

# V&V Reference Report

## L2 ASCDS Version : 8.4.4

Observation 9521 - L2 Version 2  
Chandra X-Ray Center

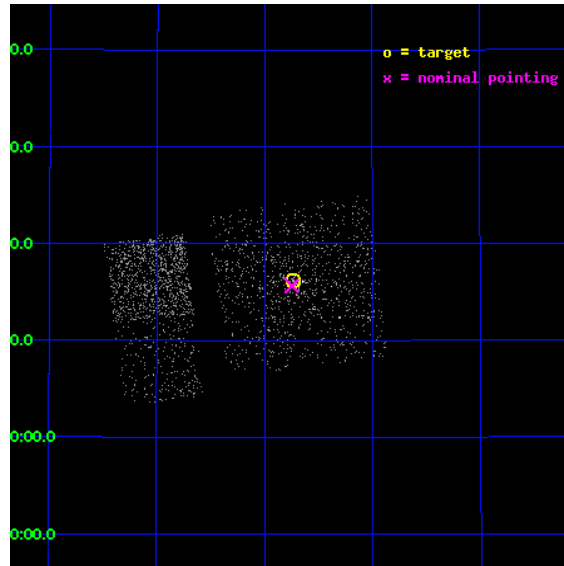
L2 Processing Date : May 24 2012

## Contents

|          |                               |           |
|----------|-------------------------------|-----------|
| <b>1</b> | <b>Front</b>                  | <b>2</b>  |
| <b>2</b> | <b>OBI Primary</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>3</b> | <b>OBI Secondary</b>          | <b>17</b> |
| 3.1      | OBI . . . . .                 | 17        |
| 3.1.1    | Images . . . . .              | 17        |
| 3.1.2    | Bias . . . . .                | 17        |
| 3.1.3    | Parameters . . . . .          | 18        |
| 3.1.4    | Events . . . . .              | 18        |
| <b>A</b> | <b>Summary</b>                | <b>19</b> |
| A.1      | Status . . . . .              | 19        |
| A.2      | Comments . . . . .            | 19        |

# 1 Front

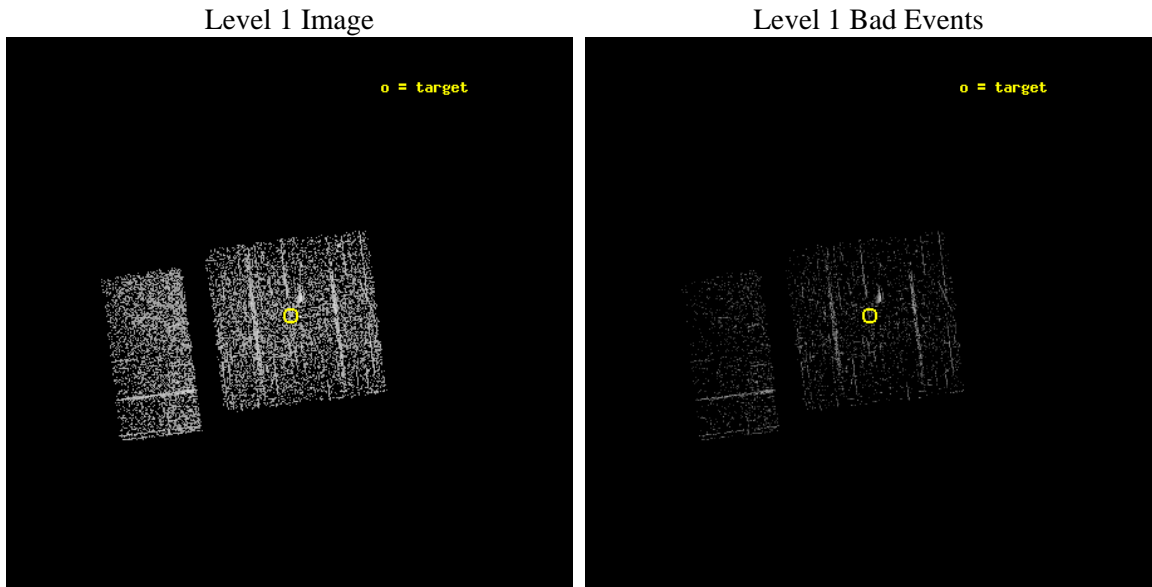
|          |                               |  |
|----------|-------------------------------|--|
| seq_num  | 600662                        | Sequence number                                    |
| obs_id   | 9521                          | Observation id                                     |
| title    | Black Hole X-ray Novae in M31 | Proposal title                                     |
| observer | Dr. Stephen Murray            | Principal investigator                             |
| object   | M31                           | Source name  |
| dtcycle  | 0                             | &#160  |
| cycle    | P                             | events are from which exps? P[rimary]<br>S[econdar |
| ra_targ  | 10.685                        | Observer's specified target RA [deg]               |
| dec_targ | 41.268972                     | Observer's specified target Dec [deg]              |
| ra_nom   | 10.686885306382               | Nominal RA [deg]                                   |
| dec_nom  | 41.260968234923               | Nominal Dec [deg]                                  |
| roll_nom | 262.89231708912               | Nominal Roll [deg]                                 |
| revision | 2                             | Processing version of data                         |
| ontime   | 937.72791308165               | Sum of GTIs [s]                                    |
| livetime | 147.62099299174               | Livetime [s]                                       |
| ontime0  | 937.72790318727               | Sum of GTIs [s]                                    |
| ontime1  | 937.72791308165               | Sum of GTIs [s]                                    |
| ontime2  | 937.72791308165               | Sum of GTIs [s]                                    |
| ontime3  | 937.72791308165               | Sum of GTIs [s]                                    |
| ontime6  | 937.72791308165               | Sum of GTIs [s]                                    |
| ontime7  | 937.72790318727               | Sum of GTIs [s]                                    |
| l2events | 2543                          | Number of level 2 events                           |



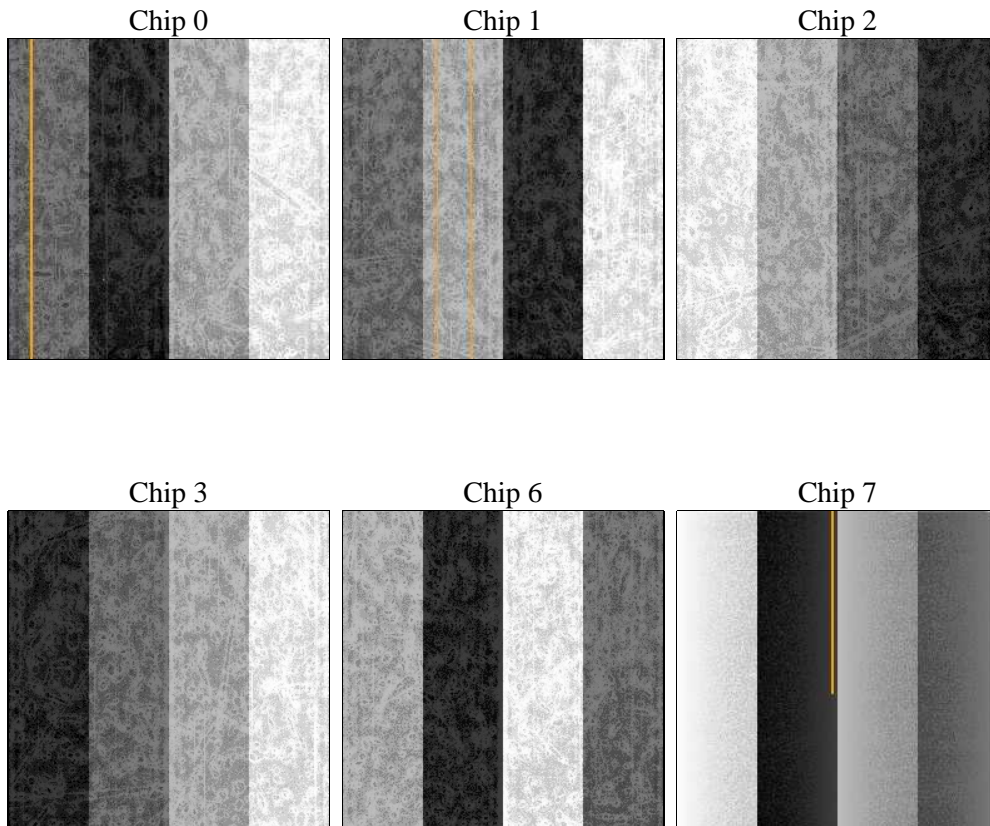
## 2 OBI Primary

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |   |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 5000.000000     | [s] Scheduled observation exposure time |
| ascdsver | 8.4.4               | Processing system revision     | ontime         | 937.72791308165 | Sum of GTIs [s]                         |
| caldsver | 4.4.9               | &#160                          | ontime0        | 937.72790318727 | Sum of GTIs [s]                         |
| date     | 2012-05-24T15:58:25 | Date and time of file creation | ontime1        | 937.72791308165 | Sum of GTIs [s]                         |
| revision | 2                   | Processing version of data     | ontime2        | 937.72791308165 | Sum of GTIs [s]                         |
|          |                     |                                | ontime3        | 937.72791308165 | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 937.72791308165 | Sum of GTIs [s]                         |
|          |                     |                                | ontime7        | 937.72790318727 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 22474           | Number of level 1 events                |

### 2.1.4 Events

|                 | ccd 0 | ccd 1 | ccd 2 | ccd 3 | ccd 6 | ccd 7 |
|-----------------|-------|-------|-------|-------|-------|-------|
| level 1 events  | 3554  | 3821  | 3981  | 3888  | 3706  | 3524  |
| rejected events | 3179  | 3288  | 3659  | 3465  | 3427  | 2492  |
| rejected %      | 89%   | 86%   | 91%   | 89%   | 92%   | 70%   |

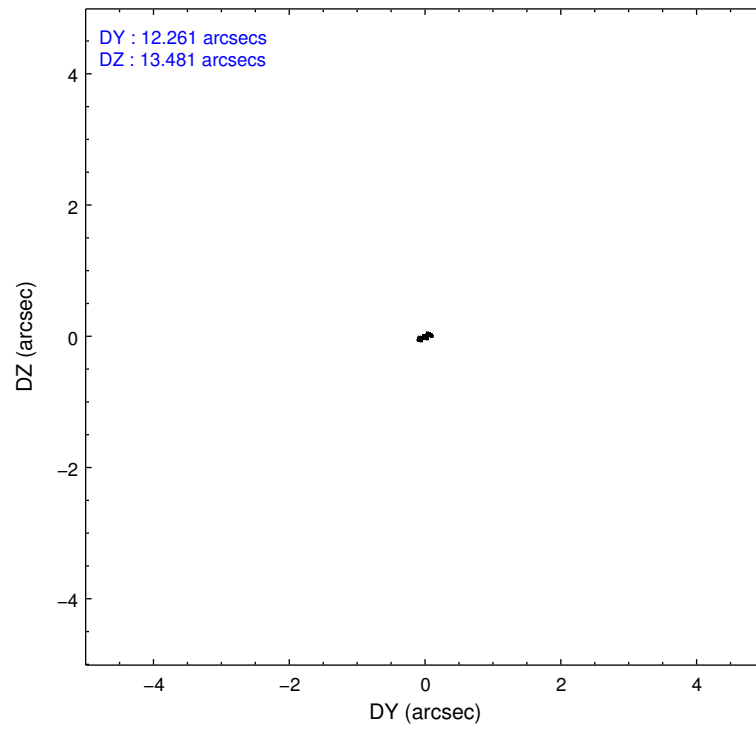
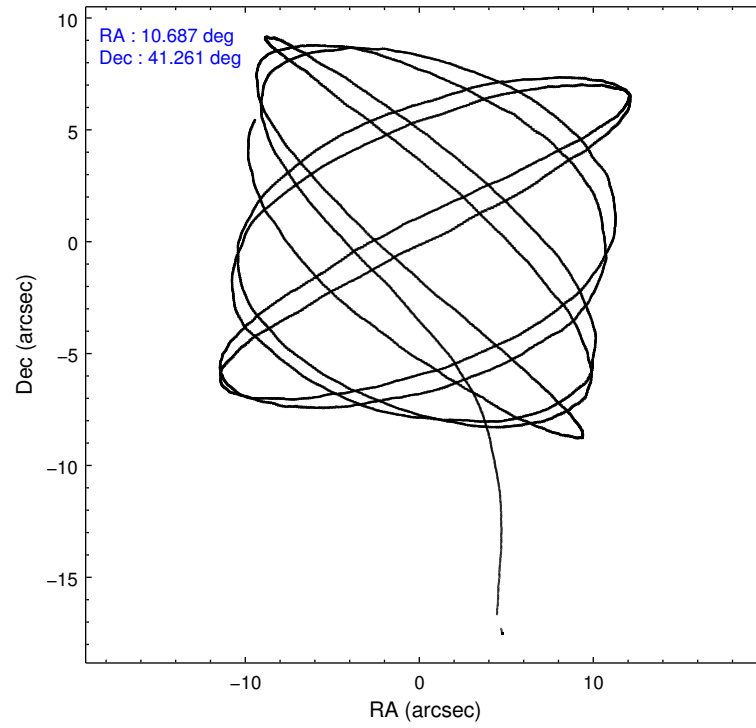
|                | ccd 0 | ccd 1 | ccd 2 | ccd 3 | ccd 6 | ccd 7 |
|----------------|-------|-------|-------|-------|-------|-------|
| grade 0 events | 137   | 271   | 110   | 199   | 39    | 102   |
|                | 3%    | 7%    | 2%    | 5%    | 1%    | 2%    |
| grade 1 events | 6     | 2     | 1     | 4     | 0     | 3     |
|                | 0%    | 0%    | 0%    | 0%    | 0%    | 0%    |
| grade 2 events | 99    | 97    | 89    | 70    | 93    | 240   |
|                | 2%    | 2%    | 2%    | 1%    | 2%    | 6%    |
| grade 3 events | 36    | 50    | 43    | 56    | 54    | 97    |
|                | 1%    | 1%    | 1%    | 1%    | 1%    | 2%    |
| grade 4 events | 43    | 61    | 39    | 35    | 29    | 100   |
|                | 1%    | 1%    | 0%    | 0%    | 0%    | 2%    |
| grade 5 events | 100   | 115   | 109   | 129   | 160   | 318   |
|                | 2%    | 3%    | 2%    | 3%    | 4%    | 9%    |
| grade 6 events | 63    | 61    | 42    | 64    | 64    | 498   |
|                | 1%    | 1%    | 1%    | 1%    | 1%    | 14%   |
| grade 7 events | 3070  | 3164  | 3548  | 3331  | 3267  | 2166  |
|                | 86%   | 82%   | 89%   | 85%   | 88%   | 61%   |

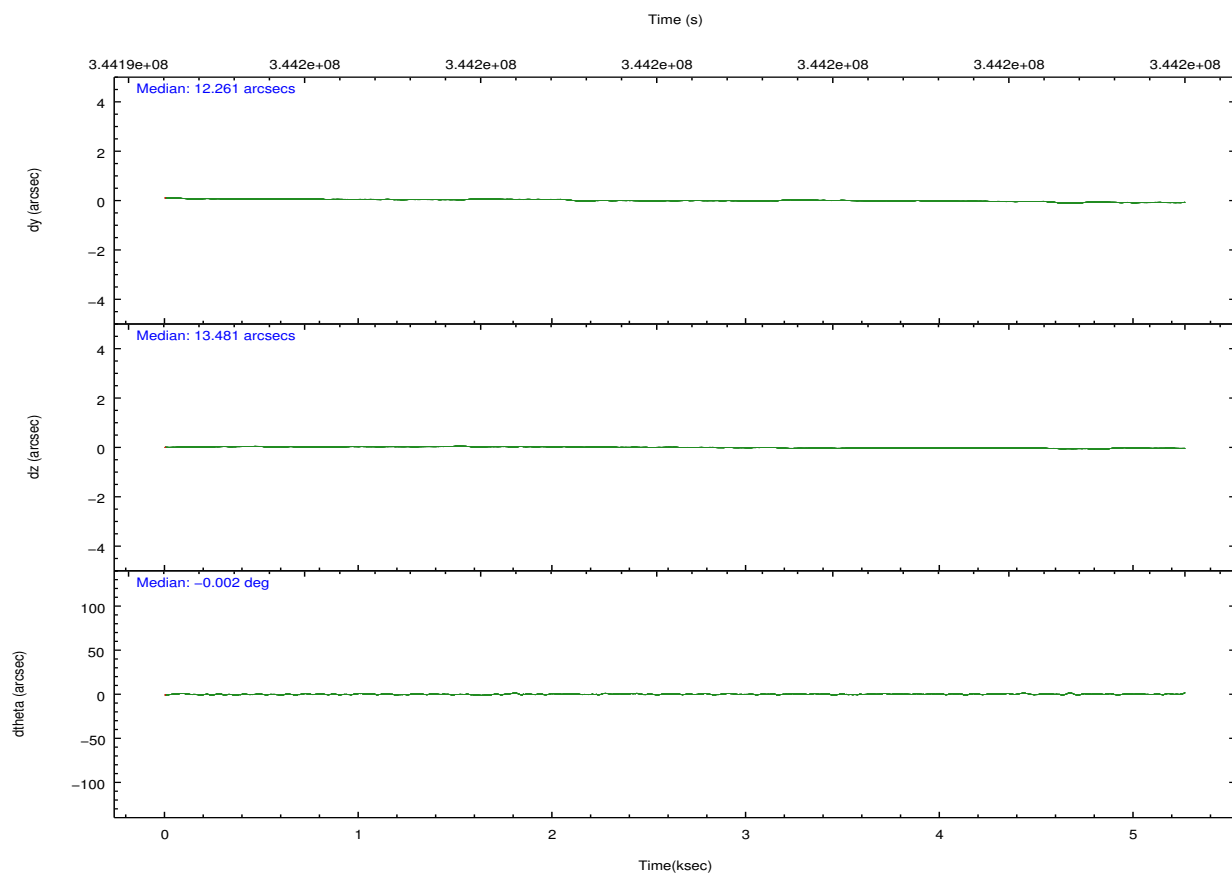
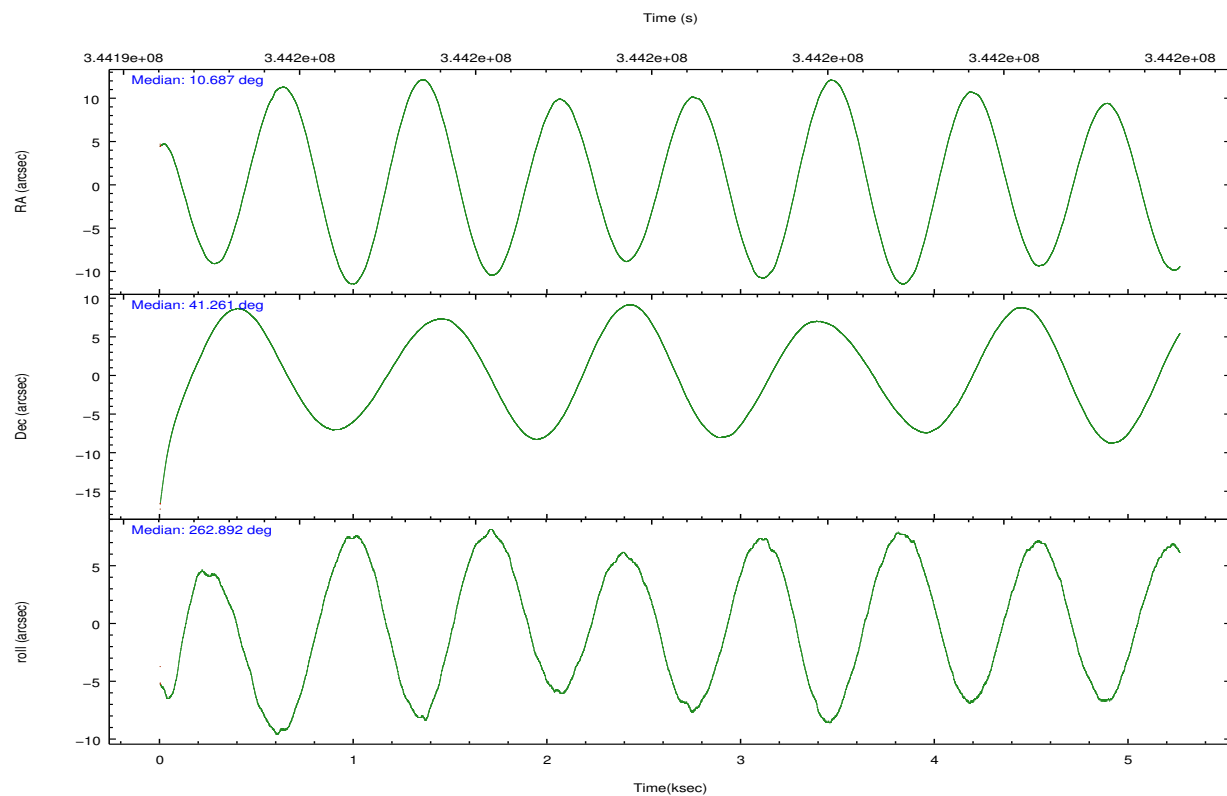


## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual                | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|-----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                  | Obspar format version number          | 7         | 7       |
| 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                 | 10.672536           | 10.68688530638184     | CCD I2 on                             | Y         | Y       |
| [deg] Pointing Dec                | 41.286302           | 41.26096823492283     | CCD I3 on                             | Y         | Y       |
| [deg] Pointing Roll               | 262.693086          | 262.8923170891167     | CCD S0 on                             | N         | N       |
| [s] Window start time (MET)       | 343872065.184000    | 343872065.184000      | CCD S1 on                             | N         | N       |
| [s] Window stop time (MET)        | 344476805.184000    | 344476805.184000      | CCD S2 on                             | O2        | Y       |
| [mm] SIM focus pos                | -0.782348           | -0.7809083437167272   | CCD S3 on                             | O1        | Y       |
| [mm] SIM defocus                  | 0                   | 0.001439871863259334  | CCD S4 on                             | N         | N       |
| [mm] SIM translation stage pos    | -233.592463         | -233.5874344608287    | CCD S5 on                             | N         | N       |
| [mm] SIM translation stage offset | 0                   | -0.005018542100998502 | Number of optional ACIS chips dropped | 0         | 0       |
| [s] Observation start time (MET)  | 344194732.184000    | 344193542.25127       | On-chip summing requested             | N         | N       |
| Observation start date            | 2008-11-27T17:37:47 | 2008-11-27T17:19:02   | Subarray requested                    | NONE      | NONE    |
| [s] Observation end time (MET)    | 344199732.184000    | 344201186.18915       | Alternating exposures requested       | Y         | Y       |
| Observation end date              | 2008-11-27T19:01:07 | 2008-11-27T19:26:26   | [s] Primary exposure time             | 0.600000  | 0.6     |
| Read mode                         | TIMED               | TIMED                 | [s] Secondary exposure time           | 0.000000  | 3.2     |
|                                   |                     |                       | Duty cycle                            | 5         | 5       |

## 2.3 Aspect



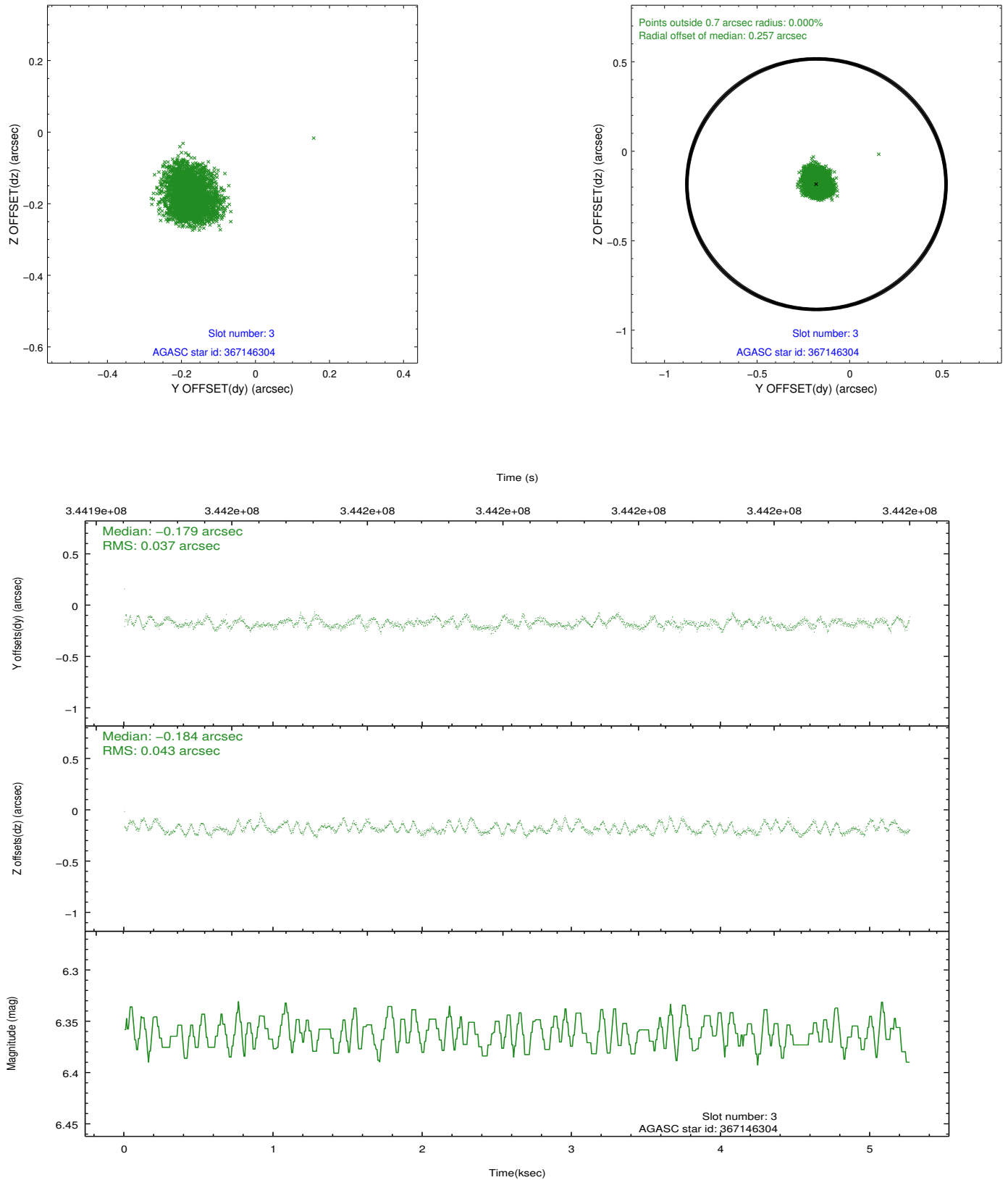


### Slot Statistics

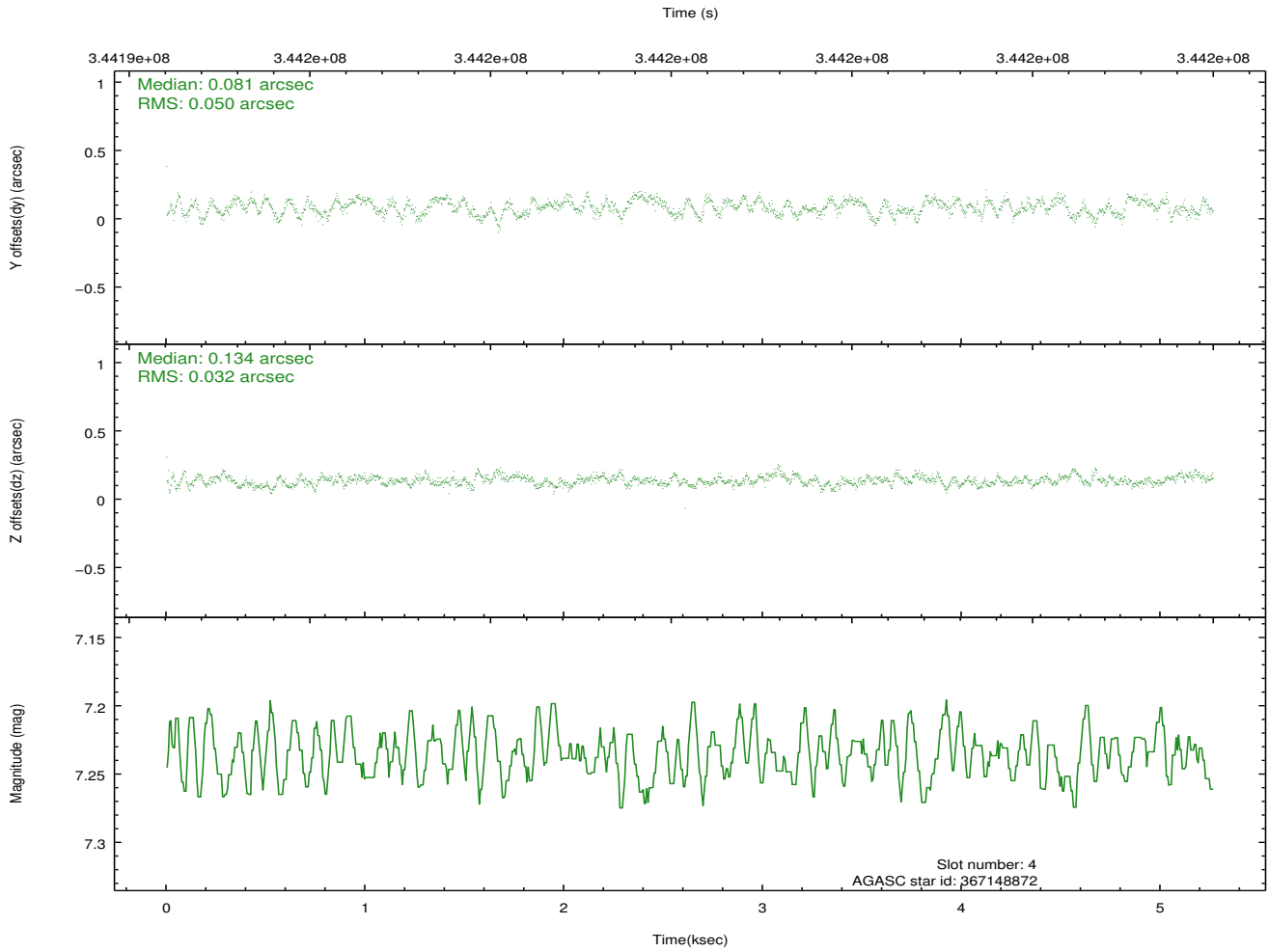
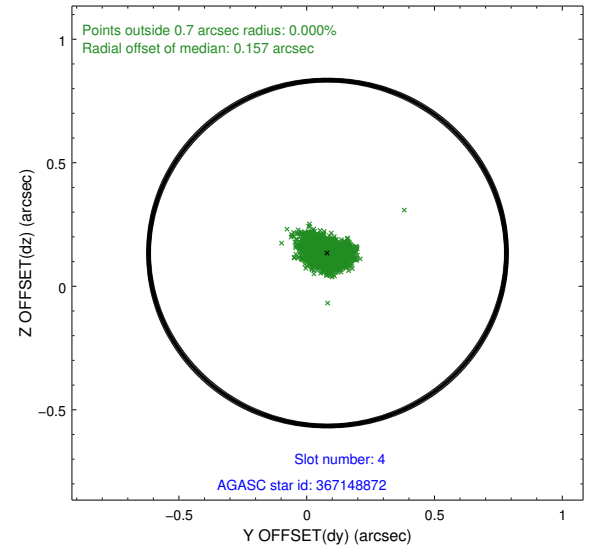
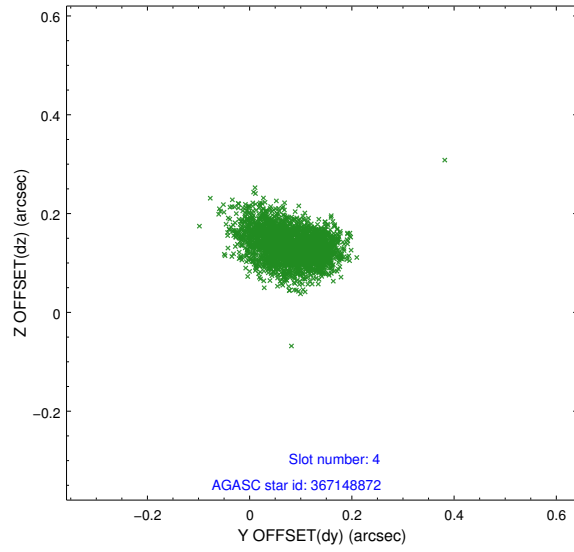
| slot | status | id        | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra        | dec       | mean_y   | mean_z  |
|------|--------|-----------|------|-------|--------|--------|-------|-------|-----------|-----------|----------|---------|
| 0    | FID    | ACIS-I-1  | 7.05 | 1285  | 0.025  | 0.029  | 0.006 | 0.009 | 0.000000  | 0.000000  | 927.30   | -837.00 |
| 1    | FID    | ACIS-I-5  | 7.04 | 1285  | -0.169 | 0.049  | 0.006 | 0.010 | 0.000000  | 0.000000  | -1820.38 | 1059.91 |
| 2    | FID    | ACIS-I-6  | 7.05 | 1285  | 0.053  | -0.008 | 0.006 | 0.010 | 0.000000  | 0.000000  | 391.61   | 1705.67 |
| 3    | GUIDE  | 367146304 | 6.36 | 2569  | -0.179 | -0.184 | 0.062 | 0.093 | 11.154952 | 40.679362 | 1996.09  | 1583.95 |
| 4    | GUIDE  | 367148872 | 7.24 | 2568  | 0.081  | 0.134  | 0.063 | 0.100 | 10.505940 | 40.688258 | 2194.30  | -176.46 |
| 5    | GUIDE  | 367657896 | 9.01 | 2566  | 0.093  | 0.030  | 0.093 | 0.148 | 11.197765 | 41.313576 | -281.34  | 1395.75 |
| 6    | GUIDE  | 367663272 | 9.29 | 2564  | -0.041 | 0.104  | 0.082 | 0.131 | 10.656279 | 41.699429 | -1469.36 | -232.37 |
| 7    | GUIDE  | 367674552 | 8.85 | 2566  | 0.046  | -0.087 | 0.074 | 0.120 | 11.016238 | 41.570845 | -1136.06 | 787.76  |

## 2.4 Star Slots

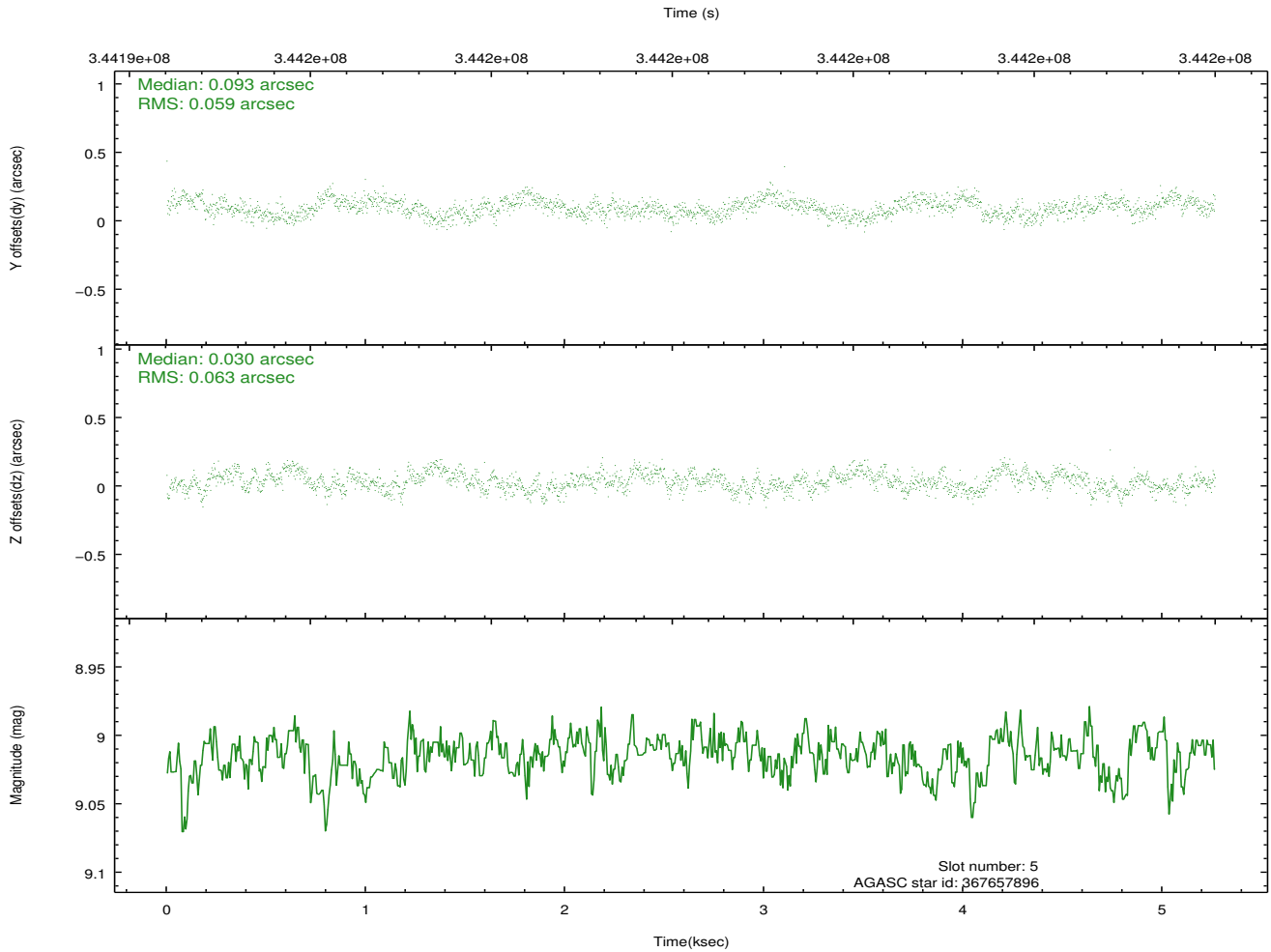
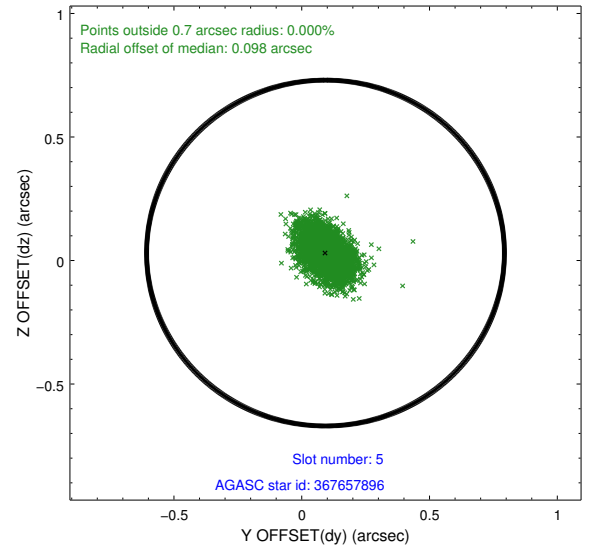
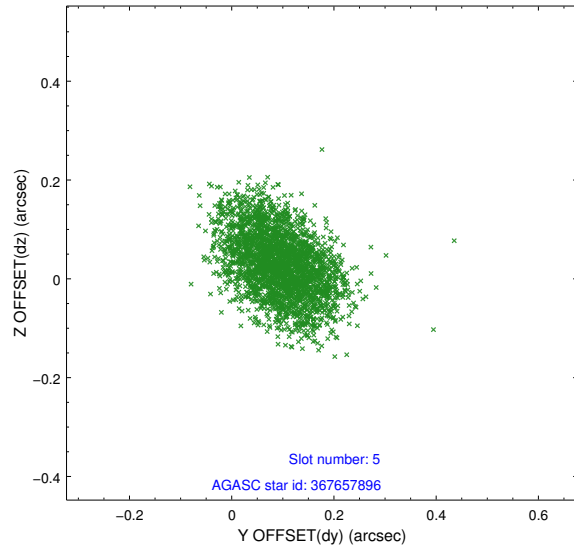
### 2.4.1 Slot 3



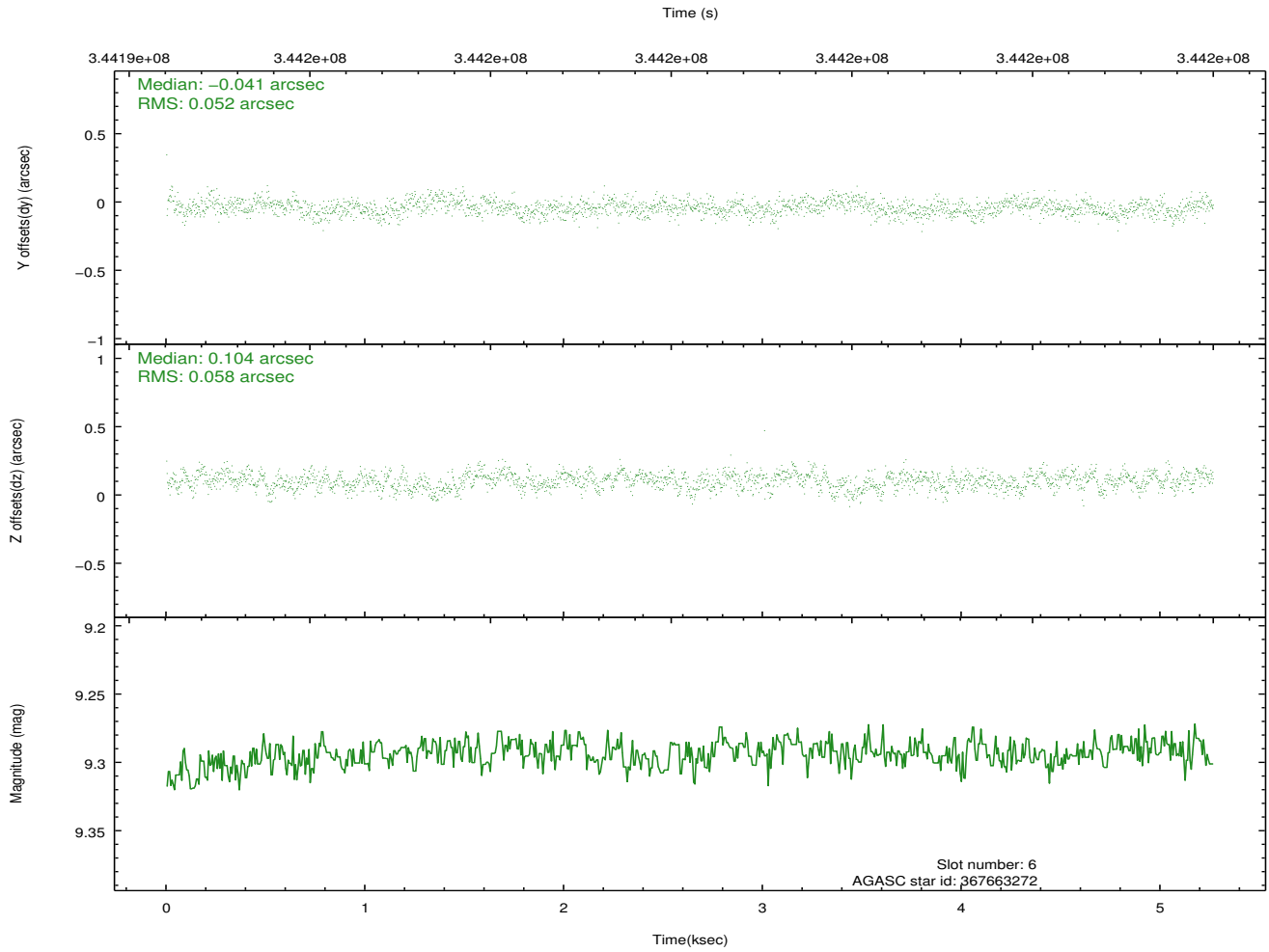
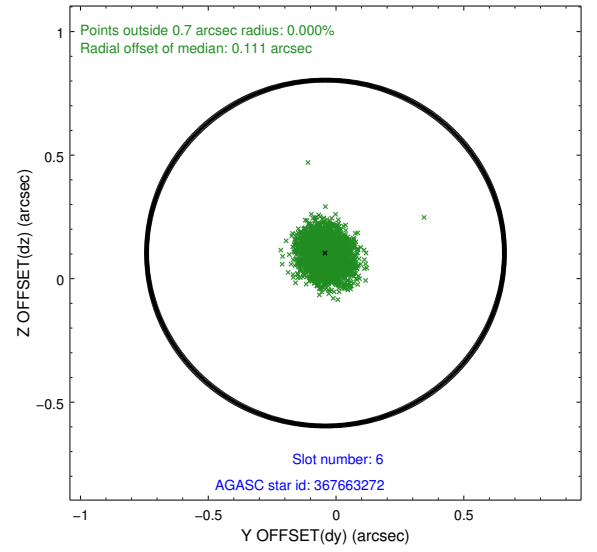
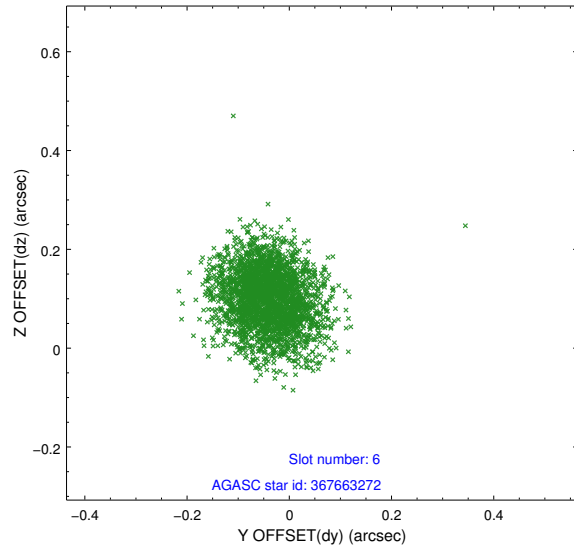
## 2.4.2 Slot 4



### 2.4.3 Slot 5

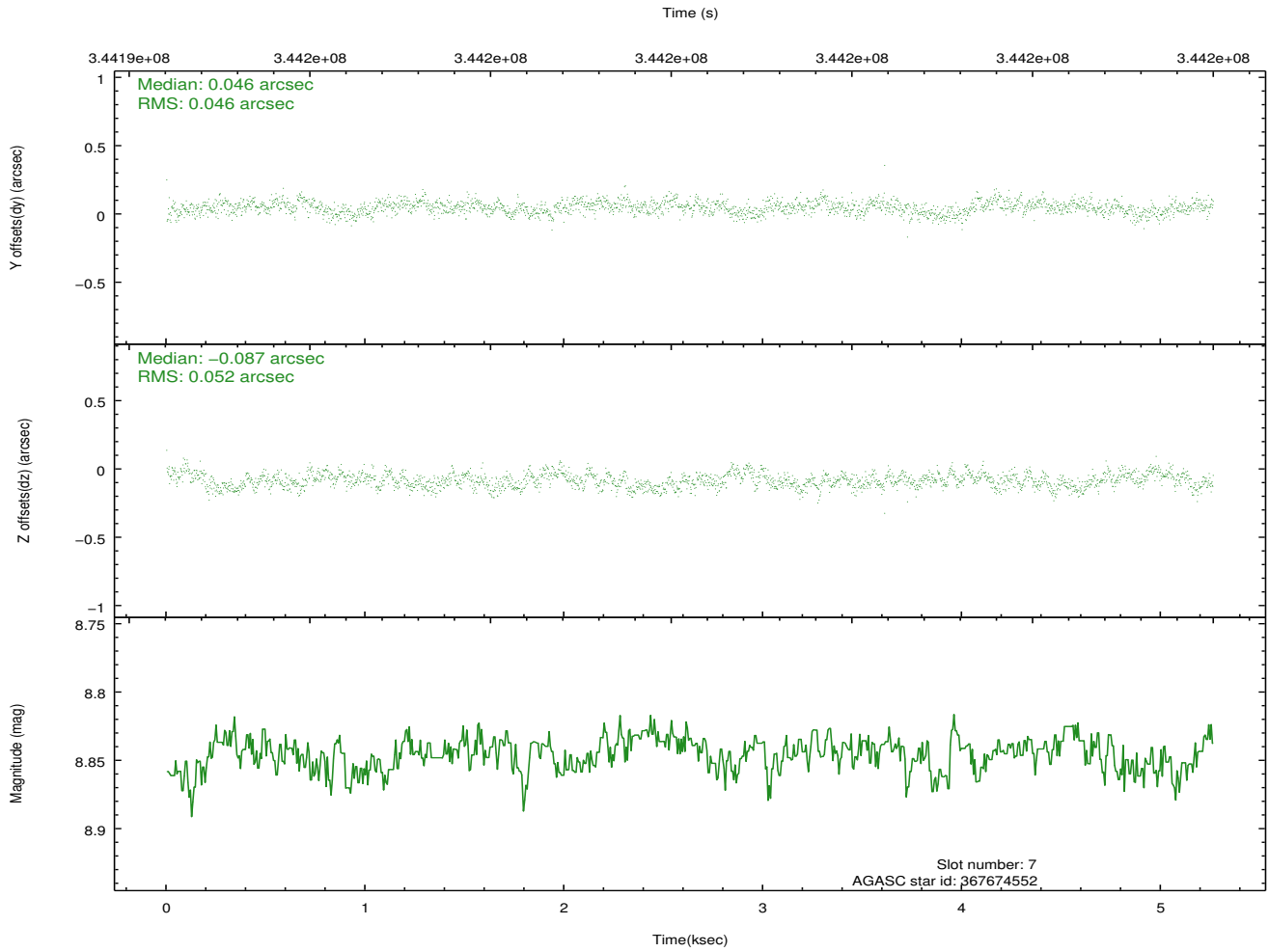
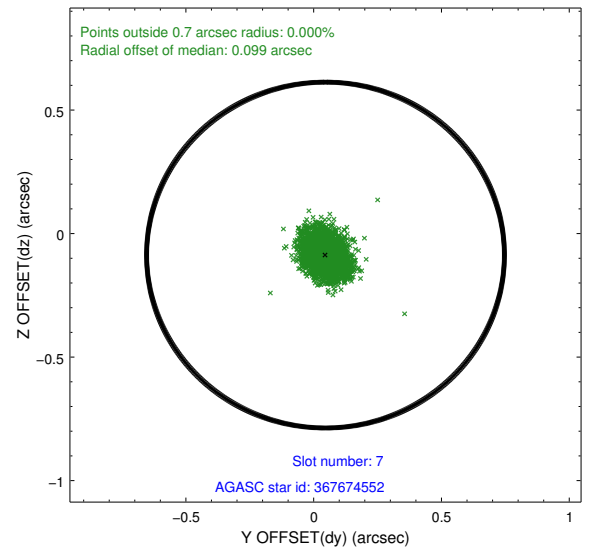
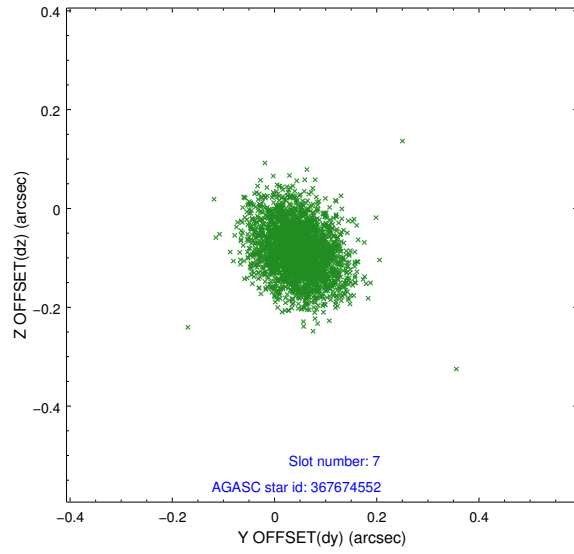


## 2.4.4 Slot 6



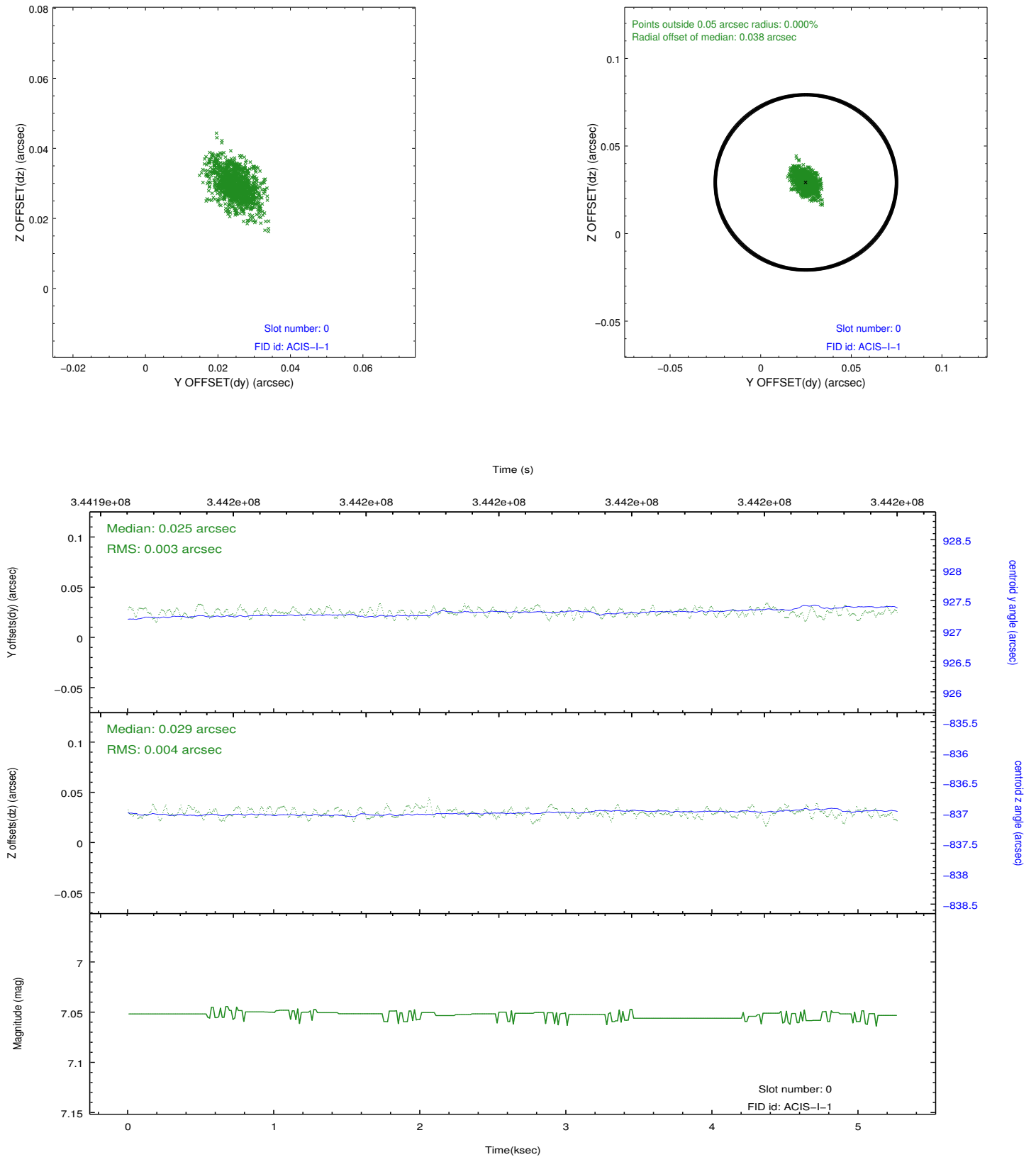


## 2.4.5 Slot 7

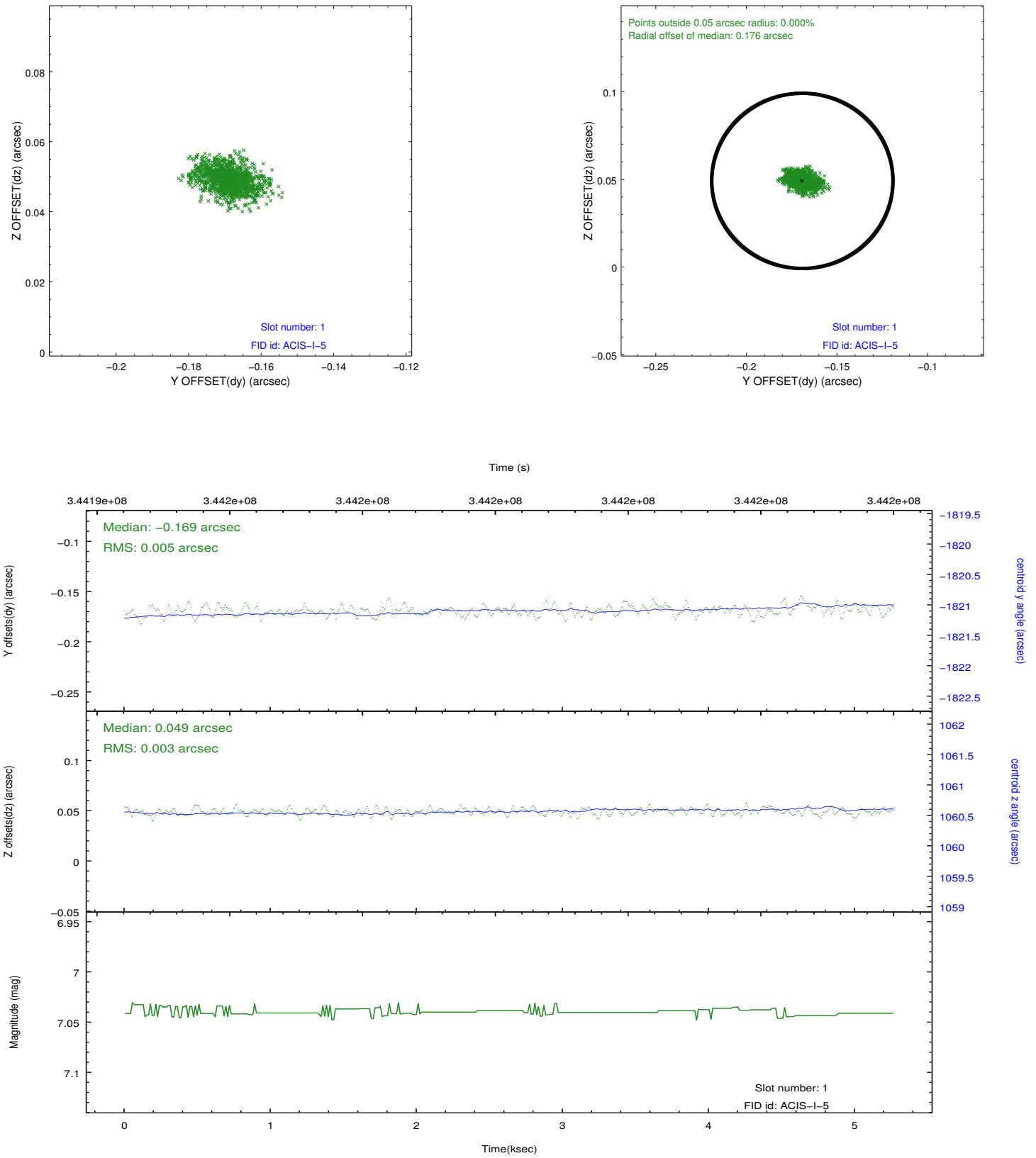


## 2.5 FID Slots

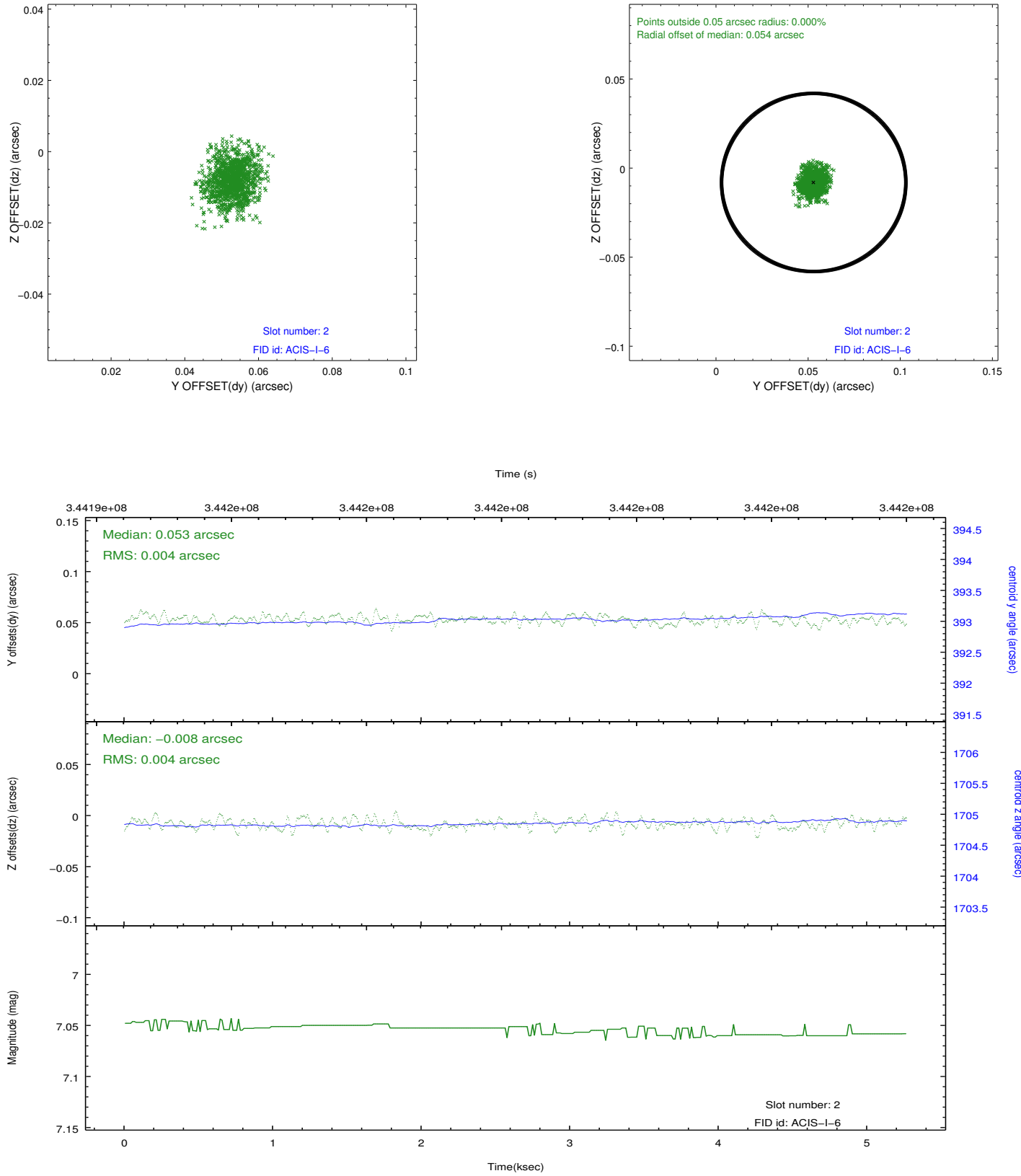
### 2.5.1 Slot 0



## 2.5.2 Slot 1



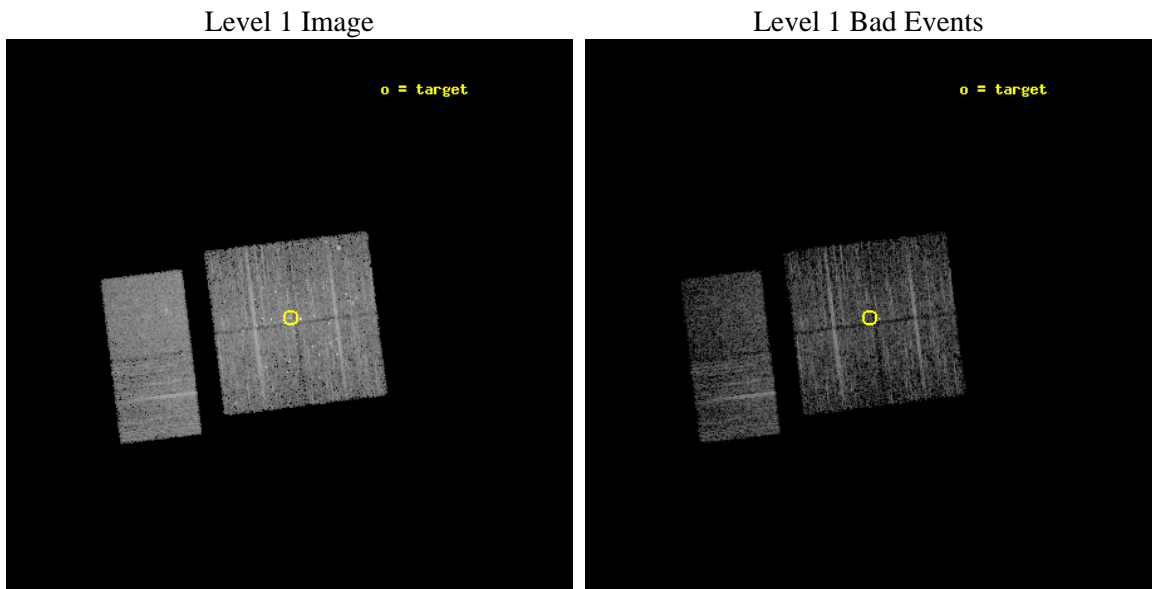
### 2.5.3 Slot 2



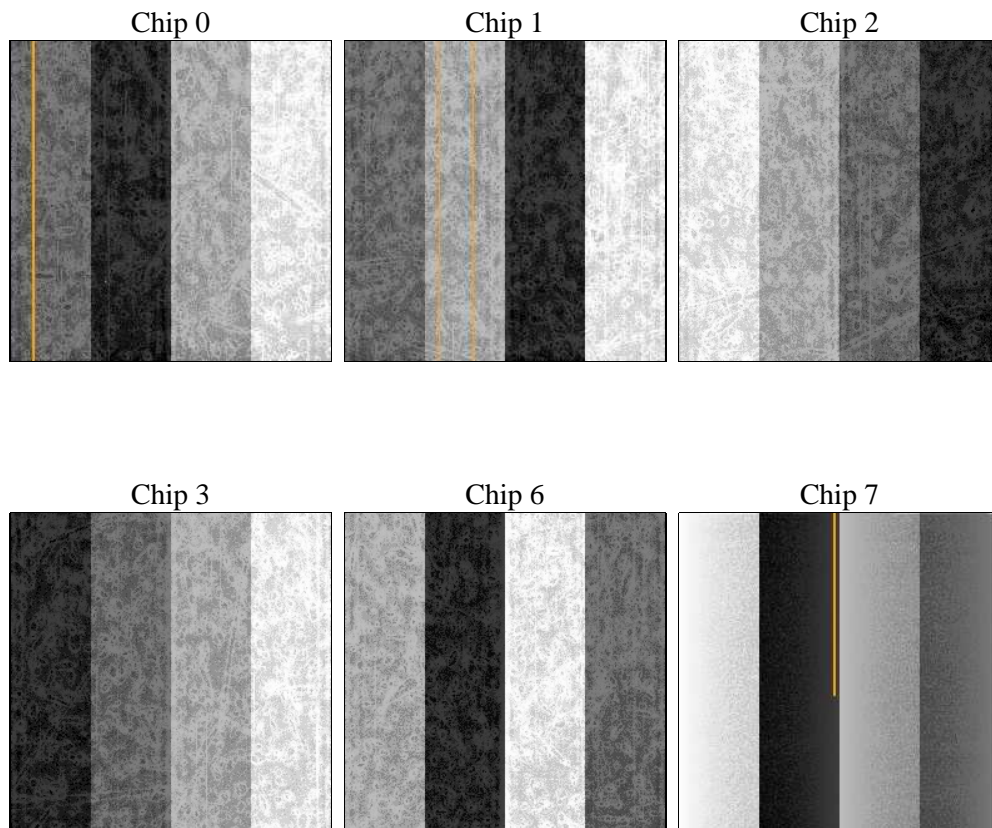
## 3 OBI Secondary

### 3.1 OBI

#### 3.1.1 Images



#### 3.1.2 Bias



### 3.1.3 Parameters

|          |                     |                                |                |                 |   |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 5000.000000     | [s] Scheduled observation exposure time |
| ascdsver | 8.4.4               | Processing system revision     | ontime         | 4016.185416162  | Sum of GTIs [s]                         |
| caldsver | 4.4.9               | &#160                          | ontime0        | 4016.1854673624 | Sum of GTIs [s]                         |
| date     | 2012-05-24T15:59:38 | Date and time of file creation | ontime1        | 4016.1854664683 | Sum of GTIs [s]                         |
| revision | 2                   | Processing version of data     | ontime2        | 4016.1854280829 | Sum of GTIs [s]                         |
|          |                     |                                | ontime3        | 4016.185416162  | Sum of GTIs [s]                         |
|          |                     |                                | ontime6        | 4016.185380578  | Sum of GTIs [s]                         |
|          |                     |                                | ontime7        | 4016.1853486896 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 207554          | Number of level 1 events                |

### 3.1.4 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  | 32005 | 33883 | 33503 | 36390 | 33193 | 38580 | grade 0 events | 2711  | 3747  | 2654  | 4426  | 1258  | 1687  |
| rejected events | 26763 | 26972 | 28545 | 29274 | 29591 | 21066 |                | 8%    | 11%   | 7%    | 12%   | 3%    | 4%    |
| rejected %      | 83%   | 79%   | 85%   | 80%   | 89%   | 54%   | grade 1 events | 43    | 122   | 38    | 64    | 14    | 47    |
|                 |       |       |       |       |       |       |                | 0%    | 0%    | 0%    | 0%    | 0%    | 0%    |
|                 |       |       |       |       |       |       | grade 2 events | 978   | 1247  | 891   | 1083  | 799   | 3490  |
|                 |       |       |       |       |       |       |                | 3%    | 3%    | 2%    | 2%    | 2%    | 9%    |
|                 |       |       |       |       |       |       | grade 3 events | 436   | 510   | 410   | 469   | 356   | 1623  |
|                 |       |       |       |       |       |       |                | 1%    | 1%    | 1%    | 1%    | 1%    | 4%    |
|                 |       |       |       |       |       |       | grade 4 events | 405   | 485   | 393   | 425   | 391   | 1596  |
|                 |       |       |       |       |       |       |                | 1%    | 1%    | 1%    | 1%    | 1%    | 4%    |
|                 |       |       |       |       |       |       | grade 5 events | 1143  | 1380  | 1060  | 1404  | 1433  | 4038  |
|                 |       |       |       |       |       |       |                | 3%    | 4%    | 3%    | 3%    | 4%    | 10%   |
|                 |       |       |       |       |       |       | grade 6 events | 719   | 931   | 615   | 717   | 798   | 9130  |
|                 |       |       |       |       |       |       |                | 2%    | 2%    | 1%    | 1%    | 2%    | 23%   |
|                 |       |       |       |       |       |       | grade 7 events | 25570 | 25461 | 27442 | 27802 | 28144 | 16969 |
|                 |       |       |       |       |       |       |                | 79%   | 75%   | 81%   | 76%   | 84%   | 43%   |

## A Summary

### A.1 Status

|                            |            |
|----------------------------|------------|
| V&V Scientist              | Jen Lauer  |
| V&V Date (YYYY-MM-DD)      | 2012.05.31 |
| V&V Edition                | 1          |
| V&V Disposition and Status | OK         |
| V&V Charge Time            | 4.95391332 |

### A.2 Comments

Window constraint met.