Open Source Software Development within DLR

Andreas Schreiber

German Aerospace Center, Simulation and Software Technology, Berlin / Braunschweig / Cologne

ADCSS 2014, ESA ESTEC

October 28, 2014

DLR

Outline

- Software at DLR
- Software Engineering Strategy
- Open Source Strategy
- Software Catalogue

DLR
Research Areas

Major research areas of DLR institutes

- Aeronautics
- Space
- Transportation
- Energy
- Security

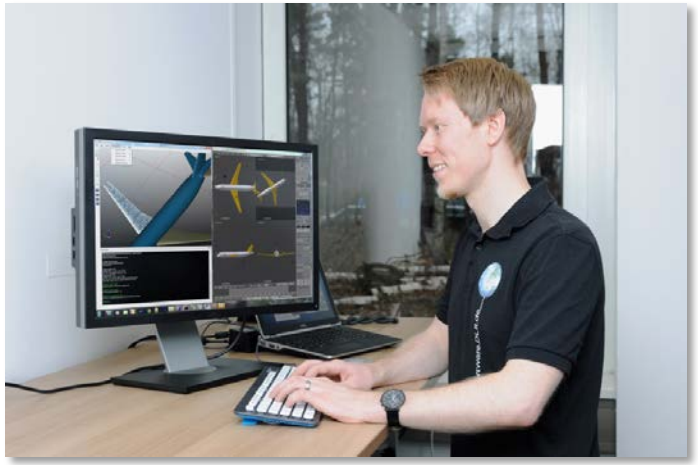
Software research and development

- Simulation and Software Technology division

Software at DLR
Size and Amount

Some numbers…

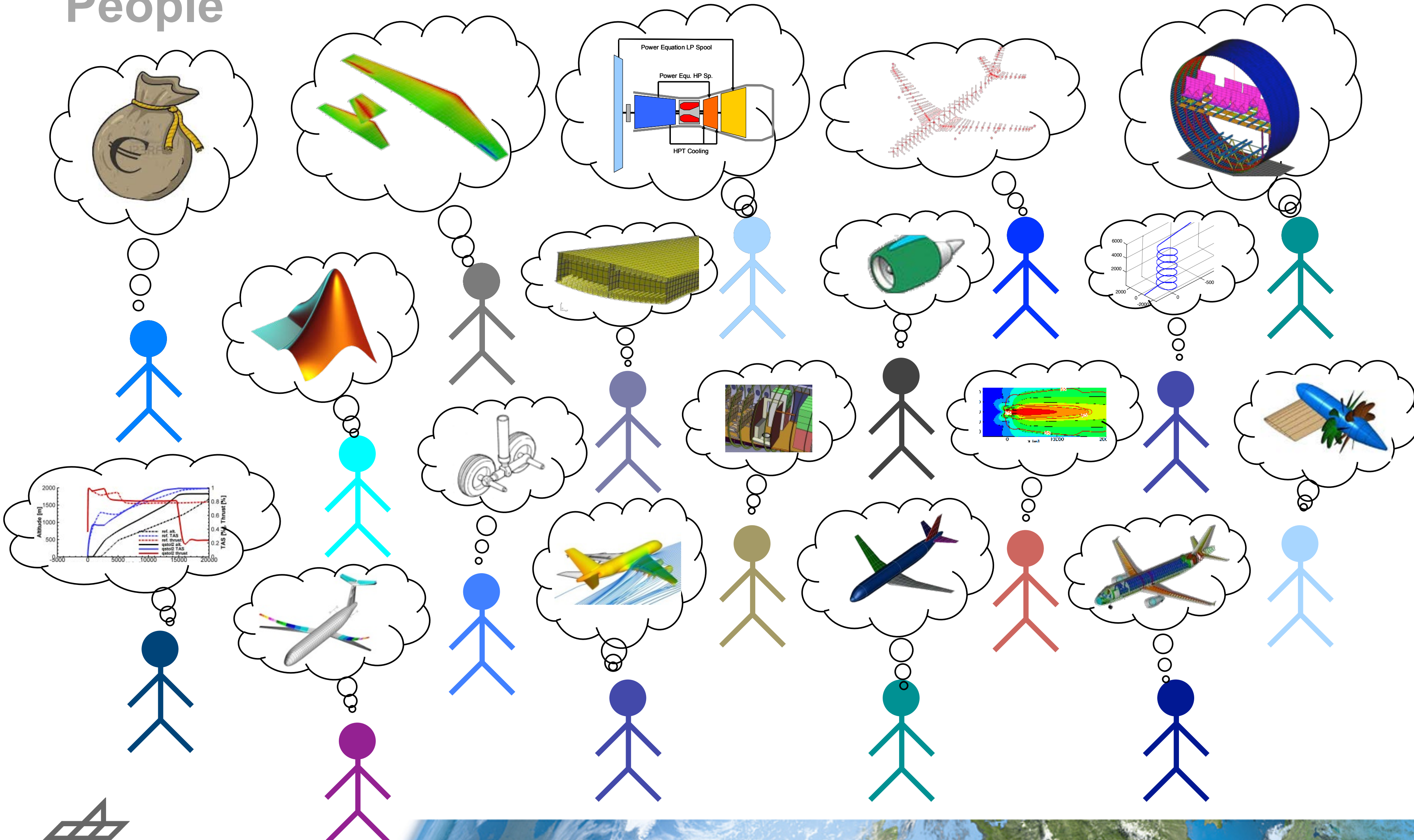
- More than 1200 employees are developing software
- More than 100 Million EURO personnel costs per year
- DLR is one of Germany largest software developing organization



Software at DLR
Characteristics

- Most software developed at DLR is non-standard software
- Often very special and specific requirements
- A great many number of software projects
- Both, Open Source and proprietary software licenses
- Overview of existing software is extremely difficult
- Many licensing issues related with Open Source software

Software at DLR
People



DLR

Software Engineering Strategy
Dealing with DLRs Software Characteristics

Methods and Tools

- Development processes tailored for scientists, documentation via Web-based tools
- Development tools seamlessly integrated with working environment
- Tools are available and accessible easily via intranet for every employee
- Standard trainings offered for most important tool chains and software technologies

Software Engineering Strategy
Knowledge Management

Exchange of knowledge and information

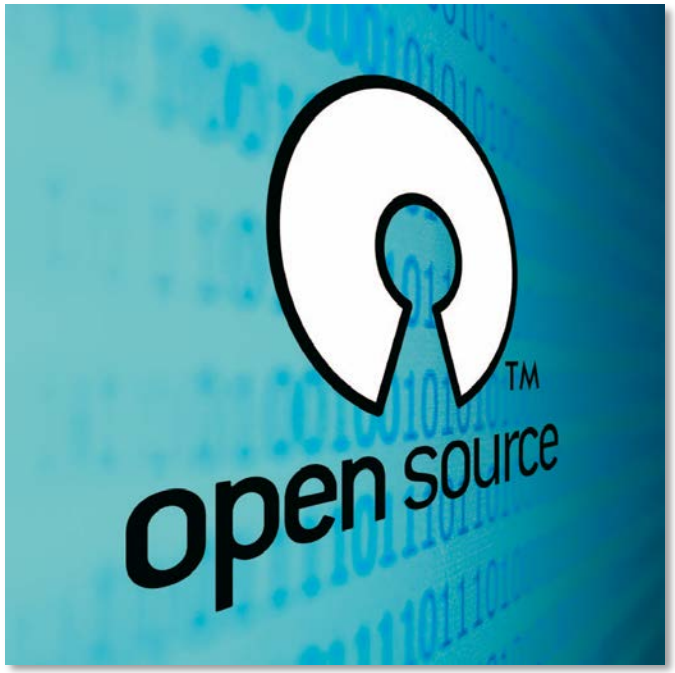
- Network of software engineering representatives
  - Information sharing via intranet and workshops
- Wiki for documentation and collaboration
- Question & Answer system (such as *Stack Overflow*)
- Software catalogue

Disclaimer: This list is intentionally not complete!

Open Source Strategy
DLR's Open Source Agenda

Sorted by importance

- Guidelines and support for Open Source licenses
- Criteria for choosing Open Source software
- Standards for approval of Open Source software
- Best-Practices for running Open Source projects



Open Source Strategy
Status at DLR

Currently in place

- Standard Open Source Licenses selected
- Brochure for legal issues
- Trainings
- Help & Support

Next steps

- Standard hosting service (within DLR or external)
  - Currently: SourceForge.net, Github, Google Code, …
- Formal process description for selecting and approval
  - should be part of quality management system

Open Source Strategy
Licenses

In practice, many licenses are being used at DLR

- AGPLv3, GPLv2, GPLv3, EPL, QPL, LGPLv2, LGPLv3, CDDL, MPLv2, Apache 2.0, BSD 2/3, MIT, Zlib, ZPLv2, Python 2.0, …

Approved by legal department and recommended to developers

- Simplified BSD License
- Apache License 2.0
- Eclipse Public License 1.0

Open Source Initiative

DLR will not develop its own Open Source license

- Large choice of OSI approved licenses is sufficient for almost all business cases

Open Source Brochure
Licenses

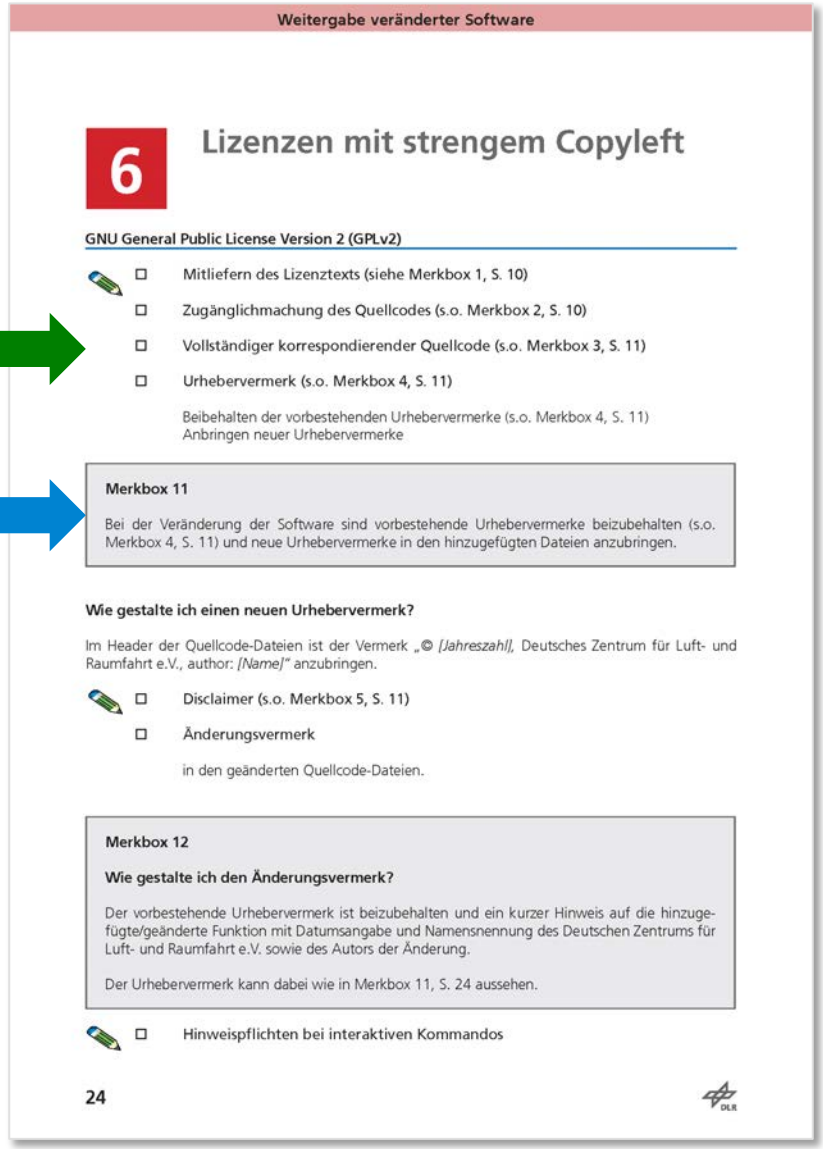
- Basic legal information about Open Source licenses
- Developed by a law firm
- Coordinated by DLR's Technology Marketing
- Recommended for every developer

Available in German only

Open Source Brochure
License Information

Checklists

Info boxes



Weitergabe veränderter Software

6 Lizenzen mit strengem Copyleft

GNU General Public License Version 2 (GPLv2)

- ☐ Mitliefern des Lizenztexts (siehe Merkbox 1, S. 10)
- ☐ Zugänglichmachung des Quellcodes (s.o. Merkbox 2, S. 10)
- ☐ Vollständiger korrespondierender Quellcode (s.o. Merkbox 3, S. 11)
- ☐ Urhebervermerk (s.o. Merkbox 4, S. 11)

  Beibehalten der vorbestehenden Urhebervermerke (s.o. Merkbox 4, S. 11)
  Anbringen neuer Urhebervermerke

Merkbox 11

Bei der Veränderung der Software sind vorbestehende Urhebervermerke beizubehalten (s.o. Merkbox 4, S. 11) und neue Urhebervermerke in den hinzugefügten Dateien anzubringen.

Wie gestalte ich einen neuen Urhebervermerk?

Im Header der Quellcode-Dateien ist der Vermerk „© *[Jahreszahl]*, Deutsches Zentrum für Luft- und Raumfahrt e.V., author: *[Name]*" anzubringen.

- ☐ Disclaimer (s.o. Merkbox 5, S. 11)
- ☐ Änderungsvermerk

  in den geänderten Quellcode-Dateien.

Merkbox 12

Wie gestalte ich den Änderungsvermerk?

Der vorbestehende Urhebervermerk ist beizubehalten und ein kurzer Hinweis auf die hinzugefügte/geänderte Funktion mit Datumsangabe und Namensnennung des Deutschen Zentrums für Luft- und Raumfahrt e.V. sowie des Autors der Änderung.

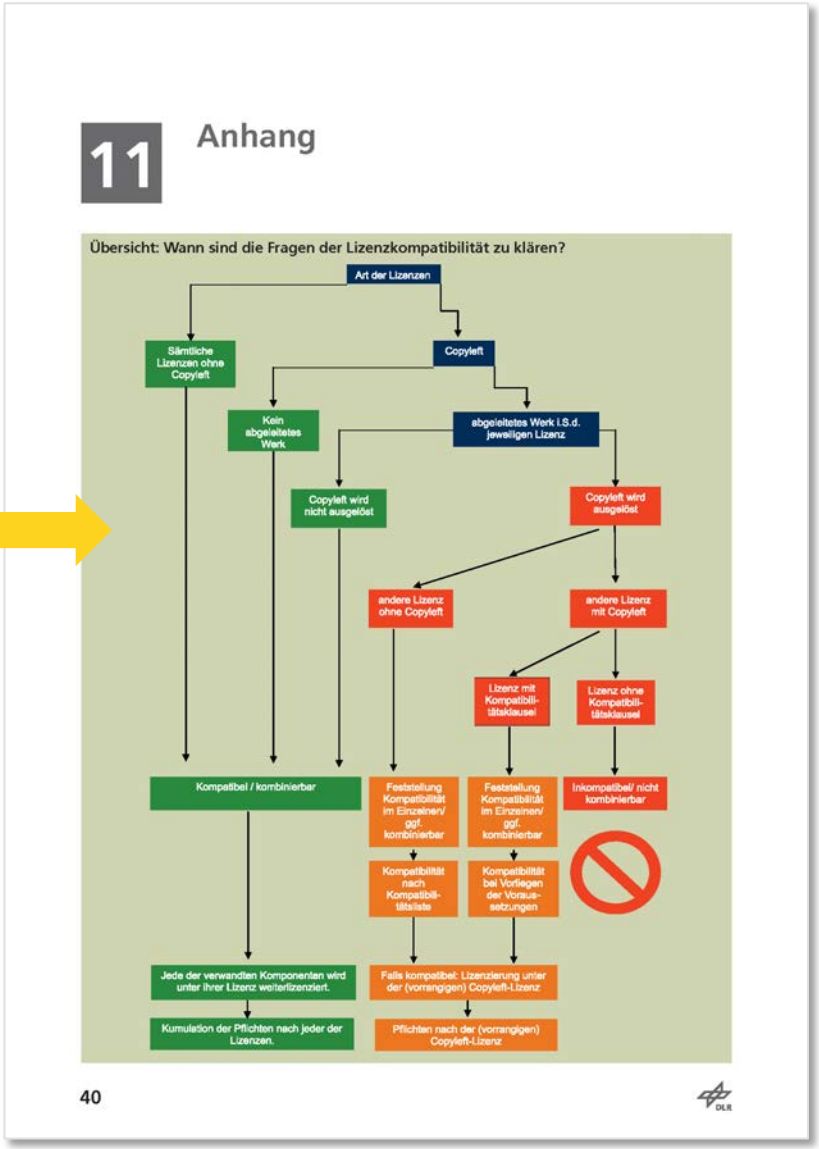
Der Urhebervermerk kann dabei wie in Merkbox 11, S. 24 aussehen.

- ☐ Hinweispflichten bei interaktiven Kommandos

24

Open Source Brochure
License Compatibility

Decision Trees



11 Anhang

Übersicht: Wann sind die Fragen der Lizenzkompatibilität zu klären?

40

Open Source
Trainings

Licensing

- „Rechtliche Aspekte der Open-Source-Nutzung im DLR“ (*“Legal aspects of Open Source usage at DLR“)*
- Standard training, periodically offered via DLR’s education program
- Given on demand for institutes, groups, projects teams, …

Development

- „Werkzeug-gestützte Software-Entwicklung” *(“Tool based software development”)*
- Development using Open Source tools
- Standard training & on demand *(see above)*

Open Source
Help & Support

Help and support offered for certain aspects

- Generals licensing questions, IPR
  → Technology Marketing Division
- Legal support for copyright and related rights
  → Legal Department
- License compatibility, license selection, development
  →Simulation and Software Technology Division

Email

- opensource@dlr.de

Software Catalogue
Goal and Essential Requirements

Intention and goal

- Employees can get an overview of all software software packages, tools, and products developed at DLR
- To prevent double development of software

Essential requirements

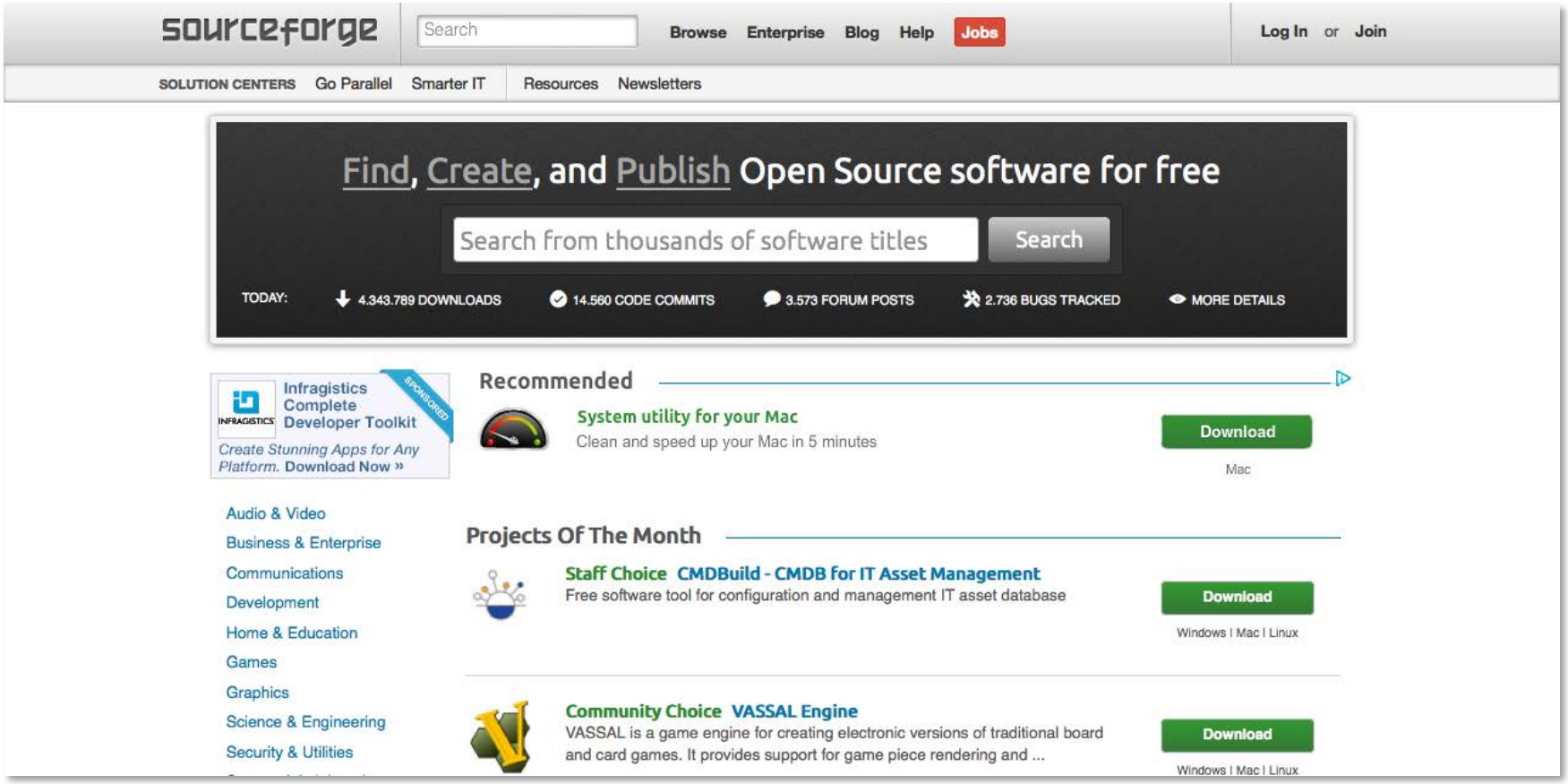
- Searching for existing software
- Browsable directory of all software

Software Catalogue
Major Requirements

Technical requirements

- Web-based
- Access control
- Basic project information
- Tagging
- Screenshots and diagrams
- Public page
- Code hosting
- Collaboration and documentation
- Commenting and rating
- Social media integration
- Scalability

SourceForge.net



Apache Allura
The Software behind SourceForge.net

„Forge“ implementation

- Source Code Repositories
- Bugs & Issues
- Discussions
- Mailing Lists
- Wiki
- Blogs

Open Source, Apache project since 2013

- https://allura.apache.org

software.DLR.de

Register Log in

DLR

Search here

software.DLR.de

- All projects
- Administration and Tools
- Communication
- Control
- Knowledge and Data Management
- Signal and Data Processing
- Software Engineering
- Simulation and Modeling
- Visualization

Search... Go!

Follow us

RSS Feed
Facebook
Twitter

Knowledge and Data Management

BACARDI

The Backend Catalog for Relational Debris Information (BACARDI) is the DLR's approach to a space debris database. The custom middleware components are implemented in Python using ZeroMQ and Protocol Buffer technology.

Simulation and Modeling

Simulation Model Library

Simulation Model Library (SimMoLib) is a distributed system to manage a library of simulation models. SimMoLib's main goal is to promote the preservation of knowledge that lies in simulation and calculation models and encourage reuse of those models.

Simulation and Modeling

Virtual Satellite

Designing space systems and planning space missions relies on many separated phases and dispciplins. The virtual satellite aims at closing the gaps in the development life-cycle and between disciplins by using model-based systems engineering.

DLR Software Portal

http://software.DLR.de

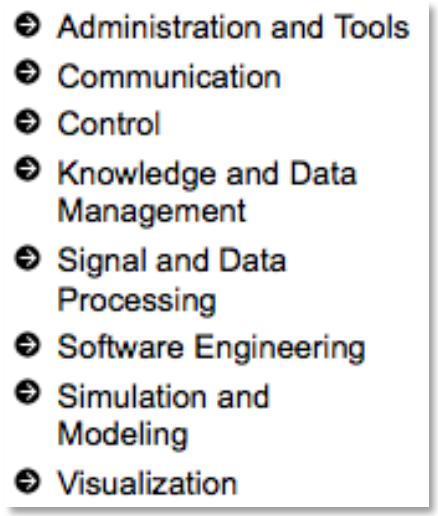
Basics

- Development started in 2011
- Available for DLR employees and the public
- For Open Source as well as proprietary software

DLR Software Portal
Customization

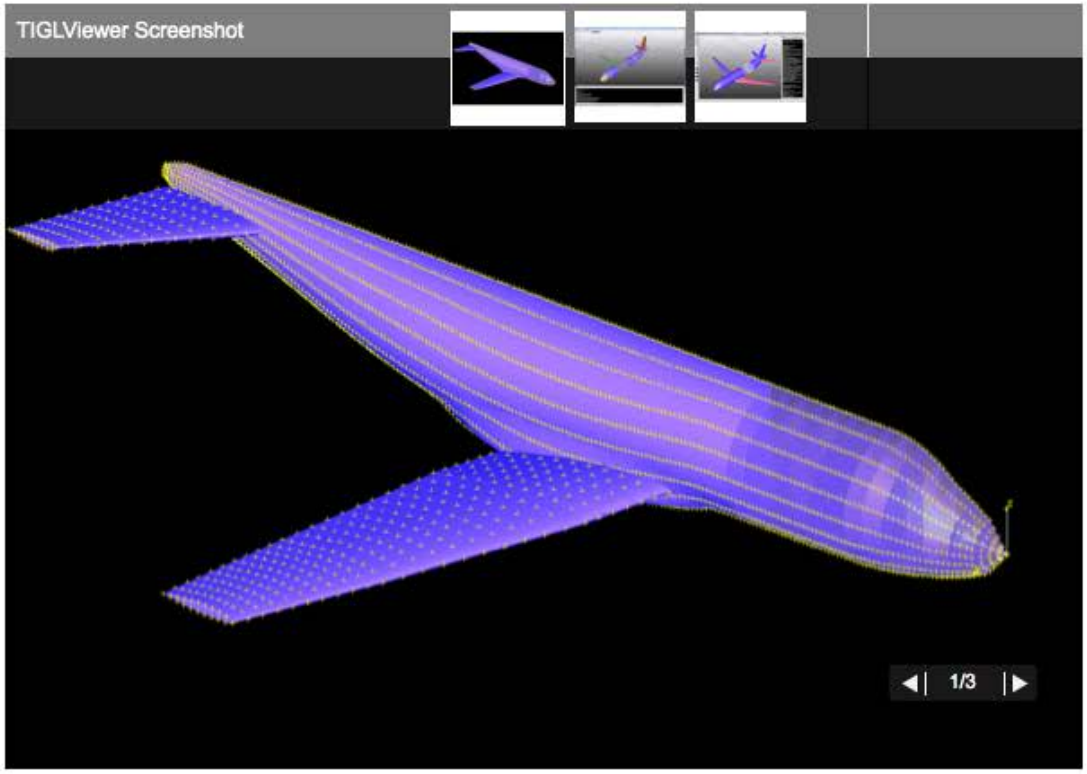
Customization of Allura

- Web templates (DLR corporate design)
- Metadata (project overview and basic information)
- Categories
  - DLR site
  - Development status
  - Institute
  - License
  - Operating system
  - Programming language
  - DLR research program



TiGL

Visualization



The TiGL Geometry Library can be used for easy processing of geometric data stored inside CPACS data sets. TiGL offers query functions for the geometry structure. These functions can be used for example to detect how

License

Apache Software License

Programming Language

C
C++
Python 2
Fortran
Matlab

Development Status

5 - Production/Stable

Operating System

Windows 7
Linux
OS X
Android

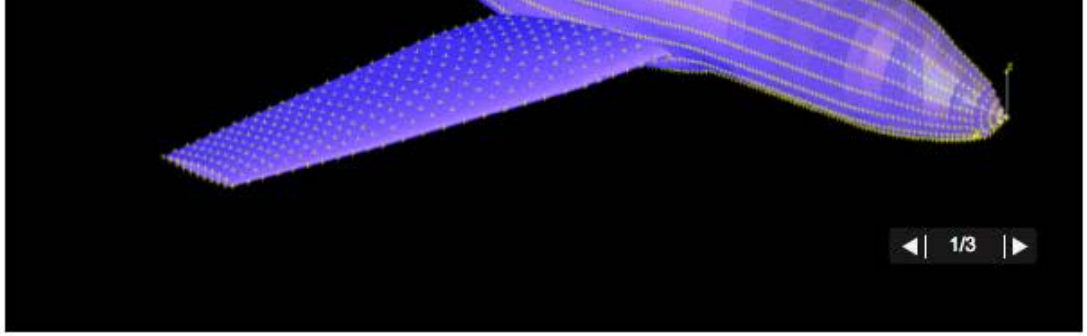
Research Program

L - no assignement

Institute

Simulation and Software Technology

feedback & support



Windows 7
Linux
OS X
Android

Research Program

L - no assignement

Institute

Simulation and Software Technology

Site

Cologne

The TiGL Geometry Library can be used for easy processing of geometric data stored inside CPACS data sets. TiGL offers query functions for the geometry structure. These functions can be used for example to detect how many segments are attached to a certain segment, which indices these segments have, or how many wings and fuselages the current airplane conguration contains. This functionality is necessary because not only the modeling of simple wings or fuselages but also the description of quite complicated structures with branches or flaps is targeted. The developed library uses the Open Source software OpenCASCADE to represent the airplane geometry by B-spline surfaces in order to compute surface points and also to export the geometry in the IGES/VTK format. The library provides external interfaces for C, C++, Python, MATLAB and Fortran.

For more information, please visit out project page on http://tigl.googlecode.com .

- Twitter
- Facebook
- Google+
- Print
- Send

Last update: 2013-08-21

Project resources

- Project homepage
- Support homepage

Project members

- Siggel, Martin

German Aerospace Center

software.DLR.de
» Projects
» TiGL

- Metadata
- Homepage
- Screenshots
- Categorization
- Permissions
- Usergroups
- Audit Trail

feedback & support

Project Setup

Please set up and update all information for your project.
Important: **Don't forget to set and maintain correct permissions!**

Basic Project Information

Metadata	Update basic project metadata, such as project name, links to other websites, a short summary of your project, the software category, and the icon. (**Info:** You can also remove your project here.)
Homepage	Provide a solid description, so colleagues can figure out what the project is all about.
Screenshots	Add as much screenshots, pictures, and diagrams as you like.

Categorization

Categories	Categorize your project. Currently, you can categorize according to license, programming language, and DLR research program.

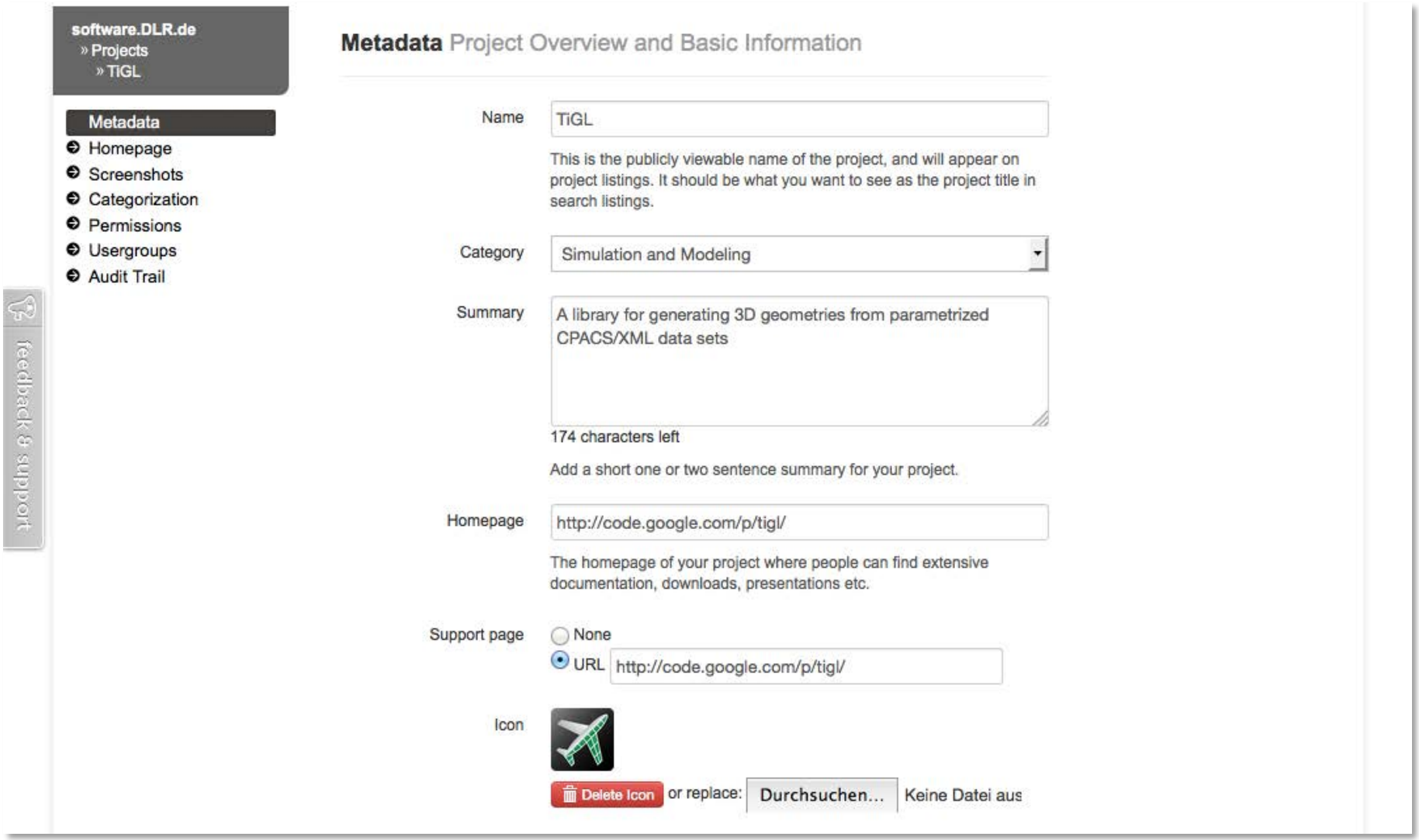
Access

Permissions	Set permissions to groups for reading, updating, administrating or creating project content.
User groups	Manage user groups for your project.

History

Audit trail	Show all changes on the project information.

German Aerospace Center


software.DLR.de
» Projects
» TiGL
Metadata
Homepage
Screenshots
Categorization
Permissions
Usergroups
Audit Trail
feedback & support
Metadata Project Overview and Basic Information
Name
TiGL
This is the publicly viewable name of the project, and will appear on project listings. It should be what you want to see as the project title in search listings.
Category
Simulation and Modeling
Summary
A library for generating 3D geometries from parametrized CPACS/XML data sets
174 characters left
Add a short one or two sentence summary for your project.
Homepage
http://code.google.com/p/tigl/
The homepage of your project where people can find extensive documentation, downloads, presentations etc.
Support page
None
URL
http://code.google.com/p/tigl/
Icon
Delete Icon
or replace:
Durchsuchen...
Keine Datei aus

software.DLR.de
» Projects
» TiGL

- Metadata
- Homepage
- Screenshots
- Categorization
- Permissions
- Usergroups
- Audit Trail

feedback & support

Categorization Categories of the Project

DLR site

DLR site :: Cologne

Augsburg

Add

Development Status

Development Status :: 5 - Production/Stable

5 - Production/Stable

Add

Institute

Institute :: Simulation and Software Technology

Design Organisation

Add

License

License :: OSI-Approved Open Source :: Apache Software License

OSI-Approved Open Source

Academic Free License (AFL)

Add

DLR

DLR Software Portal
Current State

- Open for all DLR institutes
- First set of projects added
- Adding projects not mandatory yet
- Feedback by project owners
  - Some bugs and feature requests
  - They got new contacts within DLR and with external companies

DLR Software Portal
Current and Future Work

Technical

- Upgrade to latest version of Allura
- Faceted search
- Activation of code hosting

Organizational

- Engage DLR employees to add their projects
- Extend access to other organizations

Thank You!

Questions?

Andreas.Schreiber@dlr.de

www.dlr.de/sc | @DLR_software | @onyame