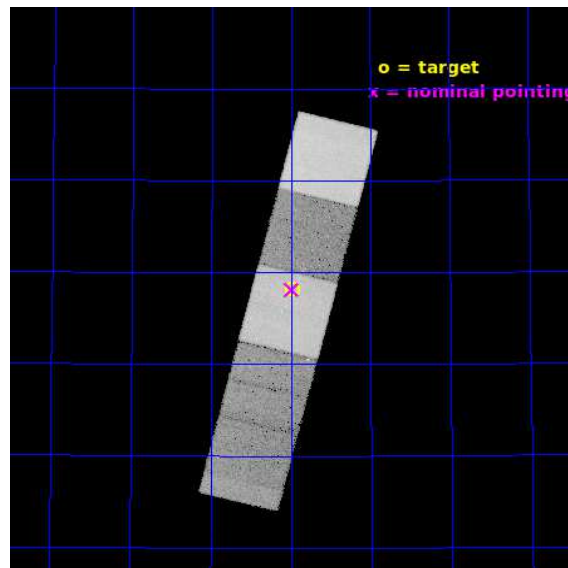
L2 Processing Date : Oct 24 2020

## Contents

|          |                               |           |
|----------|-------------------------------|-----------|
| <b>1</b> | <b>Front</b>                  | <b>2</b>  |
| <b>2</b> | <b>OBI</b>                    | <b>3</b>  |
| 2.1      | OBI . . . . .                 | 3         |
| 2.1.1    | Images . . . . .              | 3         |
| 2.1.2    | Bias . . . . .                | 3         |
| 2.1.3    | Parameters . . . . .          | 4         |
| 2.1.4    | Events . . . . .              | 4         |
| 2.2      | Compared Parameters . . . . . | 5         |
| 2.3      | Aspect . . . . .              | 6         |
| 2.4      | Star Slots . . . . .          | 9         |
| 2.4.1    | Slot 3 . . . . .              | 9         |
| 2.4.2    | Slot 4 . . . . .              | 10        |
| 2.4.3    | Slot 5 . . . . .              | 11        |
| 2.4.4    | Slot 6 . . . . .              | 12        |
| 2.4.5    | Slot 7 . . . . .              | 13        |
| 2.5      | FID Slots . . . . .           | 14        |
| 2.5.1    | Slot 0 . . . . .              | 14        |
| 2.5.2    | Slot 1 . . . . .              | 15        |
| 2.5.3    | Slot 2 . . . . .              | 16        |
| <b>A</b> | <b>Summary</b>                | <b>17</b> |
| A.1      | Status . . . . .              | 17        |
| A.2      | Comments . . . . .            | 17        |

# 1 Front

|          |                                                                                                                   |                                             |
|----------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| seq_num  | 402024                                                                                                            | Sequence number                             |
| obs_id   | 20994                                                                                                             | Observation id                              |
| title    | Killing two birds in NGC 5907 with one stone: possible dust scattering halo in ULX1 and the newly discovered ULX2 | Proposal title                              |
| observer | Fabio Pintore                                                                                                     | Principal investigator                      |
| object   | NGC 5907                                                                                                          | Source name                                 |
| dtcycle  | 0                                                                                                                 | &#160                                       |
| cycle    | P                                                                                                                 | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 228.994167                                                                                                        | Observer's specified target RA [deg]        |
| dec_targ | 56.302778                                                                                                         | Observer's specified target Dec [deg]       |
| ra_nom   | 228.9968630917                                                                                                    | Nominal RA [deg]                            |
| dec_nom  | 56.302160543788                                                                                                   | Nominal Dec [deg]                           |
| roll_nom | 104.14550195621                                                                                                   | Nominal Roll [deg]                          |
| revision | 2                                                                                                                 | Processing version of data                  |
| ontime   | 33049.100254297                                                                                                   | Sum of GTIs [s]                             |
| livetime | 32617.289429081                                                                                                   | Livetime [s]                                |
| ontime5  | 33049.100254297                                                                                                   | Sum of GTIs [s]                             |
| ontime6  | 33049.100254297                                                                                                   | Sum of GTIs [s]                             |
| ontime7  | 33049.100254297                                                                                                   | Sum of GTIs [s]                             |
| ontime8  | 33045.959224105                                                                                                   | Sum of GTIs [s]                             |
| ontime9  | 33049.100254297                                                                                                   | Sum of GTIs [s]                             |
| l2events | 377314                                                                                                            | Number of level 2 events                    |

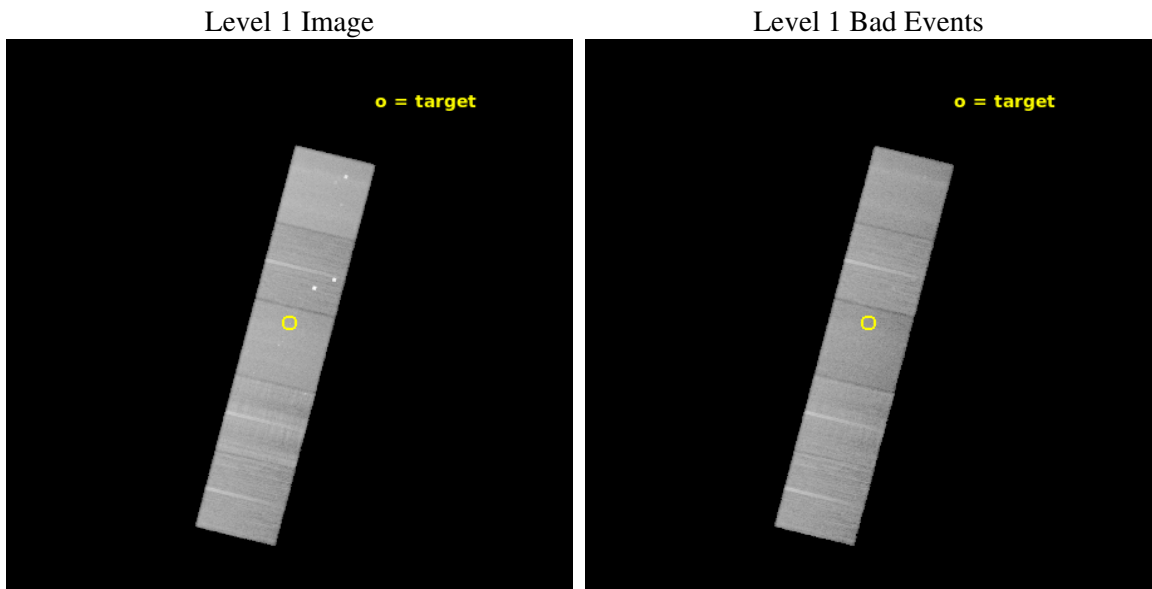




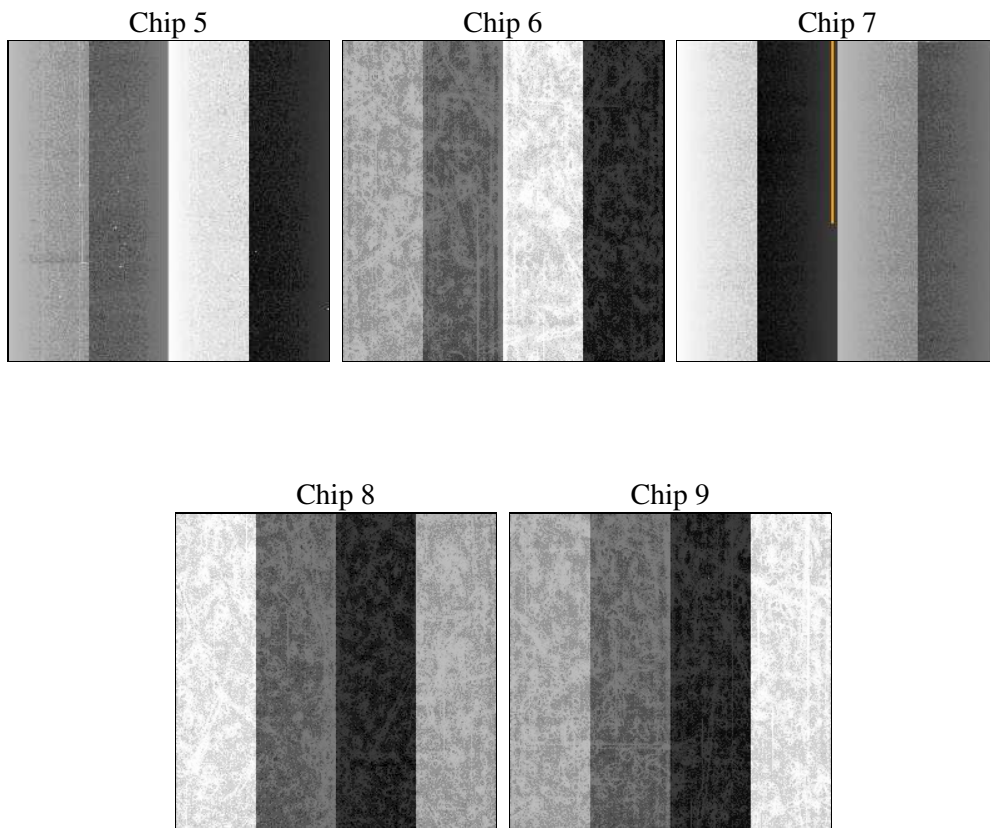
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |                                         |
|----------|---------------------|--------------------------------|----------------|-----------------|-----------------------------------------|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 33000.000000    | [s] Scheduled observation exposure time |
| ascdsver | 10.9.2              | Processing system revision     | ontime         | 33049.100254297 | Sum of GTIs [s]                         |
| caldsver | 4.9.3               | &#160                          | ontime5        | 33049.100254297 | Sum of GTIs [s]                         |
| date     | 2020-10-24T19:28:09 | Date and time of file creation | ontime6        | 33049.100254297 | Sum of GTIs [s]                         |
| revision | 2                   | Processing version of data     | ontime7        | 33049.100254297 | Sum of GTIs [s]                         |
|          |                     |                                | ontime8        | 33045.959224105 | Sum of GTIs [s]                         |
|          |                     |                                | ontime9        | 33049.100254297 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 1521183         | Number of level 1 events                |

### 2.1.4 Events

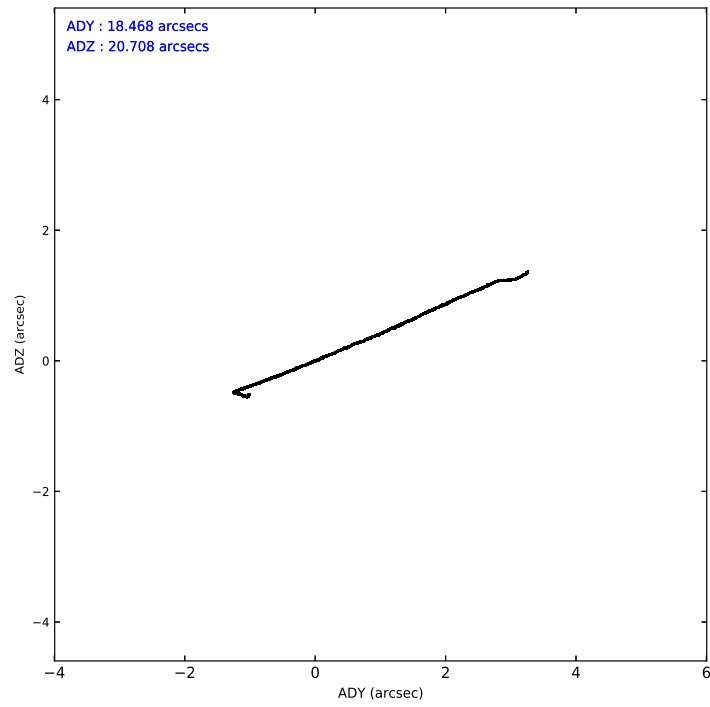
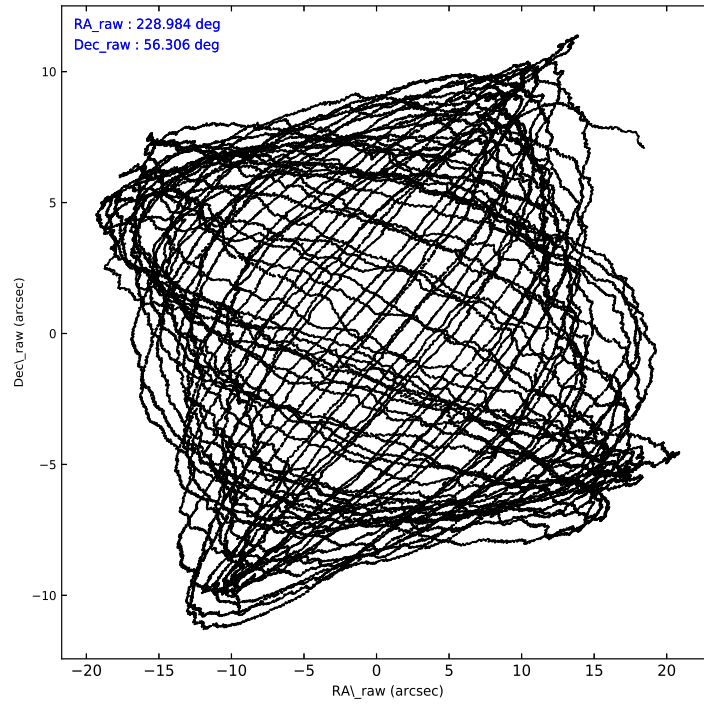
|                 | ccd 5  | ccd 6  | ccd 7  | ccd 8  | ccd 9  |                | ccd 5  | ccd 6  | ccd 7  | ccd 8  | ccd 9  |
|-----------------|--------|--------|--------|--------|--------|----------------|--------|--------|--------|--------|--------|
| level 1 events  | 380410 | 270497 | 307178 | 314748 | 248350 | grade 0 events | 12190  | 15556  | 11492  | 23237  | 9822   |
| rejected events | 199730 | 226885 | 173730 | 232556 | 219344 |                | 3%     | 5%     | 3%     | 7%     | 3%     |
| rejected %      | 52%    | 83%    | 56%    | 73%    | 88%    | grade 1 events | 1039   | 140    | 401    | 235    | 139    |
|                 |        |        |        |        |        |                | 0%     | 0%     | 0%     | 0%     | 0%     |
|                 |        |        |        |        |        | grade 2 events | 56065  | 15919  | 27618  | 20070  | 7003   |
|                 |        |        |        |        |        |                | 14%    | 5%     | 8%     | 6%     | 2%     |
|                 |        |        |        |        |        | grade 3 events | 5344   | 2555   | 10822  | 8700   | 2885   |
|                 |        |        |        |        |        |                | 1%     | 0%     | 3%     | 2%     | 1%     |
|                 |        |        |        |        |        | grade 4 events | 5233   | 2465   | 10509  | 7932   | 2704   |
|                 |        |        |        |        |        |                | 1%     | 0%     | 3%     | 2%     | 1%     |
|                 |        |        |        |        |        | grade 5 events | 24970  | 10675  | 30247  | 16540  | 12448  |
|                 |        |        |        |        |        |                | 6%     | 3%     | 9%     | 5%     | 5%     |
|                 |        |        |        |        |        | grade 6 events | 101875 | 7127   | 73037  | 22272  | 6594   |
|                 |        |        |        |        |        |                | 26%    | 2%     | 23%    | 7%     | 2%     |
|                 |        |        |        |        |        | grade 7 events | 173694 | 216060 | 143052 | 215762 | 206755 |
|                 |        |        |        |        |        |                | 45%    | 79%    | 46%    | 68%    | 83%    |

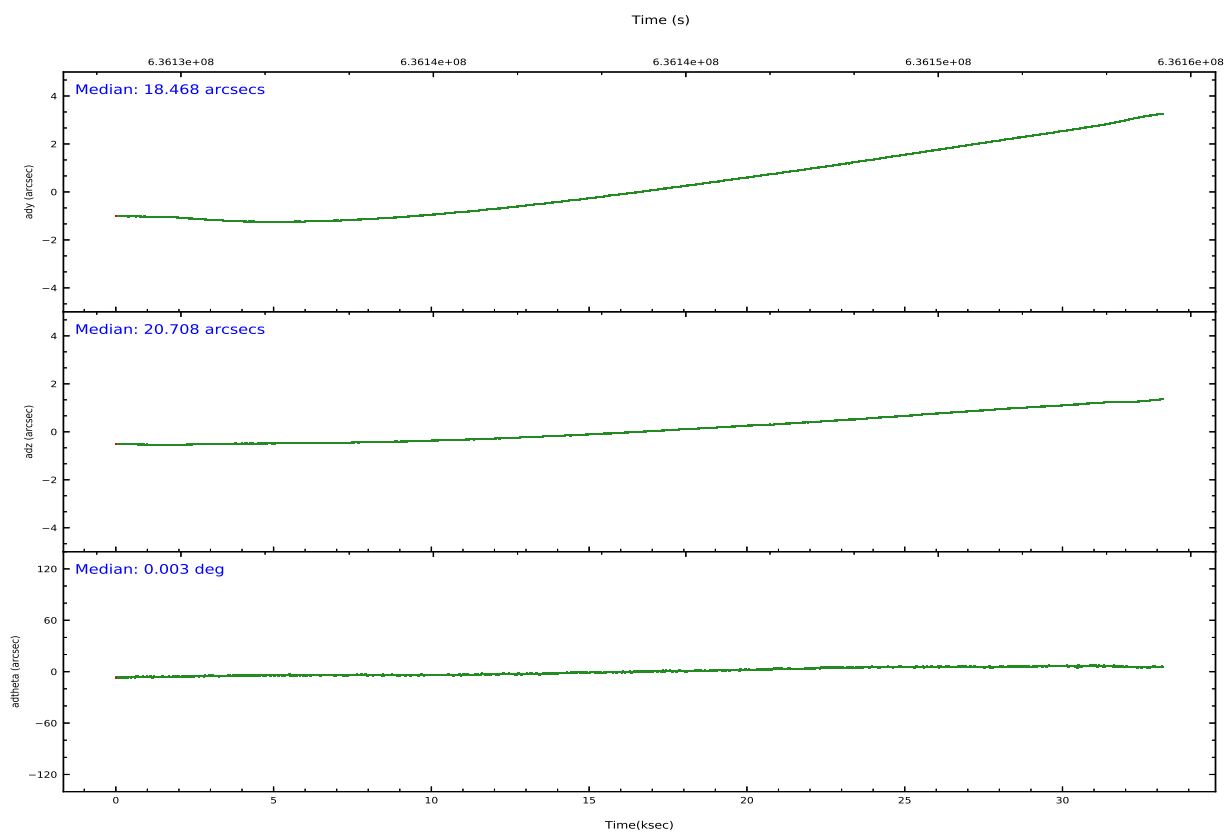
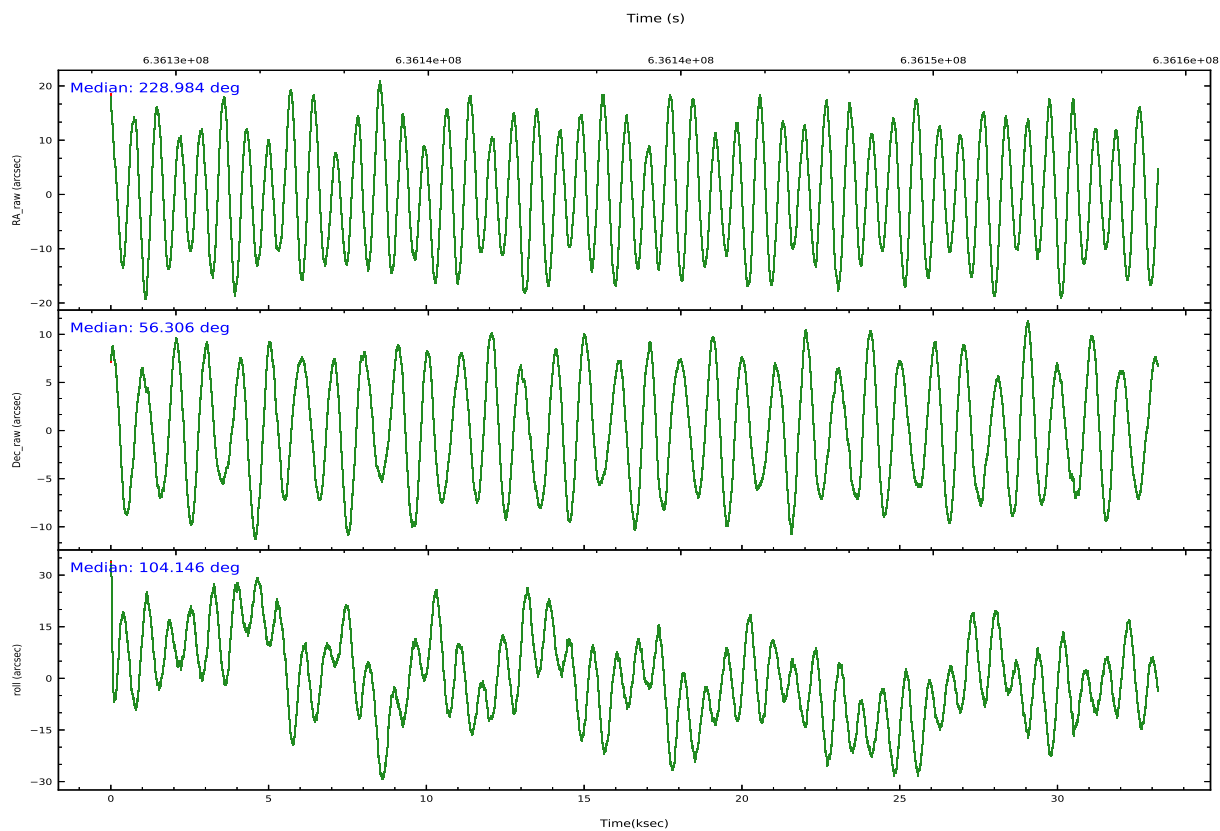
## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               |
|-----------------------------------|---------------------|----------------------|
| Instrument                        | ACIS                | ACIS                 |
| Detector                          | ACIS-56789          | ACIS-56789           |
| Grating                           | NONE                | NONE                 |
| Data mode                         | VFAINT              | VFAINT               |
| Observation mode                  | POINTING            | POINTING             |
| [deg] Pointing RA                 | 229.018935          | 228.9968630917       |
| [deg] Pointing Dec                | 56.286539           | 56.302160543788      |
| [deg] Pointing Roll               | 103.979389          | 104.14550195621      |
| [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)  | 636126126.184000    | 636125152.00734      |
| Observation start date            | 2018-02-27T13:40:57 | 2018-02-27T13:25:52  |
| [s] Observation end time (MET)    | 636159126.184000    | 636159791.3718801    |
| Observation end date              | 2018-02-27T22:50:57 | 2018-02-27T23:03:11  |
| 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                             | N         | N       |
| CCD I1 on                             | N         | N       |
| CCD I2 on                             | N         | N       |
| CCD I3 on                             | N         | N       |
| CCD S0 on                             | N         | N       |
| CCD S1 on                             | O1        | Y       |
| CCD S2 on                             | Y         | Y       |
| CCD S3 on                             | Y         | Y       |
| CCD S4 on                             | Y         | Y       |
| CCD S5 on                             | O2        | Y       |
| 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



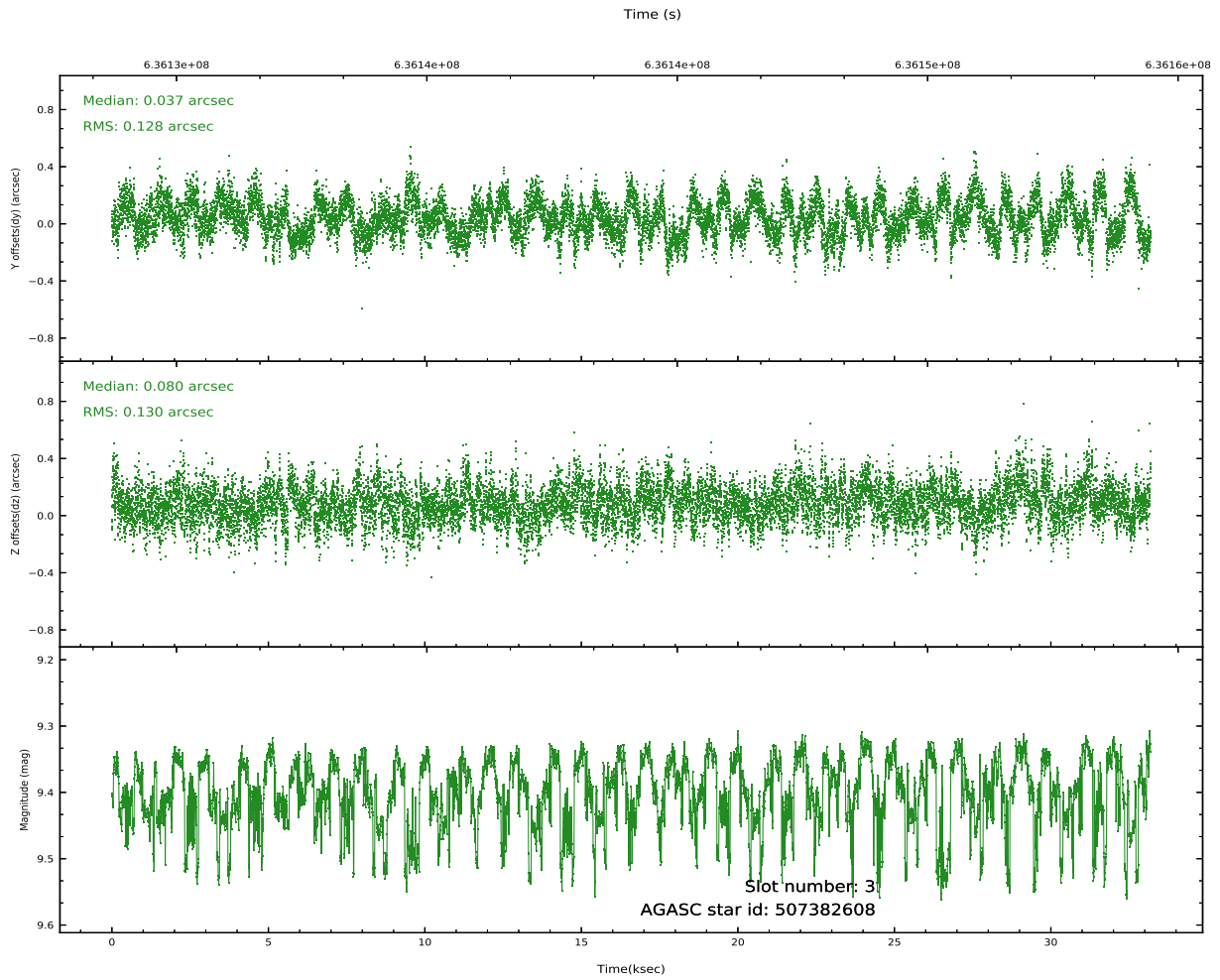
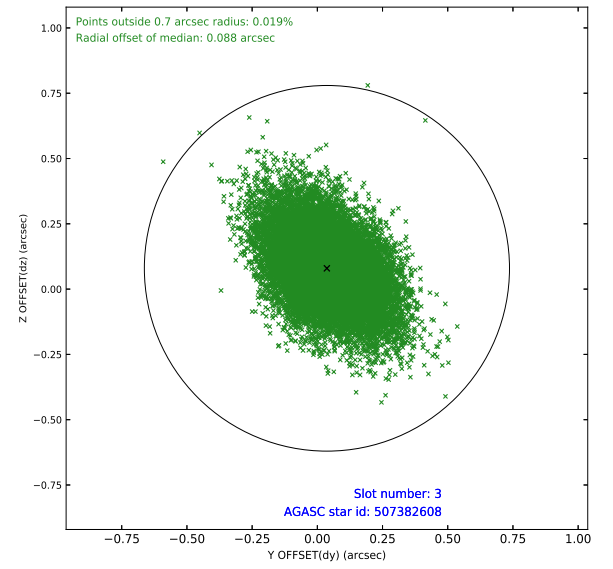
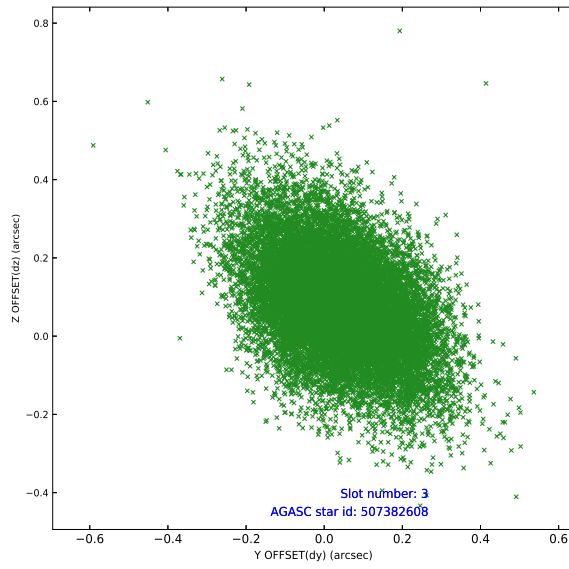


Slot Statistics

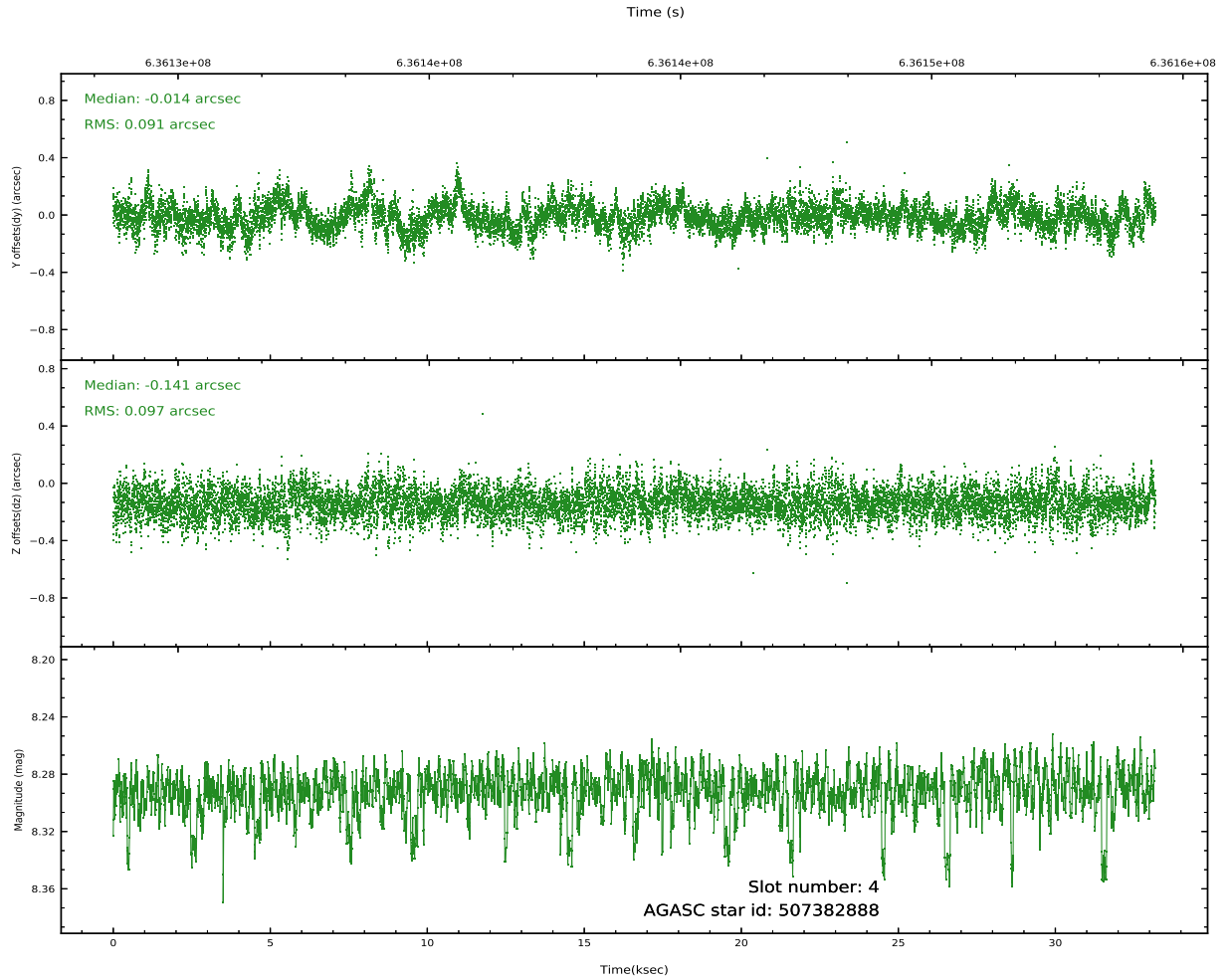
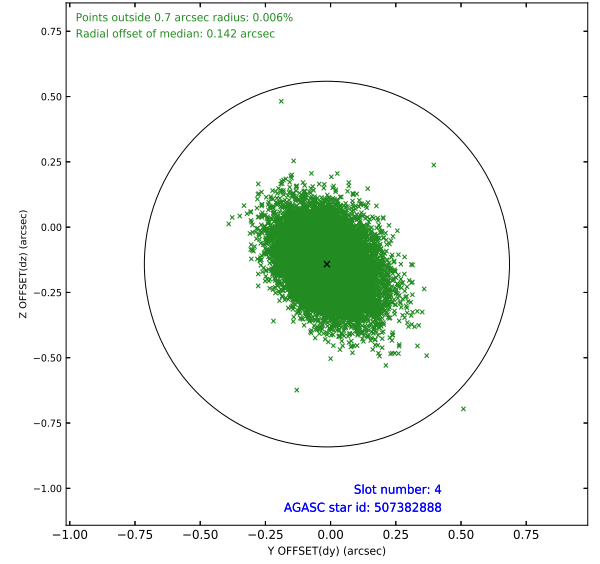
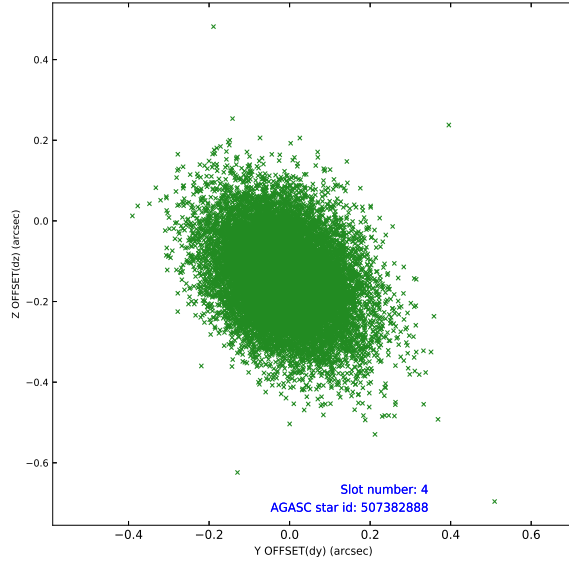
| pt | status | used | id        | mag  | n_pts | frac_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec       | mean_y   | mea   |
|----|--------|------|-----------|------|-------|----------|--------|--------|-------|-------|------------|-----------|----------|-------|
| 0  | FID    |      | ACIS-S-2  | 7.07 | 8096  | 1.000    | 0.115  | -0.083 | 0.022 | 0.065 | 0.000000   | 0.000000  | -771.98  | -1742 |
| 1  | FID    |      | ACIS-S-4  | 7.18 | 8096  | 1.000    | 0.115  | -0.034 | 0.022 | 0.083 | 0.000000   | 0.000000  | 2141.49  | 165   |
| 2  | FID    |      | ACIS-S-5  | 7.17 | 8095  | 1.000    | -0.258 | 0.124  | 0.021 | 0.056 | 0.000000   | 0.000000  | -1824.89 | 160   |
| 3  | GUIDE  | used | 507382608 | 9.40 | 16167 | 1.000    | 0.037  | 0.080  | 0.191 | 0.321 | 228.990890 | 56.011036 | -948.64  | 294   |
| 4  | GUIDE  | used | 507382888 | 8.29 | 16184 | 1.000    | -0.014 | -0.141 | 0.138 | 0.237 | 227.987228 | 56.025159 | -397.09  | 2237  |
| 5  | GUIDE  | used | 507383608 | 8.39 | 16169 | 1.000    | -0.009 | 0.054  | 0.143 | 0.242 | 228.419739 | 56.118692 | -291.18  | 1311  |
| 6  | GUIDE  | used | 507388336 | 9.20 | 16102 | 1.000    | 0.072  | -0.075 | 0.224 | 0.355 | 229.367625 | 56.897463 | 1971.03  | -1196 |
| 7  | GUIDE  | used | 507381208 | 9.17 | 16170 | 1.000    | -0.085 | 0.077  | 0.209 | 0.345 | 228.099016 | 55.627478 | -1835.23 | 2387  |

## 2.4 Star Slots

### 2.4.1 Slot 3

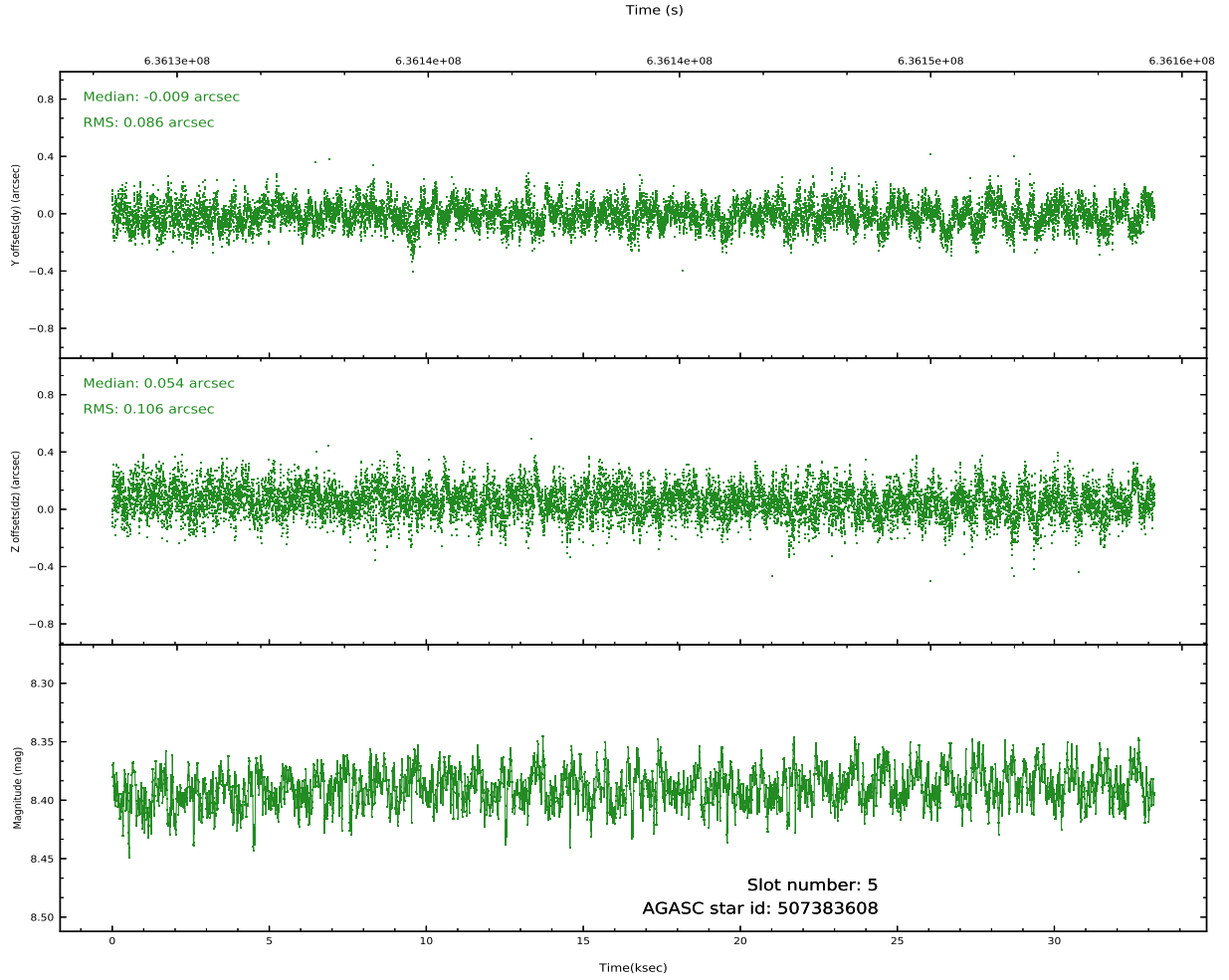
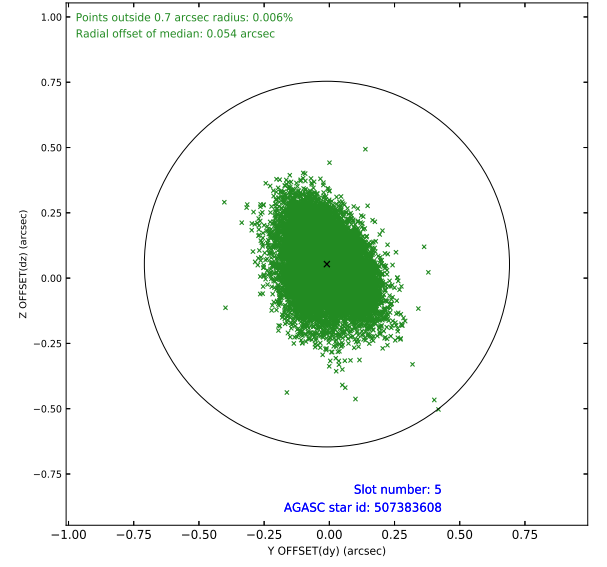
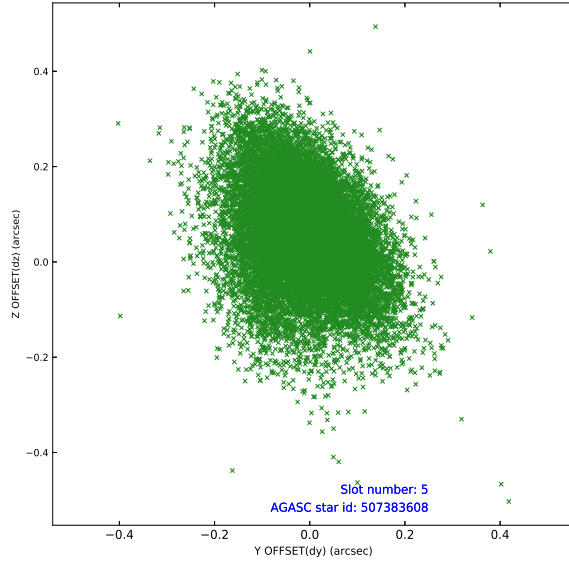


## 2.4.2 Slot 4

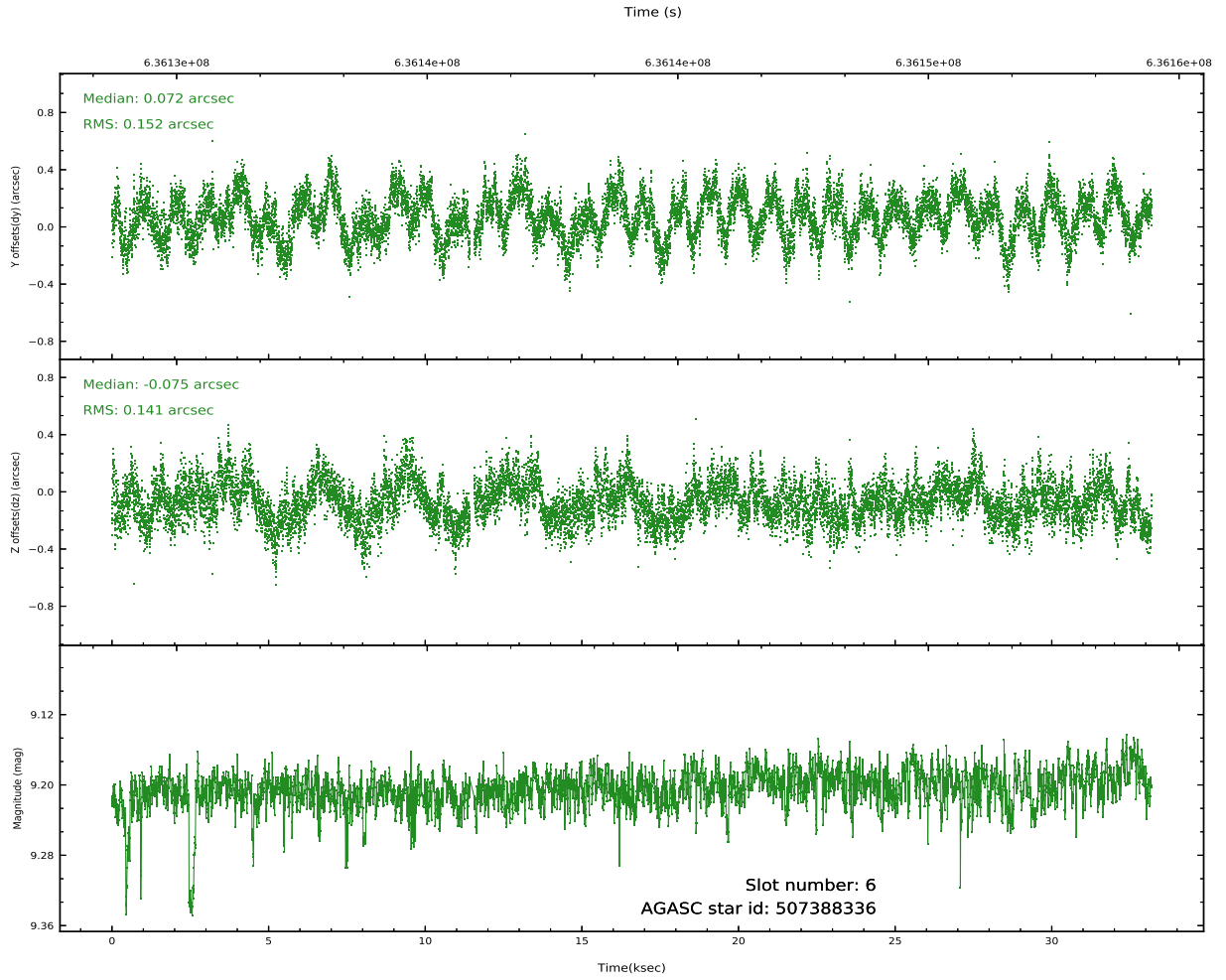
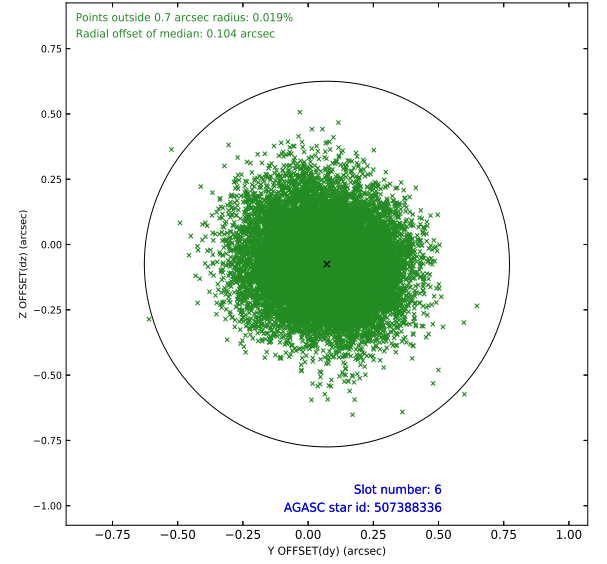
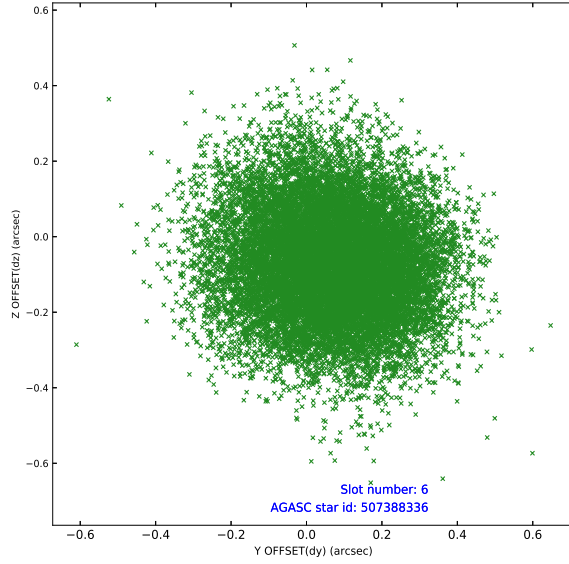




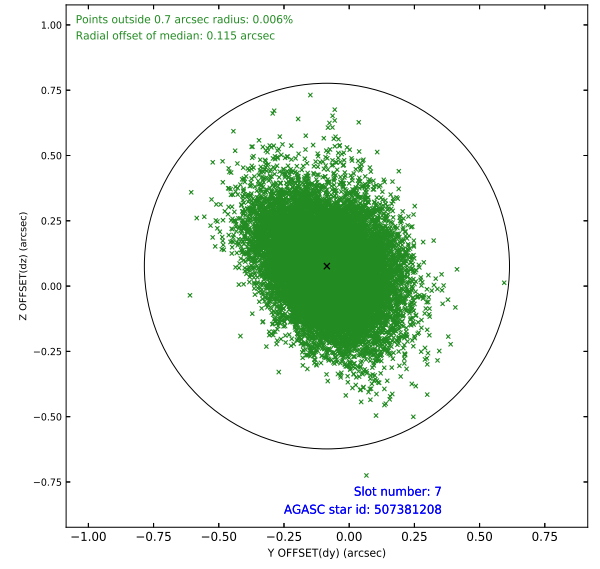
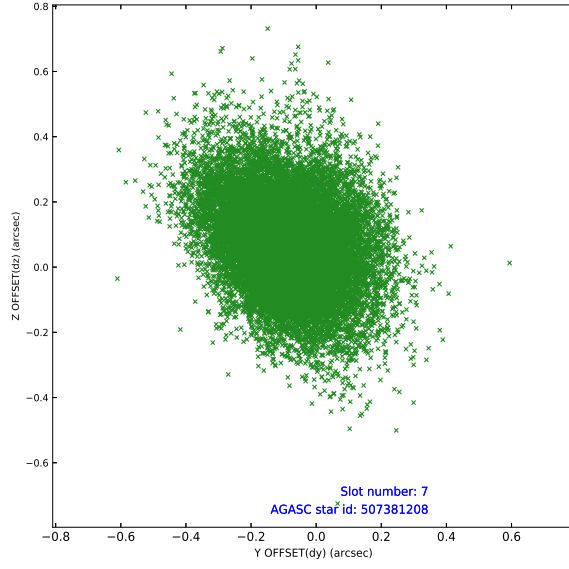
### 2.4.3 Slot 5



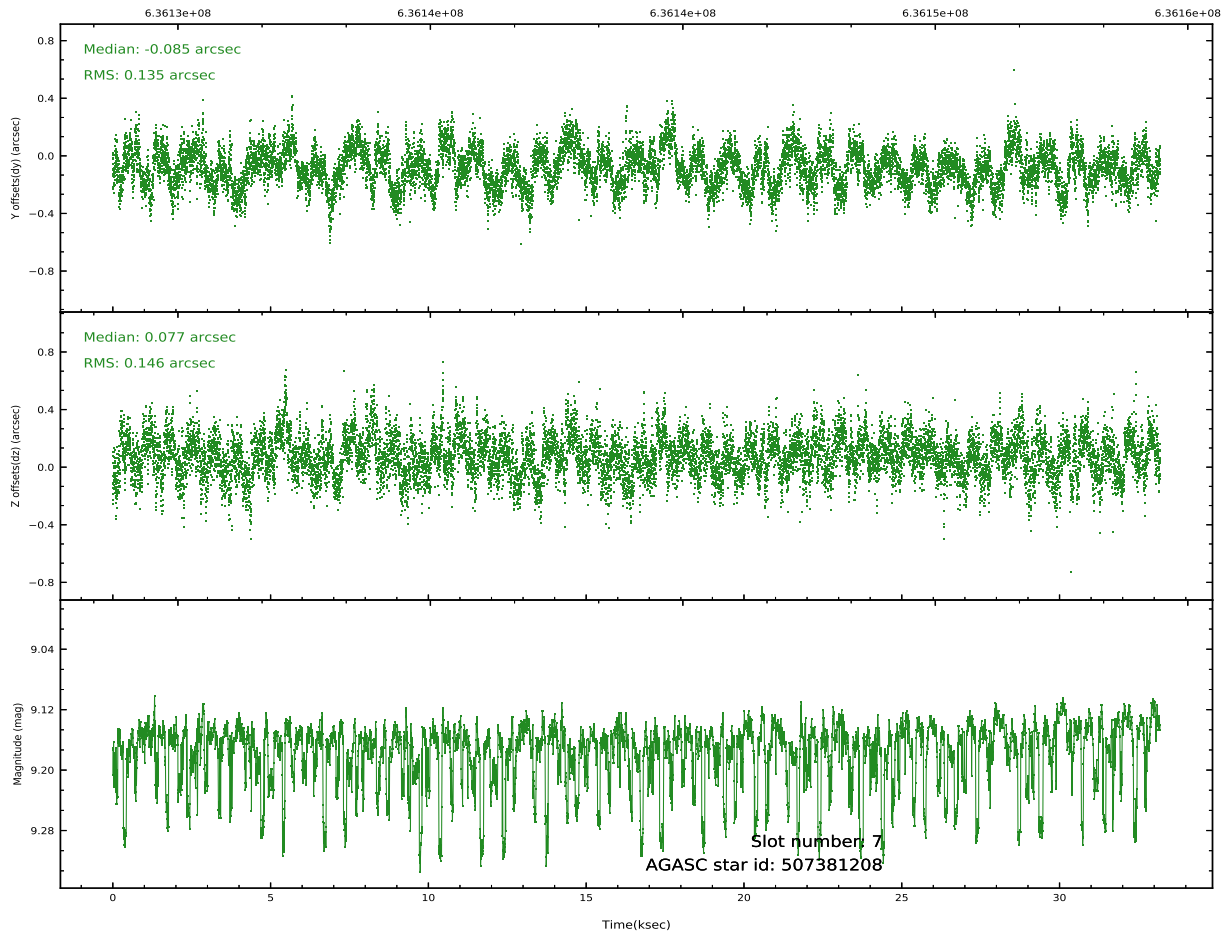
## 2.4.4 Slot 6



## 2.4.5 Slot 7

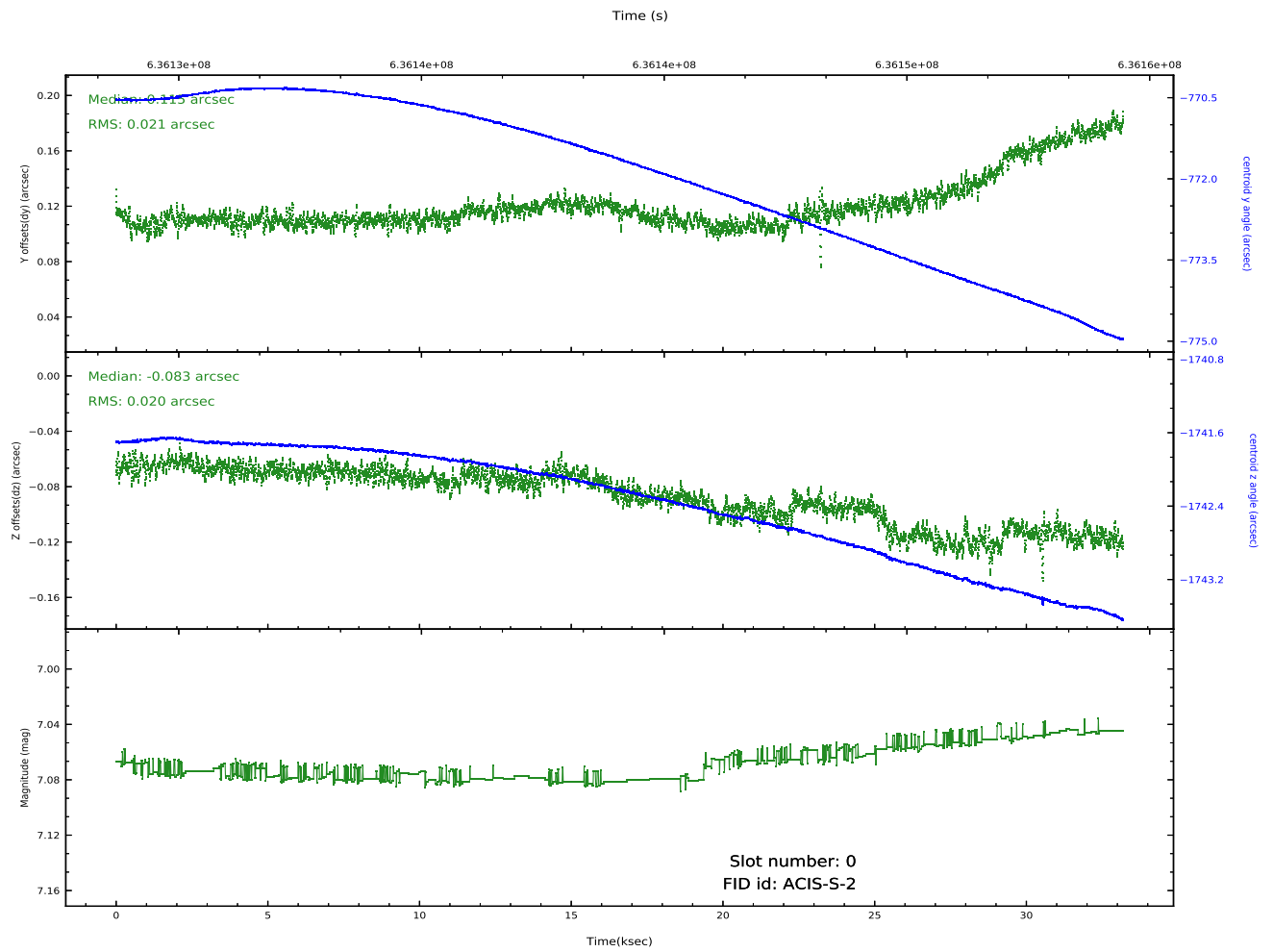
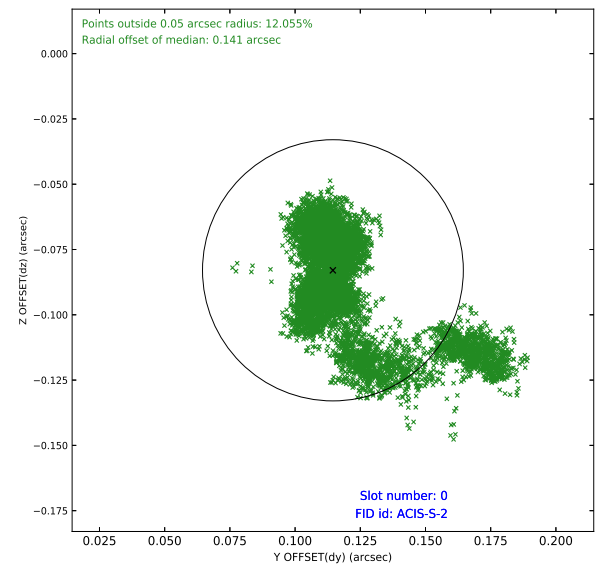
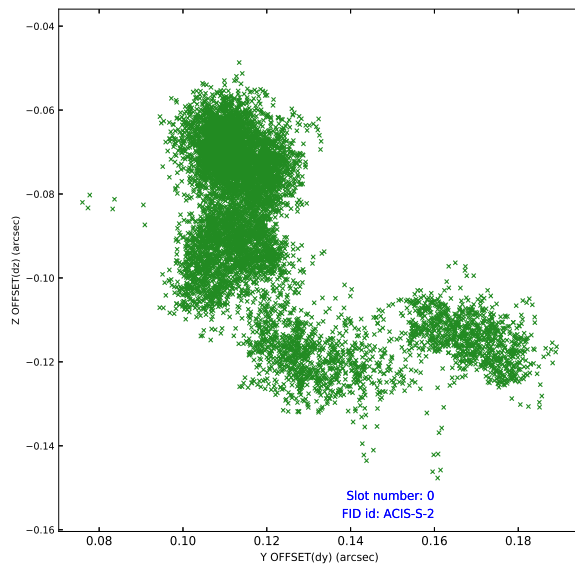


Time (s)

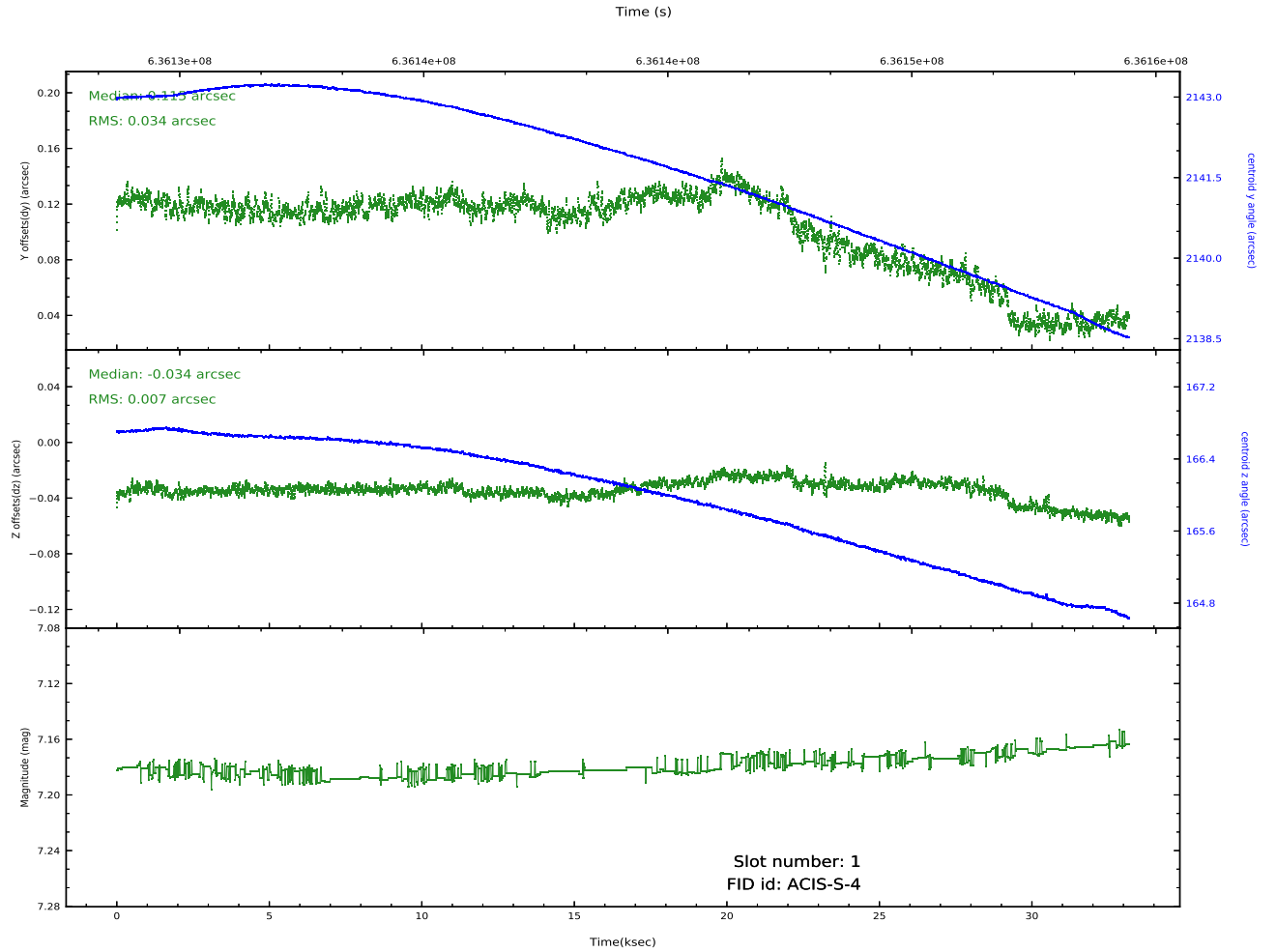
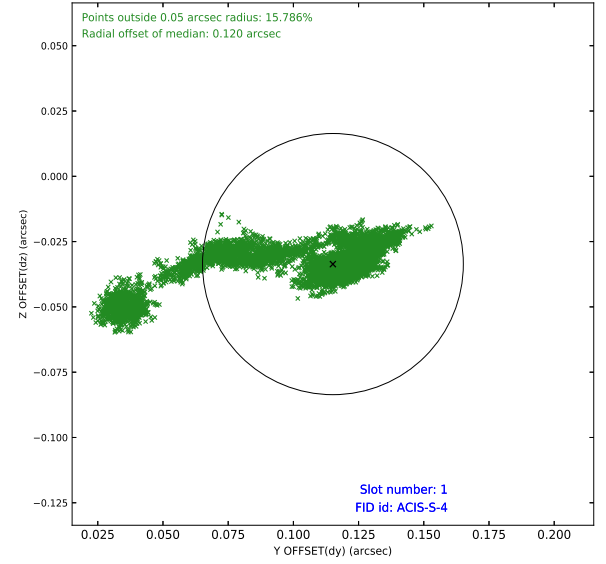
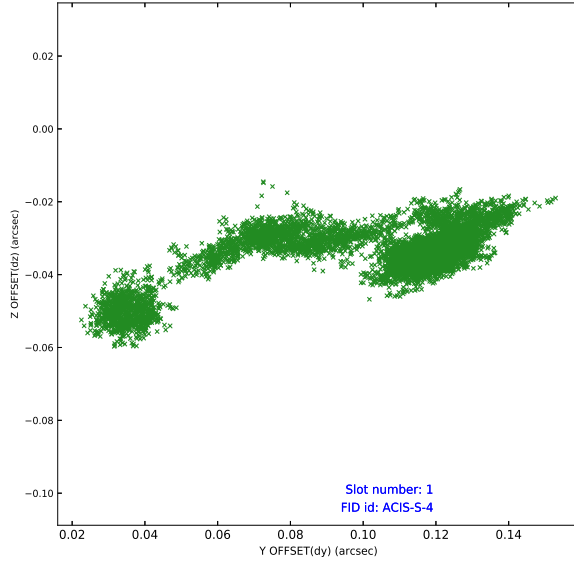


## 2.5 FID Slots

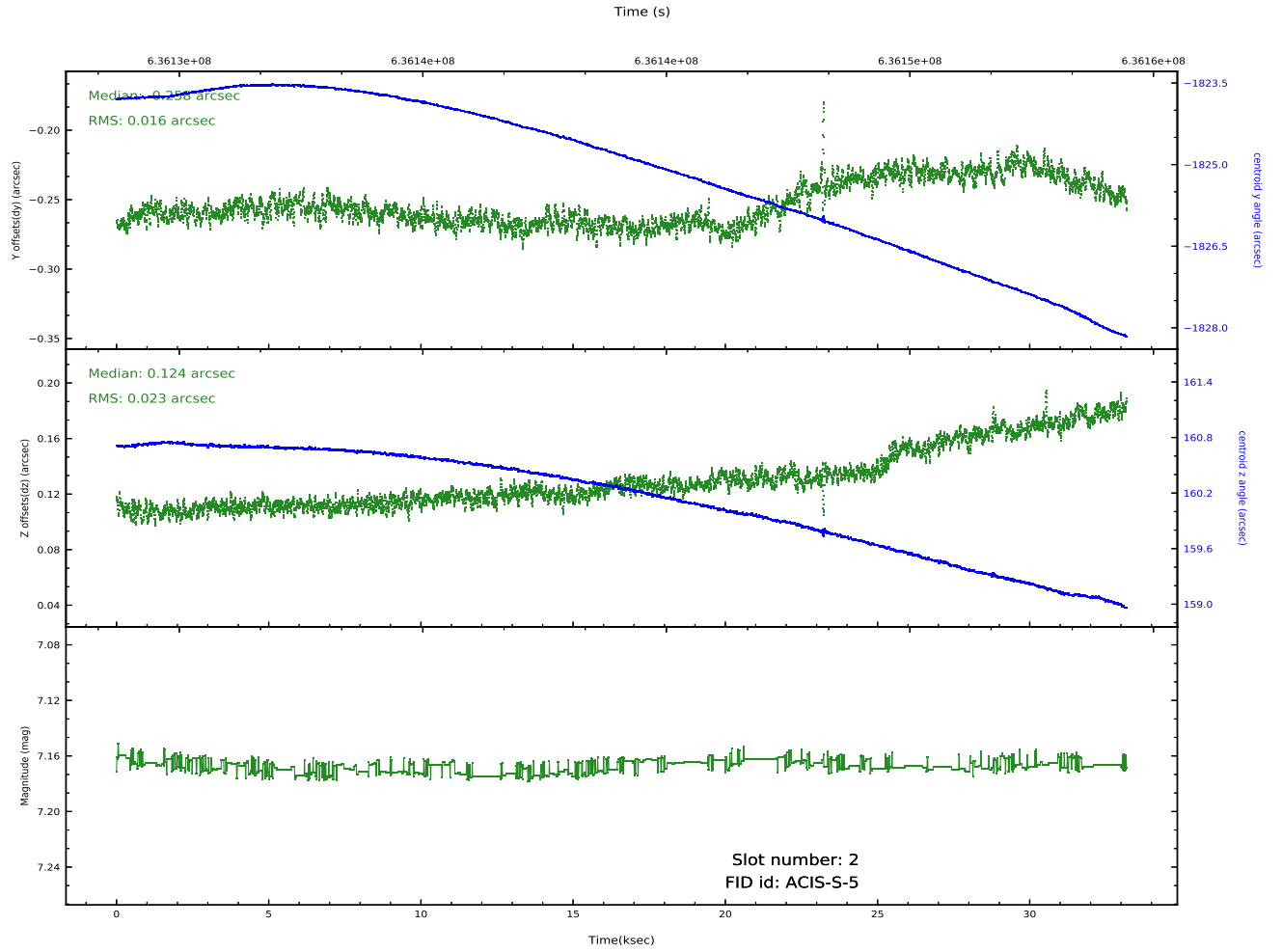
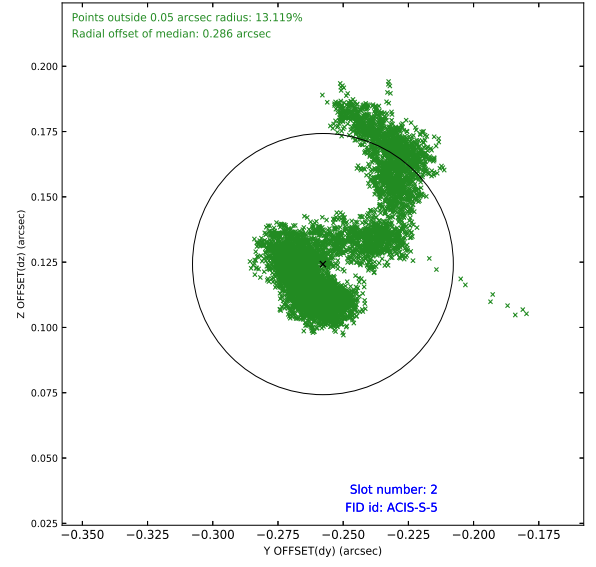
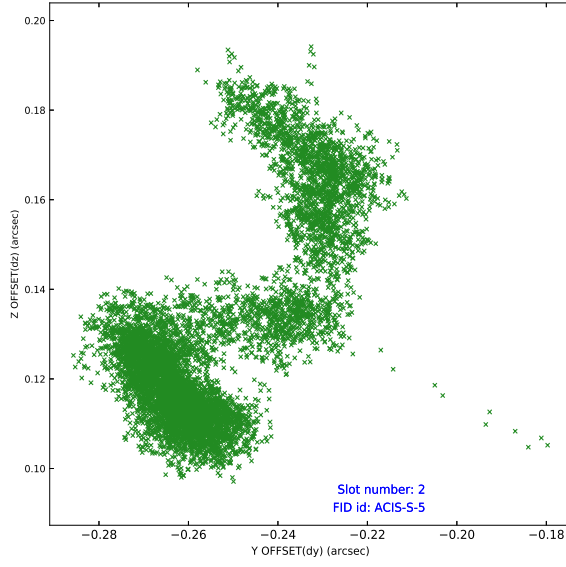
### 2.5.1 Slot 0



## 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)      | 2020.10.29      |
| V&V Edition                | 1               |
| V&V Disposition and Status | OK              |
| V&V Charge Time            | 33.049100254297 |

### A.2 Comments