

V&V Reference Report

L2 ASCDS Version : 10.8.1

Observation 22869 - L2 Version 1
Chandra X-Ray Center

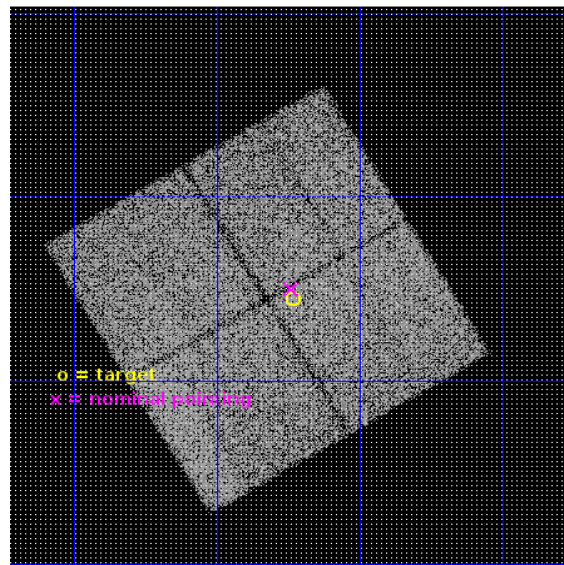
L2 Processing Date : Oct 12 2019

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1 Front

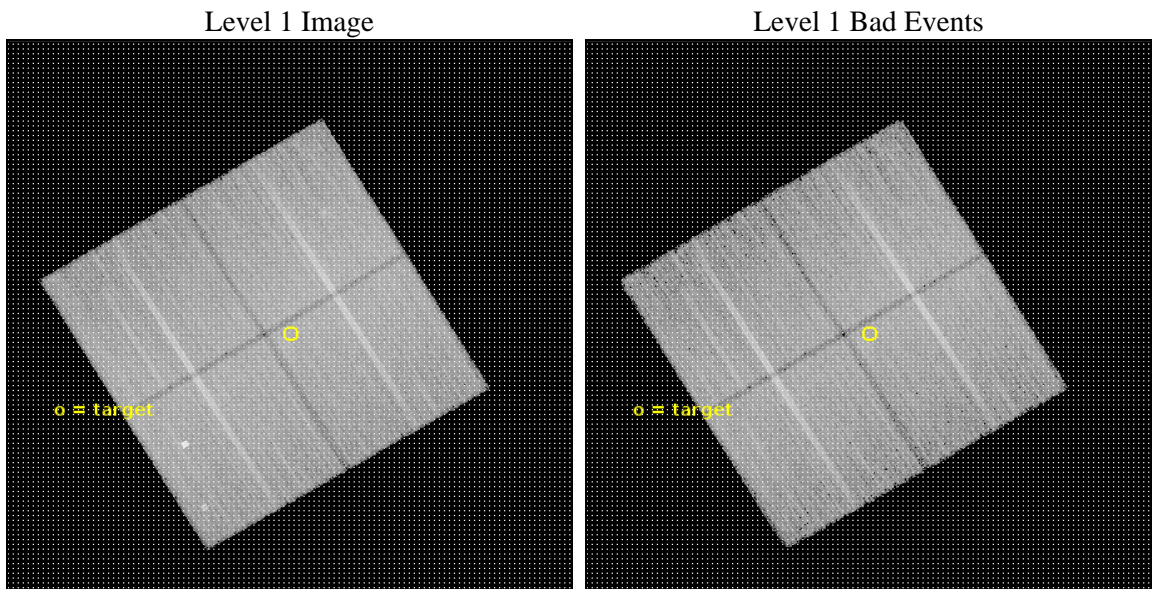
| | | |
|----------|--|---|
| seq_num | 703950 | Sequence number |
| obs_id | 22869 | Observation id |
| title | Unveiling the AGN population in the highest redshift, mature, massive galaxy cluster | Proposal title |
| observer | Emil Noordeh | Principal investigator |
| object | XLSSC 122 | Source name |
| dtcycle | 0 | |
| cycle | P | events from which exps? Prim/Second/Both |
| ra_targ | 34.433 | Observer's specified target RA [deg] |
| dec_targ | -3.759 | Observer's specified target Dec [deg] |
| ra_nom | 34.434882279582 | Nominal RA [deg] |
| dec_nom | -3.7500280363028 | Nominal Dec [deg] |
| roll_nom | 59.208820385861 | Nominal Roll [deg] |
| revision | 1 | Processing version of data |
| ontime | 35026.859189272 | Sum of GTIs [s] |
| livetime | 34569.207487565 | Livetime [s] |
| ontime0 | 35023.718148828 | Sum of GTIs [s] |
| ontime1 | 35020.577078938 | Sum of GTIs [s] |
| ontime2 | 35020.576998234 | Sum of GTIs [s] |
| ontime3 | 35026.859189272 | Sum of GTIs [s] |
| l2events | 100393 | Number of level 2 events |



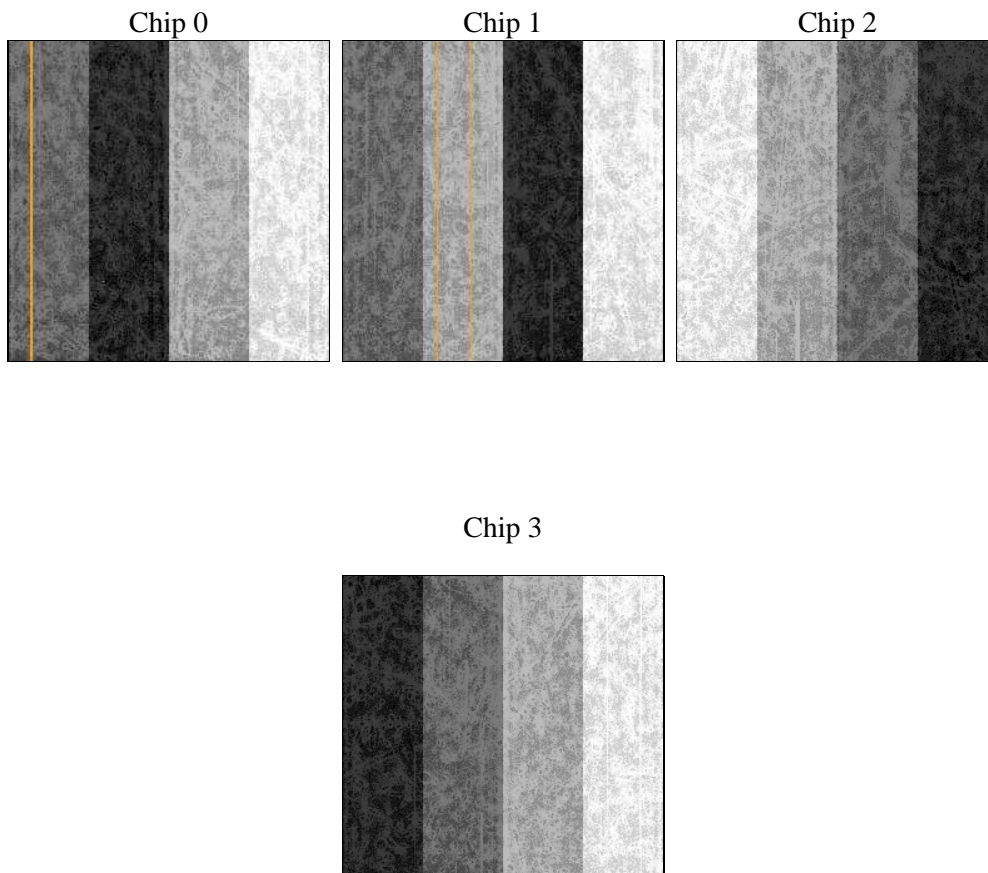
2 OBI

2.1 OBI

2.1.1 Images



2.1.2 Bias



2.1.3 Parameters

| | | | | | |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num | 0 | Obi number | sched_exp_time | 34954.000000 | [s] Scheduled observation exposure time |
| ascdsver | 10.8.1 | Processing system revision | ontime | 35026.859189272 | Sum of GTIs [s] |
| caldsver | 4.8.4.2 | | ontime0 | 35023.718148828 | Sum of GTIs [s] |
| date | 2019-10-12T14:56:05 | Date and time of file creation | ontime1 | 35020.577078938 | Sum of GTIs [s] |
| revision | 1 | Processing version of data | ontime2 | 35020.576998234 | Sum of GTIs [s] |
| | | | ontime3 | 35026.859189272 | Sum of GTIs [s] |
| | | | l1events | 1059163 | Number of level 1 events |

2.1.4 Events

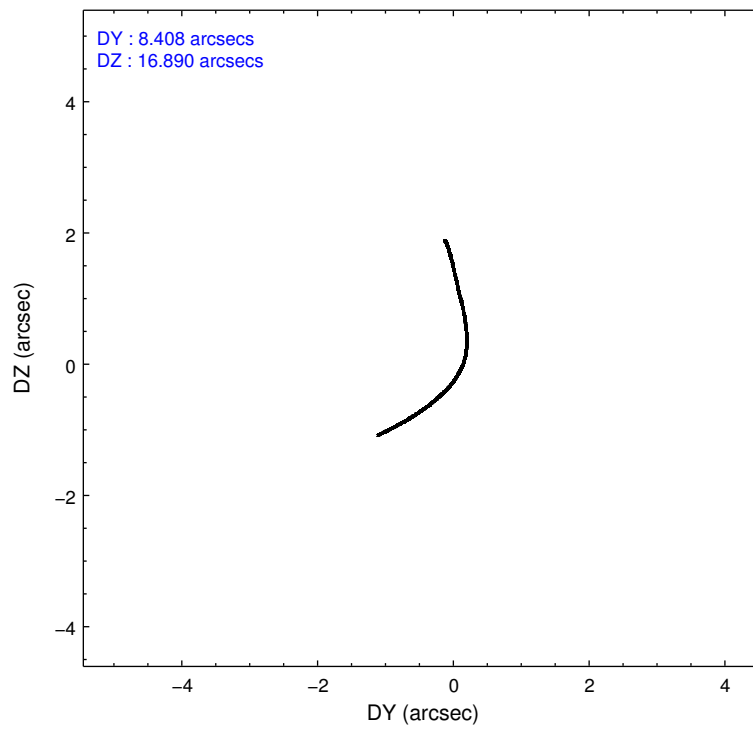
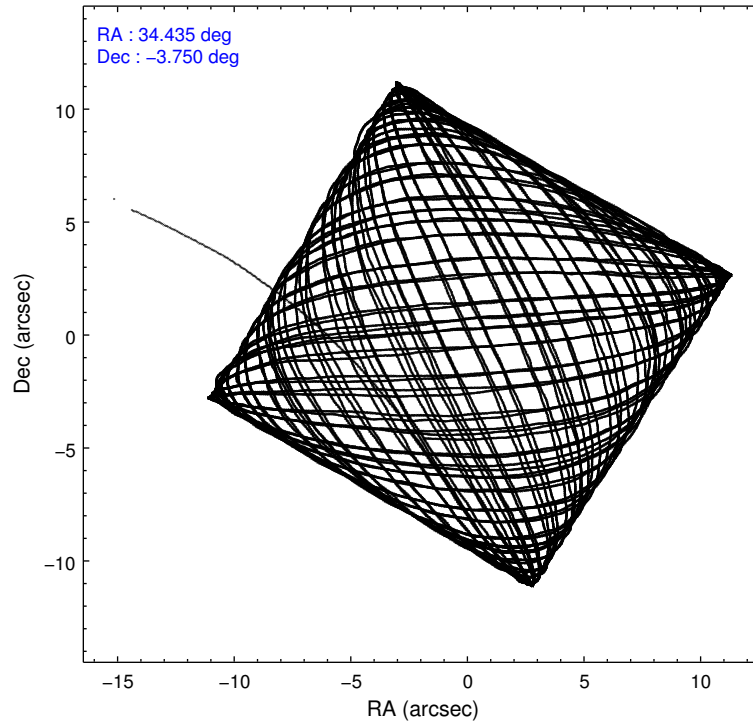
| | ccd 0 | ccd 1 | ccd 2 | ccd 3 |
|-----------------|--------|--------|--------|--------|
| level 1 events | 248875 | 267817 | 275502 | 266969 |
| rejected events | 218968 | 230524 | 246500 | 238809 |
| rejected % | 87% | 86% | 89% | 89% |

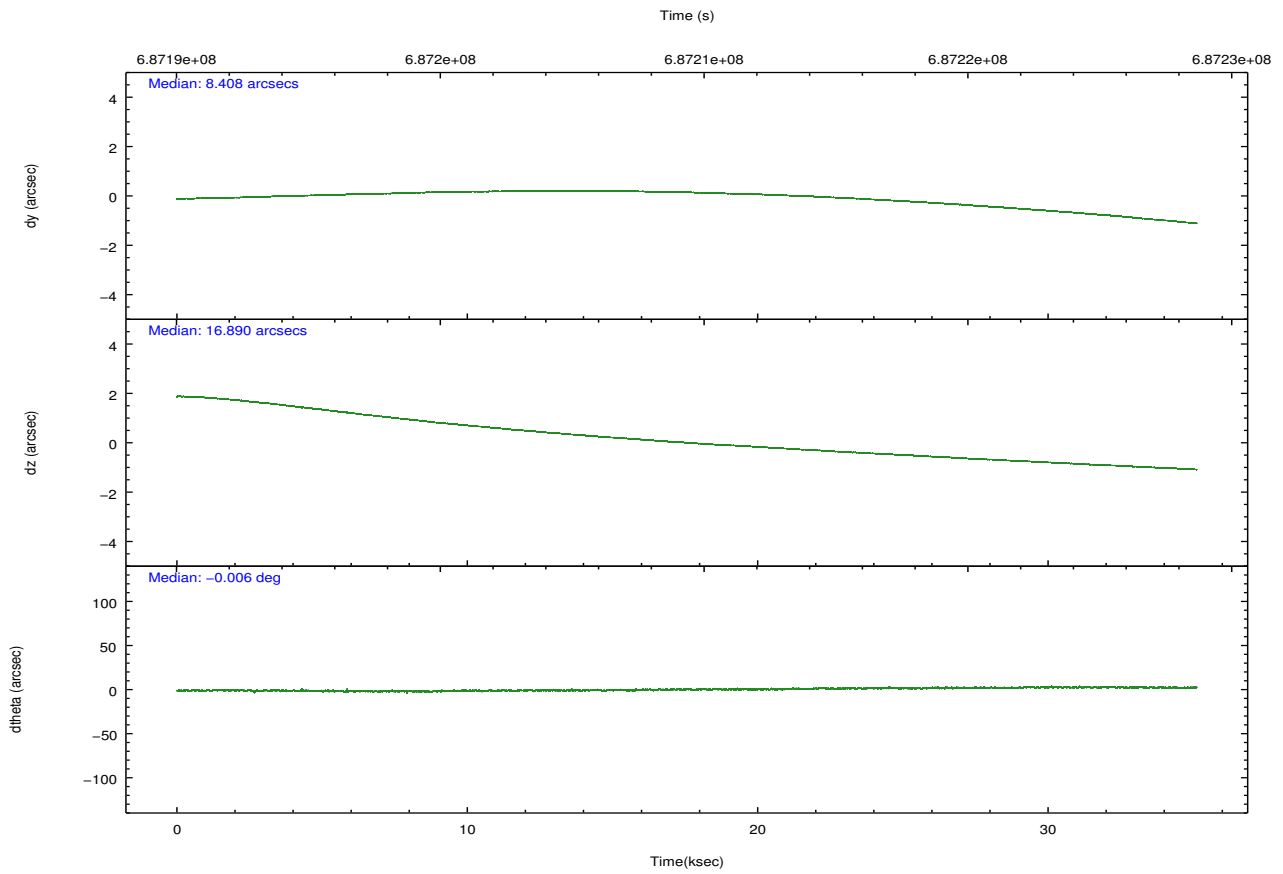
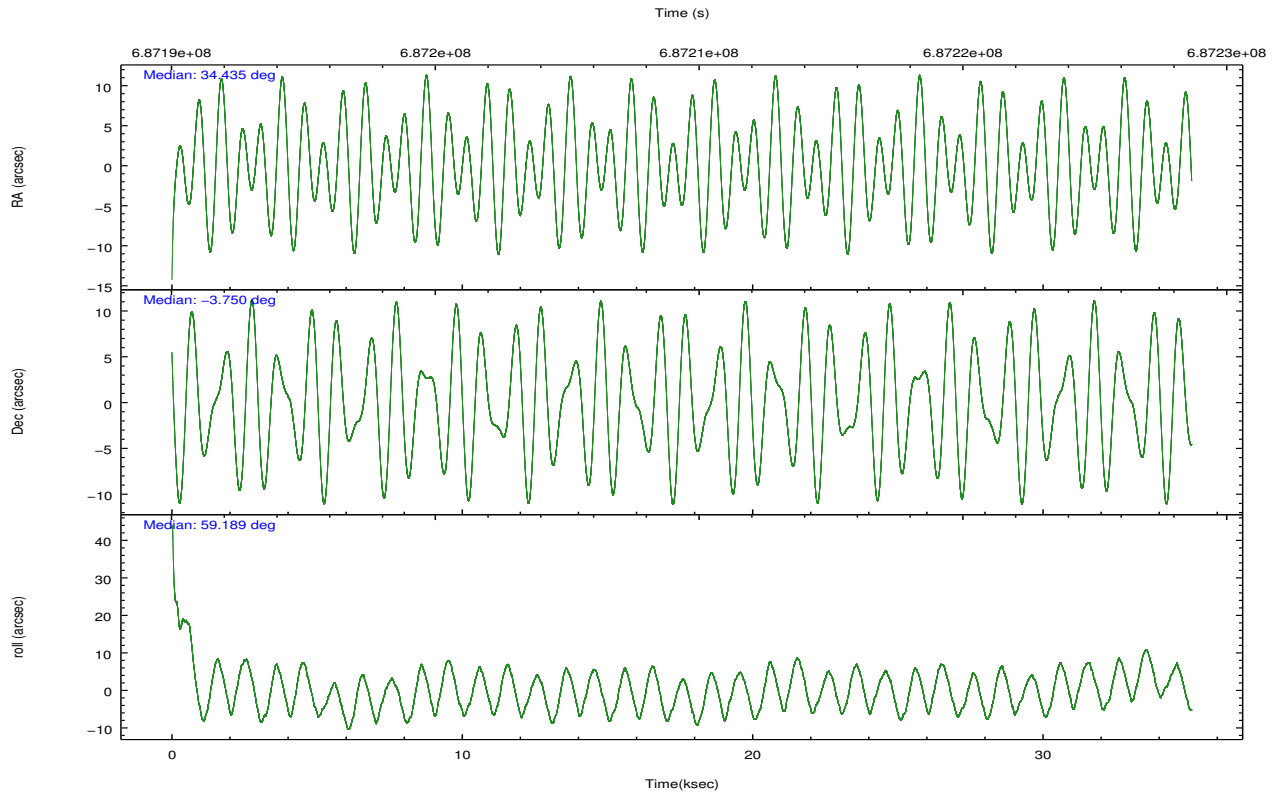
| | ccd 0 | ccd 1 | ccd 2 | ccd 3 |
|----------------|--------|--------|--------|--------|
| grade 0 events | 9849 | 14766 | 10304 | 9682 |
| | 3% | 5% | 3% | 3% |
| grade 1 events | 136 | 164 | 170 | 159 |
| | 0% | 0% | 0% | 0% |
| grade 2 events | 7664 | 8733 | 6997 | 6329 |
| | 3% | 3% | 2% | 2% |
| grade 3 events | 2875 | 2944 | 2829 | 2958 |
| | 1% | 1% | 1% | 1% |
| grade 4 events | 2816 | 2878 | 2833 | 2891 |
| | 1% | 1% | 1% | 1% |
| grade 5 events | 11323 | 11617 | 10844 | 12560 |
| | 4% | 4% | 3% | 4% |
| grade 6 events | 6704 | 7981 | 6040 | 6301 |
| | 2% | 2% | 2% | 2% |
| grade 7 events | 207508 | 218734 | 235485 | 226089 |
| | 83% | 81% | 85% | 84% |

2.2 Compared Parameters

| Parameter | Planned | Actual | Parameter | Planned | Actual |
|-----------------------------------|---------------------|----------------------|---------------------------------------|-----------|---------|
| Instrument | ACIS | ACIS | Obspar format version number | 7 | 7 |
| Detector | ACIS-0123 | ACIS-0123 | 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 | 34.434599 | 34.43488227958173 | CCD I2 on | Y | Y |
| [deg] Pointing Dec | -3.777621 | -3.750028036302795 | CCD I3 on | Y | Y |
| [deg] Pointing Roll | 59.000108 | 59.20882038586058 | 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 | N |
| [mm] SIM translation stage pos | -231.592463 | -231.5960967419932 | CCD S3 on | N | N |
| [mm] SIM translation stage offset | -2 | -1.996356260936523 | CCD S4 on | N | N |
| [s] Observation start time (MET) | 687191945.184000 | 687190647.95612 | CCD S5 on | N | N |
| Observation start date | 2019-10-11T14:37:56 | 2019-10-11T14:17:27 | Number of optional ACIS chips dropped | 1 | 1 |
| [s] Observation end time (MET) | 687226899.184000 | 687227504.39584 | On-chip summing requested | N | N |
| Observation end date | 2019-10-12T00:20:30 | 2019-10-12T00:31:44 | Subarray requested | NONE | NONE |
| Read mode | TIMED | TIMED | Alternating exposures requested | N | N |
| | | | [s] Primary exposure time | 0.000000 | 3.1 |

2.3 Aspect





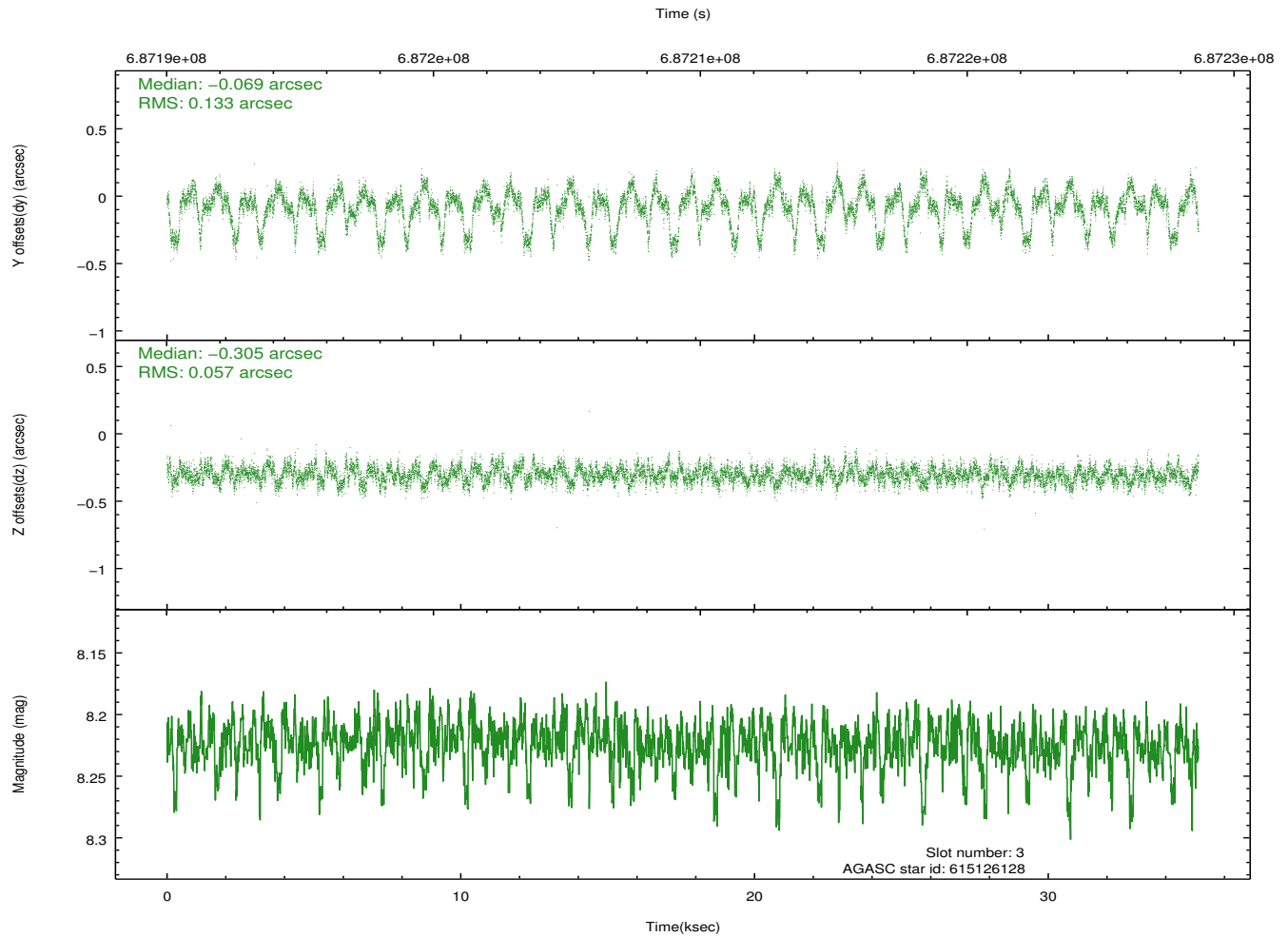
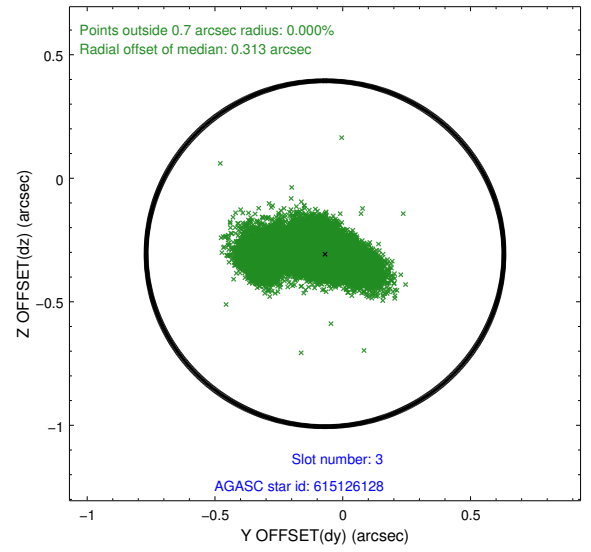
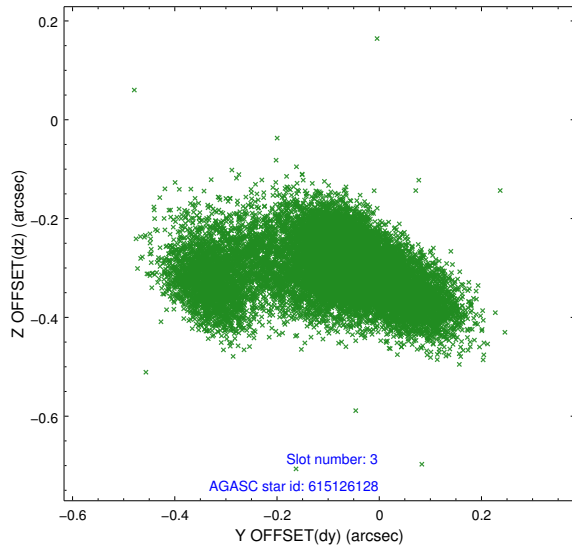
Slot Statistics

| slot | status | used | id | mag | n_pts | frac_pts | med_dy | med_dz | dr1 | dr2 | ra | dec | mean_y | mea |
|------|--------|------|-----------|------|-------|----------|--------|--------|-------|-------|-----------|-----------|----------|-------|
| 0 | FID | | ACIS-I-1 | 7.25 | 8564 | 1.000 | 0.125 | -0.115 | 0.032 | 0.050 | 0.000000 | 0.000000 | 931.52 | -881 |
| 1 | FID | | ACIS-I-5 | 7.22 | 8565 | 1.000 | -0.468 | 0.044 | 0.016 | 0.027 | 0.000000 | 0.000000 | -1817.29 | 1015 |
| 2 | FID | | ACIS-I-6 | 7.23 | 8564 | 1.000 | 0.250 | 0.142 | 0.021 | 0.029 | 0.000000 | 0.000000 | 396.97 | 1660 |
| 3 | GUIDE | used | 615126128 | 8.22 | 17122 | 1.000 | -0.069 | -0.305 | 0.138 | 0.284 | 34.026050 | -3.868420 | -1036.48 | 1089 |
| 4 | GUIDE | used | 615128304 | 8.56 | 17118 | 1.000 | 0.034 | -0.068 | 0.108 | 0.174 | 34.566287 | -4.097564 | -741.68 | -999 |
| 5 | GUIDE | used | 615129592 | 8.84 | 17114 | 1.000 | 0.032 | 0.252 | 0.125 | 0.192 | 34.607456 | -4.334536 | -1398.53 | -1564 |
| 6 | GUIDE | used | 615129680 | 8.99 | 17115 | 1.000 | -0.001 | 0.263 | 0.118 | 0.190 | 34.462822 | -4.356201 | -1732.60 | -1159 |
| 7 | GUIDE | used | 615129992 | 8.37 | 17113 | 1.000 | 0.021 | -0.150 | 0.090 | 0.150 | 33.989595 | -4.095121 | -1802.12 | 777 |

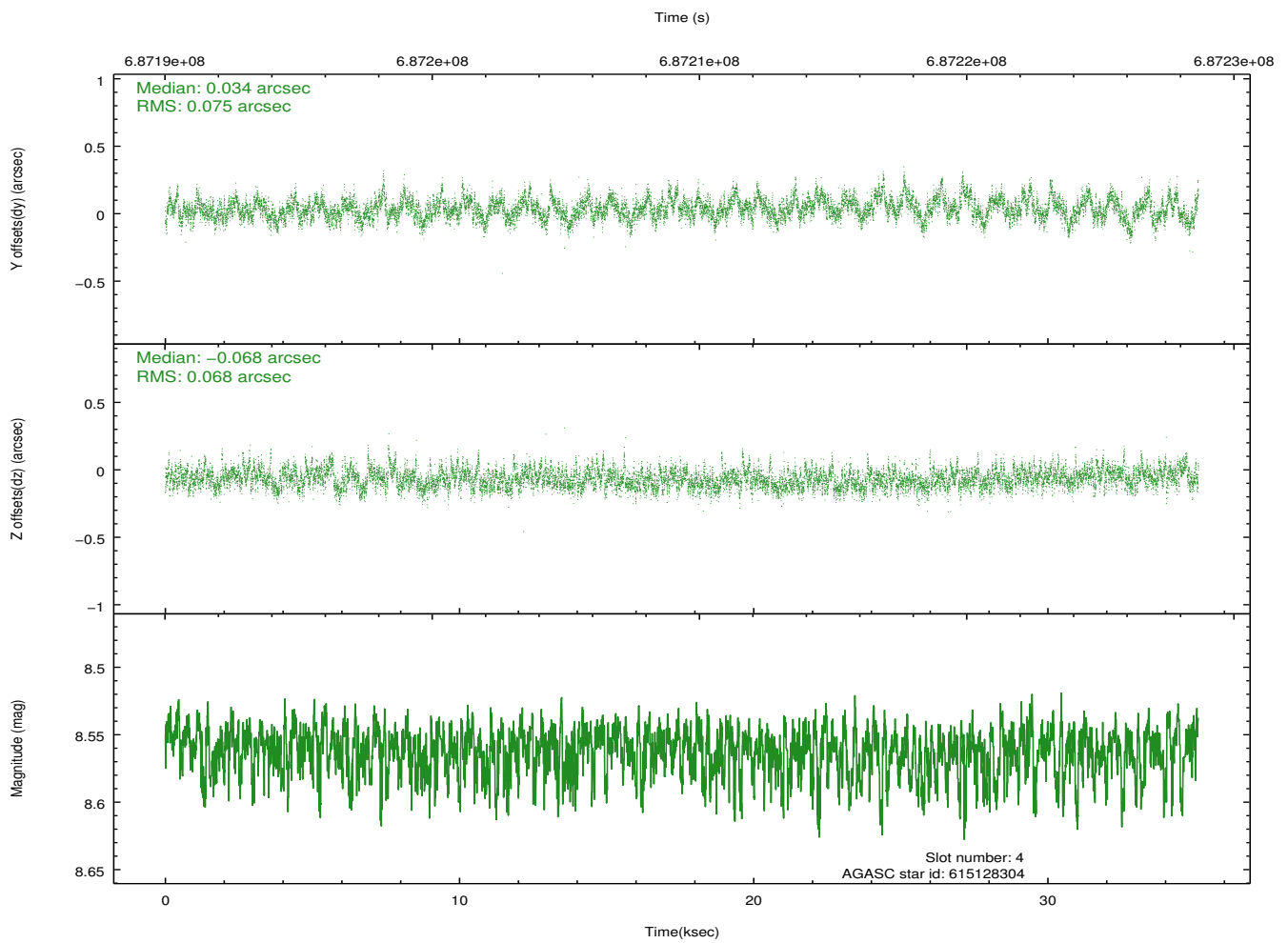
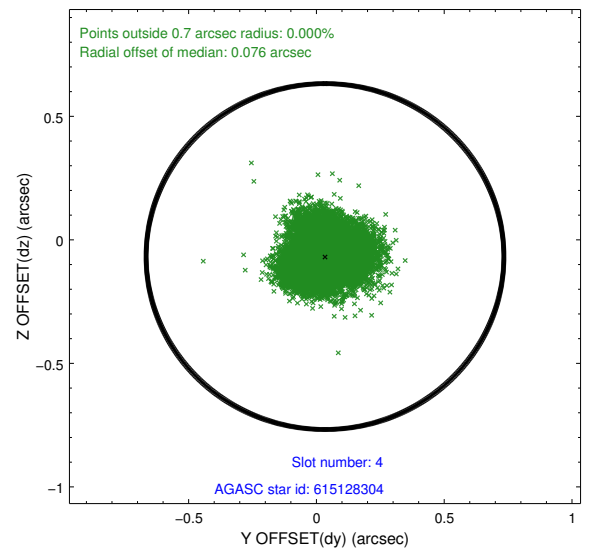
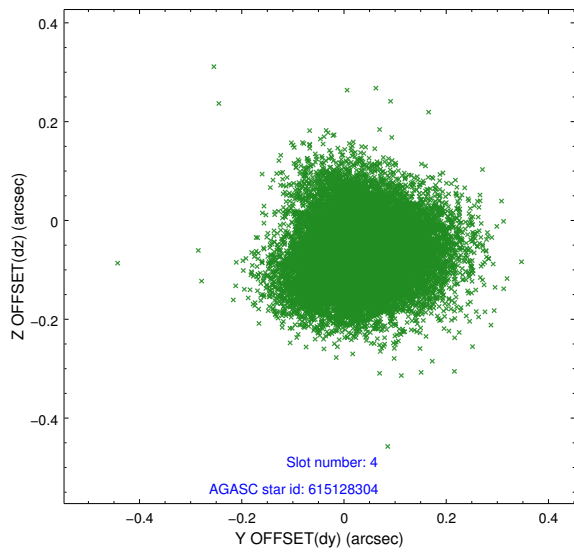
∞

2.4 Star Slots

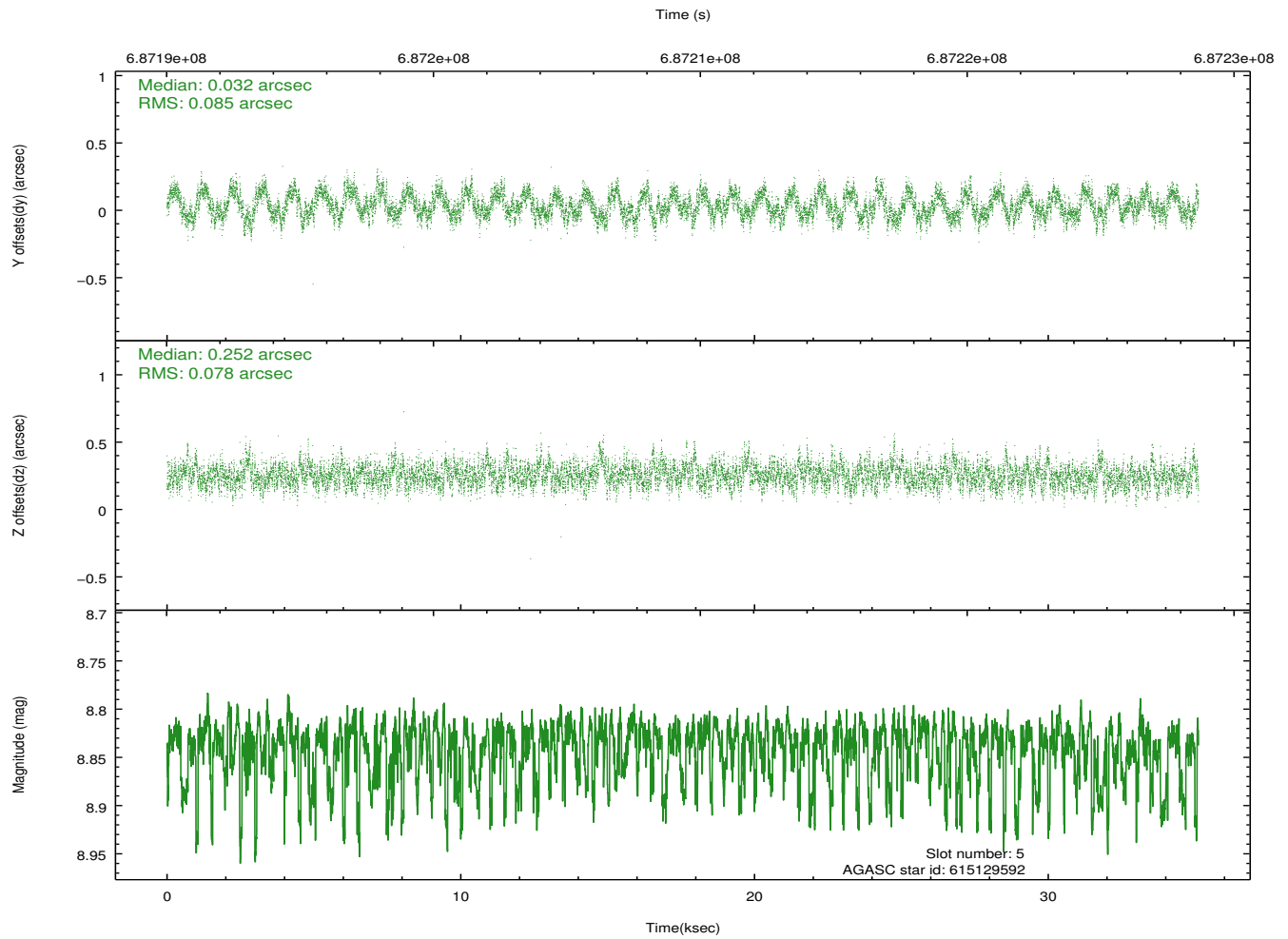
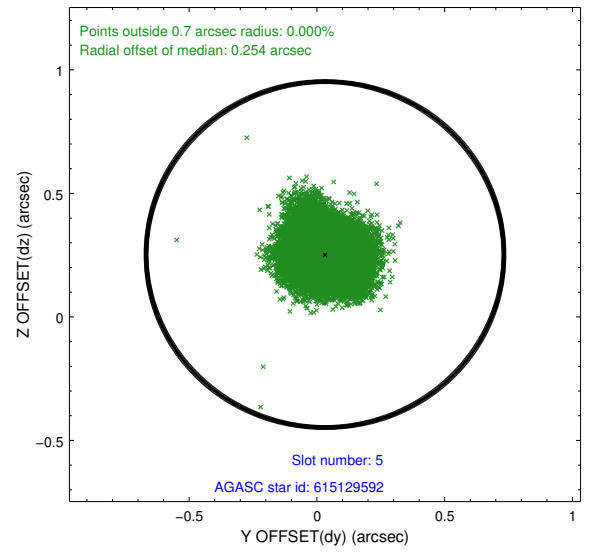
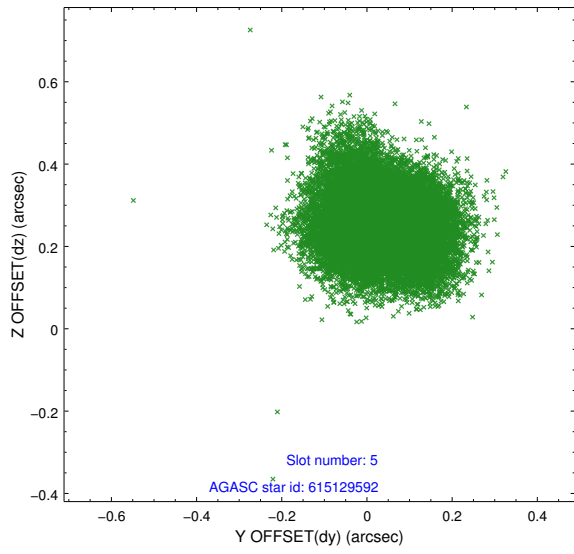
2.4.1 Slot 3



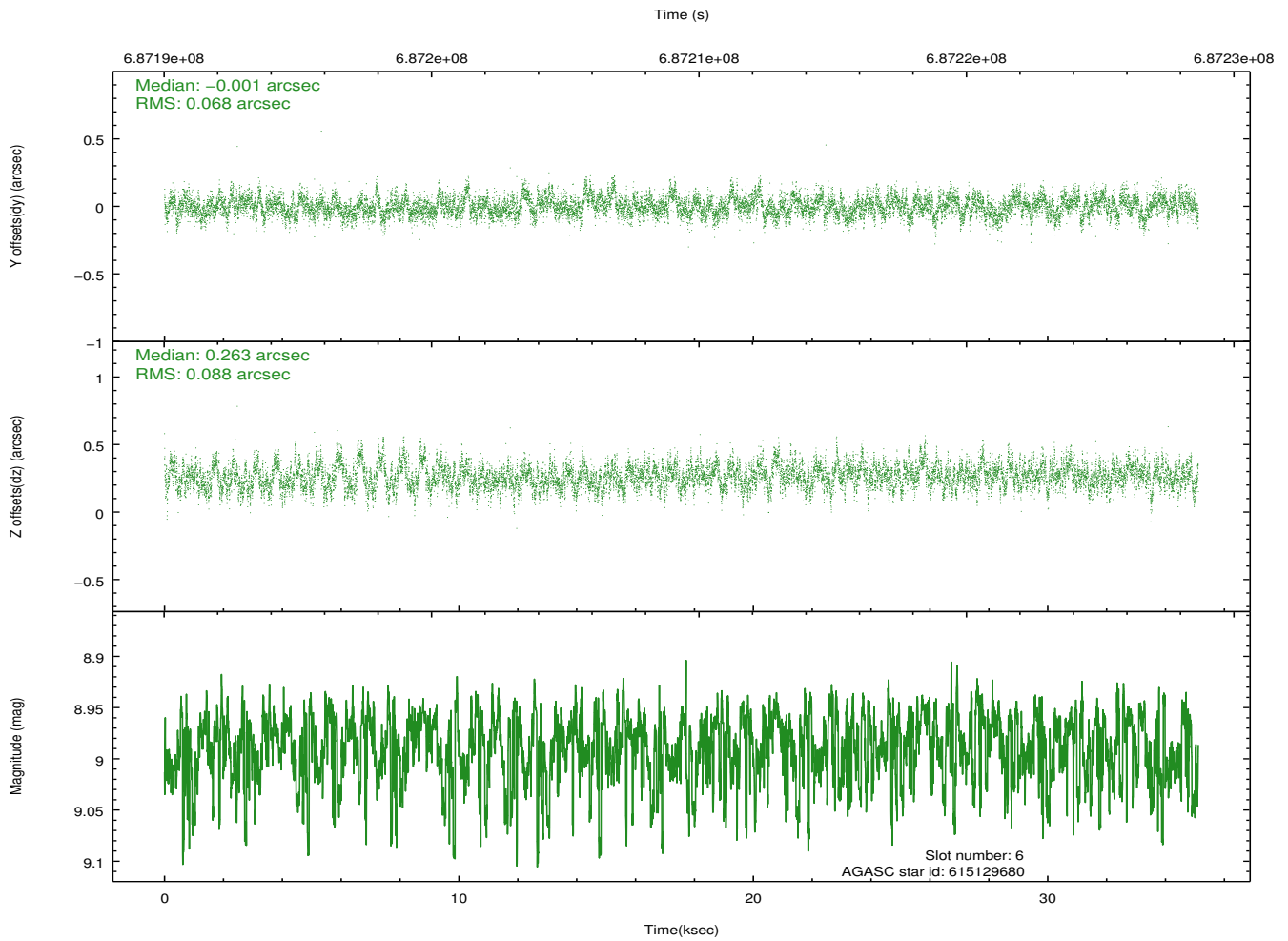
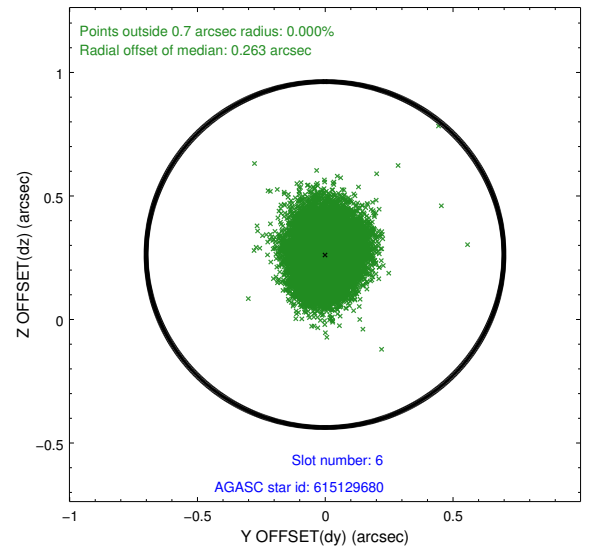
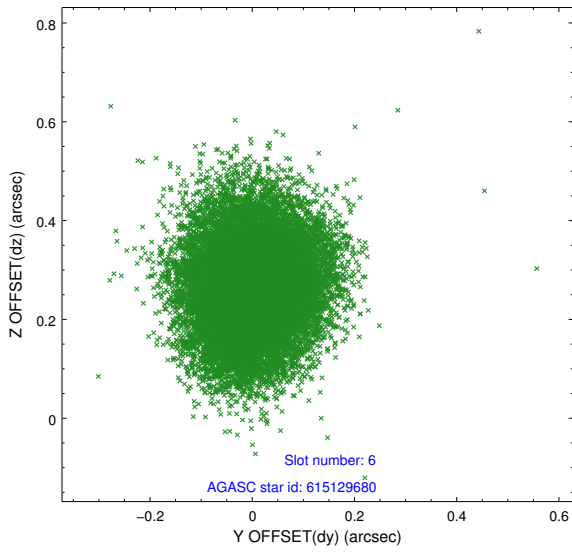
2.4.2 Slot 4



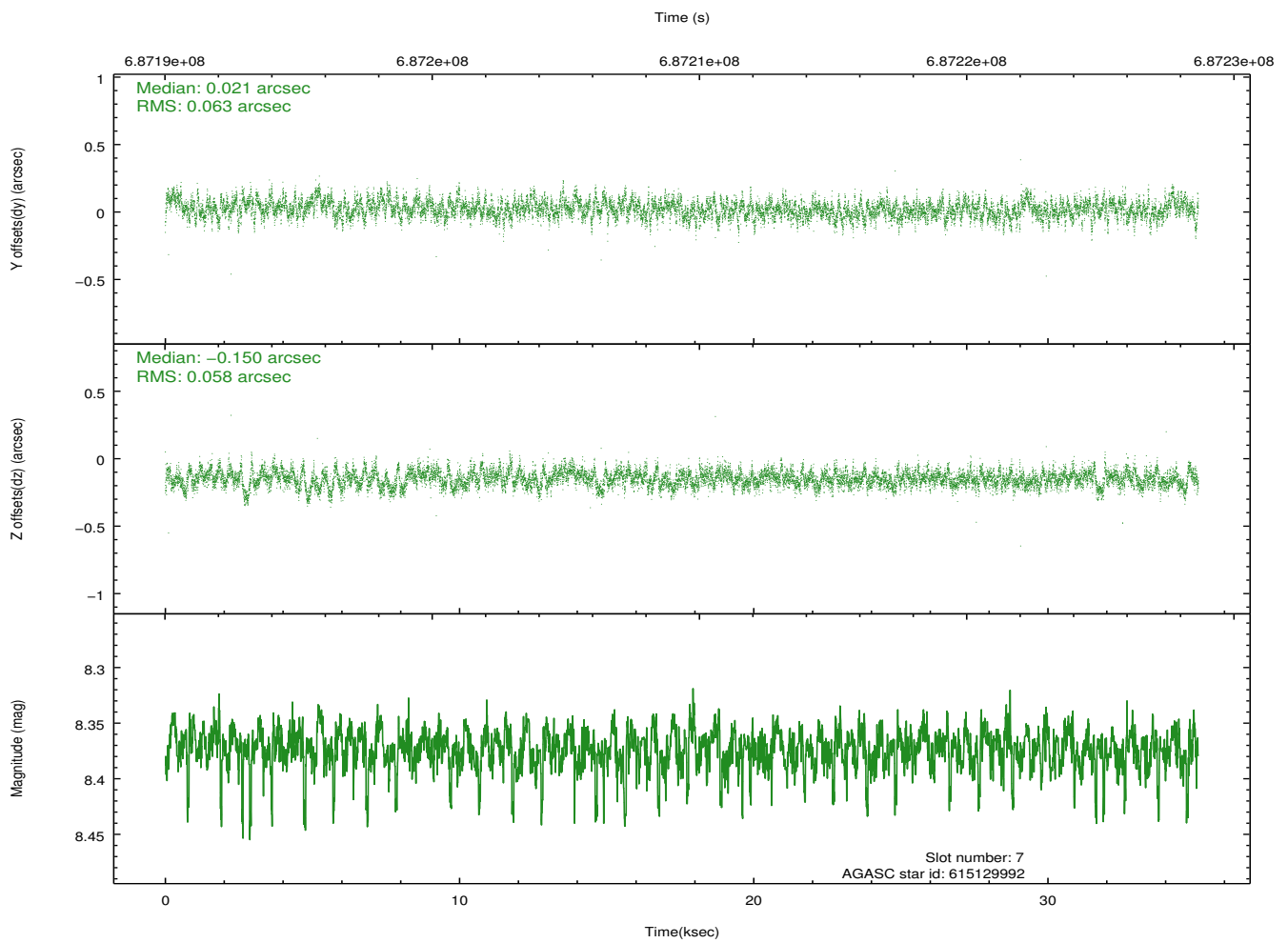
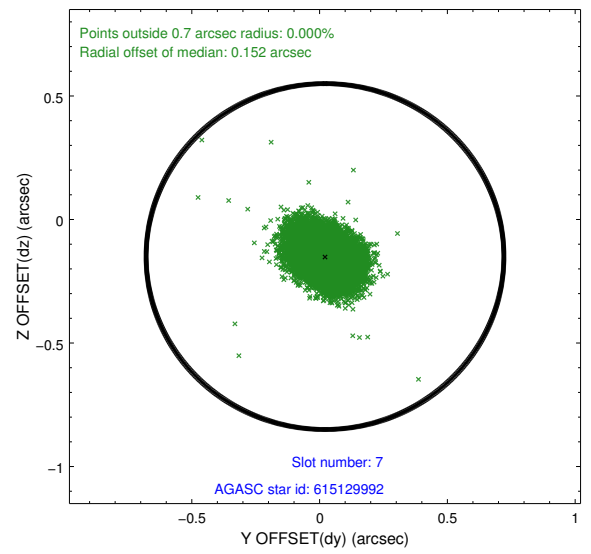
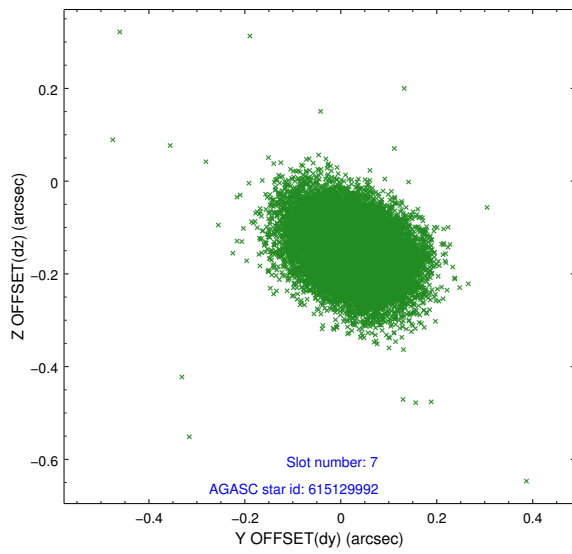
2.4.3 Slot 5



2.4.4 Slot 6

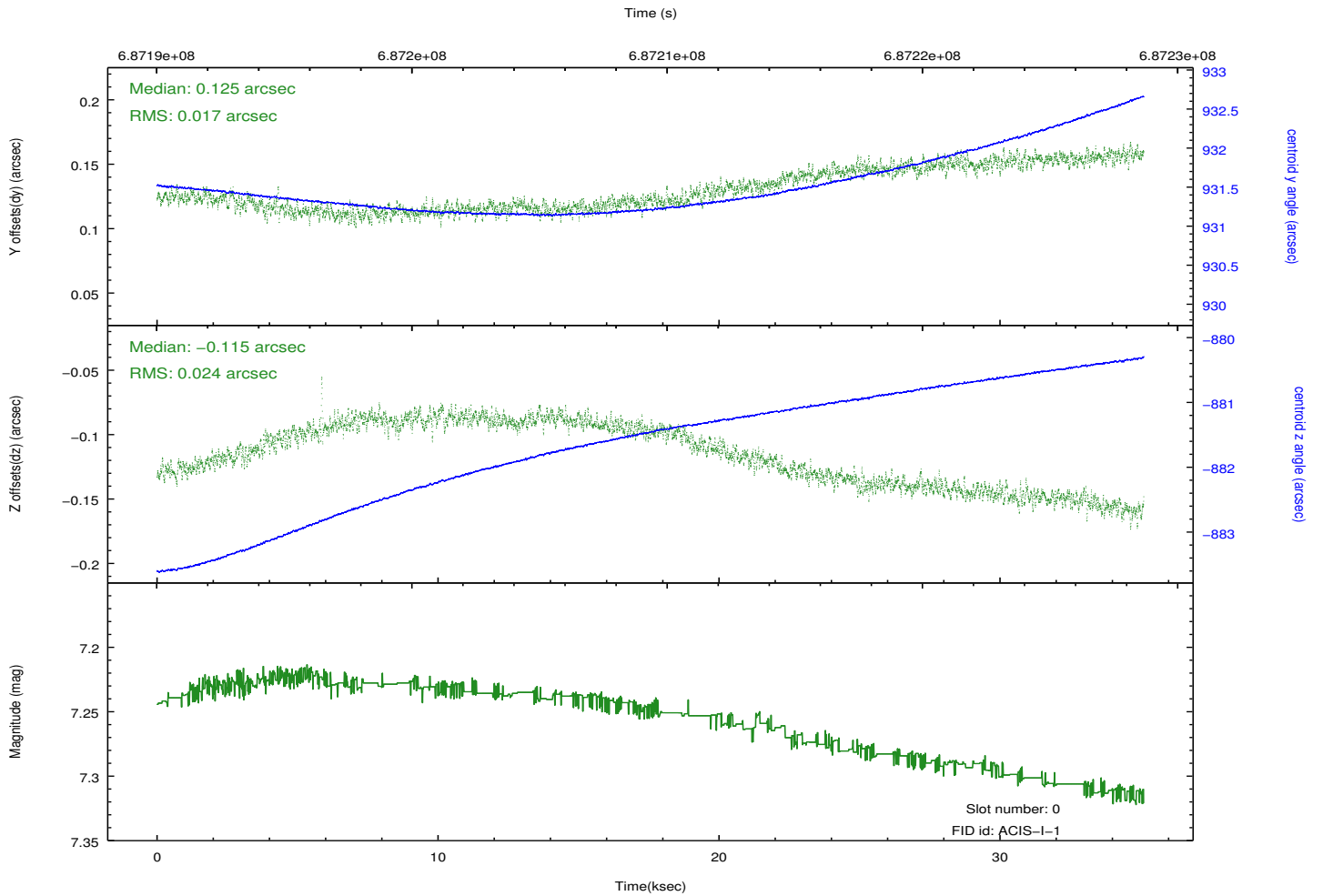
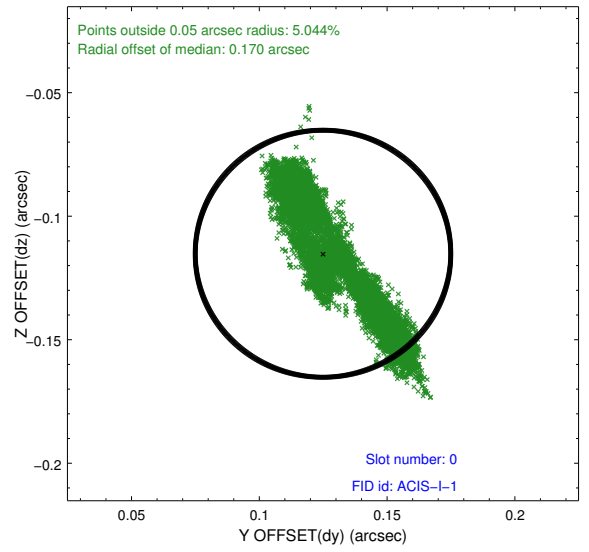
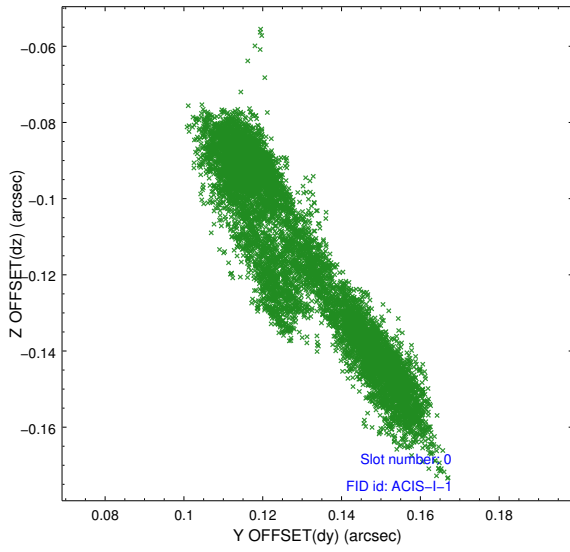


2.4.5 Slot 7

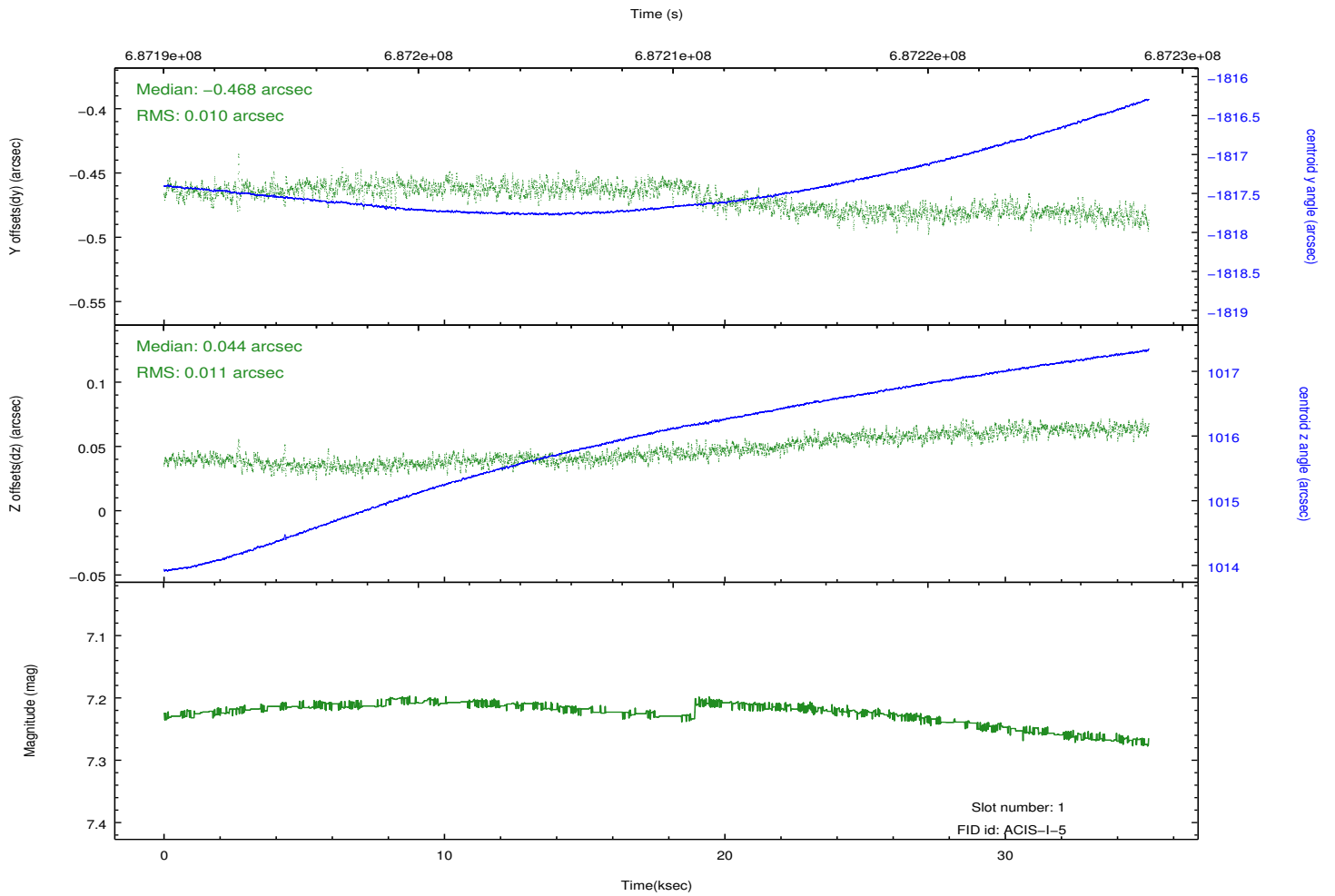
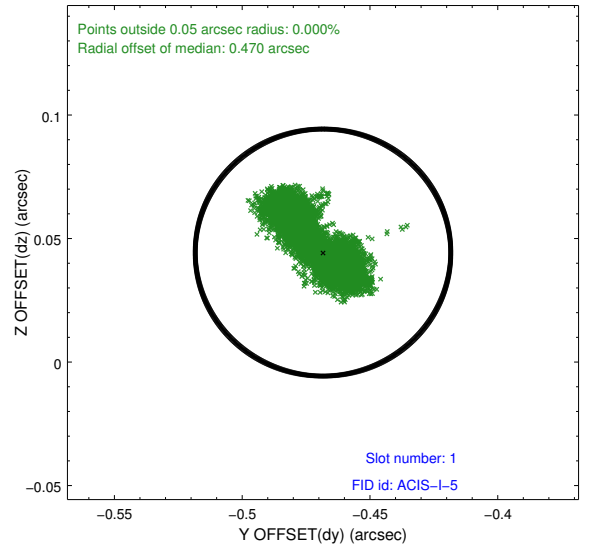
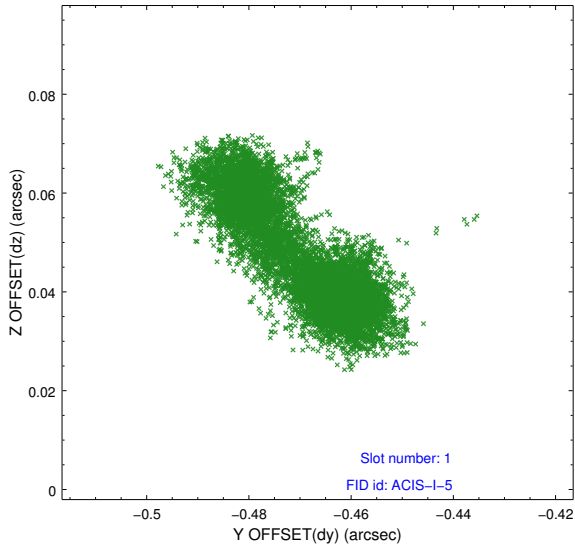


2.5 FID Slots

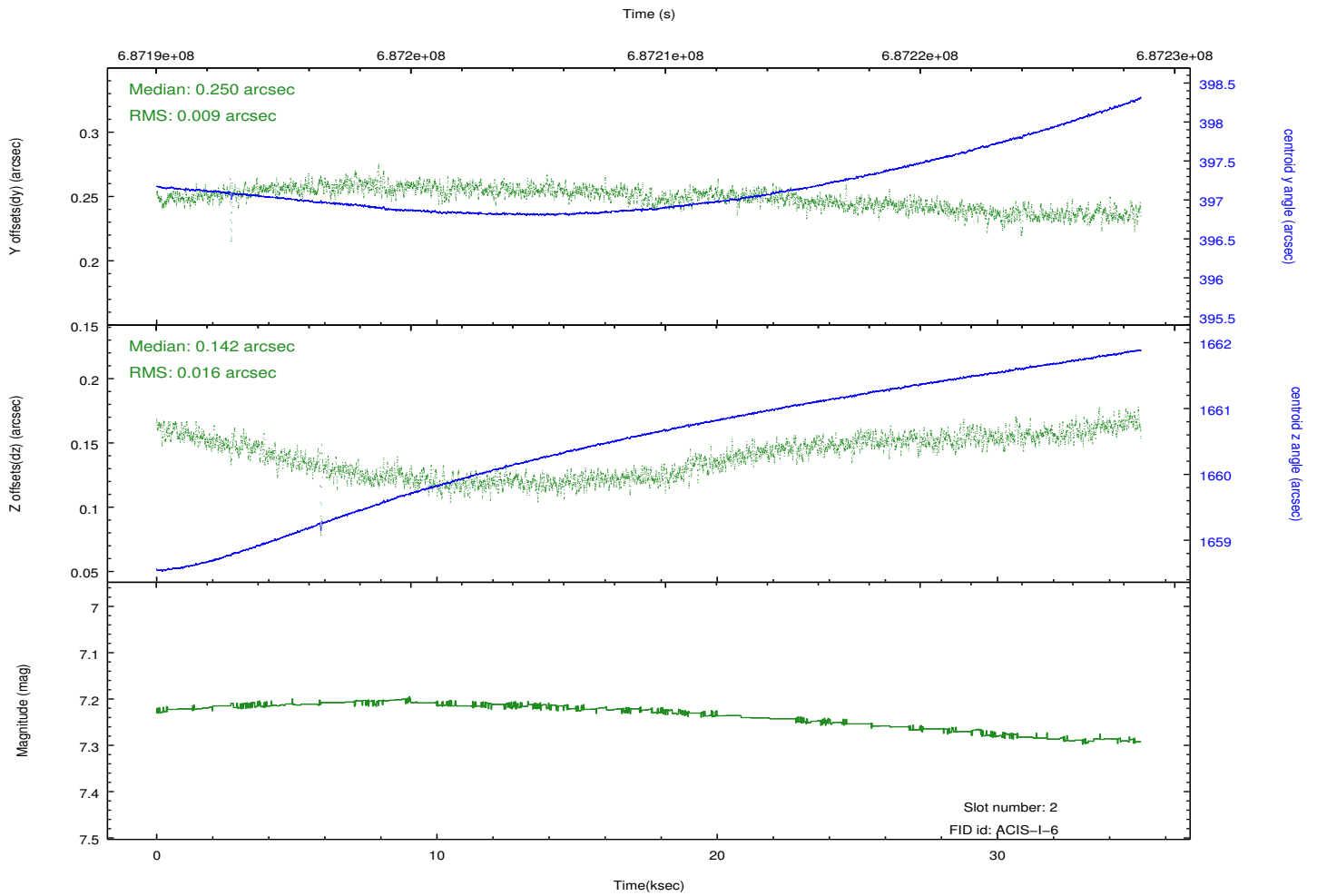
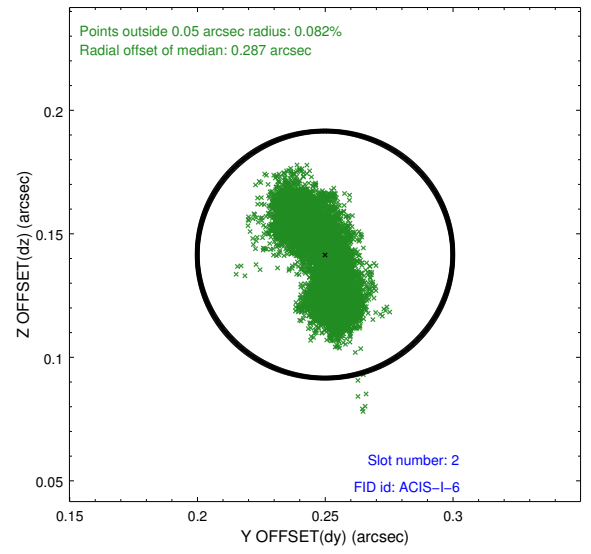
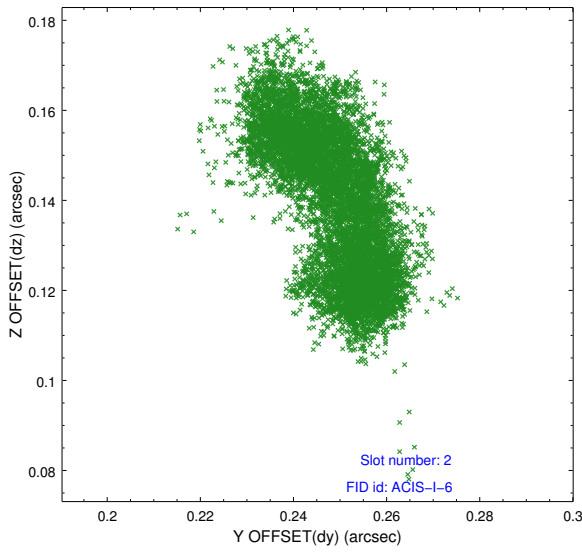
2.5.1 Slot 0



2.5.2 Slot 1



2.5.3 Slot 2



A Summary

A.1 Status

| | |
|----------------------------|-----------------|
| V&V Scientist | Beth Sundheim |
| V&V Date (YYYY-MM-DD) | 2019.10.25 |
| V&V Edition | 2 |
| V&V Disposition and Status | OK |
| V&V Charge Time | 35.026859189272 |

A.2 Comments

A spatial region of the original bias map for CCD = 1 suffered from anomalously high data values. Pixels in the event data that were bias-corrected by one of the original affected bias pixels may have an apparent energy shift. While the change in energy is expected to be small (~20 eV), it depends on many parameters that have not yet been fully explored for this bias anomaly. In this case, the bias map for CCD = 1 could not be improved because no suitable data at a compatible temperature and time range are available to use as replacement values. The bias map used in this processing is the original bias map telemetered with the observation.

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The focal plane temperature during the interval 687225264.11 - 687226891.61 (MET s) of this observation was warmer than the upper limit for optimum calibration of the ACIS gain and spectral resolution (i.e., -112.0 C for ACIS-I).

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

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.

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One optional chip was dropped.