Browser functionalities of

Potree 1.6

How to use the Potree browser to visualize point clouds with Potree.

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Potree is a WebGL based Open Source rendering engine for viewing very large point clouds, developed at the TU Wien Institute of Computer Graphics and Algorithms.

The implemented technology allows an exceptional display speed for very large point clouds.

This checklist focuses on the different options to navigate and display point clouds using Potree.

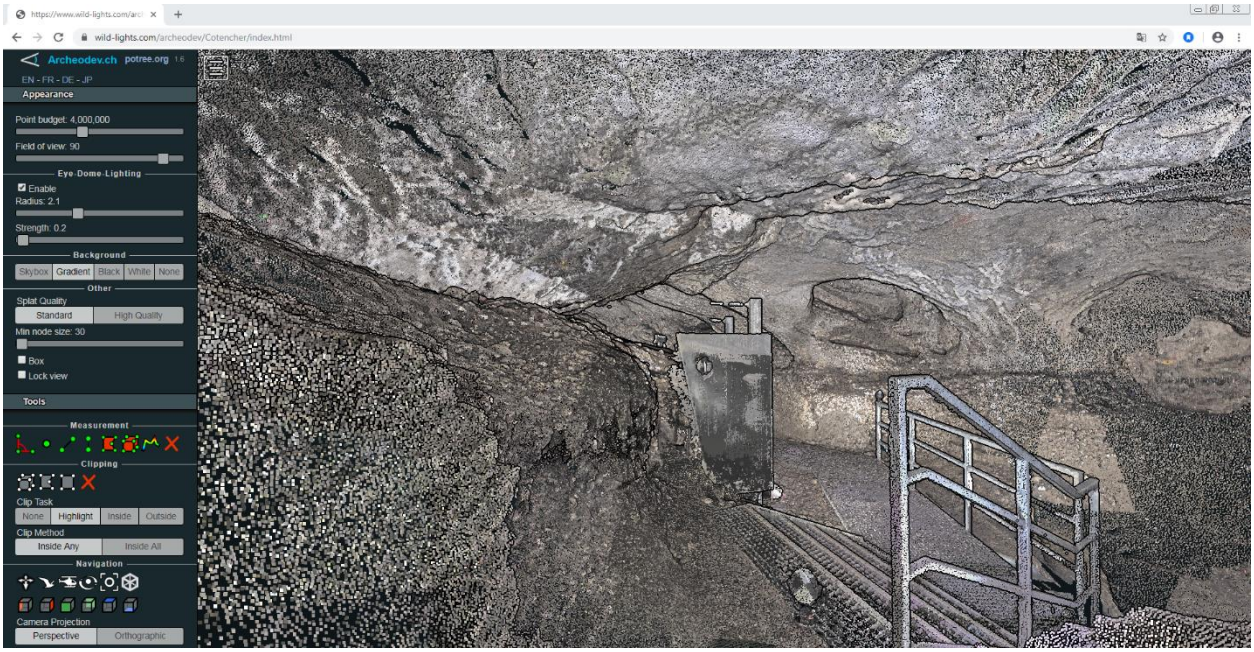
Installation and use of the potree converter is covered on the Potree.org website.

- Potree serves its content through a web server (Apache, IIS, etc ...). It is not possible to directly load a potree « file » without the going through a web server.
  In the case of confined use, you can install a web server locally on your machine.
- Standard point cloud formats (LAS, E57, etc ...) must be converted to Potree format (a set of files, consumable by your internet browser) first, using the Potreeconverter
- Caution: If the data resides on a UNIX server, the path and file name may be "case sensitive".
- Potree uses WebGL (which allows to use the OpenGL standard within a web page). It is therefore important that the browser fully supports WebGL.
  Chrome, Firefox, Safari, Edge are browsers that support WebGL. Potree also works on tablet or mobile.
  In any case, if you have issues, try first using another browser. Chrome for example, gives full satisfaction in my experience.

1. Getting started

Start your internet browser and type the address that contains your data.
For example: https://www.wild-lights.com/archeodev/Cotencher .

That's it ... you just loaded your first model.



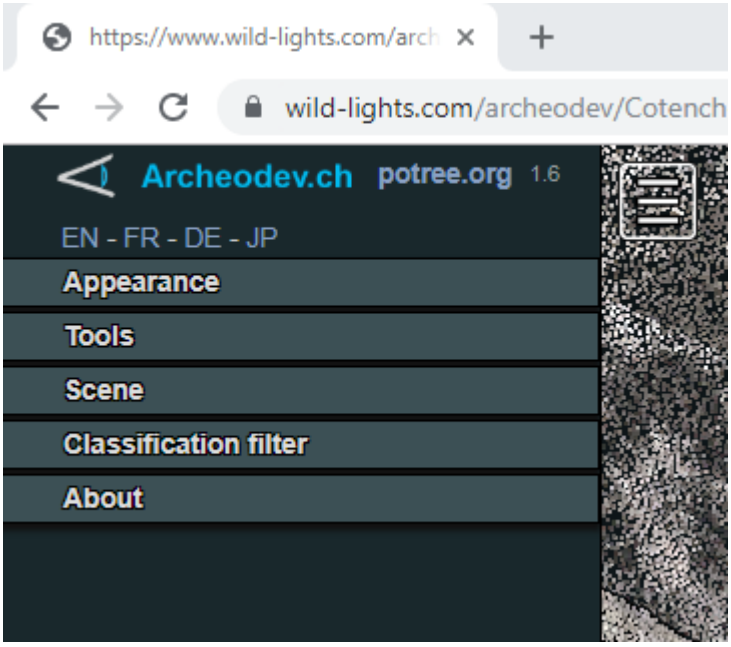
This model is displayed with the default settings that were specified when generating the potree files.

These potree files consist of a set of data files, html and scripts, interpreted by the web server and your internet browser.

By clicking on the sign  , usually located at the top left of the screen, you can open the menu containing the Potree tools.

The different tools let you

1. Define the visual aspect of the model
2. Optimise display perfomances
3. Choose a navigation mode to experience the model
4. Measure (distances, profiles, slice, etc...)



On the first line you will find the releas number (here 1.6) and a few other links

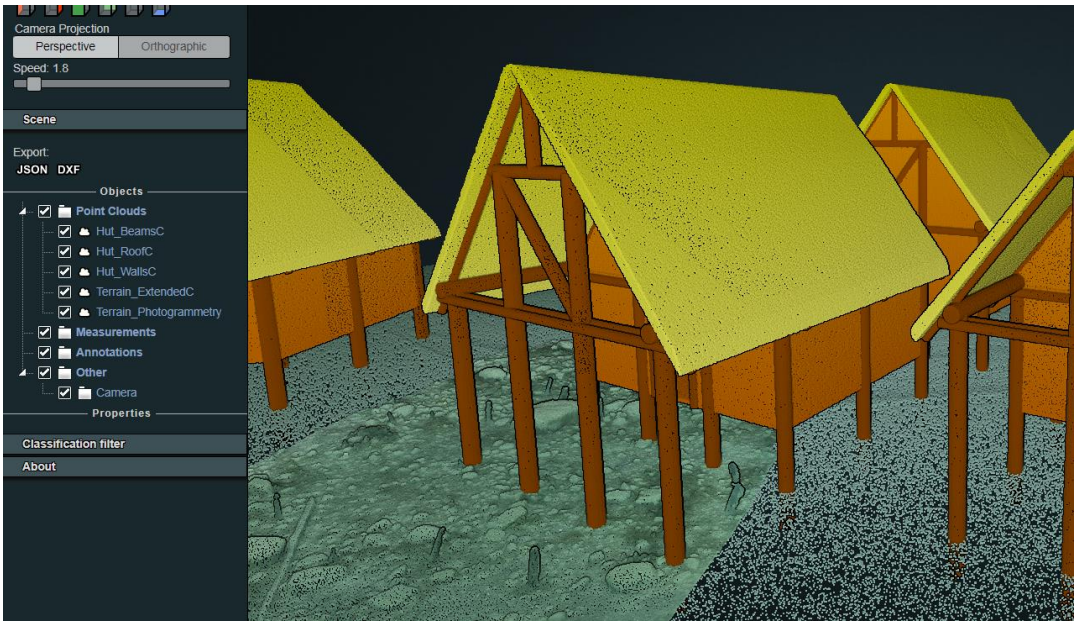
Second line let you change the interface language. EN-FR-DE-JP

Click on a section to expand its content

The visual of the model is controlled in Appeareance and Scene section.

Properties of the Appearance section are global, while scene properties apply to each scene (cloud) separately.
Through Scene, you can toggle on/off clouds.

The following https://www.wild-lights.com/archeodev/palafitte/index.html is an example where multiple clouds are loaded simultaneously, (allowing to color each cloud separately for example).



2. Appearance

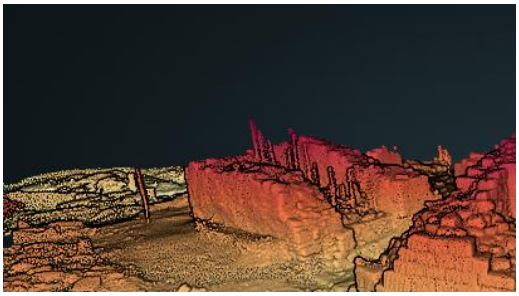
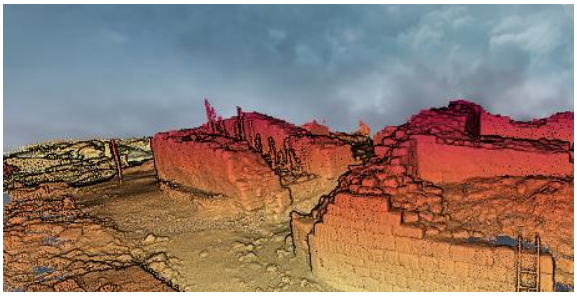
- Point Budget set the amount of points taken into account for the display. This is partly what makes the point density on screen (but it is not the only parameter)
- Field of view set the field of view.
- Eye Dome Lighting is a shading calculation methode that improves the perception of depth by sharpening the edges. Very useful to facilitate the reading of a model. The darkening due to the eye dome lighting can be compensated via the brightness of the scene.

Without Eye Dome Lighting

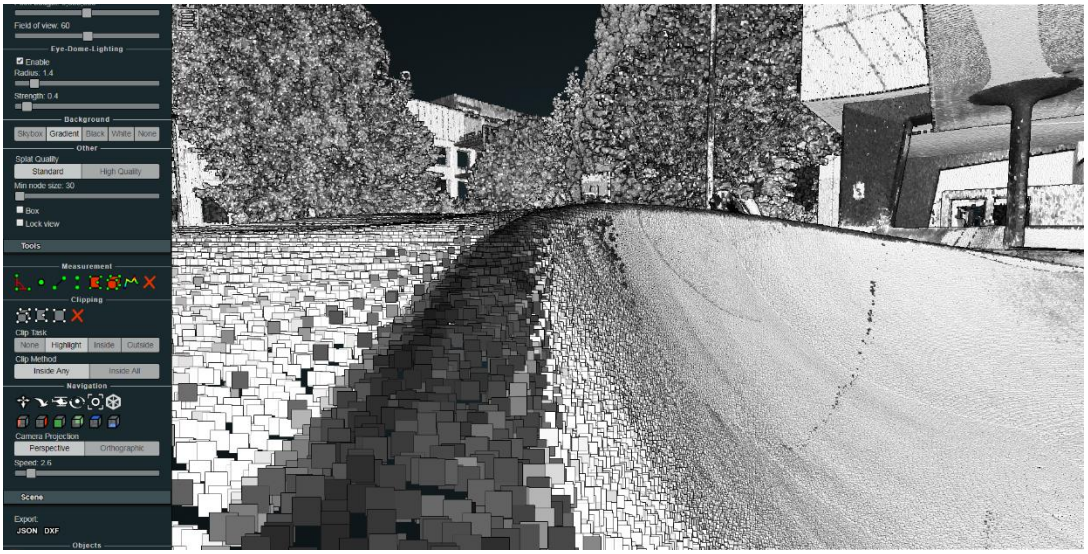
With Eye Dome Lighting.

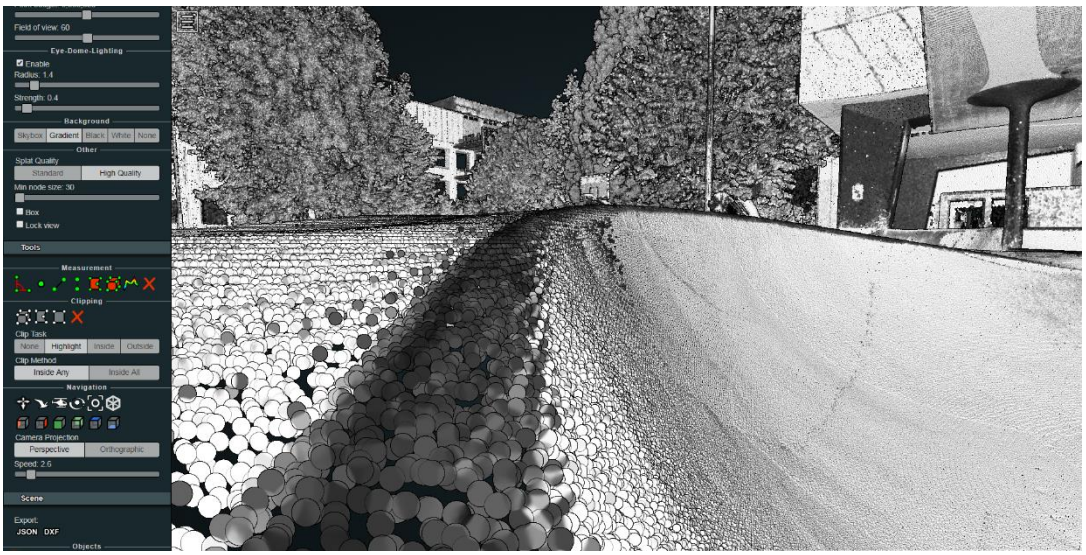
Radius and Strenght parameters impact the degree of edge shadowing

- **Background** set the background style

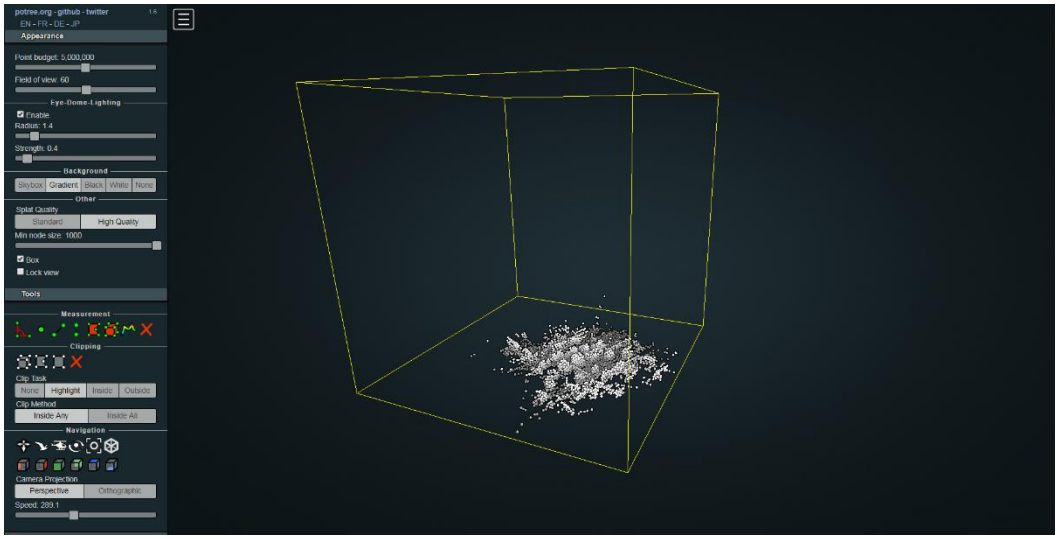
- **Splat quality** set point aspect



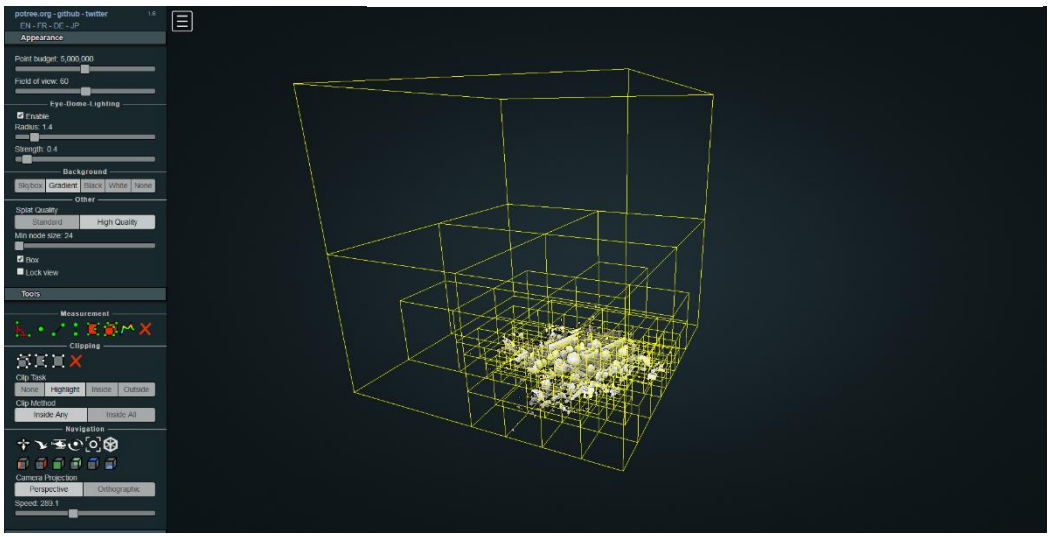


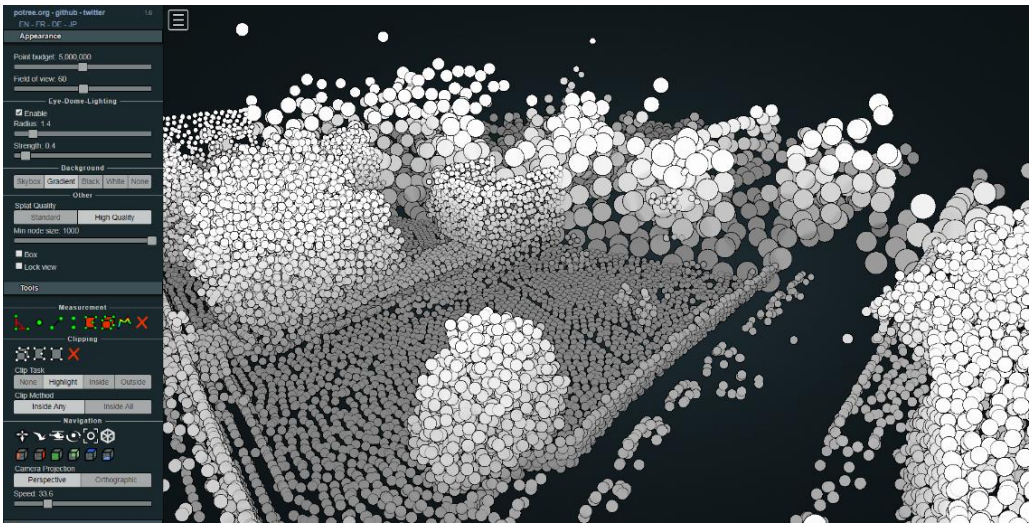
- Minimum node size defined *Min node size = 1000* the size of the nodes, not to be confused with the size of the points. Potree uses a point-storing technique based on an information structure called octree. This structure divides the space into cubes of different sizes with a specific level of detail allowing to display some cubes (or not) based on the camera/target position . This is what allows Potree to display huge points clouds with great perfomances. The smaller the size of these nodes, the greater the amount of detail displayed. If you have performance issues, increase the value of "Min node size"

Min node size = 1000

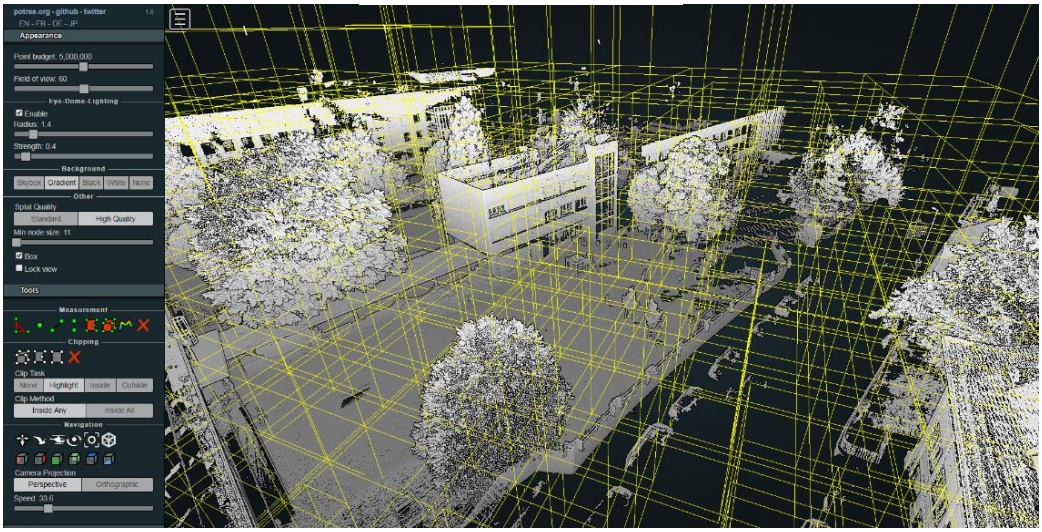


Minimum node size = 24





Minimum node size = 11

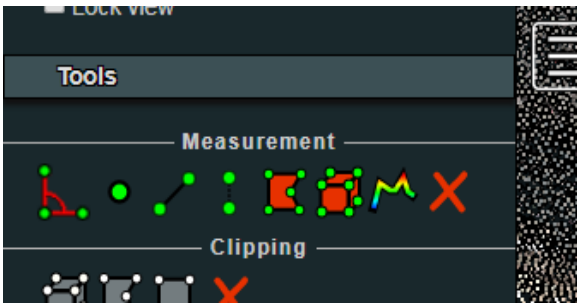


- Box display the cube structure
- Lock froze the node size view

3. Tools

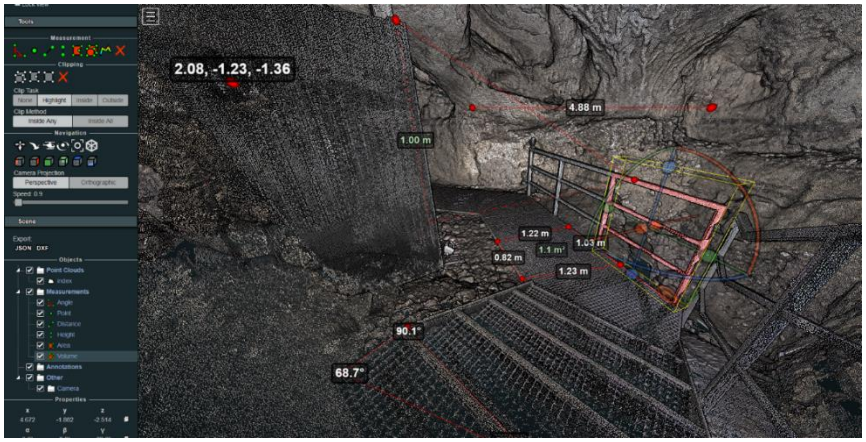
Warning: Tools available in version 1.6 of Potree are different from those of version 1.5. It is interesting to convert old point clouds to version 1.6 to benefit from the advanced functions. Volume resizing and clipping features have been improved in version 1.6

Measurement :

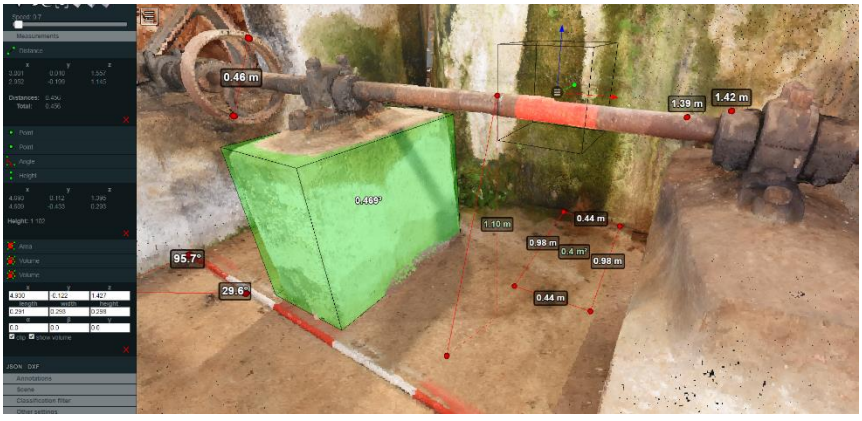


Measurement tools let you

- Measure angles
- Identify point
- Measure distances
- Measure heights
- Measure surfaces (horiz.)
- Measure volumes
- Trace profiles

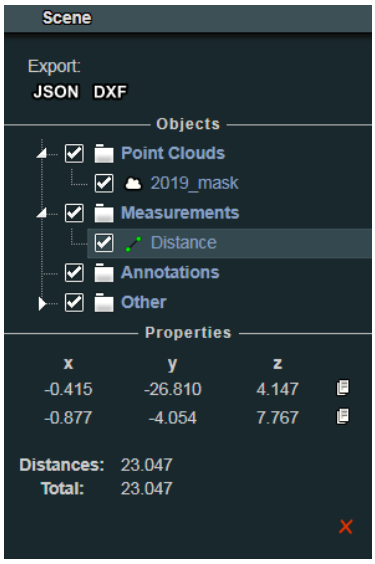


Potree R 1.6



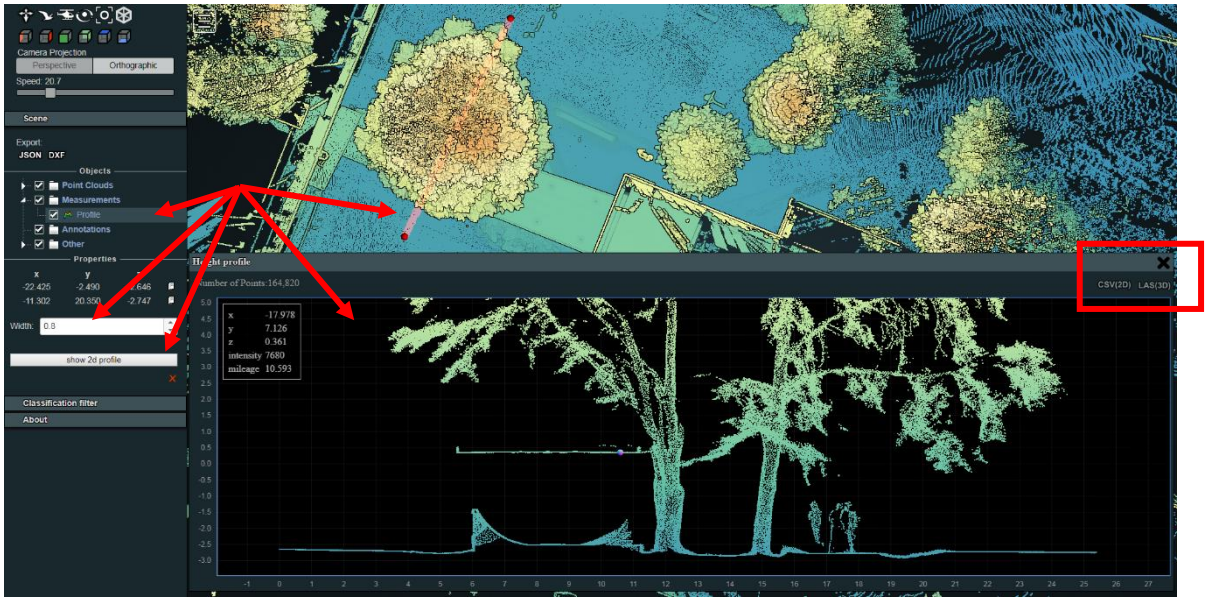
Potree R 1.5

Once you take measures, the will populate the Scene>Measurements section.



You can delete measures (red X at the bottom) or export globally (Export .JSON, .DXF).
You can also click on each one to get their detailed properties

The profile tool is very handy.



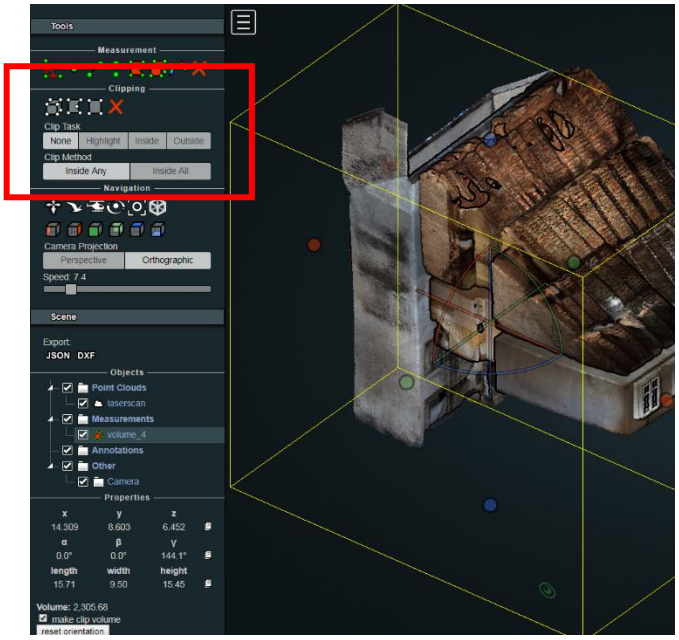
Potree Version 1.6, Profile tool

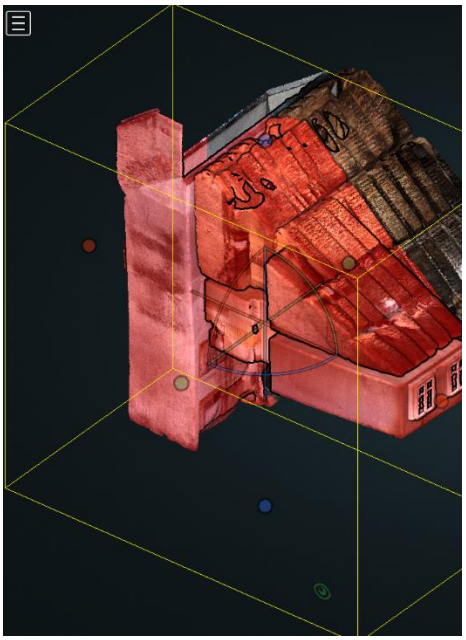
It not only allows you to view an elevation profile instantly, but also to export the points as a CSV file or as a point cloud in LAS format. This allows to exchange data with CAD/BIM software.

It is also possible to specify the width taken into account to capture the points that will be displayed inside the profile.

Clipping :

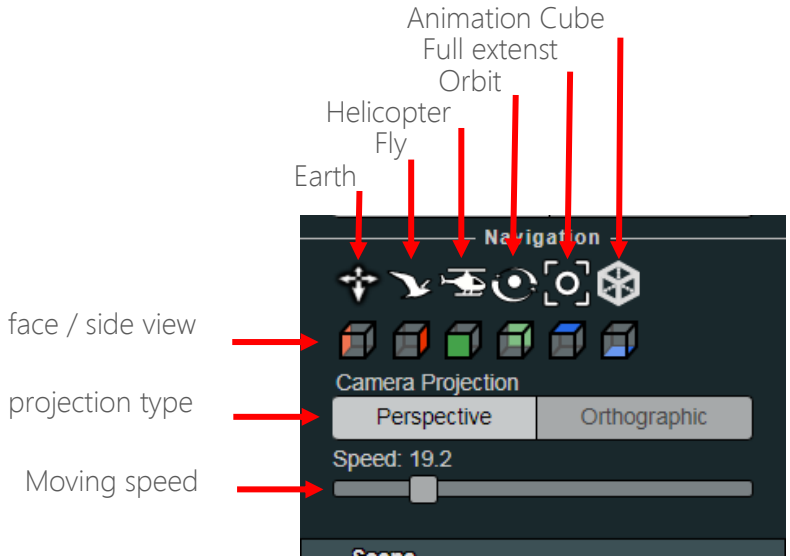
Allows you to hide part of a 3D model to better visualize some others. Version 1.6 makes it very easy to edit volumes by their grips.





Navigation

Potree navigation tools are easy to use.



- Earth controls : Hover over the model and left click + move, or right click to rotate the model. At the initial point of the click appears a colored circle which represents the center of rotation. (therefore, it is imperative to position the cursor at a location on the model)
  Use the mouse wheel to zoom simultaneously
- Fly controls : Left click to steer flight direction + keyboard arrow keys to move forward / backward. Right click + move allows a pan of the view
- Helicopter controls : Relatively similar, slightly different displacement
- Orbit : Left click, 3D rotation around the current center (possibility to adjust the center with a double-click on one of the points of the model, click right = Pan
- Full extents : Zoom extend to the model limits
- Cube : display the view cube

Earth, Fly, Orbit modes, and view by faces are let you do pretty much all you need to move around.
Orthographic projection is generally useful when measuring on the model. Some measuring or cutting tools require to switch to Ortho mode. Perspective mode is used to visualize and present a model.
Speed parameter impact the zooms and other navigation tools, you can speed up/ slow down as required.

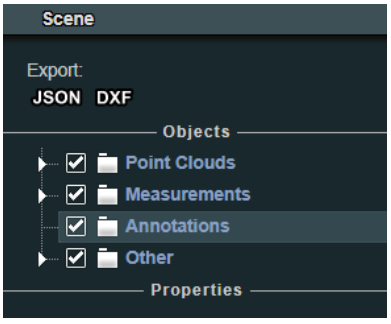
Scene

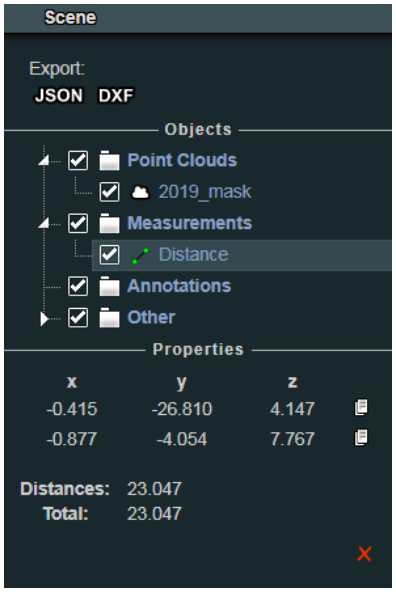
The Scene section contains different objecst.

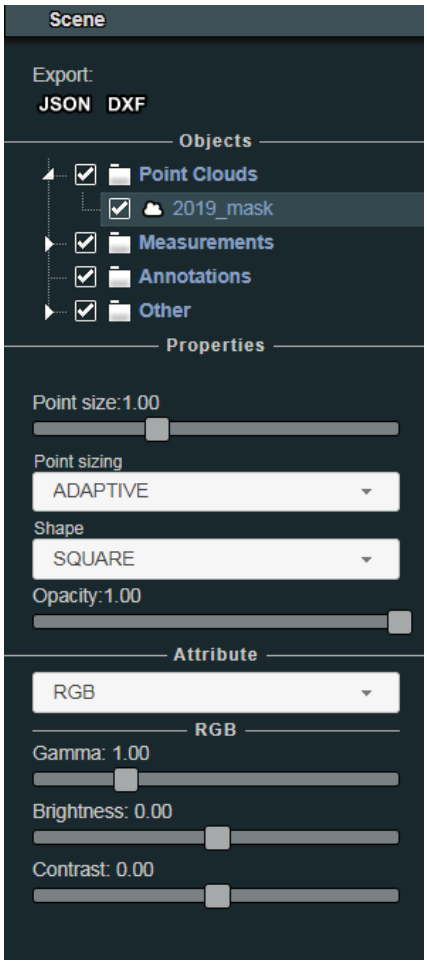
- Point Clouds : a scene can be composed of one or multiple point clouds
- Measures : If you have been taking measurements, they will appear here. By selecting them, you can see the details, export or delete them. This is also the place where you can display 2D profiles…
- Annotations : annotation management is made here. Annotations are created directly in the HTML code. You can not create annotations directly from the browser, as you would do to create measurements
- • Other: Here you will find the the camera and target positions.

If objects are present within a topics, a triangle will appear and allows you to expand and scroll the list. Selecting an object allows you to see its properties.

Each objects have its own properties (distance, starting point, arrival point, distance, etc …). A surface, profile, or point cloud have different properties.







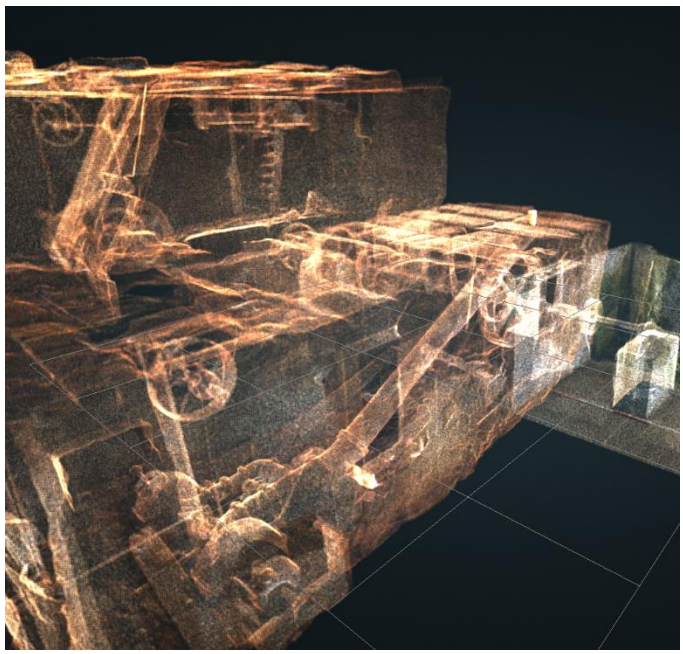
Point Clouds :

Point clouds properties mostly define their visual aspect through various display settings.

- Point size : set the point size
- Point sizing :set how the point size adapt to camera distance
- Shape : set the point shape
- Opacity : set opacity for a point cloud. This option requires « Eye Dome Lighting », EDL to be turned OFF.

Sub section « Attribute » for point clouds let you choose colorisitaion style, as well as the rgular parameters for RGB images, gamma, brightness and contrast.

RGB opacity = 1



RGB opacity = 0.1

Attibute section contains colorization style

- RGB : True colors (photogrammetry, LIDAR and some laserscans usually contains RGB)
- RGB & Elevation : Blend between RGB and color ramp
- Color : One color only

- Elevation : Color ramp by elevation
- Intensity : Color ramp by intensity (grayscale) (Laserscan & LiDAR)
- Intensity Gradient : Intensity color ramp
- Classification : If cloud is classified (usually true for LIDAR data)
- Return number : number of signal returns (usually only LIDAR data)
- Source : Source
- Index : index
- Level of details : level of details
- Composite : You can blend all of the above

Depending on the data you are viewing, some modes may not have the desired effect. If the RGB mode for example does not present colors, it is because the potree files do not contain this information. A laserscan performed without photographic capture for example will not contain RGB data.

Depending on the options used when converting the point cloud into Potree format (PotreeConverter) some properties may be available or not. It is possible to have data from laserscan in E57 or LAS format that initially contained the intensity + RGB, but no longer contain those values once converted to Potree format. In this case, i twill be necessary to regenerate the potree data using the PotreeConverter with the appropriate options.

Measurement :

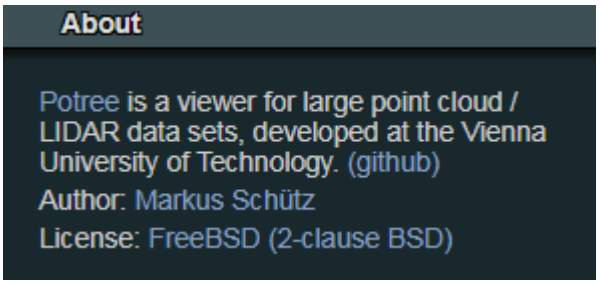
In this section you can enable / disable the display of measurements previously taken. View the measurements details, delete each measurement individually, or export them all as DXF or JSON.

Annotations:

In this section you can enable / disable annotations.

Annotations are created directly in the HTML code. You can not create temporary annotations directly from the browser, as you would create measurements.

About:



About list authors and sponsors of the project.

A warm thank you to all of them !