

# V&V Reference Report

## L2 ASCDS Version : 10.9.2

Observation 21041 - L2 Version 2  
Chandra X-Ray Center

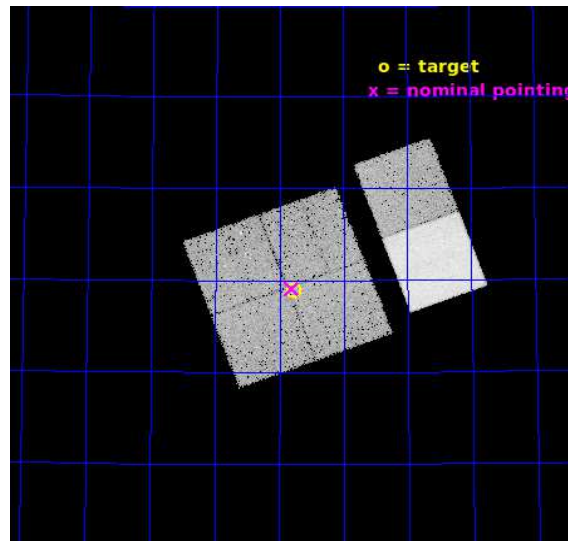
L2 Processing Date : Oct 25 2020

## 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        |
| 2.5      | FID Slots . . . . .           | 13        |
| 2.5.1    | Slot 0 . . . . .              | 13        |
| 2.5.2    | Slot 1 . . . . .              | 14        |
| 2.5.3    | Slot 2 . . . . .              | 15        |
| <b>A</b> | <b>Summary</b>                | <b>16</b> |
| A.1      | Status . . . . .              | 16        |
| A.2      | Comments . . . . .            | 16        |

# 1 Front

|          |                                                               |                                             |
|----------|---------------------------------------------------------------|---------------------------------------------|
| seq_num  | 201157                                                        | Sequence number                             |
| obs_id   | 21041                                                         | Observation id                              |
| title    | Resolving the Double FU Orionis System RNO 1B/1C With Chandra | Prop                                        |
| observer | Stephen Skinner                                               | Principal investigator                      |
| object   | RNO1BC                                                        | Source name                                 |
| dtcycle  | 0                                                             | &#160                                       |
| cycle    | P                                                             | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 9.194167                                                      | Observer's specified target RA<br>[deg]     |
| dec_targ | 63.482639                                                     | Observer's specified target Dec<br>[deg]    |
| ra_nom   | 9.2013472972951                                               | Nominal RA [deg]                            |
| dec_nom  | 63.485047839917                                               | Nominal Dec [deg]                           |
| roll_nom | 69.52919499384                                                | Nominal Roll [deg]                          |
| revision | 2                                                             | Processing version of data                  |
| ontime   | 24952.904823542                                               | Sum of GTIs [s]                             |
| livetime | 24636.936117831                                               | Livetime [s]                                |
| ontime0  | 24952.781703591                                               | Sum of GTIs [s]                             |
| ontime1  | 24936.617841959                                               | Sum of GTIs [s]                             |
| ontime2  | 24949.622813344                                               | Sum of GTIs [s]                             |
| ontime3  | 24952.904823542                                               | Sum of GTIs [s]                             |
| ontime6  | 24952.986903548                                               | Sum of GTIs [s]                             |
| ontime7  | 24952.945863605                                               | Sum of GTIs [s]                             |
| l2events | 172347                                                        | Number of level 2 events                    |

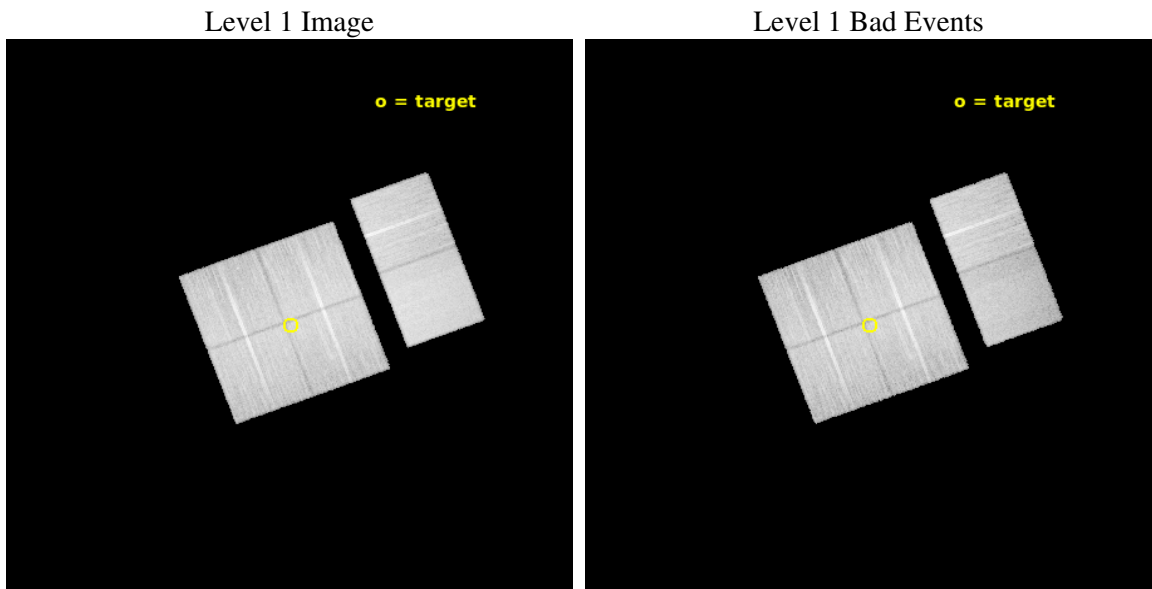




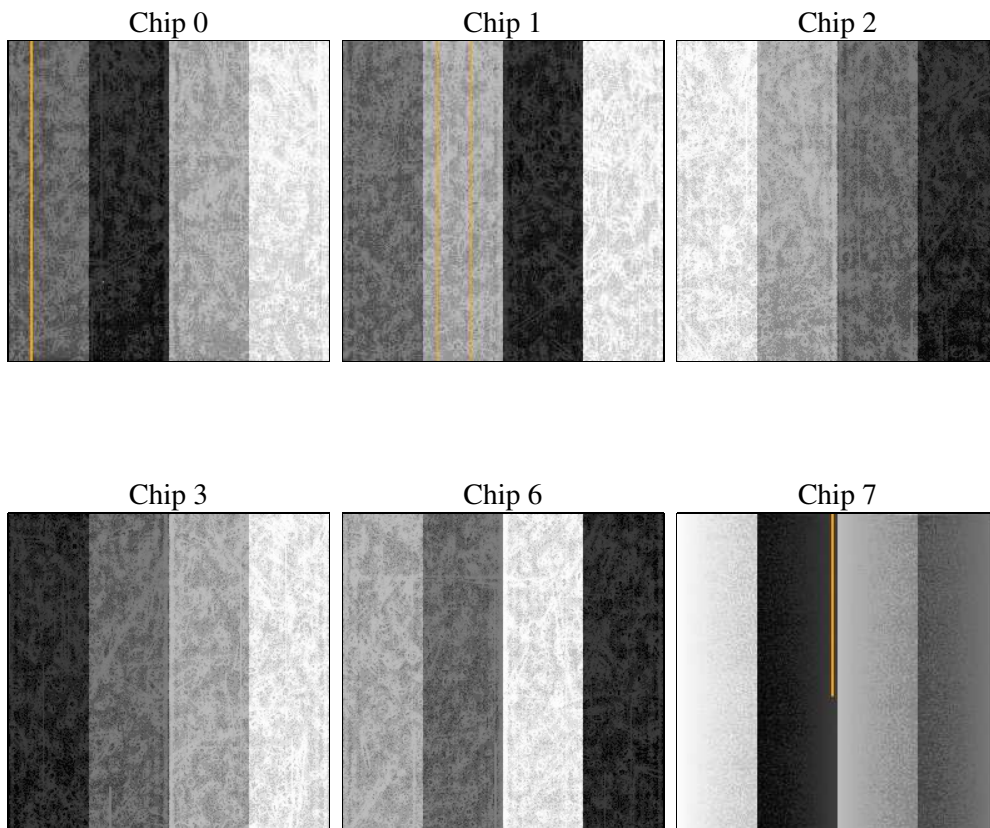
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |                                         |
|----------|---------------------|--------------------------------|----------------|-----------------|-----------------------------------------|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 25000.000000    | [s] Scheduled observation exposure time |
| ascdsver | 10.9.2              | Processing system revision     | ontime         | 24952.904823542 | Sum of GTIs [s]                         |
| caldsver | 4.9.3               | &#160                          | ontime0        | 24952.781703591 | Sum of GTIs [s]                         |
| date     | 2020-10-26T02:44:08 | Date and time of file creation | ontime1        | 24936.617841959 | Sum of GTIs [s]                         |
| revision | 2                   | Processing version of data     | ontime2        | 24949.622813344 | Sum of GTIs [s]                         |
|          |                     |                                | ontime3        | 24952.904823542 | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 24952.986903548 | Sum of GTIs [s]                         |
|          |                     |                                | ontime7        | 24952.945863605 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 1064455         | Number of level 1 events                |

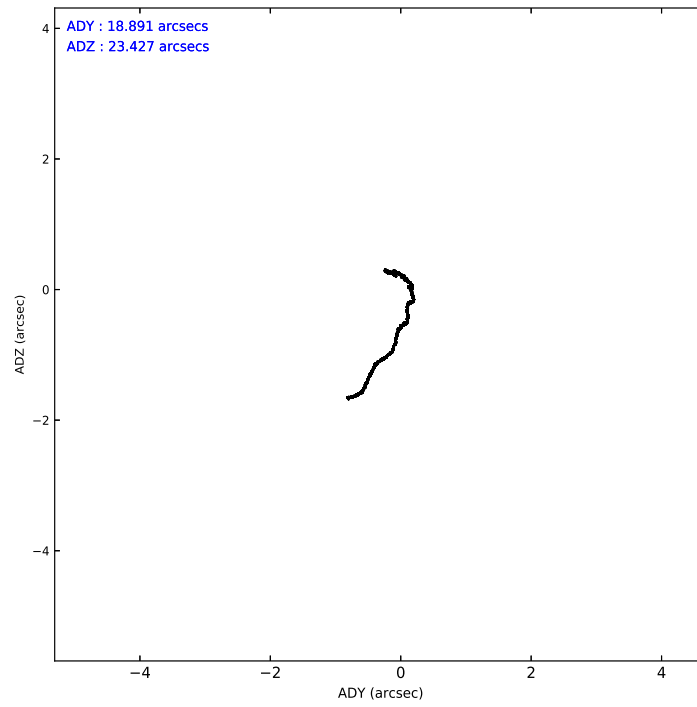
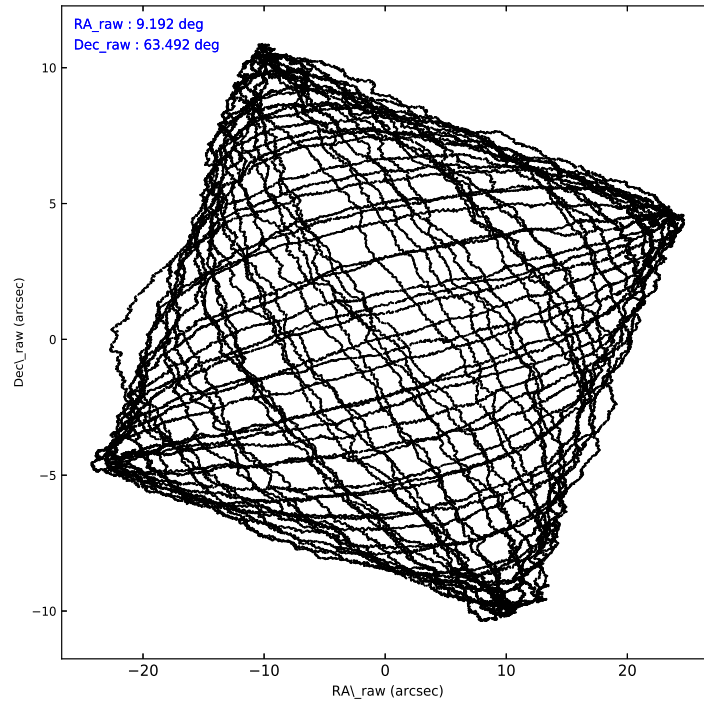
### 2.1.4 Events

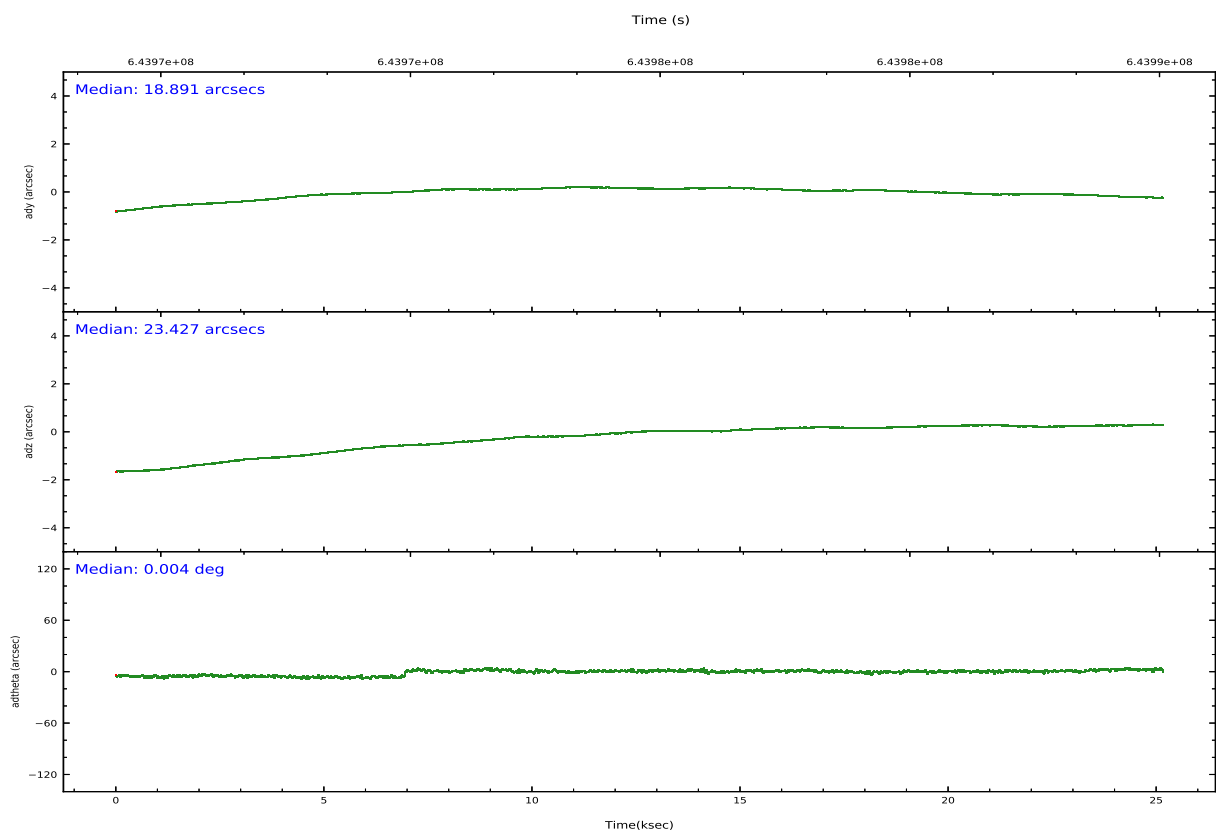
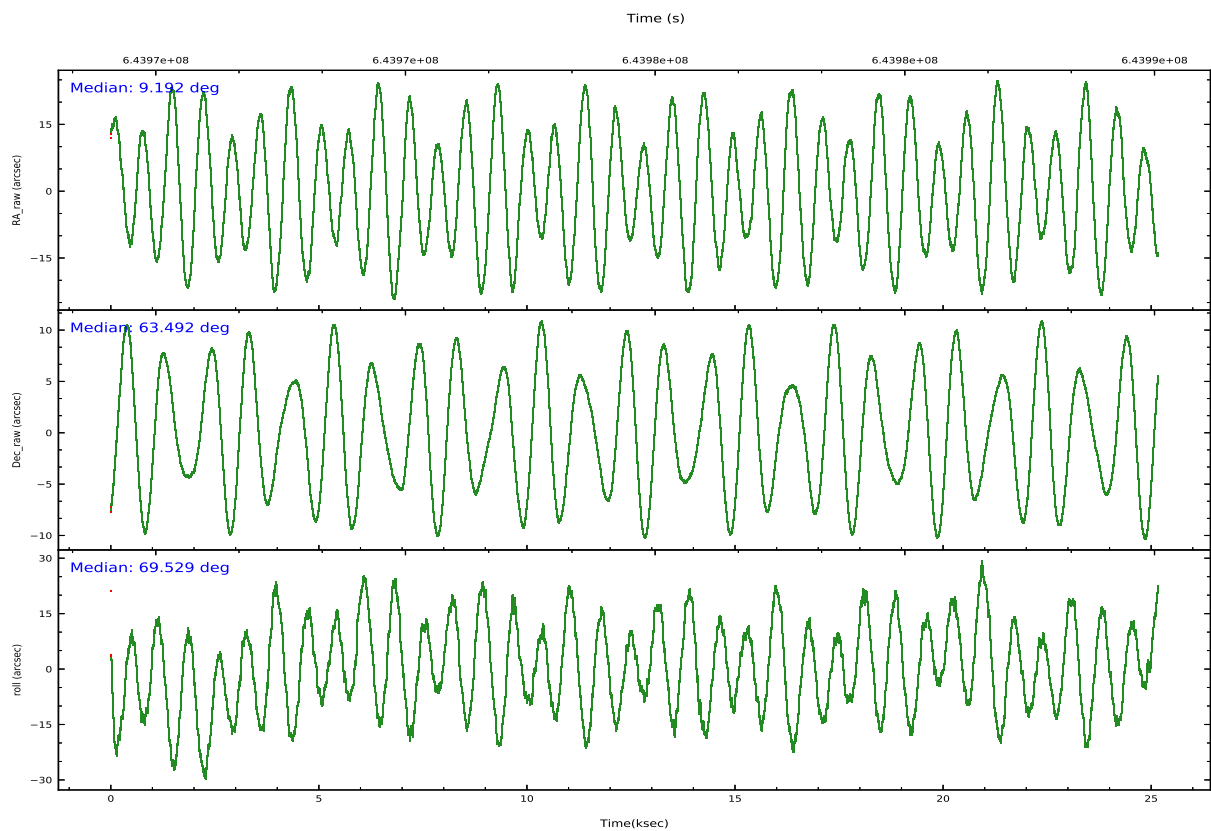
|                 | ccd 0  | ccd 1  | ccd 2  | ccd 3  | ccd 6  | ccd 7  |                | ccd 0  | ccd 1  | ccd 2  | ccd 3  | ccd 6  | ccd 7 |
|-----------------|--------|--------|--------|--------|--------|--------|----------------|--------|--------|--------|--------|--------|-------|
| level 1 events  | 162917 | 162707 | 182558 | 168673 | 179335 | 208265 | grade 0 events | 7103   | 6437   | 6866   | 6280   | 6720   | 8218  |
| rejected events | 142831 | 142758 | 163262 | 150736 | 159008 | 113697 |                | 4%     | 3%     | 3%     | 3%     | 3%     | 3%    |
| rejected %      | 87%    | 87%    | 89%    | 89%    | 88%    | 54%    | grade 1 events | 105    | 77     | 128    | 101    | 99     | 324   |
|                 |        |        |        |        |        |        |                | 0%     | 0%     | 0%     | 0%     | 0%     | 0%    |
|                 |        |        |        |        |        |        | grade 2 events | 5192   | 4937   | 4991   | 4105   | 4901   | 20856 |
|                 |        |        |        |        |        |        |                | 3%     | 3%     | 2%     | 2%     | 2%     | 10%   |
|                 |        |        |        |        |        |        | grade 3 events | 1990   | 2031   | 1907   | 1913   | 1916   | 7624  |
|                 |        |        |        |        |        |        |                | 1%     | 1%     | 1%     | 1%     | 1%     | 3%    |
|                 |        |        |        |        |        |        | grade 4 events | 1827   | 1942   | 1874   | 1917   | 2107   | 7616  |
|                 |        |        |        |        |        |        |                | 1%     | 1%     | 1%     | 1%     | 1%     | 3%    |
|                 |        |        |        |        |        |        | grade 5 events | 6748   | 7379   | 6453   | 7857   | 7951   | 21126 |
|                 |        |        |        |        |        |        |                | 4%     | 4%     | 3%     | 4%     | 4%     | 10%   |
|                 |        |        |        |        |        |        | grade 6 events | 3979   | 4610   | 3665   | 3725   | 4689   | 50284 |
|                 |        |        |        |        |        |        |                | 2%     | 2%     | 2%     | 2%     | 2%     | 24%   |
|                 |        |        |        |        |        |        | grade 7 events | 135973 | 135294 | 156674 | 142775 | 150952 | 92217 |
|                 |        |        |        |        |        |        |                | 83%    | 83%    | 85%    | 84%    | 84%    | 44%   |

## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual                | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|-----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                  | Obspar version number                 | 8         | 8       |
| Detector                          | ACIS-012367         | ACIS-012367           | Obspar file type                      | PREDICTED | ACTUAL  |
| Grating                           | NONE                | NONE                  | Obspar update status                  | NONE      | UPDATED |
| Data mode                         | VFAINT              | VFAINT                | CCD I0 on                             | Y         | Y       |
| Observation mode                  | POINTING            | POINTING              | CCD I1 on                             | Y         | Y       |
| [deg] Pointing RA                 | 9.202094            | 9.201347297295101     | CCD I2 on                             | Y         | Y       |
| [deg] Pointing Dec                | 63.465242           | 63.485047839917       | CCD I3 on                             | Y         | Y       |
| [deg] Pointing Roll               | 69.323389           | 69.52919499383999     | CCD S0 on                             | N         | N       |
| [mm] SIM focus pos                | -0.782348           | -0.7809083437167272   | CCD S1 on                             | N         | N       |
| [mm] SIM defocus                  | 0                   | 0.001439871863259334  | CCD S2 on                             | O1        | Y       |
| [mm] SIM translation stage pos    | -233.592463         | -233.5874344608287    | CCD S3 on                             | O2        | Y       |
| [mm] SIM translation stage offset | 0                   | -0.005018542100998502 | CCD S4 on                             | N         | N       |
| [s] Observation start time (MET)  | 643965087.184000    | 643964036.25757       | CCD S5 on                             | N         | N       |
| Observation start date            | 2018-05-29T07:10:18 | 2018-05-29T06:53:56   | Number of optional ACIS chips dropped | 0         | 0       |
| [s] Observation end time (MET)    | 643990087.184000    | 643990927.13416       | On-chip summing requested             | N         | N       |
| Observation end date              | 2018-05-29T14:06:58 | 2018-05-29T14:22:07   | Subarray requested                    | NONE      | NONE    |
| Read mode                         | TIMED               | TIMED                 | Alternating exposures requested       | N         | N       |
|                                   |                     |                       | [s] Primary exposure time             | 0.000000  | 3.2     |

## 2.3 Aspect



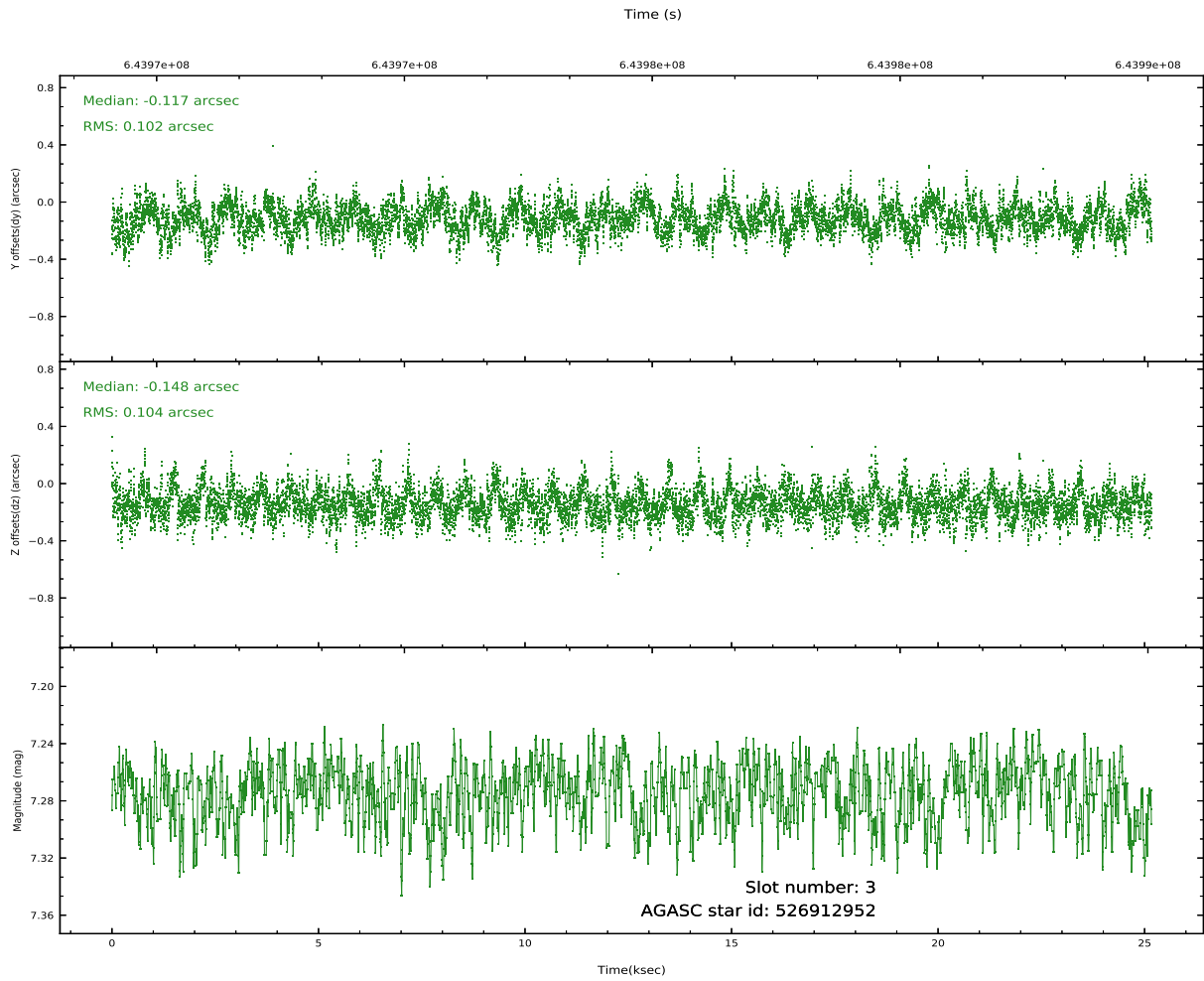
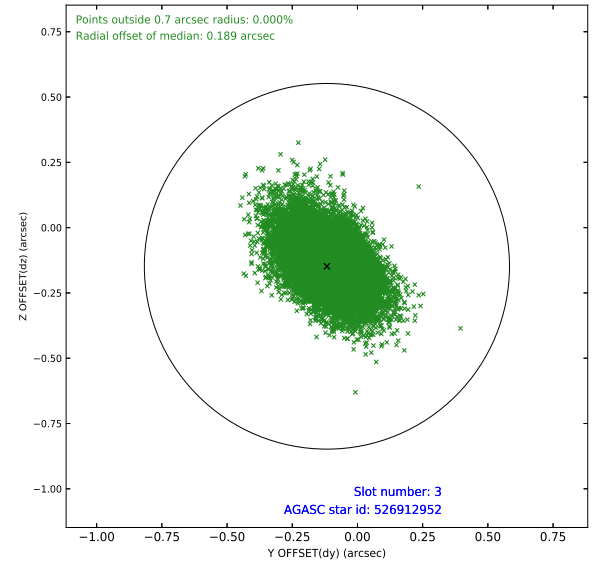
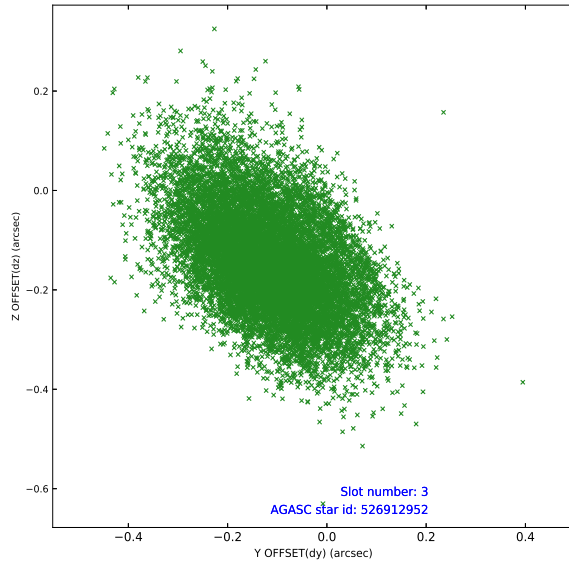


Slot Statistics

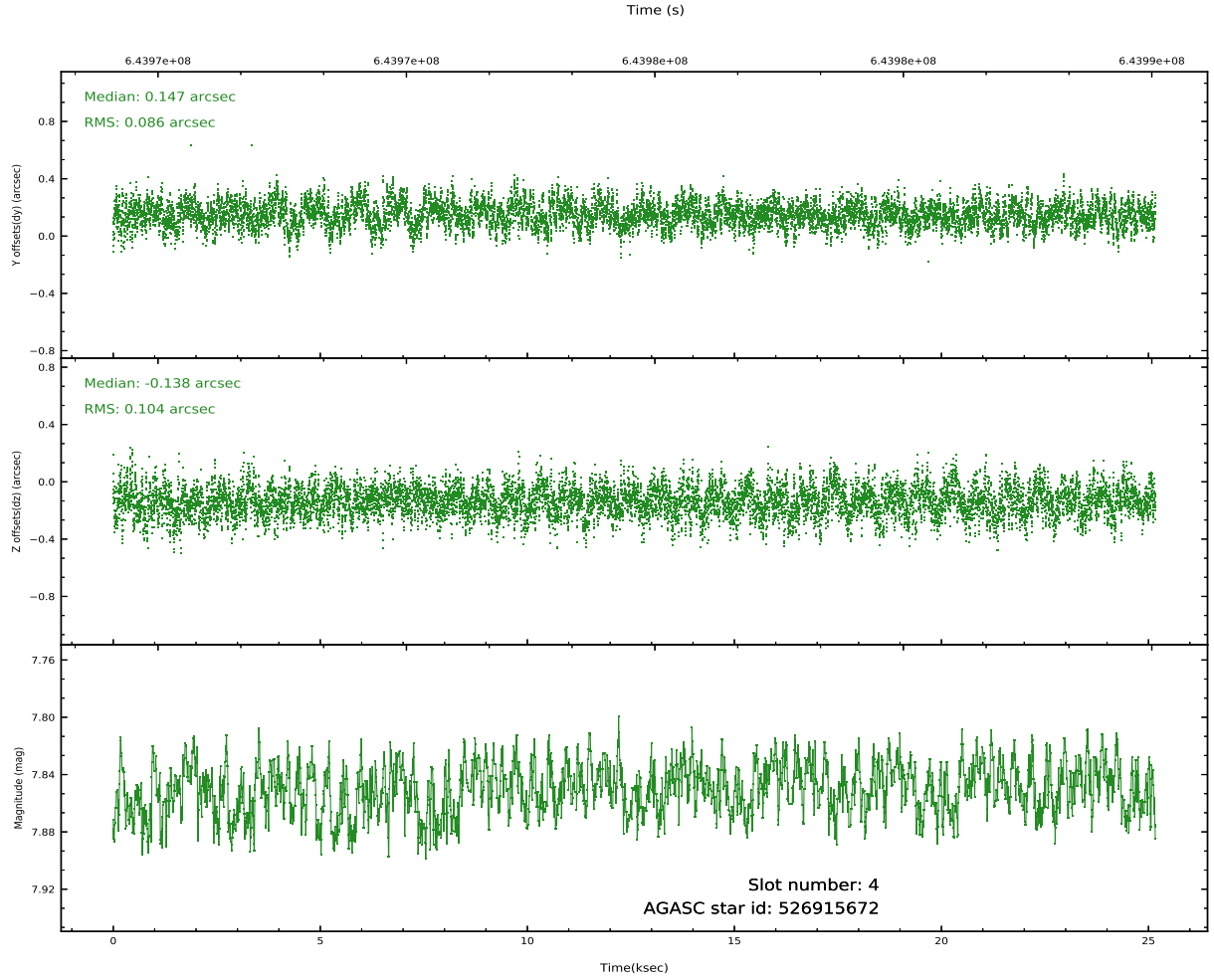
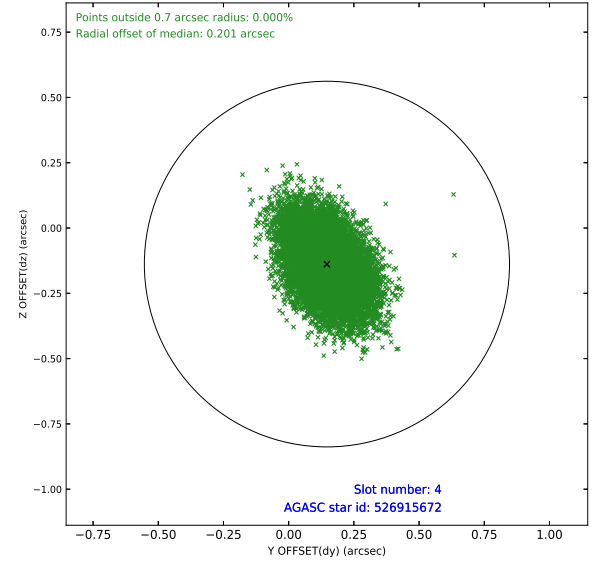
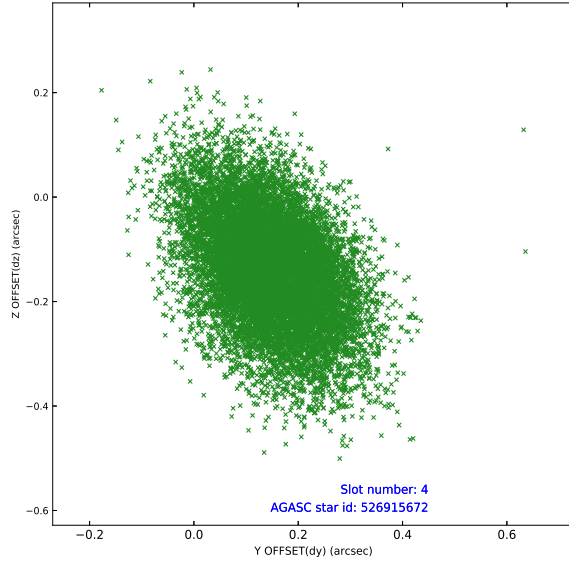
| pt | status  | used | id        | mag  | n_pts | frac_pts | med_dy | med_dz | dr1   | dr2   | ra       | dec       | mean_y   | mea   |
|----|---------|------|-----------|------|-------|----------|--------|--------|-------|-------|----------|-----------|----------|-------|
| 0  | FID     |      | ACIS-I-1  | 7.16 | 6138  | 1.000    | 0.009  | -0.005 | 0.019 | 0.107 | 0.000000 | 0.000000  | 920.44   | -847  |
| 1  | FID     |      | ACIS-I-2  | 7.05 | 6139  | 1.000    | -0.064 | 0.043  | 0.017 | 0.030 | 0.000000 | 0.000000  | -773.67  | -853  |
| 2  | FID     |      | ACIS-I-4  | 7.10 | 6139  | 1.000    | -0.045 | 0.031  | 0.019 | 0.091 | 0.000000 | 0.000000  | 2140.42  | 1052  |
| 3  | GUIDE   | used | 526912952 | 7.27 | 12269 | 1.000    | -0.117 | -0.148 | 0.152 | 0.258 | 8.797150 | 62.989377 | -1834.50 | 15    |
| 4  | GUIDE   | used | 526915672 | 7.85 | 12272 | 1.000    | 0.147  | -0.138 | 0.141 | 0.240 | 9.966288 | 63.227532 | -356.23  | -1458 |
| 5  | GUIDE   | used | 526918616 | 7.57 | 12276 | 1.000    | -0.061 | 0.024  | 0.132 | 0.225 | 9.855515 | 63.043996 | -1036.90 | -1531 |
| 6  | GUIDE   | used | 526920840 | 8.22 | 12275 | 1.000    | 0.029  | 0.259  | 0.124 | 0.216 | 9.735372 | 62.844468 | -1777.89 | -1607 |
| 7  | OMITTED |      |           | 0.00 | 0     | 0.000    | 0.000  | 0.000  | 0.000 | 0.000 | 0.000000 | 0.000000  | 0.00     | 0     |

## 2.4 Star Slots

### 2.4.1 Slot 3

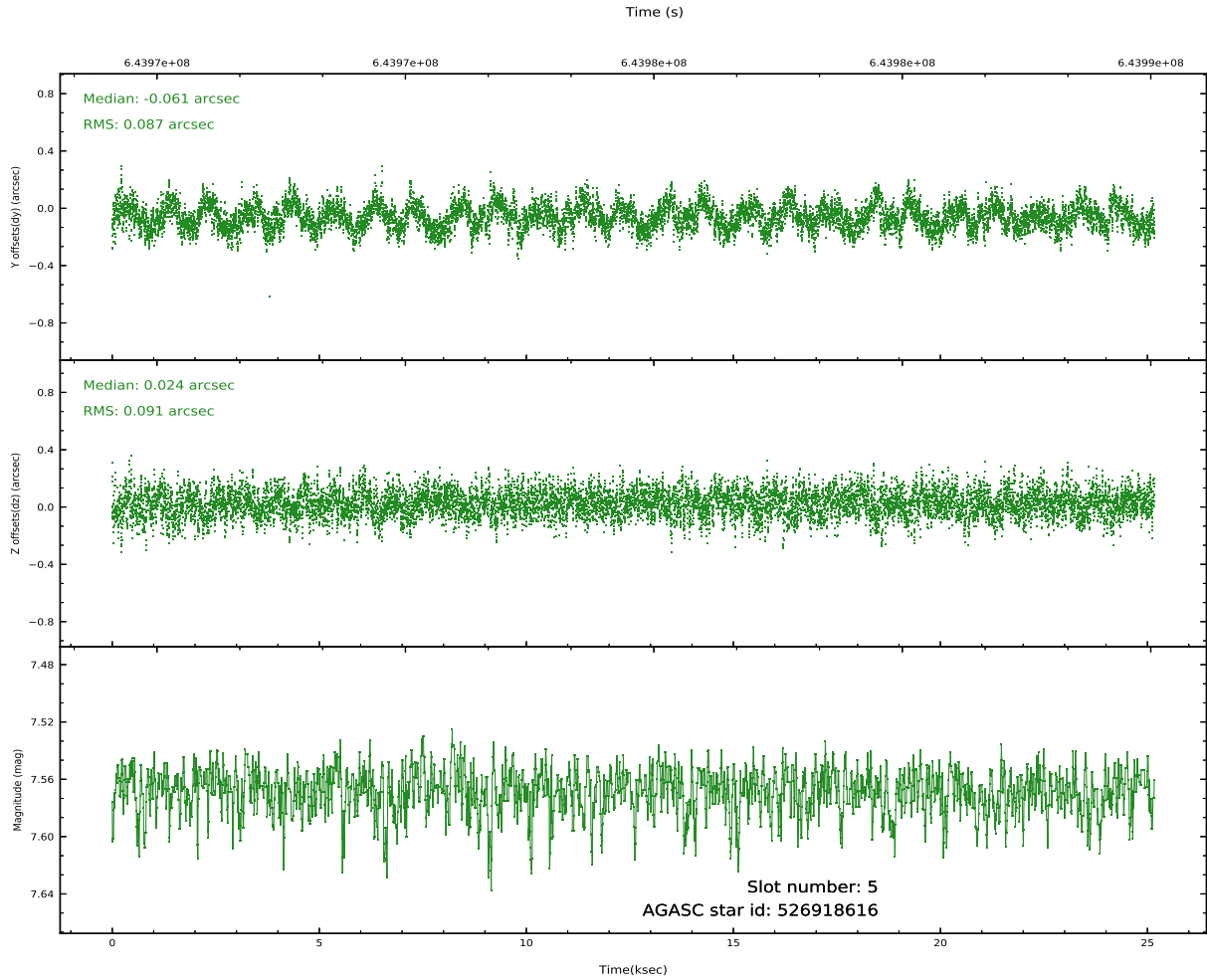
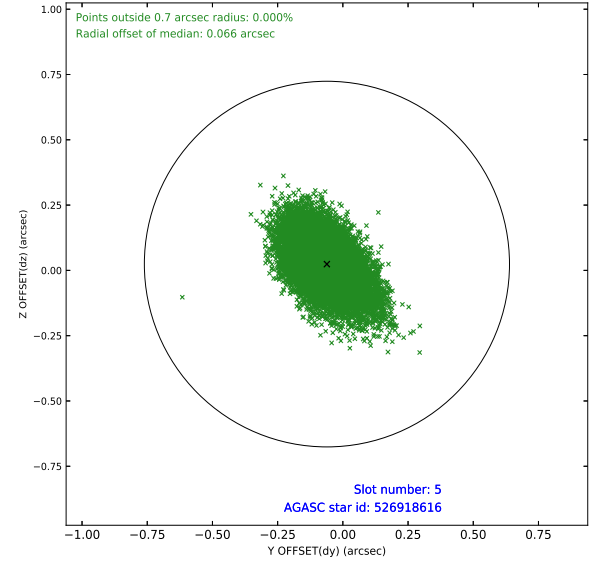
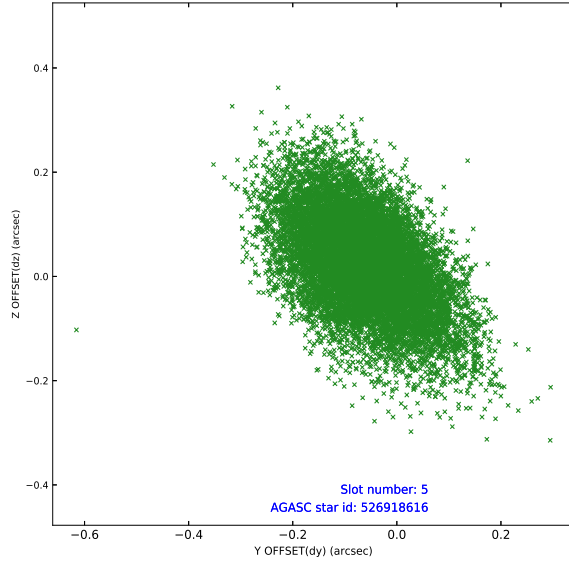


## 2.4.2 Slot 4

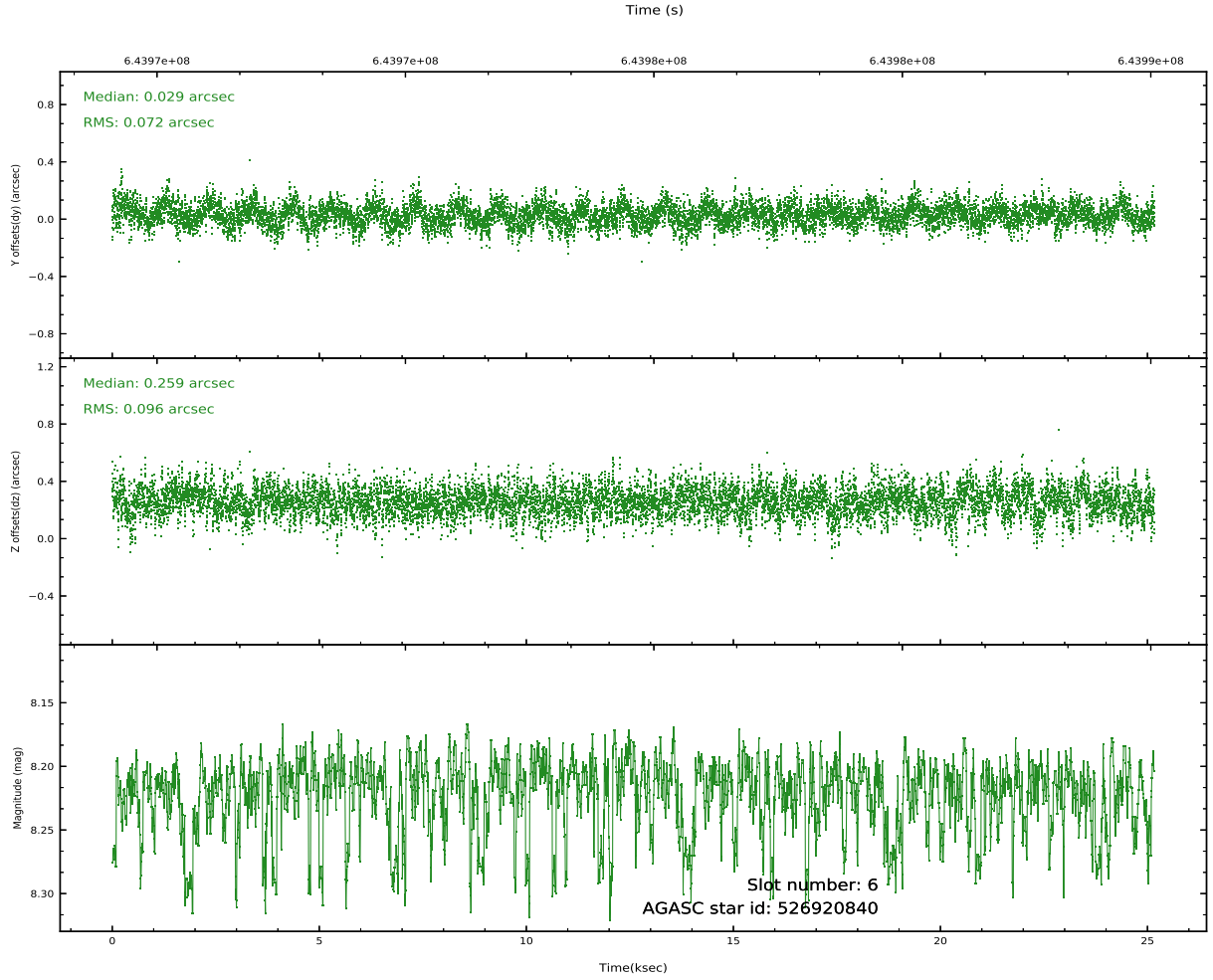
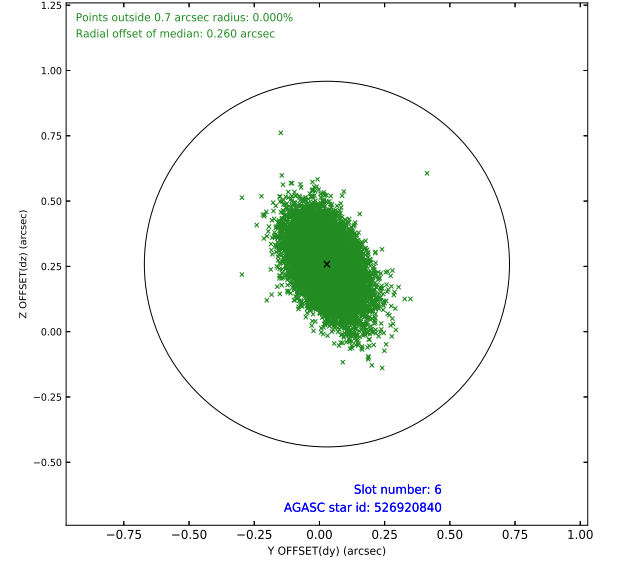
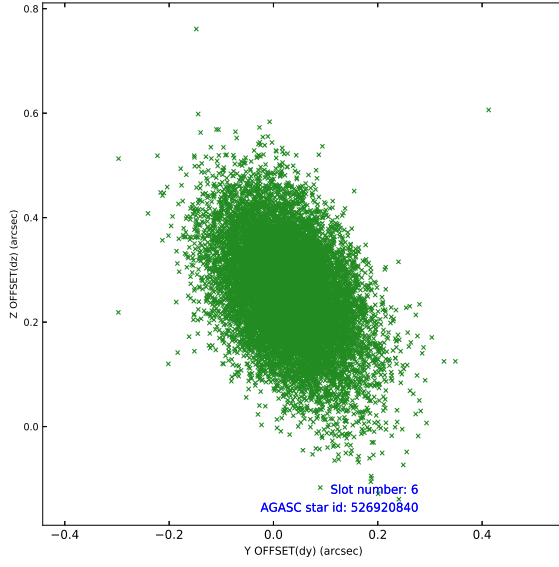




### 2.4.3 Slot 5

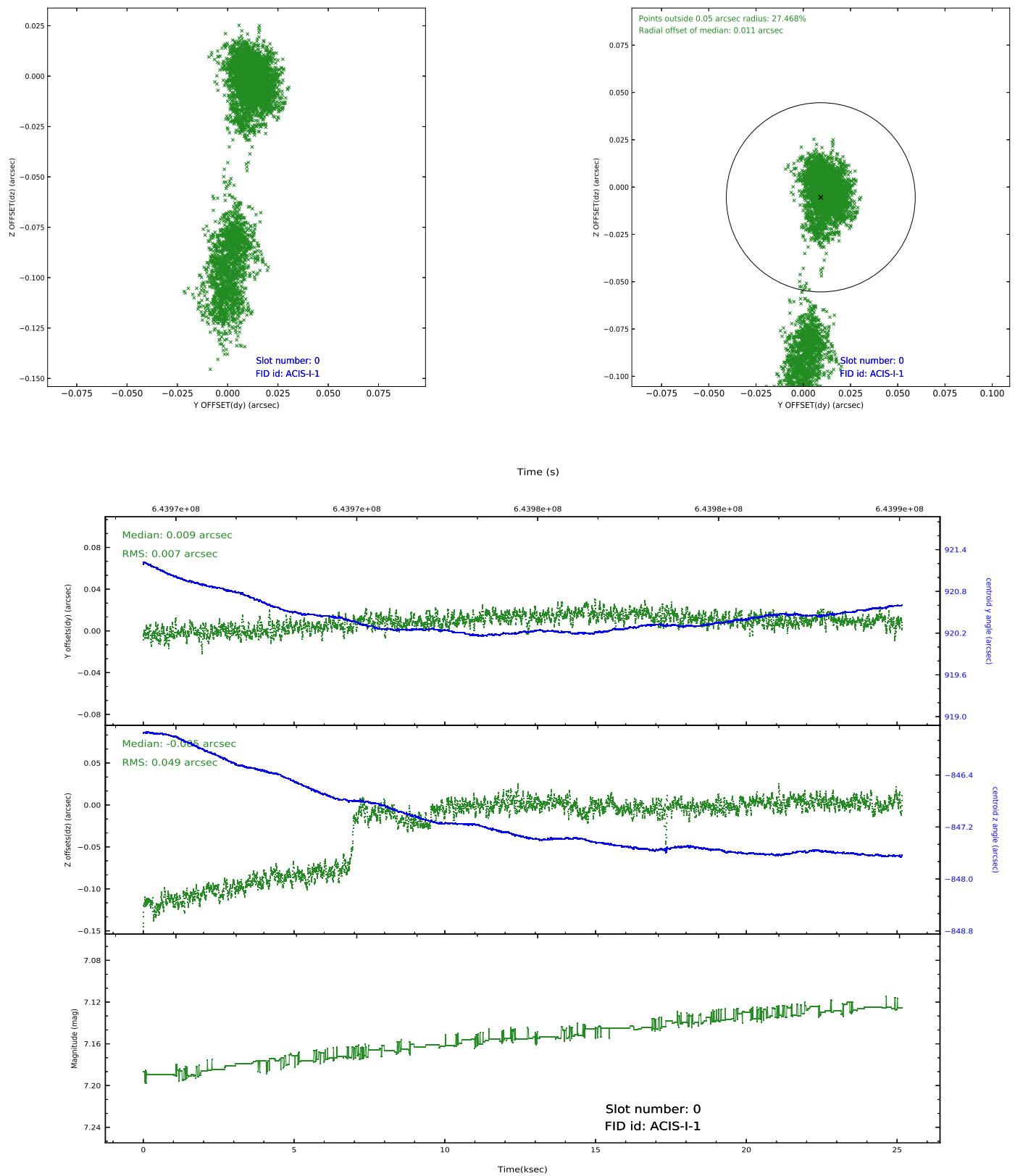


## 2.4.4 Slot 6

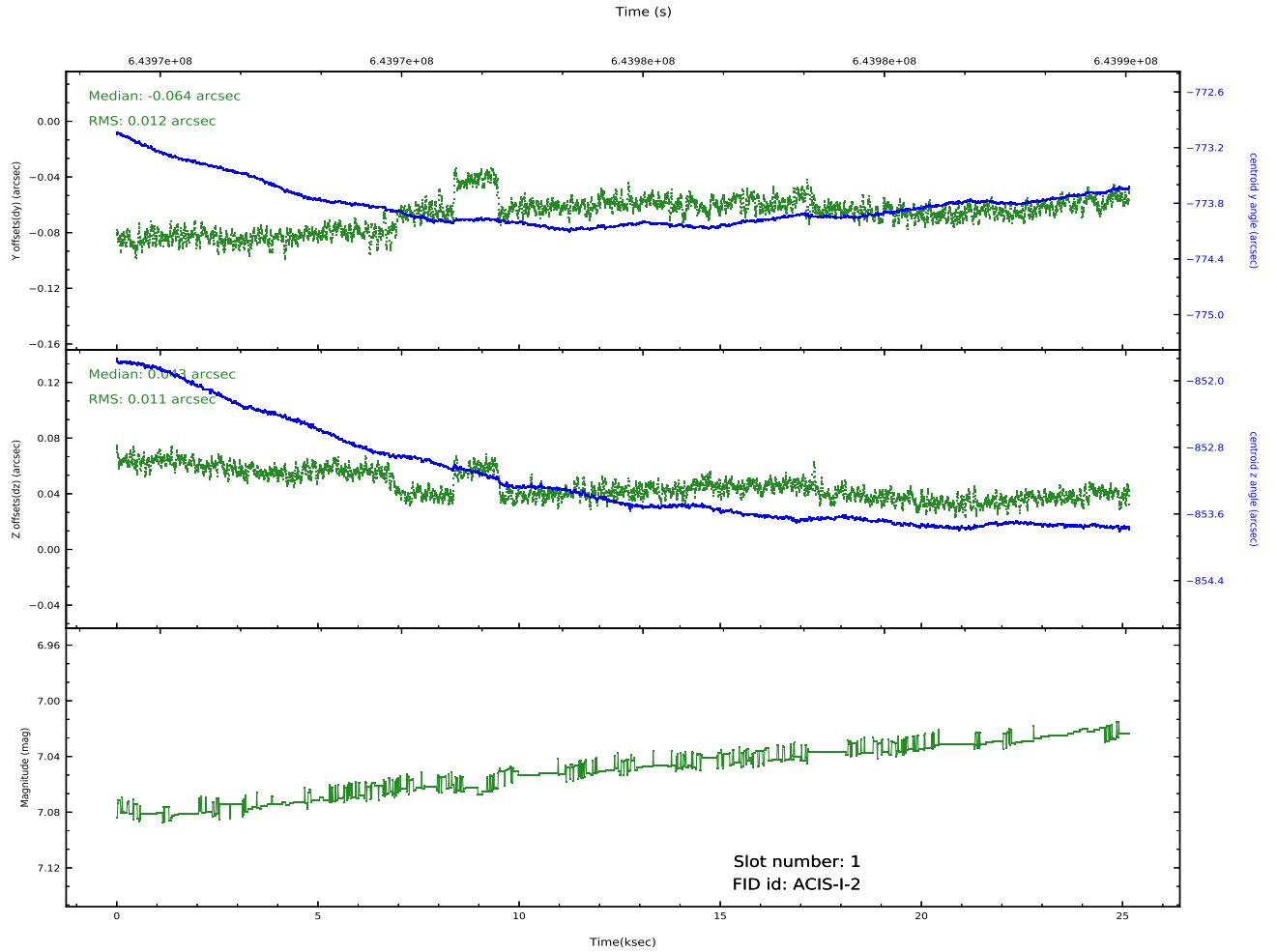
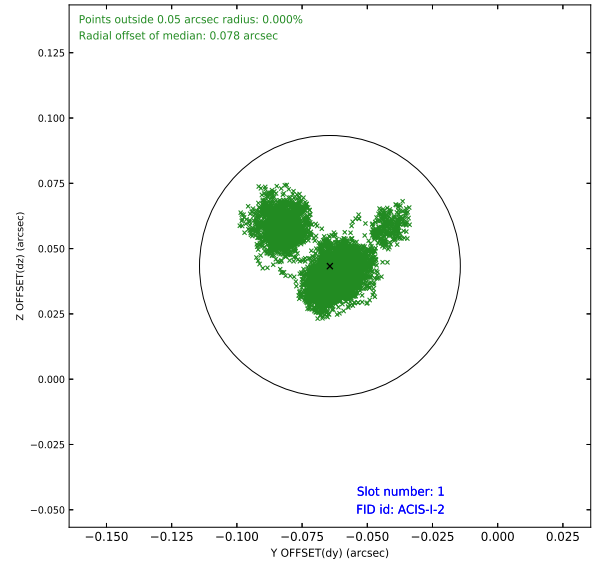
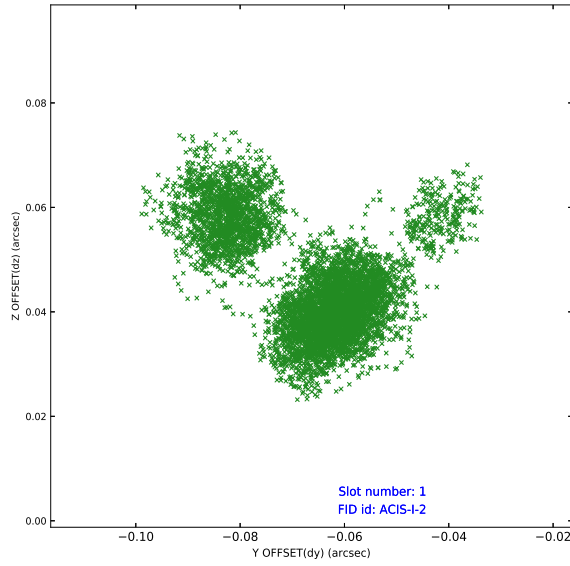


## 2.5 FID Slots

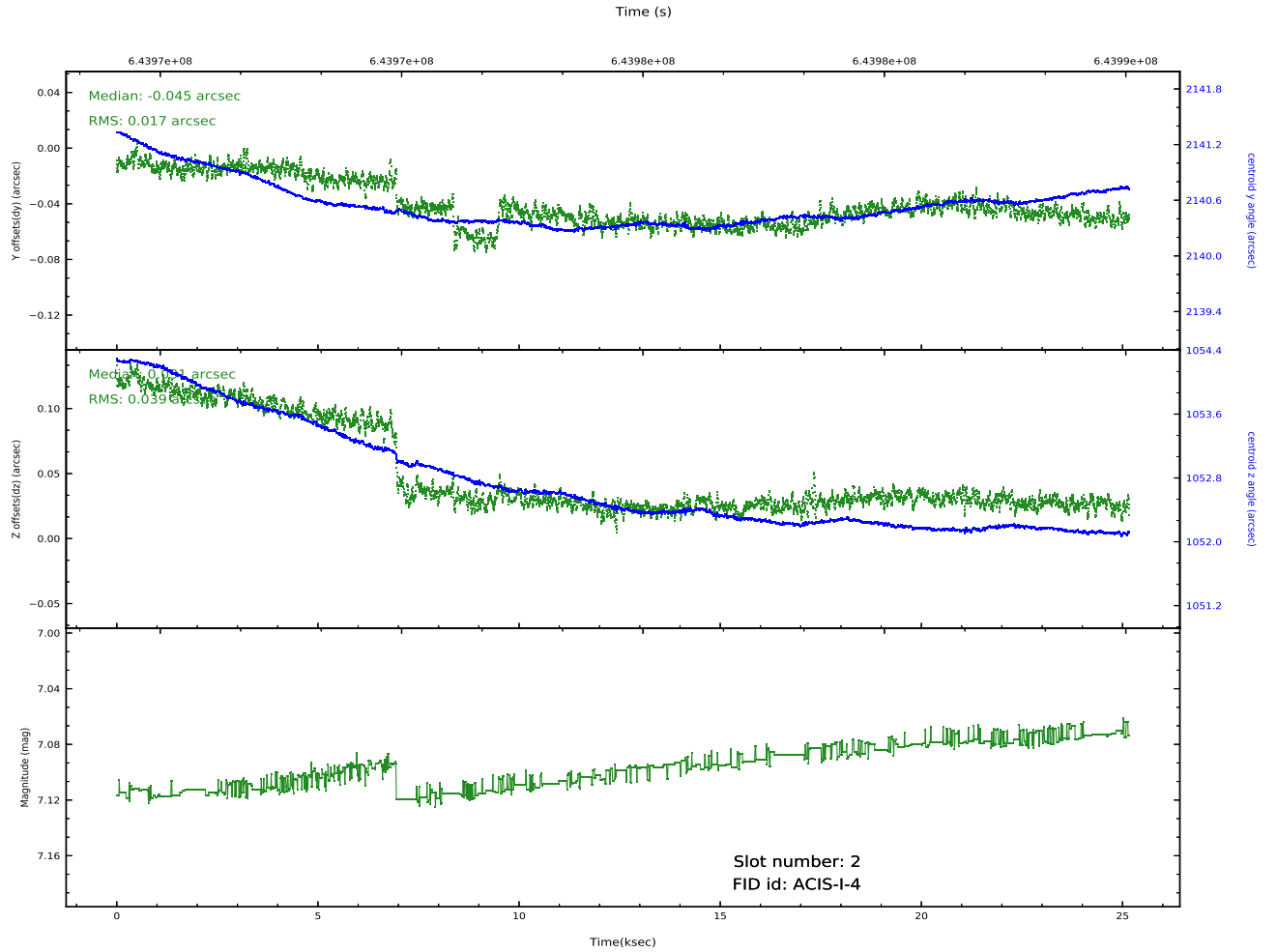
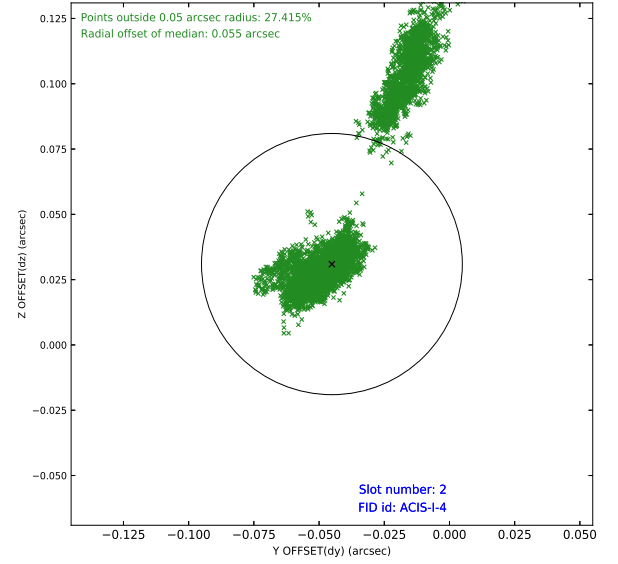
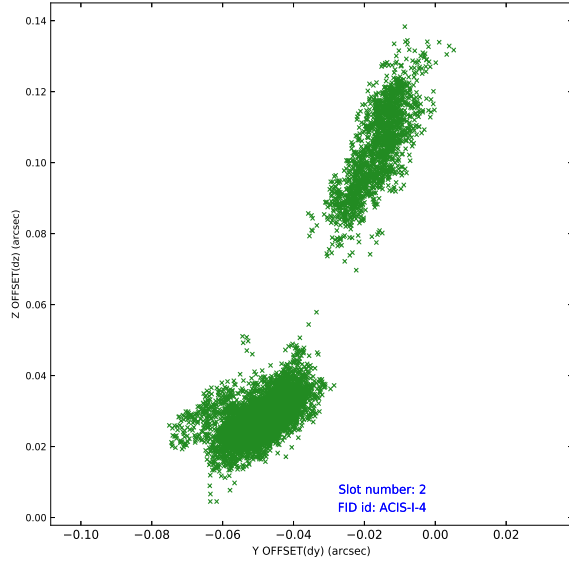
### 2.5.1 Slot 0



## 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)      | 2020.10.29      |
| V&V Edition                | 1               |
| V&V Disposition and Status | OK              |
| V&V Charge Time            | 24.952904825807 |

### A.2 Comments

The guide star in slot 7 was removed from the aspect solution due to poor data quality. The aspect solution is improved by the removal of this guide star from the solution.