

The Debian Astro project

A Debian Pure Blend for astronomy and astrophysics

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- Free Linux based operating system
- One of the oldest distributions (founded 1993)
- **Free** as in “Free Speech”
- Base: Social Contract; Debian Free Software Guidelines
- > 50.000 software packages
- > 1.000 official developers
- Base for many derivatives: Ubuntu, Mint, ...
- Current stable version: Debian 9 (Stretch), since June 2017



The Debian Astro Pure Blend

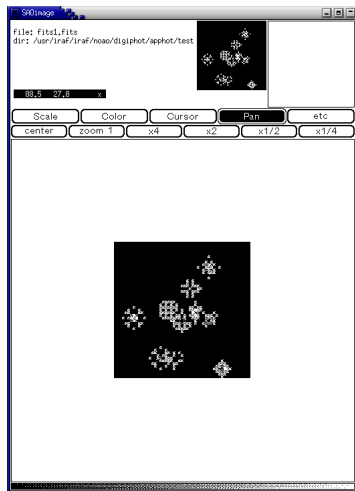
- *Blended tea*: a combination of different kinds of teas to guarantee consistent quality (Wikipedia)
- Method to organize Debian astronomy packages
 - currently 294 packages, (more in preparation)
 - 19 metapackages
 - Web page, “tasks” pages
 - Handle citations, ASCL entries
- Completely integrated into Debian (*Pure*)
- First release with Debian Stretch (June 2017)



- **Debian Astro** - Astronomy and astrophysics
- **Debian GIS** - Geographical Information Systems
- **DebiChem** - Chemistry
- **Debian Med** - Strong focus on Microbiology
- **NeuroDebian** - Neuroscience
- **Debian Science** - “Umbrella” blend for sciences
- **Debian Edu** - Education of all kind
- Debian Games, Debian Junior, Debian Multimedia, Hamradio, ...



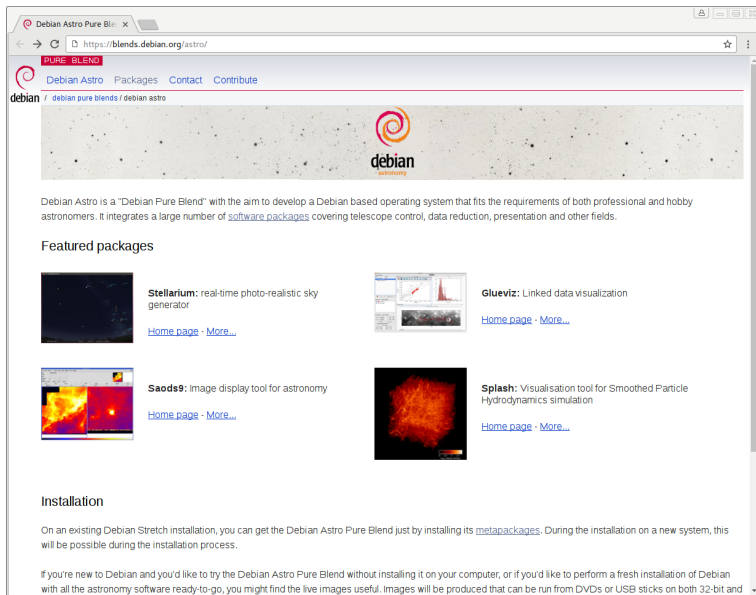
History of Debian Astro



- First packages: saoiimage (1999), cfitsio (2000), iraf (2000), sextractor (2002), pyfits (2006)
- After 2006, many packages got unmaintained; bitrot, partial removal
- 2014 start with mailing list and alioth project
- 2016 official announcement of the Debian Astro Pure Blend
- 2017 First release
- Logo created by Maria Hammerstrom



Debian Astro Web Pages



The screenshot shows a web browser window with the address bar displaying `https://blends.debian.org/astro/`. The page has a header with the "PURE BLEND" logo and navigation links: "Debian Astro", "Packages", "Contact", and "Contribute". Below the header is a banner image featuring the Debian logo and the word "astronomy". The main content area describes "Debian Astro" as a "Debian Pure Blend" system for professional and hobby astronomers, integrating various software packages. A "Featured packages" section lists four tools: Stellarium, Glueviz, Saads9, and Splash, each with a small image and a description. An "Installation" section provides instructions on how to install the system on an existing Debian Stretch installation or on a new system.

Debian Astro Pure Blend


[PURE BLEND](#)

[Debian Astro](#) [Packages](#) [Contact](#) [Contribute](#)

debian / [debian pure blends](#) / [debian astro](#)


Debian Astro is a "Debian Pure Blend" with the aim to develop a Debian based operating system that fits the requirements of both professional and hobby astronomers. It integrates a large number of [software packages](#) covering telescope control, data reduction, presentation and other fields.

Featured packages




Stellarium: real-time photo-realistic sky generator

[Home page](#) - [More...](#)




Glueviz: Linked data visualization

[Home page](#) - [More...](#)



Saads9: Image display tool for astronomy

[Home page](#) - [More...](#)



Splash: Visualisation tool for Smoothed Particle Hydrodynamics simulation

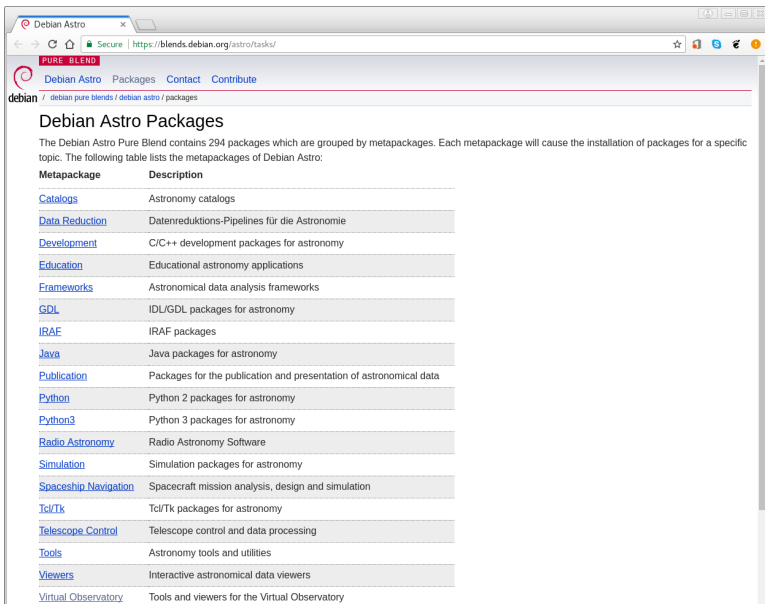
[Home page](#) - [More...](#)

Installation

On an existing Debian Stretch installation, you can get the Debian Astro Pure Blend just by installing its [metapackages](#). During the installation on a new system, this will be possible during the installation process.

If you're new to Debian and you'd like to try the Debian Astro Pure Blend without installing it on your computer, or if you'd like to perform a fresh installation of Debian with all the astronomy software ready-to-go, you might find the [live images](#) useful. Images will be produced that can be run from DVDs or USB sticks on both 32-bit and

Debian Astro Web Pages



The screenshot shows a web browser window with the address bar displaying <https://blends.debian.org/astro/tasks/>. The page title is "Debian Astro" and the navigation bar includes links for "Debian Astro", "Packages", "Contact", and "Contribute". The main heading is "Debian Astro Packages". Below this, a paragraph states: "The Debian Astro Pure Blend contains 294 packages which are grouped by metapackages. Each metapackage will cause the installation of packages for a specific topic. The following table lists the metapackages of Debian Astro:". A table follows with two columns: "Metapackage" and "Description". The table lists 16 metapackages, each with a blue underlined link in the first column and a description in the second column. The metapackages are: Catalogs, Data Reduction, Development, Education, Frameworks, GDL, IRAF, Java, Publication, Python, Python3, Radio Astronomy, Simulation, Spaceship Navigation, Tcl/Tk, Telescope Control, Tools, Viewers, and Virtual Observatory.

| Metapackage | Description |
|--------------------------------------|--|
| Catalogs | Astronomy catalogs |
| Data Reduction | Datenreduktions-Pipelines für die Astronomie |
| Development | C/C++ development packages for astronomy |
| Education | Educational astronomy applications |
| Frameworks | Astronomical data analysis frameworks |
| GDL | IDL/GDL packages for astronomy |
| IRAF | IRAF packages |
| Java | Java packages for astronomy |
| Publication | Packages for the publication and presentation of astronomical data |
| Python | Python 2 packages for astronomy |
| Python3 | Python 3 packages for astronomy |
| Radio Astronomy | Radio Astronomy Software |
| Simulation | Simulation packages for astronomy |
| Spaceship Navigation | Spacecraft mission analysis, design and simulation |
| Tcl/Tk | Tcl/Tk packages for astronomy |
| Telescope Control | Telescope control and data processing |
| Tools | Astronomy tools and utilities |
| Viewers | Interactive astronomical data viewers |
| Virtual Observatory | Tools and viewers for the Virtual Observatory |



Debian Astro Virtual x

Secure | <https://blends.debian.org/astro/tasks/virtual-observatory>

debian / [debian pure blends](#) / [debian astro](#) / [packages](#) / [virtual observatory](#)

[Show all details](#) • [Hide all details](#)


Debian Astro Virtual observatory packages

The Virtual Observatory allows astronomers to interrogate multiple data centers in a seamless and transparent way, provides new powerful analysis and visualization tools within that system, and gives data centers a standard framework for publishing and delivering services using their data. This is made possible by standardization of data and metadata, by standardization of data exchange methods, and by the use of a registry, which lists available services and what can be done with them.

Official Debian packages with high relevance

| Package | Version | Description |
|-----------------------------|-------------------------------|--|
| ▼ Adql-Java | 1.3-4 | Parse, manipulate and translate ADQL queries with Java |
| ▼ Aladin | 10.076+dfsg-1 | Interactive sky atlas for astronomical images and datasets |

Aladin: Interactive sky atlas for astronomical images and datasets



Aladin is an interactive software sky atlas allowing the user to visualise digitised astronomical images, to superimpose entries from astronomical catalogues or databases, and to interactively access related data and information from the Simbad database, the VizieR service and other archives for all known sources in the field.

Created in 1999 by the Centre de Données astronomiques de Strasbourg (CDS), Aladin has become a widely-used tool of the Virtual Observatory (VO) framework capable of addressing challenges such as locating data of interest, accessing and exploring distributed datasets, and visualising multi-wavelength data.

Reference: F. Bonnarel, P. Fernique, O. Bienayme, D. Egret, F. Genova, M. Louys, F. Ochsenbein, M. Wenger and J. G. Bartlett: *The ALADIN interactive sky atlas. A reference tool for identification of astronomical sources*. Astronomy and Astrophysics Supplement Series 143:33 - 40 (2000) ([eprint](#))

Maintainer: [Debian Astro Team](#) • [Ole Streicher](#)

Versions: [10.056+dfsg-2 \(buster\)](#) • [10.076+dfsg-1 \(sid\)](#)

Debian: [Maintainer page](#) • [Bugs](#) • [Git](#)

Upstream: [Home page](#)

[Impressum notice](#) • [Create topic](#) • [Translate descriptions](#)

Close

- cfitsio, ccfits, qfits
- wcslib
- wcstools
- ESO cpl
- Starlink AST, PAL, Java
- healpix (C, C++, Python)
- erfa (SOFA), giza (PGPLOT)
- casacore
- selected common science packages: fft, cminpack etc.

Debian Astro Pure Blend Contents

- Python
 - Astropy
 - affiliated packages
- "Legacy"
 - IRAF, PyRAF
 - ESO-MIDAS
 - Tcl/Tk (DS9, fv, skycat)
 - GDL (IDL replacement)
- Java/Virtual Observatory
 - Aladin
 - Topcat
- Radio Astronomy
 - cassbeam, wsclean, ...
- much more (education, publication, amateurs, ...)

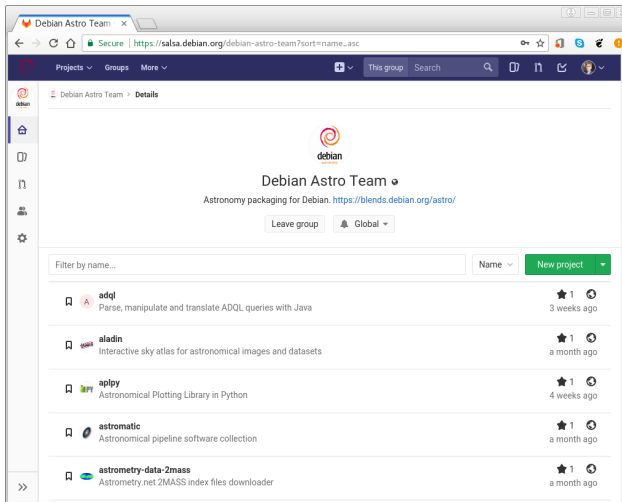


The Debian Astro Team

- Mailing list: 170 subscribers
- Team members
 - total: 45
 - uploaders: 13
- Team maintained source packages: 155
- Git repositories in a central space (salsa.debian.org)
- Most packages have only one maintainer
- Some package not maintained by the Debian Astro team
 - educational
 - publishing
 - general physics, data analysis etc.



Debian Astro Development Server



The screenshot shows a web browser window displaying the Debian Astro Team's Salsa page. The browser's address bar shows the URL https://salsa.debian.org/debian-astro-team?sort=name_asc. The page header includes navigation links for 'Projects', 'Groups', and 'More'. The main content area features the Debian logo and the text 'Debian Astro Team' with a sub-header 'Astronomy packaging for Debian' and a link to <https://blends.debian.org/astro/>. Below this, there are buttons for 'Leave group' and 'Global'. A search bar with the placeholder 'Filter by name...' and a 'Name' dropdown menu are present. A 'New project' button is also visible. The main list displays five projects, each with a repository icon, name, description, star count, and update time:

| Repository | Project Name | Description | Stars | Update Time |
|-----------------------|-----------------------|--|-------|-------------|
| adql | adql | Parse, manipulate and translate ADQL queries with Java | 1 | 3 weeks ago |
| aladin | aladin | Interactive sky atlas for astronomical images and datasets | 1 | a month ago |
| apipy | apipy | Astronomical Plotting Library in Python | 1 | 4 weeks ago |
| astromatic | astromatic | Astronomical pipeline software collection | 1 | a month ago |
| astrometry-data-2mass | astrometry-data-2mass | Astrometry.net 2MASS index files downloader | 1 | a month ago |



Advantages for Public Packaging: Technical

- Testing:
 - install tests on 23 platforms (10 official, 13 inofficial)
 - regular integration tests (on each dependency change)
 - repeated “inofficial” install tests (Reproducible builds)
 - people doing research with software metrics
 - bug tracker is already there
- Coupled to distribution development
- Dependencies are recognized
 - automated “transitions” (recompilations) when ABI breaks
 - prevent from silent removal of dependencies
- Automatic migration to Ubuntu



Advantages for Public Packaging: Social

- Self-magnification: a strong Debian Astro Pure Blend will attract more people to contribute
- Others may contribute to your package: bugfixes etc.
- Debian is “bazaar” style: everyone can follow, everyone can contribute, development is transparent
- Packages may get some attention even if “orphaned”
 - Team uploads
 - Non-maintainer uploads (NMU)
 - QA team
 - package adoption
- Coordinate / Avoid duplication of development efforts



Debian as a Reference Platform

- Almost standard linux
- High quality standards
- Clear, consistent structure: comprehensive Debian policy, specific policies for different fields: Python, Java, Tcl/Tk, Science
- Lots of tools for packaging + package checks
- Patches from Debian often migrate upstream or “side stream” (to Macports, Fedora, ...)



Packaging Rules, “Policy”

- Social Contract + Debian Free Software Guidelines: strict rules
- Debian policy
 - completely build from source
 - no convenience copies of code; re-use existing libraries
 - recursive packaging (package dependencies first, ...)
 - file system standard
 - package names, ...
- Specific policies (Python, Java, Tcl/Tk, Science)
- Portability (10 official architectures)
 - 32 vs. 64 bit
 - byte order
- Team maintenance



Comparison to other approaches

| | Debian Astro | Fedora Astronomy | STScI AstroConda | ESO SciSoft |
|-----------------------|-----------------|---------------------|---------------------|----------------|
| Release year | 2017 | 2016 | 2016 | 2014 |
| Operating System | Linux+ | Linux | Linux, Mac | Linux |
| Binary Packages | 250 | 73 | 75 | 102 |
| Integrated in OS | yes | yes | no | no |
| Install as Non-root | no | no | yes | no |
| All sources available | yes | yes | partly | no |
| CI tests | yes | no | no | no |
| Mailing list | yes | yes | yes | no |
| Bug tracker | yes | yes | (yes) | no |



debian
astronomy

- Stable version: package versions fixed after distribution release
 - currently Debian 9, “Stretch”
 - updates: Only bug fixes, no new versions
- Backports
 - new versions
 - no automated backporting, need to be maintained
- Ubuntu: similar, but needs extra approval
- No specific workflow in Debian Astro yet
 - may be adopted from NeuroDebian
 - first steps recently with Astropy



Problems and surprises

- Licensing
 - unclear or unspecified license from upstream
 - files or code copied from somewhere else
 - “stolen” code: Numerical Recipes
- Dependencies and convenience copies
 - non-free
 - try free replacement: IDL → GDL, PGPLOT → giza
 - package for “contrib” area
 - not packaged yet → packaging of dependency needed
 - outdated: try to migrate to latest version
 - local changes: discuss with upstream



- Origin often unclear
- License often unclear or restrictive
- Large package size
- Often impossible to create from a “source”
- Possible solutions:
 - Discuss with upstream and on the debian-astro mailing list
 - Try harder ;-)
 - Download during install: package must go to contrib
 - Package in non-free

- Policy: <https://www.debian.org/doc/debian-policy>
- Developers Reference:
<https://www.debian.org/doc/manuals/developers-reference>
- Web page: <https://blends.debian.org/astro>
- Mailing lists:
 - Astro: <https://lists.debian.org/debian-astro>
 - Python: <https://lists.debian.org/debian-mentors>
 - Mentors: <https://lists.debian.org/debian-mentors>
 - Common development: <https://lists.debian.org/debian-devel>
- Salsa project; Git repositories:
<https://salsa.debian.org/debian-astro-team>
- IRC: <irc://irc.debian.org/debian-astro>



Thank you



debian
astronomy

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Debian Astro Team Uploaders

- Axel Beckert
- Vincent Hourdin
- Ben Keller
- Josue Ortega
- Vincent Prat
- Paul Sladen
- Roger Wesson
- Tomasz Buchert
- Filip Hroch
- Gijs Molenaar
- Thibaut Paumard
- Leo Singer
- Ole Streicher

