THEA RENDER

SOLIDIRIS
TECHNOLOGIES

THEA FOR SKETCHUP

USER MANUAL

Revision 3

1.1 Introduction

Thea for SketchUp is an integrated version of Thea Render. This allows a creation of stunning images right inside SketchUp and an interactive work with cameras, materials and lights. There is an option of saving a complete Thea scene with all associated files for utilizing advanced tools present in Thea Studio. Thea For SketchUp supports SketchUp Versions 6, 7, 8 both Free and Pro, on both systems: Windows & OS X.

1.2 Installation

MS Windows

Please use provided installer. It is advised to install Thea Render first and enter Thea4SU license (SketchUp plugin) inside Thea.
Please make sure you have administrator rights while installing the plugin.

A default SketchUp installation folder is:
C:\Program Files (x86)\Google\Google Sketchup >version number<\Plugins

The folder will be automatically found in case of SketchUP versions 6, 7 and 8.
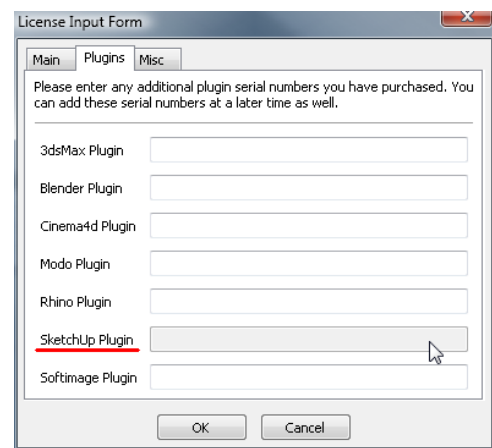

Figure 1: License Input Form – Plugins Tab

Mac - OS X

Please use supplied ZIP archive. OS X installer will be available soon. It is advised to install Thea Render first and enter Thea4SU license (SketchUp plugin) inside Thea. A default plugin installation folder is:
Macintosh HD/Library/Application Support/Google Sketchup >version number</Sketchup/Plugins

Please unpack\copy all files and folders into a Sketchup\Plugins folder

>> Sketchup\Plugins\Thea4SU_loader.rb
>> Sketchup\Plugins\Thea4SU_files\

Overwrite all older files.

Demo version limitations

While plugin is not licensed, rendered image resolution will be limited and watermarks will be added. Demo version doesn't save rendered scene into a Thea Scene file.

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1.3 GENERAL LAYOUT OF THE PLUGIN WINDOWS

Once the plugin is installed correctly a new item in the Plugins menu will appear (see Figure 2). You can also have an access to Thea for SketchUp through tools palette. Select "Show Thea toolbar" from the plugin menu. A toolbar as seen in Figure 3 will appear on the screen.
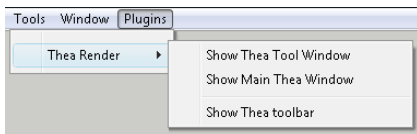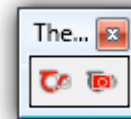

Figure 2: Plugins Menu

Figure 3: Thea Render Toolbar

User interface of the plugin is divided into two windows:
- Main Window
  The main window displays currently rendered image, provides controls over the displayed rendering and environment settings.
- Thea Tool Window
  It allows setting up cameras, editing materials, placing and editing lights and inserting external models as simplified components – proxies.
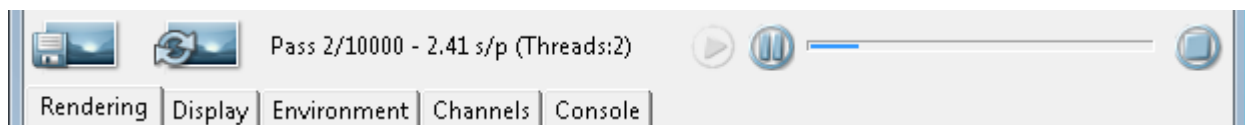
1.5 MAIN WINDOW

1.5.1 CONTROL BUTTONS

Figure 4: Control Buttons of Main Window

Save: it allows to save non-interactive render as an image and also a currently being rendered model as *.thea.pack file, which can be opened in Thea Studio.

Refresh: **i**t forces a refresh of a current view of the rendering. It is usually being used when one wants to see immediately the progress of the rendering being done. The plugin refreshes the view automatically at some intervals.

Start: this button makes Thea collect all necessary data from SketchUp and start the rendering process.

Pause: it pauses the rendering.

Stop: it stops the rendering and makes Thea refresh the main window, so it displays the final image.

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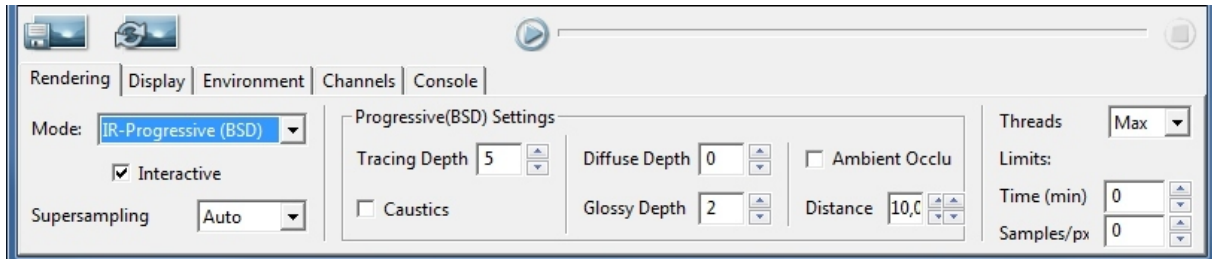
1.5.2.1 RENDERING TAB

Figure 5: Rendering Tab - Interactive Mode

Figure 6: Rendering Tab – Unbiased Mode

Rendering Modes

The control provides a selection of a rendering modes. There are several options that allow also an interactive type of rendering.

For Interactive rendering engines, as seen in Figure 5, user can specify several settings for the selected engine, as it is analytically described later.

Server

Server option is available for the Non-Interactive modes (Adaptive (BSD), Unbiased TR1 and TR2) and helps user perform a network rendering, with the use of client machines.

Super-sampling

This corresponds to the super-sampling used for the image output, i.e. internal resolution multiplier for anti-aliasing enhancement. None corresponds to no super-sampling, Normal to 2x2 and High to 3x3. Auto corresponds to no super-sampling for biased engine and 2x2 for unbiased engines. Setting super-sampling to a higher level will generally improve anti-aliasing of the output but will increase memory demands for storing the image (4 times in Normal level and 9 times in High level). The time needed to render the scene will also be increased for biased engine. But for the unbiased engines, the extra time needed to render the higher resolution image is usually amortized by the reduced noise visible in the visualized (down-sampled) image. It is usually suggested, for unbiased rendering, to change super-sampling to None for high resolution output

and High when there is persisting noise.

Additional Settings

Threads

This is the entry for the render worker threads that will be used during rendering (not all application process threads). The special value 0, same like Max, corresponds to the number of logical cores on your machine. Exceeding this value (shown explicitly as the last value in the drop-down list) will have no benefit and actually an impact on performance.

Limits

- Time(min)

  This is a parameter used to terminate the unbiased render process (it is only used by unbiased render engines). It is given in minutes, and 0 is a special value corresponding to no time limit at all.

- Samples/px

  This allows to terminate an unbiased rendering when each pixel in a rendered image will be sampled given number of times. In simple cases when no much caustics is present in a model a value of 300 is sufficient. In more complex scenes higher values may be needed.

Interactive Modes

Those modes allow not only render the model as a static image, but also let interactively move a camera around a model or adjust Sun position and see the rendering view being updated. IR-Progressive(BSD), IR-Unbiased*(MC) and IR-Adaptive(AMC) are names of available methods. Most robust is Adaptive(AMC) method, which works very well with multiple lights and complex lighting conditions.

Most important parameter is the 'Tracing Depth' which defines how many times light bounced in a model. Values starting from 4 give good results in simple conditions, while higher number is needed when there are many highly reflective surfaces in a model.

For detailed description of parameters of rendering methods, please refer to Thea Render manual.

Non-Interactive Modes

There are three non-Interactive high quality modes available:

- **Adaptive (BSD)**: in many cases the fastest method based on pre-sets, but it requires some experience when a certain set-up is advantageous.
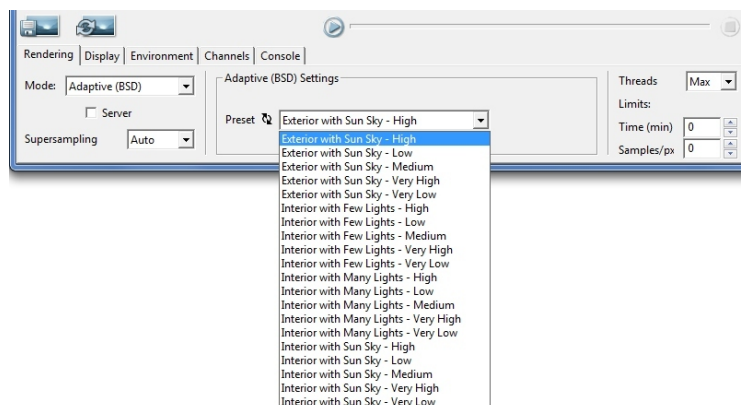

Figure 7: Adaptive (BSD) Presets

Two Unbiased methods: they don't require any settings and deliver renderings of the highest

quality. These are:

- **Unbiased (TR1) engine**: it is preferred in exterior renders and interiors where direct lighting is the most dominant in the scene.
- **Unbiased (TR2) mode**: it is preferred when difficult indirect lighting is dominant in the render or heavy caustics are present (such as a pool sun caustics).
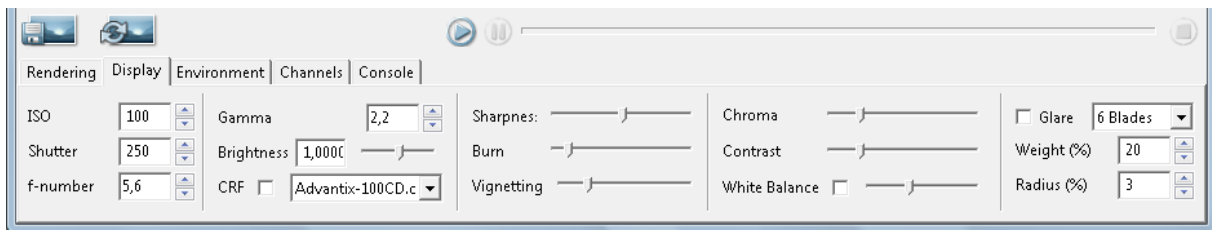
1.5.2.2 DISPLAY TAB

Figure 8: Display Tab

Display Tab is a space where you can manipulate your rendered image and apply any post-processing. First two sections are related to a render exposure and the following three to a filtering. For a detailed description of all options, please refer to Thea Render Darkroom tutorial – Section 2A.
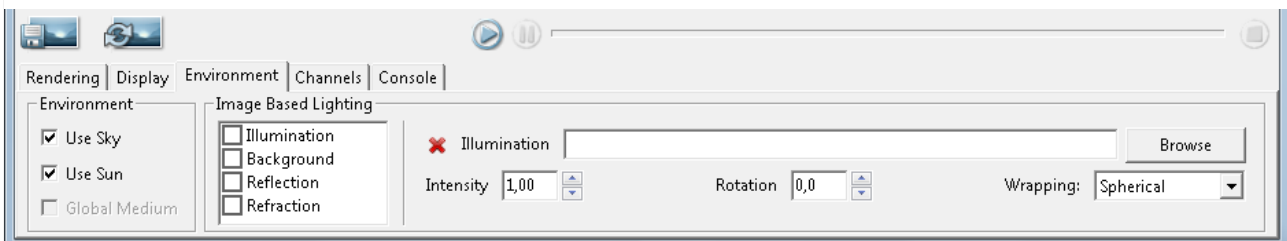
1.5.2.3 ENVIRONMENT TAB

Figure 9: Environment Tab

Environment
Use Sky
It tells Thea to create a background for a rendered scene in a form of Physical Sky. It will look as a clear sky which will be automatically adjusted to a position of the Sun. Turning this on makes plugin disable the background image, if it is being used.

Use Sun
It tells Thea to create the Sun that will give same shadows as those present in a SketchUp model.

Image Based Lighting
Image-based lighting is a convenient way to add illumination to your scene, coming from captured photos of the surrounding environment. Since a photo of a real scene can be used, the lighting is highly convincing and enhances the realism of your renders. In most cases, the images used for this kind of lighting need to be of high dynamic range in order to provide enough lighting for a scene.

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One can use an image for illuminating the scene, nevertheless, he can also set up different images for background, reflections and refractions. This makes possible to use different source for lighting and for reflections/background, which in most cases need more details in the image. This is actually a usual render optimization, where the illumination source is relatively low-detailed texture in order for the image to quickly "converge", while background and reflections use a detailed map for visually enhanced results.

To add one of image types select proper type and press 'Browse' button to select a desired image. When proper bitmap selected its path will be displayed in the adjacent horizontal input box. One can control intensity, rotation and a way the image is wrapped around a model.
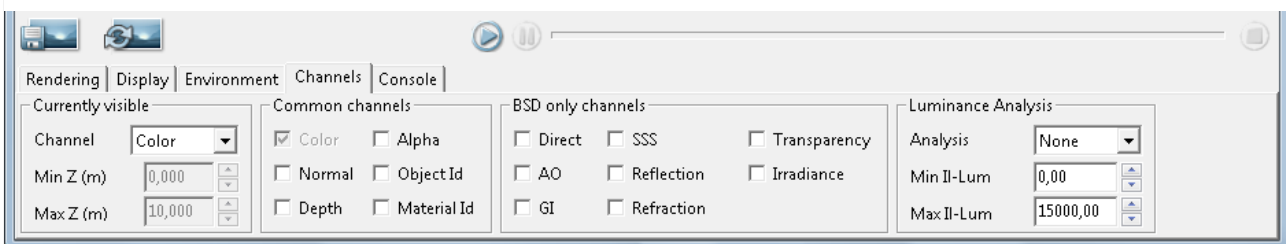
1.5.2.4 CHANNELS TAB

Figure 10: Channels Tab

This tab is being used when an additional image is being required, other than a standard rendering. This is mostly used when a post-processing is intended using external image manipulation program.

Available channels are: Color (standard rendering) , Normal, Depth, Alpha, Object Id, Material Id and channels specific to Adaptive(BSD) rendering mode: Direct, Ambient Occlusion, Global Illumination, Sub-Surface Scattering, Reflection, Refraction, Transparency and Irradiance.

Luminance Analysis describe the luminance and illuminance distribution. Thea Render can compute both of them. Luminance is computed out of the box for any image that you have already rendered and for any render settings. Illuminance can be computed by the Adaptive BSD engine.

To view the analysis of a rendered image select 'Photometric' from the drop down menu. 'Min Il – Lum' and 'Max Il – Lum' parameters control a range of illumination the analysis is performed on.

1.5.2.5 CONSOLE TAB

Thea For SketchUp uses the console to send you messages informing you about current state of rendering, time in which rendering was finished and warnings. In general visiting the console is recommended if something doesn't work as expected. It can help you finding a source of problem - no light in a model or missing texture.

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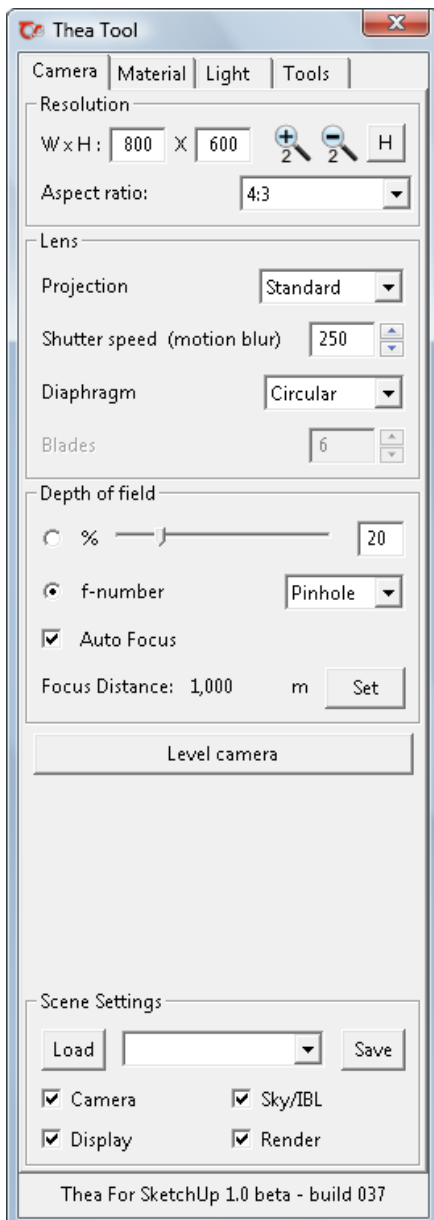
1.6 Thea Tool Window

Figure 11: Thea Tool – Camera Tab

Resolution

The 'Width' and 'Height' settings control resolution of a rendered image. Please note that interactive rendering modes use full area of plugin's main window and render exactly at same resolution. The Plus & Minus buttons increase or decrease current resolution two fold. (H)orizontal \(V)ertical toggle button changes orientation of the rendered image.

Aspect ratio

This setting control proportions of a final rendered image. When "SU Window" option is selected the resolution of a rendered image will be adjusted to be same aspect ratio as model view in SketchUp. When "Thea Window" is selected the resolution is adjusted to reflect current proportions of main render view. A typical proportions of 4:3 is characteristic for old type of monitors with resolutions of 800x600, 1024x768, 1600x1200. Wide screen proportions of 16:9 is more common in new monitors with resolution of 1600x900, 1920x1080. When creating a panoramic spherical or hemispherical image a correct ratio is 2:1.

Lens

Thea can project a rendered image on the screen in a standard manner – perspective or orthogonal, depending on a current view in SketchUp or using Spherical or Cylindrical projection. The spherical projection allows creating renderings of virtual panoramas that can be viewed in external programs. Correct aspect ratio of such an image is 2:1.

Shutter speed controls a motion blur which appears in an animated scene. Thea gives you control over a diaphragm of a camera. It can be circular or polygonal defined by a number of blades. This influences a look of a 'depth of field' effect and a motion blur.

Depth of Field

The depth of field can be controlled in the plugin in two ways. Either by 'f-number' of camera

lenses or by percentage of a "blurriness" of a rendered image.

When Auto Focus is enabled plugin automatically adjusts focus distance to keep what is visible in a camera 'in focus' when possible. Focus distance displays a manual distance at which a camera is focused at. To set that value click 'Set' button and select a point in a model. The distance will be calculated automatically. The value is disregarded when 'Auto Focus' is enabled.

Level Camera

This button levels camera without changing its' position. It is helpful especially when setting-up a camera for a panoramic shot.

Scene Settings

This section allows associating Thea Render settings with SketchUp scenes/pages. It works same way as it is done in SketchUp with scene settings except they are not loaded automatically when a scene is selected, but it has to be done manually by clicking "Load" button. To save settings select a scene name from the list, mark setting types you want to store and press 'Save' button

Available options are: Camera Settings, Display Settings, Sky/IBL Settings, Render Settings.
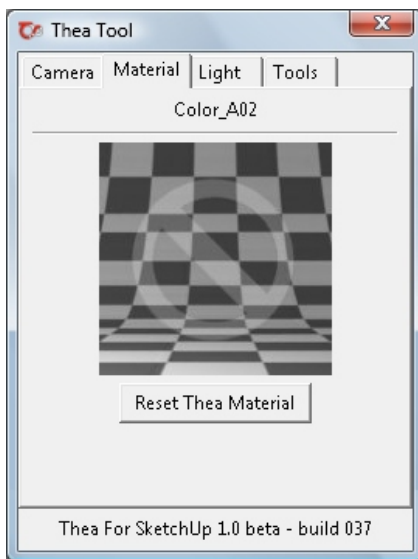
1.6.2 MATERIAL TAB

Figure 12: Thea Tool – Material Tab

Material tab displays a name of a currently edited material and a preview of Thea material if the material has been already edited in Thea. To edit a material one has to open Thea Tool and while the tool is active, double click on an already painted face in SketchUp. Thea Tool is active when a cursor changes it's appearance as seen in Figure 13.

When you double-click the face Thea Mat Lab window will

Figure 13: Thea Tool Cursor

appear allowing you to modify the material properties or apply another material from a library.

When user clicks just once the material tab will display the name and a preview (currently Windows only) of a Thea Material, if the material has been already edited.

"Reset Thea Material' removes all Thea material settings associated with SketchUp material.

Below is a screenshot of the Thea Material Lab (Figure 14). For a detailed information on it, please refer to Thea Render Manual.
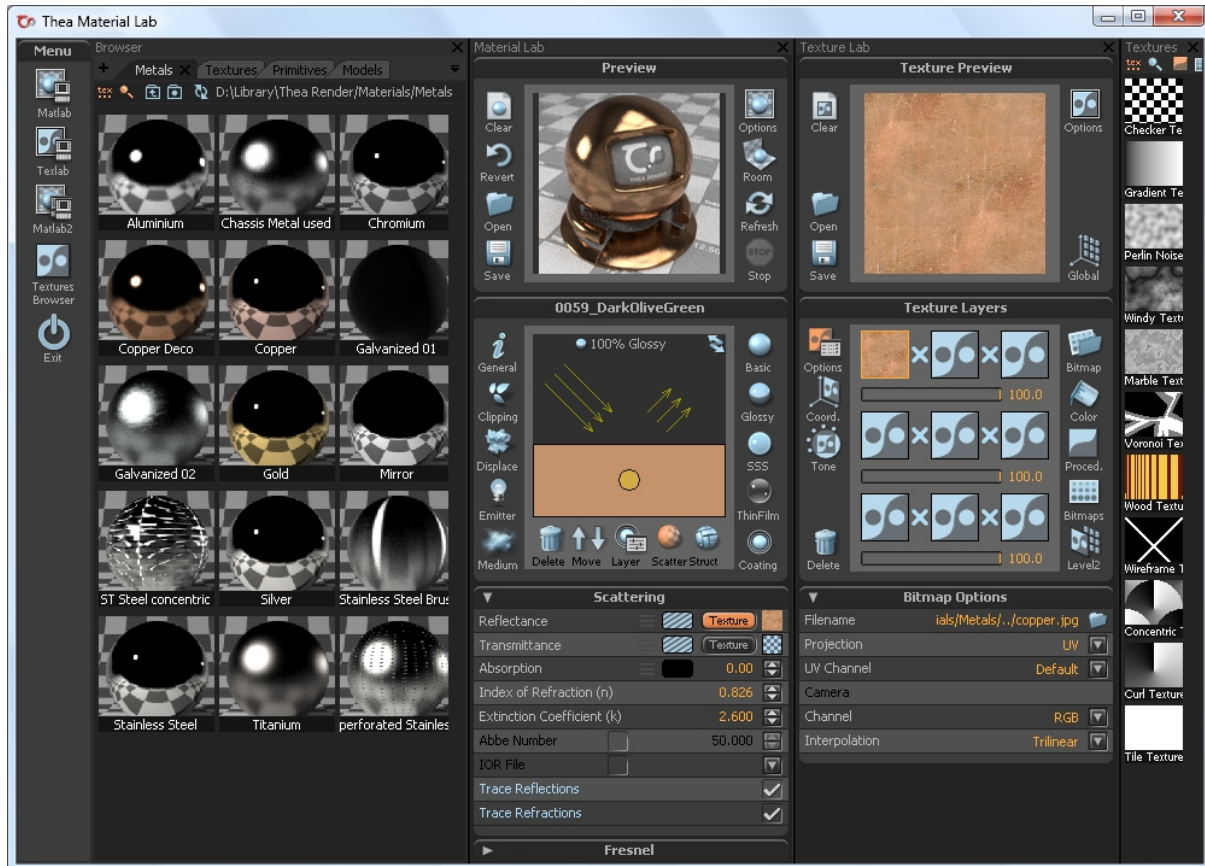
Figure 14: Thea Material Lab

1.6.3 LIGHT TAB

SketchUp doesn't have its' native light sources. Thea for SketchUp uses components with a special names to define position and orientation of lights. There are thee light types available in the plug-in:

- Point Light: a regular omnidirectional spherical light.
- Spot Light: a directional light that allows focusing of a light cone on a chosen area in a model.
- IES Light: a light based on scientifically measured real life values, provided by light-bulbs and fixture manufacturers in a form of *.ies files.

One can also paint a face with a material using emittance and in this way create an area light. Front side of the face will be emitting light.

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Creating Lights

Light tab allows a creation and editing properties of light components. To create a light open Thea Tool Widnow and select 'Light' tab. At the bottom there are three buttons responsible for creation of three types of lights. On the start of light placing tool user is asked to show in SketchUp model a location of a

Figure 15: Create Lights Options

source of light by right clicking and subsequently a 'target' of the light. In case of a point-light only the distance from the source to target is being used to calculate a sufficient light power to reach the target. It is important to place light sources in a distance to an adjacent geometry higher than a radius of the light. Failing to comply with that rule may produce undesired "noise" in the final image. Once light component is created its name and properties will be displayed in the Light tab.
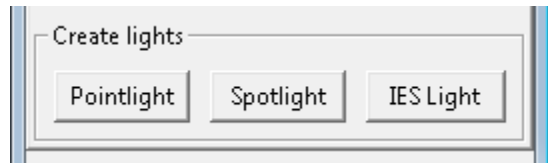
Editing Lights

Light properties can be invoked by selecting a light component or clicking a component while Thea Tool is active. On a top of the Light tab a name of currently edited light component is being displayed.
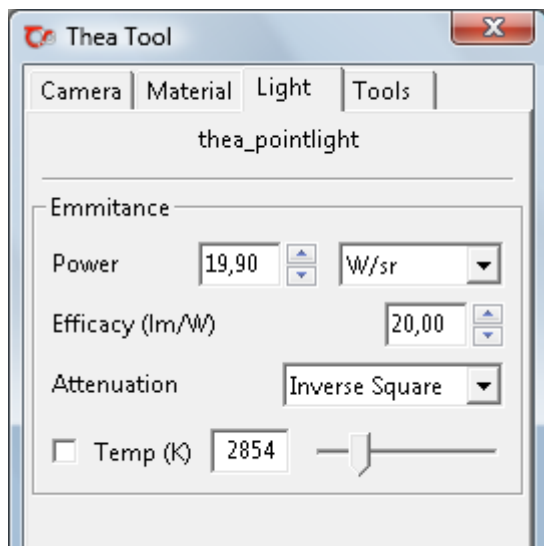

Figure 16: Emittance Properties

Pointlight & Spotlight properties

Point-lights and spot-lights share several properties:

Emittance

A colour of a light is controlled by a color of material the light component is painted with. When a temperature is enabled it will be used instead of the color.

All lights have flowing parameters:

Power expressed in multiple units, efficacy (lm/W), attenuation and light temperature (K).

Spotlight properties

Spot-lights have additional Hot Spot and Fall Off values that control a shape of light cone. 'Hot Spot' describes the inner angle where the light is emitted at a full intensity and 'Fall Off' is and angle the light fades completely at.
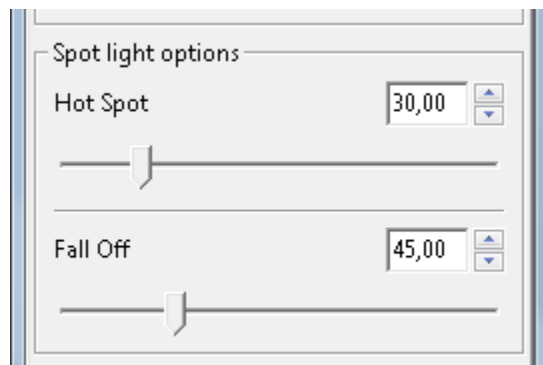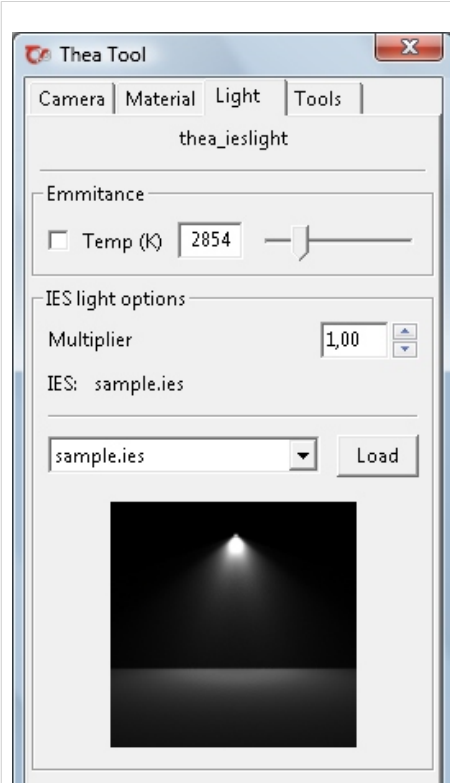

Figure 17: Spotlight Properties

Figure 18: IES Light Properties

IES Light properties

By default an IES light have a sample.ies file loaded into it. It is possible to load a different description of light distribution by selecting it from a dropdown menu and pressing 'Load' button.

To use an IES file not present in Thea Studio IES files folder, select from the list 'Other file' and press 'Load'. You will be asked to select a file you want to save into the light component.

General Properties

A light component can be 'Enabled' which means it will be casting light. 'Shadow' controls whether the light will be casting shadows. 'Soft Shadow' specifies whether the shadow will be soft, based on a imaginary radius of the light source expressed in meters.

'Min Rays' and 'Max Rays' parameters are used only by the Adaptive(BSD) engine. Those are used rarely. For a detailed description, please refer to Thea Render Manual.

'Container' lets you assign a container-material in which the light is placed. Setting this material is valid only for a situations when a light is submerged in a water or placed inside a material congaing properties of a medium. It can be also used to force a light to show a volumetric projection of light.
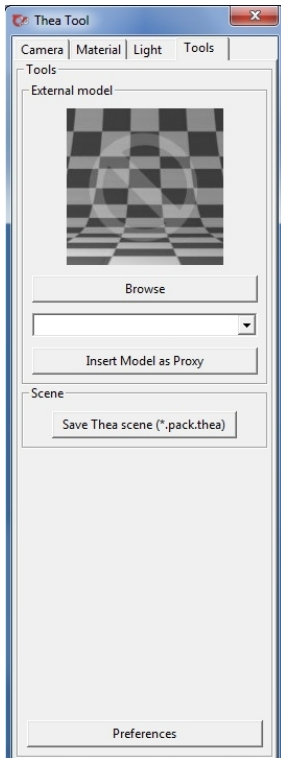
Figure 19: Thea Tools Tab

Figure 20: Plugin Preferences Window

Figure 21: Selecting another Language

External Model

Thea For SketchUp allows an insertion of complex, external Thea models in a form of a bounding box, which will be replaced by the original, detailed model inside Thea rendering window when a rendering starts.

To insert a model press "Browse" button and select a *.mod.thea file from a Library or from your own collection. Once the model file selected a preview of the model will be displayed right below the button.

Press "Insert Model as Proxy" button to insert the model into SketchUp.

If the folder where the file is located contains more then one model, then all models names will be added to a selection box.

Scene Save

Saves model as Thea scene in *.pack.thea format.

Preferences

By clicking on Preferences button, a new window appears as seen in Figure 20. From here, you can change the Language of the plugin. In order to do so, you need to follow the next steps:

There is a TheaForSketchUp.po file in the folder: Thea4SU_file/languages/

This file needs to be translated using Poedit program. The program will generate a TheaForSketchUp.mo file, that has to be copied to the corresponding folder of the selected translation language.

If the language is already set in the system then it will be automatically used when SketchUp starts.

If it has not been set automatically, user can open Thea Tool/Tools/Preferences and select the language manually. The language modification will be active after SketchUp will restart.

If for example you have placed the TheaForSketchUp.mo file at the folder with name es (Spanish) at the drop down list of the Language window you will see the Spanish language too.

Typical Country Codes are: de (German), es (Spanish), fr (French), it (Italian), ja (Japanese), pt (Portuguese), pt_BR (Brazilian Portuguese), ru (Russian), zh_CN (Chinese Simplified), zh_TW (Chinese Traditional)
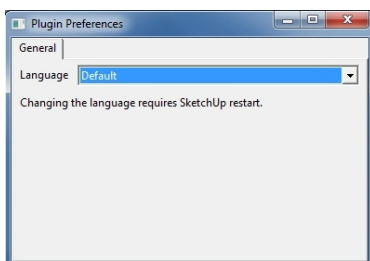
1.7 LICENSE TERMS

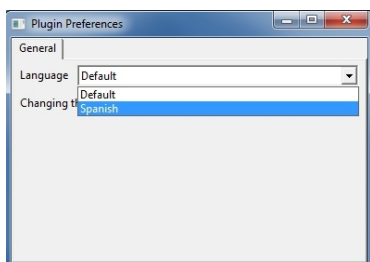Solid Iris grants to You a personal, non-transferable, and non-exclusive license to download, install and use "Thea for SketchUp" and associated printed and/or electronic documentation accompanying the Software, in accordance with this agreement. This license does not under any circumstances grant ownership of the Software to You.

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