CIAO Highlights

The remarkable science capabilities of the Chandra X-ray Observatory demanded new, flexible, multi-dimensional software to analyze the data it returned. The result is CIAO, a system that has proven itself useful for the analysis of data from non-X-ray missions as well, due to the mission independence that is the basis of the CIAO design.

CIAO 2.0:

- Sherpa enhancements include robust optimization methods, improved error calculations, and new save/restore features, as well as several options for analyzing grating data, e.g enhanced analysis of type 2 pha files, analysis in wavelength or energy space, use of multiple backgrounds, background modeling, as well as beta version of GUIDE (Grating User Interactive Data Extension) and S-lang.
- GUIDE is designed for high resolution spectral analysis (e.g. line identification). GUIDE works with the line lists and emissivities created by APEC, the successor code to Raymond-Smith. [Which is backwards-compatible with earlier models, e.g. MEKAL.]
- S-lang provides a scripting language that allows users to create personalized data analysis routines within Sherpa and Chips, via commmon programming control features, interactive access to data structures, and the ability to define variables and functions.
- The datamodel I/O library, underlying all CIAO tools, now supports advanced filtering (e.g. multiple conditions, data flags)
- Upgraded event processing tools to use the latest calibrations and include newly discovered instrumental effects.
- Better response tools to help users fit spectral features and flat field their observations. The number of RMF files for ACIS has been reduced from over 4000 to 4 (1 per temperature). [The true number of RMFs has not changed, but they have been packaged more cleverly to reduce overhead for users.]
- More utilities to help users view and manipulate their data.
- Source detection tools now deal with exposure variations across the field.

- Enhanced online help (" ahelp") which now includes context, and cross-references; and new thread-based guides (on the WWW).

The website for CIAO 2.0 is located at http://asc.harvard.edu/ciao2.0/index.html

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CIAO 2.1:

- CIAO 2.1 brings major advances in stability and opens up the system to users of Alpha's Tru-64 OS.
- User configuration has been simplified. Other packages, e.g. FTOOLS v5.x, may be configured in the same shell/window/script with fewer problems.
- The tool dmextract now makes radial profiles, including background subtraction (i.e. functionality similar to IRAF's 'imcounts'). The FITS output can be modelled with Sherpa.
- There is a new CIAO tool, destreak, that was adopted from the existing destreak script. This tool is used to remove the excess streaking events that are seen primarily on the ACIS-8 (ACIS-S3) chip.
- Observers of solar system objects may use another new tool, sso_freeze, to compute a set of coordinates that is centered on the moving object.
- Users can now easily modify existing badpixel files with dmmakereg.
- Sherpa enhancements include improved subtraction and fitting of (multiple) background(s), improvements to the Levenberg-Marquardt optimization method which allow it to be used with background data and double-precision data, inclusion of the XSPEC v11 model library, and improved interaction with S-Lang.
- Numerous bugs have been fixed: log plotting in chips & sherpa, grouping errors, timepxr used in computing GTIs, data-type guessing in dmhedit, and WCS propagation in dmimgcalc, to name several.
- The Ahelp system has been improved, adding the 'ahelp -w' functionality for all CIAO tool help files.

The website for CIAO 2.1 is located at http://asc.harvard.edu/ciao/index.html

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