LINUX BASED WORKSTATIONS

Large Packages for data reduction

- AIPS : (Astronomical Image Processing System)
- AIPS++ : (Astronomical Image Processing System –Object-Oriented)
- AipsView : Aipsview is a tool for visual data analysis built at NCSA with support from the NSF/ARPA Grand Challenge project in Radio Astronomy Imaging.
- ASAP : The ATNF Spectral Analysis Package.
- Astro-Wise : Astronomical Wide-field Imaging System for Europe. Astro-WISE is an environment consisting of hardware and software which has been developed to be able to scientifically exploit the ever increasing avalanche of data produced by science experiments.
- CIAO Chandra Interactive Analysis of Observations. Sophisticated X-ray data reduction package.
- Difmap : Interactive program for radio synthesis imaging from Caltech
- DRAO : Synthesis imaging software from Canada's Dominion Radio Astronomy Observatory.
- Gildas : Radio astronomy applications from IRAM
- GIPSY : Groningen Image Processing SYstem. It is a highly interactive software system for the reduction and display of astronomical data. It supports multi-tasking using a versatile user interface, it has an advanced data structure, a powerful script language and good display facilities based on the X Window system.
- IRAF : (Interactive Reduction and Analysis Facility)
- MIDAS : The ESO-MIDAS system provides general tools for image processing and data reduction with emphasis on astronomical applications including imaging and special reduction packages for ESO instrumentation at La Silla and the VLT at Paranal.
- Miriad : Calibration, mapping, deconvolution and image analysis of interferometric data
- NEWSTAR : Netherlands East- West Synthesis Array Reduction. A software package for the reduction of radio interferometric data.
- PROS : (Post-Reduction Off-line Software) X-ray analysis
- PyRAF : a new command language for IRAF based on the Python scripting language.
- PyMidas : Python interface to MIDAS
- SPC : Spectral Line Reduction package.
- STSDAS : Space Telescope Science Institute (Space Telescope Science Data Analysis System)
- STScI : Multi-Wavelength Spectrum and Line Analysis Package
- STECF : (Space Telescope European Coordinating Facility IRAF Package)
- Starlink : (Rutherford Appleton Laboratory UK)
- UniPOPS : A spectral reduction package used with Parkes and Mopra data.
- VISTA : Pipeline Software package
- Xanadu : The XANADU software package comprises high-level, multi-mission tasks for X-ray astronomical
- XAsssist (JHU Astrophysics)- XAssist is a software package to automate the analysis of X-ray astrophysical data.
- ESO Pipeline software for individual instruments
- AMBER
- CRIRES
- FORS
- GIRAFFE
- ISAAC
- NACO

- SINFONI
- SOFI
- UVES
- FLAMES-UVES
- VIMOS
- VISIR

Virtual Observatory Data Processing

- Aladin : Interactive federated sky atlas
- AstroRunTime : The Astro Runtime (AR) is a platform-independent executable that, in it's typical configuration, runs in the background on the user's desktop. It hides the complexity of the emerging VO system behind a simple, stable, consistent, self-contained
- Atlasmaker : Grid software for bulk image resampling
- conVOT : is a tool for converting ASCII or FITS tables to VOTable format.
- CSharpFITS package : is a pure C# .NET port of Tom McGlynn's nom.tam.fits Java package. It provides native C# support for reading and writing FITS files.
- Euro3D : Analyse datasets in Euro3D FITS format.
- find_cats : a program for fast access to large surveys from a list of positions at CDS.
- Globular Cluster Theoretical Models : This prototype allows the user to select a globular cluster simulation and compare it to observed color-magnitude diagrams.
- Glu.java library : The GLU system (Générateur de Liens Uniformes) gives a global solution to avoid this problem, allowing one to use symbolic names of resources; the URLs will be generated on the fly and always with the most recent definition.
- Mirage : Multi-dimensional visualization of data from VOTable source file
- Montage : Science-grade custom mosaics from a portal
- Observation Catalog Exploration Tools (Octet) - With Octet, CVO has developed advanced observation query capabilities to help users fully exploit the broad wavelength coverage of our collections.
- Pegasus : Workflow Management on the Grid
- PHP VO Client Library : A collection of PHP classes that implement interfaces to Cone Search, SIAP, SkyNode, SkyPortal, and VORegistry.
- PLASTIC : (PLatform for AStronomical Tool InterConnection) is a communication protocol for client-side virtual observatory tools.
- Python VO Client Library : A collection of Python classes that implement interfaces to Cone Search, SIAP, SkyNode, SkyPortal, and VORegistry.
- SPLAT : A spectra analysis tool.
- Specview : Visualization and analysis tool for 1-D astronomical spectrograms.
- STC Metadata : Space-Time Coordinate metadata for the VO
- STIL : Tool Set is a set of command-line tools based on STIL, the Starlink Tables Infrastructure Library.
- TOPCAT : Tool for OPerations on Catalogues And Tables. Viewer and editor for tabular information
- Unit Conversion Library : Java class is an application of the “Adopted Standards for Astronomical Catalogues”
- VisIVO : A visualisation and analysis software for astrophysical data. VisIVO can handle both observational and theoretical data.
- vizquery, a program to remotely query VizieR
- VO Desktop : A desktop application for working with the Virtual Observatory. It can explore data resources, query remote catalogs, and construct workflows to automate tasks.

- VO Services : A growing selection of VO services in production
- VOCat : is a stand alone tool which is used to convert astronomical catalogs to MySQL databases. VOCat can be used to create various views of the databases, to query them in various ways and to transfer query output directly to various tools and services like VOPlot, VOPlot3D, VOStat, SIMBAD, NED, Aladin and Cone Search.
- VOPlot : Tool for visualizing astronomical data from VOTable sources
- VOSpec : A Tool to Handle VO-SSAP compliant Spectra
- VOStat : allows astronomers to use both simple and sophisticated statistical routines on large datasets. This tool uses a large public-domain statistical computing package called 'R'.
- VOTFilter : XML filter for OpenOffice Calc to Read/Write VOTable Files
- Specview : 1-D spectral visualization and analysis
- VOSED : SED Builder & Fitting Tool.
- Yafit : An SED fitting tool.

Graphical tools

- DS9 : (SAO, Unix)
- Fitsblink (analysis of astronomical images) : Fitsblink is a program for Unix computers with the following functions: it reads and displays an arbitrary number of FITS images, allows their alignment, blinks them on screen, extracts and reads star lists, matches them with GSC, USNO, ACT and TYCHO catalogs, performs astrometry, identifies asteroids using the asteroid_server and allows sending of results directly by email.
- FITSview : (NRAO mage viewer)
- fv : Interactive fits viewer
- Graphical Astronomy and Image Analysis Tool (GAIA) : GAIA is a graphical image display and analysis tool, it provides the usual facilities of image display tools, plus more astronomically useful ones such as aperture photometry, arbitrary region analysis, celestial co-ordinate readout, calibration and modification, grid overlays, blink comparison, defect patching and the ability to query on-line (WWW) catalogues.
- Grenoble Image and Line Data Analysis Software (GILDAS) : GILDAS, the “ Grenoble Image and Line Data Analysis Software”, is a collection of software developped by the Observatoire de Grenoble and IRAM, oriented towards radioastronomy applications.
- GIDS: Gipsy image tool
- jskycat : (ESO, any Java platform),
- SKYCAT : Graphical access to catalogs and images
- SAOimage : (SAO, Unix),
- SAOtng : (SAO, Unix),
- Skycat : ESO image display tool with catalogue and image server access
- QFitsView : FITS file viewer.
- x11iraf : May 2000 version, including xgterm (but excluding ximtool)
- ximtool : Iraf image tool
- XPA : Messaging system from SAO. Used by DS9.

Graphics Software

- SM : SuperMongo
- PGPLOT Graphics Subroutine Library - The PGPLOT Graphics Subroutine Library is a Fortran-callable, device-independent graphics package for making simple scientific graphs.

- gnuplot : Command-line driven interactive function plotting utility
- Grace : 2D WYSIWYG plotting tool
- ggobi : Data visualisation in 3D
- Matplotlib : Python 2D plotting library
- xgobi:
- PSPLOT : PSPLOT is a Fortran-callable PostScript plotting library which can create 2-D publication-quality graphics.

Scripting Languages

- Python : General purpose, object orientated, extensible scripting language.
- Java : Java runtime environment and JDK
- DPUser : Interactive language for handling numbers, strings, and matrices
- Perl : is a dynamic programming language created by Larry Wall and first released in 1987
- Bash/Tcsh : Shell, or command language interpreter, that will appear in the GNU operating system.
- Ruby : Ruby is the interpreted scripting language for quick and easy object-oriented programming.
- php : is a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.

Scientific Libraries

- Atlas : Another Linear Algebra Library
- GSL : The GNU Scientific Library
- JPype : Java to Python integration
- LAPACK : Linear Algebra Subroutine Library
- BLAS : Basic Linear Algebra Subprograms (BLAS) is a de facto application programming interface standard for publishing libraries to perform basic linear algebra operations such as vector and matrix multiplication.
- LINPACK : is a software library for performing numerical linear algebra on digital computers.
- plotutils : GNU plotting utilities
- Numerical Algorithms Group (NAG) - NAG is a supplier of numerical, statistical, symbolic and visualisation systems plus compilers and tools.
- Numerical Recipes - The Numerical Recipes (NR) books are developed by Numerical Recipes Software and published by Cambridge University Press (CUP).
- Parallel Virtual Machine (PVM) - PVM (Parallel Virtual Machine) is a software system that enables a collection of heterogeneous computers to be used as a coherent and flexible concurrent computational resource.
- MPI : a library specification for message-passing, proposed as a standard by a broadly based committee of vendors, implementors, and users.

Miscellaneous Utilities

- DISLIN : Scientific Data Plotting software
- FFTW : Fast Fourier Transform library
- Tex :

- Latex :
- Latex style files : A collection of style files for astronomical journals
- OpenOffice :
- G77 : Fortran 77 compiler
- G95 : Fortran 95 compiler
- gcc : C-compiler
- g++ : C++ compiler
- fintel : Intel fortran compiler
- dislin : is a high-level plotting library for displaying data as curves, polar plots, bar graphs, pie charts, 3D-color plots, surfaces, contours and maps.

Astronomical Utilities

- ANGSIZ: A general and practical method for calculating cosmological distances
- ASSIST : implements a uniform graphical interface to analysis systems, documentation, and other community memory.
- Astrometrix : is the first astrometric calibration tool developed at TERAPIX
- BHSKY: Visual distortions near a black hole
- BLOCK: A Bayesian block method to analyze structure in photon counting data
- BSGMODEL: The Bahcall-Soneira Galaxy Model
- CFITSIO : FITS File Subroutine Library
- CHIANTI: A database for astrophysical emission line spectroscopy
- CLOUDY: Numerical simulation of plasmas and their spectra
- CMBFAST: A microwave anisotropy code
- CONSKY: Sky CCD Integration Simulation
- COSMICS: Cosmological initial conditions and microwave anisotropy codes
- CSENV: A code for the chemistry of CircumStellar ENVelopes
- DAOPhot : Stellar Photometry and related packages from Peter Stetson at DAO/HIA, see agreement for redistribution or access to the source code
- dss & dss2 : Digitized Sky Survey image extraction software
- DDSCAT: The Discrete Dipole approximation for Scattering and absorption of light by irregular particles
- Drizzle : Mosaic Image combination processing program
- DUSTY: Radiation transport in a dusty environment
- ECLIPSE : a suite of IR datacube processing software. Includes ISAAC, CONICA, WFI, Lua and ADONIS add-ons
- EXTINCT: A Computerized Model of Large-Scale Visual Interstellar Extinction
- FASTELL: Fast calculation of a family of elliptical mass gravitational lens models
- fitsverify : FITS format checker
- GADGET: A code for cosmological simulations of structure formation
- HDF5 : is a unique technology suite that makes possible the management of extremely large and complex data collections.
- HEASARC FITS toolset (FTOOLS) : FITSIO This directory contains files related to version 3.410 of the FITSIO subroutine package for reading and writing data files in FITS (Flexible Image Transport System) format. Also: FTOOLS (FITS Tools) This directory contains the FTOOLS distribution file for Suns, DECstations, Alpha and VAX computers. Distribution for both the Public and Develop releases of FTOOLS are located here. This is also the distribution point for XSELECT as of the version 2.4c Develop release.

- Hipparcos Transit Tools : Two small Fortran applications (td2uv and td2gf) for processing transit data
- HyperZ : Photometric Redshift Code
- Icosahedron: The Icosahedron Package for Pixelizing the Sphere
- ISIS: A method for optimal image subtraction
- JSkyCalc: A Convenient, Portable Observing Aid
- LENSKY: Galactic Microlensing Probability
- MILLISEARCH: A Search for Millilensing in BATSE GRB Data
- MLAPM: Simulating Structure Formation from Collisionless Matter
- Mongo and Its Variants A SuperMongo by by Robert Lupton and Patricia Monger
- NBODY2: A Direct N-Body Integration Code
- NOVAS : Naval Observatory Vector Astrometry Subroutines)
- PMcode: Particle-Mesh code for cosmological simulations
- PopRatio: A program to calculate atomic level populations in astrophysical plasmas
- RADPACK: A RADical compression analysis PACKage for fitting to the CMB
- RATRAN: Radiative transfer and molecular excitation in one and two dimensions
- RVSAO: Digital redshifts and radial velocities
- SCAMP : which reads SExtractor catalogs and computes astrometric and photometric solutions for any arbitrary sequence of FITS images in a completely automatic way.
- SExtractor : which finds positions of sources in images.
- SkyMaker : is a program that simulates astronomical images.
- SLOPES: least-squares linear regression lines for bivariate datasets
- SPECTRUM: A stellar spectral synthesis program
- SPH_1D: Hierarchical gravity/SPH treecode for simulations of interacting galaxies
- StarFinder: A code for stellar field analysis
- SWarp : which resamples and co-adds together FITS images using any astrometric projection defined in the WCS standard.
- TIM (Telescope Imaging Model) (PSF software for HST) - TinyTIM PSF software for HST
- Tria Image Processing (Tria) - Tria Image Processing provides fast and effective blind deconvolution (de-blurring) of optical and non-optical images.
- wcstools : World Coordinate System software tools and library from Doug Mink at SAO
- WeightWatcher : a program that combines weight-maps, flag-maps and polygon data in order to produce control maps which can directly be used in astronomical image-processing packages.
- WINGSPAN: A WINdows Gamma-ray SPectral Analysis program
- Xephem: An Interactive Ephemeris for X Windows/Motif (XEPHEM) Xephem is an interactive astronomical ephemeris program for X Windows systems.
- XSPEC: An X-ray spectral fitting package
- XSTAR: A program for calculating conditions and spectra of photoionized gases
- Yale Observatory iMAge Manipulation Application (YO MAMA) - Yale Observatory iMAge Manipulation Application (yomama) is a java tool for FITS image manipulation and viewing.
- SAO Telescope Data Center (Smithsonian Astrophysical Observatory)
    - RVSAO: an IRAF package for finding radial velocities from spectra
    - RGSC a program for searching the Space Telescope Guide Star Catalog.
    - SKYMAP: a program for mapping star catalogs onto the sky
    - STAR: a program for searching star catalogs

Astronomical Software Libraries

- WCSLIB : C implementation of the FITS World Coordinate System (WCS) convention.
- CASAcore : Common Astronomy Software Applications core library.

- ATELIB : Australia Telescope Ephemeris computation, subroutine library.
- MFITSIO : is a MATLAB interface to CFITSIO – a library used to manipulate images and headers stored in the Flexible Image Transport System (FITS) file format. It currently supports reading and writing FITS images, headers, and array subsets.
- ephemeris.com C Library for JPL Ephemerides
- FITSIO : A FITS File Subroutine Library
- JSky : Java Components for Astronomy
- PGPLOT Fortran Graphics Library (Caltech)
- PSPLOT A library of Fortran-callable subroutines which can be used to create publication-quality 2-dimensional graphics in the form of PostScript output files.
- Spice Toolkit
- The Navigation and Ancillary Information Facility (NAIF)
- ISIS (Integrated Software for Imaging Spectrometers)
- IDL Astronomy User's Library : The IDL Astronomy Users Library is a central repository for general purpose astronomy procedures written in the commercial language IDL.
- Algorithm reference implementations, astronomical and Unix system management tools :
- Jiggle, a program for noninteractive mosaic assembly;
- Limbctr, a program for non-interactive identification of planetary limbs and centers in images;
- Mko2FITS for converting '80s-era UH 2.24-meter telescope CCD image files to FITS;
- Icarus.bst, Latex macros for formatting papers for the planetary journal Icarus;
- ANA data processing package/language (ANA) : Extensive, IDL-like interactive data analysis and display program and language
- Astro Space Center (ASC) : The Astro Space Center as a branch of Lebedev Institute of Physics has a number of commitments for space experiments in the areas of upper atmospheric, solar, and astronomical research aboard Radioastron , Kvant and other space projects. Division scientists are involved in major research thrusts that include interferometric observations, studies of the solar atmosphere by using spectrographic techniques, and studies of astronomical ranging from the ultraviolet through cosmic rays. The division maintains facilities to design, construct, assemble, and calibrate space experiments.
- AstroMB: Computer Aided Astronomy (MBCAA) : The AstroMB software package provides a database, image viewer and planetarium to handle astronomical images and catalogs.
- Astronomical software clock (MAXCLOCK) : The high-precision astronomical clock displays various sidereal and solar time signals(for Greenwich and other selectable site), equation of equinoxes, Julian dates in UT1 and ET, Delta-T, Sun and Moon in aequatorial and ecliptic coordinates(milliarcsec-accuracy), and issues announcements for solstices, equinoxes, and Moon phases.
- Astronomical Software & Documentation Service (ASDS) : The Astronomical Software and Documentation Service (ASDS) is a network service that allows you to find existing astronomical resources for solving your problem.
- AstroNotes (Free and commercial tool for recording and planning observations)
- Astrophysics Source Code Library (ASCL.net) : The Astrophysics Source Code Library (ASCL or ASCL.net) is a free, on-line library housing source codes of all sizes that are of interest to astrophysicists.
- AstroViewer - quick orientation in the night sky
- Binary Stars - Free software for Macintosh computers, complete with manuals, for use in an educational setting or for self-learning. Teaches binary star concepts.
- BUlge/Disk Decomposition Analysis (BUDDA) - Budda is a Fortran code to perform a detailed structural analysis on galaxy images.
- The CADC tools package includes:
    - starcat : STARCAT is a tool for accessing the HST Archive, CFHT and ESO archives.
    - xhot : X tool which displays the planned activities of the Hubble Space Telescope. It allows

    - you to find out what the telescope is currently observing
    - simbad : The new SIMBAD tool now runs on your workstation.
    - xmgr : This very nice interactive plotting package is now used for the Preview system whitin STARCAT.
    - This site carries information about usage of CCD by amateurs for astronomical photography. [mostly in French]

- CCDPHOT : An IDL widget based CCD photometry reduction system
- CSENV : a code that computes the chemical abundances for a desired set of species as a function of radius in a stationary, non-clumpy, CircumStellar ENVelope.
- CHIANTI : A database for astrophysical emission line spectroscopy (CHIANTI)
- CIGALE : Data Analysis Software - Analyse et Depouillement Homogene des Observations Cigale (ADHOC) - ADHOC is a 3D complete package to acquire, display and reduce data from Perot-Fabry scanning interferometer devices.
- CLOUDY : Photoionization Simulation code (CLOUDY) Cloudy is a large-scale Fortran code designed to simulate physical conditions in a broad range of astronomical plasmas, and predict its resulting spectrum.
- Data Reduction Expert Assistant (DRACO) : The use of large format detectors, increased access to very large astronomical databases, and other developments in observational astronomy have led to the situation where many astronomers are overwhelmed by the reduction and analysis process.
- FIGARO Data reduction system (AAO)
- FITS Information Archive: This is an archive for the Flexible Image Transport System [FITS], the standard data interchange and archival format of the worldwide astronomy community.
- GeoAstro Applet Collection : Interactive Java applets display the position of sun and moon on the horizon for any date, time and location.
- GLU (Uniform Link Generator) : GLU is a tool developed by CDS (Strasbourg) for managing heterogeneous distributed Web services.
- Grid Physics Network (GriPhyN) The GriPhyN (Grid Physics Network) collaboration is a team of experimental physicists and information technology (IT) researchers who plan to implement the first Petabyte-scale computational environments for data intensive science in the 21st century.
- Grup d'Estudis Astronomics (GEA) : GEA is a private non-profit organization devoted to research in Astronomy. We are now deeply involved in Jupiter & Saturn atmospheric studies. Our members are also developing LAIA, a powerful image analysis tool for MS-Windows, able to reduce CCD images of Jupiter, giving coordinates of atmospheric details. We are, among others, collaborating with the “Pic du Midi” observatory (French Pyrenees). From that observatory, our members discovered and tracked the last GWS (Great White Spot) in Saturn (August 1994). [in Catalan]
- Hierarchical Equal Area isoLatitude Pixelisation of a sphere (HEALPix) : Future satellite missions to measure the CMB anisotropy - NASA's Microwave Anisotropy Probe, MAP, and ESA's Planck - will produce multifrequency data sets sufficient for the construction of full-sky maps of the microwave sky at an angular resolution of a few arcminutes.
- Hierarchical Triangular Mesh (HTM) The Hierarchical Triangular Mesh (HTM) : is the indexing concept used in the Sloan Digital Sky Survey (SDSS) Science Archive to partition the data by location on the celestial sphere.
- Multiparametric virtual Instrument for GALaxy Evolution (MIGALE)
- Munipack - The Munipack is a photometry package for a long time series of CCD images.
- NEMO Stellar Dynamics Toolbox (NEMO) - NEMO is a Stellar Dynamics Toolbox with many programs to create, integrate, analyze and visualize N-body (and related) systems.

General Purpose Scientific Software

- Interactive Data Language from Research Systems, Inc. (IDL) : IDL, Interactive Data analysis Language, is a complete package for the interactive reduction, analysis, and visualization of scientific data and images.
- Karma (ATNF@CSIRO-RP) : The Karma package is a library and applications for Signal and Image Processing
- Mathematica : Scientific Astronomer A comprehensive astronomy package for Mathematica.
- S-Plus : is a commercial advanced statistics package sold by Insightful Corporation. It is a commercial implementation of the S programming language
- MathSoft : A variety of other tools for statistical and data analysis.
- MathSource : Mathematica Software (Wolfram Research, Inc.)
- Maple : All purpose mathematics software tool. Maple provides an advanced, high performance mathematical computation engine with fully integrated numerics & symbolics, all accessible from a WYSIWYG technical document environment.
- MATLAB : a high-level language and interactive environment that enables you to perform computationally intensive tasks faster than with traditional programming languages such as C, C++, and Fortran.
- Multivariate Data Analysis Software and Resources (Fionn Murtagh)
- NETLIB Software : Netlib is a collection of mathematical software, papers, and databases.
- Object Language for Numerical Relativity (LORENE) - Langage Objet pour la RElativité NumériquE is a set of C++ classes to solve various problems arising in numerical relativity, and more generally in computational astrophysics.
- Orbit Reconstruction, Simulation and Analysis (ORSA) - Orbit Reconstruction, Simulation and Analysis (ORSA) is a framework for Celestial Mechanics investigations.
- Origin (data analysis) : Origin is a data analysis and technical graphics software in Windows for scientists and researchers.
- PERiod ANalysis SOftware (PERANSO) : PERANSO is a Windows based period analysis software offering advanced features for period error and period accuracy determination statnet (Neural network code) : This is a flexible feed-forward neural network code for data modelling, such as automated classification. The code incorporates a conjugate gradient optimizer and weight decay regularisation.
- R : is a software environment for statistical computing and graphics.

Remote Proposal Submission Software

- Spike Planning and Scheduling (Spike) : Space Telescope Science Institute developed the Spike planning and scheduling software in support of the Hubble Space Telescope as a general toolkit for planning and scheduling under Contract NAS5-26555 with the National Aeronautics and Space Administration.
- P2PP : The Phase 2 Preparation (P2PP) Tool is used to create and manage Observation Blocks (OBs). These OBs are used to describe observing sequences for all ESO instruments, both in Visitor Mode and in Service Mode.