Hands on EPrints
Haptic Software Systems through 3D Printing

Florian Fittkau

Kiel University, Germany

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ExplorViz

Motivation

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- Software systems are abstract
- Most customers see the GUI as the software system

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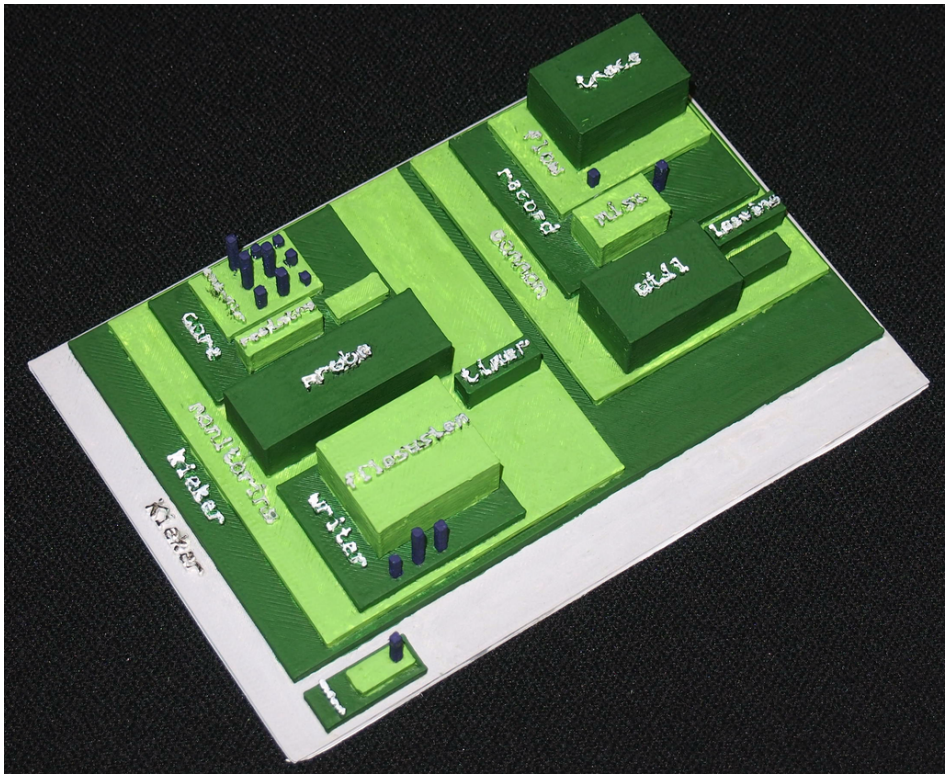
- Most customers see the GUI as the software system
- **Vision: Haptic, physical 3D models of software systems**



Possible Scenarios

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1. Customer dialog
   (“Change in back-end from x to y costs 10,000€”)
2. Communication basis for software developers/architects

Physical 3D Model Advantages

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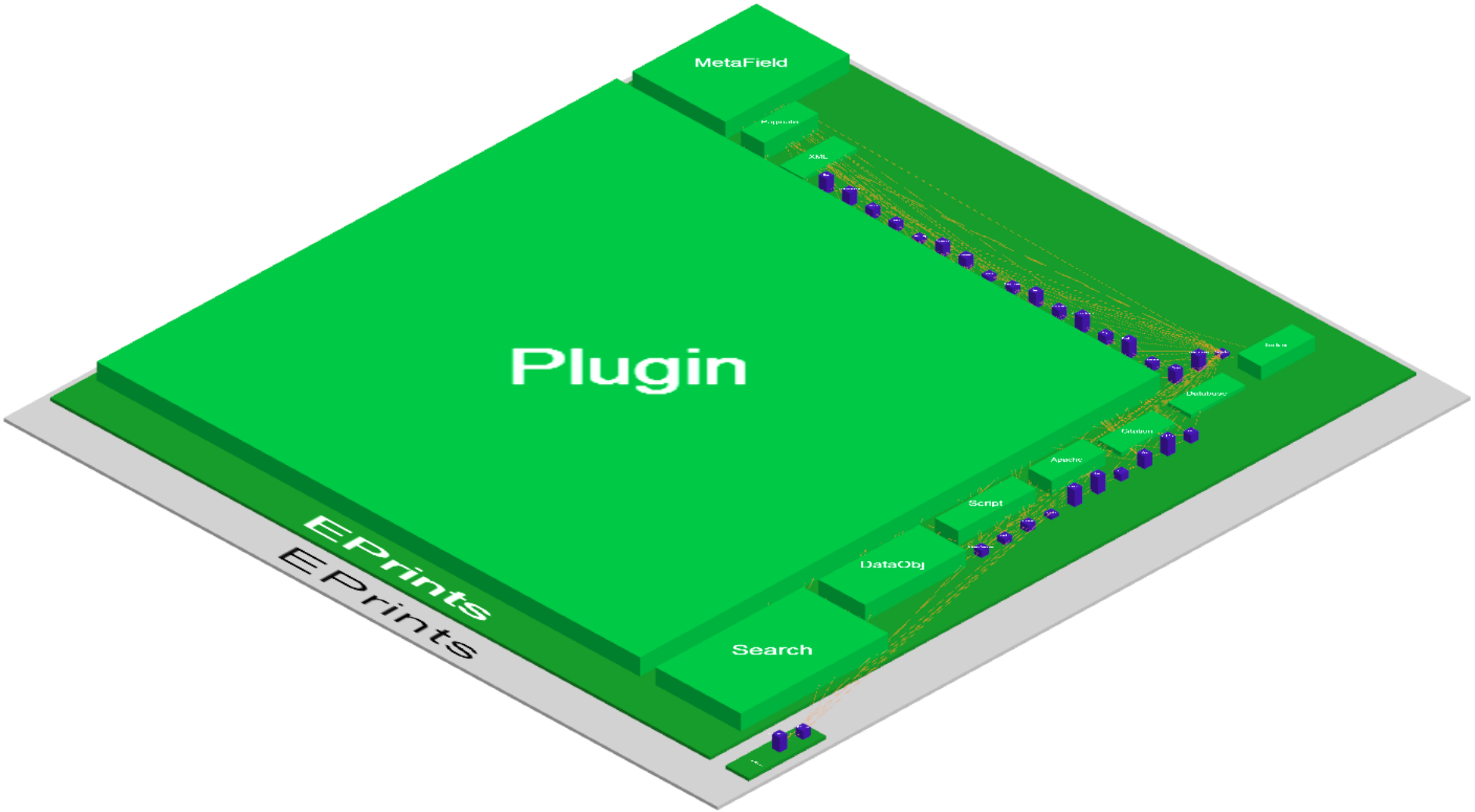
- Occlusion “resolved” in a natural way
- “Something to touch”
- No extra equipment/monitors/glasses

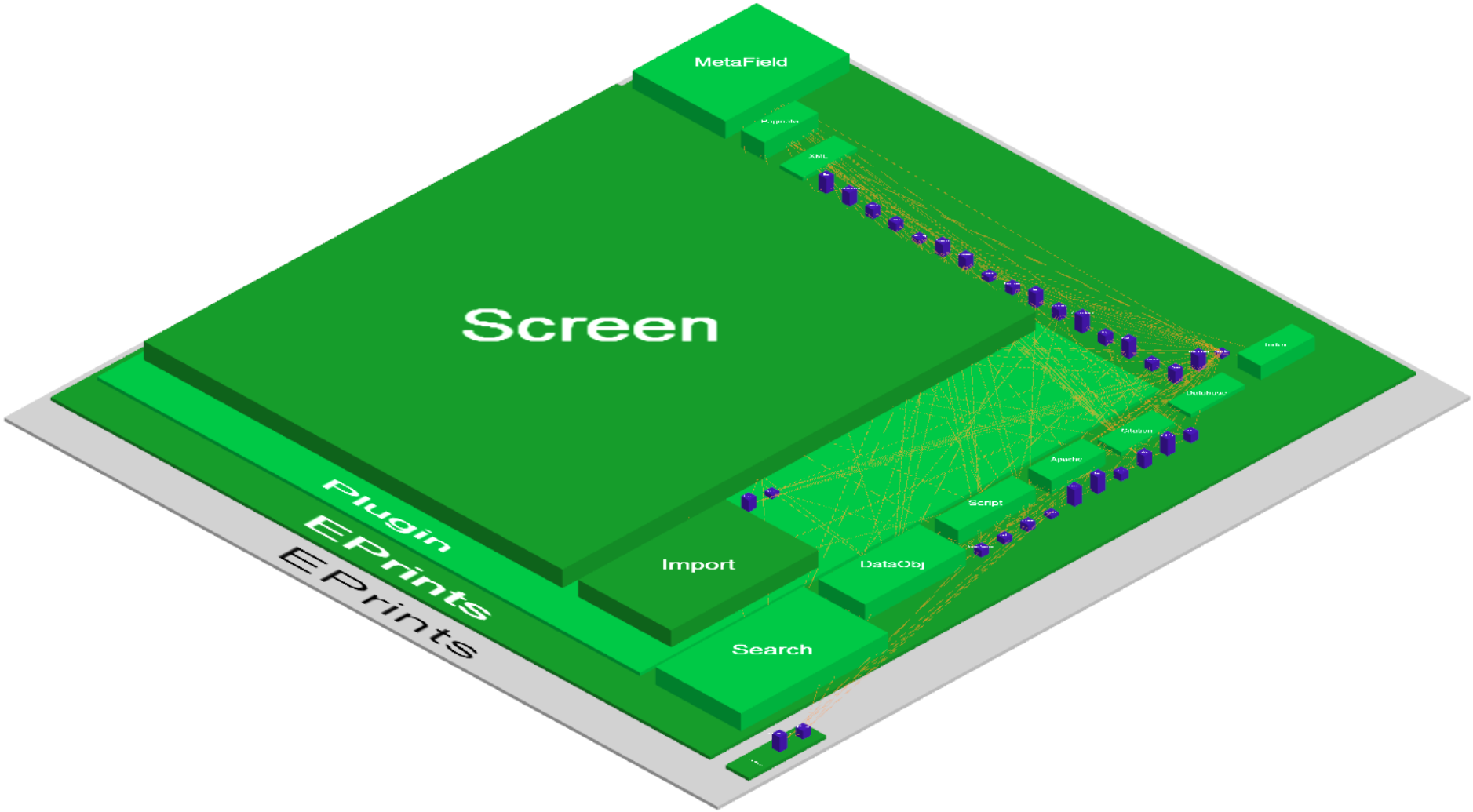
ExplorViz Landscape Level

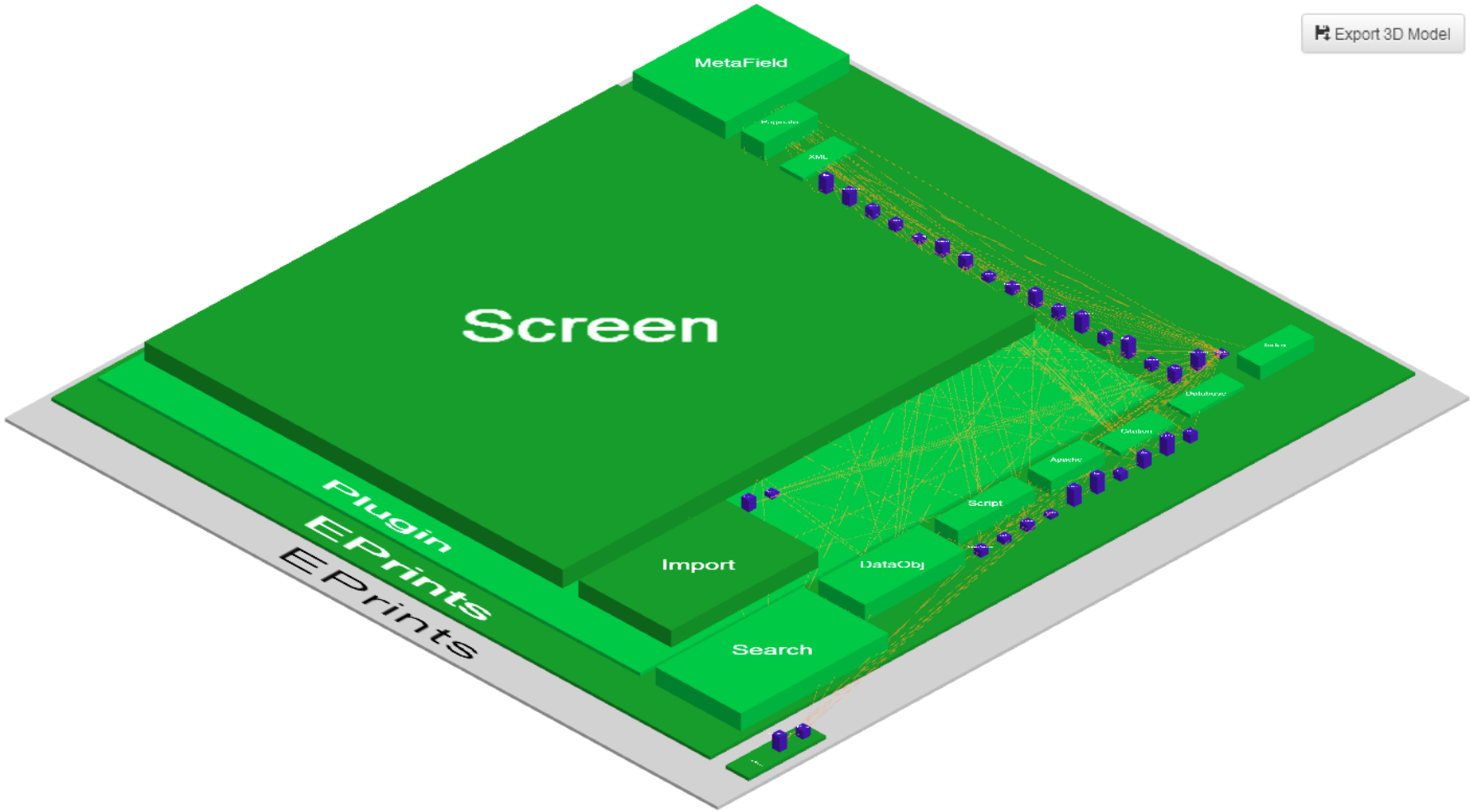
- Interactive approach for the live, explorable visualization of software landscapes [FWWH13]

ExplorViz Application Level



ExplorViz Application Level




Export 3D Model
MetaField
Screen
Plugin
EPrints
EPrints
Import
Search
DataObj
Script
Apache

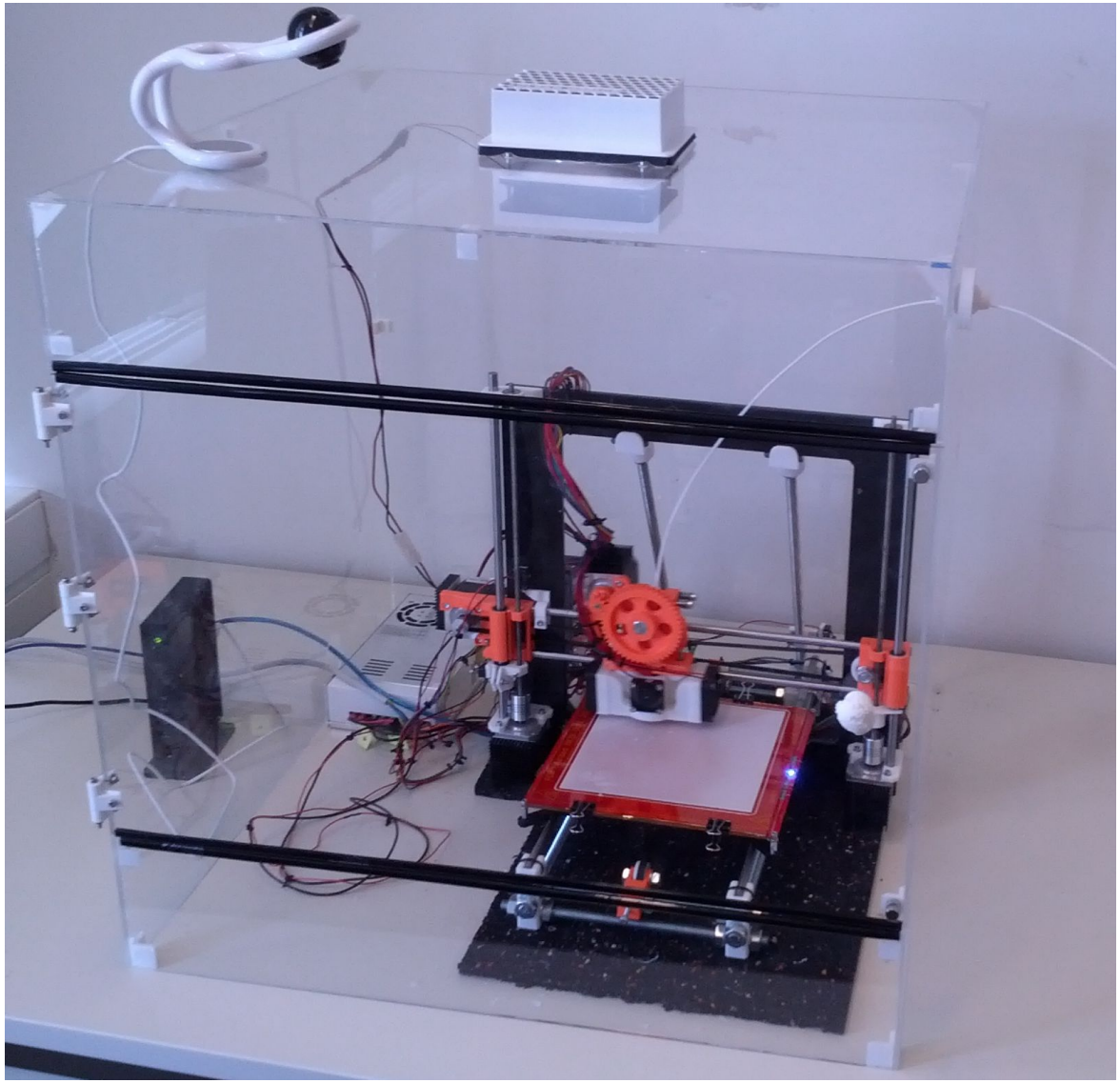
- Export current view as OpenSCAD[1] file:

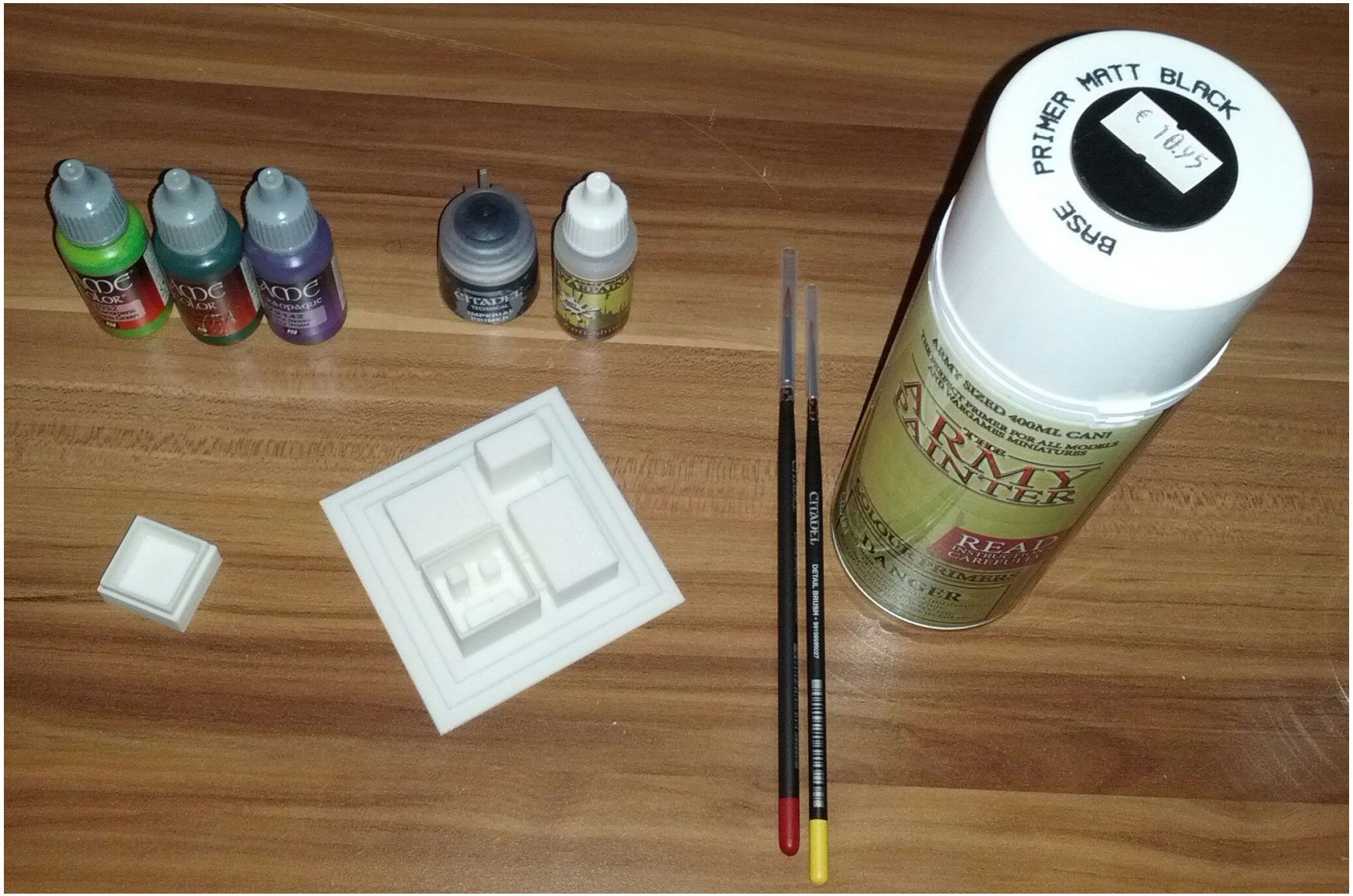
```
1 module application() {
2   union() {
3     translate([0,5,3])
4     cube(size = [194,184,3.059999942779541], center = true);
5   }
6 }
7
8 application();
```

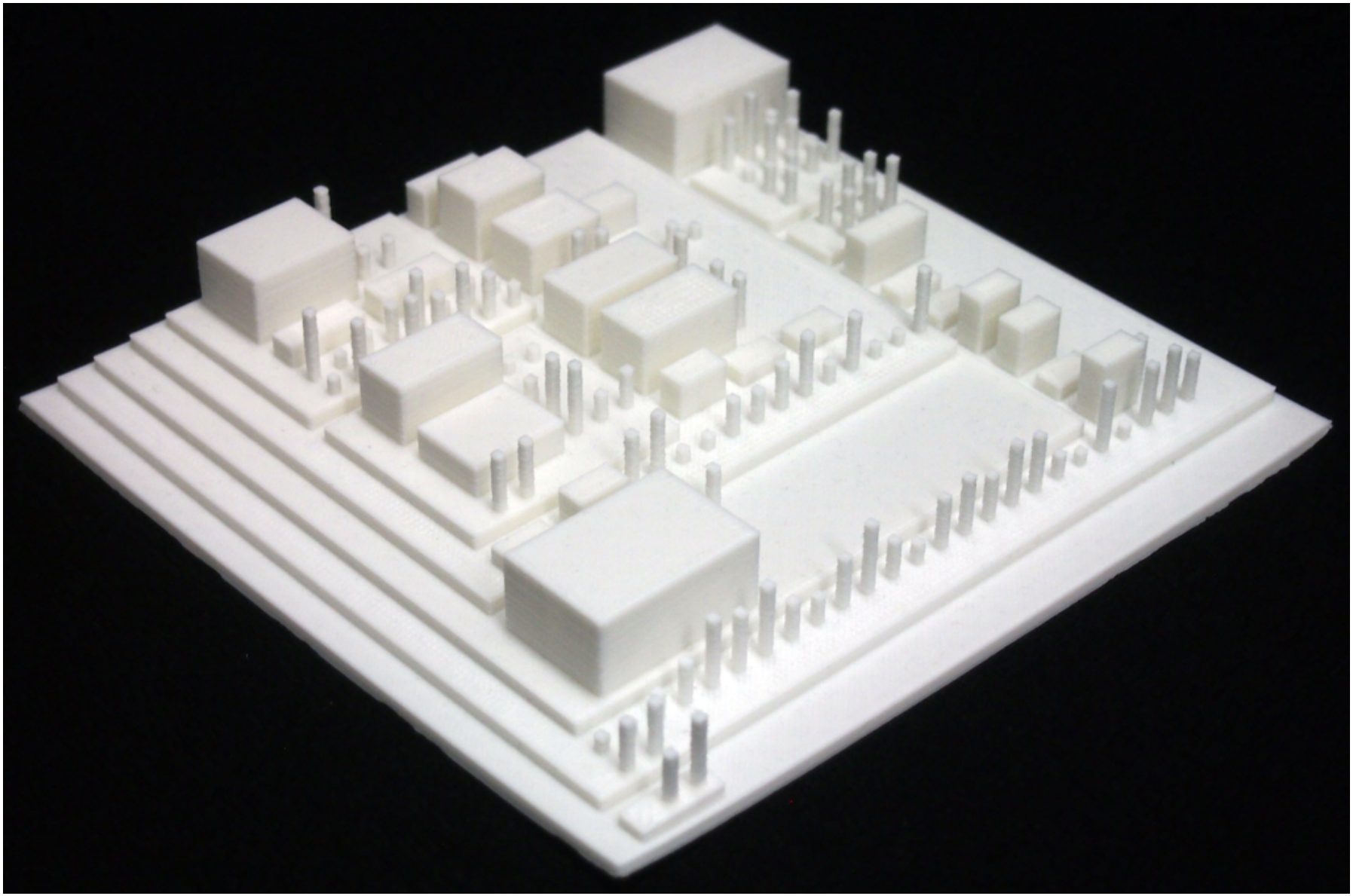
- From OpenSCAD export into STL, OFF, DXF, CSG, ...

[1] http://www.openscad.org

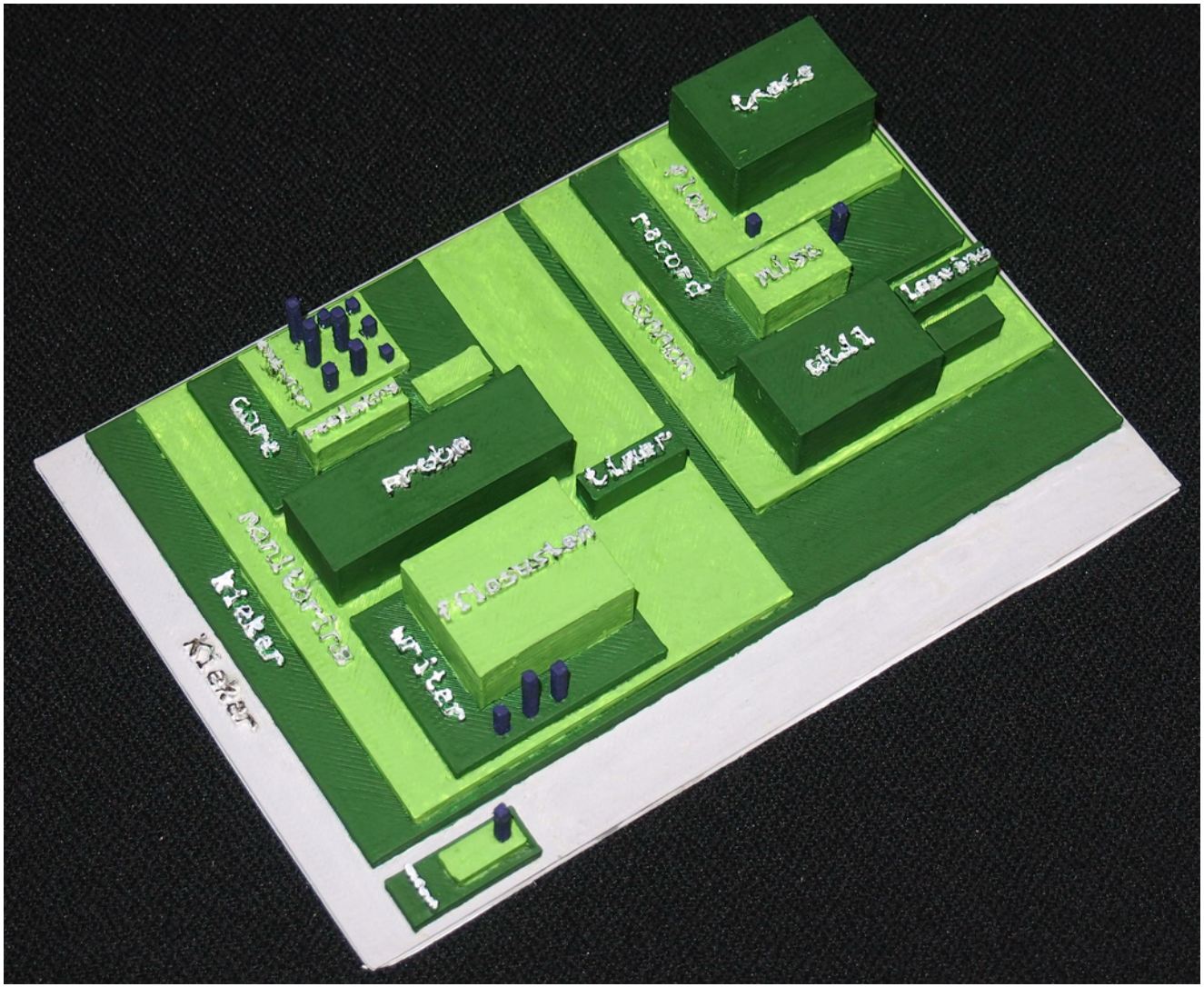
Our 3D Printer (Prusa i3)




PRIMER MATT BLACK
BASE
ARMY PAINTER
CITADEL

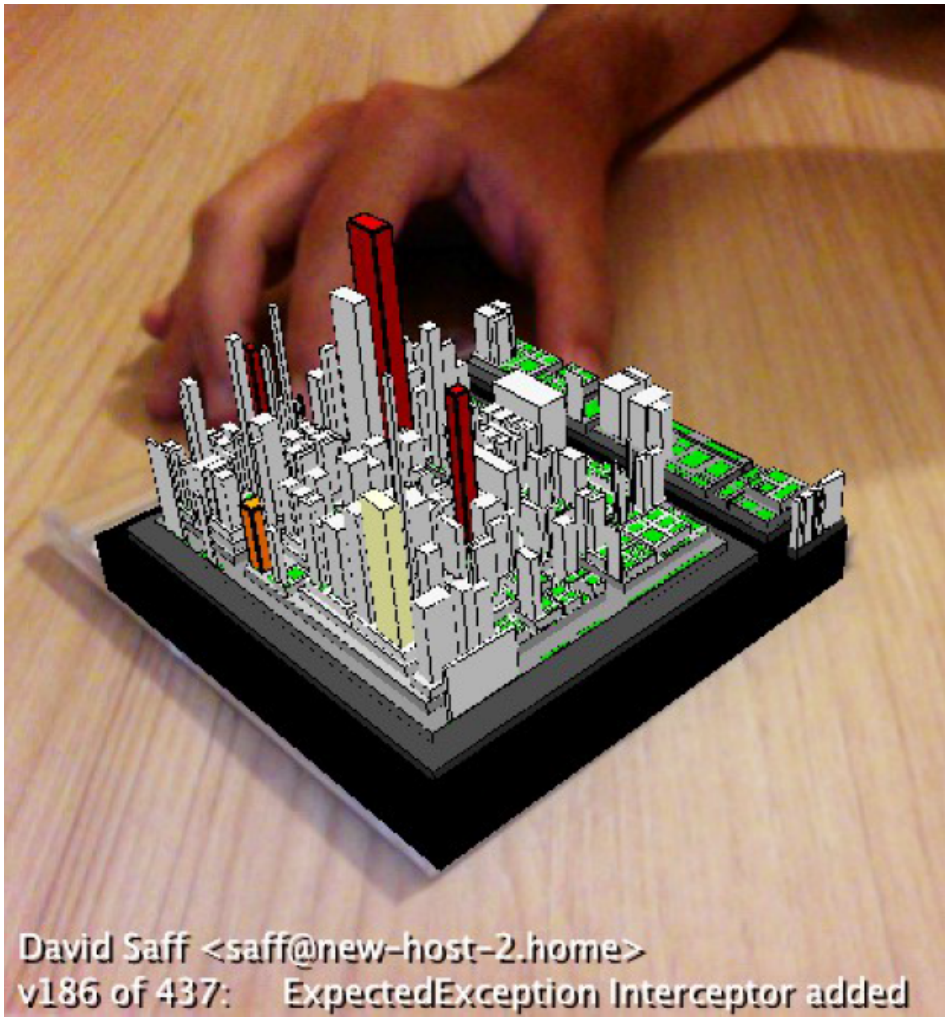


Painted Kieker with Labels



Live Demo

- Skyscrapar [RS12] (Virtual Reality)



- 3D printing is time consuming
  - Calibration (micro meters precision)
- Time consuming production
  - Printing about 5 to 8 hours
  - Painting about 5 to 8 hours

Summary

- Haptic, physical 3D models of software systems
- Open source tool ExplorViz available at `http://explorviz.net`

ExplorViz

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ExplorViz

Future Work

- Class **communication**
- Lids for **interactively looking** into packages
- Puzzling of packages such that **larger models** are possible
- Printing other visualization **metaphors**
- Virtual Reality with Oculus Rift


Florian Fittkau, Jan Waller, Christian Wulf, and Wilhelm Hasselbring.
Live trace visualization for comprehending large software landscapes: The ExplorViz approach.
In Proc. VISSOFT 2013, 2013.


Thiago Mendes Manoel Mendonca Rodrigo Souza, Bruno Silva.
SkyscrapAR: An augmented reality visualization for software evolution.
In Proceedings of II Brazilian Workshop on Software Visualization (WBVS 2012), 2012.