



# **Undet for SketchUp**

## User Manual

## Undet for SketchUp User Manual

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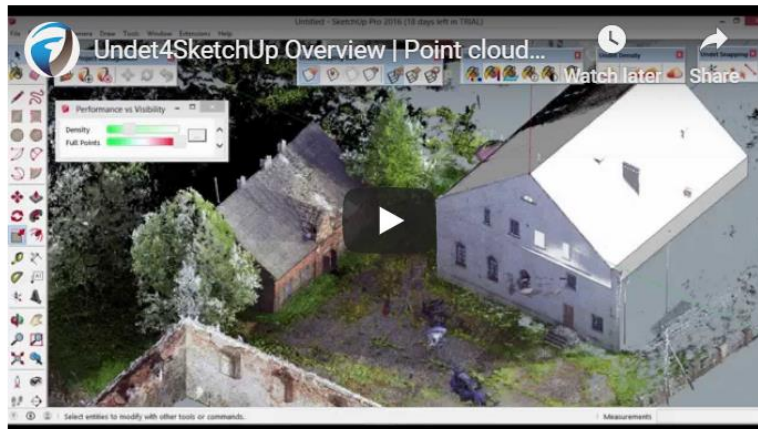


## Overview

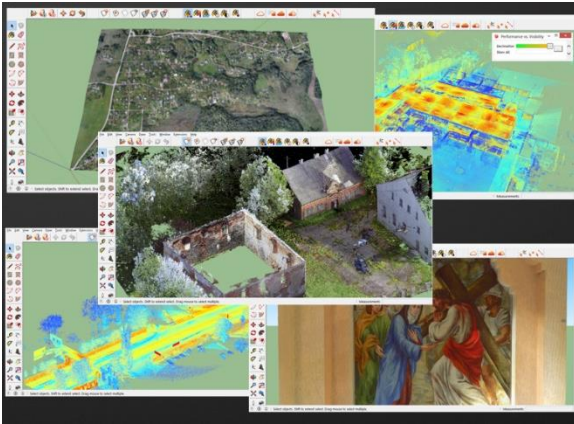
Undet for SketchUp is a plug-in that allows you to use point clouds of any size directly in SketchUp.

**Watch software overview video on YouTube:**

### Undet for SketchUp video overview



## Main Undet for SketchUp functionality:



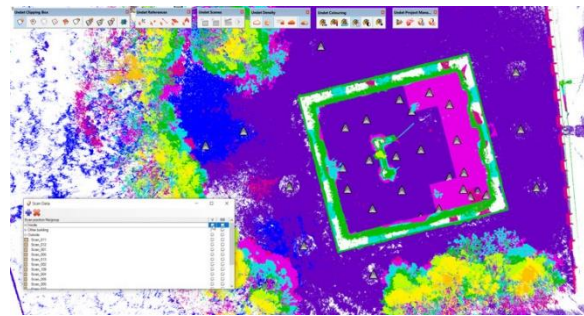
### High performance with large point clouds

Create point cloud projects with Undet Indexer from a wide range of scanners: airborne, mobile mapping, terrestrial or any other 3D sensors.

### Limitless project size

## Comprehensive point cloud data management

Combine individual scan stations into groups: for each floor/level, outside or separate scans. Control visibility of created groups or individual scans stations/files.



## Interactive coloring management

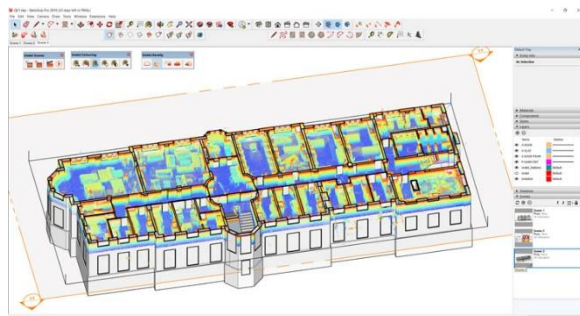
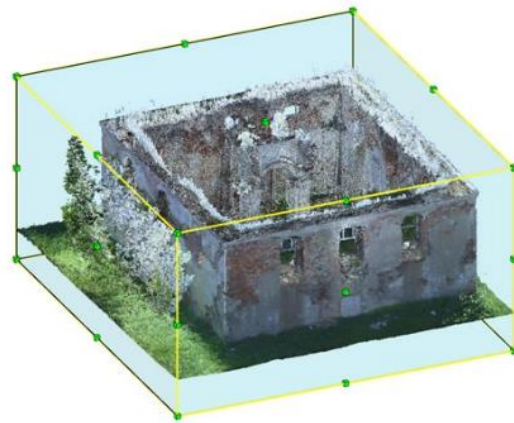
Use the different color settings to get the clearest possible view:

- RGB | Intensity | By plane or height |
- Adjust transparency
- Change point cloud point size

## Interactive visibility management

Use the clipping box to navigate between point clouds. The clipping box can be moved to any area of a point cloud to see a more detailed view by using the arrows attached to the sides of the clipping box.

Create new clipping box: By Line, By Rectangle.



## Enrich SketchUp scenes with point clouds

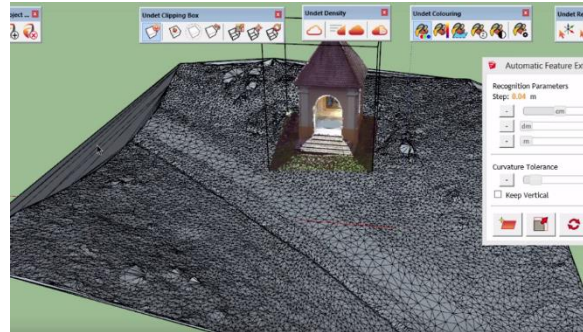
Add point clouds to SketchUp Scenes:

- Point clouds clipping box
- Coloring settings
- Density settings

All options can be saved for each scene regardless of the different point cloud settings

## Automatic features extraction

- Extract ground terrain points from unclassified point clouds and create surface mesh.
- Corner lines
- Planes





## Installation and Activation

**Undet for SketchUp** is a plug-in for SketchUp® software that can be installed only on Windows PC's with SketchUp® installed.

Supported SketchUp Versions: 2017, 2018, 2019.

## System requirements

**Operating System:** Windows OS 64 bit. **MAC is not supported.**

**Supported SketchUp versions:** SketchUp 2017 – 2019.

**Technical requirements:** [Minimal technical requirements](#) are the same as for SketchUp, but since Undet is dealing with point clouds, which is often heavy and data rich (millions of points having XYZ coordinates, Intensity and RGB values) some specs are worth upgrading.

**RAM:** The bigger the point cloud project the more RAM will be needed. Most users working with small scale point clouds will be fine with 8 GB of RAM. When dealing with tens of gigabytes of scan data 16 GB of RAM will be welcomed. Heavy duty point cloud professionals utilizing hundreds of gigabytes in a single project will appreciate 32 GB of RAM or more.

**Hard Drive:** An SSD is far faster than a HDD. If your project is located on a drive in a server machine, LAN will reduce performance considerably. Thus, copy your project to the local drive for better performance.

**CPU:** Multiple threads are not supported, therefore, you need to pay attention to single thread performance.

**GPU:** While your CPU can render graphics, it'll do so at a much slower rate than a GPU. Thus, we recommend using graphical processors like NVidia or AMD. There is no need to go for the fanciest series. A moderate gaming card should suffice.



## Software installation

First, you need to download and install **Undet indexer** (Undet project creator), if you don't have any point cloud data to create an Undet project, below you will find several already created Undet demo projects. To open the Undet project in SketchUp please install and download the Undet plug-in (**Undet for SketchUp**).

1. Download Indexer (project creator): [Undet Indexer.exe](#)
2. Download Undet for SketchUp: [Undet for SketchUp.exe](#)

### Additional useful information:

Video tutorial: How to create an Undet project [Youtube Video link](#)

Tutorial on how to create an Undet project: [Undet indexer User Manual](#)

Undet for SketchUp help: [Undet for SketchUp User Manual](#)

How to start video tutorial: [Undet for SketchUp Overview](#)

3D modeling tutorial video: [How to Model from Point Clouds in SketchUp?](#)

Undet demo project (point cloud): [Small Chapel DEMO 463 Mb](#)

Undet demo project (point cloud): [Wooden Church \(Internal & external\) DEMO 1.2 GB](#)

Undet demo project (point cloud): [UAV City Area DEMO 385 Mb](#)

Undet demo project (point cloud): [Simply Building including 1st floor DEMO 1.3 GB](#)

Undet demo project (point cloud): [Railway Bridge DEMO 660 Mb](#)

### Notes:

*Some antivirus software may disturb the installation process. If installation was blocked by your antivirus software, we recommend that you temporarily disable your antivirus software during the Undet for SketchUp installation process.*

*Undet requires the latest Microsoft Framework, which is a heavy update that might take some time to install. But if your PC is up to date it should take just a couple minutes.*





## License activation procedure

After installing **Undet for SketchUp**, you will, by default, begin a **2 day** free trial.

### Undet for SketchUp license option:

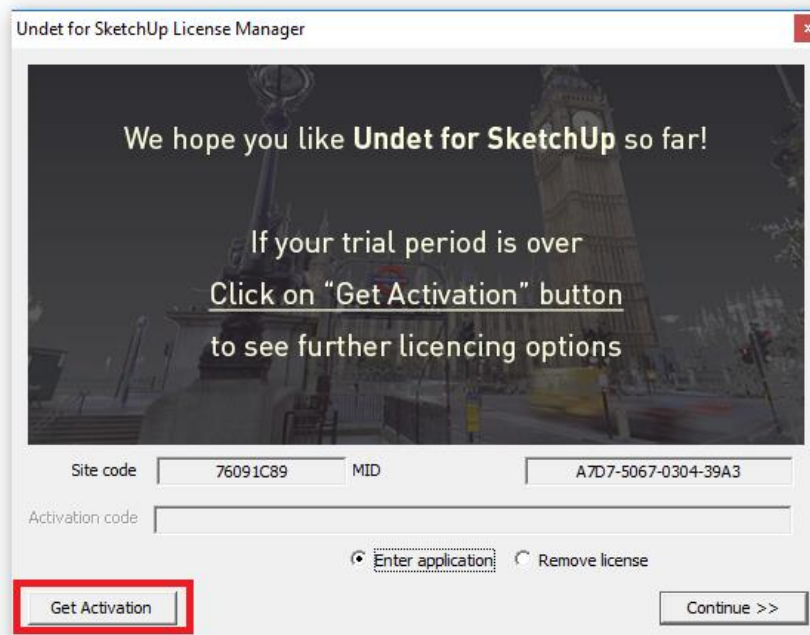
Node-locked license (1 – month license)

USB Dongle license (Annual and perpetual licenses)

Network (floating) license (Annual and perpetual licenses)

Undet license can be bought from our website, by clicking “Get Activation” in the Undet for SketchUp License Manager

<http://www.undet.com/purchase-undet-for-sketchup/> - (link to order Undet license).





## Node-locked license

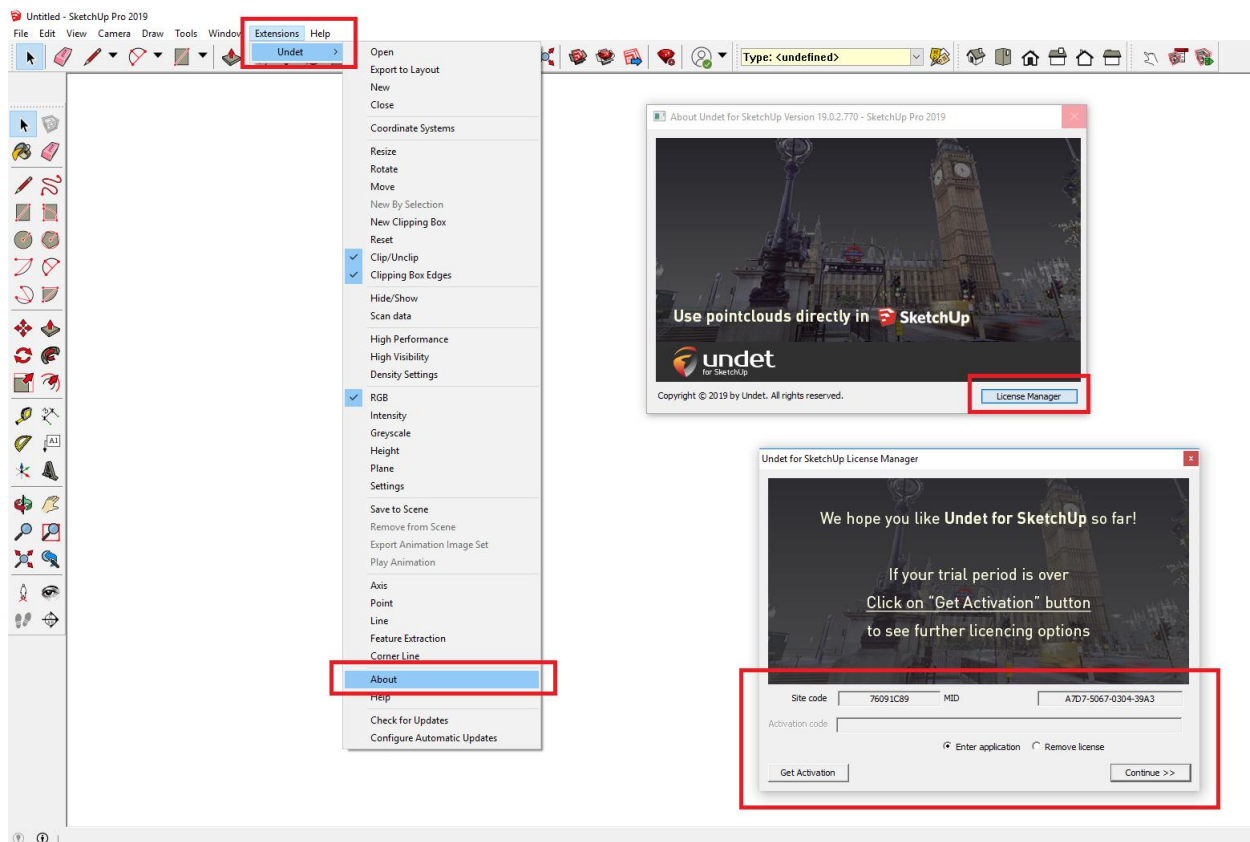
Node-locked licenses are unique for each computer and are tied to the system hardware. If you are to replace major system components you may not be able to activate software on the renewed system with the same codes\*

The Undet software Node-locked license type requires your system digital codes to be activated.

- Site code:

- MID:

Undet license manager can be opened in Extensions -> Undet menu by clicking “About”



\* In this case, please contact our support team at [info@undet.com](mailto:info@undet.com)



### Dongle license (Annual and perpetual licenses)

A USB Dongle has a hardware-based protection lock. The dongle contains license details for a particular version of the Undet for SketchUp application. The dongle can be moved and used on different computers which have Undet for SketchUp software installed.

The dongle license can be bought and integrated with **annual and perpetual** Undet for SketchUp licenses.

### Network (floating) license (Annual and perpetual licenses)


A floating licensing is a software licensing approach in which a limited number of licenses for a software application are shared among a larger number of users over time. The license server can manage licenses over a local area network **with a network dongle license**.

An Undet for SketchUp license **can't be borrowed** from a server for offline use.

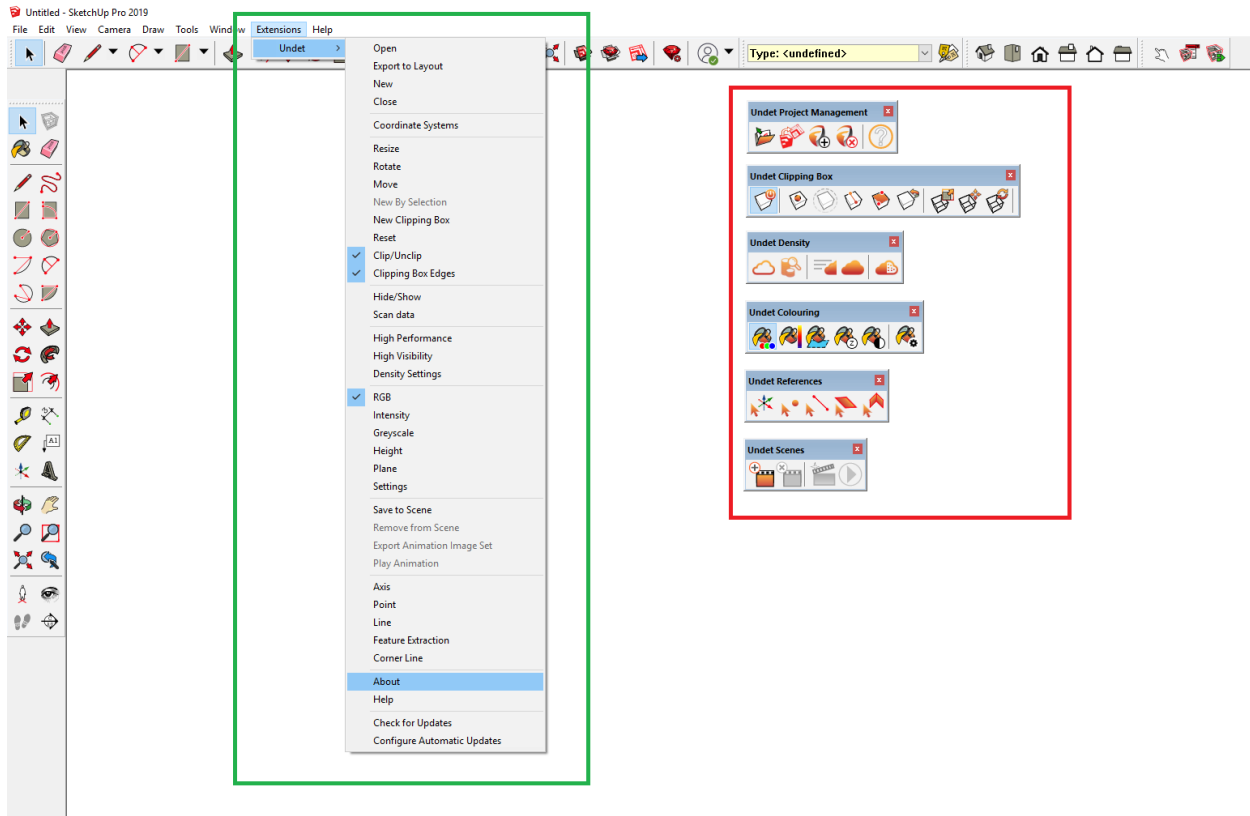
The network dongle license can be bought separately and integrated with **annual and perpetual** Undet for SketchUp licenses.

## Graphical user interface and control

Undet tools and functions are placed in the toolbars and in the additional Undet extension menu.

 - Extensions -> Undet menu

 - Undet toolbars



## Undet project creator (Undet Indexer)

First to import a point cloud into SketchUp you need to create an Undet project with **Undet Indexer**.

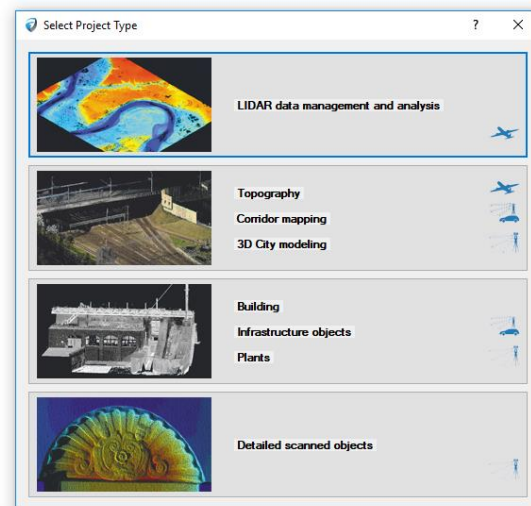
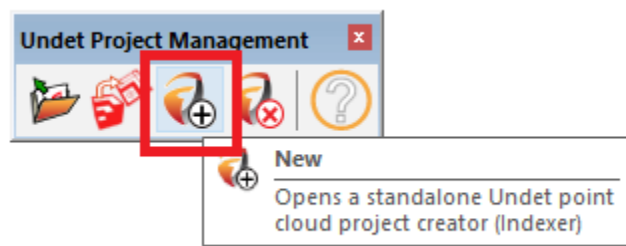
Undet Indexer is standalone software to create an **Undet project file** from a wide range of scanners or scan data files. An Undet project database is created to handle massive point clouds and allow efficient management.

Supported formats \*.E57, \*.FLS, \*.RCP, \*.PTX, \*.ZFS, \*.LAS, \*.LAZ, \*.PTS, \*.DP, \*.FPR, \*.LSPROJ, \*.FWS, \*.CL3, \*.CLR, \*.RSP, ASCII / NEZ (X,Y,Z/i/RGB).

Link to download Undet Indexer >>>> [Download](#) <<<<

Link to Undet Indexer (project creator) User Manual >>>> [Read PDF](#) <<<<

To open Undet Indexer in Undet Project Management toolbar click



The indexer window will appear before importing scan data, first you must select the project type based on your scan data set:

- **LiDAR data management and analysis** *(The most common choice for large airborne LiDAR projects)*
- **Topography, corridor mapping, 3D city modeling** *(The most common choice for infrastructure projects)*
- **Buildings, Infrastructure objects, plants** *(The most common choice for terrestrial scanners)*
- **Detailed scanned objects** *(The most common choice for small detailed objects such as monuments, parts of buildings or areas with a footprint up to 100m2)*

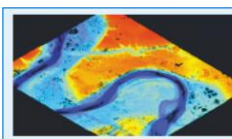
The Undet database has a double-file structure - **Preview points** and **Full points**. Selecting the right project type speeds up the indexing process, without losing full point cloud points and affects only **the preview view**. **Preview points** are created from all imported scan data by using GRID, its size depends on the

selected project type. The default GRID size for each project is chosen for optimal indexing speed and faster preview navigation to **find a place to load all points using the "clipping box"**.

Undet loads all points in the "clipping box" when the point count is less than the maximum point count. The maximum point count can be set manually in the Undet Density toolbar according to your system hardware parameters. If your clipping box is too big to load all points you will only see the preview points.

#### Default "max point count" settings:

<i>Undet for SketchUp</i>	Interval from <b>8 – 24 million points</b> [can be tuned with performance slider]
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LiDAR data management and analysis



**LiDAR data management and analysis** (*The most common choice for large airborne LiDAR projects*)

Preview points grid – 100 x 100 cm



Topography  
Corridor mapping  
3D City modeling



**Topography, corridor mapping, 3D city modeling** (*The most common choice for infrastructure projects*)

Preview points grid – 30 x 30 cm



Building  
Infrastructure objects  
Plants



**Buildings, Infrastructure objects, plants** (*The most common choice for terrestrial scanners*)

Preview points grid – 3 x 3 cm



Detailed scanned objects



**Detailed scanned objects** (*The most common choice for small detailed objects such as monuments, parts of buildings or areas with a footprint up to 100m2*)

Preview points grid – 1 x 1 cm

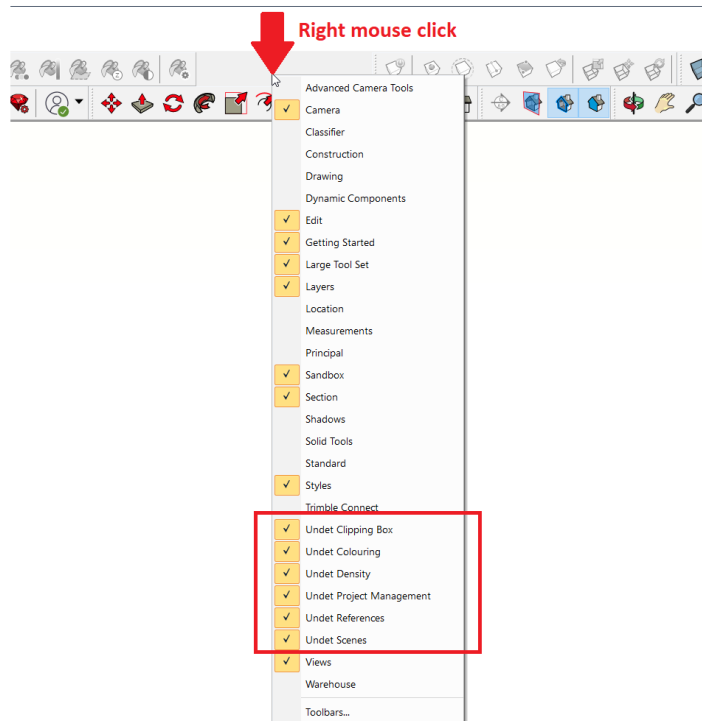
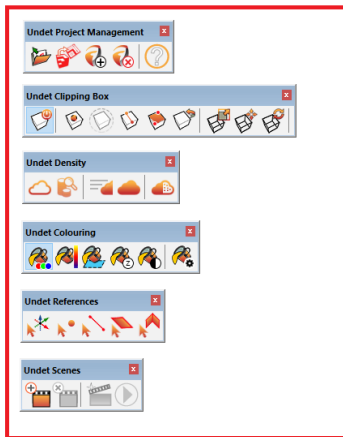
Note regarding Undet project creation:

Selecting the right project type speeds up the indexing process, without losing full point cloud points and affects only the preview view.

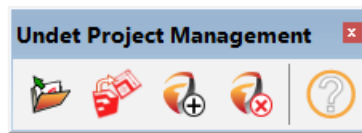
Link to Undet Indexer (project creator) User Manual [>>>> Read PDF <<<<](#)

## Undet for SketchUp toolbars interface

The main Undet tools are placed in the toolbars, which can be enabled / disabled with a right mouse click in the toolbar space.



## Undet Project Management toolbar



- **Open** Undet point cloud project
- **Exporting** point cloud image to SketchUp Layout file
- **Opens** Undet project creator (Undet Indexer)
- **Close** active Undet point cloud project
- Open Undet for SketchUp User Manual

## Undet Clipping Box toolbar

Use the **Clipping Box** to navigate between point clouds. Undet loads all points in the **Clipping Box** when the point count is less than the maximum point count. The maximum point count can be set manually in the Undet Density toolbar according to your system hardware parameters. If your clipping box is too big to load all points you will only see the preview points.



- **Enabled / disabled** Undet Clipping Box
- Creates **new Clipping Box** by defining a **center point**
- Creates **new Clipping Box** around **selected SketchUp objects**
- Creates **new Clipping Box** by defining a **line** and its thickness
- Creates **new Clipping Box** by defining a **rectangle**
- **Resets Clipping Box** to the full project extents
- Tools to **resize** active **Clipping Box** using **grips**
- Tools to **move** active **Clipping Box** using **grips**



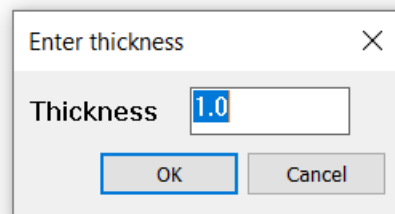


- Tools to **rotate** active **Clipping Box** using grips

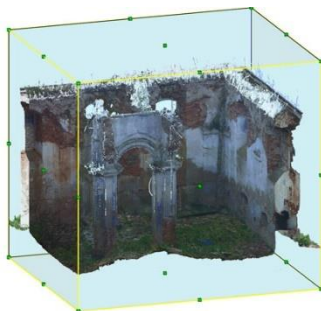
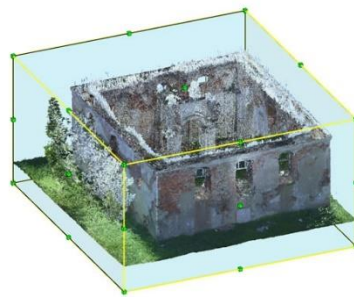
When choosing **Clip by Line**, you will need to enter the line thickness.



Tip: hold "*Shift*" for orthogonal mode when defining a line for the Clipping Box.



The **clipping box** can be moved to any area of a point cloud to see a more detailed view by using the arrows attached to the sides of the **clipping box**.



## Examples with different project GRID (enabled / disabled clipping box)

### LiDAR data management and analysis (UAV data)

Preview points

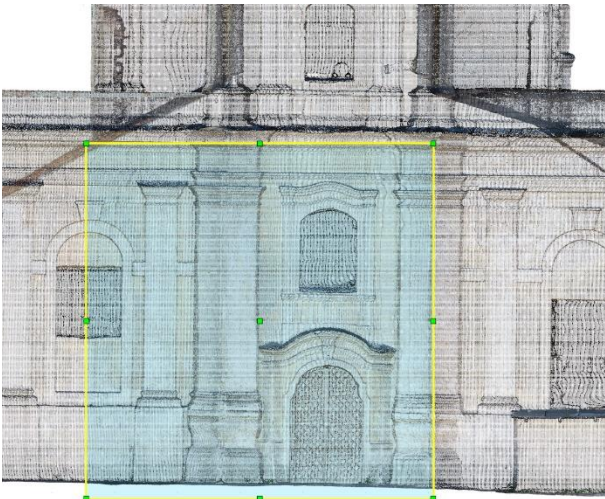


All points loaded with clipping box (view section)



### Buildings, Infrastructure objects, plants

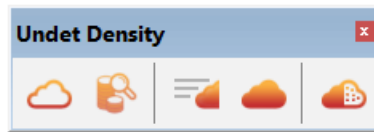
Preview points








All points loaded with clipping box (view section)



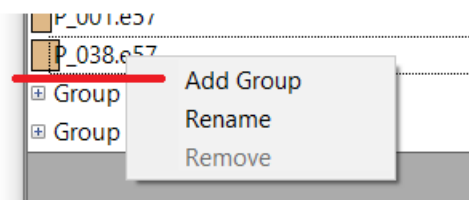
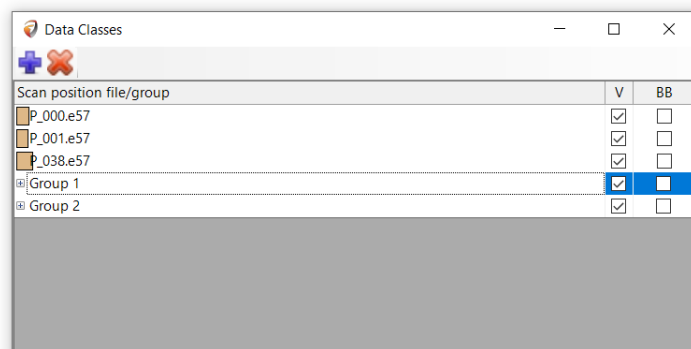
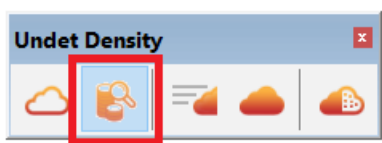
## Undet Density toolbar



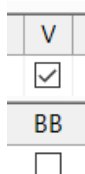
-  - Hide / show point cloud
-  - Opens **scan data management settings**
-  - **Optimizes** point cloud density settings **for higher performance**
-  - **Optimizes** point cloud density settings **for higher visibility**
-  - Opens **manual point cloud density settings**

## Scan data management settings

In the Scan data management settings, a user can manage visibility and group scan data files into chunks.  
*Note: Use „Ctrl” and „Shift” for multiple selections from the scan list in order to group Data.*



- **Add group** of selected point cloud data file
- **Rename** selected file
- **Remove** selected point cloud data file from created group



- **Check / uncheck to show / hide points** from selected scan data file
- **Enable / disable** selected scan **station position center** symbol



*Optimized higher performance / higher-visibility settings*

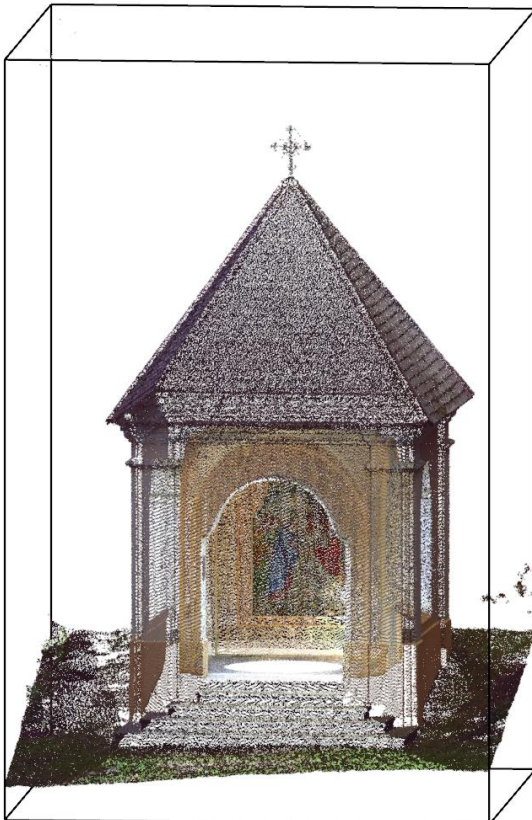
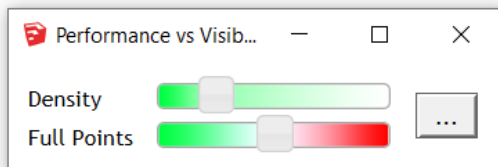
These commands **are preserved with pre-set settings for faster control** and can be edited manually in the point cloud density settings:

*Example:*

Point cloud density settings after clicking:



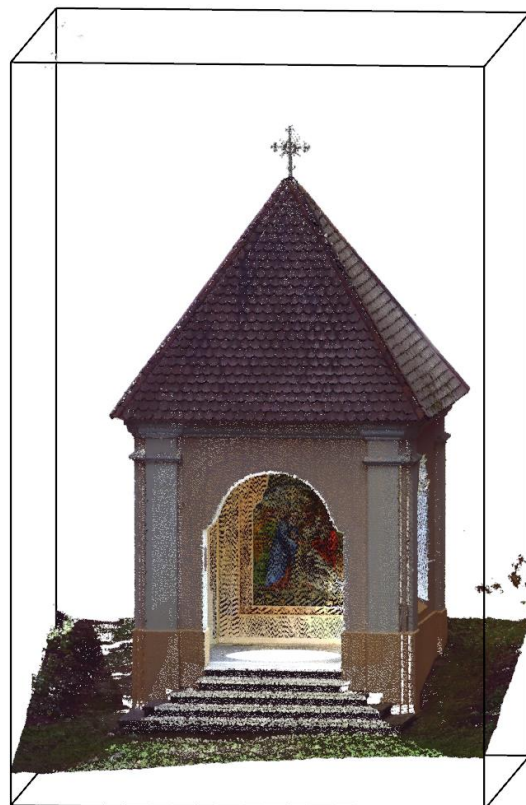
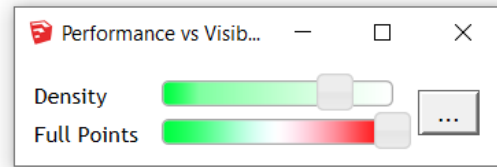
**Optimizes point cloud density settings for higher performance**



Point cloud density settings after clicking:

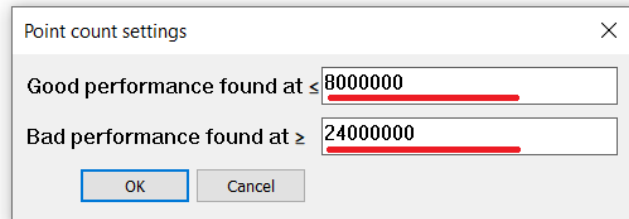
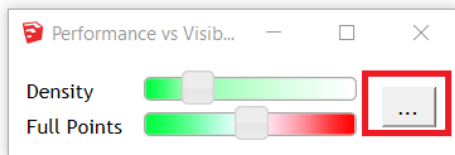


**Optimizes point cloud density settings for higher visibility**



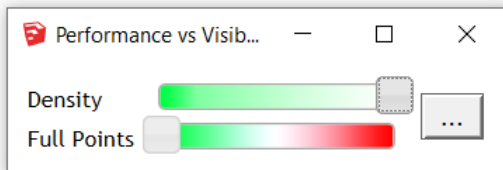
## Manual control of point cloud density

Undet loads **all points** in the **Clipping Box** when the point count inside the clipping box is less than the maximum point count. The maximum point count can be set manually in the Undet Density toolbar according to your system hardware parameters. If your clipping box is too big to load all points you will only see the preview points. Once the Clipping box is smaller Undet switches to **All points** automatically.

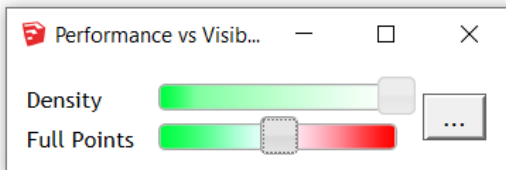


**Density slider:** controls the density of **preview points**.

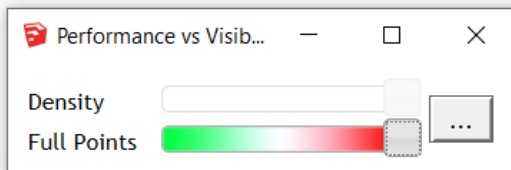
**Full Points slider:** controls the maximum point count in the Clipping Box.



- Placing the full points slider on the **left side**, means you **are not be able to see All points**, you **will only see Preview points** regardless of the Clipping Box size and project total point count (maximum default preview point count 8, Good performance)



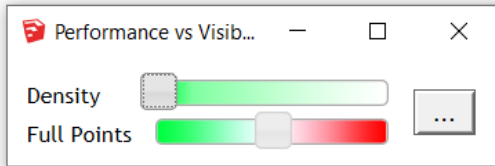
-Placing the full points slider in the **middle**, means that Undet will **load all points** if the active **Clipping Box** area is **less than 50% of maximum point count** (by default 12 million points)



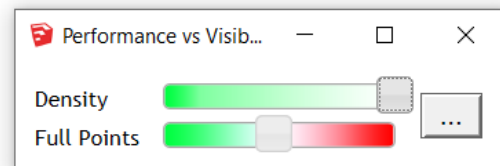
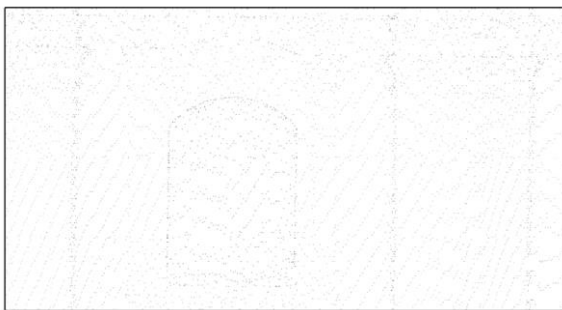
- Placing the full points slider on the **right side**, means that Undet will **load all points** if the active **Clipping Box** area is **less than 100% of maximum point count** (by default 24 million points)

**Density bar (slider)** Controls the density of **preview points**. To increase/decrease preview points (GRID), possible only in Project creation step.

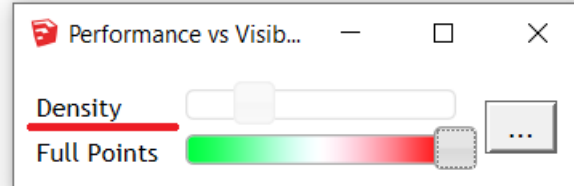
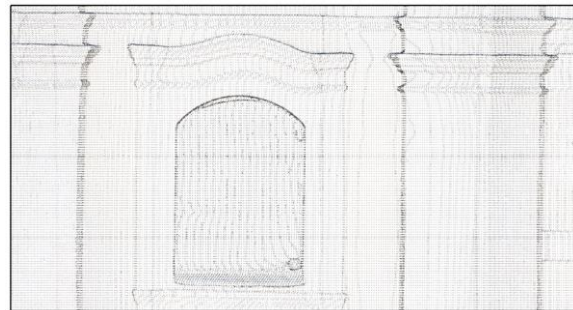
*Example: with different DENSITY slider settings*



Preview points density



Preview points density









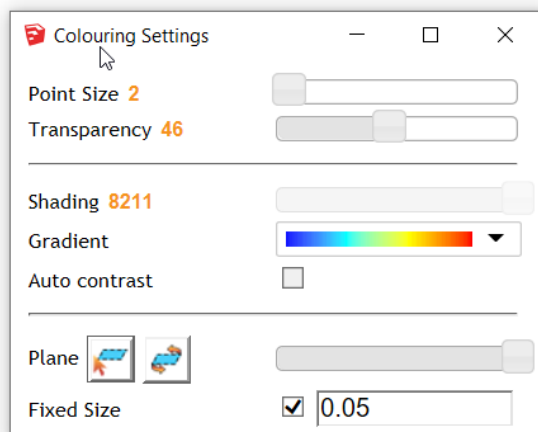
Loaded **All points**. When density bar becomes **inactive**, this means you see All points from the original data in the active Clipping Box area. No missing points!



## Undet Coloring toolbar



-  - Colors point cloud by RGB (true colors)
-  - Colors point cloud by Intensity
-  - Colors point cloud by plane. Define plane in Settings.
-  - Colors point cloud by Height (Z value)
-  - Colors point cloud in Black/white
-  - Opens Coloring Settings



**Point Cloud point size:** 1 – 25 pixels

**Transparency settings** 0 – 100 %

**Shading:** intervals depend on gradient pallet

**Color Palette (Gradient):** various color band

**Auto Contrast** adjusts Point Cloud contrast

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**Plane:** Setting to define Plane coloring

**Plane depth slider:** Move from left to right increases depth by plane.



- **Select** for reference plane

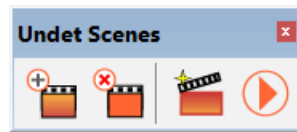


- **Flips** reference plane

**Set fixed size interval to** Color point cloud by plane mode according to chosen gradient.



## Undet Scenes toolbar



- **Saves** point cloud **Clipping Box settings** (Coloring settings, Density settings, View section box geometry, Data classes and Visibility) active SketchUp SCENE.



- Removes point cloud **Clipping Box settings** from active selected SketchUp SCENE.

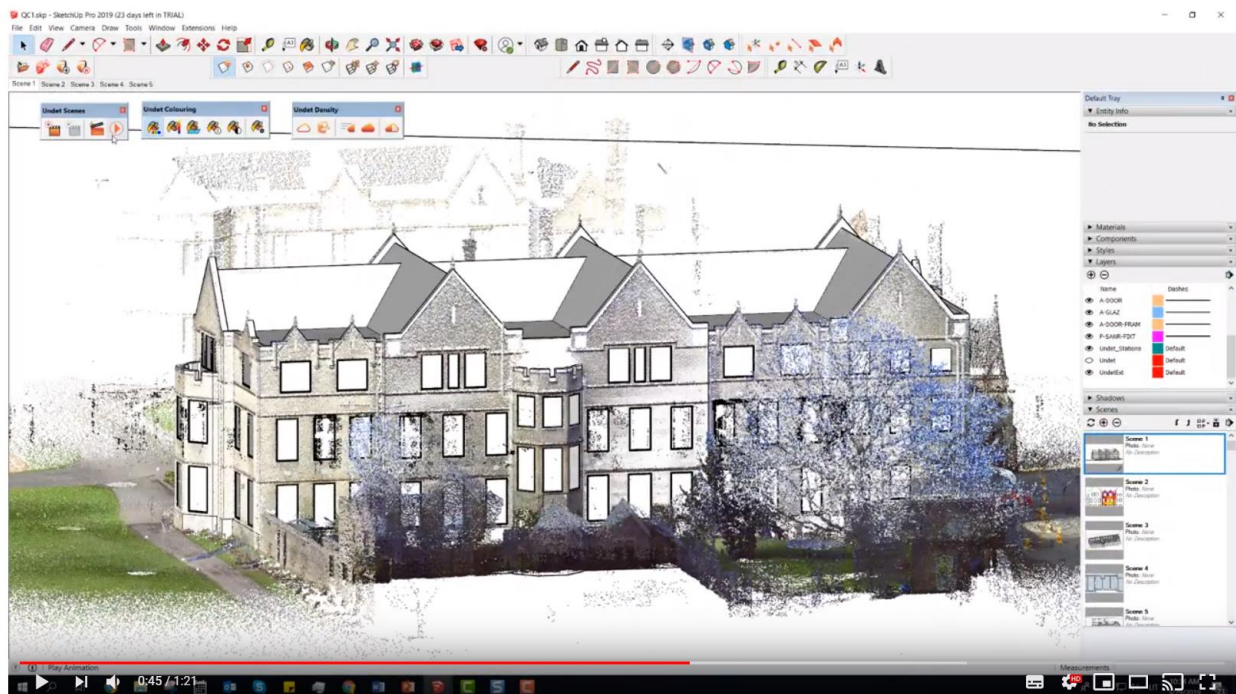


- **Exporting SketchUp Scenes animation** to image set by choosing Resolution, Frames Rate and Antialiasing;

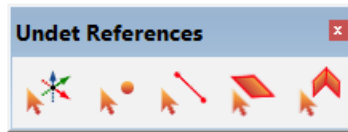


- **Plays animation of your created SketchUp SCENES** with different saved point cloud Clipping Box settings.

[Watch a video that shows more about Undet Scenes](#)



## Undet References toolbar



- **Creates** point type object snapping to point cloud and allows you to set axes start point



- **Creates** point type object snapping to point cloud



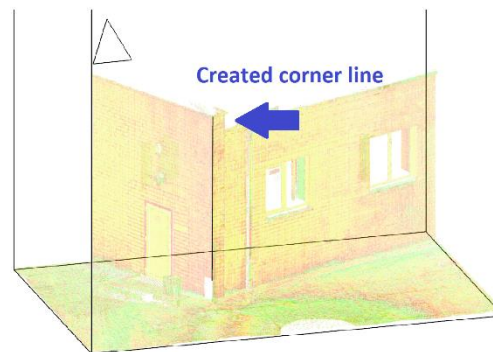
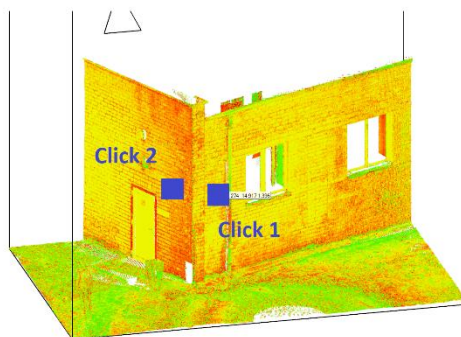
- **Draw** new line by snapping to point cloud

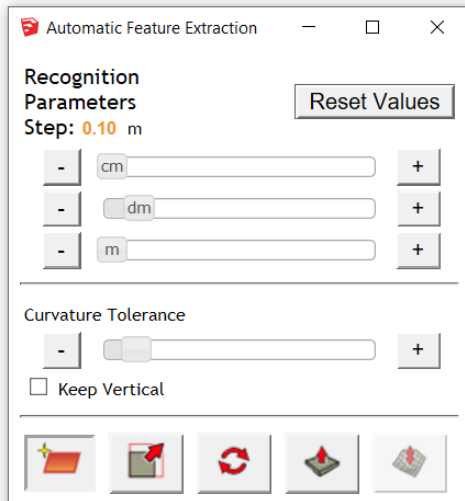


- **Opens** automatic feature extraction settings



- **Extracts** a corner line between point cloud planes, by selecting click1 and click2





Step size value should be **3-5x bigger** than point cloud density (distance between neighboring points).

A **Bigger step** means, a bigger distance between point cloud points for plane extraction. By selecting a bigger value, you will be able to **extract large planes** (for example: walls, columns, roof plane windows frames)

A **Smaller step** means, a smaller distance between point cloud points for plane extraction. By selecting a small value, you will be able to **extract smaller planes** (for example: windows frames, door frames)

Reset Values

- Resets step size to default

**Curvature Tolerance.** If the surface is bumpy or curvy by increasing tolerance you will be able to create a detailed mesh and capture small bumps and curves.

Keep Vertical means that the **extracted plane will stay in the vertical position.**



- Select **initial point location** to extract plane



- Extracted plane **scale** function



- Extracted plane **rotate** function



- Extracted plane **press&pull** function

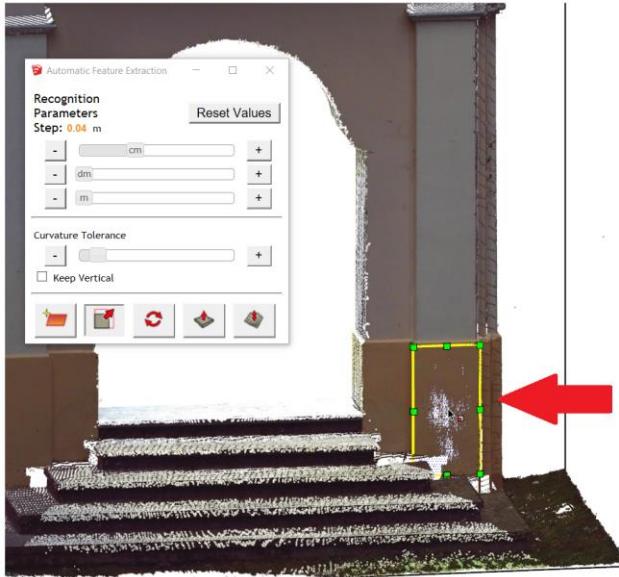


- Finds and creates surface mesh according to extracted plane

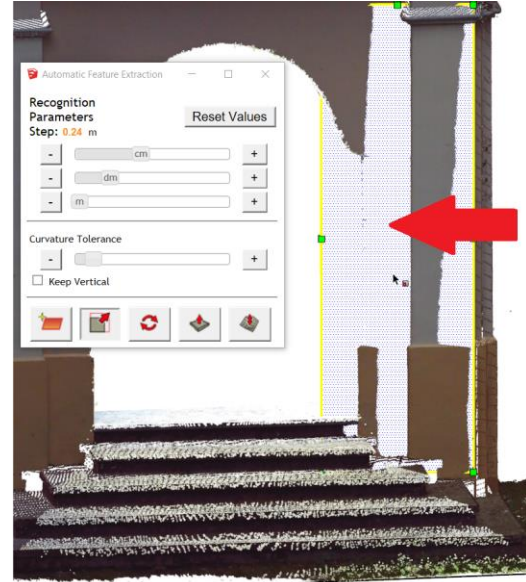
[Watch a video that shows more on automated extraction and meshing](#)

Example: Plane Recognition settings

Well recognized plane (Step size 0.04 m)



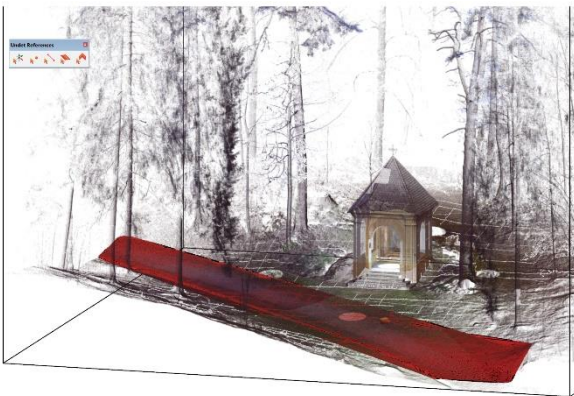
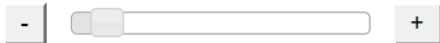
Badly recognized plane (Step size 0.24 m)



Example: Surface creation with small step size

(Step size 0.34 m)

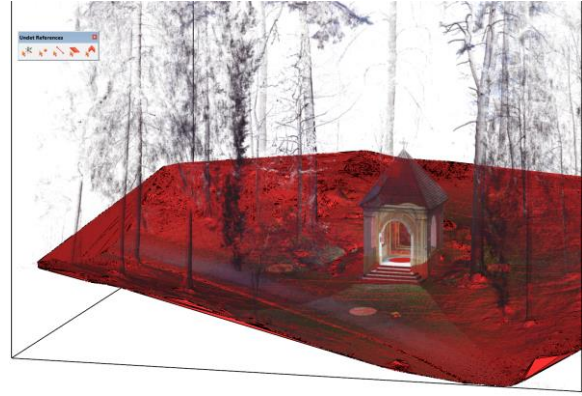
Curvature Tolerance



Detailed ground mesh created until first bigger bump

(Step size 0.34 m)

Curvature Tolerance



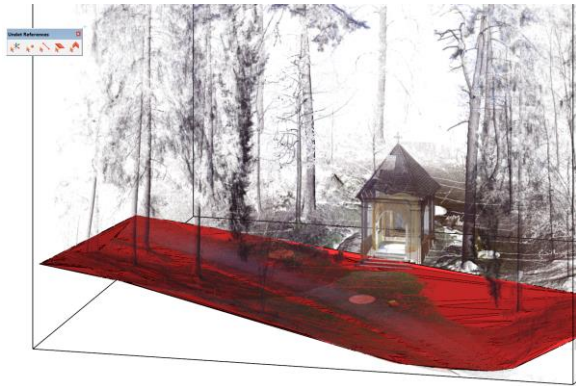
Detailed ground mesh created in all areas



*Example: Surface creation with bigger step size. A Bigger step means a more decimated mesh without small bumps and curves.*

(Step size 1.34 m)

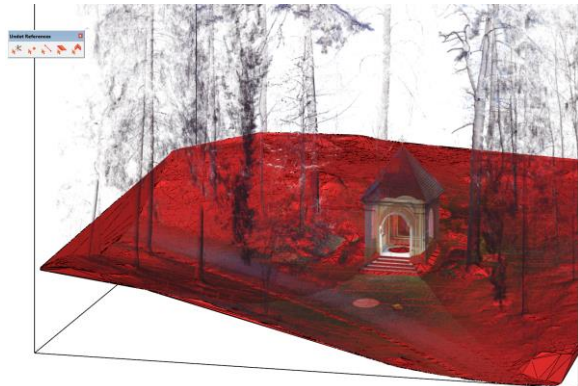
Curvature Tolerance



Detailed ground mesh created until first bigger bump

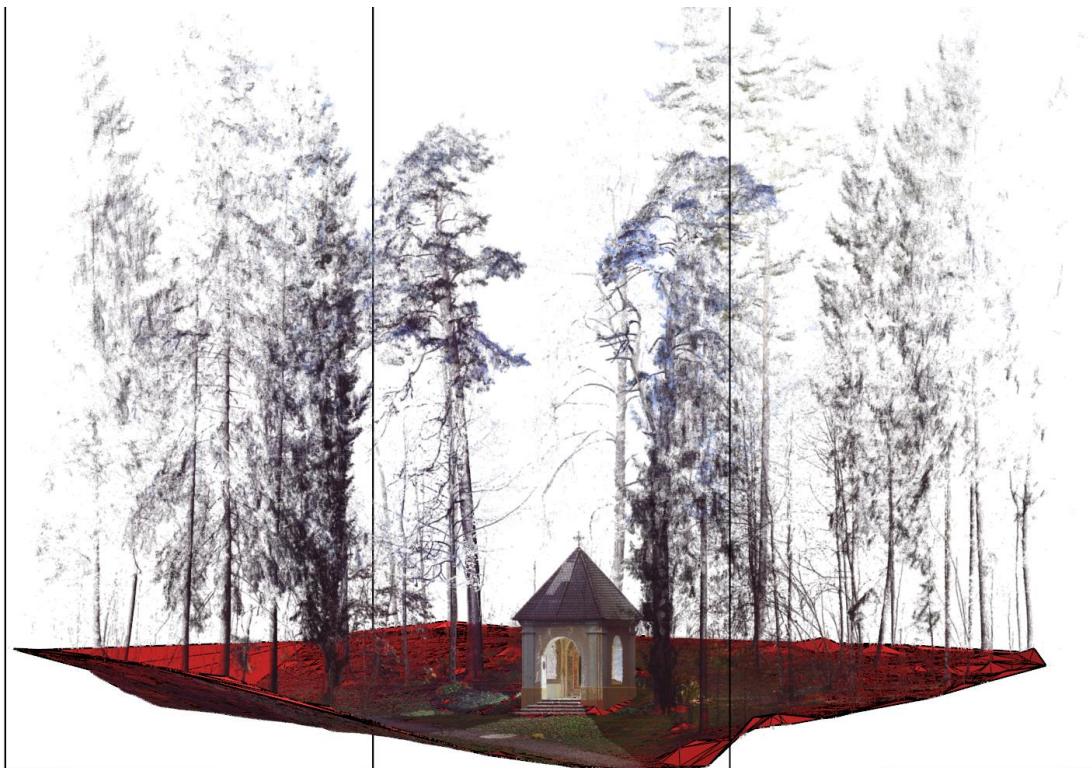
(Step size 1.34 m)

Curvature Tolerance



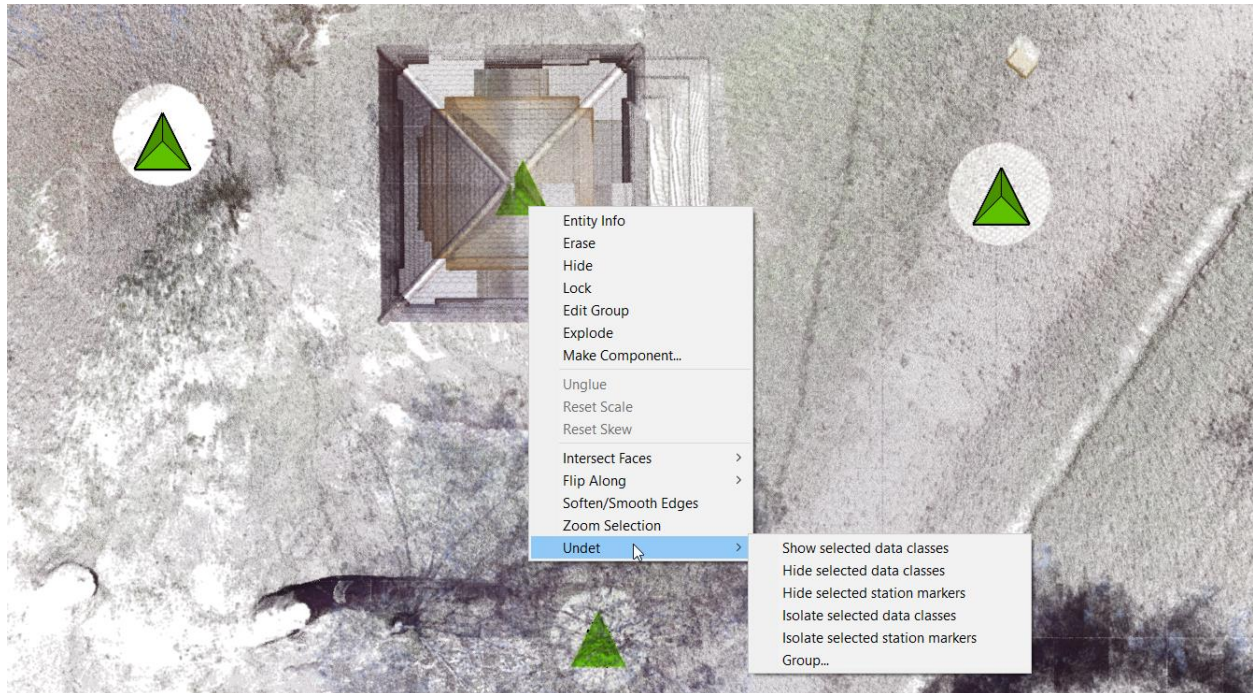
Detailed ground mesh created in all areas

A ground surface mesh can be created from an unclassified point cloud



## Menu on Right Mouse Click

By clicking the right mouse button on a selected scan station marker (green triangles in picture below), you will see an additional Undet menu.



**Show selected data classes** – Shows selected scan station point cloud data

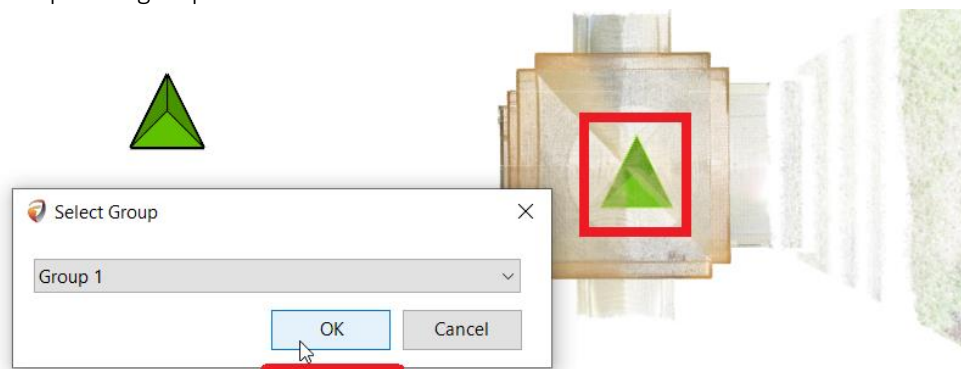
**Hide selected data classes** – Hides selected scan station point cloud data

**Hide selected station markers** – Hides selected scan station markers

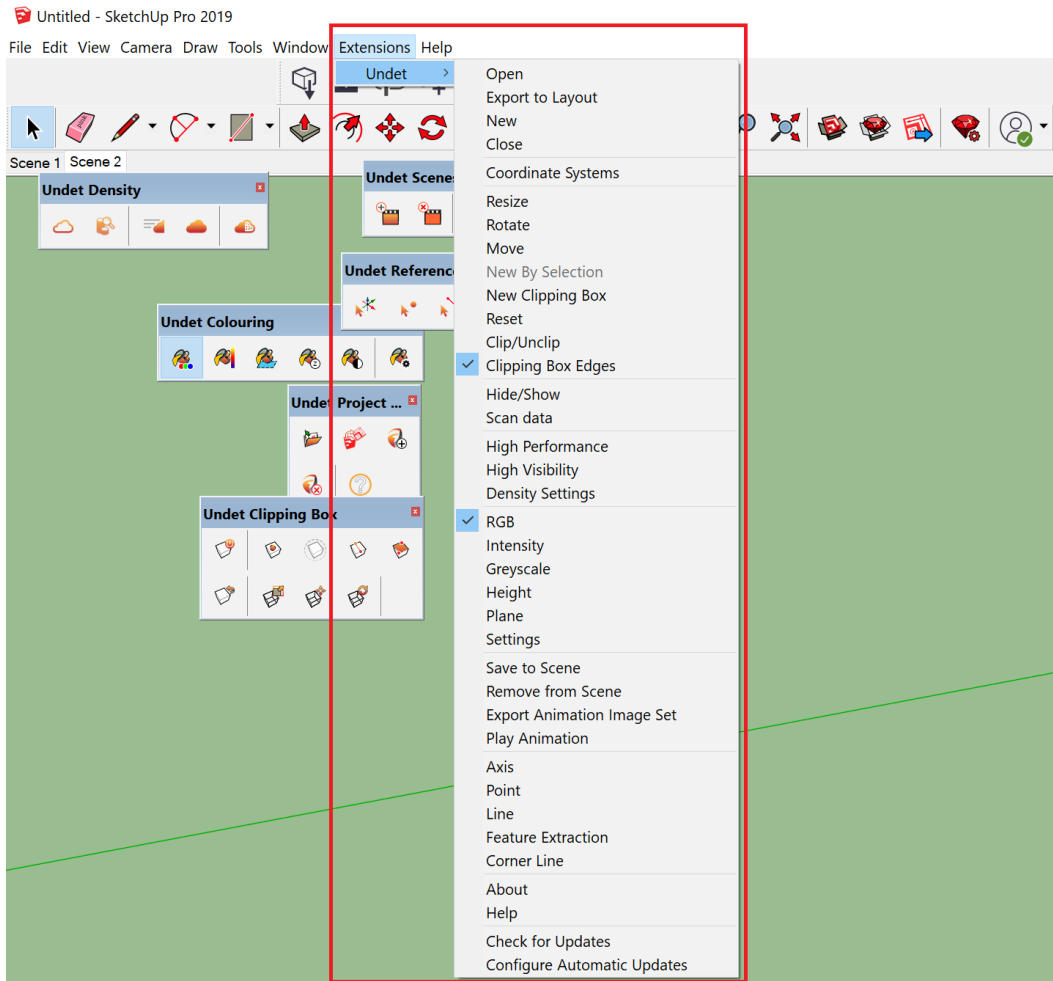
**Isolate selected data classes** – Isolates selected scan stations point cloud data

**Isolate selected station markers** – Isolates selected scan station markers

**Group ...** - Group or Ungroup selected scan station



## Undet Extensions menu



**Open** – Opens Undet point cloud project

**Export to Layout** – Exports Point Cloud image to SketchUp Layout file;

**New** – Opens a standalone Undet point cloud project creator (Undet Indexer), if you don't have Undet Indexer you can download it [here](#) ;

**Close** - Close Undet Point Cloud project;

**Coordinate Systems** – Opens Coordinate Systems settings;

**Resize** – Activates clipping box grips for resizing;

**Move** – Activates clipping box grips for moving;

**Rotate** – Activates clipping box grips for rotating;

**New Clipping Box** – Creates new view Section by defining a center point;

**New by Selection** – Creates new view Section around selected SketchUp objects;

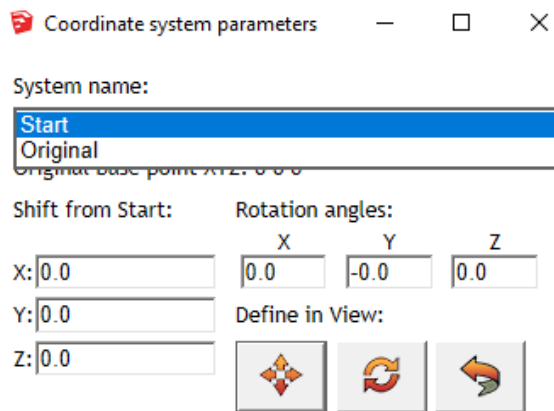




**Reset** – Resets Clipping Box to the full extent of the point cloud;  
**Clip/Unclip** – Activates UNDET view Section;  
**Clipping Box Edges** – Activates / Deactivates clipping box edges;  
**Hide/Show Settings** – Hides or Shows point cloud;  
**Scan Data** – Opens scan data grouping settings;  
**High Performance** – Optimizes density for higher performance;  
**High Visibility** – Trades performance for higher density;  
**Density** – Opens density settings;  
**RGB** – Colors point cloud in Natural colors;  
**Intensity** – Colors point cloud by Intensity;  
**Plane** – Colors point cloud by plane. Define plane in Settings;  
**Height** – Colors point cloud by Height;  
**Greyscale** – Colors point cloud in Greyscale;  
**Settings** – Opens Coloring Settings;  
**Save to Scene** – Saves your Point cloud settings: Coloring settings, Density settings, View section box geometry, Data classes and Visibility to selected scene;  
**Remove from Scene** – Removes all Point cloud settings from selected scene;  
**Export Animation Image Set** – Exports SketchUp Scenes to image set by choosing Resolution, Frames Rate and Antialiasing;  
**Play Animation** - Shows the animation of your created scenes in different Point cloud settings;  
**Axes** – Snaps SketchUp drawing Axes to point cloud point;  
**Point** – Snaps a point cloud point;  
**Line** – Snaps a line between two-point cloud points;  
**Feature Extraction Settings** – Opens Feature Extraction recognition parameters;  
**Corner line** – Extracts a corner line between two-point cloud planes;  
**About** – Information about your license and Undet for SketchUp version;  
**Help** – User guide;  
**Check for updates** – Checks if there are updates available for your software version;  
**Configure Automatic Updates** – Configuration of Automatic updates;

## Coordinate system management

If your Undet project scan data files are in a large / state coordinate system (for an example UAV, Airborne LiDAR), when opening a project in SketchUp a pop-up will request to Shift the project (0,0,0) point. You can find the Undet Coordinate System settings at: **Extensions -> Undet -> Coordinate Systems**.



**System name:** Here you can choose different coordinate systems. You can change your project coordinate system at any time.

**Shift from start and rotation angles:** You can manually insert these values to shift and rotate your project.



- Manually move point cloud



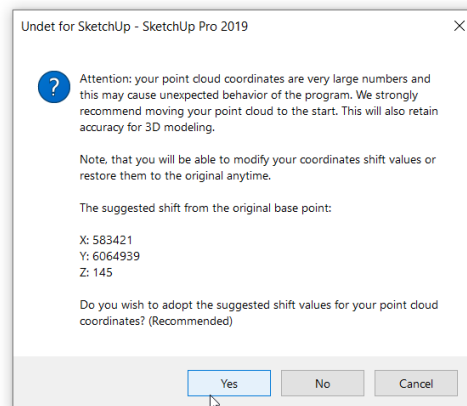
- Manually rotate point cloud



- Restore original coordinates values

*Note: If you close an Undet project, the manually inserted coordinate transformation values will be lost. Please save them manually in a text file or take a screenshot of your transformation parameters.*

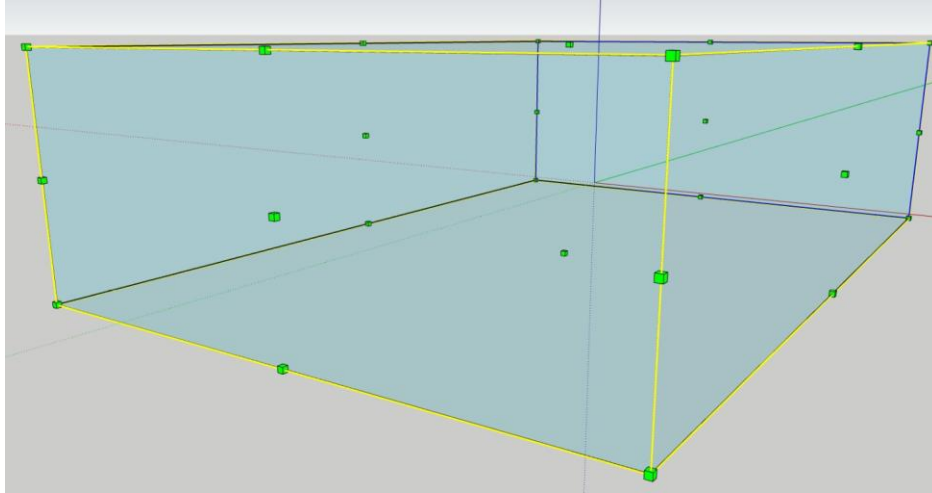
For example: if you try to open an Undet project in a large coordinate system, Undet will suggest shifting the point cloud data to coordinates (0,0,0). You will be able at any time to change the coordinate system from (0,0,0) to the original with large numbers.



We do not recommend to create deliverables using the point cloud in a large coordinate system. It may cause errors in the modeling tools and start screen view glitching while zooming.

## FAQ

### 1. When I open an Undet project my clipping box is empty? Why?



An empty clipping box means problems with Nvidia Quadro and some Radeon video drivers or in rare cases conflict situations with other plug-ins.

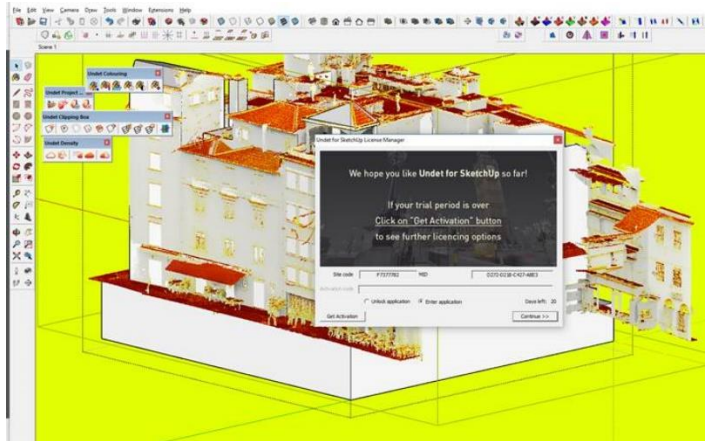
**Please try these options:**

1. To work with Undet for SketchUp, please run Undet software from our ICON „Undet for SketchUp 2019“, our shortcut will activate drivers for Quadro / Radeon video cards.
2. Please update video card drivers and try the first step.

If the problem still persists we will need to connect to your computer for individual customization. Regarding this issue please contact us at [info@undet.com](mailto:info@undet.com).

## 2. Why does an Undet license dialog pop-up each time when I open Undet for SketchUp?

An Undet license dialog box will appear when opening Undet for SketchUp if Caps Lock is activated. Please switch off Caps Lock and license manager should not appear when opening the software.

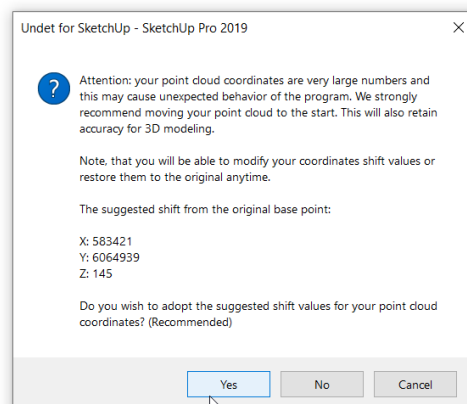


## 3. Do Undet projects support large coordinate systems (State, airborne LiDAR)?

Yes, if you have scan data files in large / state coordinate systems (for example UAV, Airborne LiDAR, etc) you can create an Undet project.

In all Undet plugins, there are "coordinate system transformation" tools.

*For example: if you try to open the Undet project in a large coordinate system, Undet will suggest shifting point cloud data to coordinates (0,0,0). At any time you will be able to change the coordinate system for the project (0,0,0) to the original with large numbers.*



We do not recommend creating deliverables using the point cloud in large coordinate systems. This is because it may cause errors when using modeling tools and start screen view glitching while zooming.



#### 4. Can I scale / resize point clouds with Undet for SketchUp?

Undet keeps initial file structure and scale. By using the "coordinate system transformation" tools you can shift and rotate the Undet project, **but scaling is disabled**.

All scan data files should be registered and on the same scale and coordinate system.