

# V&V Reference Report

## L2 ASCDS Version : 8.4.3

Observation 12374 - L2 Version 2  
Chandra X-Ray Center

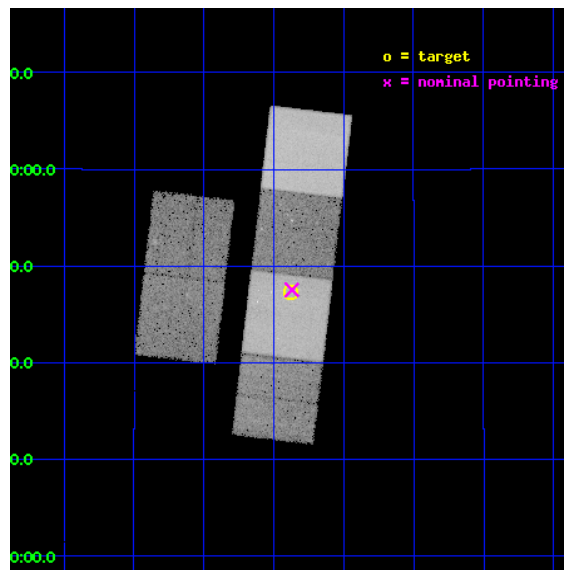
L2 Processing Date : Feb 8 2012

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# 1 Front

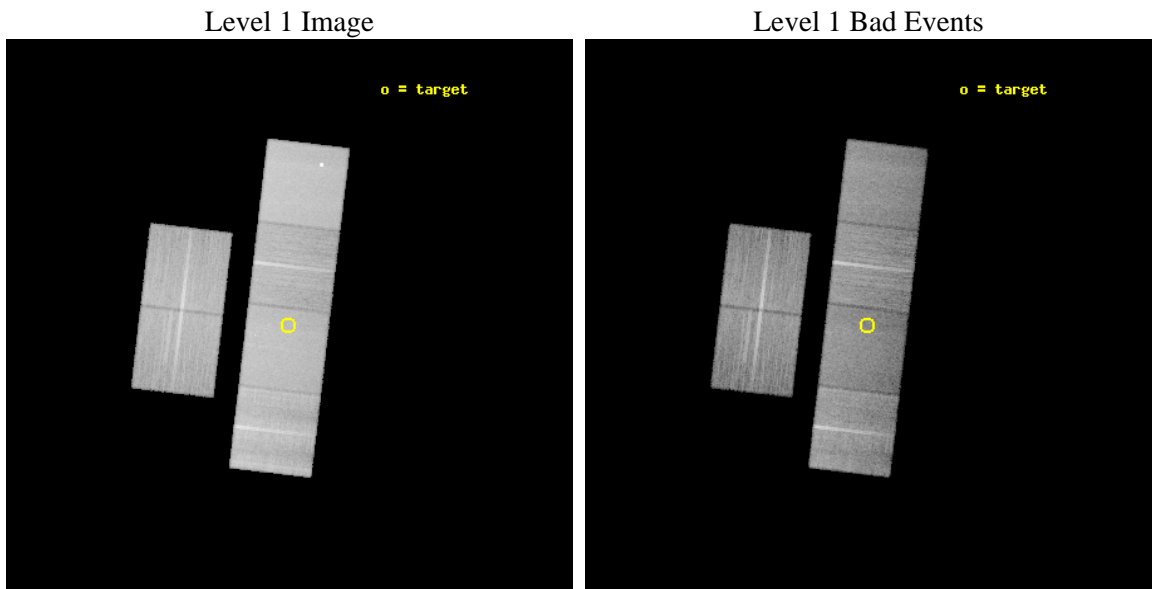
|          |   |   |
|----------|---|---|
| seq_num  | 200708  | Sequence number                             |
| obs_id   | 12374   | Observation id                              |
| title    | X-rays from Planetary Nebulae: Unveiling Binarity, Magnetic Fields, and Wind Collisions | Proposal title                              |
| observer | Dr. Joel Kastner  | Principal investigator                      |
| object   | NGC 7094  | Source name                                 |
| dtcycle  | 0   | &#160                                       |
| cycle    | P   | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 324.220833  | Observer's specified target RA [deg]        |
| dec_targ | 12.788611   | Observer's specified target Dec [deg]       |
| ra_nom   | 324.21775946509   | Nominal RA [deg]                            |
| dec_nom  | 12.792414428671   | Nominal Dec [deg]                           |
| roll_nom | 96.737047864327   | Nominal Roll [deg]                          |
| revision | 2   | Processing version of data                  |
| ontime   | 30053.692643881   | Sum of GTIs [s]                             |
| livetime | 29673.134691463   | Livetime [s]                                |
| ontime2  | 30050.492713571   | Sum of GTIs [s]                             |
| ontime3  | 30050.328533649   | Sum of GTIs [s]                             |
| ontime5  | 30053.651603878   | Sum of GTIs [s]                             |
| ontime6  | 30053.610563874   | Sum of GTIs [s]                             |
| ontime7  | 30053.692643881   | Sum of GTIs [s]                             |
| ontime8  | 30053.528483868   | Sum of GTIs [s]                             |
| l2events | 320525  | Number of level 2 events                    |



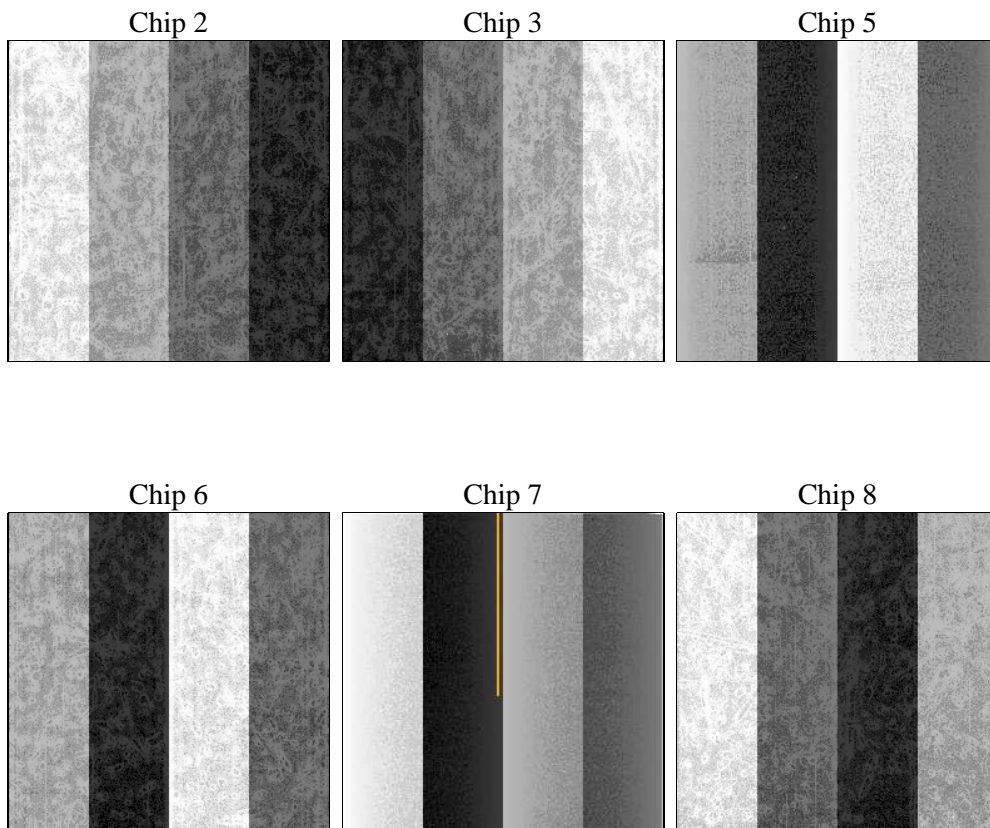
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |   |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 30000.000000    | [s] Scheduled observation exposure time |
| ascdsver | 8.4.3               | Processing system revision     | ontime         | 30053.692643881 | Sum of GTIs [s]                         |
| caldbver | 4.4.7               | &#160                          | ontime2        | 30050.492713571 | Sum of GTIs [s]                         |
| date     | 2012-02-08T22:58:28 | Date and time of file creation | ontime3        | 30050.328533649 | Sum of GTIs [s]                         |
| revision | 2                   | Processing version of data     | ontime5        | 30053.651603878 | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 30053.610563874 | Sum of GTIs [s]                         |
|          |                     |                                | ontime7        | 30053.692643881 | Sum of GTIs [s]                         |
|          |                     |                                | ontime8        | 30053.528483868 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 1361186         | Number of level 1 events                |

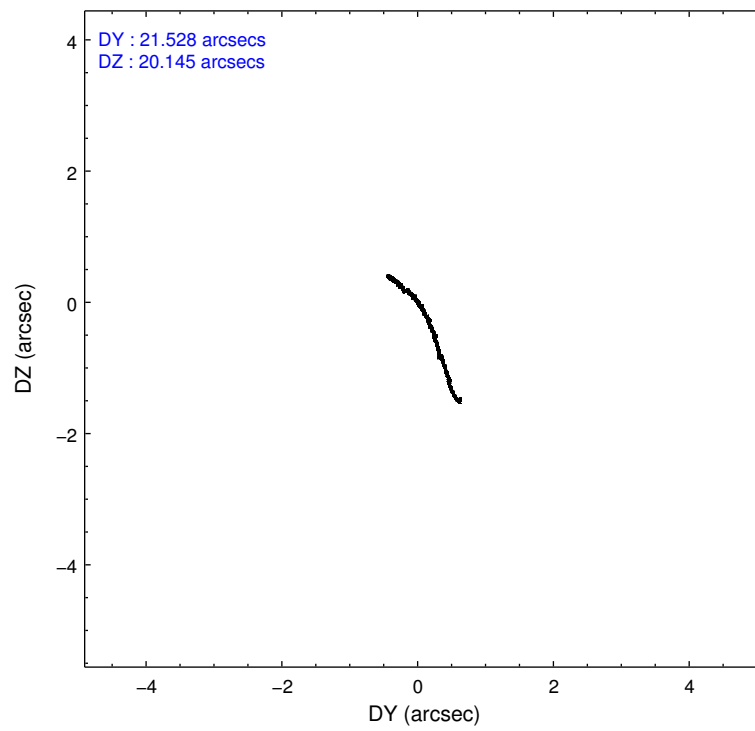
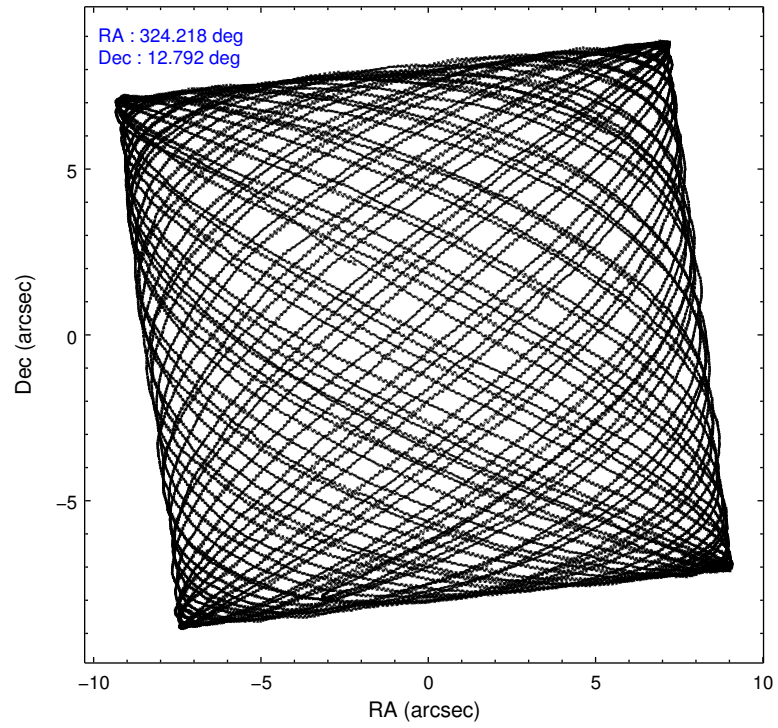
### 2.1.4 Events

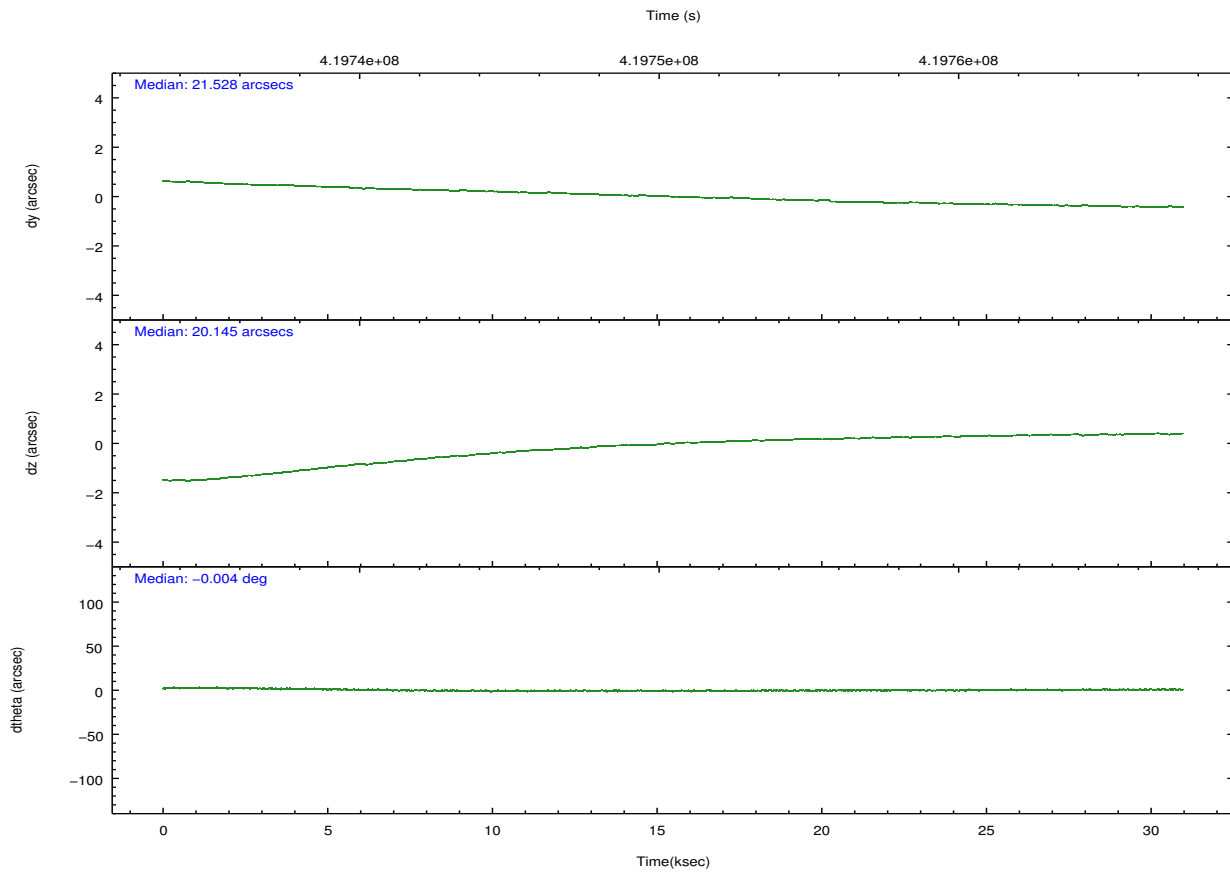
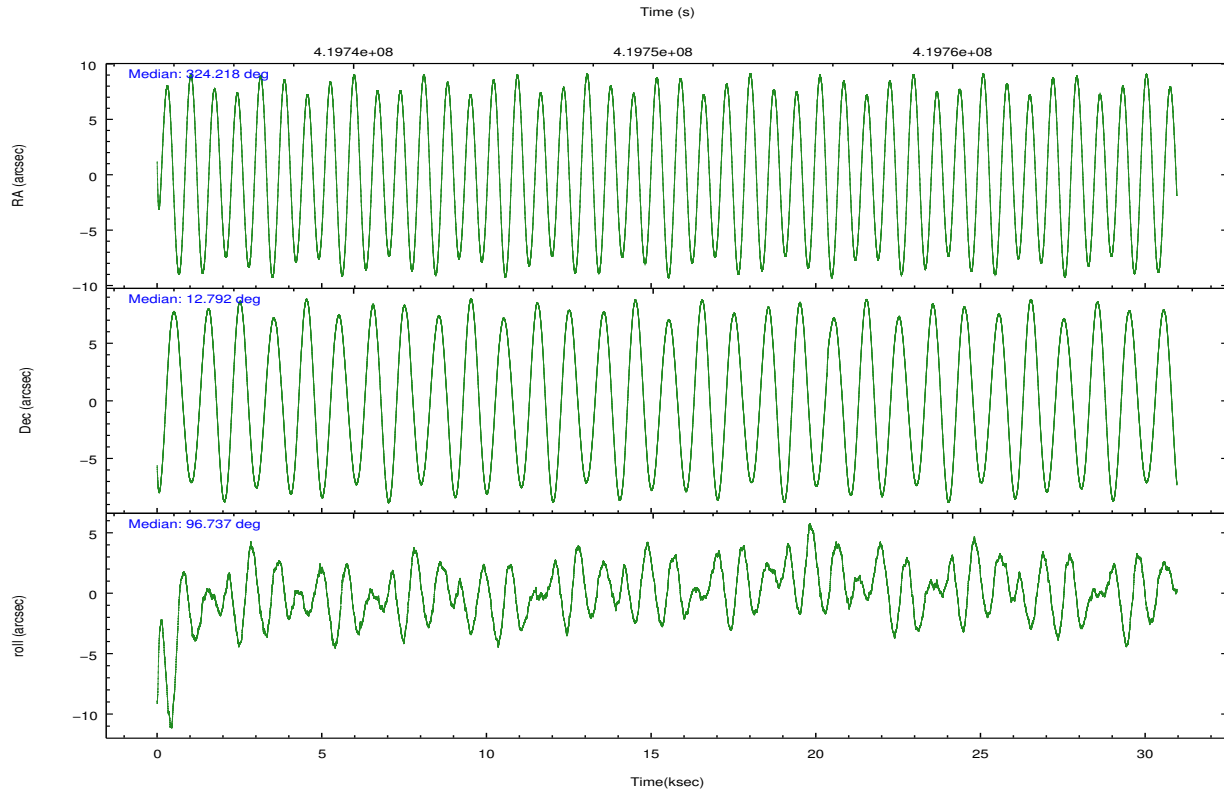
|                 | ccd 2  | ccd 3  | ccd 5  | ccd 6  | ccd 7  | ccd 8  |                | ccd 2  | ccd 3  | ccd 5  | ccd 6  | ccd 7  | ccd 8  |
|-----------------|--------|--------|--------|--------|--------|--------|----------------|--------|--------|--------|--------|--------|--------|
| level 1 events  | 196941 | 183324 | 294269 | 195194 | 241498 | 249960 | grade 0 events | 7465   | 6848   | 12193  | 7825   | 9973   | 20056  |
| rejected events | 176021 | 163649 | 150561 | 172895 | 133336 | 183258 |                | 3%     | 3%     | 4%     | 4%     | 4%     | 8%     |
| rejected %      | 89%    | 89%    | 51%    | 88%    | 55%    | 73%    | grade 1 events | 112    | 116    | 468    | 93     | 281    | 170    |
|                 |        |        |        |        |        |        |                | 0%     | 0%     | 0%     | 0%     | 0%     | 0%     |
|                 |        |        |        |        |        |        | grade 2 events | 5173   | 4372   | 43116  | 4971   | 22210  | 15477  |
|                 |        |        |        |        |        |        |                | 2%     | 2%     | 14%    | 2%     | 9%     | 6%     |
|                 |        |        |        |        |        |        | grade 3 events | 2072   | 2189   | 5623   | 2326   | 9556   | 7091   |
|                 |        |        |        |        |        |        |                | 1%     | 1%     | 1%     | 1%     | 3%     | 2%     |
|                 |        |        |        |        |        |        | grade 4 events | 2159   | 2161   | 5364   | 2227   | 9573   | 6450   |
|                 |        |        |        |        |        |        |                | 1%     | 1%     | 1%     | 1%     | 3%     | 2%     |
|                 |        |        |        |        |        |        | grade 5 events | 7739   | 9085   | 22871  | 9272   | 25458  | 12927  |
|                 |        |        |        |        |        |        |                | 3%     | 4%     | 7%     | 4%     | 10%    | 5%     |
|                 |        |        |        |        |        |        | grade 6 events | 4053   | 4110   | 77433  | 4952   | 56865  | 17637  |
|                 |        |        |        |        |        |        |                | 2%     | 2%     | 26%    | 2%     | 23%    | 7%     |
|                 |        |        |        |        |        |        | grade 7 events | 168168 | 154443 | 127201 | 163528 | 107582 | 170152 |
|                 |        |        |        |        |        |        |                | 85%    | 84%    | 43%    | 83%    | 44%    | 68%    |

## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                 | Obspar format version number          | 7         | 7       |
| Detector                          | ACIS-235678         | ACIS-235678          | Obspar file type                      | PREDICTED | ACTUAL  |
| Grating                           | NONE                | NONE                 | Obspar update status                  | NONE      | UPDATED |
| Data mode                         | VFAINT              | VFAINT               | CCD I0 on                             | N         | N       |
| Observation mode                  | POINTING            | POINTING             | CCD I1 on                             | N         | N       |
| [deg] Pointing RA                 | 324.234817          | 324.2177594650886    | CCD I2 on                             | O4        | Y       |
| [deg] Pointing Dec                | 12.770719           | 12.79241442867124    | CCD I3 on                             | O5        | Y       |
| [deg] Pointing Roll               | 96.576649           | 96.73704786432734    | CCD S0 on                             | N         | N       |
| [mm] SIM focus pos                | -0.684267           | -0.6828225247311905  | CCD S1 on                             | O3        | Y       |
| [mm] SIM defocus                  | 0                   | 0.001444936568705701 | CCD S2 on                             | O1        | Y       |
| [mm] SIM translation stage pos    | -190.132523         | -190.1400660498719   | CCD S3 on                             | Y         | Y       |
| [mm] SIM translation stage offset | 0                   | 0.00754346686406393  | CCD S4 on                             | O2        | Y       |
| [s] Observation start time (MET)  | 419735941.184000    | 419733948.41477      | CCD S5 on                             | N         | N       |
| Observation start date            | 2011-04-21T01:17:55 | 2011-04-21T00:45:48  | Number of optional ACIS chips dropped | 0         | 0       |
| [s] Observation end time (MET)    | 419765941.184000    | 419766949.31648      | On-chip summing requested             | N         | N       |
| Observation end date              | 2011-04-21T09:37:55 | 2011-04-21T09:55:49  | Subarray requested                    | NONE      | NONE    |
| Read mode                         | TIMED               | TIMED                | Alternating exposures requested       | N         | N       |
|                                   |                     |                      | [s] Primary exposure time             | 0.000000  | 3.2     |

## 2.3 Aspect



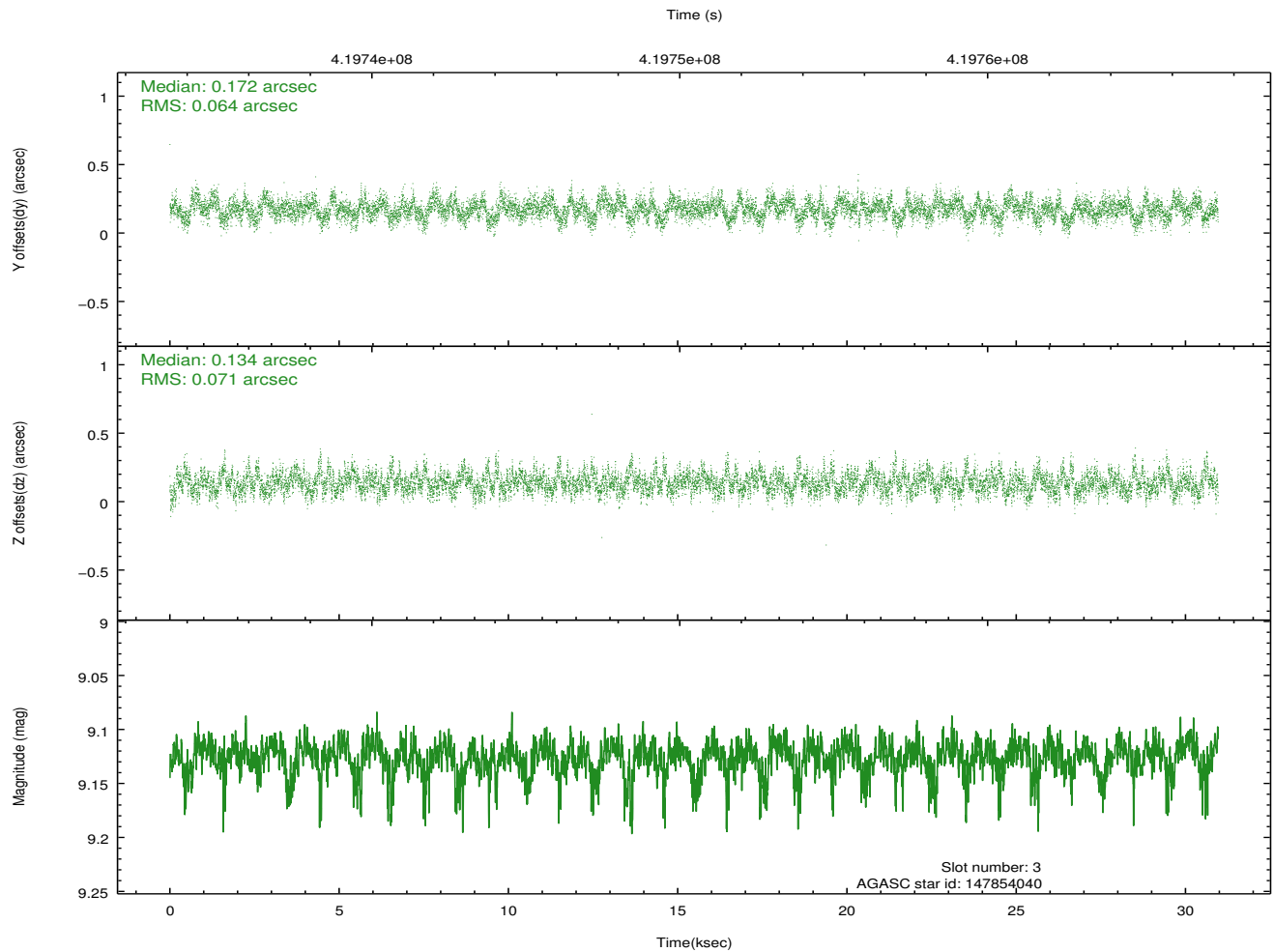
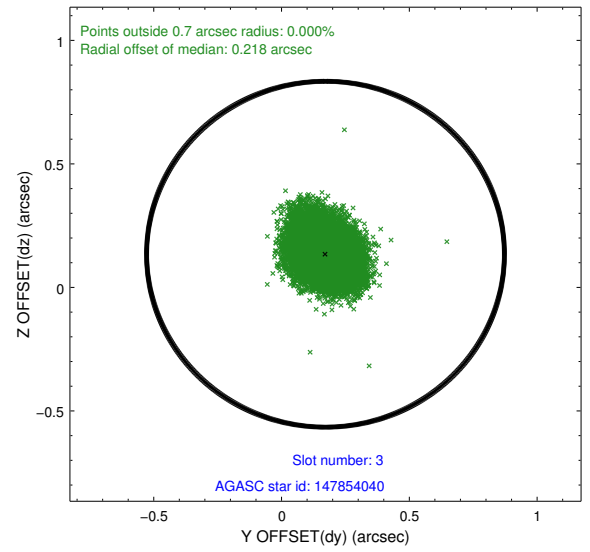
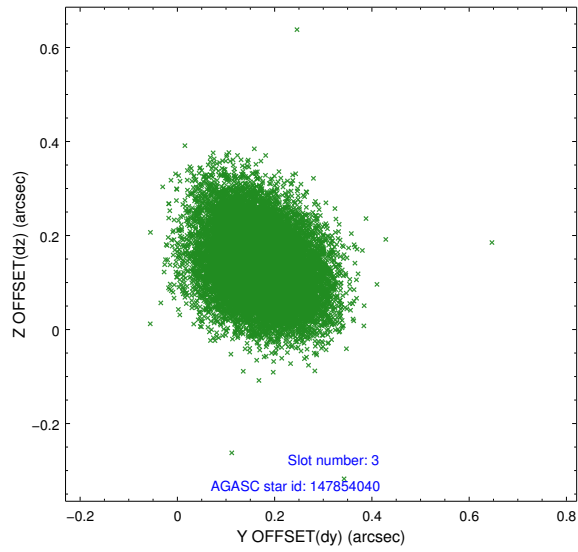


### Slot Statistics

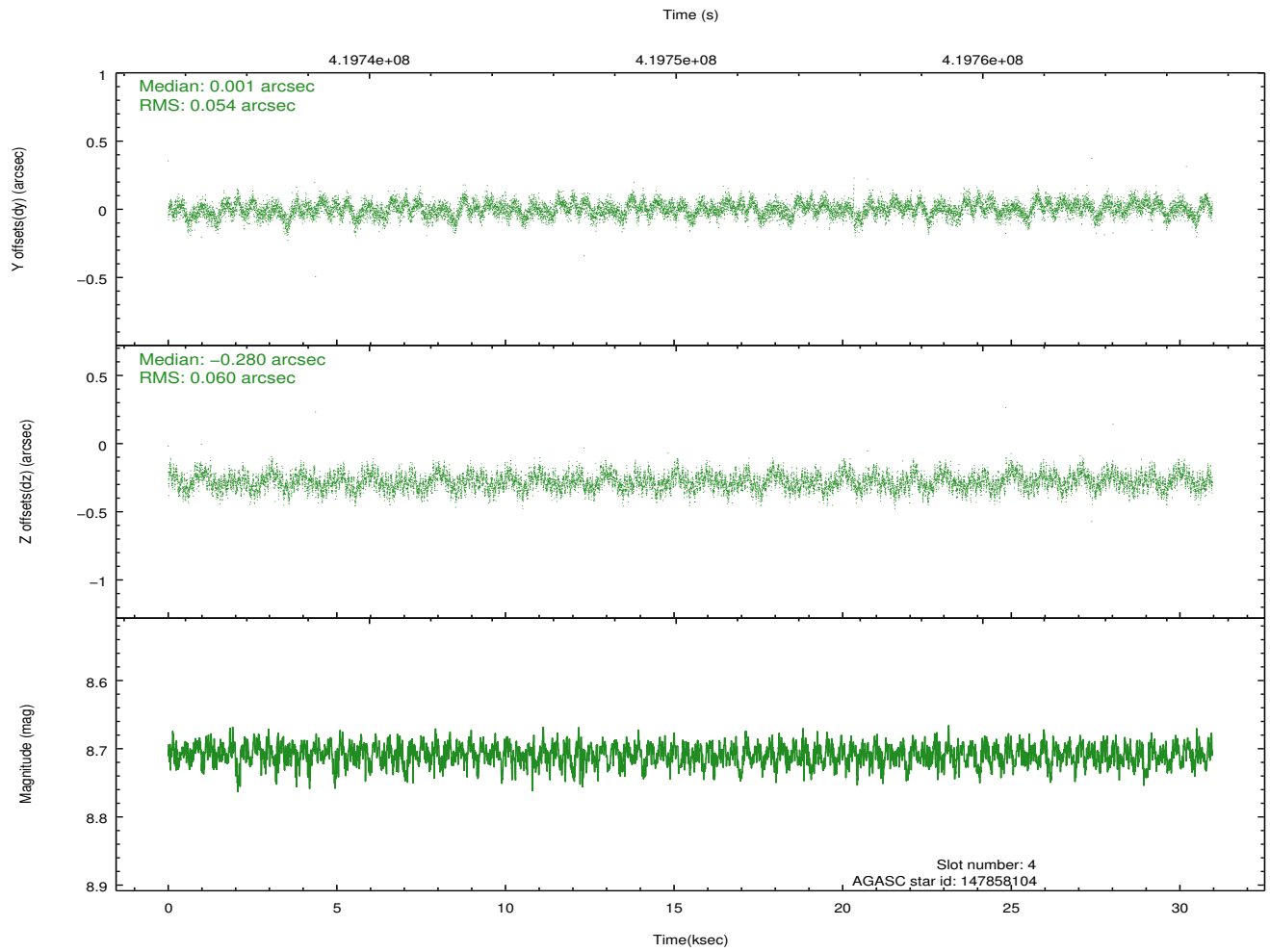
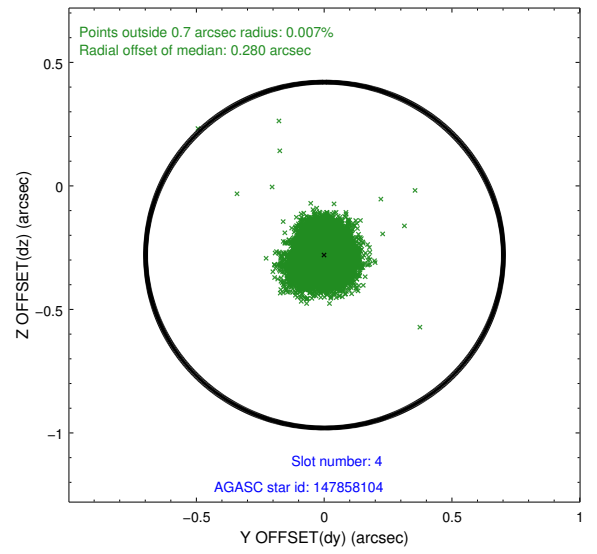
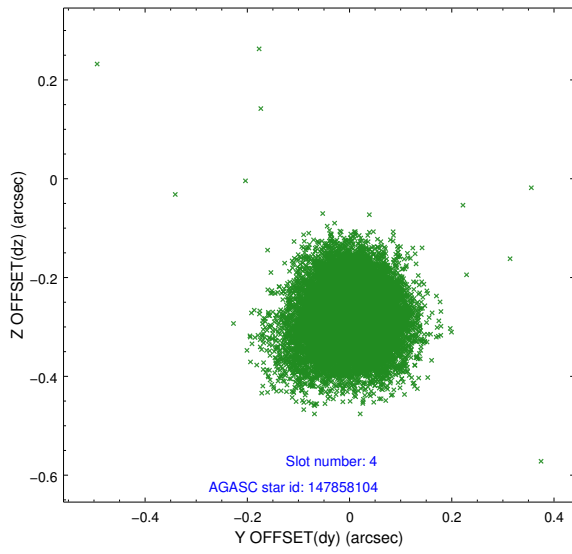
| slot | status | id        | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec       | mean_y   | mean_z   |
|------|--------|-----------|------|-------|--------|--------|-------|-------|------------|-----------|----------|----------|
| 0    | FID    | ACIS-S-2  | 6.91 | 7552  | -0.100 | -0.015 | 0.013 | 0.039 | 0.000000   | 0.000000  | -774.79  | -1741.45 |
| 1    | FID    | ACIS-S-4  | 6.99 | 7552  | 0.198  | 0.052  | 0.012 | 0.021 | 0.000000   | 0.000000  | 2138.75  | 167.04   |
| 2    | FID    | ACIS-S-5  | 7.02 | 7550  | -0.127 | -0.029 | 0.018 | 0.055 | 0.000000   | 0.000000  | -1827.59 | 160.70   |
| 3    | GUIDE  | 147854040 | 9.13 | 15096 | 0.172  | 0.134  | 0.102 | 0.165 | 324.491562 | 12.333895 | -1665.01 | -716.37  |
| 4    | GUIDE  | 147858104 | 8.71 | 15102 | 0.001  | -0.280 | 0.087 | 0.138 | 324.066845 | 12.591427 | -573.36  | 660.14   |
| 5    | GUIDE  | 147861048 | 8.14 | 15101 | 0.171  | 0.199  | 0.078 | 0.123 | 324.638280 | 12.237867 | -2067.07 | -1189.84 |
| 6    | GUIDE  | 148387872 | 9.60 | 15055 | -0.247 | 0.016  | 0.129 | 0.209 | 324.292655 | 13.341798 | 2018.95  | -436.53  |
| 7    | GUIDE  | 147863712 | 9.35 | 15013 | -0.094 | -0.068 | 0.095 | 0.160 | 324.073426 | 12.129278 | -2228.53 | 828.99   |

## 2.4 Star Slots

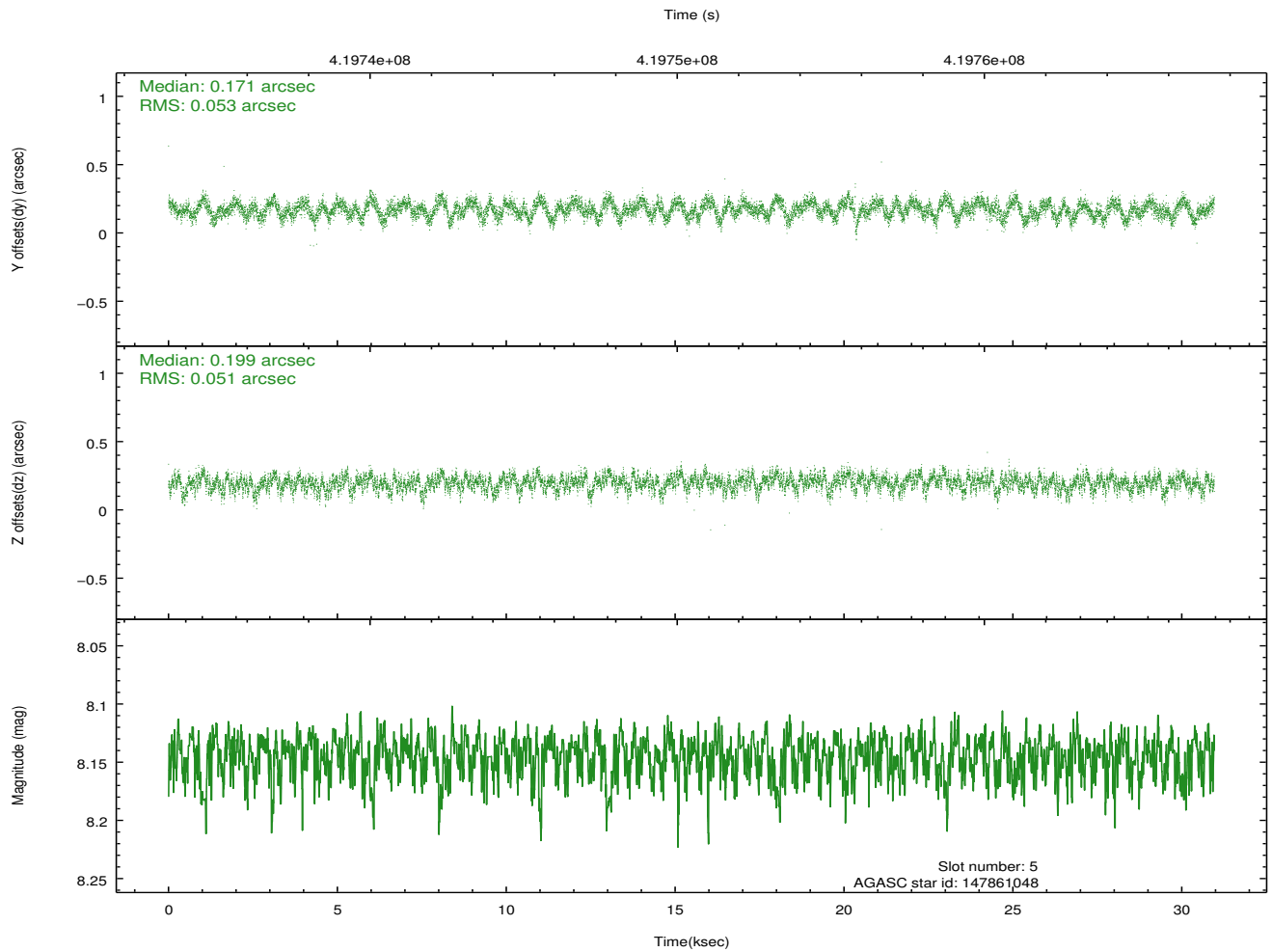
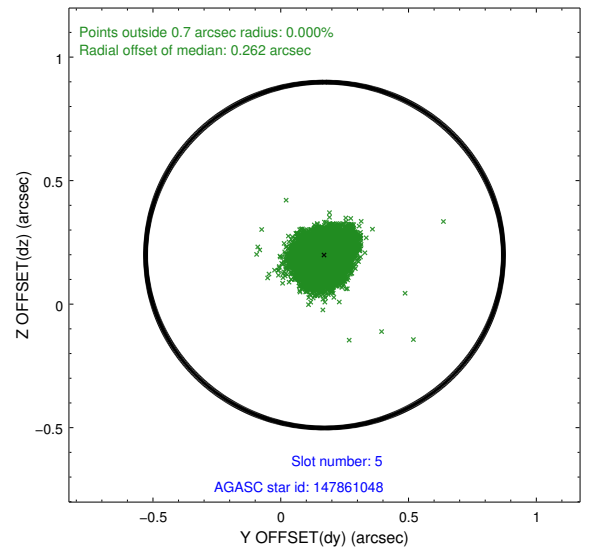
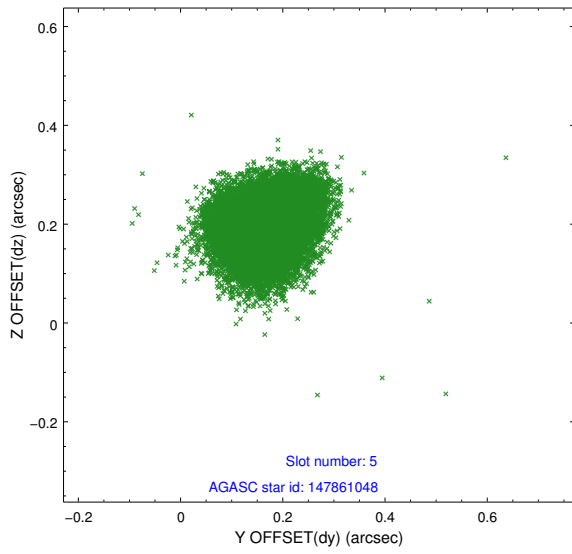
### 2.4.1 Slot 3



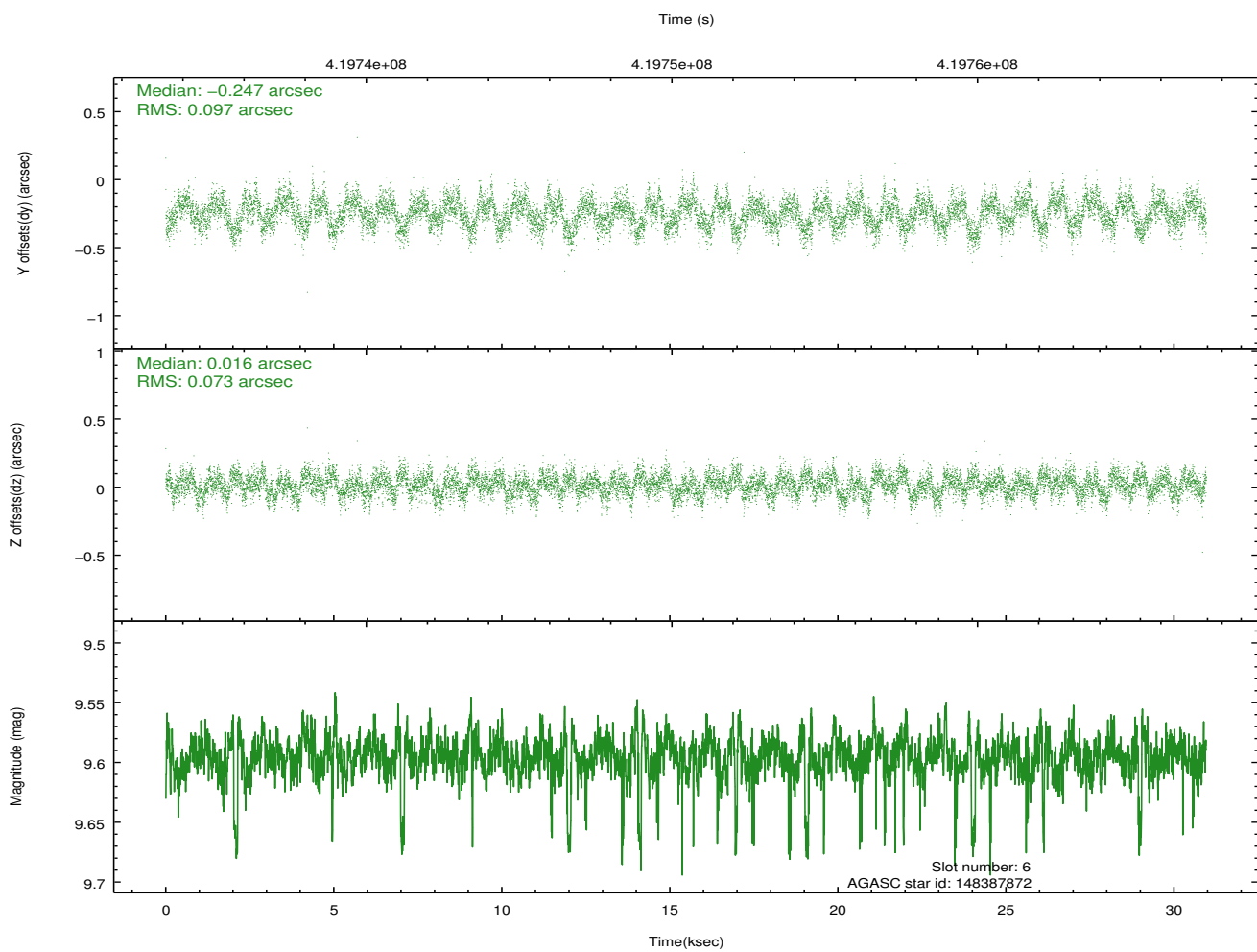
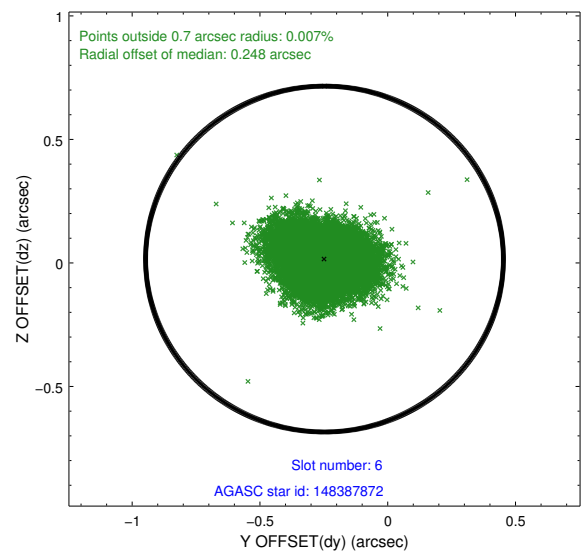
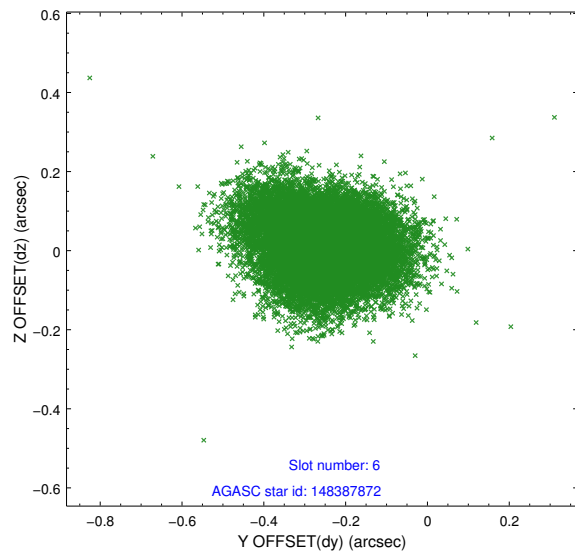
### 2.4.2 Slot 4



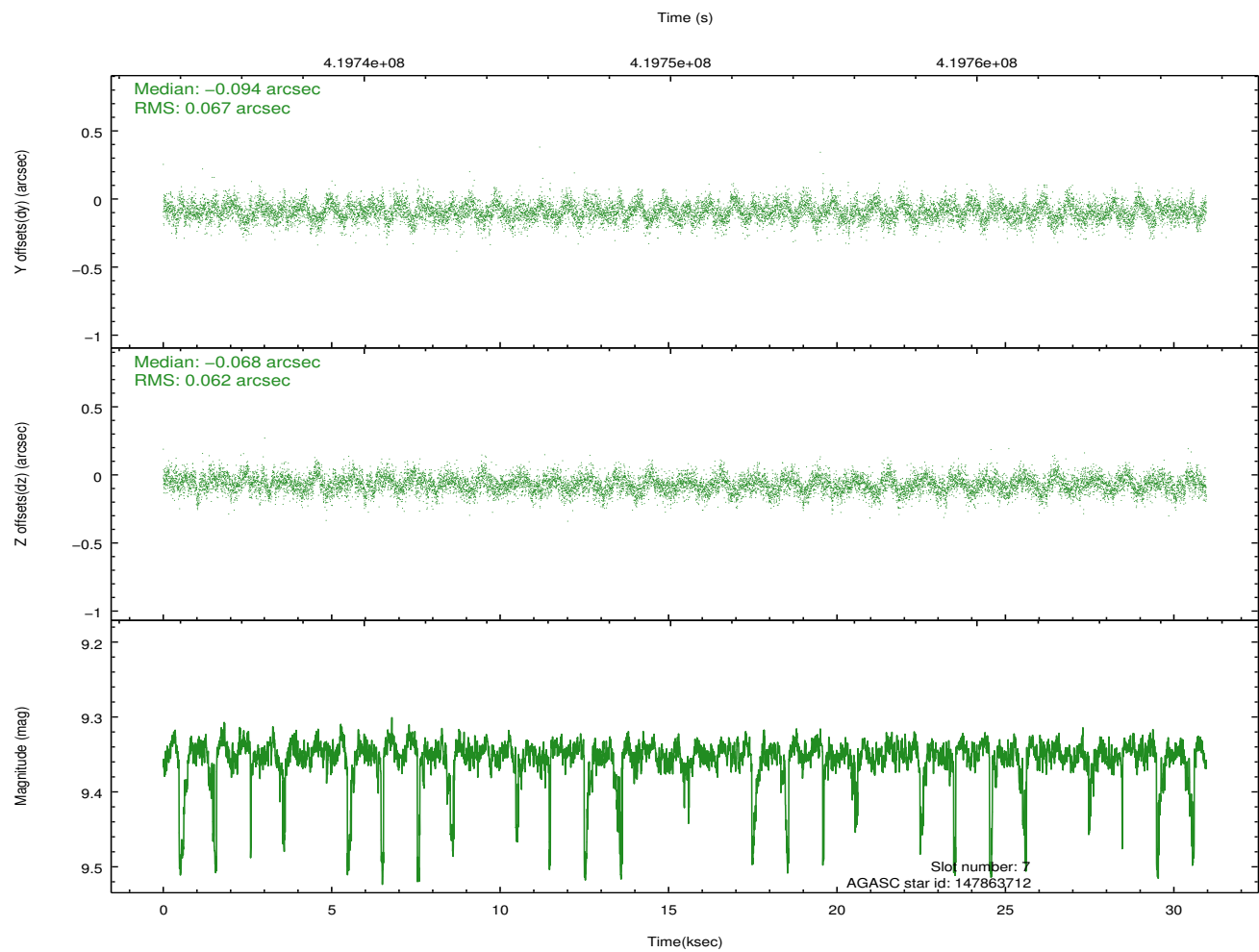
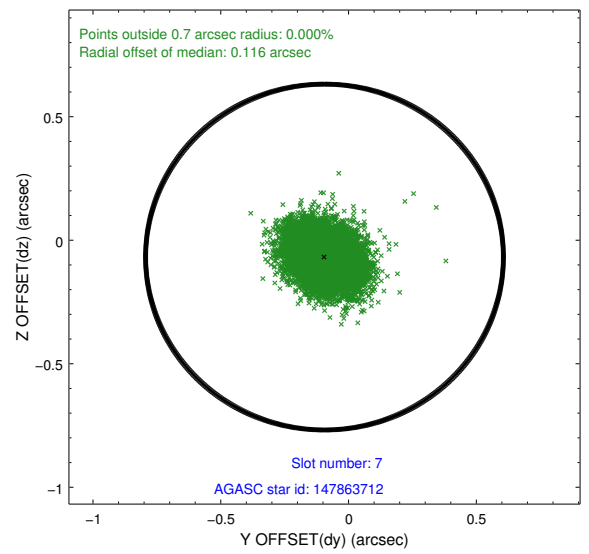
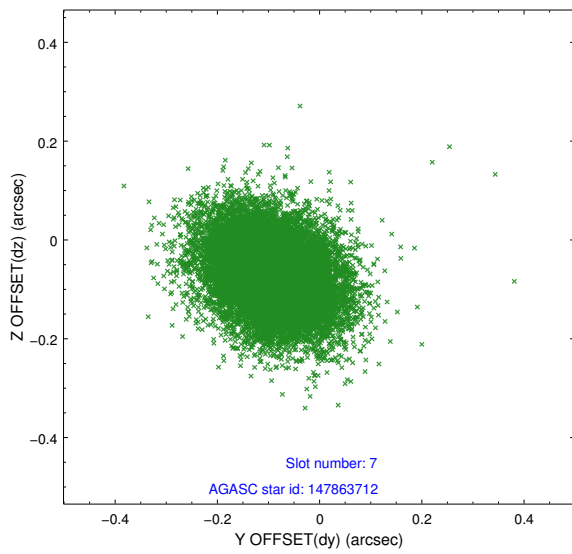
### 2.4.3 Slot 5



## 2.4.4 Slot 6

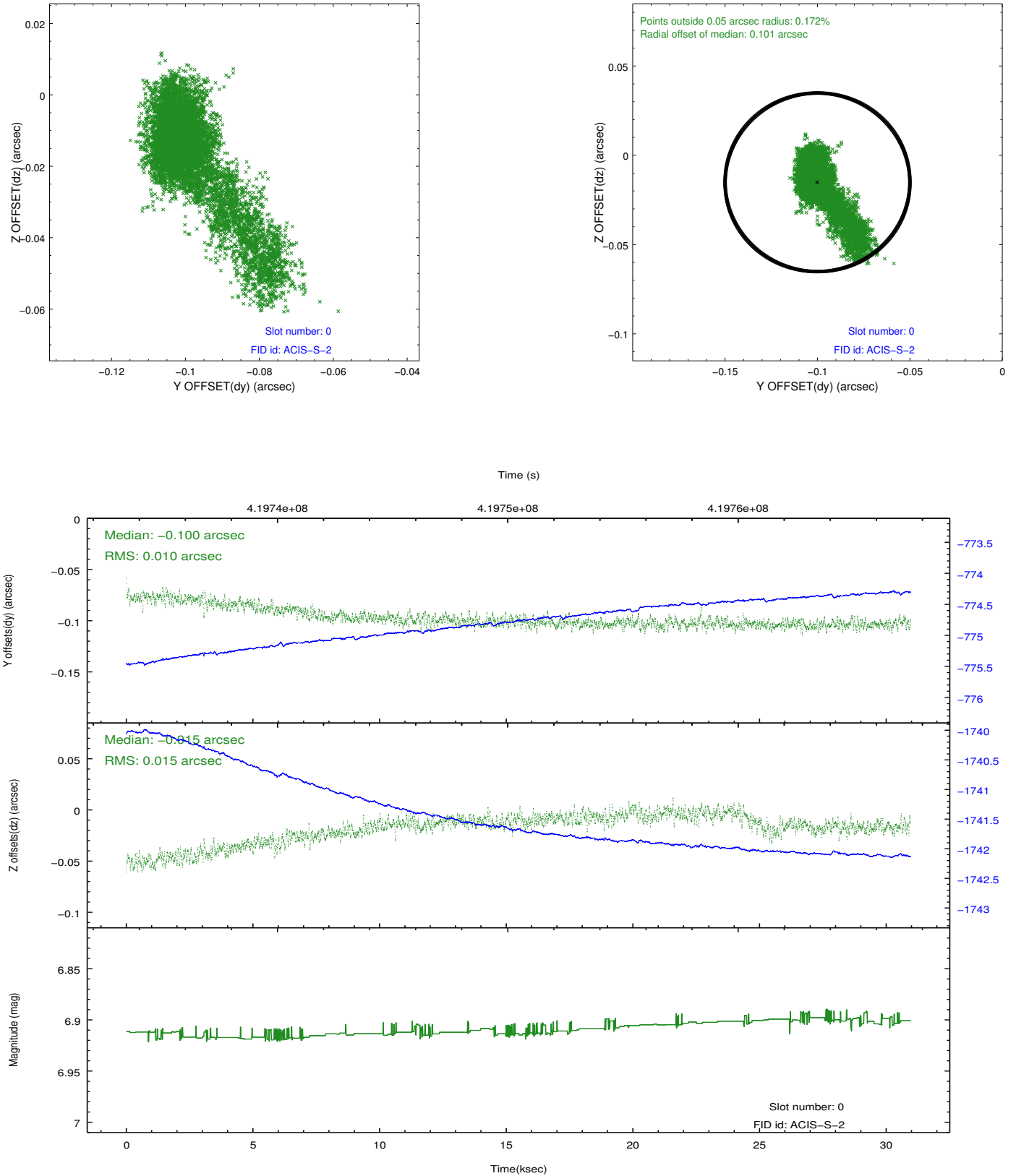


## 2.4.5 Slot 7

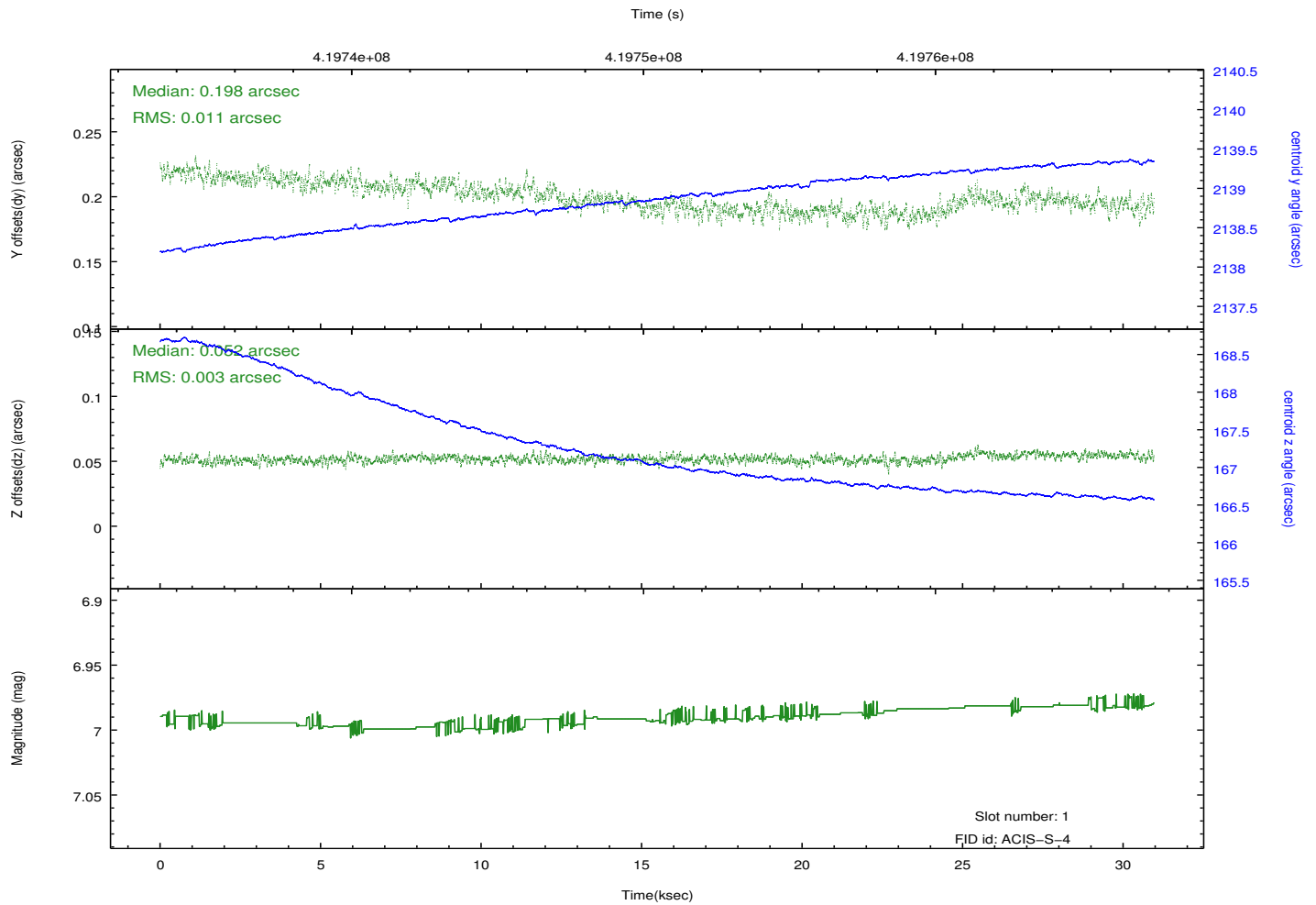
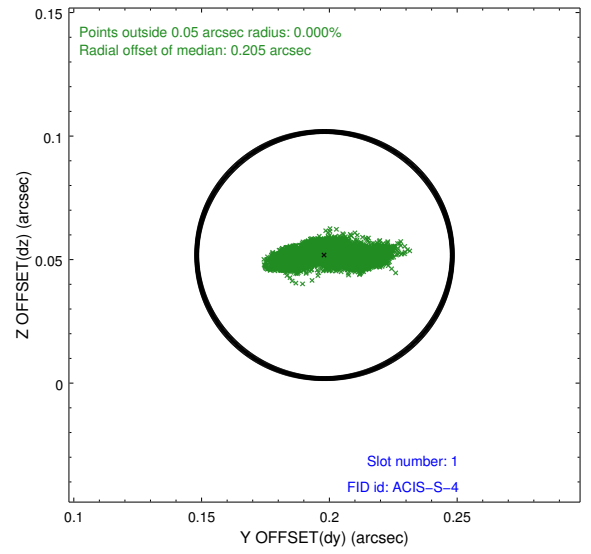
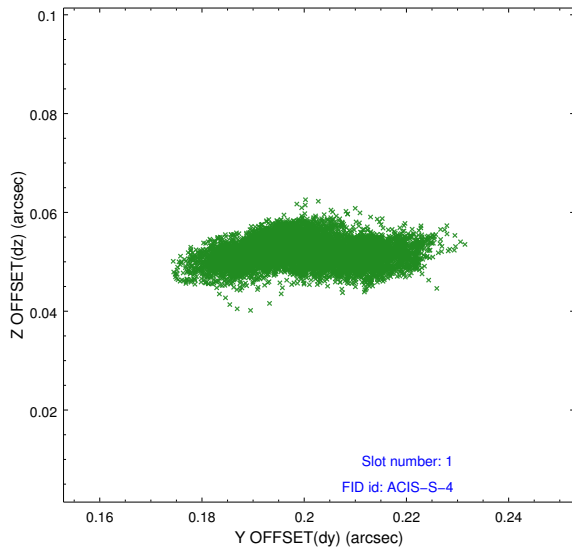


## 2.5 FID Slots

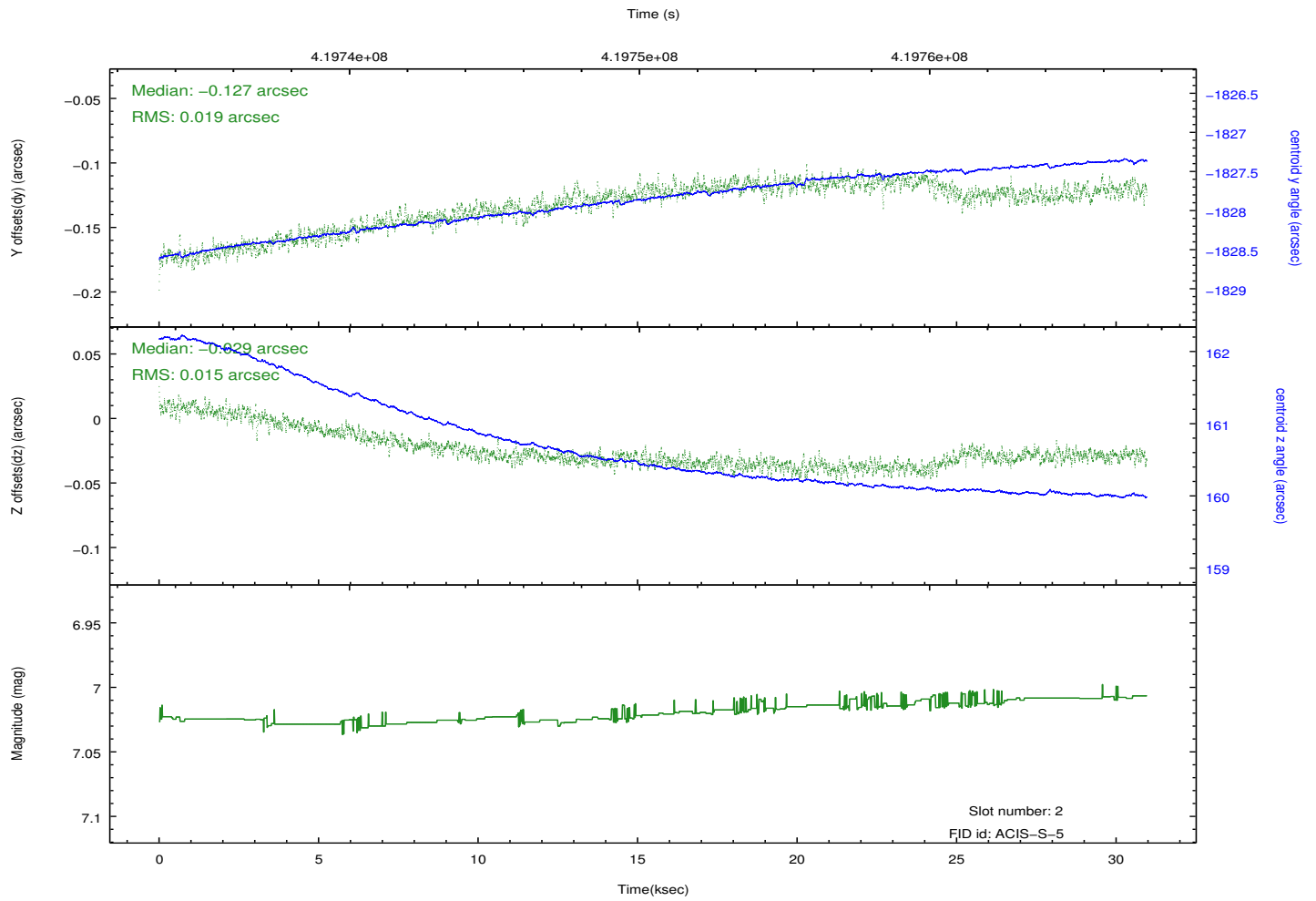
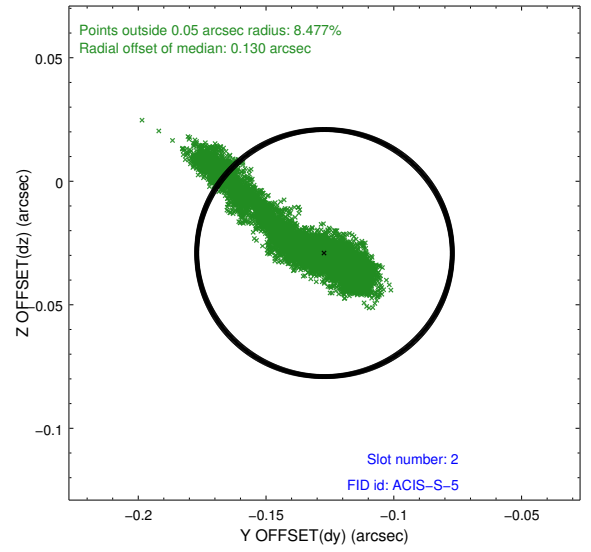
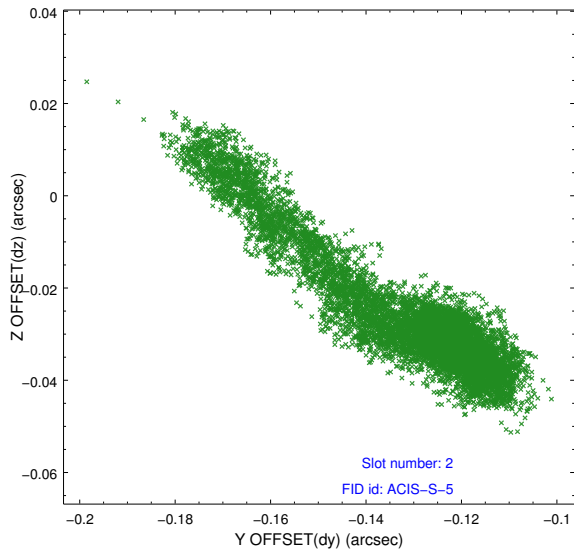
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2



# A Summary

## A.1 Status

|                            |                 |
|----------------------------|-----------------|
| V&V Scientist              | Jen Lauer       |
| V&V Date (YYYY-MM-DD)      | 2012.02.10      |
| V&V Edition                | 1               |
| V&V Disposition and Status | OK              |
| V&V Charge Time            | 30.053692640185 |

## A.2 Comments

The data for this observation have been processed using the 'EDSER' sub-pixel event-repositioning algorithm of Li et al. (2004, ApJ, 610, 1204). Small-scale features should become sharper for sources near the aim point. The improvement will be less noticeable for off-axis sources where the size of the point-spread function is comparable to or larger than the size of an ACIS pixel. To take full advantage of the improvement, images should be binned on spatial scales smaller than the size of an ACIS pixel. Note that, at present, the point-spread function has not been calibrated for data to which the EDSER algorithm has been applied. If dither was disabled for the observation, then the algorithm can introduce artificial aliasing effects on spatial scales smaller than a pixel. If you would prefer to use no sub-pixel adjustment or to apply a coordinate randomization, then use `acis_process_events` to reprocess the data with the parameter `pix_adj=NONE` or `RANDOMIZE`, respectively.