Linux Astronomy HOWTO

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This document shares tips and resources to utilize Linux solutions in the pursuit of Astronomy.

6.Installation Help

1.Introduction

1.1 Knowledge Required

With all the help from major Linux distributions such as SuSE, Redhat, Caldera and many others, Linux based systems are becoming easier to use. However, there is still some need of understanding of basic UNIX skills to make the most of Linux. Thus, this HOWTO will assume that the reader has at least a basic knowledge of using a UNIX system including the ability to compile and install programs.

A few resources we have found useful over the years include:

- "A Practical Guide to the UNIX System", Mark G. Sobel
- "Advanced Programming in the UNIX Environment", the late W. Richard Stevens
- "Running LINUX", Matt Welsh et al.
- "LINUX Device Drivers", Alessandro Rubini

Similarly, this is not a tutorial or reference for astronomy principles or astronomical instrumentation. Astronomy is perhaps the grandest of all sciences, employing widely disparate disciplines in a bold attempt to understand nothing less than the universe itself. Your interests will lead in many directions. A few references we have used include:

- "Astronomy with your Personal Computer", Peter Duffett−Smith
- "Astronomy on the Personal Computer", Oliver Montenbruck et al
- "Textbook on Spherical Astronomy", W. M. Smart
- "The Astronomy and Astrophysics Encyclopedia", Stephen P. Maran, ed.

1.2 Scope

The authors define the scope of this HOWTO as primarily an index

to Linux tools applicable in some fashion to the pursuit of Astronomy. It

is *not* our intention to list WWW astronomy references in general. Our

own interests tend more towards the technology than the pure science and so

we welcome contributions from others who have found Linux tools which

contribute in other ways to Astronomy. Please contact us at the address

above.

1.3 Version

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The latest version of this document is always available on the Astronomy Net at Astronomy HOWTO.

We eagerly accept suggestions from you. Send them to Astronomy HOWTO Editors.

1.4 Copyright

2.Software

2.1 Collections

Here are some links to collections and other indexes of Linux astronomy

software.

- The Linux for Astronomy CDROM
- Scientific Applications on Linux (SAL), Physics and Astronomy
- Linux Applications and Utilities Page, Science and Math

2.2 Planetarium Programs

Here is discussion of whole programs for use in finding objects, natural and

man−made, in the sky which run on Linux.

- XEphem has been the pet project of one of us (Downey) for the past 15−odd years. It has grown to become one of the more capable interactive tools for the computation of astronomical ephemerides.
- XSky is by Terry R. Friedrichsen, terry@venus.sunquest.com. XSky is essentially an interactive sky atlas.
- Skymap is an astronomical mapping program written in Fortran and C for unix workstations by Doug Mink of the Smithsonian Astrophysical Observatory Telescope Data Center.
- Xplns reproduces real starry sky on your display of X Window System.
- AstrHorloge is a small astronomy software that shows a sky map, give you the coordinates of stars and planets.

2.3 Libraries

This section discusses bits and pieces of software that can be used to form the

basis for specialized projects.

- SLALIB, part of the Starlink Project, is a complete library of subroutines for astrometric computations.
- Astrophysics Source Code Library is a collection of links to numerical astrophysical process models.
- Astronomy and numerical software source codes is a collection of C codes related to astronomy.
- How to compute planetary positions.

2.4 Other

Every list needs a miscellaneous section, and this is it for Software.

* IRAF is a gigantic but exceptionally capable astronomical analysis system, shepherded over the past 20−odd years by Doug Tody of NOAO. It has accumulated innumerable authoritative contributions from leading astronomers in all areas of astronomical data analysis. If you have a serious interest in astronomical data reduction and significant time to invest, this system will reward you mightily.
* Nightfall Eclipsing Binary Star Program

3.Astronomical Images over the web

Much effort exists to allow access to Astronomical image file type such as FITS from any web browser. Here are some pointers.

3.1 List

The folks at harvard have a list of Image Servers and Image Browsers.

* Astronomical Images Over the Web

4.Organizations

* The yearly Astronomical Data Analysis Software and Systems, ADAAS, Conference Series provides a forum for scientists and computer specialists concerned with algorithms, software and operating systems in the acquisition, reduction and analysis of astronomical data. The program includes invited talks, contributed papers and poster sessions as well as user group meetings and special interest meetings ("BOFs"). All these activities aim to encourage communication between software specialists and users, and also to stimulate further development of astronomical software and systems.
* The linuxastro mailing list, linuxastro@majordomo.cv.nrao.edu, is for people who are interested in porting astronomical software to linux. For more information, see linuxastro.

5.Hardware Control

More folks are using Linux to control equipment. Users range from amateur astronomers in the field to professional observatories.

5.1 Telescope Control

- OCAAS is a complete Observatory Control and Astronomical Analysis System for Linux.
- XEphem has the capability to communicate with a telescope control daemon process.

5.2 CCD Camera Control

- Apogee Instruments Inc supports their line of professional CCD cameras under Linux.
- SBIG offers some assistance with operating their ST7 and ST8 CCD cameras under Linux.

6.Installation Help

You need to know what you're doing with Linux and installing programs, but help is available for some programs. Here are some ways to make life easier.

- AstroMake is is a utility intended to make installations of some common astronomical packages (in binary form) easy.
- XEphem requires several elements to exist on your machine. Life is much simpler with the CDROM version of the program as it contains an installation script which loads the appropriate precompiled binary for most systems and places all auxiliary files to the correct spots. See XEphem CDROM