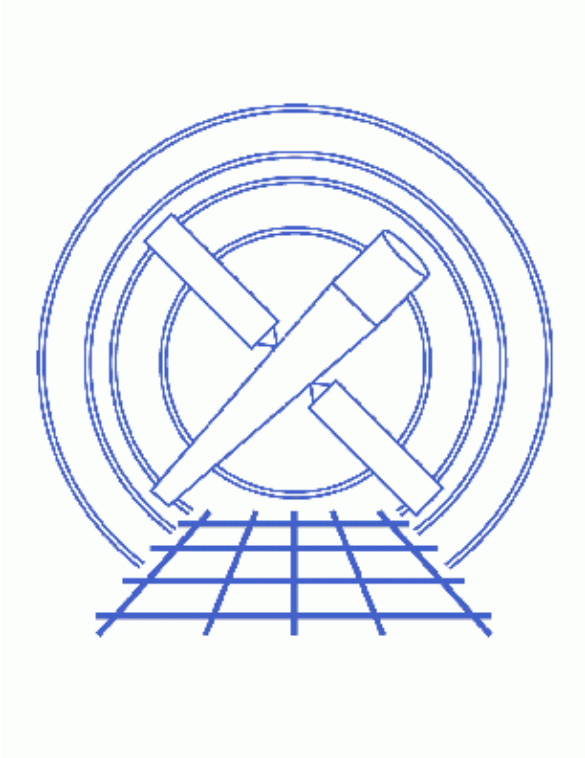
Overview: Reprojecting Files



CIAO 3.4 Science Threads

Table of Contents

- ***reproject_aspect: minimize position differences between two files***
- ***reproject_events: regrid an event file to a common tangent point***
- ***reproject_image: match one image to another***
- ***reproject_image_grid: project an image to a WCS grid***
- ***sso_freeze: reproject a solar system object***
- ***Note: using stacks of input files***
- ***History***

URL: http://cxc.harvard.edu/ciao/threads/reproject/ Last modified: 1 Dec 2006

Overview: Reprojecting Files

CIAO 3.4 Science Threads

Overview

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

Synopsis:

The CIAO 3.3 software release included three new tools useful for reprojecting files with different coordinate WCS: `reproject_aspect`, `reproject_image`, and `reproject_image_grid`. Joining the existing tools `reproject_events` and `sso_freeze`, there are now five different tools for reprojecting files available.

Purpose:

To describe the tools available for reprojecting event, image, and aspect files in CIAO, and provide links to the threads that use them.

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

reproject_aspect: minimize position differences between two files

`reproject_aspect` applies corrections for translation, scale, and rotation to the WCS of a file. It compares two sets of source lists from the same sky region. If three or more sources are found to be a close match in position, the tool calculates the transformation that relates the two files and updates the WCS mapping from SKY(X,Y) to (RA,Dec) either by modifying the aspect solution or by revising the WCS keywords, depending on how the parameters are set.

`reproject_aspect` is actually a script which runs two tools: `wcs_match` and `wcs_update`. These tools may be run individually for slightly more flexibility; see the help files for details.

This tool is the most accurate method of reprojecting a file, but does depend on source lists for each observation being available. Note that the source list from the archive (`src2.fits` file) ***is not accurate enough*** for use with this tool. Users should create a new source list by running one of the detect tools; `wavdetect` is recommended because of its ability to separate closely spaced point sources. The Running wavdetect thread illustrates how to use the tool.

Threads:

- Correcting Absolute Astrometry with reproject_aspect thread

- The Correcting Aspect Prior to Merging section of the Merging Data from Multiple Imaging Observations has an example of using `wcs_update` as a standalone tool.

---

reproject_events: regrid an event file to a common tangent point

`reproject_events` calculates new sky coordinates for the input event file using the WCS from the match file. There are two modes of operation:

1. the new sky coordinates are evaluated assuming the old aspect solution was correct, and
2. the user supplies a new aspect solution and the sky coordinates are calculated from scratch, independent of the original aspect solution.

Refer to the help file for details on each approach.

Threads:

- `reproject_events` is called by the `merge_all` script, which is used in many of the CIAO Imaging threads to merge observations and create exposure maps.
- Merging Data from Multiple Imaging Observations
- Using the ACIS "Blank−Sky" Background Files

---

reproject_image: match one image to another

`reproject_image` maps an image in one WCS reference frame to the WCS of a match image. If a match image is not available, use `reproject_image_grid` instead.

`reproject_image` has a parameter (`method`) which controls whether the input files are summed or averaged together; "`sum`" is typically used to reproject the counts image and "`average`" is used to reproject the exposure map when making fluxed images.

Threads:

- Reprojecting Images: Making an Exposure−corrected Mosaic

---

reproject_image_grid: project an image to a WCS grid

`reproject_image_grid` maps an image in one WCS reference frame to a specified WCS grid. This tool works similarly to `reproject_image`, but does not require a match image.

`reproject_image_grid` has a parameter (`method`) which controls whether the input files are summed or averaged together; "`sum`" is typically used to reproject the counts image and "`average`" is used to reproject the exposure map when making fluxed images.

Threads:

- Reprojecting Images: Making an Exposure−corrected Mosaic

sso_freeze: reproject a solar system object

`sso_freeze` reprojects the coordinates in an event file from the frame fixed to the celestial sphere to the frame of the object. This eliminates the blur that occurs when an object (e.g. a planet or comet) is observed moving with respect to the observer.

Thread:

- Reprojecting Coordinates of a Solar System Object

Note: using stacks of input files

All of the reproject tools can take a stack of files in the input parameter, but they do not all handle the stack in the same way. For instance, `reproject_events` creates a separate output file for each item in an input stack, while `reproject_image` creates a single merged image from the stack. Refer to the individual tool help files for details on how they handle a stack of input files.

History

04 Apr 2006	new for CIAO 3.3: original version
24 Apr 2006	The Correcting Absolute Astrometry with reproject_aspect thread is now available; link added to this thread
06 Jun 2006	added "Merging Data from Multiple Imaging Observations" thread to reproject_aspect section
01 Dec 2006	reviewed for CIAO 3.4: no changes

URL: http://cxc.harvard.edu/ciao/threads/reproject/ Last modified: 1 Dec 2006