URL: http://cxc.harvard.edu/ciao3.4/data_products_guide/asol_descrip.html
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Aspect Solution File

Data Products Guide

Level	Instrum	ICD	Data product	Content	Pipeline	Filename template
L1	PCAD	v2.4	Aspect Solution File	ASPSOL	ASP1	pcad...asol1.fits

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Description:

The aspect solution describes the pointing of the telescope as determined by the Pointing Control and Determination (PCAD) system. The PCAD uses three instruments to determine the alignment of the detectors relative to the sky. They are:

1. two 2−axis gyroscopes
2. a 4.25" star−tracking optical CCD camera
3. an internal set of fiducial lights (LEDs mounted on the science instrument focal planes)

The accurate determination of pointing is necessary to take full advantage of the high spatial resolution of the HRMA. During a normal science observation, Chandra is continually "dithering" in a repetitive 8" (ACIS) or 20" (HRC) Lissajous pattern to minimize the affect of bad pixels and lessen the effect of radiation on the detectors. The aspect solution therefore allows the ground processing pipeline to remove this dither pattern (as well as any other random disturbances) and assign an RA and Declination to each detected photon.

In some instances, more than one asol file will be included in the package of data products. The files may be merged with the tool `dmmerge`, to create a complete asol file for the observation. Alternatively, many tools which require the asol file(s), such as `asphist`, will accept a list of asol files, as a stack.

file name template:

`pcad*_asol1.fits` − the string of numbers in the asol file name (e.g. "`pcadf111767021N001_asol1.fits`") refers to the start time of the period for which the aspect solution is valid. The time is measured in seconds, starting at 0h UT, Jan 1, 1998.

creator pipeline:

ASP1

creator tool:

no tool (asol files generated internally).

Useful links:

- Chandra Aspect page − the prime source for the latest information on aspect determination.
- Positional Accuracy Monitor − Up to date info on the accuracy of the aspect solutions.

ASOL specific columns:

Column Name	Units	Description
time	seconds	−
ra	degrees	RA of MNC frame (x−axis). The Mirror Nodal Coordinates (MNC) have their origin at the optical axis. See the coordinates manual for more info.
dec	degrees	Dec of MNC frams (x−axis). See 'ra' description.
roll	degrees	Roll of MNC frame. See 'ra' description.
ra_err	degrees	uncertainty in RA
dec_err	degrees	uncertainty in DEC
roll_err	degrees	uncertainty in Roll
dy	mm	Shift of STF frame realtive to FC frame. The SIM (Science Instrument Module) Translation Frame (STF) takes into account the position of the optical bench and the instrument's position on the bench. The Focal Coordinate (FC) system is centered on the telescopes nominal focus. The difference between STF and FC is usually very small, and due to shifts in the telescope structure. For more info see the coordinates manual.
dz	mm	Shift of STF frame relative to FC frame. See 'dy' description.
dtheta	degrees	Rotation of STF frame relative to FC frame. See 'dy' description.
dy_err	mm	Uncertainty in dy
dz_err	mm	Uncertainty in dz
dtheta_err	degrees	Uncertainty in dtheta
q_att[4]	−	−
roll_bias	degrees/second	Change in the Telescope roll, as determined by gyroscope.
pitch_bias	degrees/second	Change in the Telescope pitch, as determined by gyroscope.

yaw_bias	degrees/second	Change in the Telescope yaw, as determined by gyroscope.
roll_bias_err	degrees/second	Uncertainty in roll_bias
pitch_bias_err	degrees/second	Uncertainty in pitch_bias
yaw_bias_err	degrees/second	Uncertainty in yaw_bias

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