Open source engineering software

By providing access to relevant, open source engineering software tools, using input provided by both Appropedia contributors and the wider OSAT engineering community. We aim to both provide information on existing tools and identify areas in which new tools would be of use so as to encourage the development of such tools.

For tools that are available, our goal is to provide reviews regarding the usefulness of each tool for particular applications, guides on how to most effectively use the tools for various types of efforts related to space system development, and descriptions of how the tools can be used together. Where needs exist to either create new tools or enhance existing tools, we will aim to gather input regarding what functionality is desired and (when possible) point towards relevant commercial tools that could serve as models.

While the focus of this project is on tools that are relevant to sustainable development applications there is significant overlap with many other engineering disciplines, as such a significant number of the tools we describe will be relevant outside of the appropriate technology arena.

Please help this project and the sustainable development engineering community as a whole by expanding the material available here.

Software Licenses

For the purposes of this project, we are interested in identifying software tools that are free and open source in the sense that the software's source code is provided and the software license allows you to use, modify, and freely redistribute the software without paying royalties or other fees. Software included here should meet the Open Source Definition of the Open Source Iniative (OSI) and the Free Software Definition of the Free Software Foundation (FSF) (where free means freedom).

OSI maintains a list of software they have approved here . FSF has a listing of software free and non-free software licenses here . The FSF listing also specifies whether the license is compatible with the GNU General Public License (GPL), a leading open source license.

Engineers who have great experiences can gain online life experience degree which will allow them to help other engineers through open source engineering software.

Software Listing

Computer Aided Design (CAD) Software

- BRL-CAD
- Blender
  - Blender CAD
  - Procad
- Python CAD
- VARKON
- OpenCASCADE
- OpenSCAD - The Programmers Solid 3D CAD Modeller
- FreeCAD
- Archimedes
- Wikipedia Free CAD Software Listing
- Linux.org CAD/CAM Software Listing
- RepRap.org CAD/CAM Software Listing, mainly open-source
- RapCAD - like OpenSCAD less user friendly but less likely to crash

Computer vision software

- OpenCV (BSD license)
- NASA Vision Workbench (NOSA license)
- cv.jit (GPL License) Computer vision for Jitter

Spreadsheets and Office Software

Because sometimes all you need is a good spreadsheet...

- OpenOffice.org (LGPL) Includes the Calc spreadsheet as part of a complete office suite.
- Gnumeric (GPL) GNOME project spreadsheet.
- wikiCalc (GPL) Online spreadsheet system that allows users to edit in a wiki-like fashion.
- Dia (GPL) GNOME project diagramming software. Useful for system diagrams, schematics, etc.
- Veusz - scientific plotting and graphing package

Structural analysis /Computational Fluid Dynamics (CFD) software/Finite Element Modeling (FEA)

- Impact (GPL) Dynamic finite element suite
- Code_Aster Finite element modeling software
- SALOME (LGPL) Platform for Pre and Post-Processing for numerical simulation.
- Elmer Finite Element Software for Multiphysical Problems
- Gmsh A three-dimensional finite element mesh generator with built-in pre- and post-processing facilities
- OpenFVM A general three-dimensional CFD solver that uses Gmsh for pre- and post-processing
- Calculix A Three-Dimensional Structural Finite Element Program
- OpenFOAM a C++ toolbox for the development of customized numerical solvers, and pre-/post-processing utilities for the solution of continuum mechanics problems, including computational fluid dynamics (CFD)
- OpenSEES The Open System for Earthquake Engineering Simulation

Numerical Programming Languages and Visualization Software

- Octave (GPL)
- Package of Additional Octave Libraries
- ASCEND modelling environment
- OpenDX (IBM) Visualization Software
- Freshmeat.net Visualization Software Listing
- Veusz - scientific plotting and graphing package

Software Engineering

- Tigris Website dedicated to open source software engineering tools

Electronic Design Automation (EDA)

- EETimes.com Open Source EDA Listing by EETimes.com
- Freshmeat.net Electronic Design Automation Listing
- Wikipedia Free EDA Software Listing
- GEDA. Free, open sourced ensemble of EDA packages. Schamatic, PCB, FPGA, project organizer.
- FREE PCB. Free, open sourced PCB layout package with autorouter. Windows only.
- Tinycad. Free, open sourced schematic package. Windows only.
- KiCAD. Open sourced EDM package capture, PCB, DRC, Sim, Windows and Linux.

Communications and Ground Station Software

- Ground Station Software Suite Aims to provide a set of open source tools for ham radio operators
- PREDICT (GPL) Multi-user satellite tracking and orbital prediction program
- Open Source Software Radio (GPL) May have some relevance for software defined radios on spacecraft
- Pachube is a platform enabling developers to connect sensor data to the Web and to build their own applications on it.

Systems Engineering Software

- Protoforge (GPL) Web-based systems engineering platform for opnn, wiki-style, system development.
- SciLab - is an interactive platform for numerical computation providing a powerful computing environment for engineering and scientific applications.

Project Management

- Open Pario - is a project hosting environment featuring task & time tracking, wikis, blogs, file upload, workflows, forums and more.

Diagrams/Flowcharts

- Dia is a GTK+ based diagram creation program for GNU/Linux, MacOS X, Unix, and Windows, and is released under the GPL license.
- Gaphor is the simple modeling tool for UML and SysML. It is cross-platform and is released under the Apache License.

Additional Listings

- iCivilEngineer.com Open Source Civil Engineering Tools Listing
- Scientific Applications on Linux Listing - A collection of information and links to the software of interest to scientists and engineers
- Freshmeat.net Scientific/Engineering Software Listings (beyond those included above)
  - Physics
  - Mathematics
  - Chemistry
- Wikipedia Software Listings (beyond those included above)
  - Science
  - Mathematics
- Linux.org Computer-Aided Engineering software Listing

Getting started with 3D modeling software (SketchUp)

- The SketchUp_Beginner_Manual (see User talk:Chriswaterguy, http://web.archive.org/web/20100731030338/http://www.skup.be:80/syntra/sketchup/)
- SketchUp Intermediate Manual
- SketchUp: the missing manual for anything not covered in the articles above

Publishing your models online

See CAD_model_collections

Scientific and Engineering Linux Distributions

- CAELinux Linux distribution (LiveCD) with a series of open source CAE tools including SALOME and Code-Aster
- Quantian Linux distribution (LiveCD) tailored to numerical and quantitative analysis

Free Engineering Websites (Discipline Specific)

- http://web.archive.org/web/20201024181744/http://www.epower-propulsion.com/
- http://www.efluids.com/
- http://web.archive.org/web/20200211024003/http://www.emicronano.com:80/
- http://imechanica.org
- http://www.cfd-online.com/

Articles Related to Open Source Space Software

- 3D_printing_services: 3D models intented for printing are best converted to .STL
- Open Source Satellite Control
- Software of Space Exploration by David Boswell

This list was originally held at DevelopSpace project to aid the space systems development.

Catégories : Engineering Open source software Information technology Community informatics