

# V&V Reference Report

## L2 ASCDS Version : 10.4.2.1

Observation 16750 - L2 Version 1  
Chandra X-Ray Center

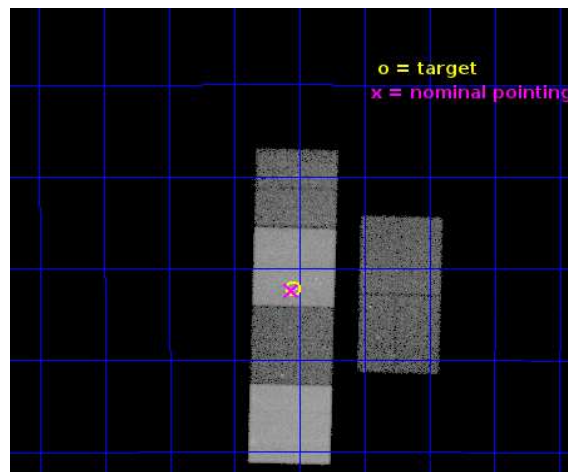
L2 Processing Date : Nov 8 2015

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# 1 Front

|          |                                                                      |                                             |
|----------|----------------------------------------------------------------------|---------------------------------------------|
| seq_num  | 401672                                                               | Sequence number                             |
| obs_id   | 16750                                                                | Observation id                              |
| title    | Spying on millisecond pulsar paradise: Chandra+GBT monitoring of M28 | &#160                                       |
| observer | Dr Manuel Linares                                                    | Principal investigator                      |
| object   | M28                                                                  | Source name                                 |
| dtcycle  | 0                                                                    | &#160                                       |
| cycle    | P                                                                    | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 276.137083                                                           | Observer's specified<br>target RA [deg]     |
| dec_targ | -24.869833                                                           | Observer's specified<br>target Dec [deg]    |
| ra_nom   | 276.14097947944                                                      | Nominal RA [deg]                            |
| dec_nom  | -24.873966253207                                                     | Nominal Dec [deg]                           |
| roll_nom | 271.41039533403                                                      | Nominal Roll [deg]                          |
| revision | 1                                                                    | Processing version of<br>data               |
| ontime   | 29945.013906837                                                      | Sum of GTIs [s]                             |
| livetime | 29565.832110025                                                      | Livetime [s]                                |
| ontime2  | 29938.572886109                                                      | Sum of GTIs [s]                             |
| ontime3  | 29944.890786767                                                      | Sum of GTIs [s]                             |
| ontime5  | 29944.972866774                                                      | Sum of GTIs [s]                             |
| ontime6  | 29944.93182683                                                       | Sum of GTIs [s]                             |
| ontime7  | 29945.013906837                                                      | Sum of GTIs [s]                             |
| ontime8  | 29944.849746823                                                      | Sum of GTIs [s]                             |
| l2events | 282791                                                               | Number of level 2<br>events                 |

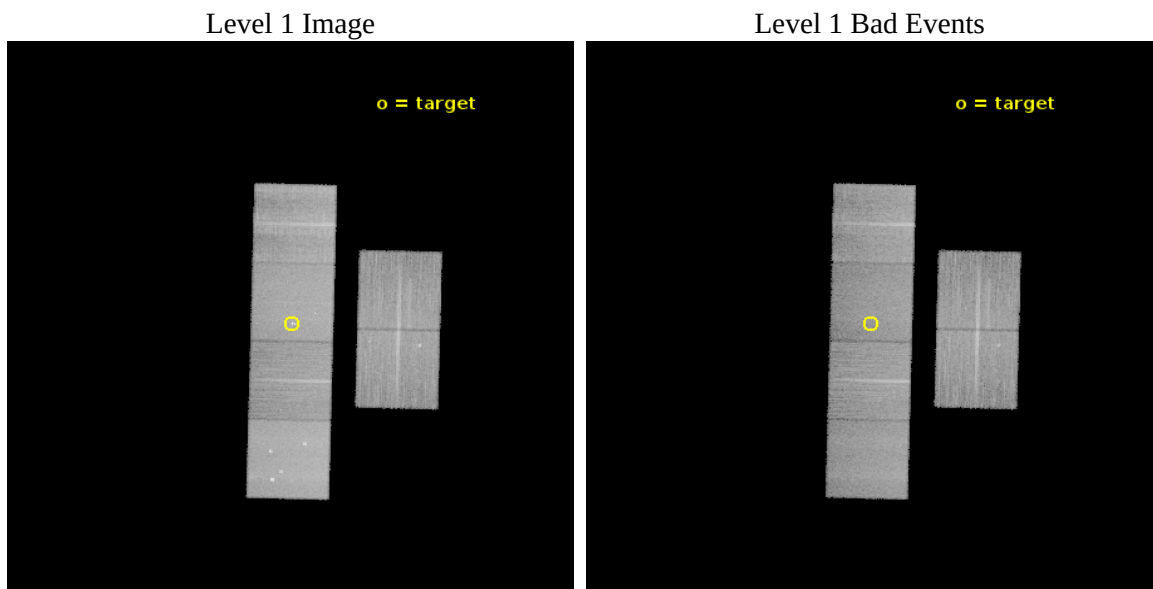




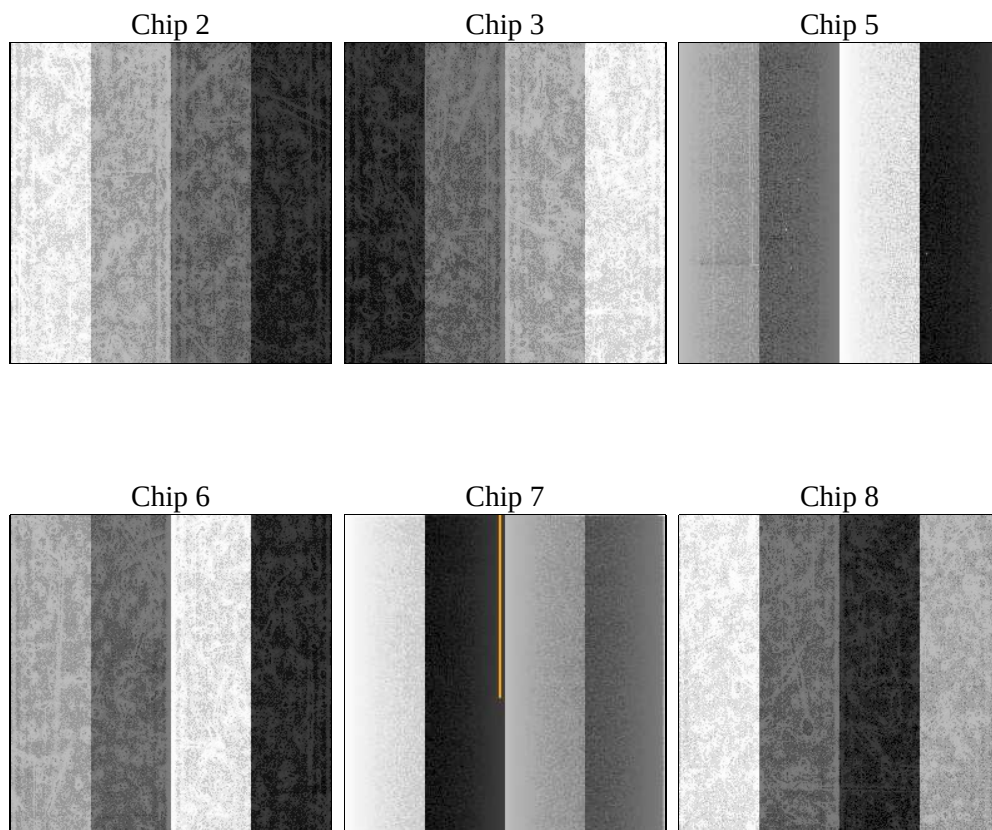
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |                                         |
|----------|---------------------|--------------------------------|----------------|-----------------|-----------------------------------------|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 30000.000000    | [s] Scheduled observation exposure time |
| ascdsver | 10.4.2.1            | Processing system revision     | ontime         | 29945.013906837 | Sum of GTIs [s]                         |
| caldsver | 4.6.10a             | &#160                          | ontime2        | 29938.572886109 | Sum of GTIs [s]                         |
| date     | 2015-11-08T19:05:50 | Date and time of file creation | ontime3        | 29944.890786767 | Sum of GTIs [s]                         |
| revision | 1                   | Processing version of data     | ontime5        | 29944.972866774 | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 29944.93182683  | Sum of GTIs [s]                         |
|          |                     |                                | ontime7        | 29945.013906837 | Sum of GTIs [s]                         |
|          |                     |                                | ontime8        | 29944.849746823 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 1173489         | Number of level 1 events                |

### 2.1.4 Events

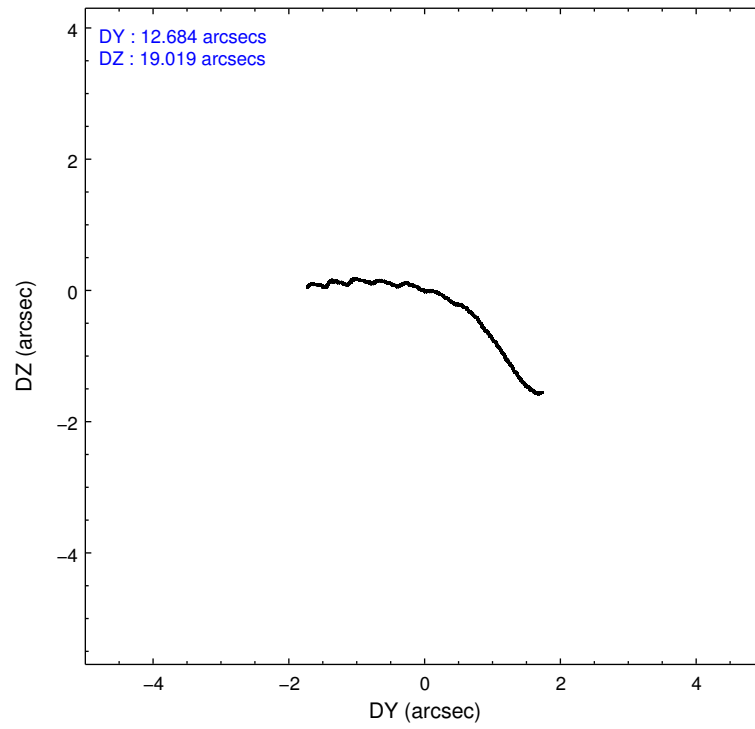
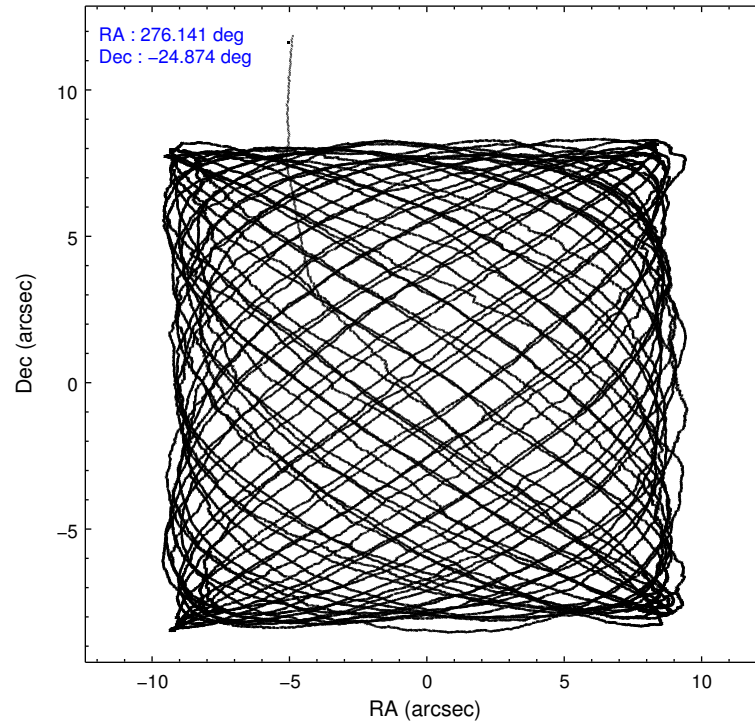
|                 | ccd 2  | ccd 3  | ccd 5  | ccd 6  | ccd 7  | ccd 8  |                | ccd 2  | ccd 3  | ccd 5  | ccd 6  | ccd 7 | ccd 8  |
|-----------------|--------|--------|--------|--------|--------|--------|----------------|--------|--------|--------|--------|-------|--------|
| level 1 events  | 165488 | 158137 | 260205 | 164045 | 215376 | 210238 | grade 0 events | 7215   | 7221   | 11695  | 7807   | 9016  | 17133  |
| rejected events | 146218 | 139751 | 133283 | 143447 | 119761 | 154497 |                | 4%     | 4%     | 4%     | 4%     | 4%    | 8%     |
| rejected %      | 88%    | 88%    | 51%    | 87%    | 55%    | 73%    | grade 1 events | 211    | 90     | 545    | 87     | 295   | 156    |
|                 |        |        |        |        |        |        |                | 0%     | 0%     | 0%     | 0%     | 0%    | 0%     |
|                 |        |        |        |        |        |        | grade 2 events | 4914   | 3802   | 39062  | 4571   | 20428 | 12797  |
|                 |        |        |        |        |        |        |                | 2%     | 2%     | 15%    | 2%     | 9%    | 6%     |
|                 |        |        |        |        |        |        | grade 3 events | 1824   | 1744   | 3886   | 1821   | 7748  | 5764   |
|                 |        |        |        |        |        |        |                | 1%     | 1%     | 1%     | 1%     | 3%    | 2%     |
|                 |        |        |        |        |        |        | grade 4 events | 1786   | 1923   | 3853   | 1912   | 7560  | 5329   |
|                 |        |        |        |        |        |        |                | 1%     | 1%     | 1%     | 1%     | 3%    | 2%     |
|                 |        |        |        |        |        |        | grade 5 events | 6773   | 7833   | 17581  | 7763   | 20390 | 11610  |
|                 |        |        |        |        |        |        |                | 4%     | 4%     | 6%     | 4%     | 9%    | 5%     |
|                 |        |        |        |        |        |        | grade 6 events | 3539   | 3704   | 68452  | 4498   | 50883 | 14721  |
|                 |        |        |        |        |        |        |                | 2%     | 2%     | 26%    | 2%     | 23%   | 7%     |
|                 |        |        |        |        |        |        | grade 7 events | 139226 | 131820 | 115131 | 135586 | 99056 | 142728 |
|                 |        |        |        |        |        |        |                | 84%    | 83%    | 44%    | 82%    | 45%   | 67%    |

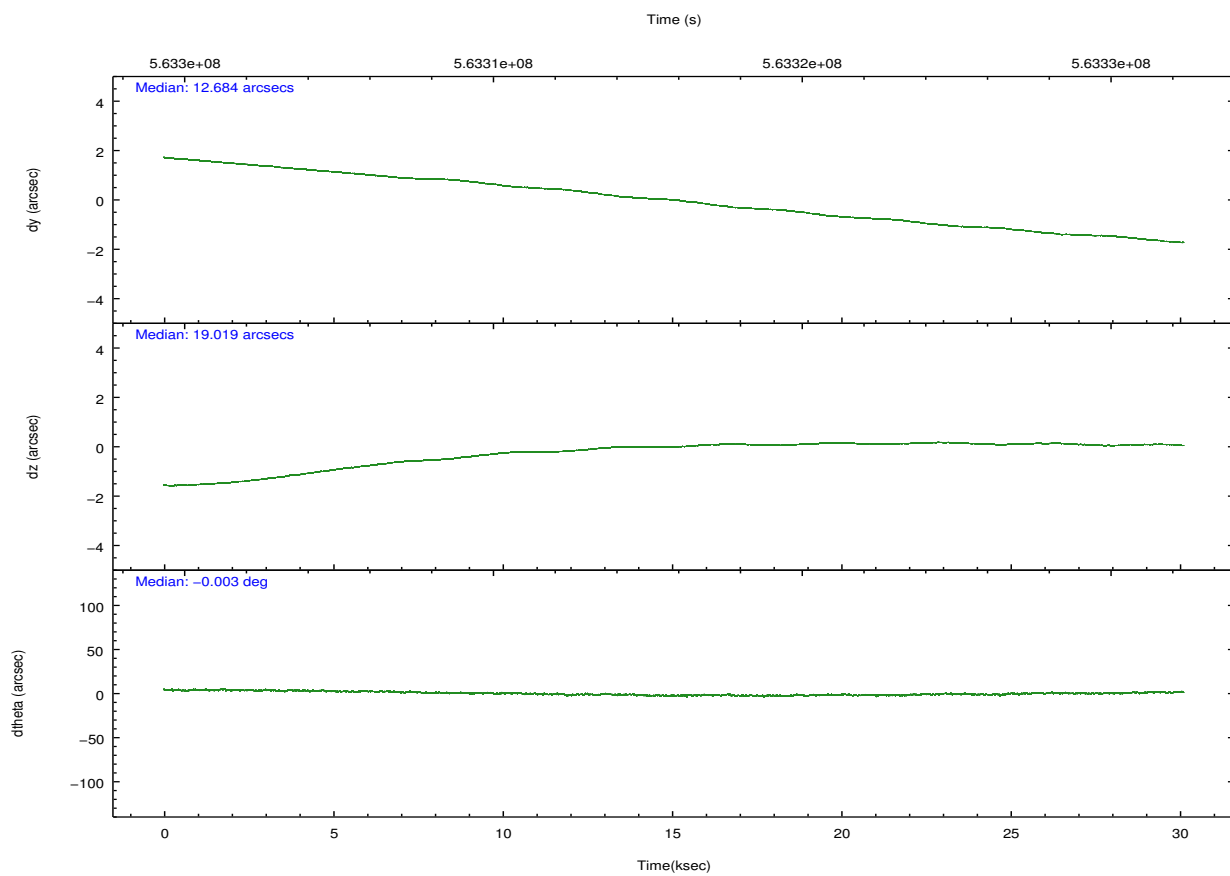
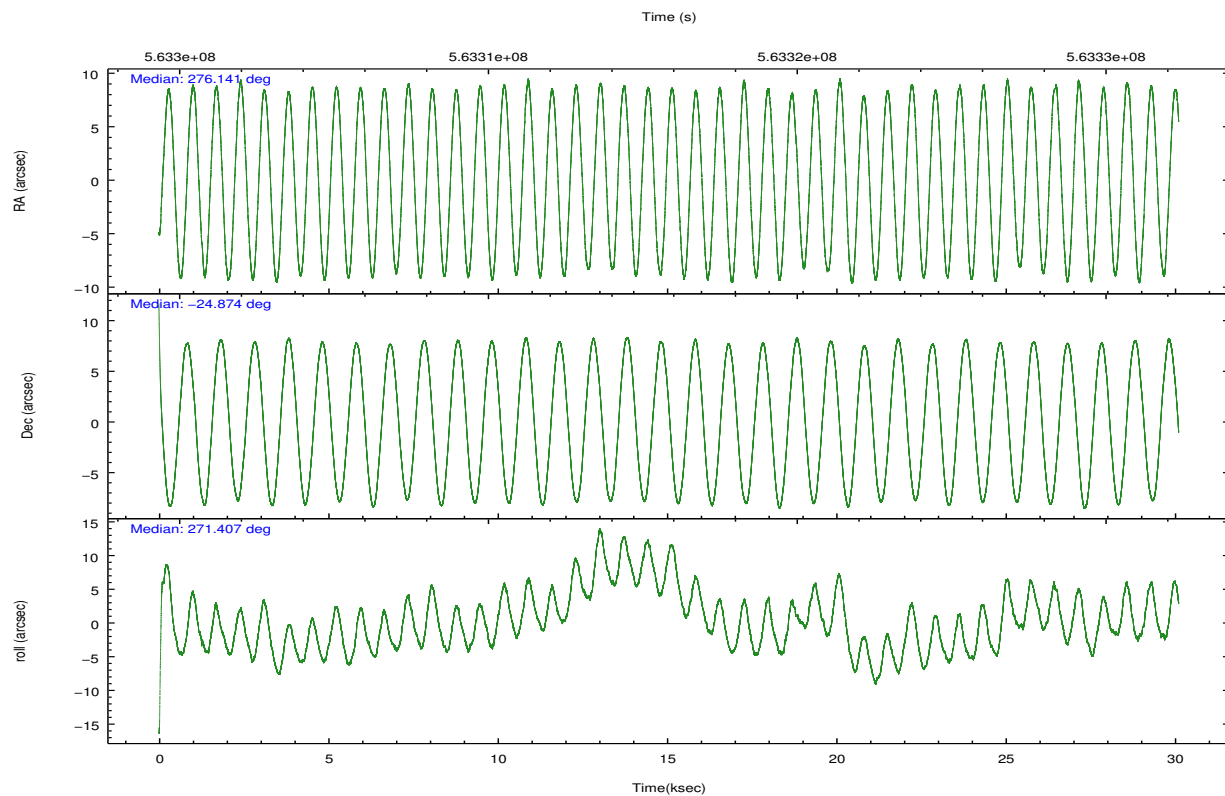
## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               |
|-----------------------------------|---------------------|----------------------|
| Instrument                        | ACIS                | ACIS                 |
| Detector                          | ACIS-235678         | ACIS-235678          |
| Grating                           | NONE                | NONE                 |
| Data mode                         | VFAINT              | VFAINT               |
| Observation mode                  | POINTING            | POINTING             |
| [deg] Pointing RA                 | 276.124859          | 276.1409794794434    |
| [deg] Pointing Dec                | -24.850739          | -24.87396625320694   |
| [deg] Pointing Roll               | 271.247000          | 271.4103953340268    |
| [mm] SIM focus pos                | -0.684267           | -0.6828225247311905  |
| [mm] SIM defocus                  | 0                   | 0.001444936568705701 |
| [mm] SIM translation stage pos    | -190.132523         | -190.1425803651734   |
| [mm] SIM translation stage offset | 0                   | 0.01005778216563158  |
| [s] Observation start time (MET)  | 563300892.184000    | 563299608.1863101    |
| Observation start date            | 2015-11-07T16:27:04 | 2015-11-07T16:06:48  |
| [s] Observation end time (MET)    | 563330892.184000    | 563331862.88814      |
| Observation end date              | 2015-11-08T00:47:04 | 2015-11-08T01:04:22  |
| 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                             | N         | N       |
| CCD I1 on                             | N         | N       |
| CCD I2 on                             | Y         | Y       |
| CCD I3 on                             | Y         | Y       |
| 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                             | 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  | 3.2     |

## 2.3 Aspect



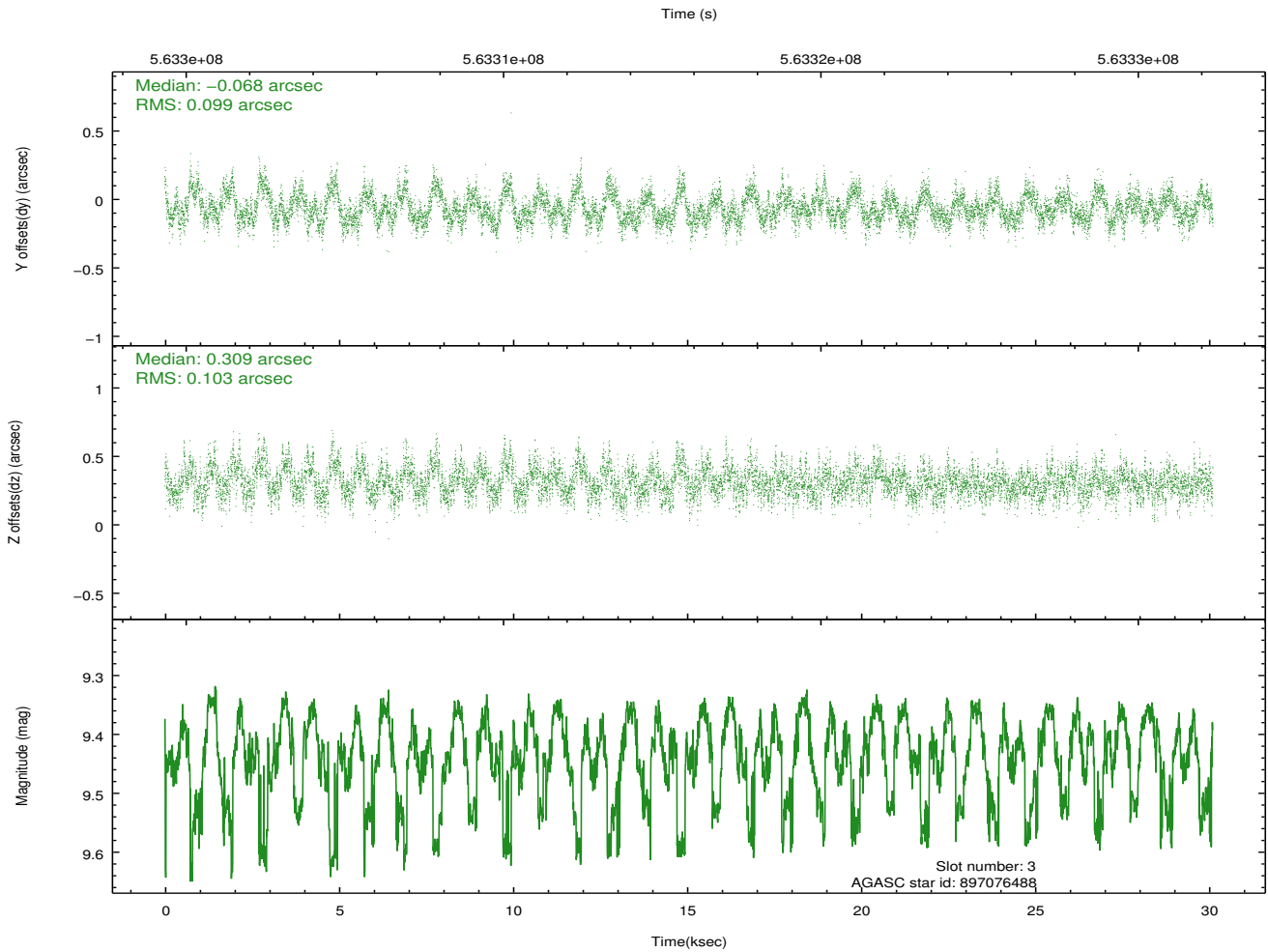
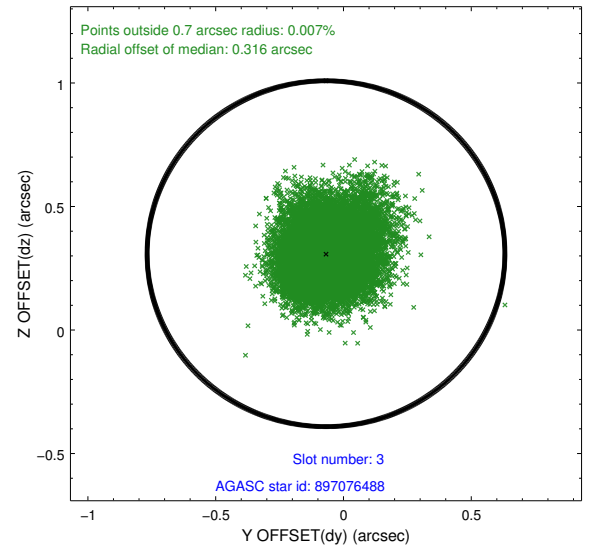
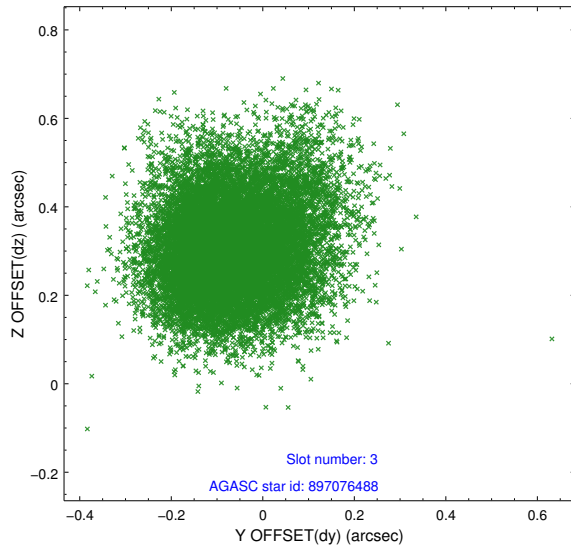


# Slot Statistics

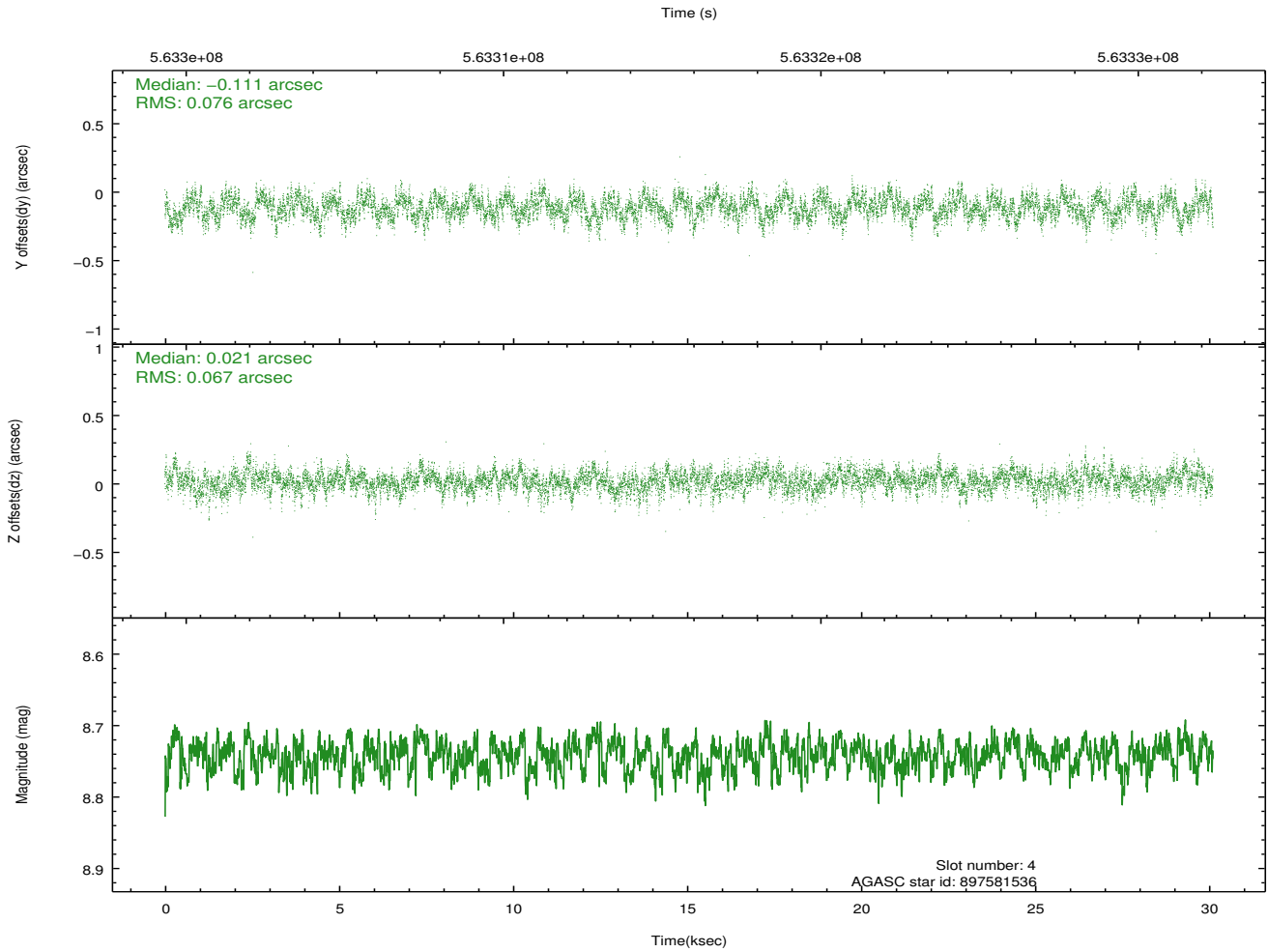
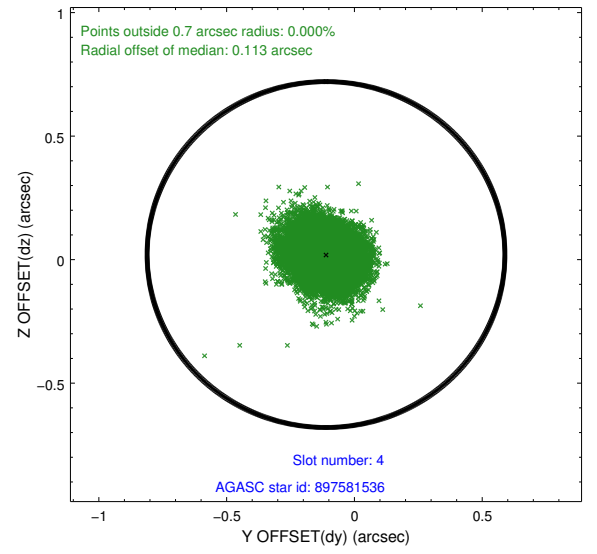
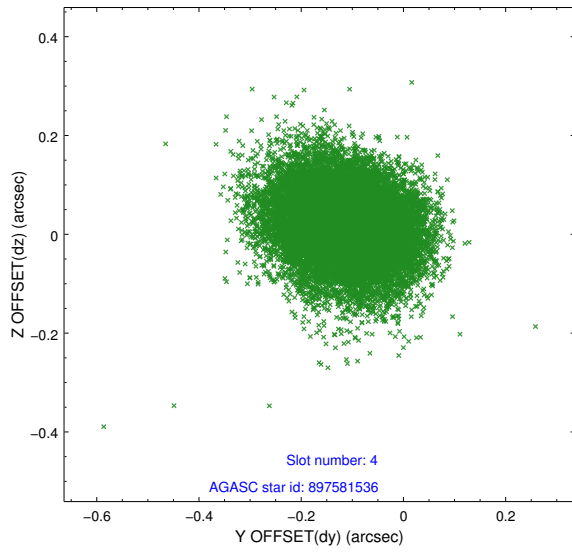
| slot | status | used | id        | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec        | mean_y   | mean_z   |
|------|--------|------|-----------|------|-------|--------|--------|-------|-------|------------|------------|----------|----------|
| 0    | FID    |      | ACIS-S-2  | 7.10 | 7344  | -0.209 | -0.134 | 0.031 | 0.054 | 0.000000   | 0.000000   | -765.80  | -1740.29 |
| 1    | FID    |      | ACIS-S-4  | 7.21 | 7344  | 0.248  | 0.115  | 0.025 | 0.040 | 0.000000   | 0.000000   | 2147.94  | 168.33   |
| 2    | FID    |      | ACIS-S-6  | 7.35 | 7344  | -0.064 | 0.027  | 0.015 | 0.025 | 0.000000   | 0.000000   | 396.46   | 805.74   |
| 3    | GUIDE  | used | 897076488 | 9.44 | 14674 | -0.068 | 0.309  | 0.151 | 0.248 | 275.884089 | -24.287832 | -2041.78 | -745.60  |
| 4    | GUIDE  | used | 897581536 | 8.74 | 14680 | -0.111 | 0.021  | 0.109 | 0.173 | 276.270189 | -24.414428 | -1559.55 | 510.54   |
| 5    | GUIDE  | used | 897585408 | 8.89 | 14689 | -0.014 | -0.214 | 0.114 | 0.183 | 276.128475 | -24.385394 | -1673.85 | 48.54    |
| 6    | GUIDE  | used | 897607632 | 8.98 | 14682 | 0.216  | -0.085 | 0.117 | 0.189 | 275.528210 | -25.239953 | 1363.75  | -1973.16 |
| 7    | GUIDE  | used | 899295912 | 9.13 | 14680 | -0.027 | -0.034 | 0.162 | 0.240 | 276.702891 | -25.456161 | 2224.39  | 1831.15  |

## 2.4 Star Slots

### 2.4.1 Slot 3

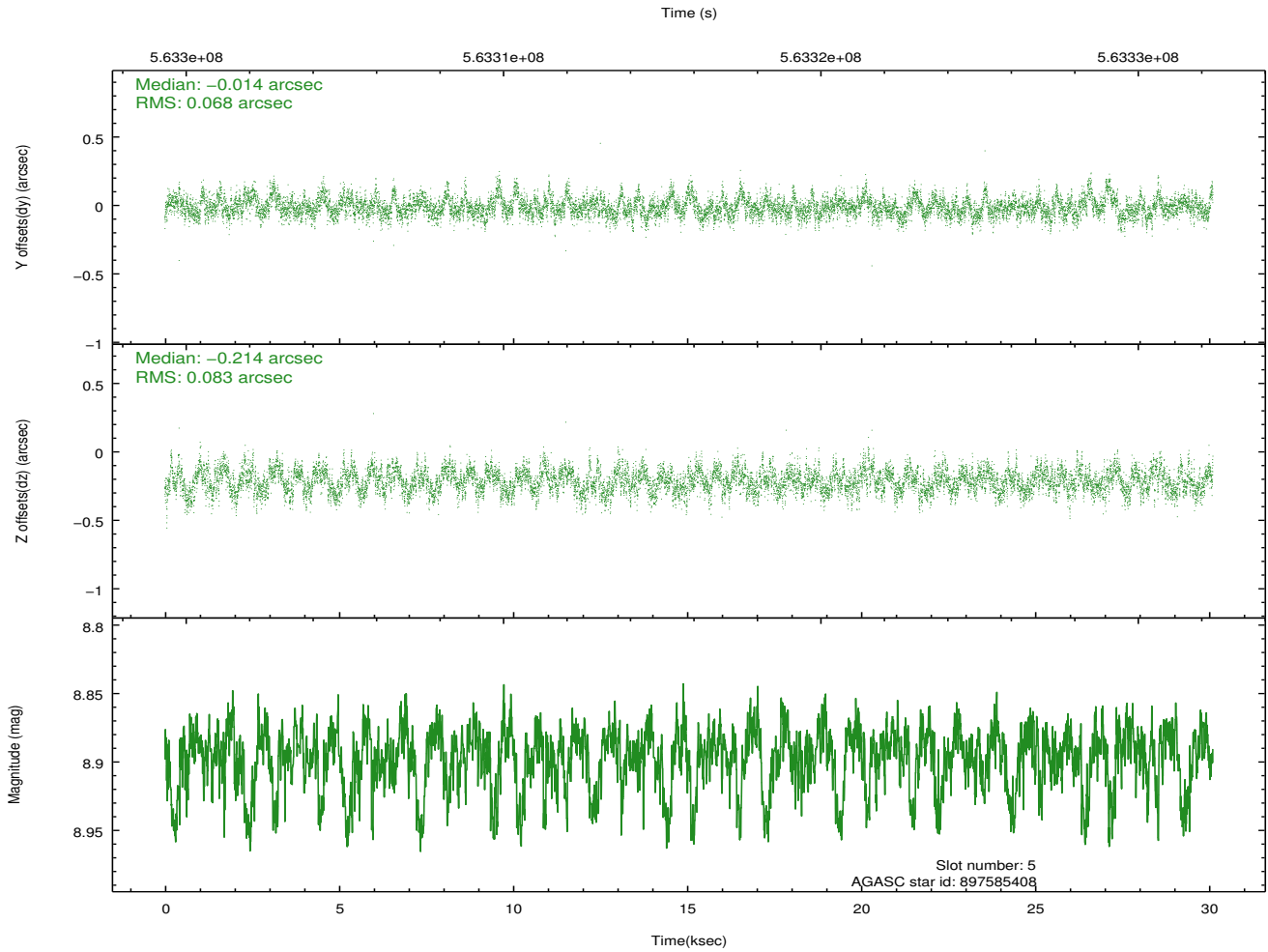
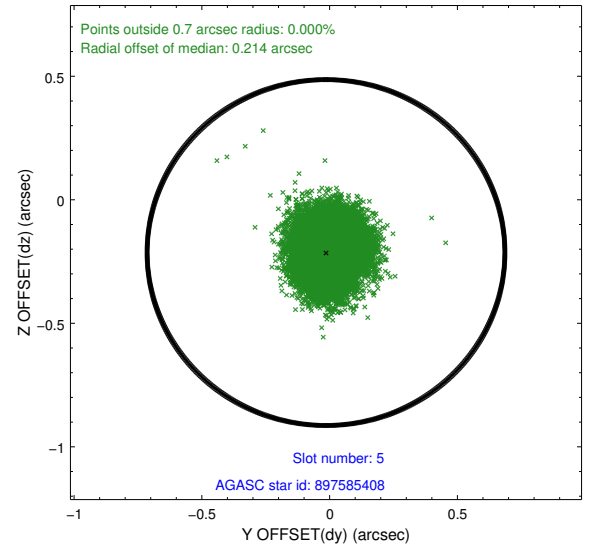
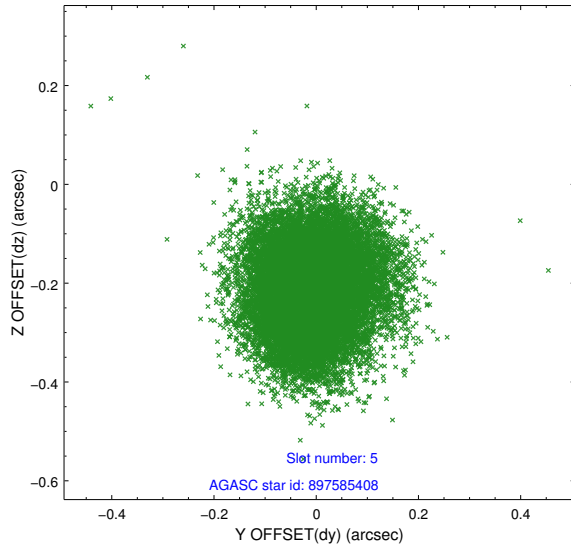


## 2.4.2 Slot 4

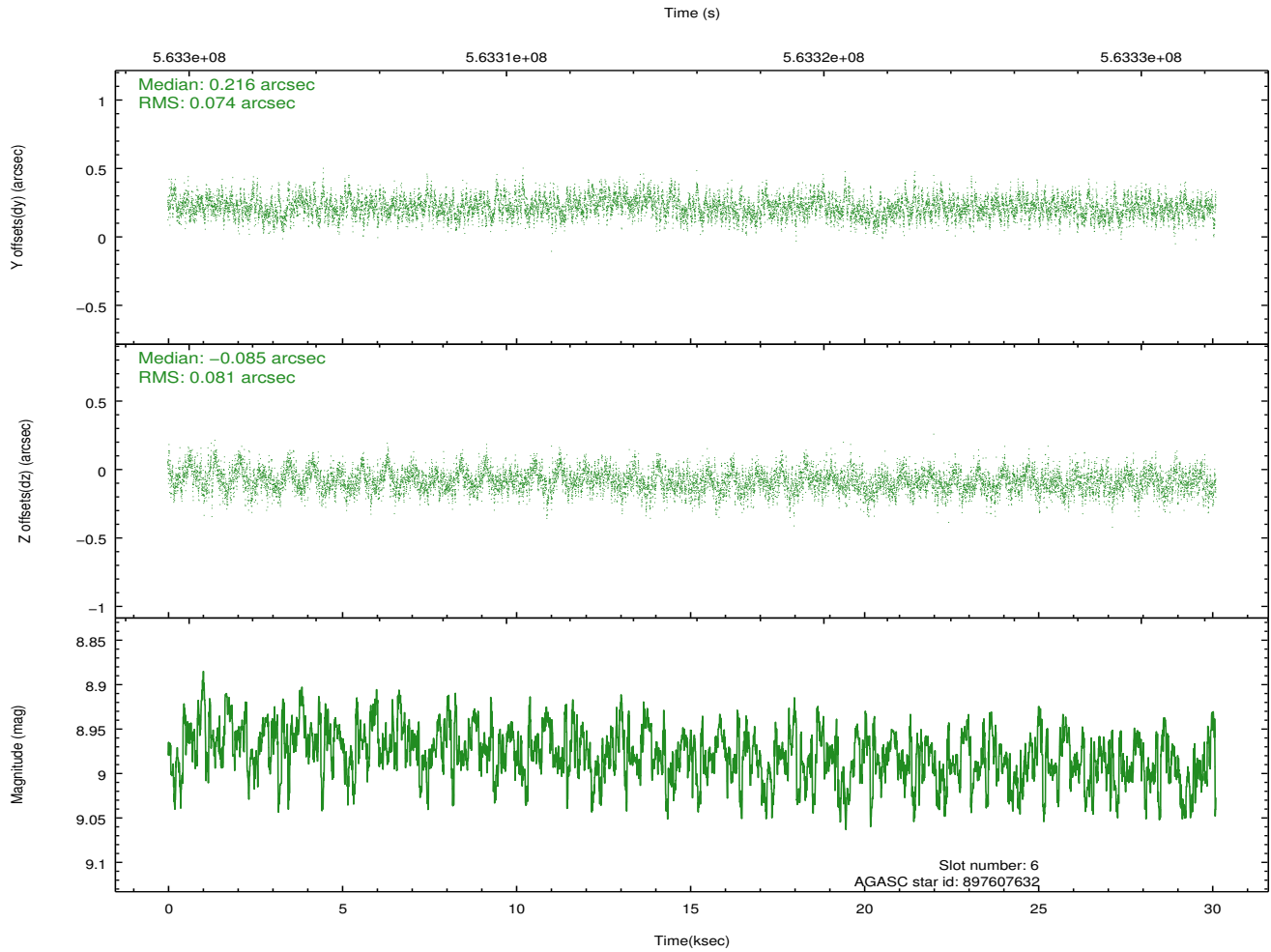
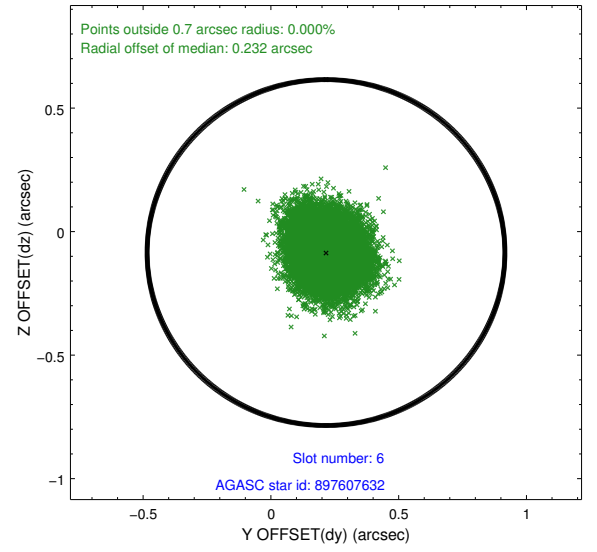
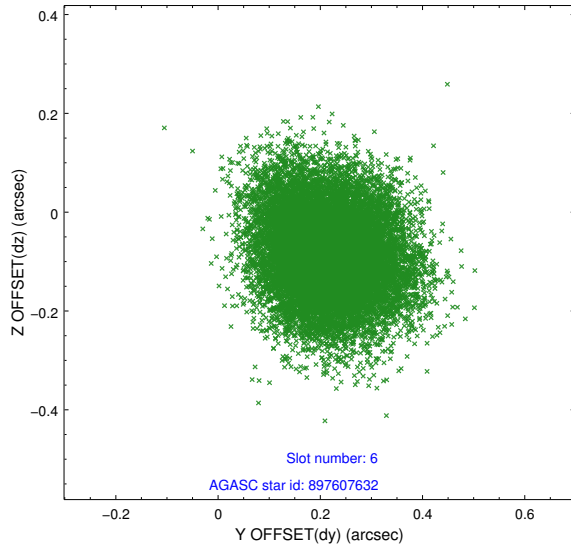




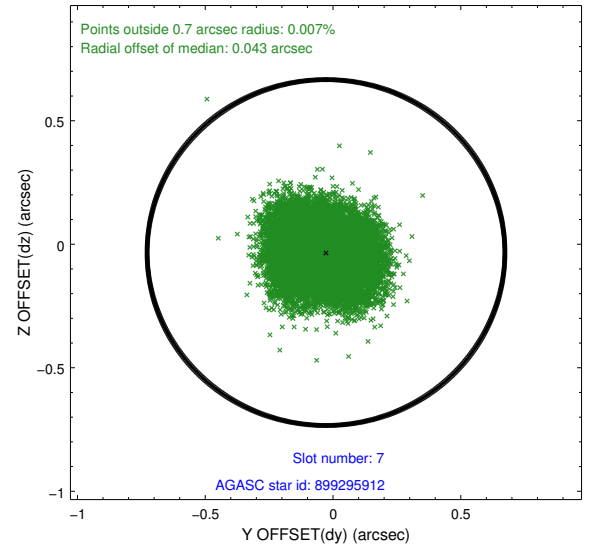
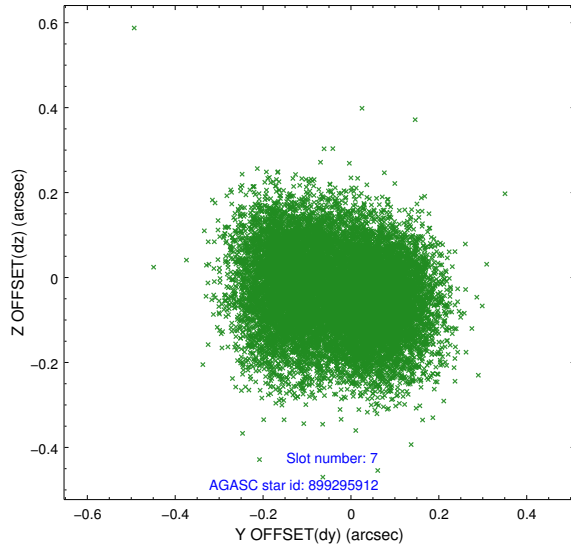
### 2.4.3 Slot 5



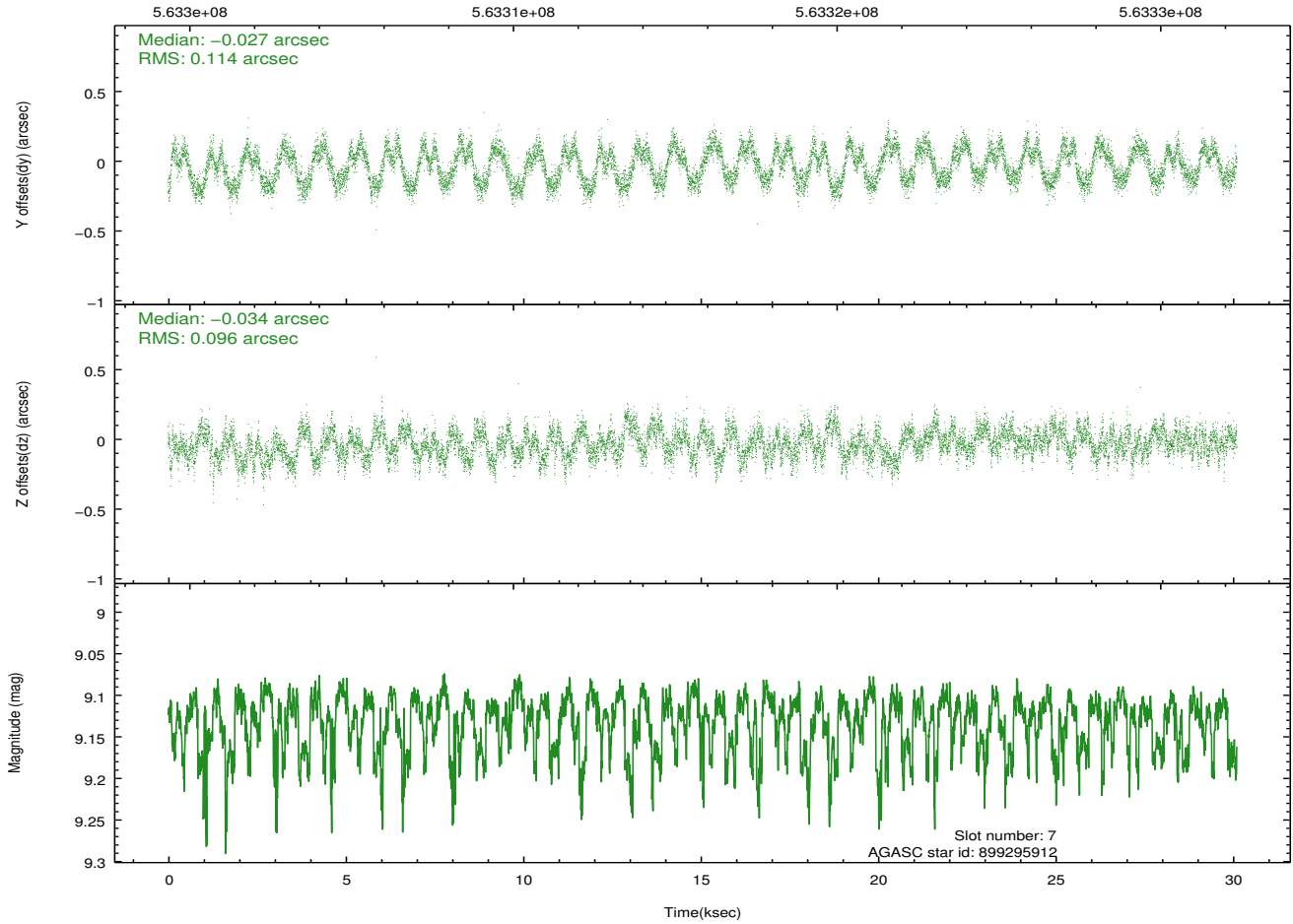
## 2.4.4 Slot 6



## 2.4.5 Slot 7

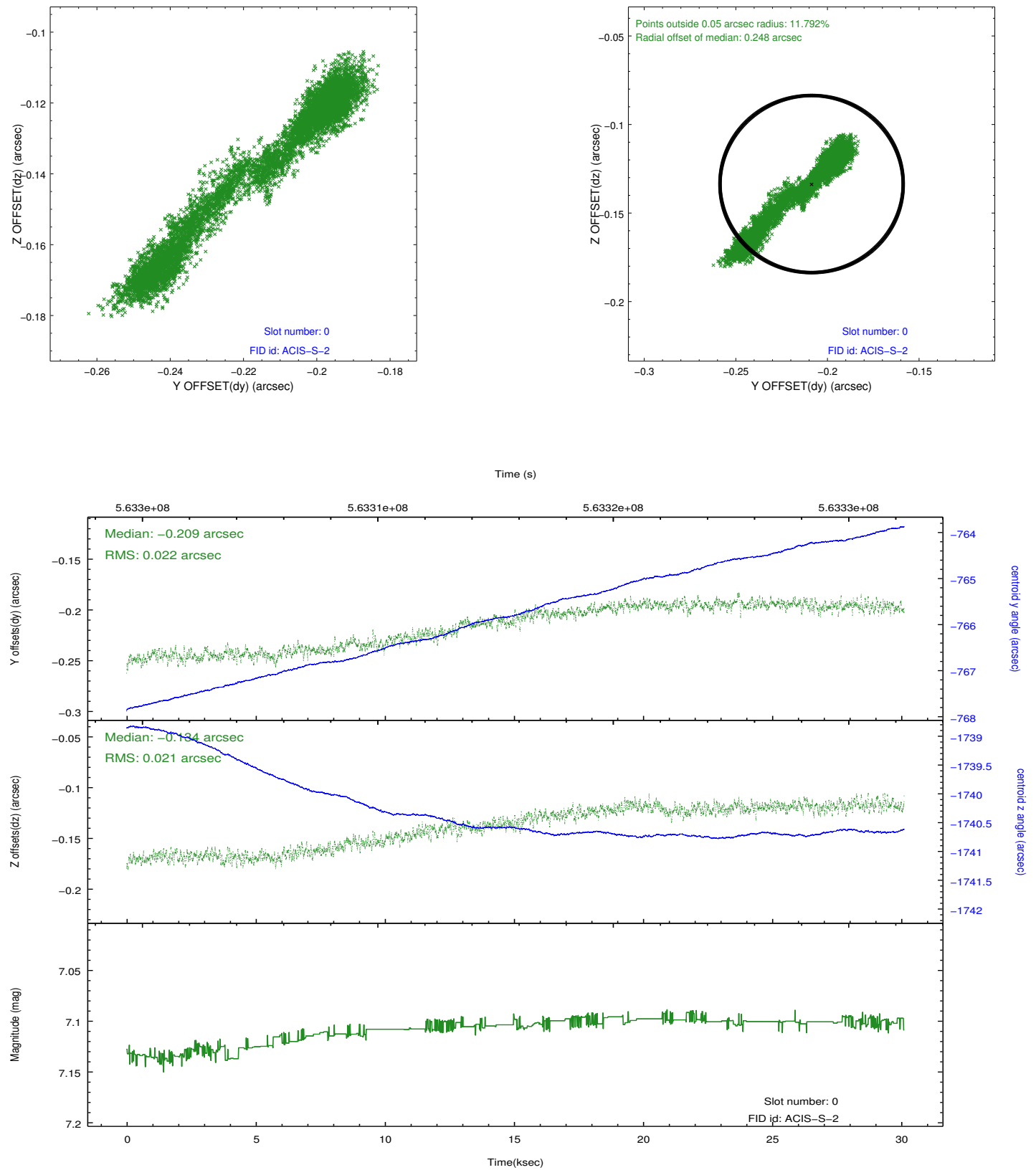


Time (s)

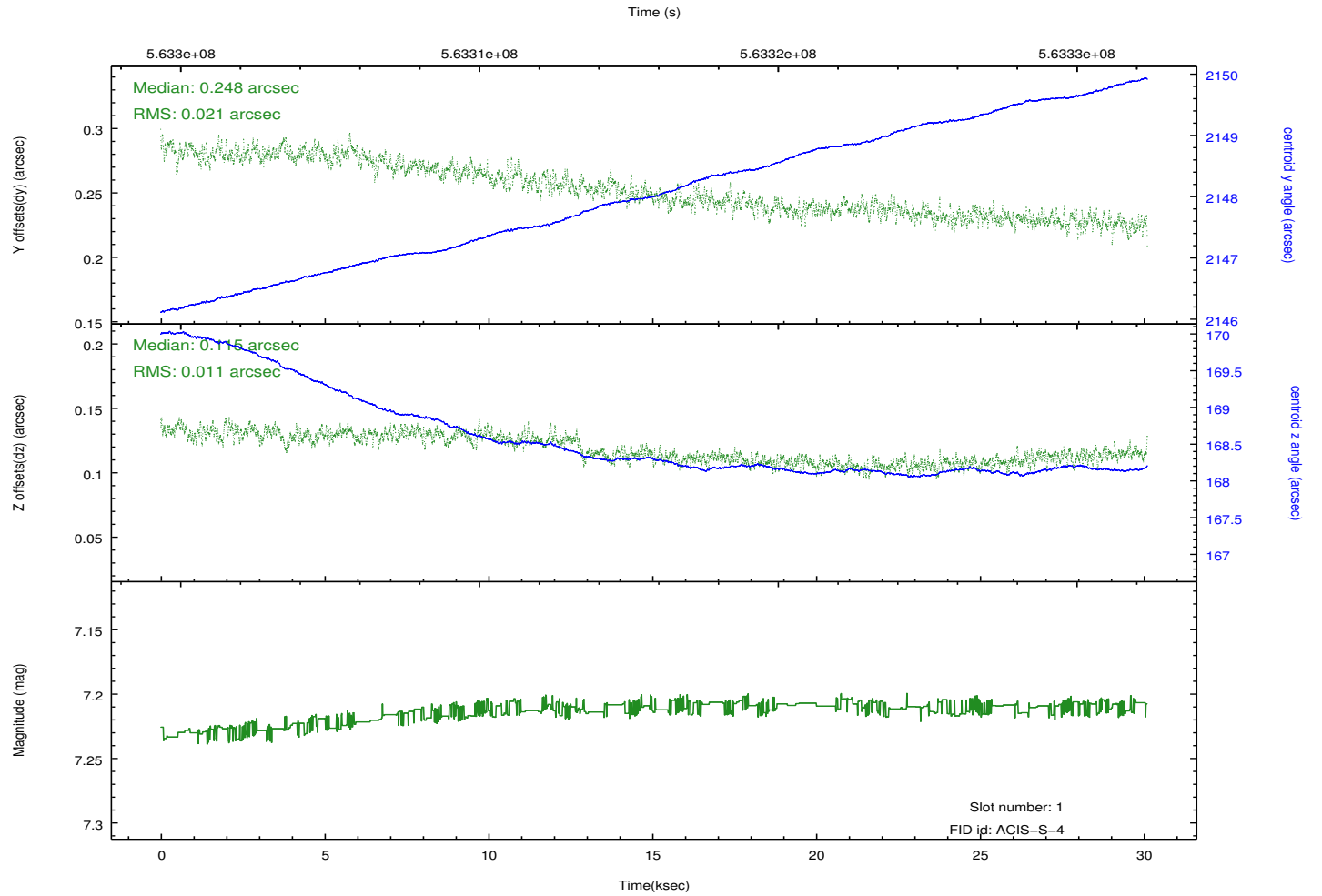
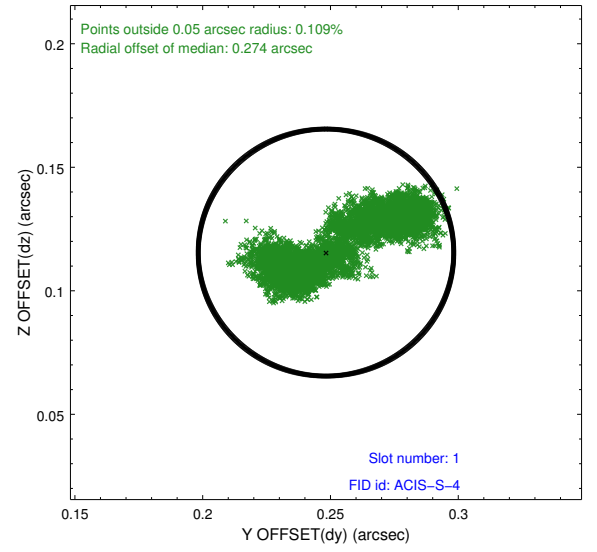
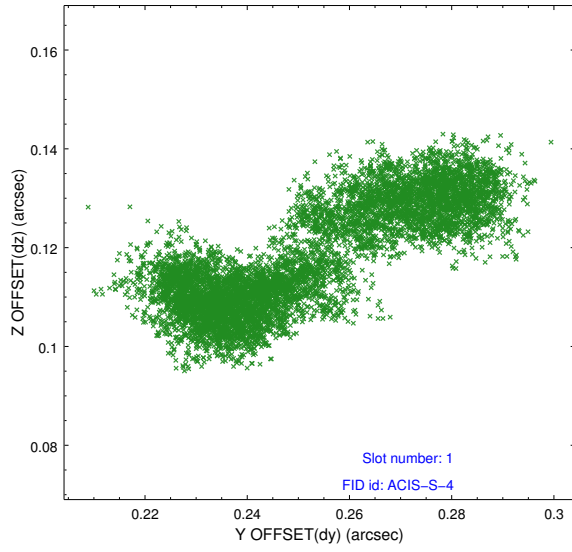


## 2.5 FID Slots

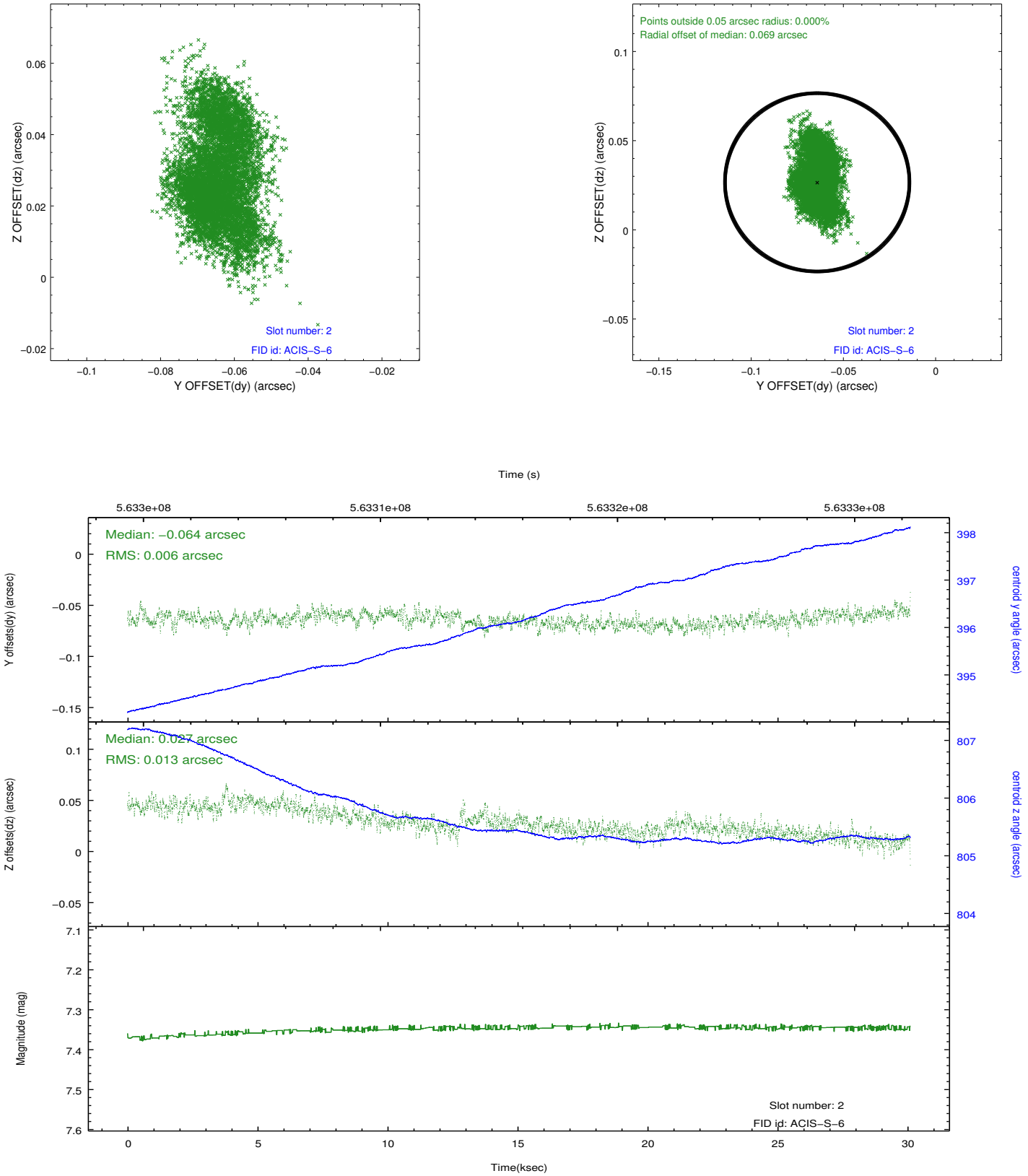
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2



## A Summary

### A.1 Status

|                            |                 |
|----------------------------|-----------------|
| V&V Scientist              | Joy Nichols     |
| V&V Date (YYYY-MM-DD)      | 2015.11.09      |
| V&V Edition                | 1               |
| V&V Disposition and Status | OK              |
| V&V Charge Time            | 29.945013906837 |

### A.2 Comments