

# Potree – Rendering Large Point Clouds in Web Browsers

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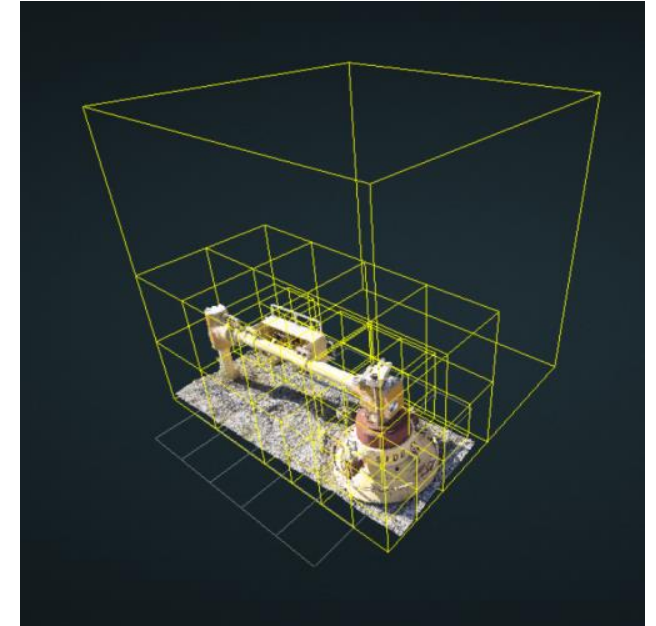
[Potree.org](http://Potree.org)

# Potree

- A WebGL based viewer for large point cloud data
- Tested with up to 640 billion points
- Free and Open Source
- Evolved from the Scanopy project at TU Wien, Institute of Computer Graphics and Algorithms
- Currently continued as Master Thesis project under Harvest4D and with help of sponsors

# How does potree work?

- Only small part of data essential for point of view
- Multi-resolution octree allows to cull away data and only load what is needed the most
- High-level nodes contain low resolution models of large volumes
- Resolution increases while coverage decreases at lower levels
- Similarly to web-maps (OSM, Bing, ...)
  - Low-resolution data from far away
  - Gradually higher resolution data when zooming in



# Features

- Multi-Res format with BINARY, LAS or compressed LAZ files
- High-Quality Rendering (Interpolation, HQ-Splats)
- Eye-Dome-Lighting (EDL)
- Various Point Attributes (RGB, Intensity, Classification, ...)
- Measuring
- Height-Profiles

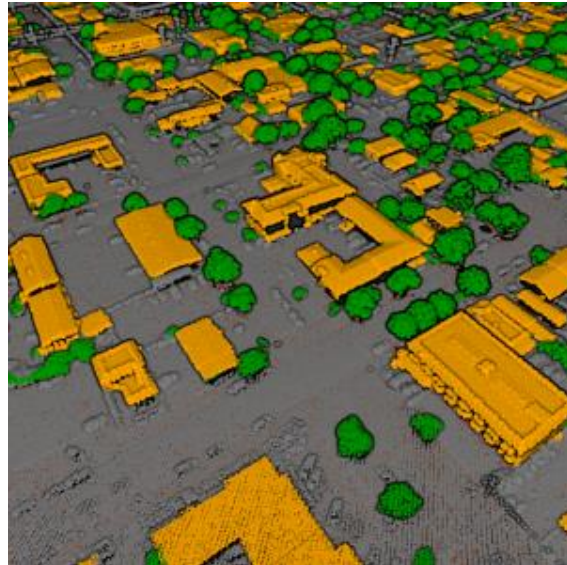
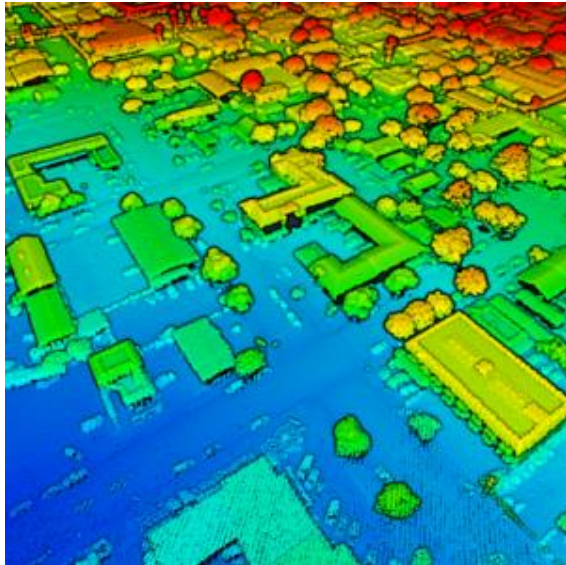
# High-Quality Rendering Modes

- Standard point cloud rendering causes overlaps
- High-Quality modes reduce overlaps and increase readability
  - Interpolation mode does nearest-neighbor-like interpolation
  - Splats mode blends overlapping points together



# Eye-Dome-Lighting

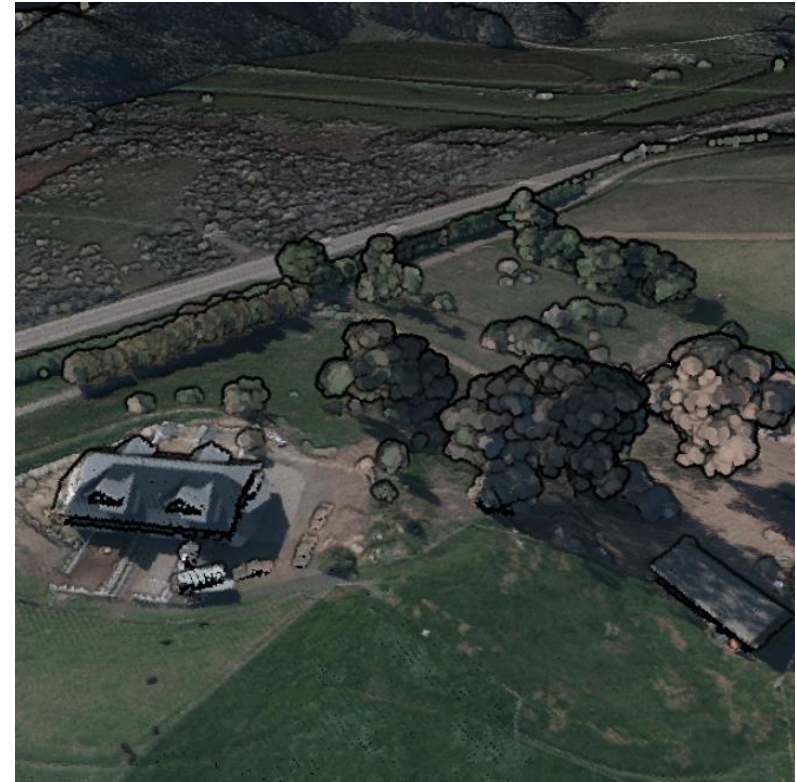
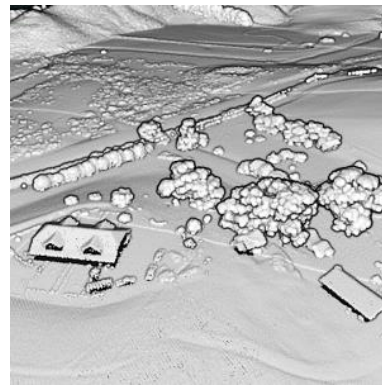
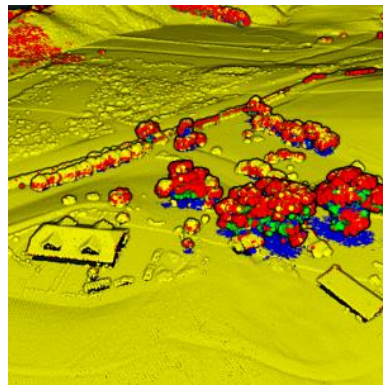
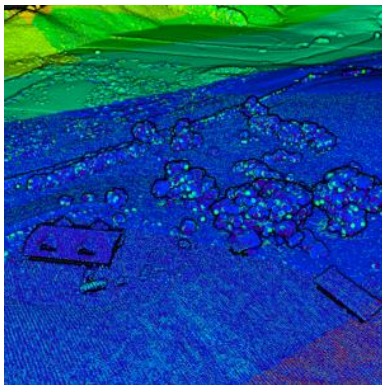
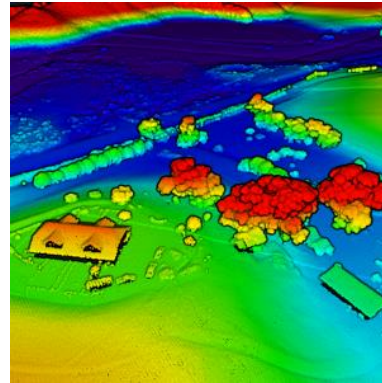
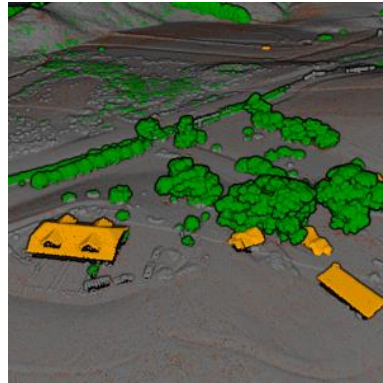
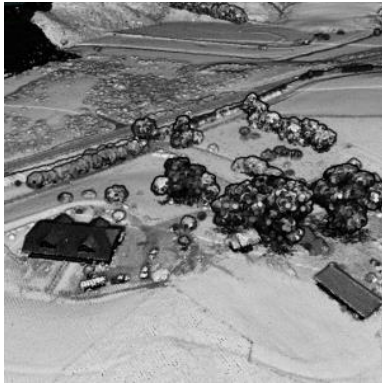
- Illumination for point clouds without normals
- Outlines enhance depth-perception
- Especially useful to render elevation, classification or single colors



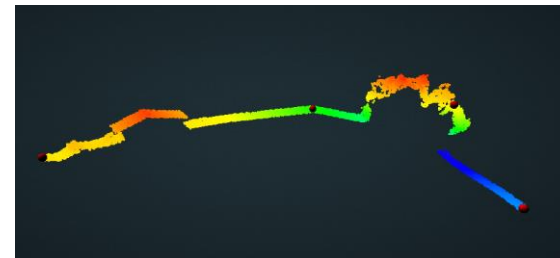
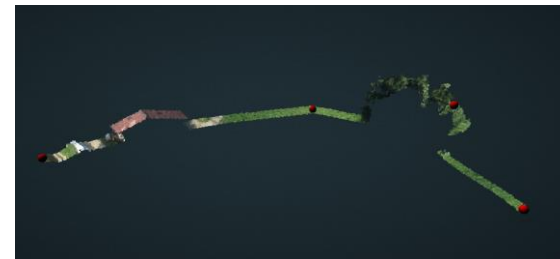


# Point Cloud Attributes

- Various point attributes are supported



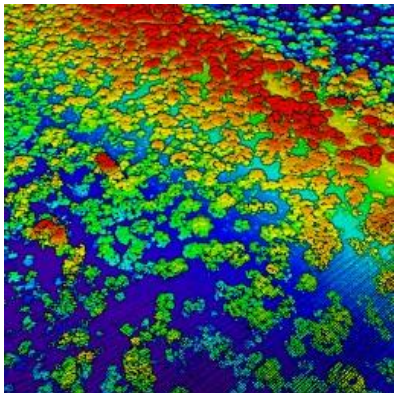
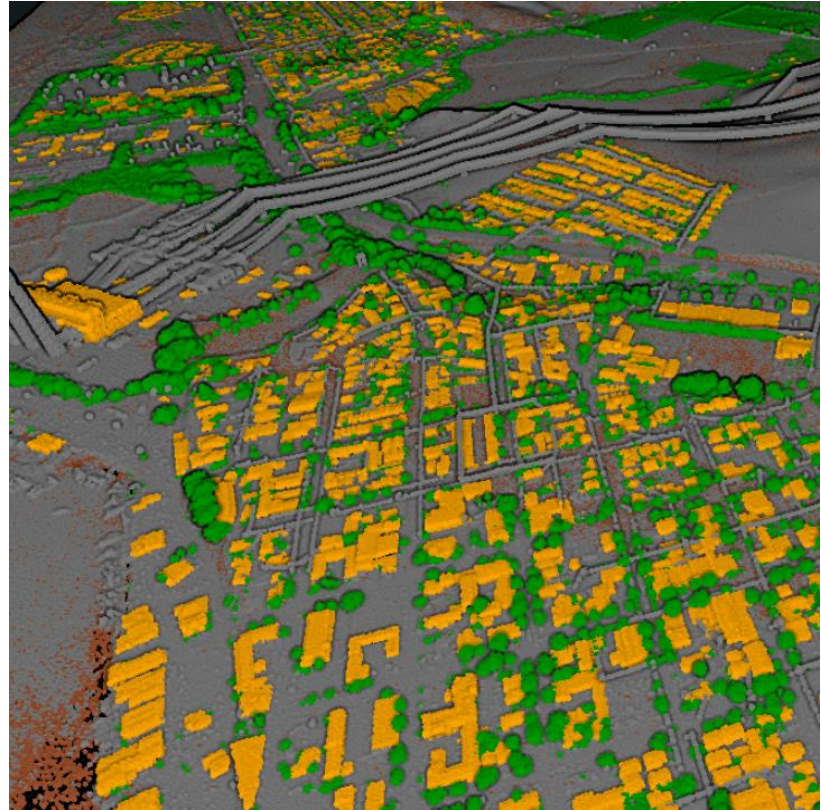
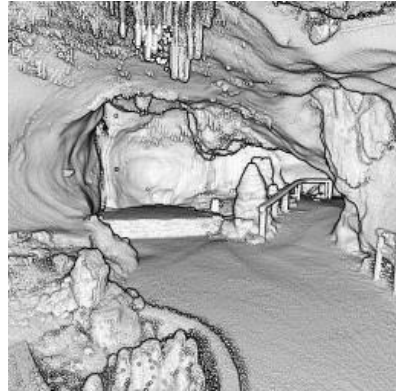
# Measuring and Height-Profiles



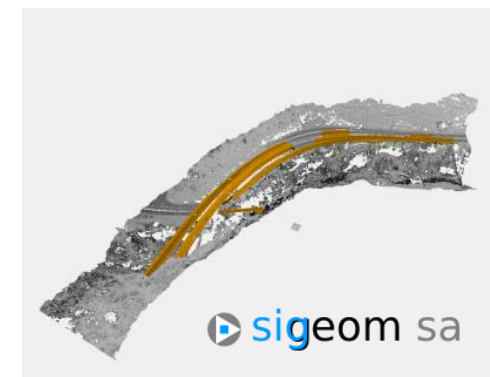
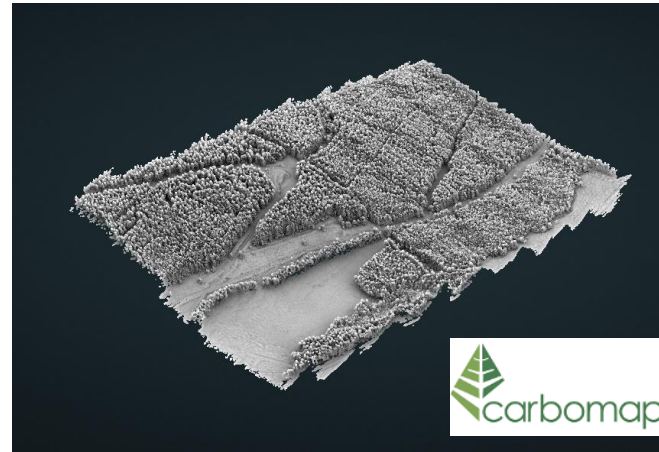


# Examples

- <http://potree.org/wp/demo/>



# Who is using Potree?



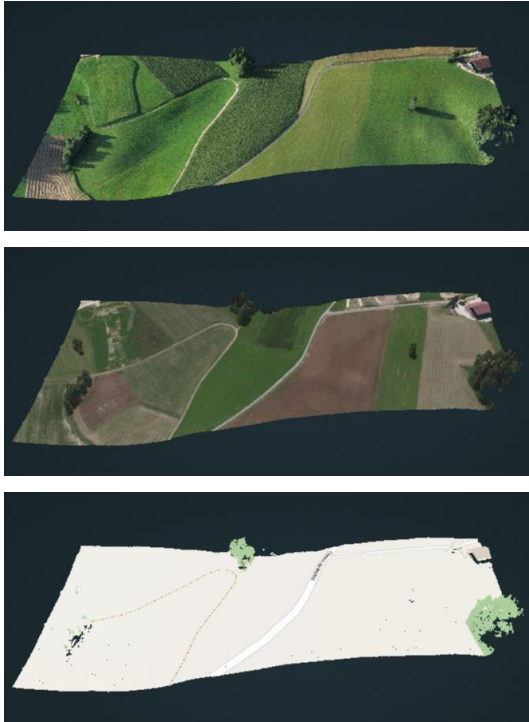
# What comes next?

- Projecting maps (OSM, Bing) onto point cloud in realtime
- Combine with the Cesium globe renderer
- Load and display various point cloud formats without conversion
- Further improve performance and push the boundaries
- Improve support for mobile devices
- Additional tools and rendering modes
- A lot more is possible and funding will help reach those goals!

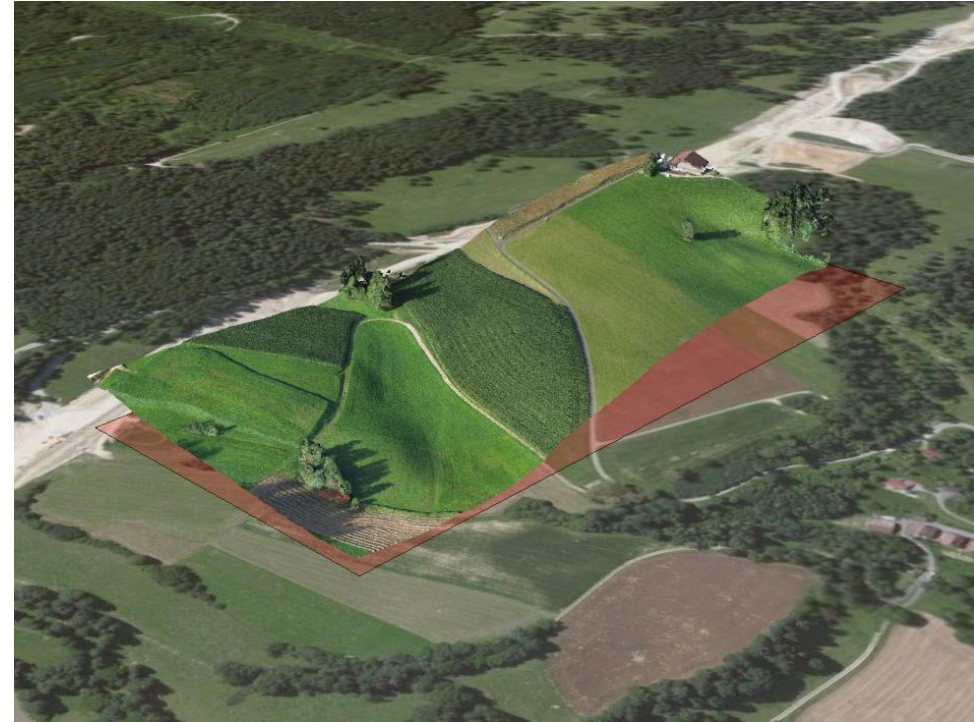


# What comes next?

Prototype for Map Projection



Prototype for Potree + Cesium



# Cooperation with other Projects

- Potree is going to be included in lastools by rapidlasso
  - <http://rapidlasso.com/lastools/>
- Support for Veesus Arena4D point server.
  - <http://veesus.com/>
- NLeSC converted 640 billion points with their custom “Massive-PotreeConverter” extension
  - <http://ahn2.pointclouds.nl/>
- SITN created a PotreeViewer to display the Neuchatel region
  - <http://sitn.ne.ch/lidar/>



# Thanks to all Sponsors and Contributors

- Sponsors



rapidlasso



- Credits to

- TU Wien, ICGA who developed the multi-res octree model
- The Harvest4D project under which potree is currently continued
- Three.js, the WebGL rendering engine used by potree
- Rapidlasso and Georepublic for their extensive support
- Howard Butler and Uday Verma for the javascript port of LASzip
- Christian Boucheny and Daniel Girardeau-Montaut (Cloud Compare) for EDL
- Anyone else who supported and contributed to potree! 😊