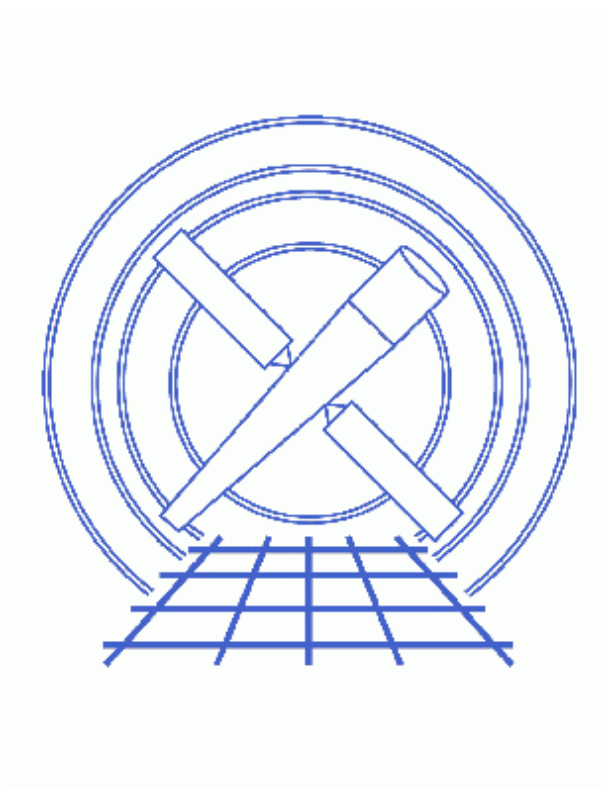


# Creating Accurate RA, Dec Coordinates for src2 Files



## ***CIAO 3.4 Science Threads***

# Table of Contents

- *Get Started*
- *Run celldetect*
- *Summary*
- *Parameter files:*
  - ◆ dmcoords
  - ◆ celldetect
- *History*

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# Creating Accurate RA, Dec Coordinates for src2 Files

*CIAO 3.4 Science Threads*

## Overview

*Last Update:* 1 Dec 2006 – reviewed for CIAO 3.4: no changes

### *Synopsis:*

The (RA,Dec) positions of sources in src2 files are incorrect for some automatically processed (AP) data. The regions are shifted, essentially at random. The range of affected observations is unknown, so users should consider the src2 file for all observations suspect. The x and y positions in the file, however, *are* correct.

### *Purpose:*

To determine if the source positions in the pipeline–produced src2 file are affected, and correct them if necessary.

### *Read this thread if:*

having accurate (RA,Dec) source positions in the `src2.fits` is important to your analysis.

*Proceed to the [HTML](#) or hardcopy (PDF: [A4](#) | [letter](#)) version of the thread.*

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## Get Started

*Sample ObsID used:* 578 (ACIS–S, 3C 295)

*File types needed:* evt2; src2; asol1

We need to determine if the (RA,Dec) coordinates as supplied by AP are accurate. Since we know that the (x,y) coordinates are correct, we can use them as input for `dmcoords`, and compare the output to the values listed in the `src2.fits` file.

To begin, display the RA, Dec, and POS columns:

```
unix% dmlist "acisf00578N002_src2.fits[cols RA,DEC,POS]" data rows=1:1
```

## Creating Accurate RA, Dec Coordinates for src2 Files – CIAO 3.4

```
-----  
Data for Table Block SRCLIST  
-----
```

```
ROW  RA              DEC              POS(X,Y)  
1    212.8785247803   52.2400550842   (3896.5952380952,4385.7857142857)
```

Note that the POS column *may* be named SRC\_POS instead.

Now use the given (x,y) position (which are known to be correct) to calculate what the RA and Dec *should* be:

```
unix% punlearn dmcoords  
unix% dmcoords acisf00578N002_evt2.fits asolfile=pcadf052378346N002_asol1.fits \  
option=sky x=3896.5952380952 y=4385.7857142857 celfmt=deg
```

The conversion to RA and Dec can be obtained from the parameter file:

```
unix% pget dmcoords ra dec  
212.8785255685877  
52.24005379720089
```

In this case, the (RA,Dec) produced by dmcoords matches that in the `src2.fits` file. There is therefore no need to produce a new `src2` files for this observation. If the two results *do not* match, however, complete the rest of this thread.

---

## Run celldetect

In order to generate a new source file, we need to re-run `celldetect` as it is run in the pipeline:

```
unix% punlearn celldetect  
unix% pset celldetect infile=acisf00578N002_evt2.fits  
unix% pset celldetect outfile=new_578_src2.fits  
unix% celldetect  
Input file (acisf00578N002_evt2.fits):  
Output source list (new_578_src2.fits):
```

The contents of the parameter file may be checked using `plist celldetect`.

---

## Summary

This thread is now complete. The file `new_578_src2.fits` contains accurate RA and DEC coordinates for the sources.

---

Parameters for `/home/username/cxcds_param/dmcoords.par`

## Creating Accurate RA, Dec Coordinates for src2 Files – CIAO 3.4

```
infile = acisf00578N002_evt2.fits Input dataset/block specification
#
# Position of photon in different coord systems
#
chip_id = 7 Chip ID number
chipx = 403.6431782100918 Chip X [pixel]
chipy = 229.5449957964382 Chip Y [pixel]
tdetx = 4320.643178210092 TDETX [pixel]
tdety = 1931.544995796438 TDETY [pixel]
detx = 4280.246288025161 FPC X [pixel]
dety = 4396.309005800286 FPC Y [pixel]
x = 3896.5952380952 Sky X [pixel]
y = 4385.7857142857 Sky Y [pixel]
logicalx = 3896.5952380952 X coordinate in binned image [pixel]
logicaly = 4385.7857142857 Y coordinate in binned image [pixel]
ra = 212.8785255685877 RA [deg or hh:mm:ss]
dec = 52.24005379720089 Dec [deg or dd:mm:ss]
theta = 2.883417576772354 Off axis angle [arcmin]
phi = 58.49679169514548 Azimuthal angle [deg]
order = 0 Grating order
energy = 1 Energy [keV]
wavelength = 0 Wavelength [A]
ra_zo = 212.8785255685877 RA of zero order
dec_zo = 52.24005379720089 Dec of zero order
(asolfile = none) Input aspect solution file
(option = ) Conversion option
#
# Override setup for observation
# All parameters here are strings so that they can
# be set blank, in which case the data file value is used
#
(ceilfmt = hms) RA and Dec format [deg or hms] (xx.xx or xx:xx:xx.x)
(detector = ) Detector (ACIS or HRC-I or HRC-S)
(grating = ) Grating
(fpsys = ) FP convention
(sim = ) SIM position (eg 0.0 0.0 -190.6)
(displace = ) STF displacement (X,Y,Z,AX,AY,AZ)
(ra_nom = ) Nominal pointing RA [deg or hh:mm:ss]
(dec_nom = ) Nominal dec [deg or dd:mm:ss]
(roll_nom = ) Nominal roll [deg]
(ra_asp = ) Instantaneous pointing RA [deg]
(dec_asp = ) Instantaneous pointing Dec [deg]
(roll_asp = ) Instantaneous Aspect roll [deg]
#
(geompar = geom) Parameter file for Pixlib Geometry files
(verbose = 0) Debug Level
(mode = ql)
```

---

Parameters for /home/username/cxcds\_param/celldetect.par

```
#
# celldetect parameter file
#
# input
#
infile = acisf00578N002_evt2.fits Input file
```

## Creating Accurate RA, Dec Coordinates for src2 Files – CIAO 3.4

```
#
# output
#
#       outfile = new_578_src2.fits      Output source list
#       (expstk = )                    list of exposure map files
#       (regfile = none)                ASCII regions file
#
# output options
#
#       (kernel = default)             Output file format
#       (clobber = no)                 Overwrite exiting outputs?
#
# output content/format options
#
#       (thresh = 3)                   Source threshold
#       (findpeaks = yes)               Find local peaks?
#       (centroid = yes)                Compute source centroids?
#       (ellsigma = 3)                  Size of output source ellipses (in sigmas)
#       (expratio = 0)                  cutoff ratio for source cell exposure variation
#
# detect cell size parameters
#
#       (fixedcell = 0)                 Fixed cell size to use (0 for variable cell)
#       (xoffset = INDEF)                Offset of x axis from data center
#       (yoffset = INDEF)                Offset of y axis from data center
#       (eband = 1.4967)                 Energy band
#       (eenergy = 0.8)                 Encircled energy of PSF
#       (psftable = ${ASCDS_CALIB}/psfsize20010416.fits -> /soft/ciao/data/psfsize20010416.fits) Table of PSF
#       (cellfile = )                   Output cell size image stack name
#
# background parameters
#
#       (bkgfile = )                    Background file name
#       (bkgvalue = 0)                  Background count/pixel
#       (bkgerrvalue = 0)               Background error
#
# using defaults is recommended here
#
#       (convolve = no)                  Use convolution?
#       (snrfile = )                     SNR output file name (for convolution only)
#
# run log verbosity and content
#
#       (verbose = 0)                   Log verbosity level
#       (log = no)                       Make a celldetect.log file?
#
# mode
#
#       (mode = ql)
```

---

## History

01 Jun 2004 updated for CIAO 3.2: corrected screen output, include dmcoords asolfile parameter

12 Dec 2005 reviewed for CIAO 3.3: no changes

01 Dec 2006 reviewed for CIAO 3.4: no changes

URL: <http://cxc.harvard.edu/ciao/threads/newsr2/>

Last modified: 1 Dec 2006

