CIAO

Tools and Application List

Chandra Instrument Tools

acis_process_events	Produce/update ACIS coordinates, PI, GRADE, STATUS, etc
acis_detect_afterglow *	Identify and flag cosmic ray afterglows
hrc_process_events	Correct HRC event positions, times, PHA, gain, etc.
tg_resolve_events	Assign grating coordinates (dispersion distance) & order sorting
tg_create_mask	Create a region file to define spectrum sky boundaries
tgdetect	Locate 0-order in image
tgextract	Extract the grating spectrum (wavelengths or energy)
asp_calc_offsets	Computes offsets from nominal pointing
asp_apply_sim	Add the SIM offsets to the optical axis offsets
asphist	Bin the aspect into a 3D histogram of duration vs pointing

Instrument Response Tools

mkrmf	Create RMF from a FEF file on a given 2-D grid plane
mkinstmap	Generate a Chandra instrument map (area vs. position)
mkexpmap	Generate a Chandra imaging effective exposure map
mkarf	Generate a Chandra Grating ARF for one detector element
mkgarf	Generate a Chandra Grating ARF for one detector element
mkpsf	Extract a point spread function (PSF) image

Source Detection

celldetect	Uses an adaptive "sliding cell" to search for sources
wavdetect	Mexican-Hat Wavelet source detection (wtransform+wrecon)
vtpdetect	Voronoi Tessellation and Percolation (VTP) source detection)

Utilities

dmappend	Append multiple blocks/extensions to an existing output file
dmarfadd	Add multiple ARF files together weighting by exposure.
dmcontour *	Make contour regions from a 2D image
dmcoords *	Operations on Chandra coordinate systems
dmcopy	Filter and bin tables and images.
dmextract	Make a histogram table file (e.g. PHA file) from a table
dmgroup *	Group a specified column in a table, with various options
dmgti	Create a Good Time Interval from input Mission Time Line
dmhedit	Edit datamodel file headers
dmimg2jpg *	Make color JPEG image (or EPS) from three image files
dmimgcalc	Perform arithmetic on images

dmimghist *	make histogram of values in a 2
dmkeypar *	Retrieve information about a header keyword
dmlist	List contents or structure of a file.
dmmakepar	Write header keywords to a parameter file
dmmakereg *	Convert a region string to a CXC FITS region file
dmmerge	Merge two or more compatible tables into one.
dmpaste *	Add new columns to a table.
dmreadpar	Add parameters from a .par file to a dm compatible
dmrega2fits	Convert a grating ASCII region into a FITS format
dmregrid	Rebin a stack of 2 dimensional images.
dmsort	Sort a table.
dmstat	Computes centroid, means, median, sigma, total
dmtcalc *	Define new table columns as functions of old ones
dmtype2split	Create a type 1 output file for specified rows of a type 2 file
dmwritefef	Create a FITS Embedded Function (FEF) file
reproject_events	Regrid an event file (or stack)to a common tangent point
stk_build	Expands a stack listing
stk_count	Count the number of entries in a stack
stk_read_num	Returns n-th element in a stack

Miscellaneous Analysis

aconvolve	Convolve an N-dimensional image
acrosscorr *	Computes auto or cross correlation of images
apowerspectrum *	Compute power spectrum of an N-D image
axbary *	Compute barycentric corrections to event times, GTI and headers
csmooth	Adaptively smooth a 2D image
get_src_region *	Output regions that have counts higher than background
lightcurve	Bin source and background events by specified time interval

Applications

sherpa	1 & 2D modeling and fitting application
guide *	Sherpa plug-in to analyze spectral data
chips	Generic plotting package
prism	Graphical file browser
filtwin	Interactive filter tool and launch pad for data analysis
firstlook	Provides quick access to Chandra datasets

*'ed items are new additions to CIAO.

All tools take advantage of the "datamodel" I/O layer which provides advanced filtering and history (aka subspace) mechanisms.

The applications chips and sherpa now provide the scripting power of S-Lang to the users. This allows for arbitrary manipulation (and creation!) during the analysis session.

The various GUIs also share a common "session" thread that allows users to save and restore entire data analysis sessions. These sessions can also be shared between investigators at different institutes.