Download Chandra Observations

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Both PDF and plain text versions of this document are available.

Summary

`download_chandra_obsid` is a simple command-line script that allows a user to download public data from Chandra by giving a list of Observation Ids. The files are downloaded to the current working directory, and stored using the same layout as the Chandra archive; for example, ObsId 1843 would be stored in

```
1843/...
1843/primary/...
1843/secondary/...
```

An optional list of file types can be given, which restricts the data to be downloaded (by default all available data for the Observation Id is downloaded).

WARNING

As described below, this script is not an official product of the CXC and is provided with *limited* support. A more-complete solution is being developed by the Chandra Data Archive for release in 2010.

Download

This is version `2010.05.04` of `download_chandra_obsid`.

Individual files

- download_chandra_obsid (use the "Save linked file as" option, or equivalent, to save this file as `download_chandra_obsid`)
- readme.txt (this file)
- COPYING

Tar file

- download_chandra_obsid.tar.gz (version `2010.05.04`)

The *only* file you need to download is the script itself, namely `download_chandra_obsid`.

Requirements

The script is written in `Python` and should work using the `CIAO`-provided version (`CIAO 4.2` provides version `2.6.2`). There has been limited testing of the script using version `2.5.1` of Python.

If it is given the executable bit - e.g.

```
unix% chmod u+x download_chandra_obsid
```

then it can be run as a normal UNIX command, or you can say

```
unix% python download_chandra_obsid
```

The script can be renamed if you object to typing such a long name; for instance to `get_obsid`.

The examples below assume that the script is in the current working directory, but it can be placed anywhere, such as one of the directories in your `$PATH`.

Examples

Download a single ObsId

```
unix% ./download_chandra_obsid 1843
```

The data will be stored in the directory `1843/` and will contain all available data.

Download multiple ObsIds

```
unix% ./download_chandra_obsid 1842,1843
```

To download multiple ObsIds you can run the tool multiple times or use a comma-separated list as shown above. In this example the data will be stored in the directories `1842/` and `1843/`.

Note that the ObsId values do *not* need to be listed in ascending order.

Restrict the download

```
unix% ./download_chandra_obsid 1843 fov,bpix,evt1,flt
```

Here only the FOV, BPIX, EVT1 and FLT files will be downloaded. The data will be stored in the relevant directores within `1843/` (they will be created if need be).

Restrict the download (II)

```
unix% ./download_chandra_obsid 1843,1842 fov,bpix,evt1,flt
```

Here we download the FOV, BPIX, EVT1 and FLT files for the Observation Ids 1842 and 1843.

Usage

A help message will be displayed if the `--help` option is used, or the script is called with either no arguments or invalid input. The message is shown below:

```
unix% ./download_chandra_obsid
Usage: download_chandra_obsid <obsid1>,..,<obsidN> [<type1>,..,<typeN>]

 Download public Chandra observations.  The observations to download are given
as a comma-separated list of ObsId numbers, and an optional comma-separated
list of file "types" can also be given, which will only download files that
contain the type strings. So an argument of '1842,1843' will download all data
for the obs ids 1842 and 1843, whereas '1842,1843 fov,vv,evt2' will only
download the V&V, fov, and evt2 files for these observations.  The data is
written to the current directory, with each obsid being saved to its own
directory (following the layout used by the Chandra archive).
```

```
Options:
  -h, --help       show this help message and exit
  -q, --quiet      Download the files without any screen output? [default:
                   False]
  -v, --version    List the version of the script and exit.
  -c, --copyright  List the copyright for the script and exit.
  -t, --filetypes  List the valid file types and exit.
  -d, --debug      Display diagnostic output? [default: False]
```

In this document the long names of the options will be used, such as `--help`, although the short versions listed above (e.g. `-h`) can also be used.

Supported file types

The `--filetypes` option lists the valid names for the optional `type` argument:

```
unix% ./download_chandra_obsid --filetypes
The list of valid file types is:

   aoff aqual asol bias bpix cntr_img dtf eph0 eph1 evt1 evt2 flt fov
   full_img msk mtl oif osol pbk pha2 plt soff src2 src_img stat sum vv
```

The Chandra Data Products guide provides more information on these files, including their uses (although there is no guarantee that the names agree exactly).

Version

The `--version` option displays the version of the script, which is the release date in `YYYY.MM.DD` format:

```
unix% ./download_chandra_obsid --version
2010.05.04
```

Screen output

The default behavior is to display output as each file is downloaded, as shown below. To turn this off use the `--quiet` flag, which will restrict screen output to error messages.

When run, the tool will appear to pause as it checks what data is available in the archive for the ObsId value, and then print a banner listing the total size available before listing each file as it is downloaded:

```
unix% ./download_chandra_obsid 1842
Downloading files for ObsId 1842, total size is 69 Mb.

   Type     Format    Size  0........H.........1  Download Time Average Rate
   ------------------------------------------------------------------------
   vv       pdf      88 Kb  ####################     < 1 s  1910.5 kb/s
   oif      fits     23 Kb  ####################     < 1 s  744.5 kb/s
   sum      html      2 Kb  ####################     < 1 s  58.1 kb/s
   sum      ps        2 Mb  ####################       4 s  655.9 kb/s
   sum      html      4 Kb  ####################     < 1 s  199.2 kb/s
   sum      html      3 Kb  ####################     < 1 s  215.1 kb/s
   cntr_img fits    229 Kb  ####################     < 1 s  5794.9 kb/s
   cntr_img jpg     826 Kb  ####################     < 1 s  7064.9 kb/s
   evt2     fits     19 Mb  ####################       3 s  5504.3 kb/s
   full_img fits     90 Kb  ####################     < 1 s  2964.0 kb/s
   full_img jpg      68 Kb  ####################     < 1 s  1613.4 kb/s
   src2     fits     14 Kb  ####################     < 1 s  595.3 kb/s
   src_img  jpg      70 Kb  ####################     < 1 s  1417.6 kb/s
   bpix     fits     10 Kb  ####################     < 1 s  692.3 kb/s
   fov      fits      6 Kb  ####################     < 1 s  414.4 kb/s
   eph1     fits    281 Kb  ####################     < 1 s  6248.2 kb/s
   asol     fits      2 Mb  ####################     < 1 s  2878.2 kb/s
   aoff     fits    889 Kb  ####################     < 1 s  7823.0 kb/s
   evt1     fits     36 Mb  ####################       6 s  5826.7 kb/s
   flt      fits     16 Kb  ####################     < 1 s  953.1 kb/s
   msk      fits      5 Kb  ####################     < 1 s  247.2 kb/s
   mtl      fits    334 Kb  ####################     < 1 s  5525.9 kb/s
   soff     fits      4 Kb  ####################     < 1 s  296.1 kb/s
   stat     fits    276 Kb  ####################     < 1 s  6394.4 kb/s
   bias     fits    426 Kb  ####################     < 1 s  7284.0 kb/s
   bias     fits    494 Kb  ####################     < 1 s  7877.3 kb/s
   bias     fits    430 Kb  ####################     < 1 s  7451.4 kb/s
   bias     fits    423 Kb  ####################     < 1 s  7303.9 kb/s
   bias     fits    427 Kb  ####################     < 1 s  6923.7 kb/s
   bias     fits    427 Kb  ####################     < 1 s  7491.6 kb/s
   pbk      fits      4 Kb  ####################     < 1 s  280.3 kb/s
   vv       pdf       2 Mb  ####################     < 1 s  3041.0 kb/s
   eph1     fits      6 Kb  ####################     < 1 s  312.2 kb/s
   eph1     fits    274 Kb  ####################     < 1 s  601.0 kb/s
   eph1     fits    258 Kb  ####################     < 1 s  5872.6 kb/s
   osol     fits    356 Kb  ####################     < 1 s  5526.5 kb/s
   aqual    fits    132 Kb  ####################     < 1 s  3816.4 kb/s
   osol     fits    360 Kb  ####################     < 1 s  5935.3 kb/s

       Total download size for ObsId 1842 = 69 Mb
       Total download time for ObsId 1842 = 17 s
```

The first three columns give the filetype, format and file size of the file. The fourth column indicates the fraction of the file that has been downloaded (each # mark is 5% of the file size, with the H symbol in the column header indicating the 50% point) and is updated as the file is downloaded. The last two columns are added once the file size and list the download time and average download rate for that file. A summary of the download is provided once all the files for an ObsId are downloaded.

Previous downloads

The tool will skip any files that have previously downloaded, so it is safe to halt the download during a run (using control-c) and then re-start it. Any partially-downloaded files will resume, so you do not need to re-download data you already have.

This allows you to do partial downloads, for example:

```
unix% ./download_chandra_obsid 1843 evt2,fov
Downloading files for ObsId 1843, total size is 17 Mb.

   Type     Format     Size  0........H.........1  Download Time Average Rate
   ----------------------------------------------------------------------------
   evt2     fits      17 Mb  ###################            6 s  2905.2 kb/s
   fov      fits       6 Kb  ###################          < 1 s   428.0 kb/s

      Total download size for ObsId 1843 = 17 Mb
      Total download time for ObsId 1843 = 6 s

unix% ./download_chandra_obsid/download_chandra_obsid 1843 bpix,evt2
Downloading files for ObsId 1843, total size is 17 Mb.

   Type     Format     Size  0........H.........1  Download Time Average Rate
   ----------------------------------------------------------------------------
   evt2     fits      17 Mb     already downloaded
   bpix     fits      11 Kb  ###################          < 1 s   779.5 kb/s

      Total download size for ObsId 1843 = 11 Kb
      Total download time for ObsId 1843 = < 1 s
```

and then just download the whole observation - e.g. ./download_chandra_obsid 1843 - without having to worry about wasting time on files that you already have.

Compressed files

The tool does not check that you have an uncompressed version of an archive file, so in the 1843 output above, if you uncompress the `evt2` file and then re-run the script the compressed version of the file will be re-downloaded.

File corruption

There is *no* check that files have been corrupted during the download.

Author, Copyright and Support

The copyright is Smithsonian Astrophysical 2010 and can also be found using the `--copyright` option. The information is also available in the file `COPYING`.

The author is Doug Burke (`dburke@cfa.harvard.edu`) and *limited* support is provided.

A more-complete solution for downloading Chandra data is being developed by the Chandra Data Archive for release in 2010.