

# V&V Reference Report

## L2 ASCDS Version : 10.8.1

Observation 23098 - L2 Version 2  
Chandra X-Ray Center

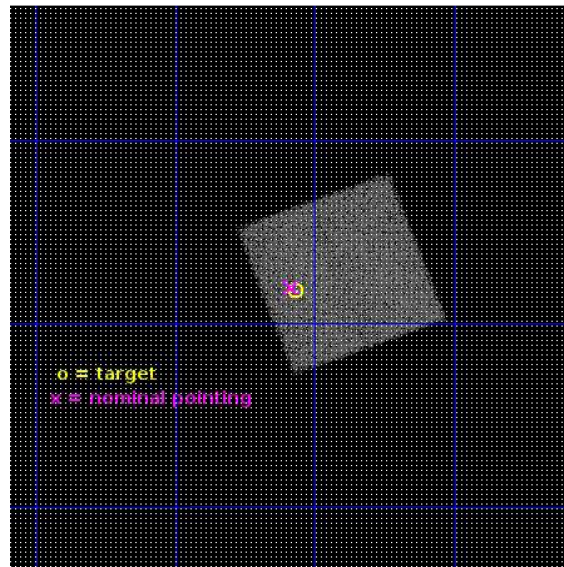
L2 Processing Date : Dec 10 2019

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# 1 Front

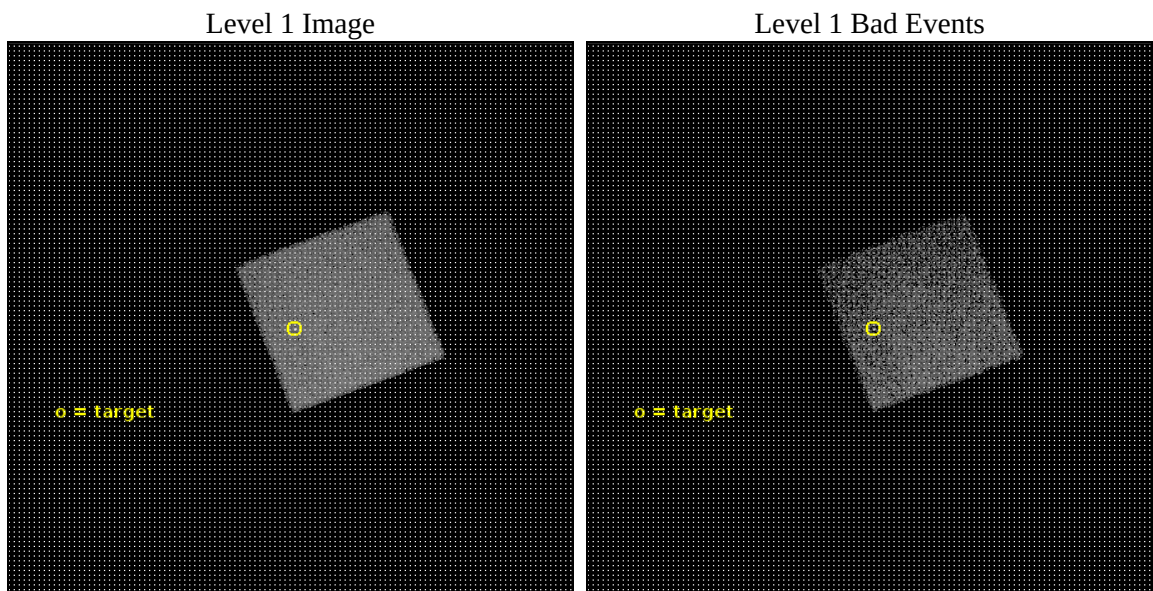
|          |                                                                           |                                             |
|----------|---------------------------------------------------------------------------|---------------------------------------------|
| seq_num  | 704031                                                                    | Sequence number                             |
| obs_id   | 23098                                                                     | Observation id                              |
| title    | C-BASS: A Chandra Legacy Survey of AGN at the Highest Spatial Resolutions | Proposal title                              |
| observer | Michael Koss                                                              | Principal investigator                      |
| object   | [HB89]0403-132                                                            | Source name                                 |
| dtcycle  | 0                                                                         | &#160                                       |
| cycle    | P                                                                         | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 61.391678                                                                 | Observer's specified<br>target RA [deg]     |
| dec_targ | -13.137132                                                                | Observer's specified<br>target Dec [deg]    |
| ra_nom   | 61.39609736658                                                            | Nominal RA [deg]                            |
| dec_nom  | -13.134364502669                                                          | Nominal Dec [deg]                           |
| roll_nom | 339.18125879449                                                           | Nominal Roll [deg]                          |
| revision | 2                                                                         | Processing version of<br>data               |
| ontime   | 10092.0                                                                   | Sum of GTIs [s]                             |
| livetime | 9955.8045931655                                                           | Livetime [s]                                |
| ontime7  | 10092.0                                                                   | Sum of GTIs [s]                             |
| l2events | 44260                                                                     | Number of level 2<br>events                 |



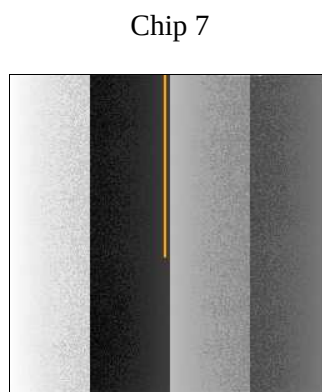
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |              |                                         |
|----------|---------------------|--------------------------------|----------------|--------------|-----------------------------------------|
| obi_num  | 0                   | Obi number                     | sched_exp_time | 10000.000000 | [s] Scheduled observation exposure time |
| ascdsver | 10.8.1              | Processing system revision     | ontime         | 10092.0      | Sum of GTIs [s]                         |
| caldbver | 4.8.4.2             | &#160                          | ontime7        | 10092.0      | Sum of GTIs [s]                         |
| date     | 2019-12-10T21:18:40 | Date and time of file creation | l1events       | 103033       | Number of level 1 events                |
| revision | 2                   | Processing version of data     |                |              |                                         |

### 2.1.4 Events

|                 |              |
|-----------------|--------------|
|                 | <b>ccd 7</b> |
| level 1 events  | 103033       |
| rejected events | 57580        |
| rejected %      | 55%          |

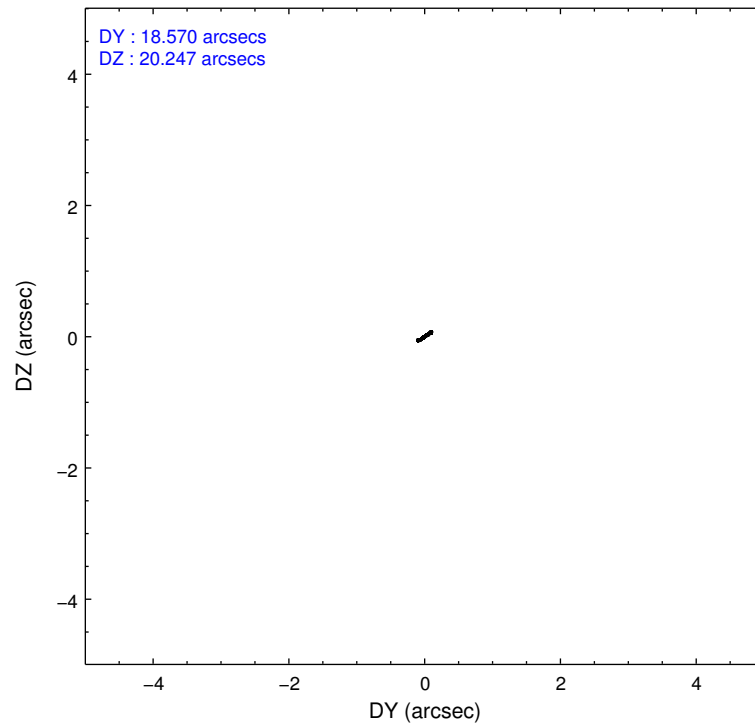
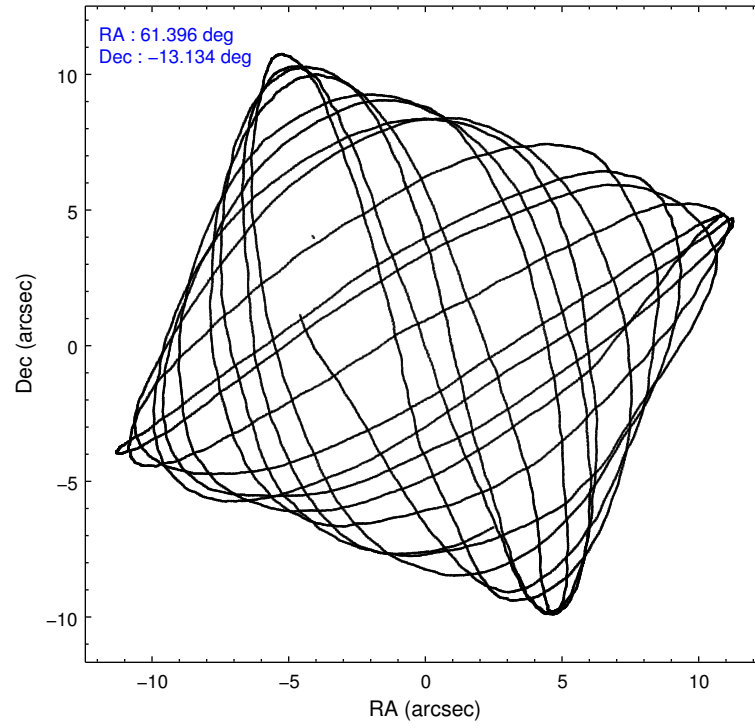
|                |              |
|----------------|--------------|
|                | <b>ccd 7</b> |
| grade 0 events | 3943         |
|                | 3%           |
| grade 1 events | 167          |
|                | 0%           |
| grade 2 events | 9414         |
|                | 9%           |
| grade 3 events | 3613         |
|                | 3%           |
| grade 4 events | 3475         |
|                | 3%           |
| grade 5 events | 9662         |
|                | 9%           |
| grade 6 events | 25022        |
|                | 24%          |
| grade 7 events | 47737        |
|                | 46%          |

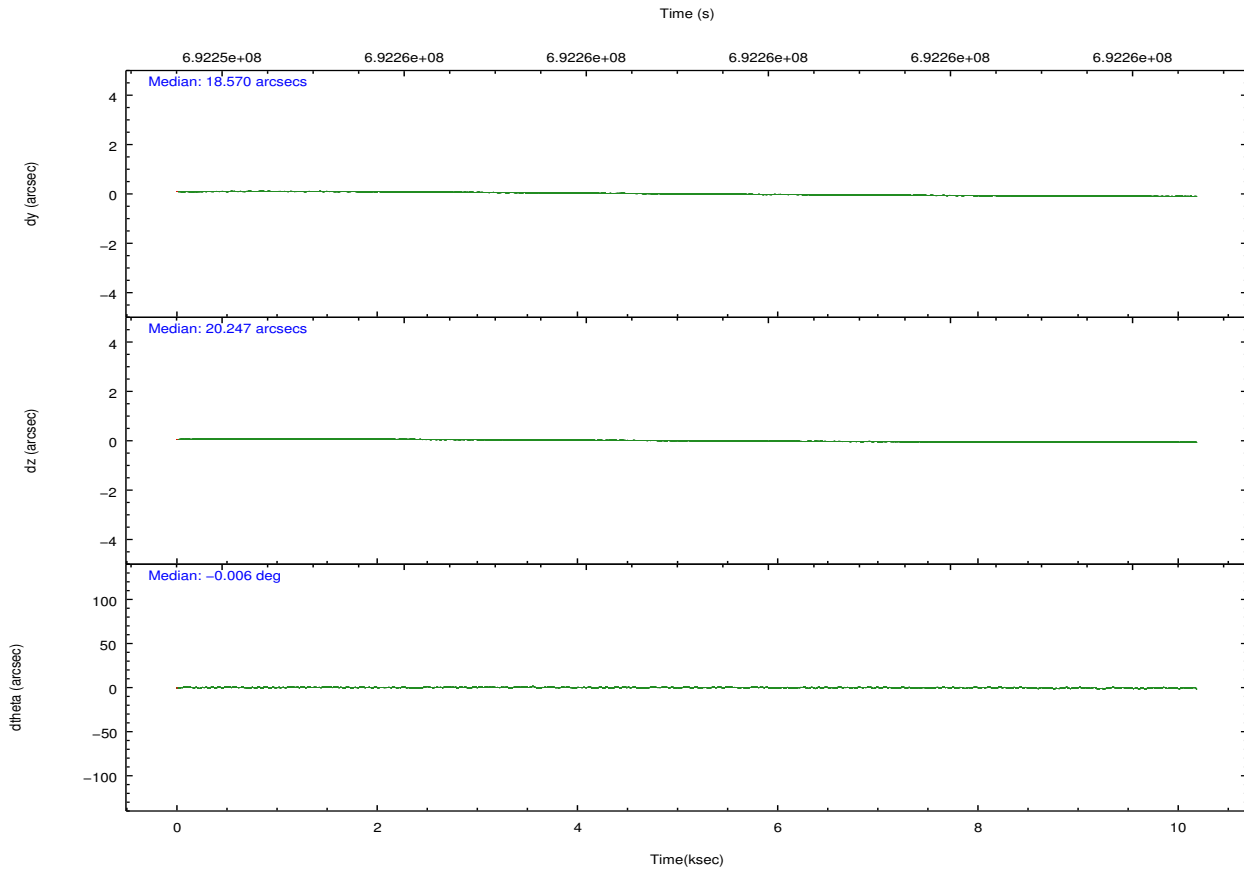
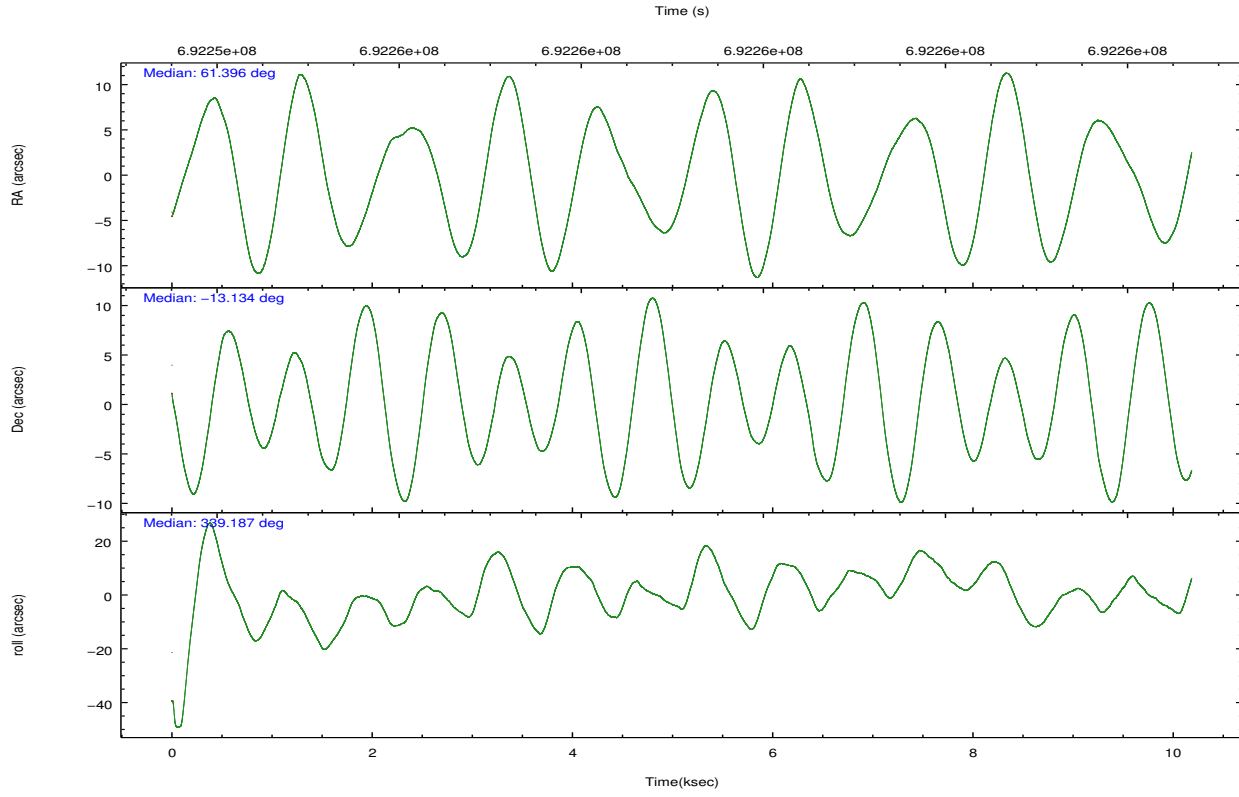


## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                 | Obspar format version number          | 7         | 7       |
| Detector                          | ACIS-7              | ACIS-7               | Obspar file type                      | PREDICTED | ACTUAL  |
| Grating                           | NONE                | NONE                 | Obspar update status                  | NONE      | UPDATED |
| Data mode                         | VFAINT              | VFAINT               | Number of optional ACIS chips dropped | 0         | 0       |
| Observation mode                  | POINTING            | POINTING             | On-chip summing requested             | N         | N       |
| [deg] Pointing RA                 | 61.368348           | 61.39609736657962    | Subarray requested                    | NONE      | NONE    |
| [deg] Pointing Dec                | -13.139071          | -13.13436450266857   | Alternating exposures requested       | N         | N       |
| [deg] Pointing Roll               | 339.018322          | 339.1812587944858    | [s] Primary exposure time             | 0.000000  | 3       |
| [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)  | 692254224.184000    | 692253362.59899      |                                       |           |         |
| Observation start date            | 2019-12-09T04:49:15 | 2019-12-09T04:36:02  |                                       |           |         |
| [s] Observation end time (MET)    | 692264224.184000    | 692265179.82471      |                                       |           |         |
| Observation end date              | 2019-12-09T07:35:55 | 2019-12-09T07:52:59  |                                       |           |         |
| Read mode                         | TIMED               | TIMED                |                                       |           |         |

## 2.3 Aspect



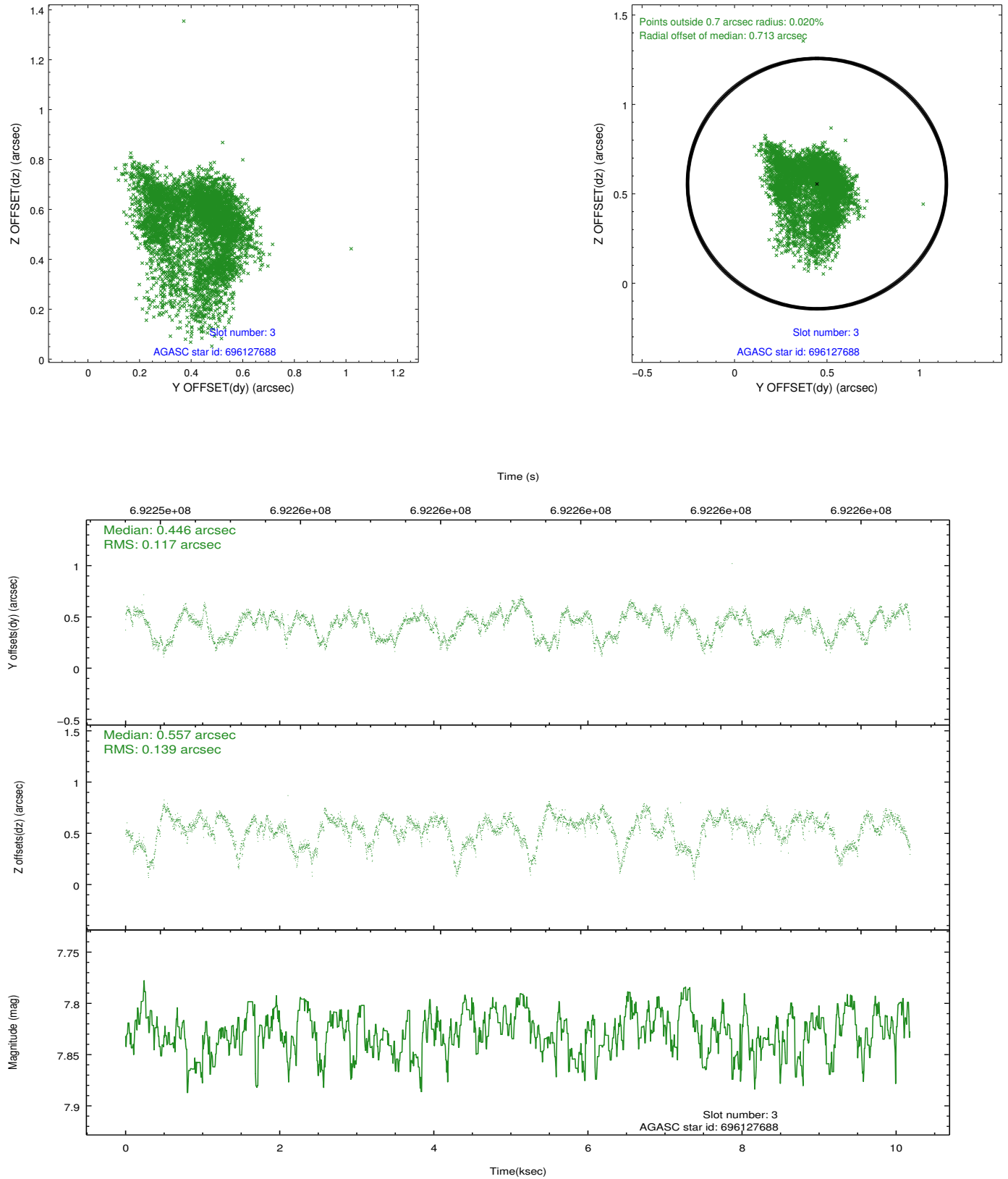


Slot Statistics

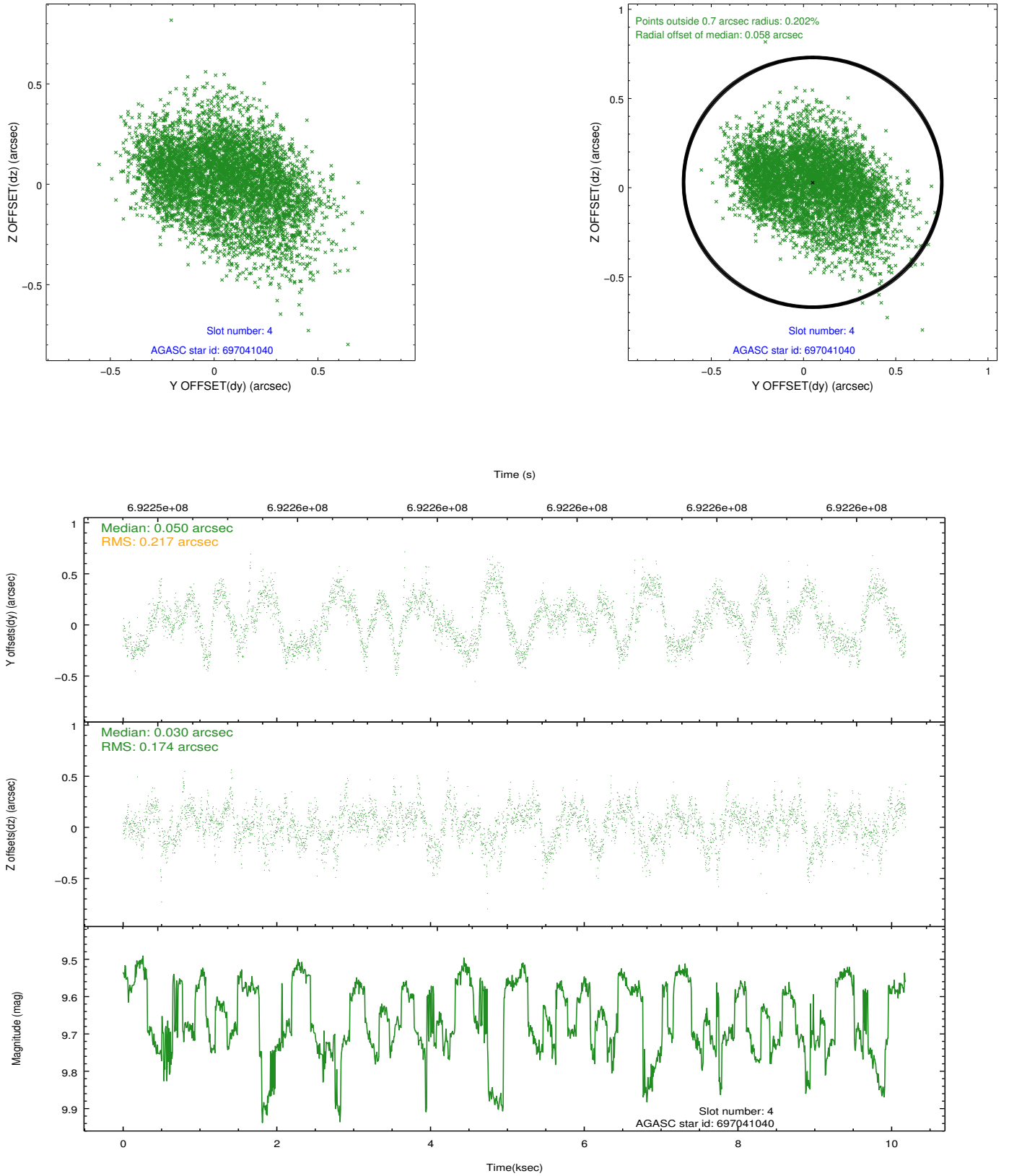
| pt | status  | used | id        | mag  | n_pts | frac_pts | med_dy | med_dz | dr1   | dr2   | ra        | dec        | mean_y   | mea   |
|----|---------|------|-----------|------|-------|----------|--------|--------|-------|-------|-----------|------------|----------|-------|
| 0  | FID     |      | ACIS-S-2  | 7.23 | 2483  | 1.000    | -0.354 | -0.291 | 0.009 | 0.016 | 0.000000  | 0.000000   | -771.92  | -1742 |
| 1  | FID     |      | ACIS-S-4  | 7.34 | 2485  | 1.000    | 0.862  | 0.249  | 0.007 | 0.012 | 0.000000  | 0.000000   | 2142.25  | 166   |
| 2  | FID     |      | ACIS-S-5  | 7.30 | 2485  | 1.000    | -0.539 | 0.051  | 0.008 | 0.013 | 0.000000  | 0.000000   | -1824.36 | 160   |
| 3  | GUIDE   | used | 696127688 | 7.83 | 4966  | 1.000    | 0.446  | 0.557  | 0.194 | 0.323 | 60.915031 | -13.485885 | -1033.56 | -1734 |
| 4  | GUIDE   | used | 697041040 | 9.68 | 4950  | 1.000    | 0.050  | 0.030  | 0.301 | 0.463 | 61.347282 | -12.993477 | -256.46  | 462   |
| 5  | GUIDE   | used | 697042024 | 9.88 | 4904  | 1.000    | -0.245 | -0.490 | 0.347 | 0.567 | 61.632985 | -12.995361 | 681.62   | 815   |
| 6  | GUIDE   | used | 697042680 | 9.05 | 4963  | 1.000    | -0.212 | -0.071 | 0.227 | 0.341 | 61.635735 | -13.210964 | 967.79   | 93    |
| 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

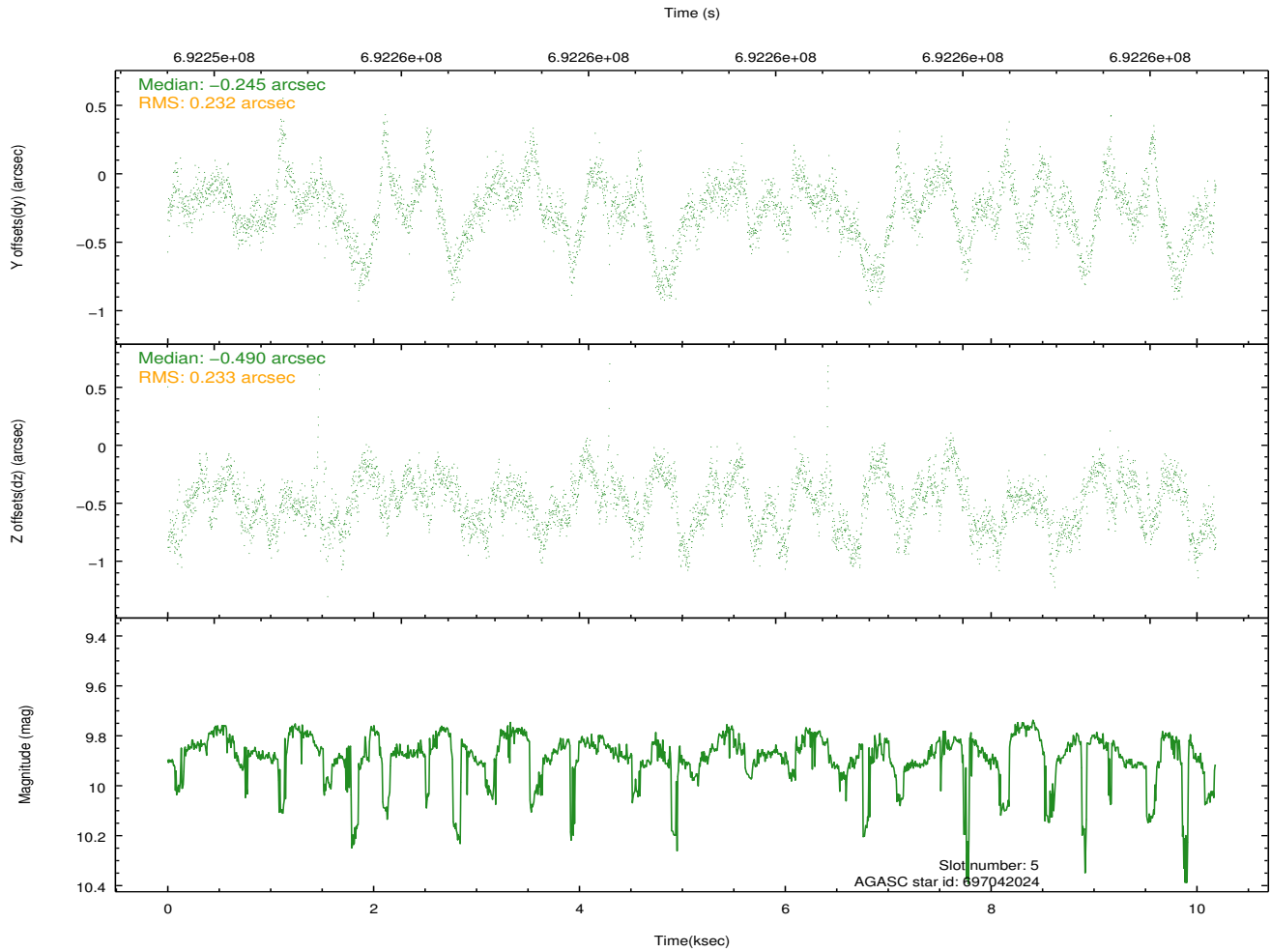
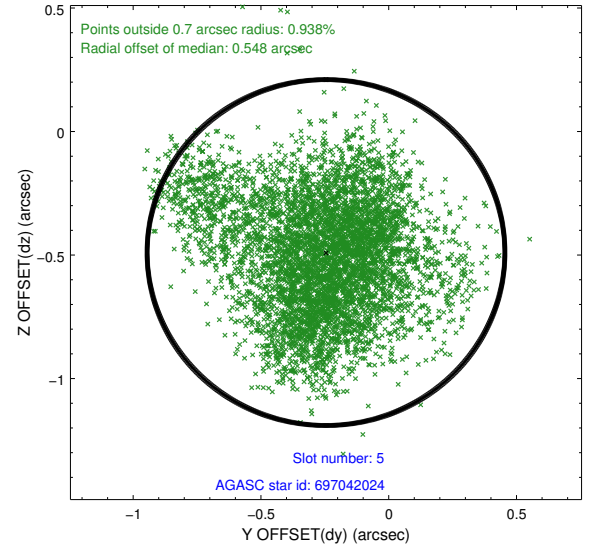
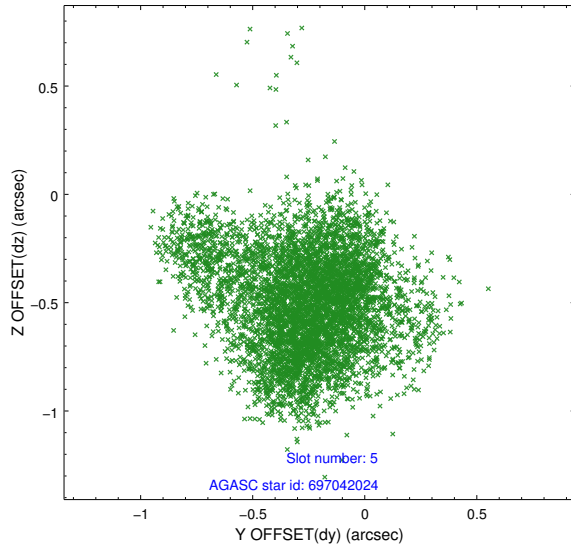
### 2.4.1 Slot 3



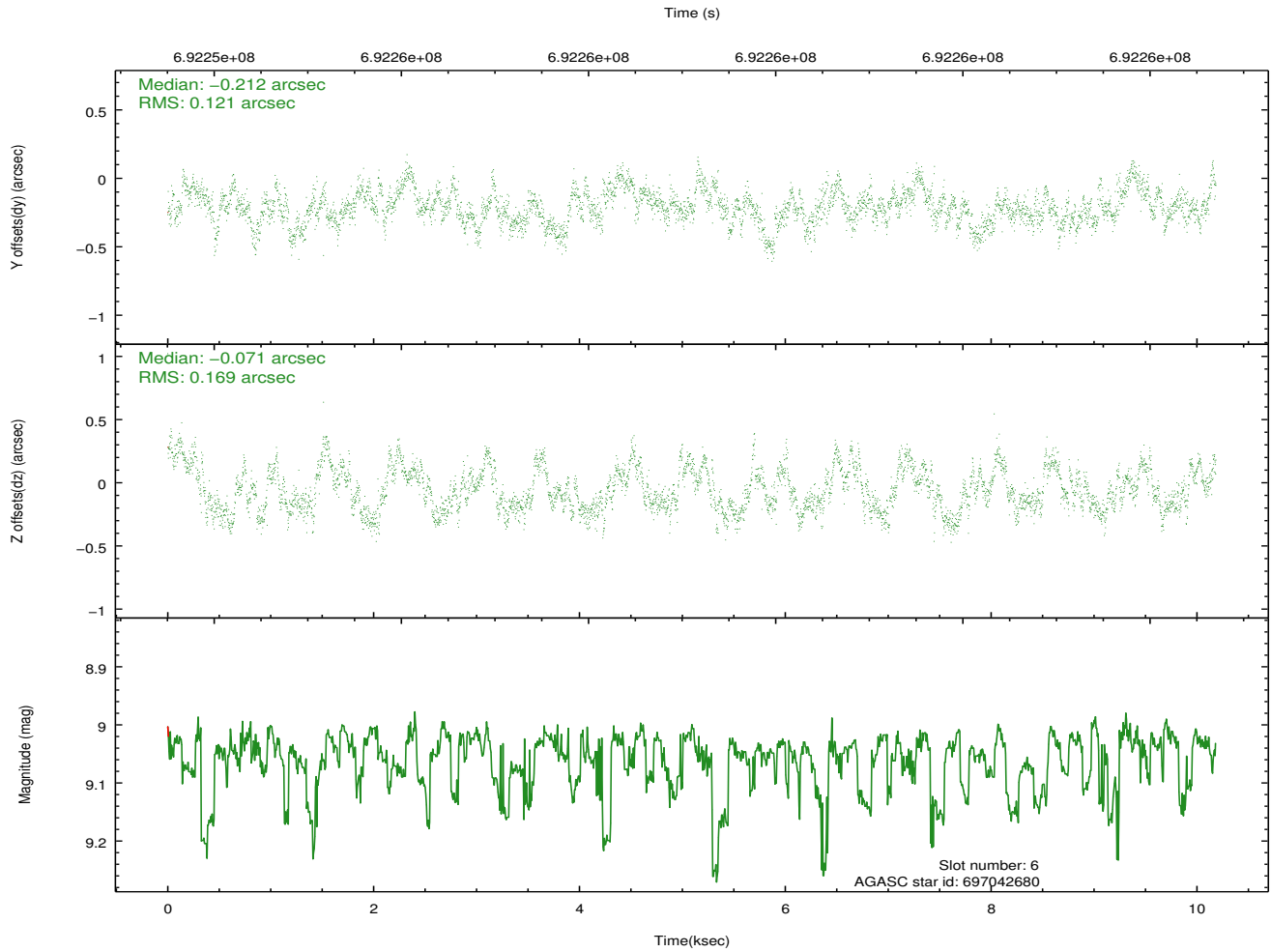
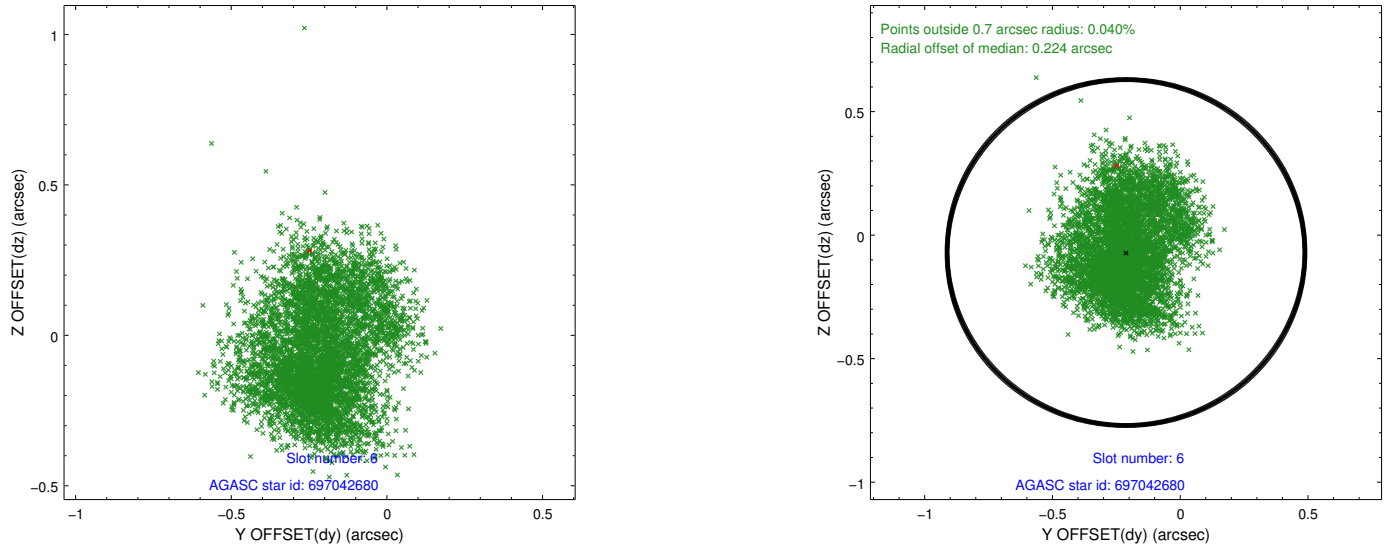
## 2.4.2 Slot 4



### 2.4.3 Slot 5



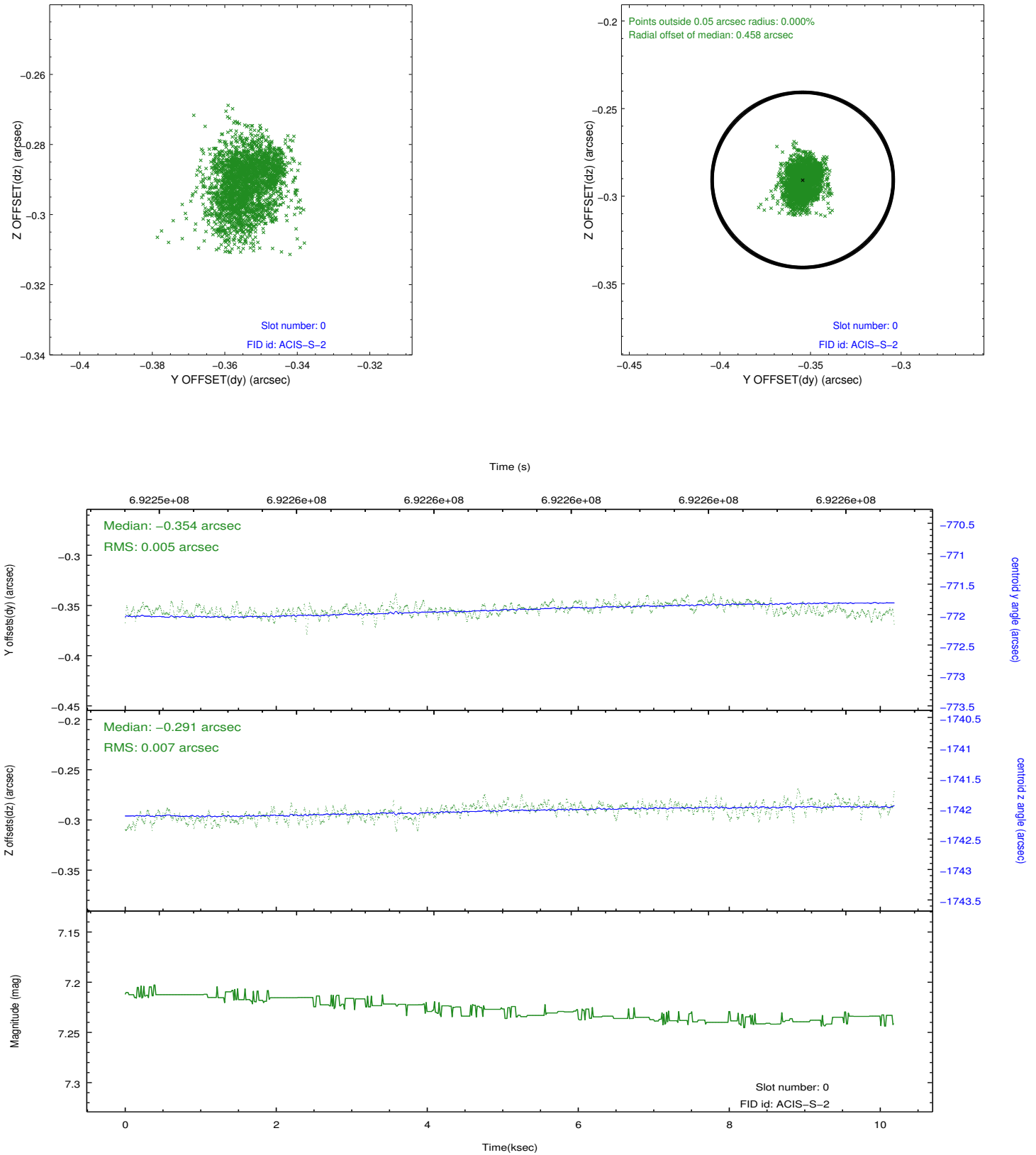
## 2.4.4 Slot 6



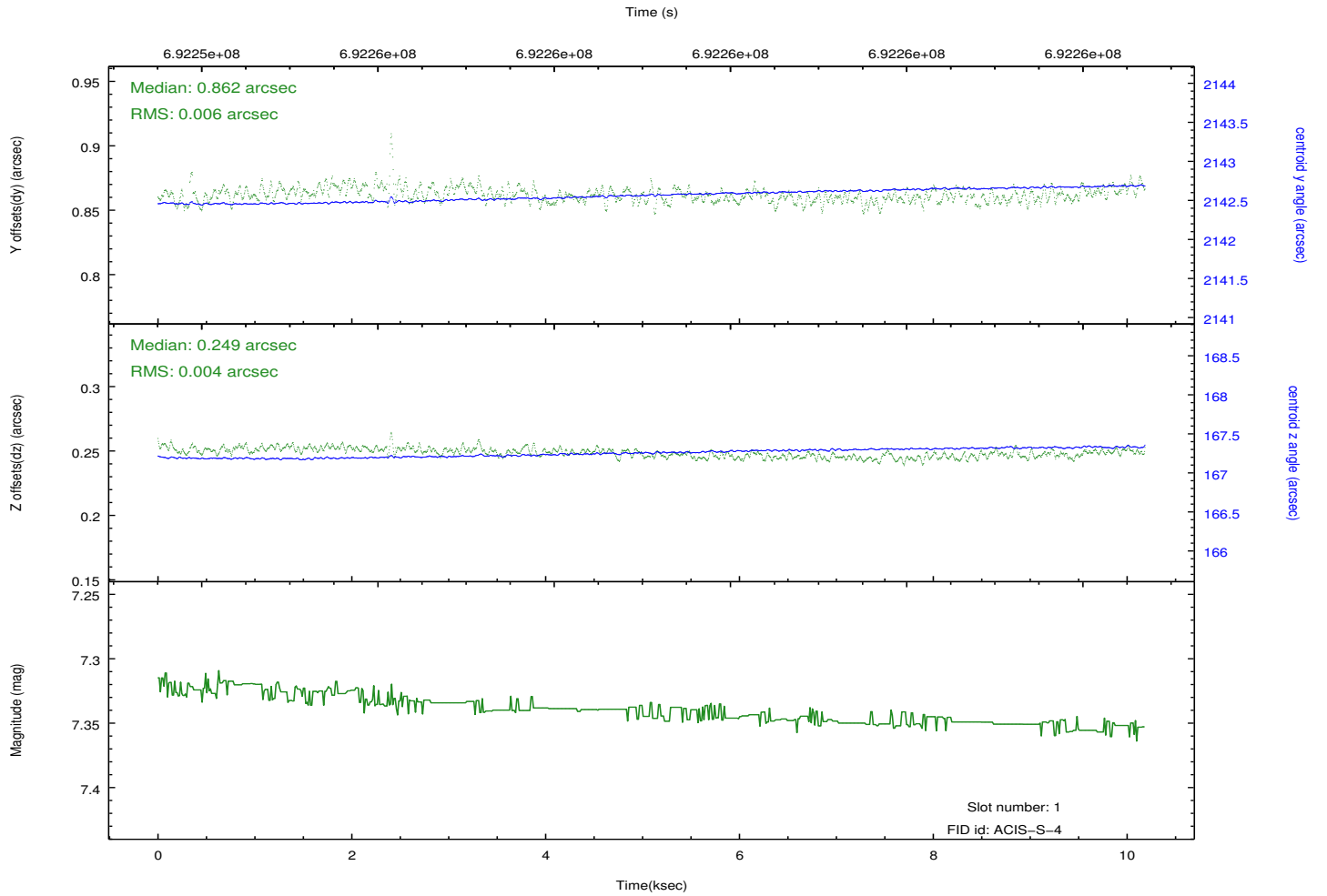
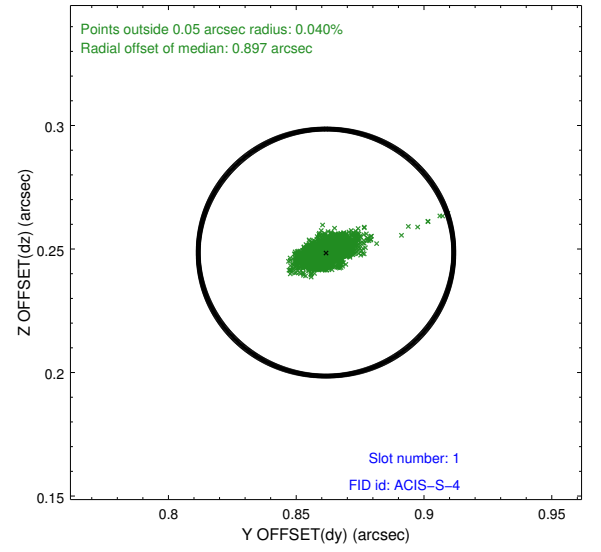
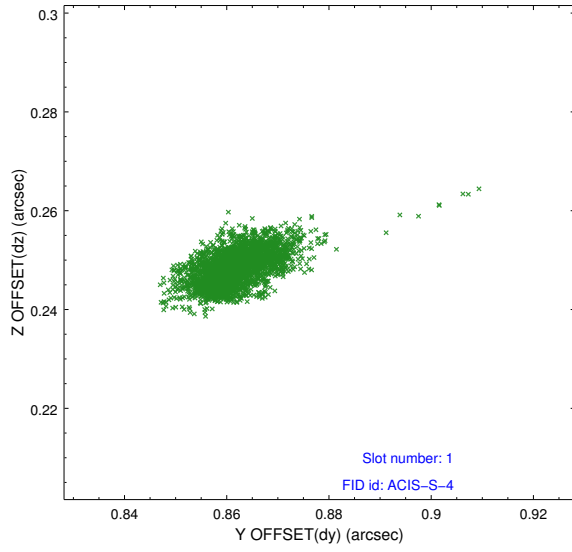


## 2.5 FID Slots

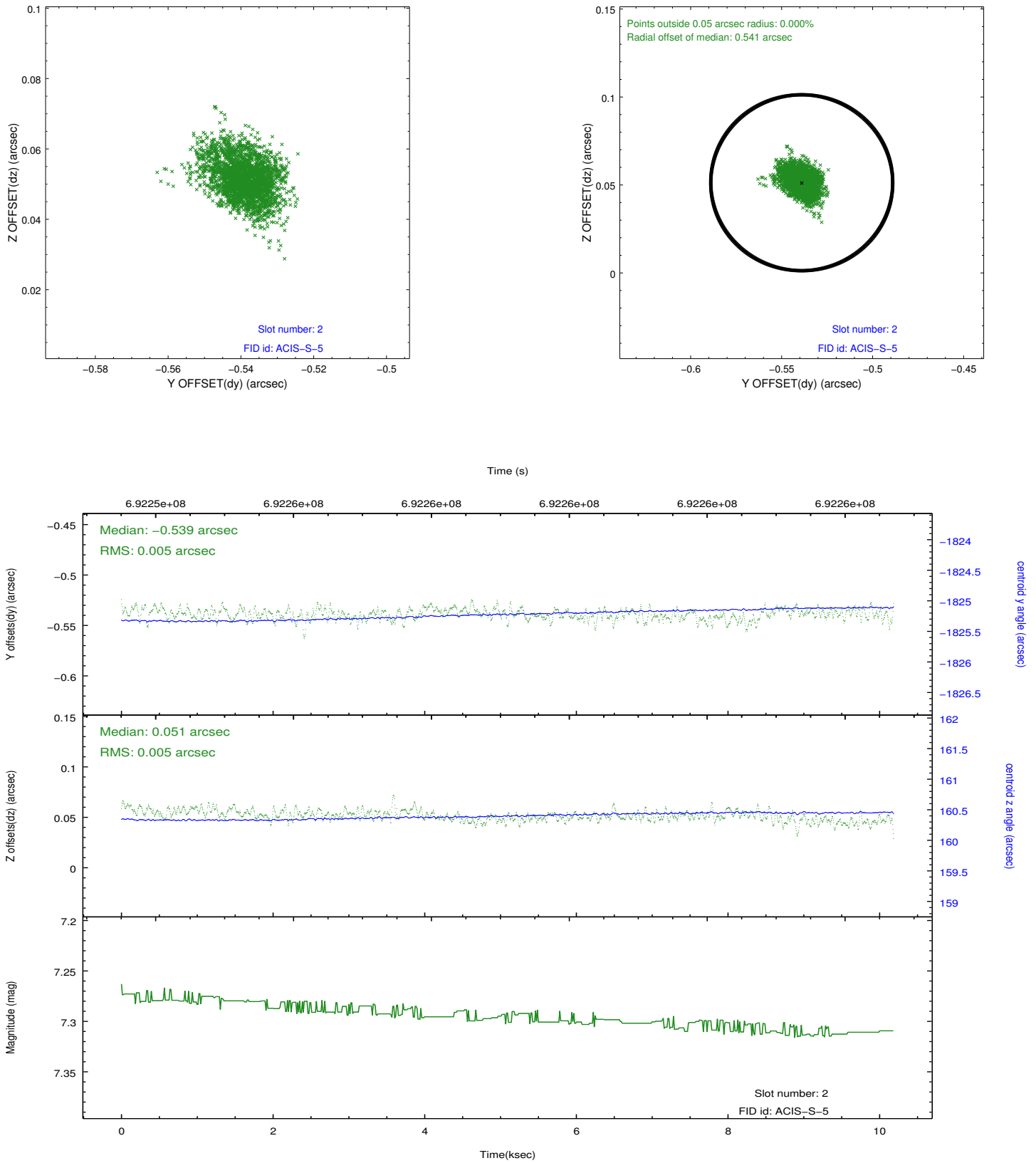
### 2.5.1 Slot 0



## 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)      | 2019.12.12 |
| V&V Edition                | 1          |
| V&V Disposition and Status | OK         |
| V&V Charge Time            | 10.092     |

## 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.

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Comment for FP temp violation

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The focal plane temperature during the interval 692256706.10 - 692264218.10 (MET s) of this observation was warmer than the upper limit for optimum calibration of the ACIS gain and spectral resolution (i.e., -111.0 C for ACIS-S).

The Chandra calibration team calibrates the ACIS gain and spectral resolution using data from the external calibration source (ECS). ECS data show that the frontside-illuminated (FI) CCDs are more temperature sensitive than the backside-illuminated (BI) CCDs.

A summary of the current calibration status of the ACIS gain and spectral resolution can be found at:

[http://asc.harvard.edu/cal/Acis/Cal\\_prods/Gain\\_and\\_Spectral\\_Resolution/ACIS\\_response\\_summary.html](http://asc.harvard.edu/cal/Acis/Cal_prods/Gain_and_Spectral_Resolution/ACIS_response_summary.html)

The main points are:

- 1) The gain on BI chips remains within 0.3% (i.e., the systematic uncertainty in the ACIS gain quoted on the Chandra Calibration Status Summary web page) at all measured temperatures.
- 2) The gain on FI chips remains within 0.3% below row 600 at all measured temperatures.
- 3) The gain on FI chips above row 600 can be underestimated by as much as 1% for focal plane temperatures exceeding -116 C.
- 4) The spectral resolution (i.e., FWHM) on BI chips is insensitive to the focal plane temperature.
- 5) Warmer focal plane temperatures increase the FWHM on FI chips by up to 30 eV near row 512 and by up to 70 eV near the top of the chips.

In summary, the user should be cautious in the spectral analysis of high S/N emission lines detected on the top half of FI chips in this observation. Default processing with the current version of the CALDB will underestimate photon energies by up to 1% and broaden emission

lines by up to 70 eV.