Chandra X-ray Center

CIAO features that should be added or improved

```
9 – more graphical interfaces to tools/plotting/imaging

12 – Ability to use S-lang on _internal_ ChIPS/Sherpa variables.
     DM access via IDL.
     DM to develop a pipe <STDIN>/<STDOUT> option.

13 – CIAO equivalents of XMM SAS commands "xmmselect" and "evigweight"
     would be *extremely* useful.

14 – lightcurve

15 – psextract.  I would love to see psextract rewritten to assume
     less and to allow users greater range in what they may provide to it,
     for instance multiple forms of mkarf and mkrmf.

16 – Add scripting of ciao tools and better interface with other
     software, eg IDL. It seems rather difficult to call ciao process from IDL.

18 – Faster, more reliable, less bloat

19 – Sherpa speed could be greatly improved.  I do all spectral
     fitting in xspec except where Sherpa is required, e.g. low-count
     spectra where Sherpa's expanded statistical methods are necessary.

21 – csmooth; examples in documentation; history recording in FITS headers;
     sherpa documentation & tutorials; simple smoothing tool (gaussian,
     tophat, etc.) similar to the ftool fgauss; cross-referencing between
     ahelp documents on the web.

24 – PSF photometry!

25 – 1) region syntax needs ability to specify unions, negations etc
     to build stock, reusable shapes (e.g. a bit like in povray)
     existing syntax has odd non-intuitive bits..., e.g.
          +shape1
          +shape2
          -src1
          -src2
     only removes src1 and src2 from the shape2, not from shape1

     2) dmregrid needs to handle wcs info, rotations, rebinning robustly.
     3) dmregrid needs to be able to rebin images to arbitary pixels sizes
     based on wcs info, not just fixed integer rebinning factors.

27 – efficiency in handling large arrays.

28 – more stability in the parameters between releases to make scripting
     easier

29 – It's not so much CIAO but a better description of the data products
     would be helpful.  The threads get the job done but they leave one
     wondering what's going on.
```

30 – better looking graphs via chips

31 – GUI to review and manage parameter files

    Easy scripting

    Less opaque customization (S-Lang is fairly obscure compared to IDL)

32 – More control over plot features in CHIPS (axis labels,
    lineweights, etc., for publication quality plots)

35 – XMM-Newton delivers response matrices appropriate to the given
    observation. That would be very nice.

    Timing tools need to be improved.

    LETG-ACIS response matrix generation fails often and inexplicably.

38 – spectral analysis tools

39 – Finding source position in zeroth order image for piled-up HETG observation.
    Handling CC mode data

40 – timing analysis and tools about HRC+LETG and maybe it can be more user friendly

43 – phased light curves

    more slang modules for interactive, customizable analysis, such
    as region functions, math libraries.

    filtering guides (e.g., for bright sources, can any standard
    filtering parameters be relaxed to get more exposure?)

47 – Scripting of spectral fitting could be improved although will be
    better with Slang. Fitting of confused sources could be
    documented/explained better. Deprojection of extended sources.

51 – the one thing I'd like to be able to do in sherpa is to read in
    data from an ascii data file and specify which lines of the data file
    I would like to read in. I know you can specify which columns of the
    data file to read in, but it would be nice to read in specific lines,
    rather than all the lines of the data file.

53 – error messages

56 – I would like to see csmooth worked on so that it is applicable to the
    exposure map in a sensible manner.

57 – Identifying discrete sources above an arbitrary sigma value

58 – I'd like a Darwin (OS X) port. I purchased a linux box
    specifically to perform Chandra analysis, though I already
    own and work on a dual processor G4.

59 – improved 1D plotting and contouring

60 – Sometimes When I am analysing the data using CIAO, the tools in CIAO
    are just like black box, I do not know how the tools work.

62 – sherpa

63 – Right now, region handling is a little shaky. There are not
    enough examples on-line or in the help files which explain, for
    example, how to give CIAO regions in RA, Dec format (need a "d" at the
    end of the numbers!!)

64 – Would like more scripts and/or software support for large-scale
     projects that use large off-axis angles and very different
     observing environments, modes. That is, observations that are not
     single pointings of on-axis point sources.

80 – The ability to export plots to .jpg format

81 – fitting and modelling tools to support analysis of photoionized plasma

82 – S3 CTI correction

     More precise PSF library for mkpsf. I don't care how big it is
     (one could probably degrade the resolution by x2). CHART + MARX is too
     complicated and doesn't cut it for making PSFs for hundreds of
     sources.

     More up to date version of CSMOOTH (perferably one that more
     effectively incorporates exposure maps).

83 – it might be technical but I like how ftools can handle the gzipped data
     especcially it can create a gzipped output file in the following manner
     fselect input.fits.gz output.fits.gz "energy < 2000"

     inclusion of the subpixel_resolution software

84 – ease of installation

89 – vtpdetect

90 – It's not always clear which parameters (in, e.g., dmgroup) are actually
     being looked at when a task is run.

     Additional examples in some of the ahelp documentation would be useful
     for some of the more configurable tasks (e.g., dmgroup).

99 – ALL threads reviewed by a scientist to ensure that they are useable and accurate.

103 – make user (table) models in sherpa much easier to implement.
      there should be a better image interface than ds9 with, e.g., RGB
      (three-channel) image display.

104 – Well, the help should be given at a level to be useful to first time
      users. I can't even convert the flux to a useful unit, as there
      is no help for such "trivial" concerns on the CIAO/chandra webpage.

105 – All aspects of data analysis that I need are sufficiently well
      supported and documented.

106 – I'd like to see monte-carlo goodness of fit estimates introduced
      into sherpa for Cash statistic. I'd also like better support for using
      a 1D psf as an instrument model when fitting a radial profile to
      extended emission. I'd also like to see a temperature profile model,
      that uses psf info and deprojection introduced.

      Oh and it would be good to have a source detection method that worked
      in several energy bands, using the correct psf at each position and
      energy, and gave estimates of whether sources are extended

108 – sherpa – more flexibility
      more scripts to do repetitive processing tasks

109 – csmooth: bugs need to be fixed, needs to properly smooth exposure and
      background tomatch data

118 – source spatial analysis

119 – The timing analysis section is poorly implemented. It would be useful

```
    to have more XRONOS-like tools.

121 - XSPEC

124 - Better access to internals.

    Better documentation of interfaces.  Can sherpa an ciao functionality
    be put into libraries with documented interfaces?  I seldom use
    the slang capabilities because of the lack of documentation, particulary
    the relation between slang and the tools.  The features look
    interesting, but I can't make much use of it until I know what the
    slang/ciao/sherpa interfaces actually are.

    Better access to internal data.  (I understand this improves a lot
    with ciao 3)  I want to be able to grab the results of a projection
    and manipulate it outside sherpa.  I want to be able to automate
    things, so I need to be able to extract much of the sherpa state
    (fit parameters, fit parameter errors, ...) easily.  The MDL files
    are a start, but they only capture a small part of the state needed.

    There seems to be virtually no support for mosaicing.  I would like
    to be able to combine datasets for larger regions.  The available
    tools basically allow reprojection to a given tangent plane, but
    that's about it.

    I need a way of doing algebra on images.  For example, I want to be
    able to construct an error image from a counts image.  Where do
    I turn for a tool to take the square root of an image?  (I'm
    going to have to roll my own.)

    An instance where this is needed is to try out csmooth.  I look at
    csmoothed images and at unsmoothed images, and I just don't believe
    csmooth.  So far, I haven't been able to find a technical
    reference on the algorithm.  If I have a bright diffuse object,
    it seems to me that the relevant quantity is the significance
    compared to background counting statistics, not the "local
    background"; for a bright diffuse source, the "local background" is
    comparable to the source intensity, so csmooth will oversmooth
    (I conjecture).  I wanted to test this using the options to
    provide a background map and error map, but got stalled because of
    the problems of generating an error map.

125 - Sherpa should be made more general. At present Sherapa does not
    support for arrays of AREASCAL and BACKSALE while XSPEC
    does. XMM-Newton RGS data cannot be analyzed with Sherpa.
```

[Back to the Survey](#)