Presented here are the results from the CXC Software User Survey conducted in March 2003. Each of 108 anonymous respondents was assigned a number in order to correlate answers within the survey. Note that a set a numbers was skipped in this process, resulting in comments being numbered up to "126" -- this error in no way affects the survey results.

Contents:

- User Information
- CIAO Tools and Applications
- CIAO Documentation
- Image Display Applications
- Portable Systems
- Web Browsers
- Memory
- Software Installation
- Proposal Tools and Applications

User Information

Total number of respondents: 108

How they described themselves:

- Undergraduate Student: 2
- Graduate Student: 21
- Post-doctoral Researcher: 23
- Astronomer who occasionally works in X-Rays: 3
- X-Ray Astronomer: 39
- Other: 20 (List)

Level of experience with scientific analysis software:

- New User: 8
- Occasional User: 11
- Regular User: 46
- Expert User: 36

CIAO Tools and Applications

What kinds of CIAO analysis tasks do you perform most often?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACIS Imaging Spatial</td>
<td>10</td>
<td>9</td>
<td>21</td>
<td>22</td>
<td>34</td>
</tr>
<tr>
<td>HRC Imaging Spatial</td>
<td>51</td>
<td>19</td>
<td>12</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>ACIS Imaging Spectral</td>
<td>8</td>
<td>6</td>
<td>16</td>
<td>36</td>
<td>32</td>
</tr>
<tr>
<td>ACIS HETG Grating Spectral</td>
<td>34</td>
<td>11</td>
<td>19</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>ACIS LETG Grating Spectral</td>
<td>45</td>
<td>15</td>
<td>14</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>HRC LETG Grating Spectral</td>
<td>55</td>
<td>8</td>
<td>12</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>ACIS Timing</td>
<td>43</td>
<td>19</td>
<td>16</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>HRC Timing</td>
<td>63</td>
<td>10</td>
<td>7</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Can you easily perform these tasks using CIAO?

- Yes: 52
- Sometimes: 46
Software Survey Results

How often do you use the following CIAO command-line tools, scripts, or applications?

<table>
<thead>
<tr>
<th>Tool</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>ahelp</td>
<td>2</td>
<td>6</td>
<td>28</td>
<td>47</td>
<td>16</td>
</tr>
<tr>
<td>chips</td>
<td>29</td>
<td>18</td>
<td>22</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>csmooth</td>
<td>33</td>
<td>16</td>
<td>20</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>detecttools</td>
<td>47</td>
<td>13</td>
<td>11</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>dmcopy</td>
<td>3</td>
<td>2</td>
<td>12</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>dmfilth</td>
<td>50</td>
<td>17</td>
<td>18</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>dmgroup</td>
<td>29</td>
<td>16</td>
<td>22</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>dmmg2jpg</td>
<td>46</td>
<td>18</td>
<td>14</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>dmlist</td>
<td>8</td>
<td>9</td>
<td>18</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>firstlook</td>
<td>66</td>
<td>14</td>
<td>6</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>lightcurve</td>
<td>24</td>
<td>14</td>
<td>28</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>mkgrmf</td>
<td>35</td>
<td>14</td>
<td>22</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>mkpsf</td>
<td>43</td>
<td>22</td>
<td>16</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>prism</td>
<td>42</td>
<td>14</td>
<td>15</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>psextract</td>
<td>29</td>
<td>15</td>
<td>19</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>sherpa</td>
<td>33</td>
<td>14</td>
<td>21</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>s-lang as embedded in CIAO</td>
<td>37</td>
<td>21</td>
<td>21</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

Responses: Tasks users cannot easily do now.

How often do you use the following packages to analyze Chandra data?

<table>
<thead>
<tr>
<th>Package</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>External (List)</td>
<td>24</td>
<td>1</td>
<td>9</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>FTOOLS (List)</td>
<td>9</td>
<td>13</td>
<td>18</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>IDL</td>
<td>29</td>
<td>4</td>
<td>11</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>IRAF</td>
<td>52</td>
<td>19</td>
<td>11</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>ISIS</td>
<td>43</td>
<td>12</td>
<td>5</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>PINTofALE</td>
<td>69</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

Responses: Other command-line tools used often. These responses have also been collected into the following table:

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number of Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>dmeextract</td>
<td>16</td>
</tr>
</tbody>
</table>
### Software Survey Results

**PROS**

<table>
<thead>
<tr>
<th>Software</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEX</td>
<td>73</td>
</tr>
<tr>
<td>XMMSAS</td>
<td>63</td>
</tr>
<tr>
<td>XRONOS</td>
<td>70</td>
</tr>
<tr>
<td>XSPEC</td>
<td>13</td>
</tr>
<tr>
<td>Other</td>
<td>14</td>
</tr>
</tbody>
</table>

**SPEX**

<table>
<thead>
<tr>
<th>Votes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**XMMSAS**

<table>
<thead>
<tr>
<th>Votes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**XRONOS**

<table>
<thead>
<tr>
<th>Votes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**XSPEC**

<table>
<thead>
<tr>
<th>Votes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

**Other (List)**

<table>
<thead>
<tr>
<th>Votes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Responses:**

- CIAO features users liked best.
- CIAO features that should be added or improved.
- CIAO features users liked the least.

### How do you compare using CIAO to other astronomical analysis systems?

<table>
<thead>
<tr>
<th>CIAO vs. other systems</th>
<th>No Opinion</th>
<th>Much More Difficult</th>
<th>Somewhat More Difficult</th>
<th>About Equal</th>
<th>Somewhat Easier</th>
<th>Much Easier</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIAO</td>
<td>8</td>
<td>4</td>
<td>14</td>
<td>39</td>
<td>24</td>
<td>10</td>
</tr>
</tbody>
</table>

**Responses:** Features that make other data analysis packages easier to use than CIAO.

### CIAO Documentation

**Do you read any of the following CIAO documents?**

<table>
<thead>
<tr>
<th>Document</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help Pages</td>
<td>1</td>
<td>4</td>
<td>31</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>Analysis Guides</td>
<td>15</td>
<td>20</td>
<td>38</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>Dictionary</td>
<td>36</td>
<td>34</td>
<td>18</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>FAQ</td>
<td>31</td>
<td>28</td>
<td>27</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Document</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>FITsview</td>
<td>73</td>
<td>4</td>
<td>8</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>GIMP</td>
<td>46</td>
<td>21</td>
<td>11</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>KARMA</td>
<td>79</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>POW (FV)</td>
<td>57</td>
<td>5</td>
<td>15</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>
How often do you use the following image display applications? (Commercial software)

<table>
<thead>
<tr>
<th>Application</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>idl</td>
<td>25</td>
<td>6</td>
<td>20</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>mathematica</td>
<td>61</td>
<td>17</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>matlab</td>
<td>79</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>photoshop</td>
<td>61</td>
<td>10</td>
<td>12</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>28</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

Responses:
- Can you make publication quality images in a journal’s desired format?
- Image display features which are missing.
- Image display features users like the most.
- Image display features users like the least.
- Reasons for using one particular image display application.

Current and Future Portable Systems

Window Managers / Desktops

Which window manager/desktop do you use now?
Which will you use in the next year?

<table>
<thead>
<tr>
<th>Manager</th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDE (dtwm)</td>
<td>35</td>
<td>28</td>
</tr>
</tbody>
</table>

Workstations

- Sun Sparc/Solaris

Which version of Solaris do you use now?
Which will you use in the next year?

<table>
<thead>
<tr>
<th>Version</th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solaris 2.6</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Solaris 7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Solaris 8</td>
<td>39</td>
<td>31</td>
</tr>
<tr>
<td>Solaris 9</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Other (List)</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

- Compaq Alpha / Tru64 Unix

Which version of the OS do you use now?
Which will you use in the next year?

<table>
<thead>
<tr>
<th>Version</th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compaq Tru64 Unix 4.0f</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Compaq Tru64 Unix 5.0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Compaq Tru64 Unix 5.1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
PC Systems

- PC-Linux (x86)

Which version of the PC-Linux (x86) OS do you use now? Which will you use in the next year?

<table>
<thead>
<tr>
<th></th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redhat 6.2</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>Redhat 8.0</td>
<td>24</td>
<td>42</td>
</tr>
<tr>
<td>SuSE 7.x</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>SuSE 8.x</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Debian 2.x</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Debian 3.0</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Mandrake 8.x</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Mandrake 9.0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Slackware 8.0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other (List)</td>
<td>17</td>
<td>11</td>
</tr>
</tbody>
</table>

- Apple PowerPC (G3-G4)

Interested in a PowerPC port?
- Yes: 31
- No: 22

Which version of the OS do you use now? Which will you use in the next year?

<table>
<thead>
<tr>
<th></th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac OS 10.2</td>
<td>23</td>
<td>31</td>
</tr>
<tr>
<td>Linux PPC</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Windows XX

Interested in a Windows port?
- Yes: 12
- No: 51

Which version of the OS do you use now? Which will you use in the next year?

<table>
<thead>
<tr>
<th></th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 2000</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Windows XP Pro</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Other (List)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Web Browsers

Which browser do you use now? Which will you use in the next year?

<table>
<thead>
<tr>
<th></th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netscape 4.x</td>
<td>49</td>
<td>29</td>
</tr>
<tr>
<td>Netscape 6.x</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Netscape 7.x</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>Mozilla 1.x</td>
<td>37</td>
<td>42</td>
</tr>
</tbody>
</table>
### Memory

**How much memory do you have available?**

**How much will you have in the next year?**

<table>
<thead>
<tr>
<th></th>
<th>Currently</th>
<th>In the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 128 Mb</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>256 Mb</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>512 Mb</td>
<td>27</td>
<td>21</td>
</tr>
<tr>
<td>1 Gb</td>
<td>35</td>
<td>41</td>
</tr>
<tr>
<td>2 Gb</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>=&gt; 4 Gb</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

### Software Installation

**What kind of installation do you generally use?**

- Individual: 28
- System Manager: 36
- Both: 35

**What pieces of software are you generally installing?**

- ATOMDB: 44
- CALDB: 70
- CIAO: 78
- NRA: 32

---

### Proposal Tools and Applications

**How often do you use the following Proposal Tools?**

For each, indicate if you use the web or the portable version.

<table>
<thead>
<tr>
<th></th>
<th>Web</th>
<th>Portable</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colden</td>
<td>42</td>
<td>6</td>
<td>24</td>
<td>9</td>
<td>17</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Dates</td>
<td>22</td>
<td>4</td>
<td>38</td>
<td>10</td>
<td>10</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>EAviever</td>
<td>13</td>
<td>2</td>
<td>46</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Obsvis</td>
<td>32</td>
<td>15</td>
<td>22</td>
<td>11</td>
<td>22</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Pimms</td>
<td>52</td>
<td>17</td>
<td>12</td>
<td>5</td>
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Last modified: 21 May 2003
Tasks users cannot easily do now in CIAO

9 - more timing analysis
10 - fluxes, interactively
12 - I mostly use CIAO to reduce data. For analysis, I tend to use IDL mostly because canned tasks have very limited use to me.
13 - Doing spectroscopy of extended sources in ACIS can be tricky. Exposure correction is slow and cumbersome.
18 - Better support for lightcurves, new gtis, etc....
19 - 1) Easily append ascii data into existing fits tables; something like fcreate + dmpaste
2) Use regions in ds9 region format
21 - Expand dmshmthresh to be able to crop high values as well as low ones.
Define multiple user models within sherpa.
Define elliptical annuli in the same way as circular ones, i.e. with a single region.
23 - Some of the timing analysis software present in IRAF/PROS is not available in CIAO, e.g. "vartst" and "period". Also, Sherpa lacks some of the functionality of XSPEC. Particularly, Sherpa cannot accept a multiplicative or additive model (the XSPEC functions "mtable" and "atable"), which are necessary for some data analysis.
These are not critical problems; overall CIAO is extremely useful.
24 - Most things with CIAO are fine, but I would really like to be able to do PSF photometry. I'd also like added functionality in ds9.
27 - It’s not about what I would like to be able to do. My issue with CIAO is that a patch should be made available immediately if/when bugs are identified.
31 - Custom models in SHERPA
Nice plots in CHIPS
33 - Scriptable access to the Chandra archive would be nice.
35 - I said "yes" but the timing tools need to be improved.
38 - look into the examples in the ahelp files and be able to use them. Many times they simply do not work because the syntax is either old or wrong.
40 - I would like to make timing analysis more quickly and more efficiently.
43 - phased lightcurves
Visualize standard gti filtering components as strip-charts
47 - Spectral/imaging analysis of spatially extended sources in CIAO is rudimentary. For Chandra galaxy and cluster data, tools on the order of IRAF's photometry and shape analysis set are more appropriate.
Deprojection analysis for extended sources (T(r) for example).
59 - create plots including contour plots to visualize the process of data analysis
64 - Source-searching which takes into account the PSF through matched filter techniques so that one gets accurate positions out of tools like wavdetect.
67 - It should have a better library of other astronomy tasks and tasks should be embedded in a programming (scripting) language that allows ready passing of results between routines. Embedding s-lang in ciao helps but there isn't a library as there is in IDL.
71 - Upper limits
Easy flux calculation
72 - better integration between ciao and mark
75 - Easily extract broadband flux estimates
81 - I would like sherpa to have improved line fitting abilities including routines for photo-ionized plasmas
I would like to see many more threads about fitting spectra (including continuum fits, line fits) of various sources. In my work I find there are many difficult and unresolved questions about this.
82 - Tools which specifically target spectra and variability for sources on multiple obsids.
Scripts for batch mode processing and analysis of greater than hundreds of sources
83 - masking of the image (e.g. exclusion of the point source regions from an exposure map)
84 - interface with IDL/Mathematica, allow other analysis software to use CIAO routines.
90 - Data preparation is unclear. There needs to be one "go-to" up-to-date manual that spells out things. The manual pages as they are now are disjointed and confusing about what needs to be done.
99 - The threads are a wonderful idea, but in some places are not written well. When I hit a wall with the threads, scientists often do not have the time or interest in helping, which makes that particular thread useless.
100 - scriptability for many parallel analyses explanations in the threads of what we're doing and why
102 - It's not that it cannot do it. It is that there is no way to check that it does it correctly.
103 - 1. calculate flux in sherpa without a model (with pha and arf files)
2. model the acis background in sherpa
3. easily input table models into sherpa
104 - The comments on how to use the software are insufficient for inexperienced users.
And when one has finally managed to use a routine, for example fullgarf, one then has no idea on what to do with the output files. Quite frustrating.

108 - CIAO is great for getting data processed to the analysis point and for low resolution spectra - ACIS only - using Sherpa, and for lightcurves. For other analysis I prefer to use IDL.

109 - Things which I do outside of CIAO (probably are others, but these were the ones that come to mind):
   1) Spectral analysis - I prefer XSPEC, which I find is more reliable
   2) Removing BG flares - easier to do outside of CIAO
   3) READOUT artifact correction for whole chip - no way to do within CIAO
   4) Temperature mapping

112 - Fit arbitrary two dimensional models, including links between the parameters of different dimensions.

113 - X-ray light curves of zero-order and first-order detected events.

115 - just about everything, ciao is a real piece of crap

117 - I would like to be able to get goodness of fit estimates in Sherpa for statistics other than Chips.

118 - check if a source is a point-like.

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Last modified: 20 May 2003
CIAO features users liked best

5 - All of them!
9 - saving parameters; scripting capabilities
12 - The DM tools philosophy, prism, _process_events
13 - scripts to do common tasks (e.g. exposure correct and combine multiple chips/observations)
14 - Threads
15 - command line, verbosity parameters, on the most part excellent ahelp
19 - The datamodel is brilliant. I cannot function without it. Also, the parameter interface is good, as it allows easy scriptability of tools.
21 - dm filename/filtering syntax; ease of scripting the various tools.
23 - acis_process_events allows a lot of user control. The documentation for CIAO tasks is extremely good. Dmcopy and dmlist I am likely to use several times per day.
24 - I like being able to apply filters on the fly, e.g., dmcopy "evt2.fits[energy=500:1500]" evt2_lo.fits
25 - 1) command line oriented - allows real power use when scripted.
2) moderately powerful, if occasionally buggy, support for regions in many formats.
28 - tools are generally fairly flexible if one knows enough
30 - the dm syntax, and object oriented nature of sherpa
32 - Online threads, programs which apply many often-repeated tasks (i.e. acispec, psextract)
38 - Extraction tools, processing....
39 - ahelp
40 - sherpa
43 - event processing and filtering
47 - The history info recorded in the file headers is very useful although difficult to read due to formatting.
51 - dmcopy
54 - Unix prompt input tools that do things well that are too complex to re-invent like dmimg/jpg smooth (haven't used it but looks good). Also from unix prompt routines which access CALDB data like: mkpsf; mkgmf.
58 - command line capabilities and scriptibility;
I intend to move over to sherpa, but am "fine where I am".
60 - Everyone could study how to use CIAO by reading the thread by himself/herself.
62 - sherpa
63 - I like the dm tools, especially dmcopy, dmlist, dmextract... all the basics are there, and it's easy to look at and manipulate fits files. I also like that CIAO interface a lot (command-line, that is), since it's clean, pretty easy to script, and generally well-documented.
64 - I like the no-nonsense dmlist commands.
69 - sherpa - I really like this, especially with the slang language embedded in it.
70 - dmcopy is very powerful.
72 - coherent syntax
75 - data model filtering
80 - I haven't used anything that's very unique, but the standard plotting things are nice..
81 - the helpdesk is outstanding - always a quick response
82 - Threads, Helpdesk
84 - dm
90 - I like very much that you are still running in your native shell. The uniformity of the interface makes the learning curve much less steep.
99 - threads and ahelp
103 - sherpa is a good extension of xspec
106 - The virtual filename syntax, the physical coord system, sherpa
107 - excellent documentation
writing commands from unix prompt
108 - general reliability; sherpa; analysis threads
111 - * nice data model
* sherpa is great
121 - XSPEC
124 - Sherpa scriptability is a win, especially being able to set up and refer to model components by name.
Embedded scripting languages are good, so slang looks very intriguing. However, until there's better documentation on the interfaces between slang and ciao, it doesn't do me a lot of good.
I do a lot of batch mode analysis, and sherpa seems to support that reasonably well. (Features of xspec that drive me mad are the problems running it in batch mode, and the problems in scripting...
xspec has many operations requiring user feedback in the form of 'yes' or 'no', and it is very difficult to set it up so that the appropriate responses can be fed to it.

125 - CHIPS, Sherpa for HETG spectroscopy
CIAO features that should be added or improved

9 - more graphical interfaces to tools/plotting/imaging
10 - Ability to use S-lang on _internal_ ChIPS/Sherpa variables. DM access via IDL. DM to develop a pipe <STDIN>/<STDOUT> option.
11 - CIAO equivalents of XMM SAS commands "xmmselect" and "evigweight" would be extremely useful.
12 - lightcurve
13 - psfphotometry!
14 - PES photometry!
15 - more stability in the parameters between releases to make scripting easier
16 - 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.
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20 - 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.
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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 - 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.

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 + HAXX is too complicated and doesn't cut it for making PSFs for hundreds of sources.

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

83 - it might be technical but I like how ftools can handle the gzipped data especially 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

85 - vipdetect

86 - 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).

89 - 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 2D 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

New scripts to do repetitive processing tasks

109 - csmooth: bugs need to be fixed, needs to properly smooth exposure and background tomcatsh data.

118 - source spatial analysis

119 - The timing analysis section is poorly implemented. It would be useful to have more XRONS-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, particularly 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 stangled because of the problems of generating an error map.

125 - Sherpa should be made more general. At present Sherpa does not support for arrays of AREA=SCALE and BACK=SCALE while XSPEC does. XMM-Newton RGS data cannot be analyzed with Sherpa.

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CIAO features users liked the least

9 - long parameter inputs
14 - hidden parameters
18 - Slow, SEGVs happen occasionally, require lots of memory
19 - The inability to run multiple instances of the same tool at the same time, even on different machines, without complicated setup (using local parameter files, etc.). It is extremely time consuming to, for example, extract spectra for 2000 sources one at a time on a single machine while other available machines sit idle.
24 - I don't know. I don't really use the ones I don't like.
28 - syntax is nonintuitive and awkward
29 - some of the low-level tools (dmlist, dmcopy) are much less intuitive than their ftools counterparts. Also, something like xselect would be nice.
33 - Many tools require an unreasonable amount of memory and cpu time.
35 - Grating threads are not very straightforward.
38 - sherpa - absolutely useless....
39 - Very frequent updating of CIAO. When is it going to be stable?
43 - sherpa's inescapable, context-sensitive commands. 
   chips extreme verbosity for simple tasks.
   slow (any equivalent, e.g., fselect vs dmcopy, is faster)
   hybrid syntax ( slang and command line)
   large code size; large parameter sets; frequency of segv's
47 - Execution speed. Various tool instabilities. Obscure error messages.
60 - Sometimes it is not convenient to download the thread, the website is very slow.
62 - chips - there are already plenty of plotting packages in the world - why adding another one.
63 - Some of the tools are just too slow. I think you know which ones I'm talking about :-).
64 - I don't use the spectral analysis tools. I prefer XSPEC. Also, it would be helpful if the photometry and/or positions from wavdetect were more reliable.
69 - csmooth - its slow and is too much of a 'black box' program. I've started using my own adaptive smoothing programs.
71 - parameter files
72 - syntax/parameter name changes when changing version of ciao (i.e. change from param "ccd" to "chip" in merge_all, or 
   [dm|ps]extract now using aoffs, now aools, now expmaps..)
75 - speed (especially sherpa, csmooth), stability
82 - that command line inputs change between versions, often breaking dozens of scripts that little time/effort is being devoted to PSF library enhancement.
83 - I want it to become more faster
90 - It is annoying that if one forgets an "=" sign when using pset, that other parameters get screwed up.
99 - Sherpa manual a disaster to read -finding things difficult, written poorly, at times incomprehensible.
100 - examples in shell are often trivial need links to other shell tasks that explain how to get the files needed by this one
105 - Sherpa. I found it difficult to use and I gave up.
108 - complicated to do any reprocessing because of many arguments for each tool etc. Many can be scripted - like psextract
111 - new features, where it is not clear if it is very important to use them and to redo the full analysis
115 - the way I can waste huge amounts of time puzzling over syntax or obscure documentation, without gaining any understanding of how anything works
121 - sherpa
124 - Speed. Speed. Speed.
   Sherpa and many of the tools are excruciatingly slow. One reason I fall back to Funtools and Ptools is to get better throughput.
   For example, converting a script over to using funcalc instead of dmcalc provided a big performance improvement. I was using funimage instead of dmcopy for awhile, and I'm thinking of going back to funimage. (The main downside is having to fix up the various header keywords.)
   I always use funtools if they will do the task (e.g., I always use funhead to examine the FITS headers.)
   The --/cxcds_param is a royal pain. I often have multiple analyses going on. The only way to keep from cluttering myself is to work hard to ensure that everyone has their own local uparm.
   A large motivation for wrapping everything in scripts is to allow me to have the script set up the (huge) ciao environment, and set up a local uparm.
   Periodically I find myself deleting the contents of ~/cxcds_param and then write-protecting it.
Features that make other packages easier to use than CIAO

- Sherpa seems less reliable, many times I cannot figure out what it is really doing or simply doesn't work. After a while plain frustration takes over. Don't its advantage to the others.

- ISIS: fully s-lang based; It is programmable, extensible, uniform, efficient. It provides both high-level functions useful for grating spectroscopy, and low-level ability for fine control and customization. More rapid turnaround for fixes, enhancements.

- IDL is more flexible than CIAO, and has a large function library, but has syntax ambiguities, command-line syntax differs from procedures. I sometimes use IDL for plotting, or to run pre-existing applications not yet converted to ISIS. IDL's primary strength now is in the large suite of multidimensional visualization functions.

- IRAF is easier to use for isophotal fitting of extended sources. ISIS is easier to use for repetitive fitting tasks.

- IRAF: I think IRAF is a little bit easier for me because of the way things are organized into different packages.

- IRAF is easier to use for isophotal fitting of extended sources. ISIS is easier to use for repetitive fitting tasks.

- IRAF: I think IRAF is a little bit easier for me because of the way things are organized into different packages.
90 - It isn't harder or easier than other packages. It's all a matter of
familiarity at this point, I think. I'm much more familiar with IRAF,
IRAF/pros and AIPS, so those tasks are easier to use.

99 - arms and legs above the SAS, but for people who know IDL and/or
XSPEC there is not much incentive to learn CIAO also, except for the
simplest tools like firstlook and psextract.

102 - It happens that some tasks are "updated" while others are not. I
remember once I had to run one part of a thread with an old version of
ciao and the following part with a newer version because there was
some incompatibility. It's not difficult, it's annoying.

103 - IDL. IDL scripts can be examined an modified. IDL vectors and
structures work very well with the FITS file format. Much easier to
understand processing in IDL and do new things with data.

105 - I find XSPEC easier, but this could be the result of "traditional" use.

107 - spectral analysis is easier with xspec, sherpa is somehow
cryptic and it seems to me that there is no tutorial around.

108 - IDL; transparent access to data at a low level.

111 - sherpa is nicer than xspec, dmlist is more comprehensive than fdump

112 - Mathematica. It is an integrated system, with a coherent logic.
It is well verified via millions of users.
It is stable.
It is extensible.

115 - everything that I'm aware of

119 - the HEAOFT package is somewhat easier (although it may be less
complete) because of its structure made of large programs with many
commands rather than single command tools with many option.
On the other hand CIAO is definitely easier than IRAF/PROS, even if
they share the same kind of user interface (CIAO is more stable and
flexible)

121 - None

124 - *All* astronomical software is aggravating to use, although
in different ways. I use ciao until I have a task which breaks.
I switch to xspec or can tools for that task until something else breaks.
I go back and see if ciao does any better now, ...

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Last modified: 20 May 2003

Chandra Science  |  Chandra Home  |  Astronomy links  |  iCXC (CXC only)  

|  Search
## CIAO documentation features that users liked best

- **9 - threads**
- **12 - ahelp and the threads.**
- **13 - The threads are fantastic**
- **23 - The threads are really spectacular.**
- **27 - again, what CIAO documentation?**
- **28 - Threads and ahelp files are usually fine.**
- **30 - the universality of ahelp**
- **32 - The threads are incredibly useful.**
- **38 - It has to be the threads and ahelp -- once they are correct of course, which many times does not seem to be the case**
- **39 - Almost everything is there in the document.**
- **40 - analysis threads**
- **43 - ahelp files are good for details when you already know what to run (though the see also seems to list too much) multiple formats; sometimes I like to browse, sometimes I like to print and markup (so the pdf version is a nice feature)**
- **47 - The threads are very useful for unfamiliar tasks.**
- **49 - ahelp pages on any ciao command.**
- **51 - data products guide**
- **58 - ahelp's ease of access, apropos capability, uniformity.**
- **59 - Threads!**
- **60 - It is easy to obtain the documentation.**
- **63 - The threads are really nice.**
- **64 - I like the ease of getting to tool description quickly in ahelp. I wish there were about 4 times as many examples included in the ahelp, and more thorough descriptions of each parameter including multiple examples of possible values.**
- **67 - The Threads web page is very useful to get started in CIAO-based Chandra data analysis.**
- **69 - The threads are very useful, and what I have looked at most often after the ahelp pages. I suspect I would have used the Analysis Guide a lot more had it existed when I first started working on chandra data.**
- **70 - Threads.**
- **75 - threads for common user tasks**
- **80 - The manuals on the website, particularly the threads since they are very succinct**
- **81 - threads are the most effective documentation component**
- **82 - Threads**
- **83 - threads**
- **84 - examples**
- **89 - Threads**
- **90 - ahelp seems to be very complete.**
- **99 - threads and ahelp, as mentioned above.**
- **103 - ahelp is still the best way to get info.**
- **105 - The presence of examples, the remainder to related problems and/or analysis aspects.**
- **106 - The threads**
- **108 - threads**
- **113 - Threads**
- **115 - none of them**
- **119 - very well organized for on-line use I like the threads section**
- **121 - ahelp**
- **124 - Threads are OK, but they need more real-world examples. They often do a simple example (which is good, gets you started), but then don't do any more realistic examples. For example: lightcurve filtering (1 chip). Real world example: I have an ACIS observation with 6 chips: how do I lightcurve filter on each chip separately and recombine the results? Similarly for dealing with sky background: how do I construct sky background datasets for all the chips, merge everything back into a single event list, and have all the GTI's, etc., set up correctly? I think there need to be many more examples like the step-by-step multi-chip exposure map thread. Lots more examples of how to do it with more than one of whatever it is.**
- **125 - Threads**
- **126 - The threads are quite good.**
Software Survey Results

http://cxc.harvard.edu/sds/survey/responses/ciaodocworst.html

Last modified: 20 May 2003

CIAO documentation features which are missing or need improvement

Back to the Survey

9 - Technical discussions

12 - ahelp pages usually need more content, such as brief descriptions of how the tools work, citations to ApJ for other papers on which tasks are based, etc.

Online thread URLs have a nasty habit of changing. This can get very annoying!

13 - Not easy to find good detailed descriptions of standard products

15 - Providing more examples under the ahelp pages of some of the more complex uses of certain commands.

18 - The web pages are too hard to follow -- to many hyperlinks. A simple linear thread would be better.

19 - Further expansion of the threads. For example, why do all the threads use F1 bins instead of PHA?

21 - The "bugs" link at the bottom of every ahelp web page should go to the bug list for THAT 70K, rather than to the list of all tools.

The cross-referencing between threads is often useful, but is sometimes just confusing, particularly when the cross-references send you several documents deep. In cases like that, it would be nice if the threads could be a bit more self-contained.

22 - Documentation which describes what the scripts do, and what's called by the script would be useful.

23 - Some aspects of the current state of calibration are well-hidden to the user, specifically the areas where calibration is extremely uncertain are not as well-defined as they could be.

24 - The threads should offer much more explanation of the choices used.

28 - If I don't use CIAO for a while, I always forget the exact syntax for doing certain things (e.g., filtering on a spatial region). It always takes me a while to find different examples of it again. It would be helpful to have this information linked within every thread where it's relevant.

32 - The manual/online help could use a little more technical info; for instance, exactly how does sherpa go about subtracting the background, or simultaneously fitting BG and source, how does it deal with pixels on the boundary of a region defined in ds9; etc.

35 - More examples of analysis chains need to be given, particularly for grating spectroscopy.

39 - More warning regarding change of CIAO version while using same data

43 - Brief usage messages, as common in Linux with --help

more top-down "ABC" guides, rather than "bottom-up" add-ons to web pages, which tend to fragment reading.

44 - "Printable" ABC Guides desperately needed. Threads are great once you know what you're doing, but a terrible way to learn. There needs to be something that you can print and read on the go.

There's a certain cavalier attitude on the threads. All references to the 3 ms readout time of CC mode should be expunged. It's 2.85 ms, and thinking "Oh, that's close enough to 3, so let's just put 3 in 90% of the threads" really isn't good enough.

47 - The main thing missing in almost all the threads are discussions of the various assumptions and limitations that go into the analysis. Perhaps an expert user class of documentation needs to be considered. The threads seek to address the needs of the novice user fairly well already. Time to move beyond the lowest common denominator service level.

49 - More understandable examples on ahelp pages.

53 - threads! - Would like to know the general principles, and flowchart of SDP. Please don't ask me to treat x-ray analysis as a black box.

59 - Information on calibration and potential problems with interpretation of the results.

60 - The documentation about script is not provided.

63 - The online ahelp pages take too many clicks to get to, and could easily do with more examples. More example=better, always!!

64 - Please include more (and more diverse) examples in the help.

69 - It would be nice to have a bit more information on the background dataset files in the CALDB, e.g. which datasets can be used with VF mode reprocessing on. As far as I can tell there is not much documentation on this and some of the header keywords in the files are misleading (e.g. header claims VF mode but the necessary columns are not there to use with a VF cleaned dataset).

I also find the helpdesk search interface to be somewhat awkward. I find it very slow to use, and I often have to search to lots of irrelevant queries before finding anything useful (which is annoying given that each one can take a long time to load).

75 - Accuracy of threads (particularly hrc); lack of printable "cookbook" to browse

81 - More examples of correct analysis are needed, mainly as threads. Maybe authors of good papers could be invited to write a thread, explaining how (and why) they did various procedures in their analysis

82 - Some details of programs are poorly documented or difficult to find.

83 - It is hard to find the older versions of the documents e.g. threads for CIAO ver 2.2

84 - Exceptions

90 - It is difficult when you have an idea of what you want to do, but don't know what task, thread, etc. will do it. Typing in keywords like "bin" doesn't produce output as useful as it could be.
even by somewhat familiar person as myself, some of the dictionary explanations are far too technical. While that technical detail needs to be there, there should also be a very basic laymans explanation.

99 - careful review of threads and ahelps by scientists.

102 - More up-to date informations. There seems to be a long lag between a "corridor rumor" on a problem/correction and the official announcement.

We should not have to ask a question to get a (late) answer that says "Oh, this is a well known problem" when this "known problem" is nowhere described...

103 - the threads need to evolve to include more complex data analysis situations.

105 - I do not know.

106 - I'd like to see a more detailed thread on extracting and fitting radial profiles, including the use of an exposure map, and comparing profiles of a source with the psf to see if it is extended.

108 - more examples of common cases

111 - information on importance of corrections, e.g. CTI corrections...

113 - Consequences for data analysis of improvements in calibration

119 - add more threads, also on "basic" topics.

Maybe it could be useful to collect them in a "how-to handbook"

124 - Scripts are often poorly documented (I mean the script code itself). There is little indication of what the steps are, and why things are being done. Also, scripts do not replace the need for step-by-step threads for what the script is doing. I don't want a black box, I want to know precisely what it is doing to my data. So, in general, I usually end up looking at the script, figuring out what it's up to, and writing my own with documentation of the steps, additional logging information, substituting tools with funtools or ftools, etc.

126 - The ahelp pages often lack information explaining all of the options for each keyword in the call sequence.
Can you make publication quality images in a journal’s desired format?

9 - yes
13 - Yes
14 - CMYK PS files capability missing with IDL
19 - Yes, though dmimg2jpg should produce higher quality postscript (and, ideally, encapsulated postscript).
20 - Only using wip
21 - Mostly, I haven’t yet found a tool I’m completely happy with for creating 1-D CMYK plots. DS9’s output often needs to be heavily edited in order to get axes & contours to come out right, and in order to add a color scale bar when necessary.
22 - Yes
23 - Yes.
24 - yes.
25 - Not quite – dmimg2jpg lacks acceptable axis labeling. Should also output postscript in CMYK (not just RGB).

Chips is good, but lacks a broad range of symbols.
27 - I don’t do imaging.
28 - Yes.
30 - Yes
31 - Yes - I love ds9 for this purpose!!!
32 - yes
35 - I’m not an imaging person.
37 - Eventually. Not with Ciao.
38 - yes, but not with CIAO tools
39 - yes
43 - yes, except for the silly cmyk business!
I’m not sure what “imaging” entails; I do mostly line/scatter plots (spectral). Sometimes I need 2D intensity images. Between IDL and lisp/pgpLOT, I can get what I need.
44 - There’s a bit of a distinction between what I need for analysis, and what I want for publication. In that sense, something like CHIPS is a bit of a mushy middle ground. Yes, the XSPEC plotting is kind of ugly, but it’s good enough to understand and think about. When it comes time for the final "publication product", I then usually go to IDL. I usually don’t see the need for the middle ground of CHIPS.
47 - Not in CIAO. I use IDL for this task.
49 - Yes, IDL works best for that.
52 - images with ds9, plots with IDL.
53 - With lots of effort, yes. Would like much better handle on resolution.
58 - Yes.
59 - ds9 can create great images! But I cannot create appropriate 2D contours with chips
60 - yes.
63 - Depends - dmimg2jpg certainly can produce good images, and then I use xv or gimp to finish them up. As for plotting, I prefer IDL to make the final thing.
64 - Yes
65 - yes
67 - It is still difficult to provide color drawings for ApJ in a format they can use readily. The cmyk output of ds9 was insufficient last time I tried.
70 - Yes. I often use "wip" http://bimas.astro.umd.edu/wip/manual/wip.html and occasionally IDL
71 - Need more examples
72 - yes
75 - using idl i can ds9 is not capable of producing really camera ready publication quality images
77 - yes, it is not a problem to make publication quality images with IDL
80 - no journal entries as of yet, but image specifications are always modifiable, though it may require a 3rd party app
81 - only just
82 - HAHAHAHA. NO. Journals always want four color images, while most programs only allow three color output.
83 - no
89 - yes, but I think contour plots with ds9 should be improved
90 - I haven’t tried that yet, and probably won’t need to. (I’m doing mostly analysis of point sources.)
100 - is CMYK postscript supported yet?
101 - no
103 - yes, in IDL.
105 - Yes.
106 - Yes, but it can be very fiddly
108 - Yes, in IDL
111 - ds9 is nice but could be improved
112 - Yes, ds9 is excellent.
113 - never tried with CIAO, I use IDL because it provides the best flexibility
118 - yes
120 - yes
121 - Yes
124 - Not for color figures. There are few tools available for manipulating CMYK images and generating CMYK postscript.
125 - yes
Image display features which are missing

9 - detailed control of marking image
13 - Nothing.
14 - none
20 - Select a region of an image to be displayed (rather than the whole image) so that several tiled images match each other on the same scale and coordinate range.
21 - In ds9; an option to print the color scale bar; axis labels that print in the right place; an option to restrict the part of the image in which the contours are printed, e.g. only print them if they're inside the axes.
22 - The ability to be able to easily crop an image to a desired region, without having to resort back to using dmcopy on the command line.
23 - ds9 has some problems with opening ROSAT or HST images, seems a WCS problem. (This may be a user error?) This is responsible for my occasionally using SAOimage.
24 - I'd really like to be able to overlay images to make a "true" color image in ds9. In fact, it'd be nice to be able to do it on the fly. If it could read in an event list and then I could tell it to display 0.5 to 2 keV in red with a log scale, etc., and define multiple filters like that, it would be all I need, and I'd have no use for Photoshop.
25 - CMYK - as above. Ability to make accurate overlays, e.g. greyscale of one image and contoured image of a totally different image.
28 - DS9 is not flexible enough for publication quality images - customizing a display is awkward. In IDL, I always spend a lot of time getting the stretch right.
30 - overlaying contours from a different image
31 - I really like ds9 these days. I would like to see the ability to put multiple contour images (positive and negative contours, for example) overlaid on a single image.
32 - none that I can think of
35 - I'm not an imaging person.
37 - most of the time, it's my fault for not getting colors right.
38 - More interactive data analysis capabilities, i.e. not only displaying an eventlist, but on screen selecting a source, get the appropriate pha, arf, rmf and other stats if desired. Something like that.
39 - I do not do imaging
47 - The ability to easily display true-color images where the RGB channels are associated with different images from various bands.
58 - ds9: Images are often truncated in what appears to be an arbitrary size. ds9: cannot read the standard src2.fits source positions from Chandra to put up some indicator of the found sources, detect-cell, and background region.
64 - It would be nice to be able to easily overlay region files on color-weighted jpeg images.
67 - Conversion from FITS to jpeg or png. I still use a Mac OS grab utility. I use IDL for analysis and then write FITS for ds9 to display.
70 - The ability to produce a publication quality postscript output. An easy way to combine images (e.g. contours from one image overlaid on another).
72 - ds9: ability to save a "view" -- i.e., to save what files with what binnings and zooms I'm viewing now, in order to be able to recover in a subsequent session ds9: I had troubles with a remote ds9 running remotely on a sun with 24bit display, and opening its window on a linux pc with 16bit display: colours were messed.
75 - in idl I can do pretty much anything; i tried ds9 but it's lack of true color and the ability to overlay complex graphics and annotations was too frustrating
77 - none, IDL and ds9 are all I need
81 - hard to adjust grid display; hard to adjust labels on plots
82 - ds9 - 1) the ability to assign regionfile grouping and then turn them on/off, delete them, modify them, etc.
2) put the "wcs match" item on the button menu (it is used SO much).
3) the ability to seamlessly read in region files with different settings (physical coords, image coords, celestial) without having to change the input format each time (isn't this what the regionfile header is supposed to be for?).
83 - masking of the image
84 - shift, rotate and regrid.
90 - The documentation on using ds9 in conjunction with ciao could be improved. The documentation borders on having far too much irrelevant detail scattered throughout. The details are good, but a better overview of its use with ciao and Chandra data analysis would be helpful.
101 - display coordinates in a user-defined way
102 - Instant smoothing of an image.
103 - None!
105 - None.
106 - When you load contours from one image onto another image in ds9, they often extend outside the borders of the image, unless you match their sizes to begin with. There should be an option to remove contours outside the image. Also, you should be able to save an image that has some particular scaling, min and max cutoffs, and contrast applied to it within ds9 as a single file that preserves this information, and also keeps your coordinate grid, contours, regions etc.

111 - ds9 is great, but could be improved:
    macro execution would help a lot
    adding text and arrows
    more options to position axis labels
    colorbar control and display.
    not well documented.

112 - Colorbar control and display.
    not well documented.

113 - Easy translation between different formats (e.g. JPEG <-> PS)

119 - The ability to cut fits images (or event files) using region files

124 - More complete XPA access (DS9). Extending rebinning and smoothing to image data in addition to event lists.
Image display features users like the most

9 - overlaying images
13 - karma produces publication quality images with minimum of mucking around
14 - color tables
22 - Its intuitive interface and ease of use.
23 - ds9's flexibility and range are stunning.
24 - ds9 has pretty easily navigable menus
25 - ds9 does to wcs-matching and region display well.
28 - DS9 - easy to use
    IDL - makes high-quality images
30 - binning on the fly
31 - The align by WCS feature in ds9. It's wunderbar.
32 - compatibility with CIAO, ease of use
35 - I'm not an imaging person.
38 - Flexibility, format conversions
43 - isis/pgplot: integrated line, scatter, image in same device.
    highly scriptable, at high and low level.
58 - CAN take a CIAO produced source position,
    downloads DSS images directly into the frame!
    Should do the same for 2MASS -- which is much more useful than DSS to me.
63 - ds9 does everything I want it to :-).
67 - Many analysis tools exist in IDL for image analysis. Matching images using WCS is simple and contouring looks pretty good in ds9.
70 - Very quick and easy to use.
72 - ds9: event file binning
77 - the programmability of IDL
80 - it's small and efficient

81 - multiple panes; able to fit xspec models, etc.
82 - ds9 - WCS matching user scaling
83 - masking of the data
84 - multiple frames
90 - ds9 is very configurable, but I prefer the controls that I have with the AIPS TV, although I have not used the AIPS TV in my Chandra data analysis.
101 - match frames
102 - Possible to include analysis packages.
    Easy overlay of images and coordinates transformations.
    Easy way to go from regions to extracting spectra.
    DS9 rocks!!!
103 - IDL is programmable, flexible and transparent from data to the exact Postscript font I want for an ApJ figure.
105 - Puntools capabilities included in ds9.
106 - the funtools and zhtools interfaces
108 - transparent and flexible access to data at a low level; control.
109 - I love ds9 -- it has too many great features to list here!!
111 - overlay with contours
112 - visibility. Speed.
119 - Lots of functions and options
124 - Ease of use. XPA!!! (DS9).
126 - The ability to lay X-ray contours over, say, optical FITS images. The ability to convert between coordinate systems.
Reasons for using one particular image display application

9 - Issues above
13 - ds9 can read in event lists directly; karma can only handle images.
18 - ds9 crashes when viewing a level 1.5 file.
21 - DS9 is best for images, IDL for 1-D plots, Illustrator for editing postscript files, etc.
22 - Gaia is better at contouring, in my opinion than ds9, so I use Gaia for contouring. I work with both radio and X-ray wavebands, so it's easier for me to use aipview when I'm working with AIPS and ds9 when I'm working with CIAO tools.
23 - Aladin is the standard Vizier tool for accessing the DSS.
25 - To make up for the various idiosyncratic deficiencies of each particular system.
27 - To take this opportunity, I would like to note that a small but appreciable percentage of population in the U.S. alone is color-blind. Therefore, color-coding usage in any survey should not be performed (such as below).
28 - I use ds9 most regularly to look at images, but I use IDL to make publication-quality images.
31 - If I'm working in IDL, I don't know how to display "live" to ds9, so I use IDL image display, which is sort of clunky.
35 - I'm not an imaging person.
38 - There is none that does everything, right?
43 - isis/pgplot: integrated with analysis s/w, provides most needed capability most of the time.
   ds9 occasionally for interactive display control, better support for binned images. User for inspection, not for output or scripts. But annoying segre's on grating data require use of other programs.
   IDL large suite of visualization functions; surface, volume; 3D projections, w/ contour or image overlays.
   xv: to scroll through a collection of output in gif or jpeg format, or to edit (small) colormaps.
47 - DS9 is good for quick looks but that's about it. For fine scale work and publication quality output, I use IDL because it provides the level of control necessary.
52 - ds9 works super for immediate image display of my FITS images/evt lists. IDL makes pretty plots, especially with help from routines in FINTofALE.
55 - Each image display is good for different image format: ds9 is best for FITS, fv is best to view images headers, xv is best to view images not in FITS format.
59 - Some are interfaced with the web (Aladini), and some handle image manipulation well (FV).
67 - See above. One is used for analysis, the other for "qualitative" work such as preparing a picture with good colors and contrast.
70 - ds9 is great to view the image, select regions, etc. (i.e. everything for scientific analysis) but xip or IDL are used to produce publication-quality postscript file.
77 - Use the best tool for the job, instead of trying to do everything with one monolithic system (which is exactly why I like the ibis, idl, and tools way better than the aips or ciao).
81 - To do various tasks (eg make a cartoon diagram or figure; display spectra and models.
82 - Difficult to make journal quality images. IDL wipes the pants off DS9 when one wants to add axis labels, fonts, etc.
83 - Overlaying the images.
84 - None can do everything I need it to do.
90 - Different displays handle different types of data better. The AIPS TV is wonderful for radio analysis, but I'd never attempt to use it to make pixelized X-ray analysis. I really only use ds9 for my X-ray analysis now.
92 - It is NOT necessary to have a software which does EVERYTHING. I'd rather have a software which works even on a limited number of problems that a monolith of code supposed to solve all the problems but which does not work...
93 - ds9 has many astronomical features which are indispensable. ds9 or something like it should be improved to allow more user interaction with data.
96 - If I use ds9 generally, but I use gala if I need to fix the astrometry of an image.
97 - I use also IDL because you can act on the .evt file and immediately visualize the effect.
101 - Paw allows custom image manipulation (with fortran subroutines).
102 - Life is diverse. Our needs are as well. It is NOT necessary to have a software which does EVERYTHING. I'd rather have a software which works even on a limited number of problems that a monolith of code supposed to solve all the problems but which does not work...
103 - Difficult to make journal quality images. IDL wipes the pants off DS9 when one wants to add axis labels, fonts, etc.