Plugins Help
SketchUp

Maxwell for SketchUp :: Plug-in Help

The Maxwell for SketchUp plugin has been created with the intention of providing a native integration of Maxwell Render with the version 6 of SketchUp Pro.

The Sketchup versions supported by the plugin are:

Google SketchUp Pro 6

The Maxwell Render versions supported by the plugin are:

Maxwell Render 1.7

Latest revision of this document: June 2008

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Installation

- Use the installation package provided.
- Once installed properly, Maxwell rendering engine will appear in Export and Plugins Menu of SketchUp.

Location of files:

- Windows

    - MaxwellExport.dll - Exporters folder of SketchUp – typically [c:\Program](c:\Program) Files\ Google\Google SketchUp 6\Exporters

    - MaxwellExport.rb - Plugins folder of SketchUp – typically [c:\Program](c:\Program) Files\Google\Google SketchUp 6\Plugins

    - Maxwell folder – Plugins folder of SketchUp – typically [c:\Program](c:\Program) Files\Google\Google SketchUp 6\Plugins

- Mac OSX

    - Skp2MXS.Plugin - /Applications/Google SketchUp 6/SketchUp.App/Contents/Plugins

    - MaxwellExport.rb- /Library/Application Support/Google SketchUp 6/SketchUp/Plugins

    - Maxwell folder - /Library/Application Support/Google SketchUp 6/SketchUp/Plugins

Export to Maxwell and Rendering

In order to render you need to export your SketchUp model to Maxwell .mxs format.

- Go to File/Export/3D Model
- Choose "Maxwell Render (*.mxs)" as an export type.
- Type the file name for the exported file.
- Click "Export" button.
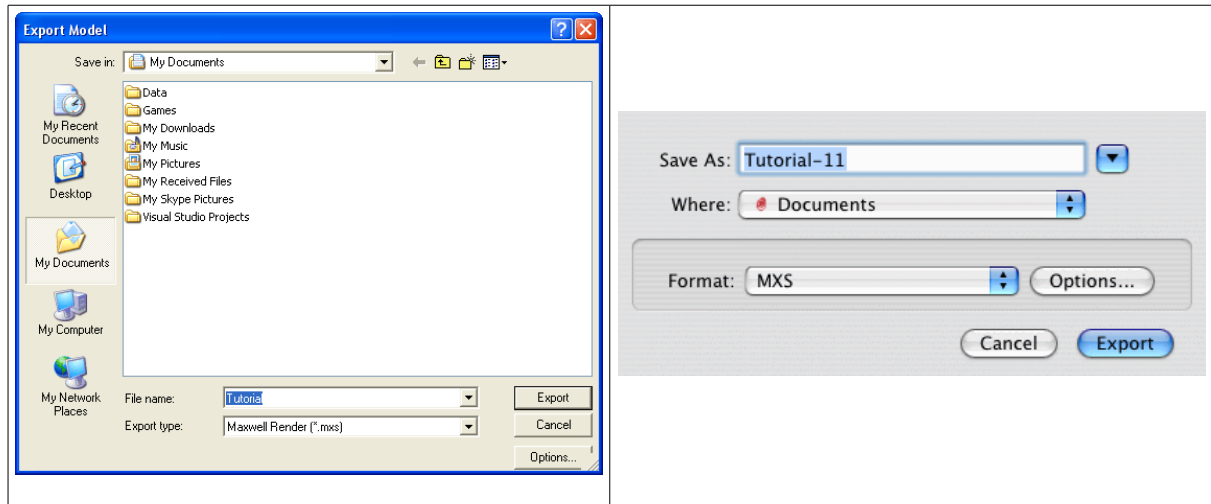
Export dialog

- Geometry and materials are exported from SketchUp model. Maxwell camera is derived from the SketchUp camera in the active page.
- Additional parameters (materials, camera options, environment settings) can be set using Ruby SketchUp plugin script included with MaxwellExporter.
- Additional options for Maxwell export can be set by clicking on "Options" button in the export dialog:
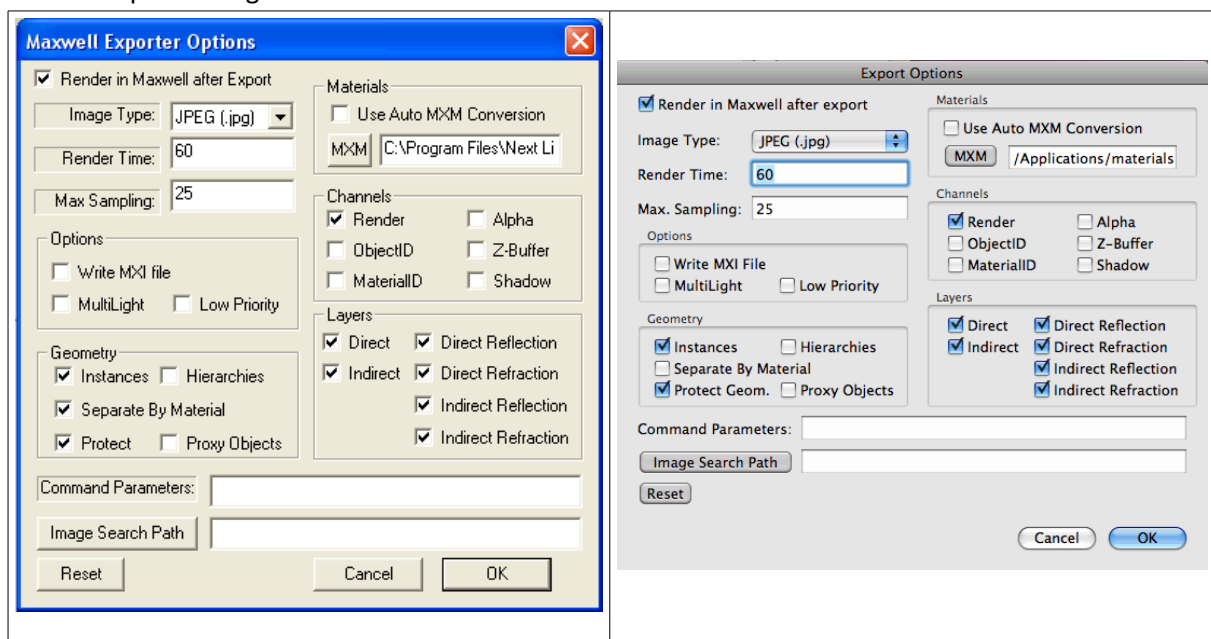

Options dialog

- **Render in Maxwell after Export:**
    - If enabled than the rendering in Maxwell is started immediately after the export is completed. The resulting image can be found in the same folder as the exported .mxs file.
    - Note that you need to have Maxwell rendering engine installed and fully configured in order to render.
- **Image Type:**
    - Desired format of the image generated by Maxwell. Jpeg, Targa and WindowsBitmap (on Windows) are supported.
- **Render Time:**
    - Suggested time to render the image in Maxwell (in minutes).
- **Max Sampling:**
    - Maximum sampling level for Maxwell rendering
- **Options**
    - **Write MXI file:**
        - Generate MXI file by Maxwell – this file can be used to continue in the interrupted rendering
    - **Multilight:**
        - Enable MultiLight function in MXCL (Maxwell command line renderer). See Maxwell manual for details on MultiLight support.
    - **Low Priority:** render in Maxwell using low priority setting.
- **Geometry** (check Geometry chapter of this manual for more details)
    - **Instances:** export SketchUp components as Maxwell instances (if possible)
    - **Hierarchies:** export full hierarchical structure of SketchUp groups – embedded groups will be exported as child groups
    - **Separate By Material**: split geometry in scene/groups into separate Maxwell objects based on the material assigned to individual SketchUp entities for easier manipulation in Maxwell Studio
    - **Protect Geometry** : protect the exported geometry in Maxwell Studio. If the geometry is protected (default) it cannot be exported from Maxwell Studio in OBJ file.
    - **Proxy Objects:** allows to utilize higher resolution components for Maxwell rendering than the regular low-poly components used withing SketchUp. Upon export components will be replaced by high-poly version of the components if component with the same name and extension_proxy is found in the list of components.
        - Create high-poly component in SU and give it the same name with extension _proxy (if the orignal component was sphere then high-res version should be named sphere_proxy).
        - Keep the component in "In model" library of components for given SU project (you can delete them from SU workspace).
- **Materials:**
    - **Use Auto MXM Conversion:**
        - Enable automatic conversion of SketchUp materials into Maxwell materials. For every SketchUp material a corresponding MXM material file is located in

specified folder (based on the material name in SketchUp) and used for the export.

- **MXM:**
  - Click the button to open a folder selection dialog. Select the search folder for Maxwell MXM files.
- **MXM path:**
  - Search path for MXM path. Specified folder (and its sub-folders) are used to search for MXM files for automatic material MXM conversion.
- **Channels:**
  - **Render** - image itself is being rendered
  - **Alpha** - alpha mask for the rendering image is generated
  - **ObjectID** - ID of the object is stored for the rendered image
  - **MaterialID** - ID of the material used is stored for the rendered image
  - **Z-buffer** - depth image for the rendering is generated
  - **Shadow –** shadows image is generated
- **Layers:**
  - **Direct** - direct lighting is taken into account (illumination from the light sources)
  - **Indirect** - indirect lighting is taken into account (illumination due to light reflection in the scene)
  - **Direct reflection** caustics layer
  - **Direct refraction** caustics layer
  - **InDirect reflection** caustics layer
  - **Indirect refraction** caustics layer
- **Command Parameters:** additional command line parameters of Maxwell render (MXCL) can be specified here.
- **Image Search Path:** specify the folder to look for missing texture files (texture files which are not placed in the location they were in when they were used to create MXM material). You can pick the folder using a dialog by clicking on "Image Search Path" button.

- Progress report dialog is shown during the export. Note that the export can be interrupted by clicking on the Stop button.
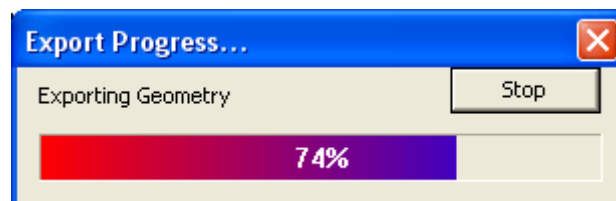
Progress report

- Additional export parameters can be controlled from the MaxwellExport Ruby plugin menu or from Maxwell SketchUp Toolbar:
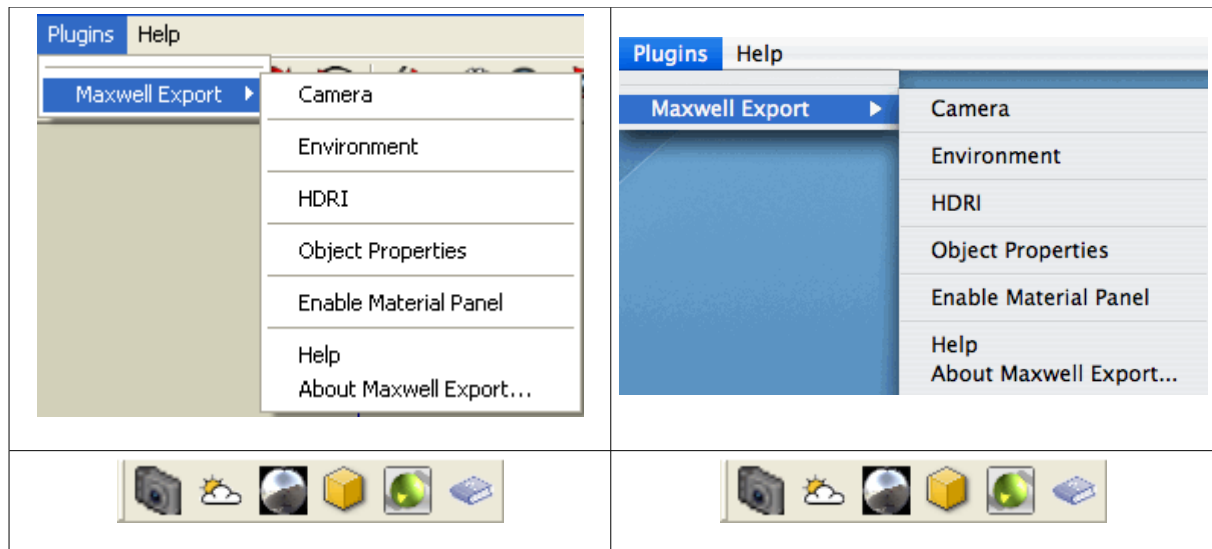
Maxwell toolbar and Ruby plugin and its location in SketchUp menu

- Camera: controls Maxwell camera parameters

- Environment: controls Maxwell environment parameters

- HDRI: controls Maxwell HDRI (background, illumination, reflection, refraction) parameters

- Object Properties: controls object properties of SketchUp entities

- Enable Material Panel: enables material observer (for details see Material chapter)

- Help: opens plugin PDF help

- About Maxwell Export: shows credits and version information

Geometry

- MaxwellExport supports all 3D polygonal geometry of SketchUp.
    - Faces
    - Components
    - Groups
- Normal vectors and UV coordinates are fully supported. Note that UV coordinates are exported only if SketchUp entity has material with texture assigned – otherwise SketchUp doesn't provide UV coordinates.
- SketchUp Components:
    - The export of components depends on geometry settings in export options panel
    - If "Instances" checkbox is enabled than components are exported as Maxwell Instances. The first instance in SketchUp is exported as a single mesh object (no hierarchy is supported and entities are not separated based on materials). Additional instances are exported as Maxwell instances.
    - If "Instances" checkbox is disabled than components are exported as groups (based on groups related settings).
    - If a material is assigned to a SketchUp component instance and component definition uses different materials than the component is exported as a mesh object (due to Maxwell limitation).
    - If component uses materials with emission than it is always exported as group (Maxwell instances cannot handle emissive materials)
- SketchUp Groups:
    - The export of groups depends on geometry settings in export options panel
    - If "Hierarchies" checkbox is enabled than full hierarchy of group definitions is preserved for easier manipulation in Maxwell Studio.
    - If "Hierarchies" checkbox is disabled than group is exported as a single mesh object (if there are no emissive materials in group and separate by materials is off) or as a group of mesh objects with separate object for emissive materials and separate object for non-emissive materials if separate by materials is on.
    - Note that exporting a full hierarchy of SketchUp groups results in longer export times.
- Object properties:
    - Object properties can be set in object properties panel from Ruby plugin:
    - Hide to camera:
        - Make the entity hidden to camera but participating in the rendering calculation.
    - Hide to Reflections:
        - Hide the entity in reflections/refractions
    - Hide to camera:
        - Hide the entity for Global Illumination computation

Maxwell Obje...	Maxwell Object ...
☐ Hide to Camera	☐ Hide to Camera
☐ Hide to Reflections	☐ Hide to Reflections
☐ Hide to GI	☐ Hide to GI
OK Cancel	OK Cancel

Materials

Material support consist of 3 separate components:
- Native SketchUp material support:
    - Used if no other material information is found for the object.
- Automatic material MXM conversion:
    - Used when automatic conversion is enabled in export options dialog.
    - Maxwell material MXM file is assigned to SketchUp material based on the material name in SketchUp.
- Ruby script based material assignment:
    - Ruby script "MaxwellExport" allows you to assign Maxwell related material attributes directly to SketchUp material. This allows both to use Maxwell MXM material specification (stored as separate files) or use simple interface to set the basic Maxwell material parameters..

## Native SketchUp material support:

- Native SketchUp materials are supported if no other material information is found for the object:
- Non-transparent objects: Maxwell's "DIFFUSE" material is used.
    - "REFLECTANCE RGB" parameter (color of the object) is taken from SketchUp color.
    - "DIFFUSE MAP" parameter (texture map) is taken from SketchUp texture image (if texture image is specified).
    - "ABSORPTION" parameter is set to 0.6
- Transparent objects: Maxwell's "DIELECTRIC" material is used.
    - "INTERNAL TRANSMITTANCE RGB" parameter (color of transparent object) is taken from SketchUp color.
    - "ABSORBANCE" parameter (transparency) is derived from SketchUp opacity.

Automatic material MXM conversion:

- **Use Auto MXM Conversion:**
    - Enable automatic conversion of SketchUp materials into Maxwell materials. For every SketchUp material a corresponding MXM material file is located in specified folder (based on the material name in SketchUp) and used for the export.
- **MXM:**
    - Click the button to open a folder selection dialog. Select the search folder for Maxwell MXM files.
- **MXM path:**
    - Search path for MXM path. Specified folder (and its sub-folders) are used to search for MXM files for automatic material MXM conversion.

- Maxwell material settings can be set/queried using Maxwell Material dialog. In order to do that you need to enable material observer using Ruby script:
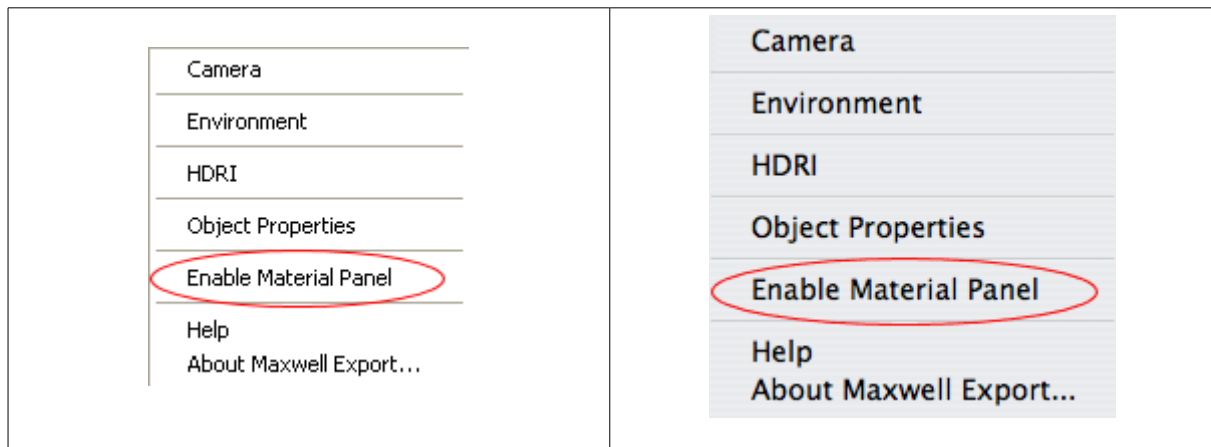
*Enabling Maxwell Material panel/observer*

- Once enabled, Maxwell Material panel will open after selecting a material in SketchUp material browser if you select "In Model" material (SketchUp material needs to be a part of the scene in order to be able to assign Maxwell attributes to it) - simply apply material to model prior to setting Maxwell attributes. On OSX you need to either apply the material or inspect one in order to have it selected (and having Maxwell dialog show).
- Parameters are stored as attributes of SketchUp material used in the project, thus they are stored with the scene when the scene is saved.
- Note that the attributes are automatically stored to SketchUp material as additional attributes (without the need to confirm them).
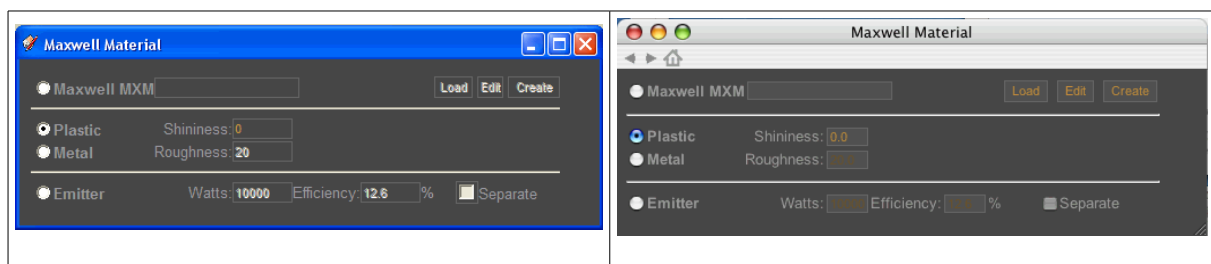
Maxwell Material panel

- **Maxwell MXM:** select Maxwell MXM material to use Maxwell file-based mxm material for the given SketchUp material.
  - *Name:* name of the loaded mxm file
  - *Load:* open file dialog to load mxm material from disk
  - *Edit:* edit the loaded mxm material - starts Maxwell material editor (MXED) in edit mode.
  - **Create:** starts Maxwell material editor (MXED) in wizard mode to create a new MXM material

- **Plastic:** plastic Maxwell material with 2 BSDF layers - color/texture/opacity of the material is taken from SketchUp material
  - *Shininess:* shininess of the material (0 for completely diffuse)
  - Note that if opacity of the material is enabled in SketchUp than AGS material is used with additional layer for transparency
  - If the shininess is set to 0 than a perfectly diffuse material with single layer is created
- **Metal:** single BSDF layer metallic material - color/texture/opacity of the material is taken from SketchUp material
  - *Roughness:* roughness of the material
  - Note that if opacity of the material is enabled in SketchUp than AGS material is used with additional layer for transparency
- **Emitter:** light emitting material (used for object acting as light sources)
  - *Watts:* the power of the light
  - *Efficiency:* the efficiency of the light source (how much power is actually used to emit light).

  - *Separate:* if enabled, individual faces/groups/components of model using the selected material will be exported as separate Maxwell objects thus allowing further modification in Maxwell Studio. They will share the same Maxwell material though. For the best results group faces/components and apply material afterwards. Note that the "separate" mechanism is fully material based – thus you will get different results if you apply material with separation enabled first and group afterwards (in this case you will get original faces as separate components in Maxwell) to grouping faces and applying material afterwards (in this case you get whole group as single object).
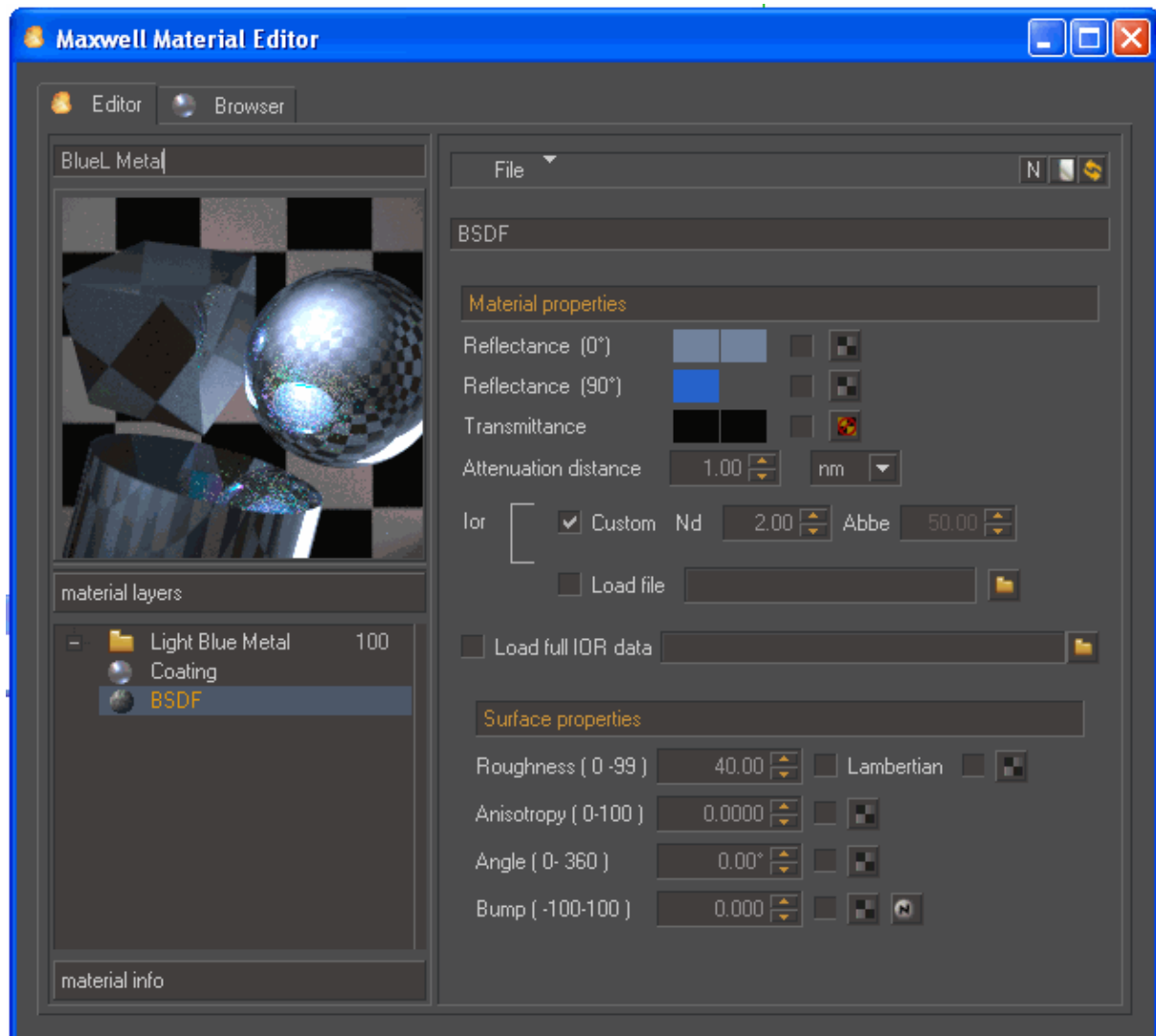
Maxwell Material editor (MXED)

- **Note!** If you want to use any map with SketchUp geometry you need to set material with texture for given entity in SketchUp. Otherwise UV coordinates (responsible for "mapping" image map to a geometry are not generated by SketchUp at the export and the map will not appear in Maxwell rendering.

Camera Parameters

Viewpoints of all SketchUp scenes are exported as Maxwell cameras. Active viewpoint is used for the actual Maxwell rendering, additional cameras can be used in Maxwell Studio.

Camera specification for Maxwell renderer is constructed from 2 components:

- SketchUp camera information:
    - Camera position, direction and field of view is taken from a camera of active SketchUp page. Cameras for other pages are exported as well (as inactive cameras) for later potential use in Maxwell studio.
- Maxwell camera specification (mimicking the real world camera):
    - Maxwell camera specification can be set from MaxwellExport plugin Ruby script (parameters are stored as attributes of the Ruby model, thus they are stored with the scene when the scene is saved).
    - Note that camera settings can be specified for every page of SketchUp model separately thus allowing to use different settings for different cameras.
    - Camera settings are always edited for currently active SketchUp page.
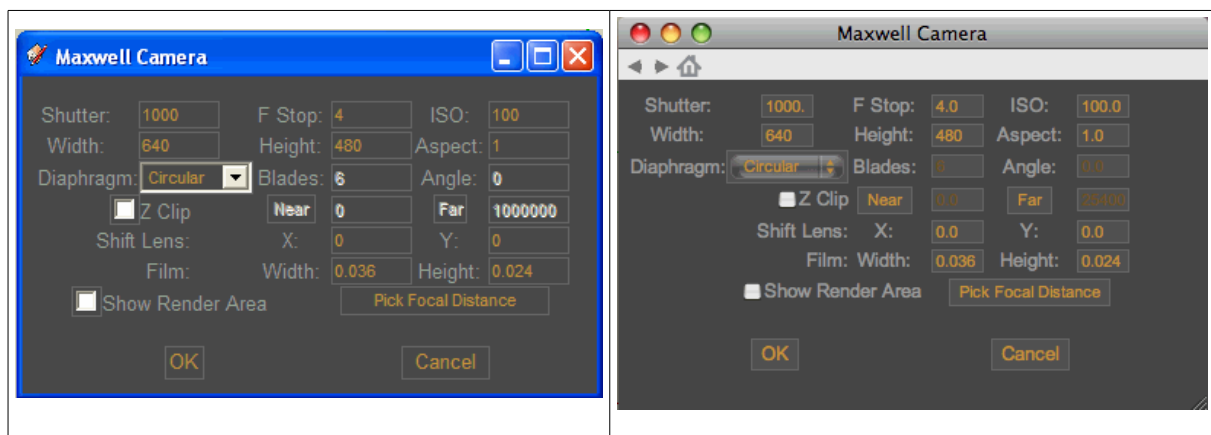
Camera parameters

- **Shutter:** intended camera shutter time (measured in fractions of second as you are used to from a real world camera)

- **F Stop:** camera F Stop value

- **ISO:** sensitivity of the camera sensor

- **Width:** width of the rendered image

- **Height:** height of the rendered image

- **Pixel Aspect:** pixel aspet ratio of the camera sensor's pixel (width of a pixel divided by height – typically 1).

- **Diaphragm:** the shape of the camera diaphragm (circular or polygonal)

    - **Blades:** number of diaphragm blades (in case of polygonal diaphragm model)

    - **Angle:** angle of diaphragm blades (in case of polygonal diaphragm model)

- **Z Clip:** clip the model's geometry based on distance from camera

    - **Near:** near clipping distance – objects closer to the camera will be ignored. You can either enter the value to the edit field or click on the button to set the near distance interactively. Zclip distance tool allows to set the distance directly by clicking on the geometry in the model.

    - **Far:** far clipping distance - objects further away from the camera will be ignored. You can either enter the value to the edit field or click on the button to set the near distance interactively. Zclip distance tool allows to set the distance directly by clicking on the geometry in the model.

- **Shift Lens:** shift lens offset of the camera (in X and Y direction). Consult Maxwell manual for more details.

- **Film Width/Height:** width and height of the camera film

- **Show Render Area:** hide the parts of SketchUp view which are not gonna be visible in Maxwell rendering (the aspect ratio of the resulting image is taken into account).

- **Pick Focal Distance:** focal distance for the camera can be set using an interactive point-and-click approach. To set the focal point, activate the tool by clicking on the button and click anywhere in the model. Focus point is acquired as a 3D point on the model which you've clicked on. Coordinates of the focal point as well as focal distance is shown in the dialog:
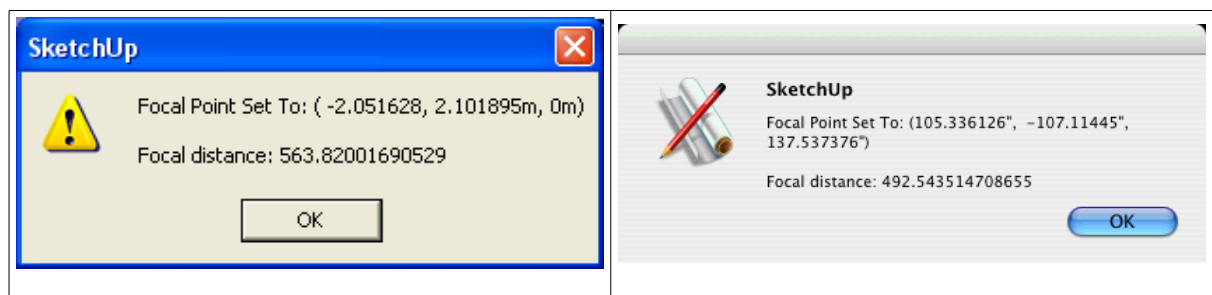
Note that focal distance is computed for the current eye position - as the focal point is fixed (unless you modify it by Set Camera Focal Point tool again) the actual focal distance can change if you move the eye. However the point in focus will remain the same.

Environment Parameters

It is possible to query/set environment parameters for Maxwell rendering. The settings are accessible from Ruby MaxwellExport plugin, option "Environment".
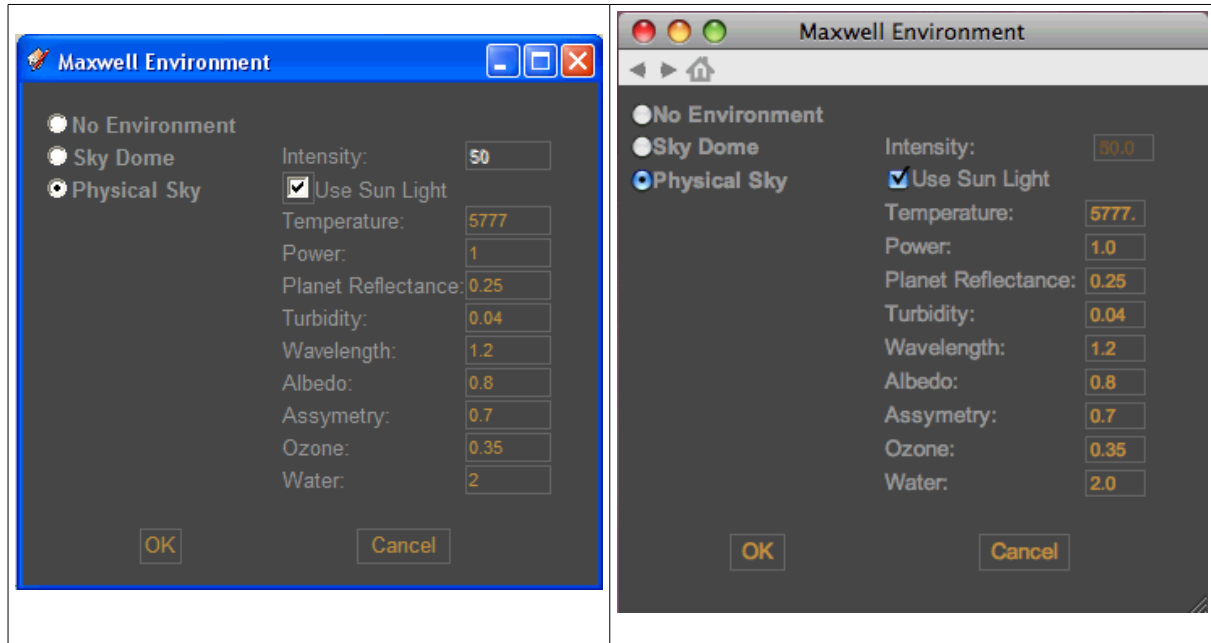

Environment parameters

- **No Environment:** no environment is taken into account (completely black environment with no lighting present)

- **SkyDome:** virtual SkyDome is constructed around your model - SkyDome illuminates the model equally from all directions

  - **Intensity:** intensity of the illumination in case of the SkyDome environment

  - Color for the SkyDome environment is taken from SketchUp background.

- **Physical Sky:** a physical sky model taking into account specifics of real world skies.

  - **Use Sun Light:** taken the sun into account

    - Note that the actual sun position is taken from "Shadow" setting of SketchUp (model location - latitude/longitude, day, hour).

  - **Temperature:** sun temperature (in Kelvins)

  - **Power:** the scale factor for the sky – 1 means the same power as the sky would have in reality

  - **Planet Reflectance:** reflectance of planets

- **Turbidity:** angstrom turbidity: coefficient Default: 0.04 Range: Any value greated than 0

- **Wavelength:** turbidity exponent Default: 1.2 Range: Any value greated than 0

- **Albedo:** aerosol albedo Default: 0.8 Range: (0-1)

- **Assymetry:** "anisotropy" of aerosol. Default: 0.7. Range (-0.99999, 0.99999)

- **Ozone:** ozone in the environment. Default: 0.4 Range: Any value greated than 0 (usually between 0 and 1)

- **Water:** water vapor (cms) Default: 2.0 Range: Any value greated than 0

HDRI Parameters

It is possible to use HDRI files for different aspects of Maxwell environment. The settings are accessible from Ruby MaxwellExport plugin, option "HDRI".
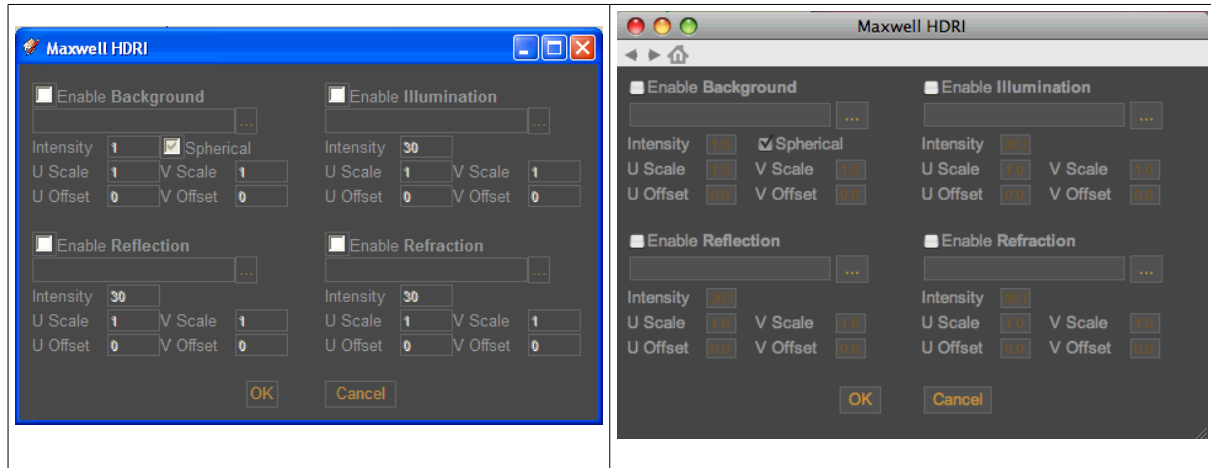
HDRI parameters

- **Background:**

    - Enable: enable image based background – selected image will be used for background instead of procedurally generated sky background

    - ...: Pick map (MXI or HDR file) to use for background

    - Intensity: intensity of the background map

    - Spherical: map background spherically (sphere enclosing the scene) as opposed to simple image based background mapping

    - Uscale: scale of the image in U (horizontal) direction

    - Vscale: scale of the image in V (horizontal) direction

    - Uoffset:offset of the image in U (horizontal) direction

    - Voffset:offset of the image in V (vertical) direction

- **Illumination:**

    - Enable: enable image based illumination environment – selected image will be used for lighting from environment instead of procedurally generated sky

    - ...: Pick map (MXI or HDR file) to use for illumination

    - Intensity: intensity of the illumination map

    - Uscale: scale of the image in U (horizontal) direction

- Vscale: scale of the image in V (horizontal) direction

- Uoffset:offset of the image in U (horizontal) direction

- Voffset:offset of the image in V (vertical) direction

- **Reflection:**

  - Enable: enable image based reflection environment – selected image will be used for mirror reflection instead of procedurally generated sky

  - ...: Pick map (MXI or HDR file) to use for reflection

  - Intensity: intensity of the reflection map

  - Uscale: scale of the image in U (horizontal) direction

  - Vscale: scale of the image in V (horizontal) direction

  - Uoffset:offset of the image in U (horizontal) direction

  - Voffset:offset of the image in V (vertical) direction

- **Refraction:**

  - Enable: enable image based refraction environment – selected image will be used for glass refraction instead of procedurally generated sky

  - ...: Pick map (MXI or HDR file) to use for refraction

  - Intensity: intensity of the refraction map

  - Uscale: scale of the image in U (horizontal) direction

  - Vscale: scale of the image in V (horizontal) direction

  - Uoffset:offset of the image in U (horizontal) direction

  - Voffset:offset of the image in V (vertical) direction

Frequently Asked Questions

- **Limitations:**

  - Sun position can be off by one hour - this is due to a fact that SketchUp ignores daylight savings time while Maxwell supports it..

- **Questions&Answers**

  - Rendering via Maxwell is not working. I get .mxs file exported by the rendering doesn't start.

    - You need to have Maxwell rendering installed and configured on your machine in order to render. Follow Maxwell application (MXCL) document to install and configure it properly.

  - Export doesn't work properly for me:

    - If the exporters experiences a problem a log file is generated with the same name as the exported file with file extension .log. The file contains developers information on what went wrong during the export. you can check the log file yourself (it may help to pinpoint the problem) or preferably you can send the log file to us for inspection.

  - What happens if I do not specify Maxwell material settings for the scene?

    - Default settings for materials will be used. Maxwell diffuse material will be used for all non-transparent objects (color and texture is inherited from SketchUp material), Maxwell dielectric material will be used for transparent objects. See materials chapter of the manual for details.

  - How do I specify materials for Maxwell rendering?

    - You can use Ruby MaxwellExport plugin to set Maxwell material parameters for SketchUp materials in your model
    - Note that material parameters set using the plugin are persistent - they are stored with the scene when the scene is saved to file. On the other hand the connection between SketchUp material and Maxwell material is model-based. That means it is not stored in SketchUp itself, instead it is stored in skp file only.

  - Maxwell Material panel is not showing up for me:

    - You need to enable the panel first – go to Ruby MaxwellExport menu (in Plugins) and select "Enable Material Panel".

    - On OSX you need to "activate" the material. This can be achieved by clicking on the entity while having bucket tool active or by inspecting the material from entity (hold option key and select the entity while in bucket mode).

  - How do I create a light for Maxwell?

    - There are 2 possibilities here:

- It is possible to enable physical sky with sun in Ruby MaxwellExport plugin.
- You can assign "Emitter" properties to any material you have in your scene. In order to do that select the material and assign it "Emitter" material with proper parameters.

- Texture map is not working for me. What went wrong?

  - If you want to use any map with SketchUp geometry you need to set material with texture for given geometry (face/component/group). Otherwise UV coordinates (responsible for "mapping" image map to a geometry are not generated by SketchUp at the export and the map will not appear in Maxwell rendering.

- None of the Camera/Environment/HDRI/Material panels are showing up for me. What can I do about that?

  - Check the installation of the Maxwell plugin. In particular Ruby script and its related files. Go to /Library/Application Support/Google SketchUp 6/SketchUp/Plugins and check the presence of following files:
    - MaxwellExport.rb
    - Maxwell sub-folder should contain following files:
      - Camera.html
      - Environment.html
      - Hdri.html
      - MXM.html

    If the file are missing copy them from the installation file (on OSX) or re-install (on Windows).