

V&V Reference Report

L2 ASCDS Version : 8.4.5

Observation 1769 - L2 Version 5
Chandra X-Ray Center

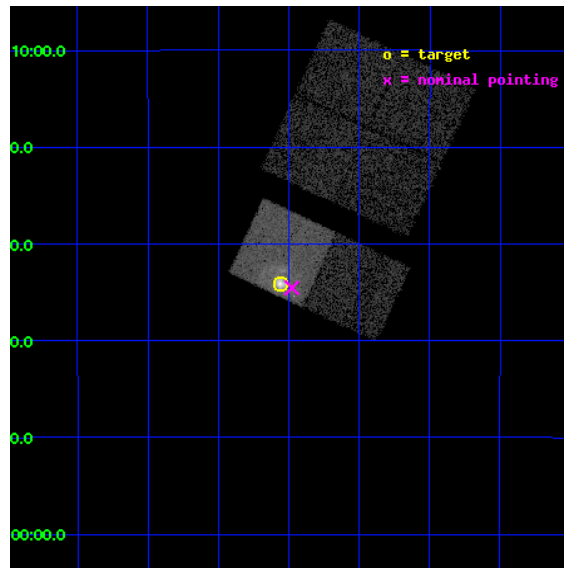
L2 Processing Date : Aug 30 2012

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1 Front

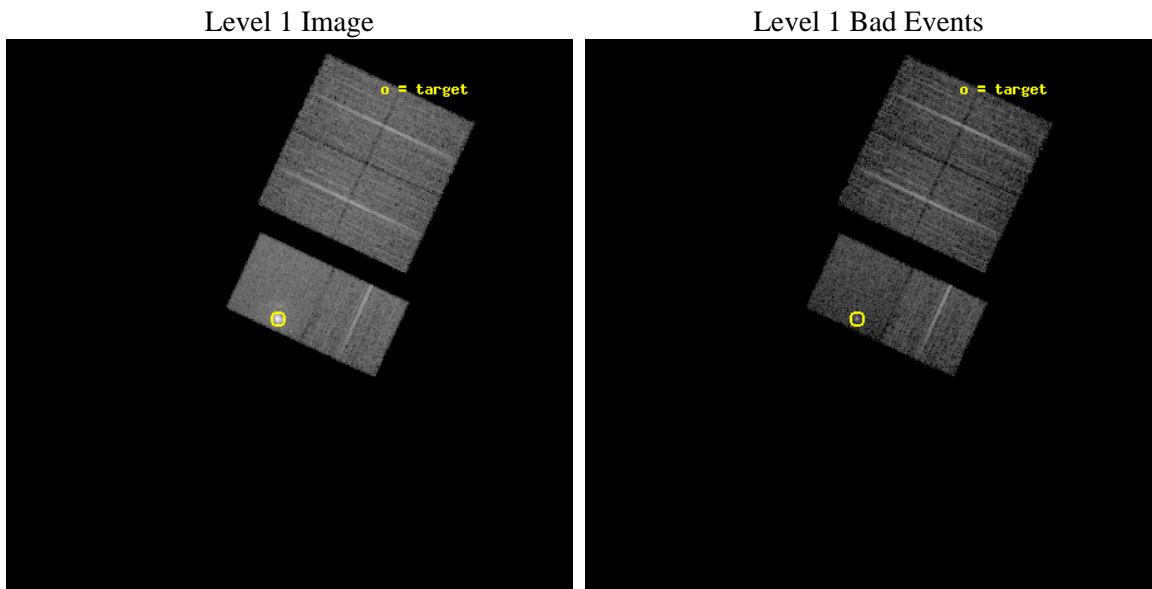
| | | |
|----------|--|---|
| seq_num | 590195 | Sequence number |
| obs_id | 1769 | Observation id |
| title | HRC RESPONSE TO CONTINUUM SOURCE. | Proposal title |
| observer | Dr. CXC Calibration | Principal investigator |
| object | G21.5-0.9 [Chip S3, T=110, Offsets=-1,0,3] | Source name |
| dtcycle | 0 | |
| cycle | P | events from which exps? Prim/Second/Both |
| ra_targ | 278.389583 | Observer's specified target RA [deg] |
| dec_targ | -10.568528 | Observer's specified target Dec [deg] |
| ra_nom | 278.36948913106 | Nominal RA [deg] |
| dec_nom | -10.575726825285 | Nominal Dec [deg] |
| roll_nom | 204.91005986037 | Nominal Roll [deg] |
| revision | 5 | Processing version of data |
| ontime | 7510.4000069797 | Sum of GTIs [s] |
| livetime | 7415.2987998714 | Livetime [s] |
| ontime0 | 7507.1590367407 | Sum of GTIs [s] |
| ontime1 | 7510.4000069797 | Sum of GTIs [s] |
| ontime2 | 7510.4000069797 | Sum of GTIs [s] |
| ontime3 | 7510.4000069797 | Sum of GTIs [s] |
| ontime6 | 7510.4000069797 | Sum of GTIs [s] |
| ontime7 | 7510.4000069797 | Sum of GTIs [s] |
| l2events | 73143 | Number of level 2 events |



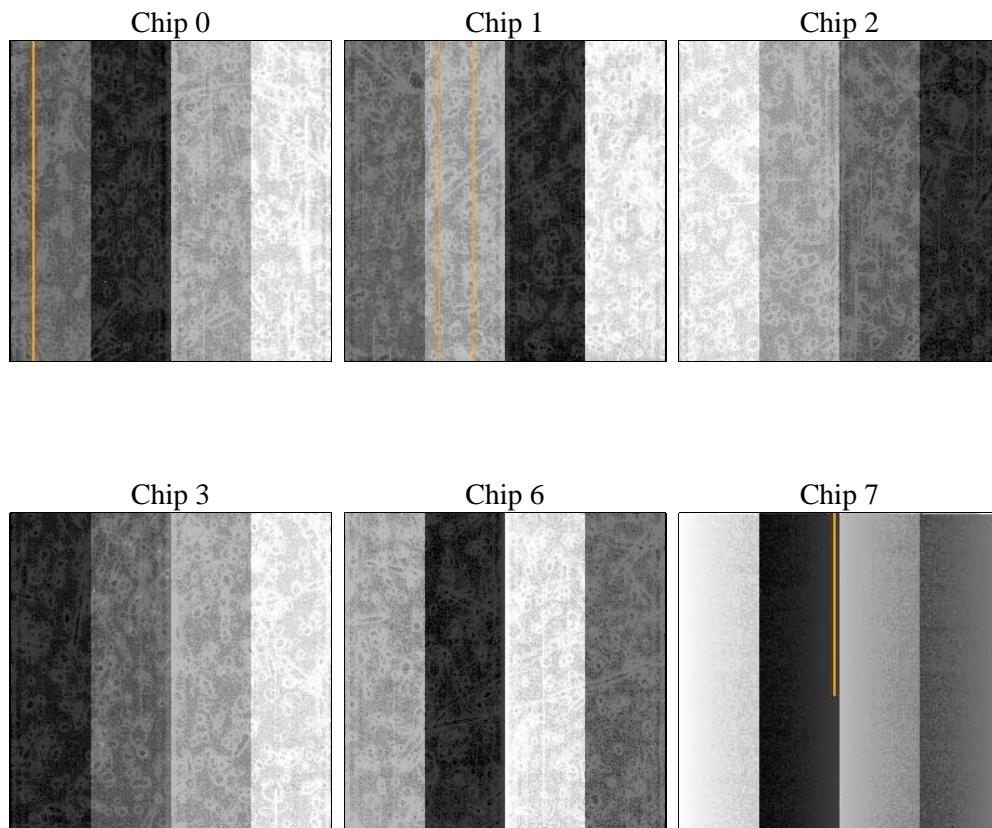
2 OBI

2.1 OBI

2.1.1 Images



2.1.2 Bias



2.1.3 Parameters

| | | | | | |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num | 0 | Obi number | sched_exp_time | 7560.000000 | [s] Scheduled observation exposure time |
| ascdsver | 8.4.5 | Processing system revision | ontime | 7510.4000069797 | Sum of GTIs [s] |
| caldsver | 4.5.1.1 | | ontime0 | 7507.1590367407 | Sum of GTIs [s] |
| date | 2012-08-30T03:39:38 | Date and time of file creation | ontime1 | 7510.4000069797 | Sum of GTIs [s] |
| revision | 5 | Processing version of data | ontime2 | 7510.4000069797 | Sum of GTIs [s] |
| | | | ontime3 | 7510.4000069797 | Sum of GTIs [s] |
| | | | ontime6 | 7510.4000069797 | Sum of GTIs [s] |
| | | | ontime7 | 7510.4000069797 | Sum of GTIs [s] |
| | | | l1events | 343822 | Number of level 1 events |

2.1.4 Events

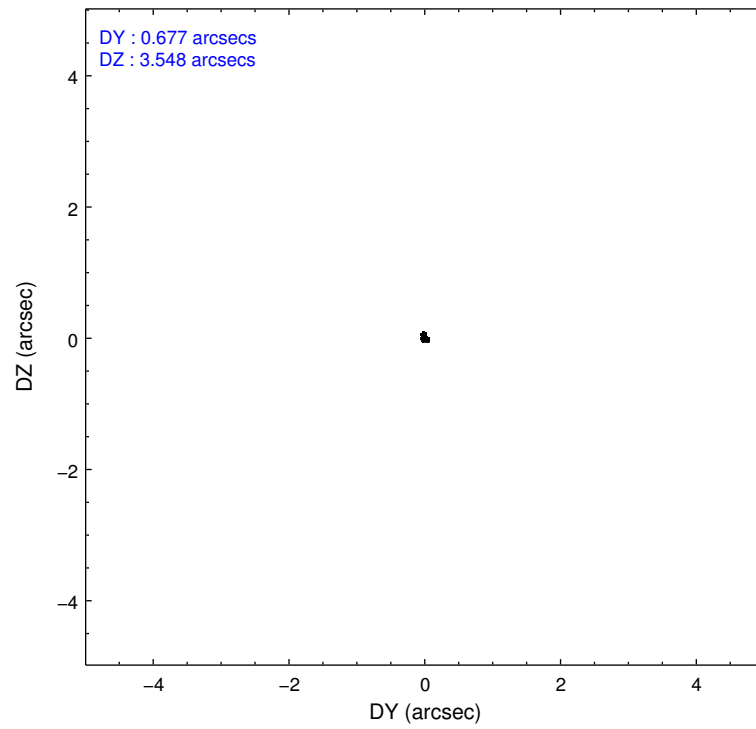
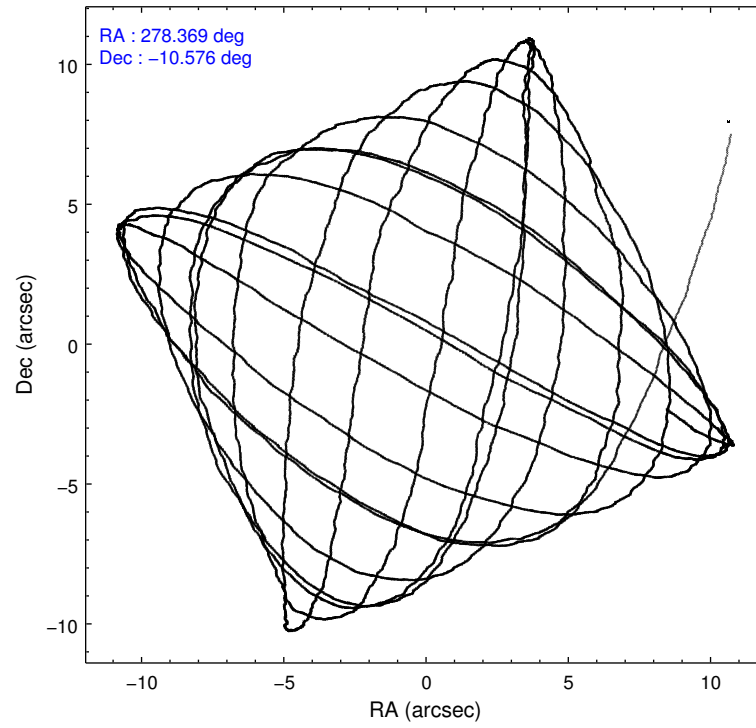
| | ccd 0 | ccd 1 | ccd 2 | ccd 3 | ccd 6 | ccd 7 | | ccd 0 | ccd 1 | ccd 2 | ccd 3 | ccd 6 | ccd 7 |
|-----------------|-------|-------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|-------|-------|
| level 1 events | 49114 | 48833 | 52964 | 51177 | 55893 | 85841 | grade 0 events | 1392 | 1594 | 1091 | 1292 | 1302 | 6234 |
| rejected events | 43508 | 42774 | 47853 | 45606 | 50031 | 36342 | | 2% | 3% | 2% | 2% | 2% | 7% |
| rejected % | 88% | 87% | 90% | 89% | 89% | 42% | grade 1 events | 11 | 17 | 4 | 14 | 8 | 74 |
| | | | | | | | | 0% | 0% | 0% | 0% | 0% | 0% |
| | | | | | | | grade 2 events | 2129 | 2165 | 2068 | 2240 | 2312 | 11391 |
| | | | | | | | | 4% | 4% | 3% | 4% | 4% | 13% |
| | | | | | | | grade 3 events | 425 | 430 | 332 | 339 | 339 | 4556 |
| | | | | | | | | 0% | 0% | 0% | 0% | 0% | 5% |
| | | | | | | | grade 4 events | 372 | 435 | 334 | 331 | 337 | 4062 |
| | | | | | | | | 0% | 0% | 0% | 0% | 0% | 4% |
| | | | | | | | grade 5 events | 1059 | 1127 | 933 | 1072 | 1187 | 3897 |
| | | | | | | | | 2% | 2% | 1% | 2% | 2% | 4% |
| | | | | | | | grade 6 events | 1293 | 1436 | 1290 | 1372 | 1573 | 23283 |
| | | | | | | | | 2% | 2% | 2% | 2% | 2% | 27% |
| | | | | | | | grade 7 events | 42433 | 41629 | 46912 | 44517 | 48835 | 32344 |
| | | | | | | | | 86% | 85% | 88% | 86% | 87% | 37% |

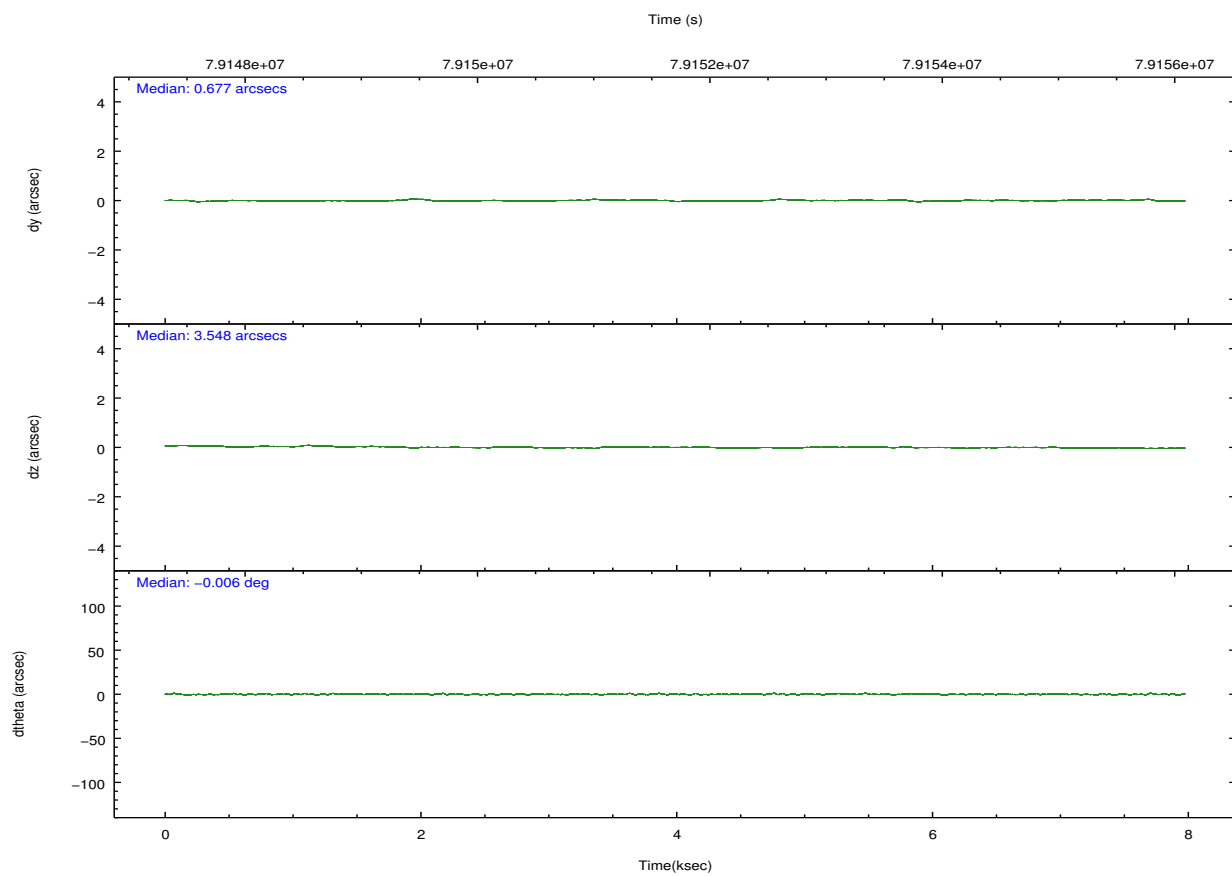
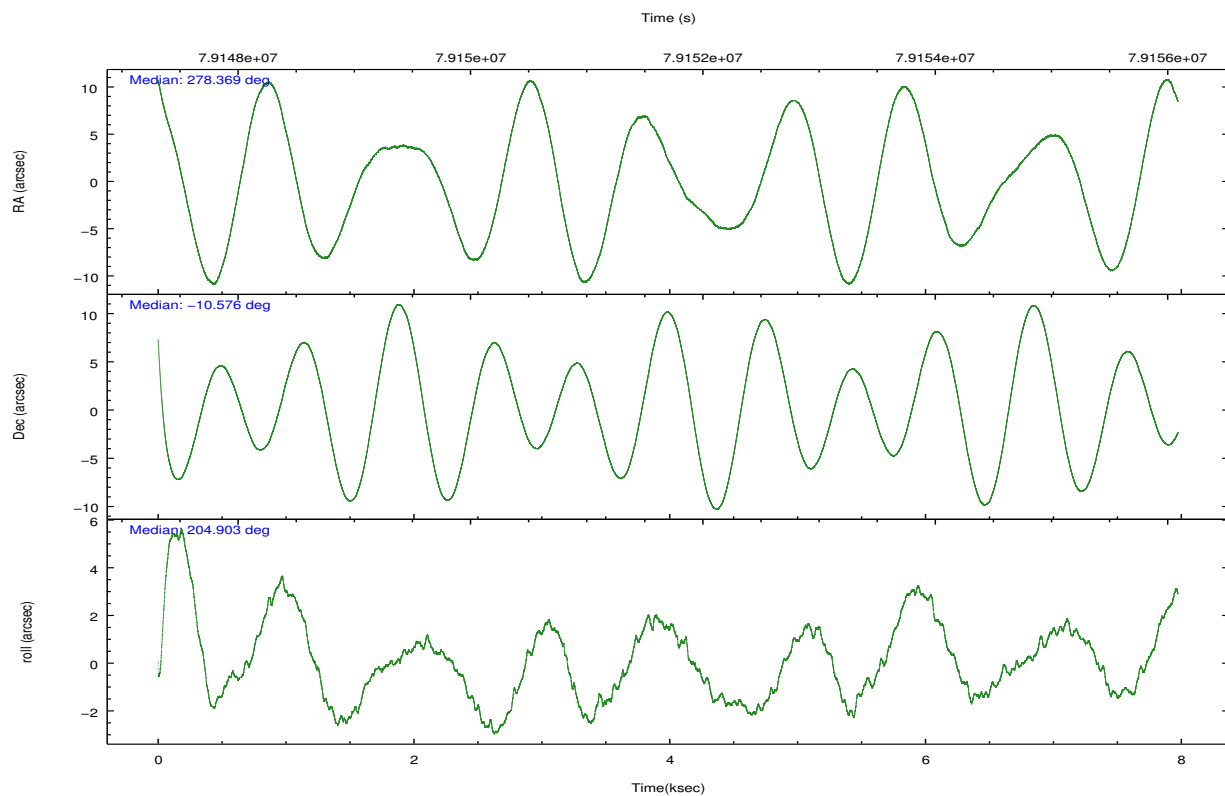
2.2 Compared Parameters

| Parameter | Planned | Actual |
|-----------------------------------|---------------------|----------------------|
| Instrument | ACIS | ACIS |
| Detector | ACIS-012367 | ACIS-012367 |
| Grating | NONE | NONE |
| Data mode | FAINT | FAINT |
| Observation mode | POINTING | POINTING |
| [deg] Pointing RA | 278.385369 | 278.3694891310648 |
| [deg] Pointing Dec | -10.553184 | -10.57572682528511 |
| [deg] Pointing Roll | 204.756347 | 204.910059860372 |
| [mm] SIM focus pos | -0.684267 | -0.6828225247311905 |
| [mm] SIM defocus | 0 | 0.001444936568705701 |
| [mm] SIM translation stage pos | -181.348523 | -181.3550483862213 |
| [mm] SIM translation stage offset | -8.784000000000001 | -8.777474196786557 |
| [s] Observation start time (MET) | 79148126.184000 | 79147054.59016301 |
| Observation start date | 2000-07-05T01:34:22 | 2000-07-05T01:17:34 |
| [s] Observation end time (MET) | 79155686.184000 | 79155819.877986 |
| Observation end date | 2000-07-05T03:40:22 | 2000-07-05T03:43:39 |
| Read mode | TIMED | TIMED |

| Parameter | Planned | Actual |
|---------------------------------------|-----------|---------|
| Obspar format version number | 7 | 7 |
| Obspar file type | PREDICTED | ACTUAL |
| Obspar update status | NONE | UPDATED |
| 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



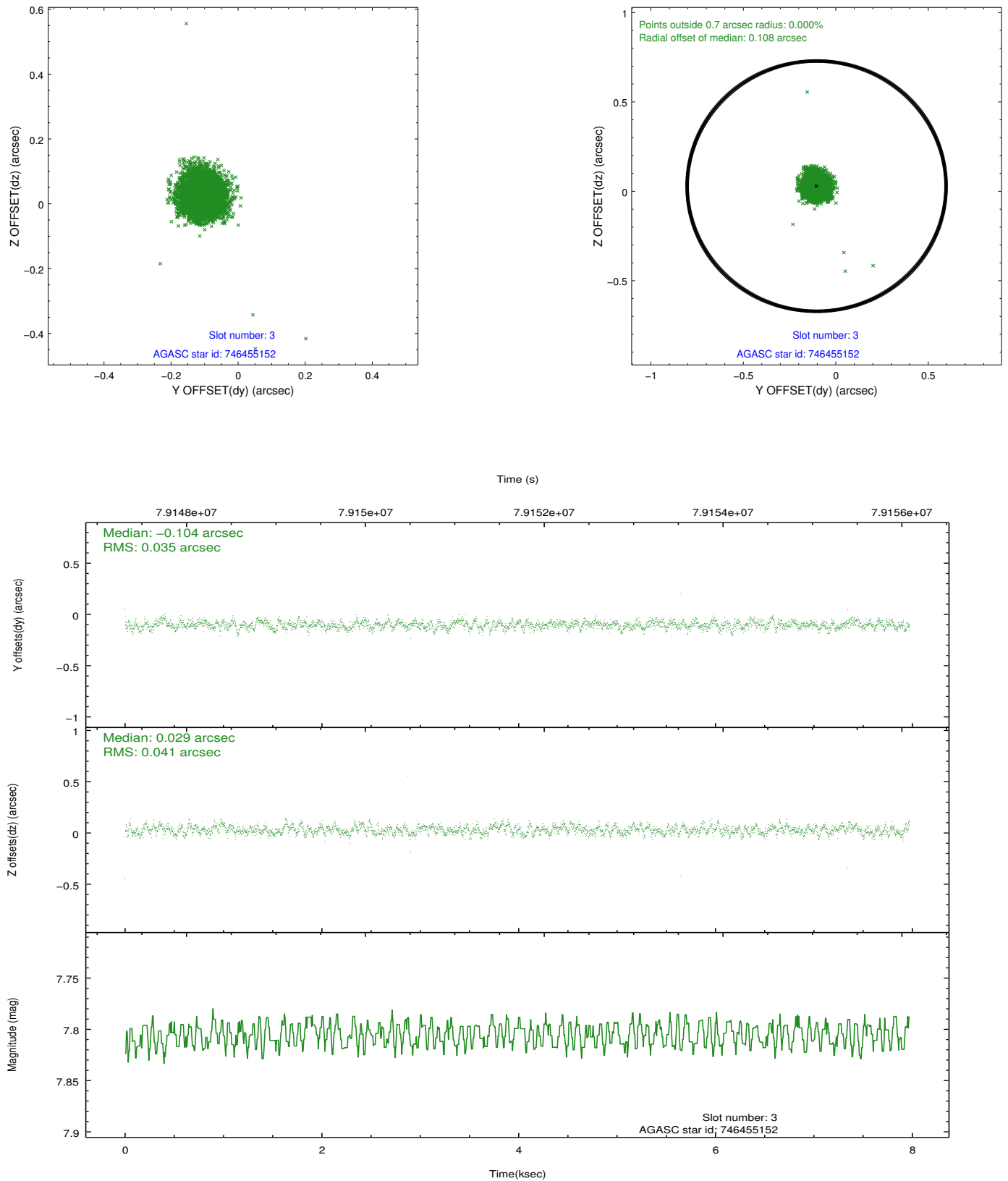


Slot Statistics

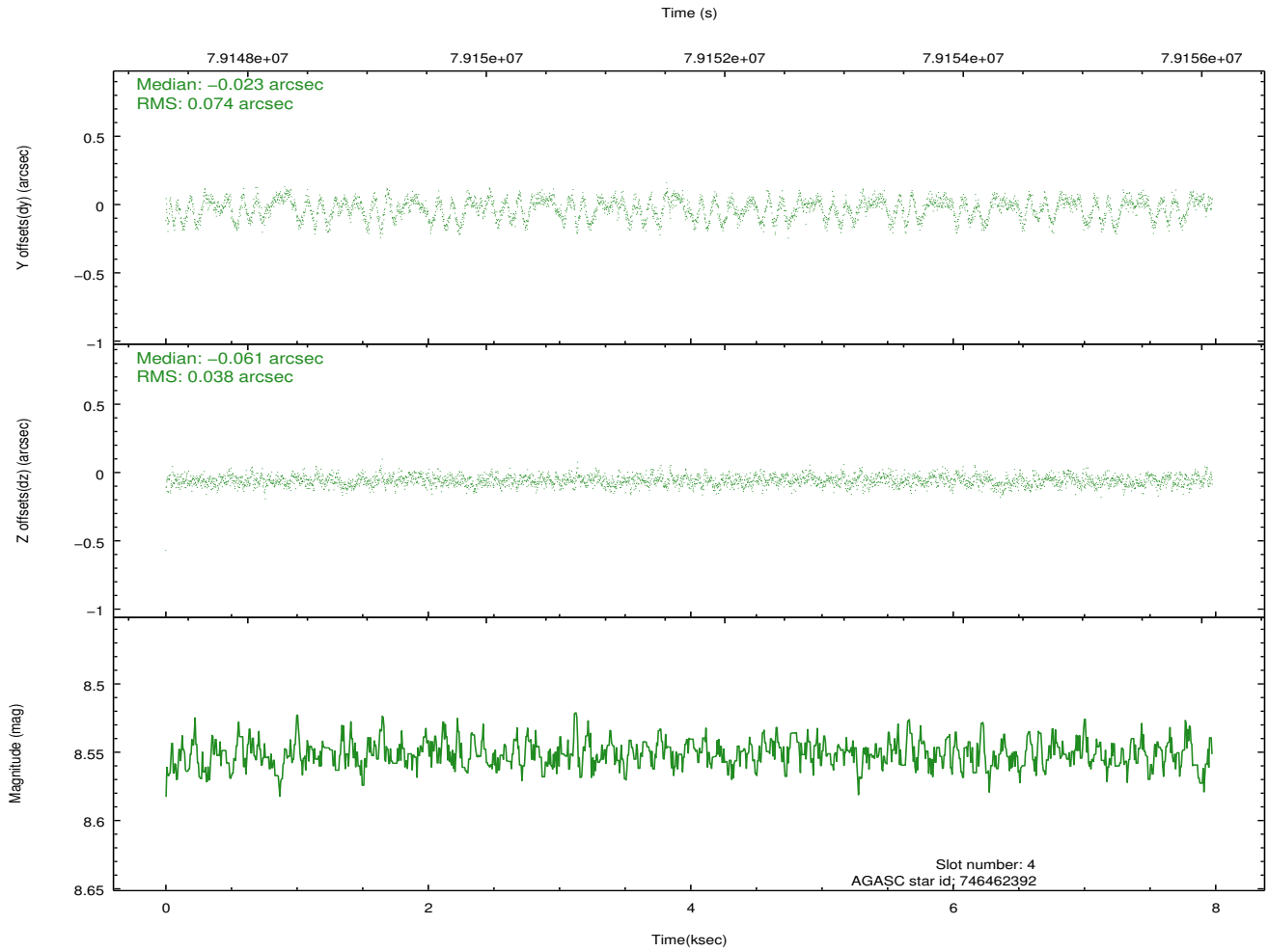
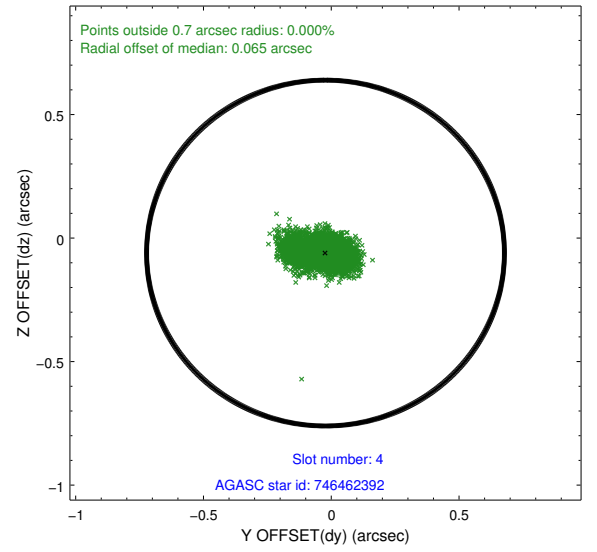
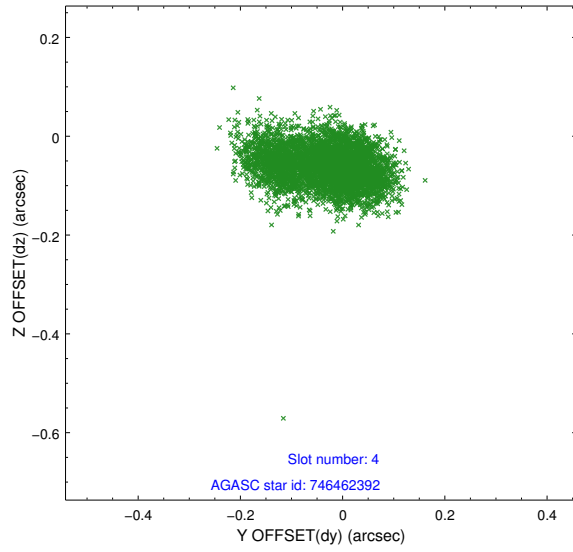
| slot | status | id | mag | n_pts | med_dy | med_dz | dr1 | dr2 | ra | dec | mean_y | mean_z |
|------|--------|-----------|------|-------|--------|--------|-------|-------|------------|------------|----------|----------|
| 0 | FID | ACIS-S-1 | 7.20 | 1945 | 0.016 | 0.077 | 0.006 | 0.011 | 0.000000 | 0.000000 | 943.47 | -1900.95 |
| 1 | FID | ACIS-S-5 | 7.23 | 1944 | -0.087 | 0.024 | 0.006 | 0.010 | 0.000000 | 0.000000 | -1805.26 | -4.32 |
| 2 | FID | ACIS-S-6 | 7.43 | 1945 | 0.050 | -0.090 | 0.007 | 0.010 | 0.000000 | 0.000000 | 408.26 | 640.36 |
| 3 | GUIDE | 746455152 | 7.81 | 3891 | -0.104 | 0.029 | 0.056 | 0.087 | 278.447893 | -9.976732 | -1070.53 | -1791.69 |
| 4 | GUIDE | 746462392 | 8.55 | 3891 | -0.023 | -0.061 | 0.087 | 0.147 | 279.038421 | -10.890715 | -1587.54 | 2071.94 |
| 5 | GUIDE | 746455112 | 8.93 | 3889 | 0.209 | -0.085 | 0.068 | 0.114 | 278.266531 | -10.703234 | 607.42 | 315.17 |
| 6 | GUIDE | 746460328 | 9.81 | 3881 | -0.030 | 0.027 | 0.089 | 0.144 | 278.603974 | -9.898096 | -1691.45 | -1816.70 |
| 7 | GUIDE | 746995400 | 9.72 | 3887 | -0.045 | 0.088 | 0.105 | 0.172 | 278.078957 | -11.289885 | 2092.24 | 1955.89 |

2.4 Star Slots

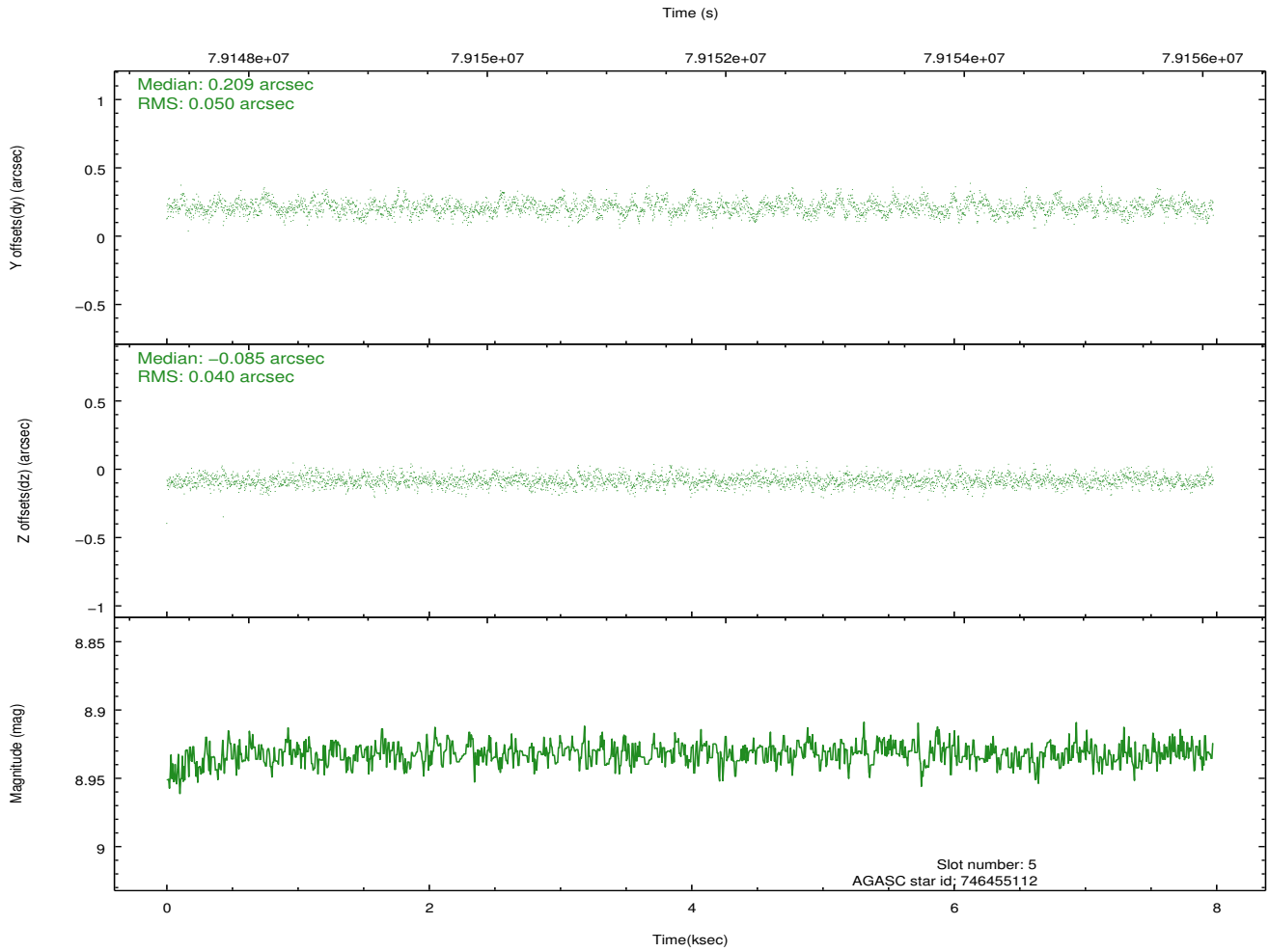
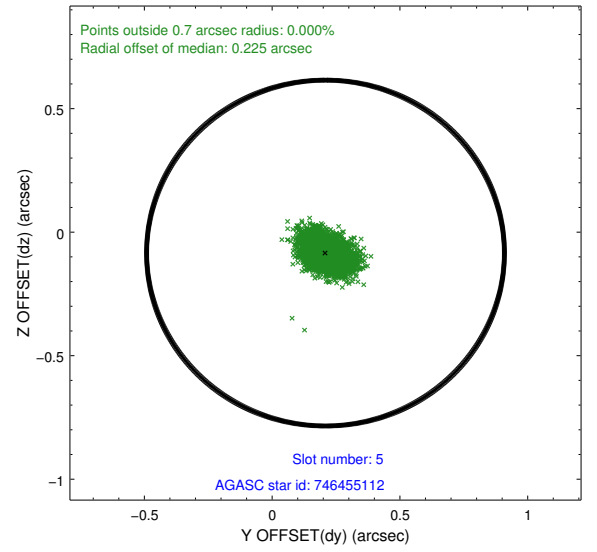
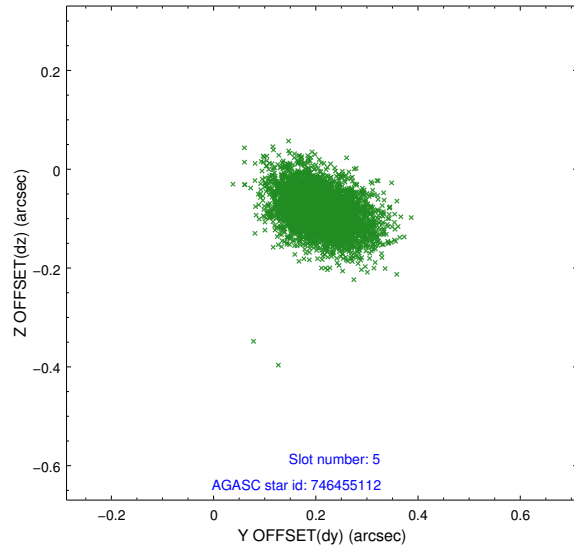
2.4.1 Slot 3



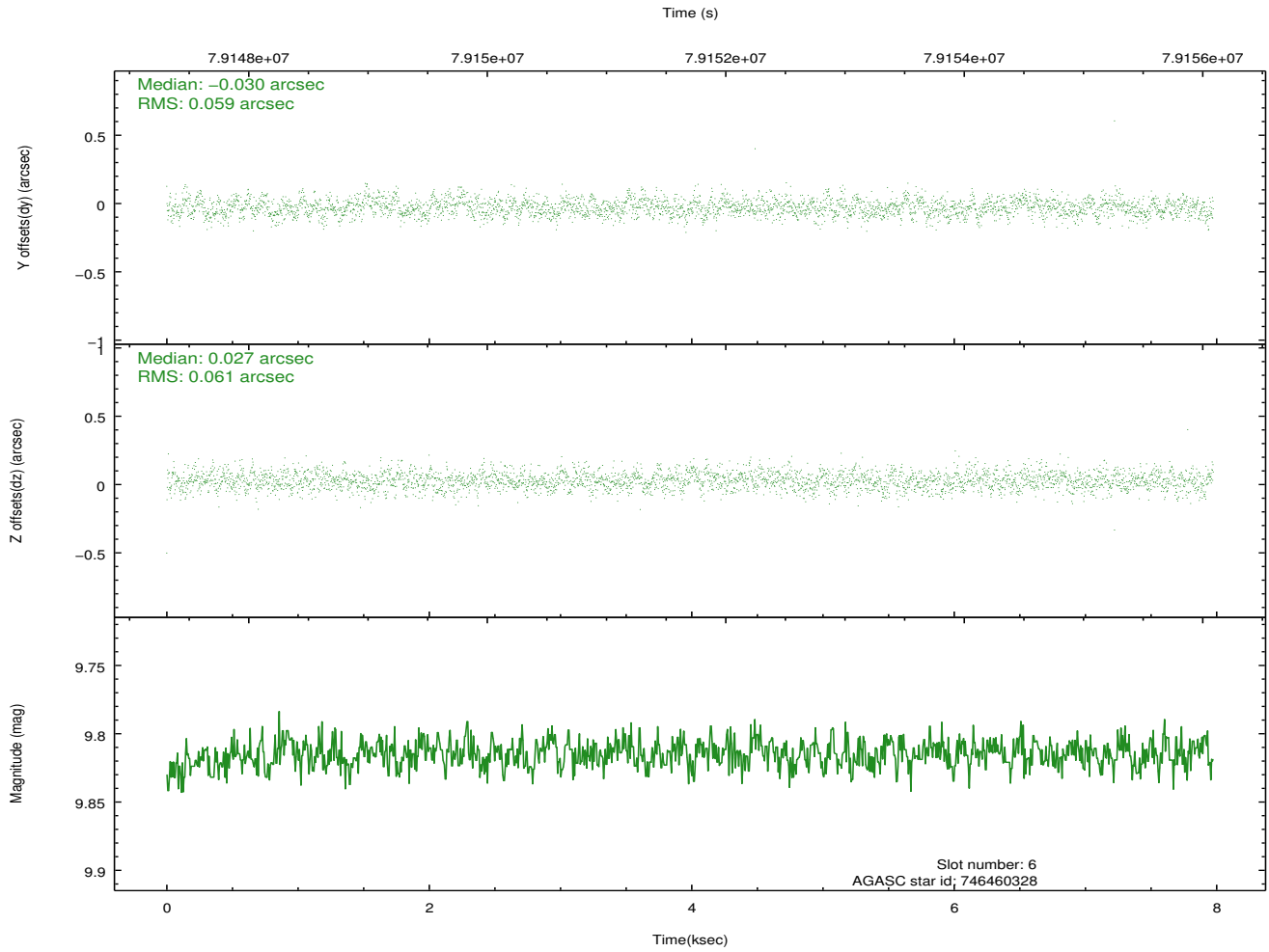
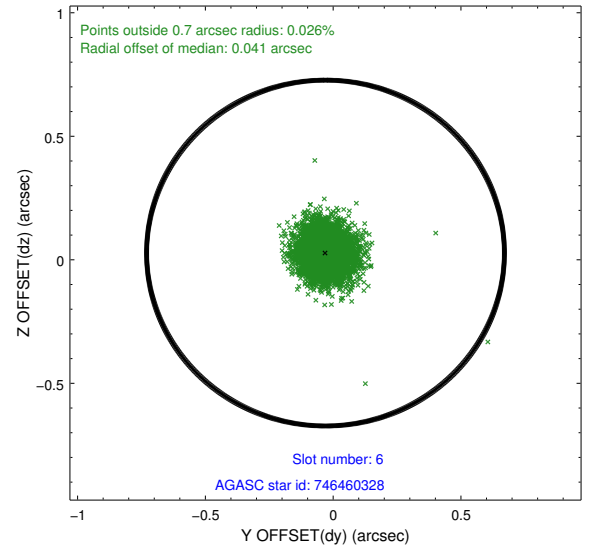
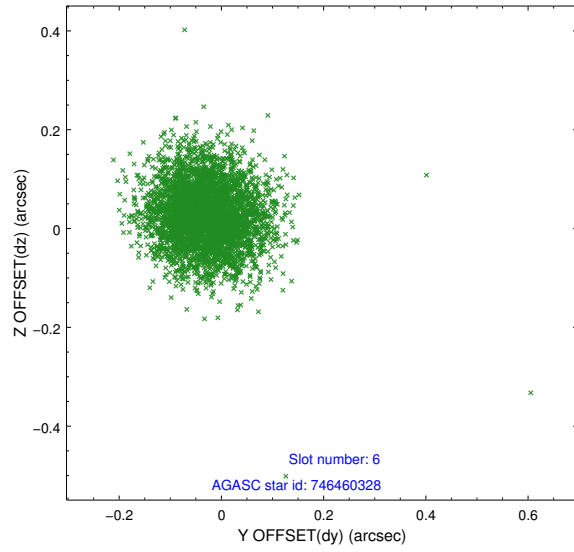
2.4.2 Slot 4



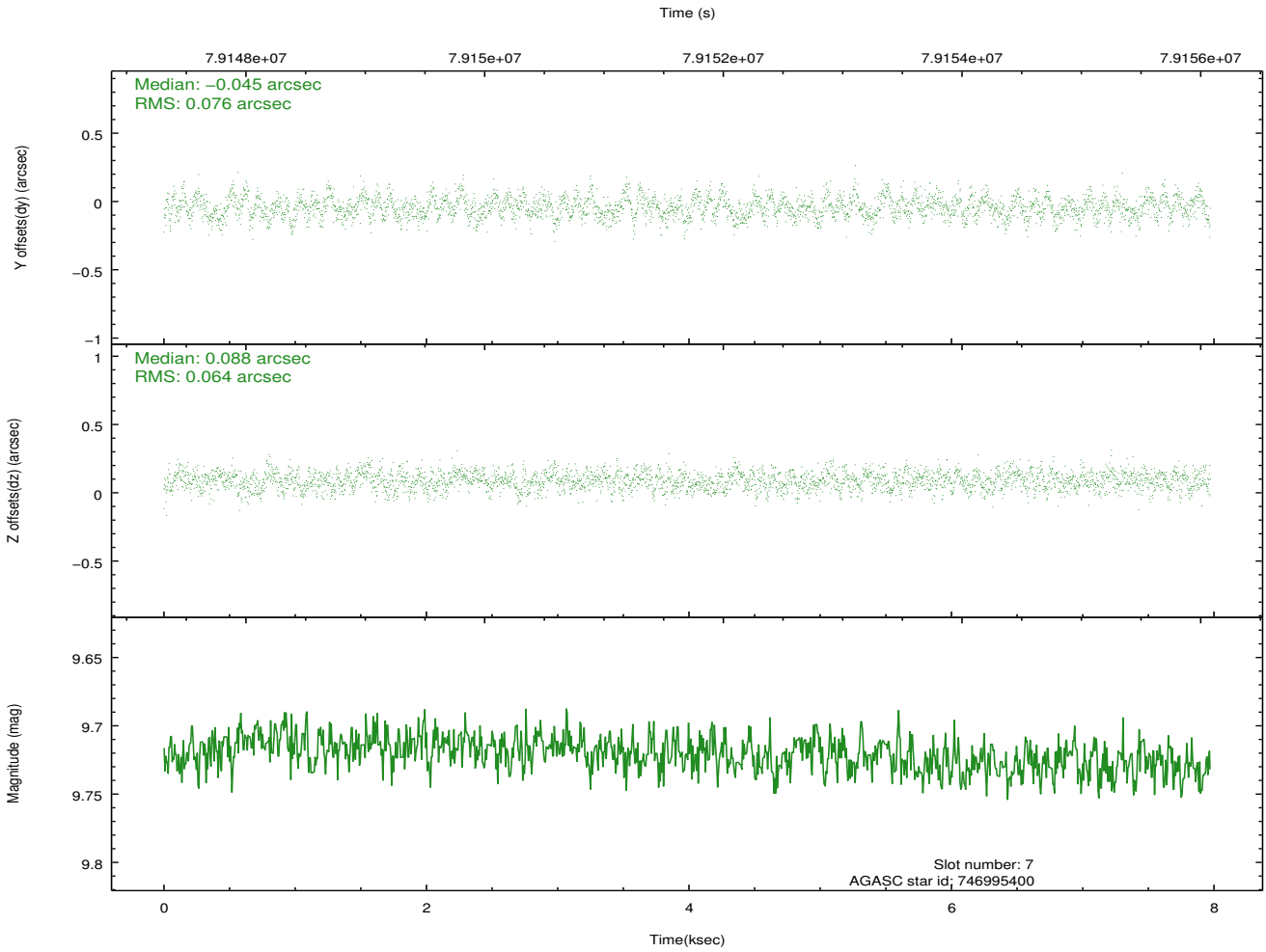
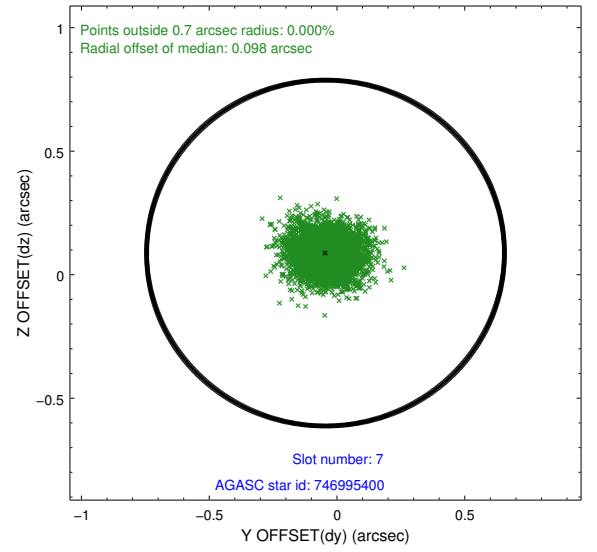
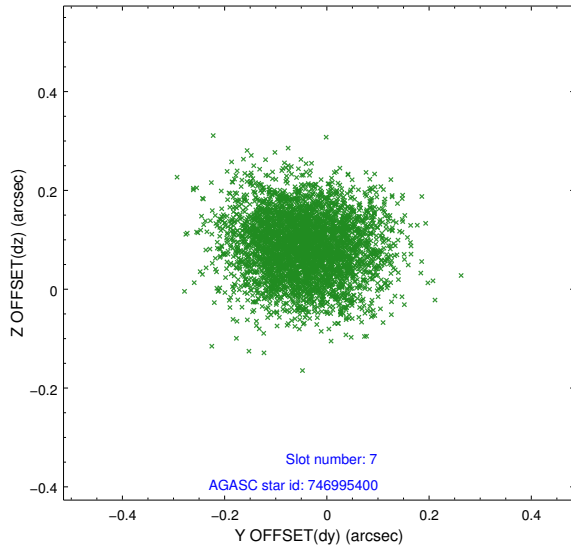
2.4.3 Slot 5



2.4.4 Slot 6

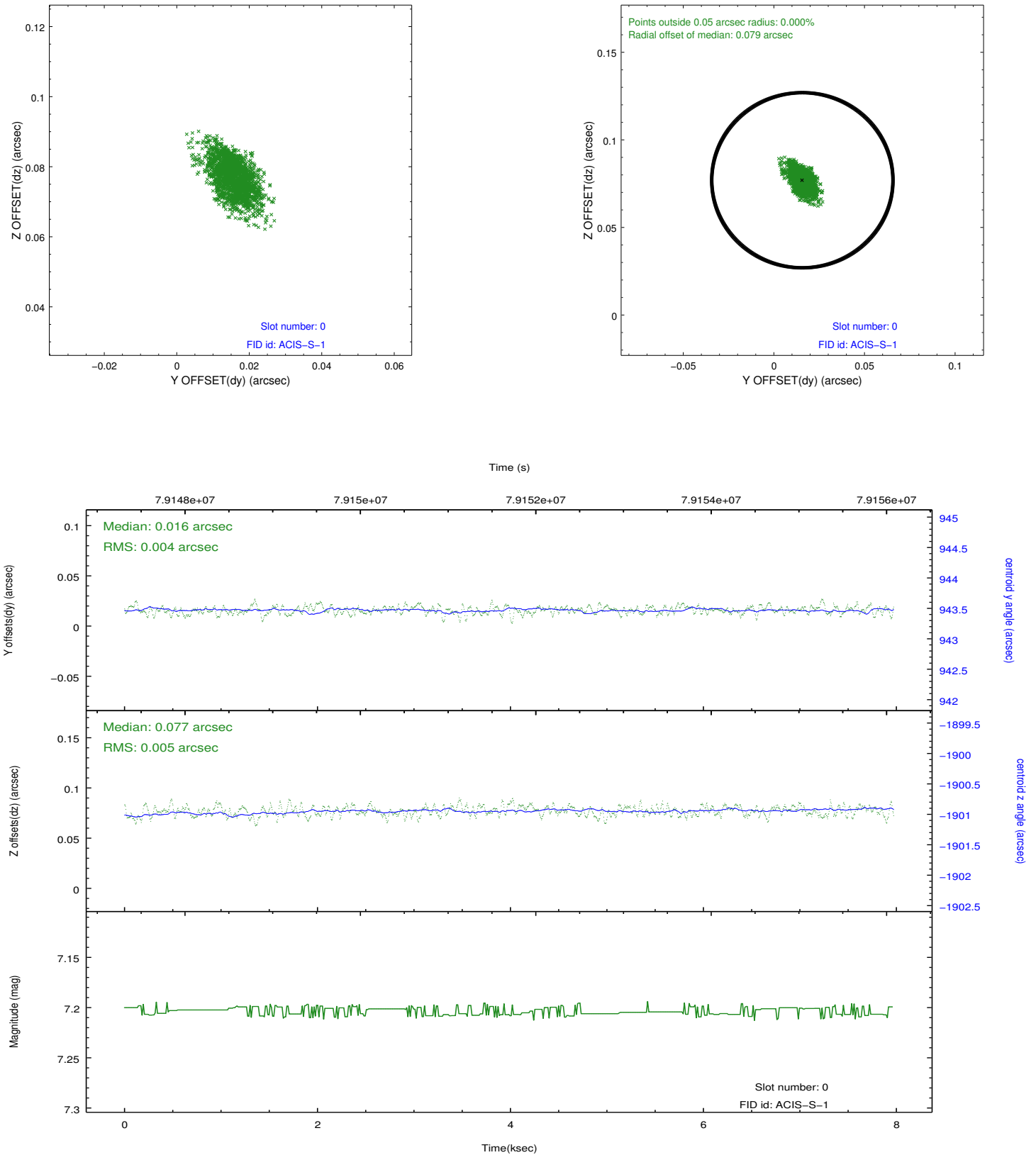


2.4.5 Slot 7

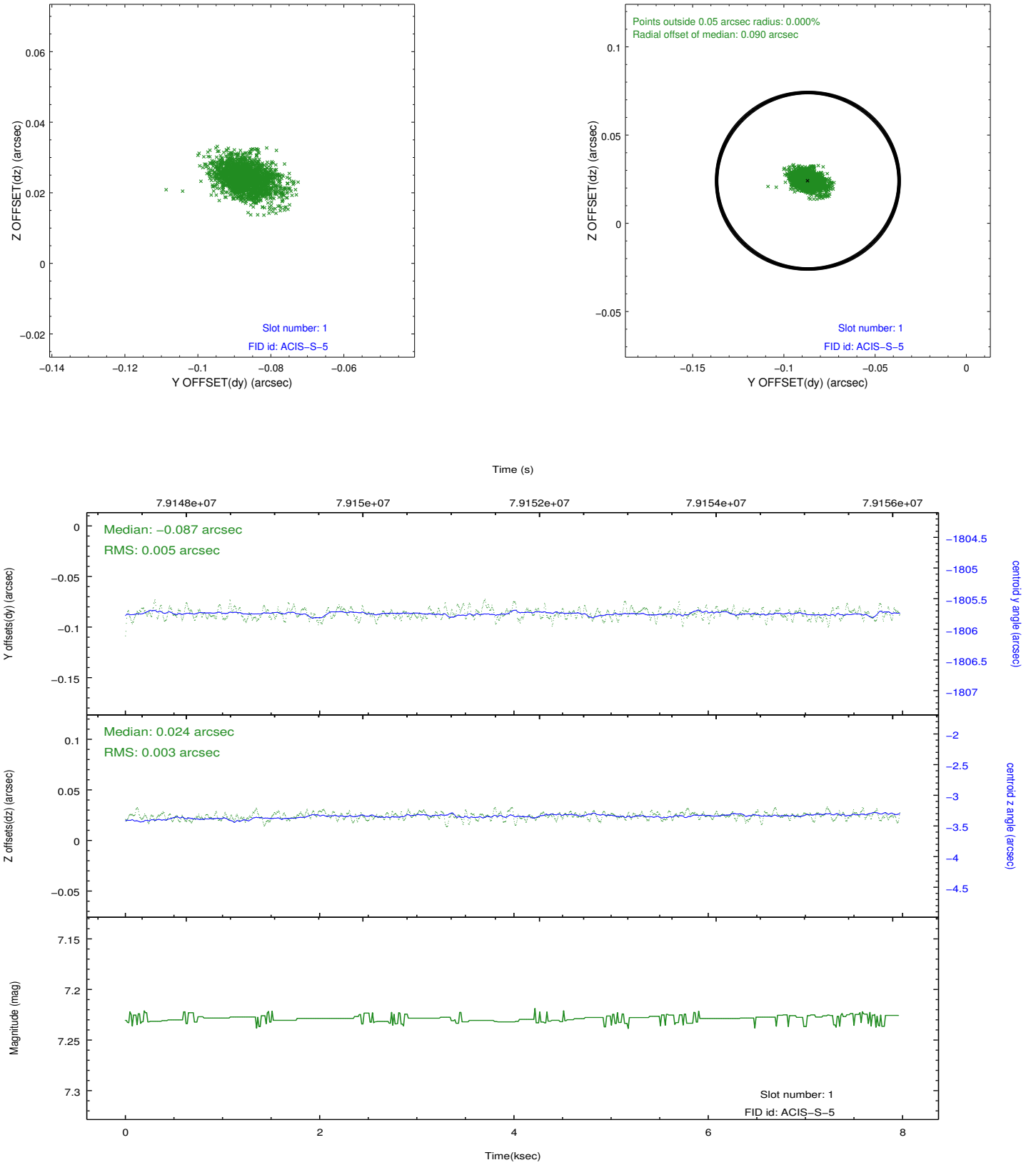


2.5 FID Slots

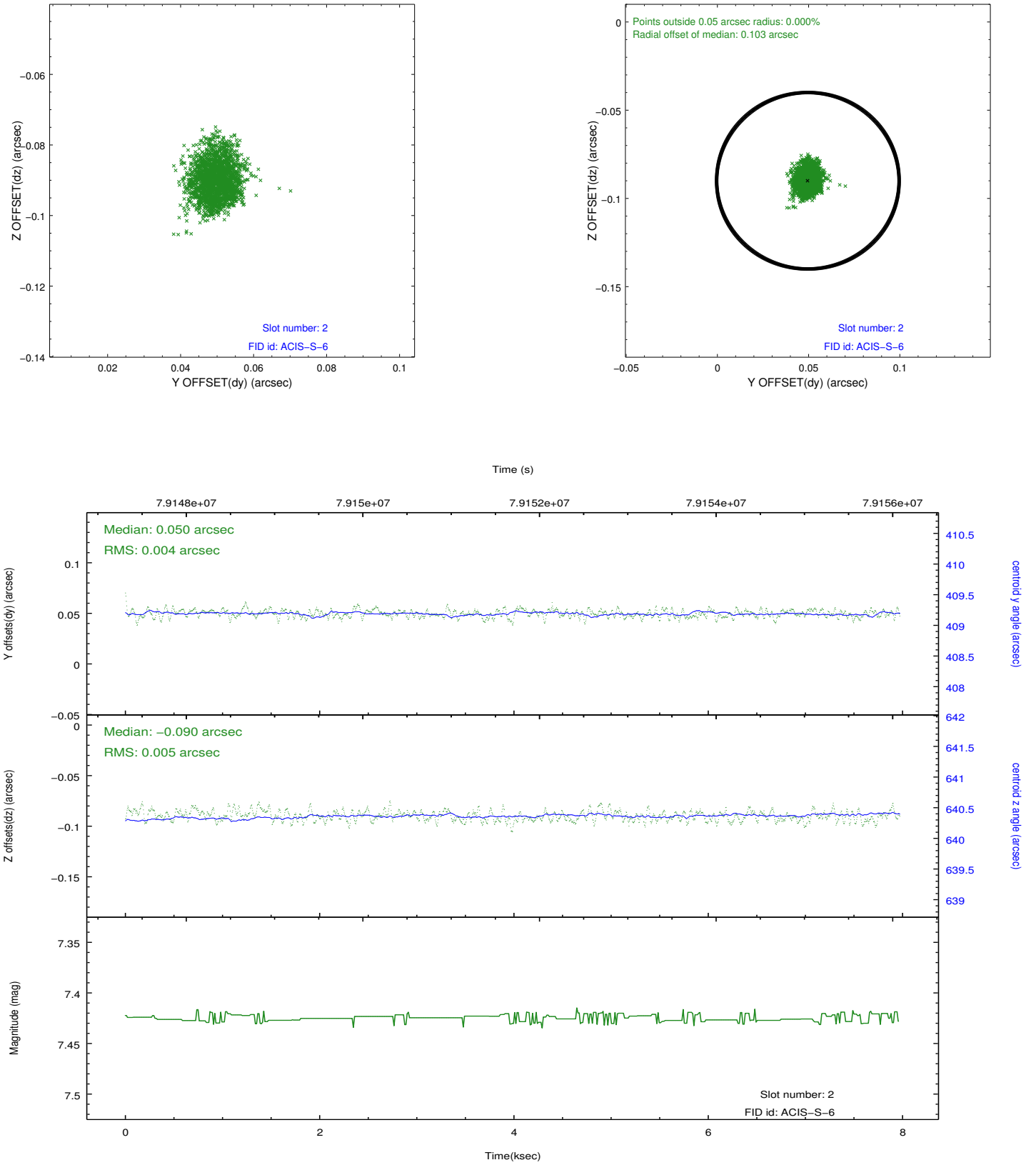
2.5.1 Slot 0



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) | 2018.03.05 |
| V&V Edition | 2 |
| V&V Disposition and Status | OK |
| V&V Charge Time | 7.516 |

A.2 Comments

The focal plane temperature during part of this observation was warmer than the upper limit for optimum calibration of the ACIS gain and spectral resolution (i.e., -114.0 C for ACIS-I and -112.0 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

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.