

# ZERMATT 3.0

## USER GUIDE

UPDATED 2008 09 18



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## 1.1 SYSTEM REQUIREMENTS

Zermatt 3.0 uses OpenGL to communicate with the computer's graphics hardware.

Some PC computers may not have a dedicated graphics card. Instead they use shared or integrated graphics.

A dedicated graphics card from for example NVIDIA or ATI is much recommended to get the best out of Zermatt 3.0.

## Required

**OpenGL Version 1.4 + ARB\_vertex\_program Support.  
Display resolution of 1280 or greater.**

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## 2.1 INSTALLATION

**Visit [www.zermatt.se](http://www.zermatt.se) and locate the latest installer in the download section. Unzip the file and run zermatt\_3\_0\_XXXX.msi where XXXX will represent the latest release build of the software. If you have obtained a license key 'z3key.zlc' put this file in the folder where Zermatt 3.0 was installed.**

**Examples of where to put 'z3key.zlc'**

**On 32-bit Win XP**

**C:\Program\Zermatt\Zermatt3\z3key.zlc**

**On 64-bit Win XP**

**C:\Program Files (x86)\Zermatt\Zermatt3\z3key.zlc**

**Run Zermatt 3.0.**

**The installer should have placed a shortcut on your desktop.  
The startup screen will confirm your license details.**

**Restrictions when running Zermatt 3.0 without a license:**

- . Program will terminate after 4 minutes.**
- . You cannot save the project.**
- . You cannot export a stand-alone .exe file for distribution.**

**Everything else is identical to the fully licensed version of Zermatt 3.0.**

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## 2.2 LICENSE

**The full version of Zermatt 3.0 is purchased at [www.zermatt.se](http://www.zermatt.se).  
This will give you a license keyfile.**

[X] Install and activate Zermatt 3.0 at the same time

See section 2.1 above.

[X] Activate an already installed version of Zermatt 3.0

You must have obtained a license key 'z3key.zlc'  
Put this file in the folder where Zermatt 3.0 was installed.

Examples of where to put 'z3key.zlc'

On 32-bit Win XP

C:\Program\Zermatt\Zermatt3\z3key.zlc

On 64-bit Win XP

C:\Program Files (x86)\Zermatt\Zermatt3\z3key.zlc

The Zermatt 3.0 startup screen will confirm your license details.

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## 2.3 QUICK START

1. Export a .3ds from your modelling application (ArchiCAD, AutoCAD, 3ds Max, Sketchup, ...).  
You have to make sure that one unit in your 3ds file equals one meter. Any texture maps must be in the same folder as the actual .3ds file.
2. Launch Zermatt 3.0 and in the 'FILE' tab locate the 'IMPORT' button and choose your .3ds file.
3. Zermatt 3.0 will import the model, converting it into its own internal format.
4. Locate the 'CONTROLS' tab to see what keys are available to navigate. Press ESCAPE to hide the interface.
5. Move around until you are comfortable navigating the camera. The next step will discuss how to record a simple walkthrough clip.
6. Hold down LEFT SHIFT and press R. You will enter the RECORD MODE. Click the LEFT MOUSE BUTTON to start/stop recording your movements. When done, hold down LEFT SHIFT and press R.  
Press ESCAPE to show the interface. Locate the 'GALLERY' tab. Here you can name, delete and re-arrange your walkthrough clips.

NOTE: This last step is only possible using the fully licensed version of Zermatt 3.0.

7. Go to the 'FILE' tab and press the 'SAVE' button to save your project. Then press 'EXPORT' to export a stand-alone .exe file that can be played on other computers.

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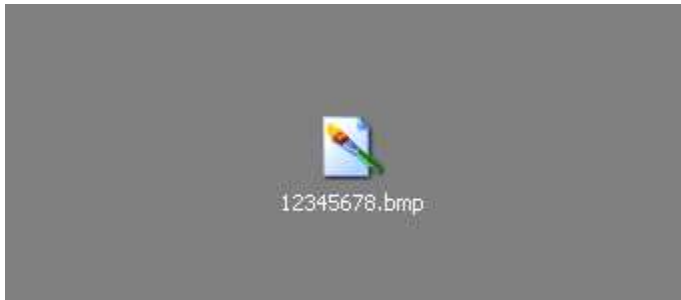
## 2.4 IMPORTING MODELS

You import .3ds files into Zermatt 3.0 through the file section in the interface. Refer to section 2.8 on how to use the 'sorted transparency' option. One unit in Zermatt is 1 meter. One unit in your .3ds file must be 1 meter. There is no scale feature when importing to Zermatt 3.0.

The 'Greyscale' option will convert the whole model into greyscale (materials and textures) during import.

Please refer to section 4 in this document on how to set up your modeling program to work with Zermatt 3.0.

**IMPORTANT:** The 3ds format does not support texture map file names longer than 8 letters. Some programs will take care of this for you when exporting, other programs require you to rename the textures yourself. Here is an example of the longest filename possible:



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## 2.5 TEXTURE MAPS

When you import a .3ds file into Zermatt 3.0, any textures referred to inside the .3ds file will be imported as well.

The textures must be located in the same folder as the .3ds file.

The maximum size of your texture, as rendered inside Zermatt 3.0, is determined by your graphics card. Zermatt 3.0 will rescale the texture, if needed, to match this.

The following file-formats are supported:

**JPG (.jpg or .JPG)**  
Always 24 bit.

**BMP (.bmp or .BMP)**  
8, 24 or 32 bit.

**TGA (.tga or .TGA)**  
8, 24 or 32 bit.

**TIF (.tif or .TIF)**

**8,24 or 32 bit.**

**Only uncompressed tif files are supported. LZW or JPG compressed .tif files will not load.**

**DDS (.dds or .DDS)**

**Must be of format DXT1 or DXT5 and have powers-of-two dimensions.**

**[X] Working with alpha channels:**

**Any 32-bit texture will be treated as transparent and rendered using its alpha channel.**

**If sorted transparency is enabled, the object using this texture will be sorted for accurate layering effects.**

**See section 2.8 for more on this.**

**If a texture would fail to load for some reason, the object that uses it will be drawn with the material color instead.**



## **2.6 SHADOWS**

**Shadows in Zermatt 3.0 are rendered using the OpenGL ARB\_shadow extension. It works by rendering the scene, from the sun's point-of-view, into a texture map. This texture map is then projected onto the scene and OpenGL will compute if a pixel is in shadow or not. Larger texture maps will produce higher quality shadows. The maximum size is determined by your graphics card. It depends on the graphics memory available as well as the maximum texture size that is allowed. Some graphics cards may have 256 MB on-board memory, but only allow a maximum texture size of 4096 x 4096.**

**A shadow texture is typically 24-bit.**

**A 8192x8192 shadow texture will consume 200 MB of video memory.**

**A 4096x4096 shadow texture will consume 50 MB of video memory.**

**A 2048x2048 shadow texture will consume 12.5 MB of video memory.**

**Zermatt 3.0 will automatically try to generate the largest possible shadow texture, starting with 8192 x 8192, then if this fails, try half that size and so on.**

**The shadows altitude, azimuth (heading) and brightness is controlled via the settings interface.**

**If your rendering is slow for some reason, turn off instant update so that the shadows are only recomputed after the value is set and you release the mouse (the value slider).**

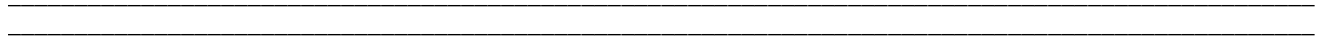
**If the ALPHA SHADOWS option in the settings interface is set to 1, the alpha portion of a 32-bit texture is used when computing shadows, so that you can create special effects such as the sun shining through a fence. Having this option turned on can make the shadows update slower.**



## **2.7 OCCLUSION CULLING**

Occlusion culling can be enabled or disabled through the settings interface.

When occlusion culling is on, Zermatt 3.0 will compute what objects are visible from the current camera position and render only these. Computing this information is somewhat expensive so you may actually gain performance by turning this feature off, and letting your graphics card simply plow through all the polygons. On the other hand, if you model contains lots of highly detailed, smaller objects that are often covered behind walls, for example a large office complex with many smaller rooms, each with complex interior detail - occlusion culling may make a huge difference in performance.



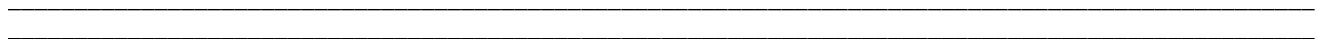
## 2.8 TRANSPARENT MATERIALS

Zermatt 3.0 will use the transparency value of the material in the .3ds file. If this value is between 10 and 90, objects will be rendered with 50% transparency. Using 50% for everything has turned out to be robust in most situations. So using a transparency value of 10, 11, 46, 50 or 90 will all produce 50% transparency in Zermatt 3.0. Using a value of 0, 7, 91 or 100 will result in a completely solid, non-transparent effect.

Transparent textures are enabled by using a texture's 4th color channel, the alpha channel. Refer to listing 2.5 here to determine what texture formats are available.

If a texture map has an alpha channel (i.e. is a 32-bit texture) it will be rendered as transparent. There is a control named 'sorted transparency' in the file interface. If a .3ds model is imported with this feature on, objects are sorted from the camera's perspective, every frame, so that alpha transparency effects are as accurate as possible. If a .3ds model is imported with this feature off, objects will not be sorted. This may still look perfectly right, depending on the effect you are trying to achieve. Sorted transparency can be expensive so it is best to try out what works best with a particular scene.

If the ALPHA SHADOWS option in the settings interface is set to 1, the alpha portion of a 32-bit texture is used when computing shadows. More on this in section 2.6.



## 2.9 TWO SIDED MATERIALS

If a material is flagged as two-sided in the source .3ds file, you can enable the rendering of these in the settings interface.

Using a two-sided material on an object means the object has to be rendered twice, one time with all triangles facing

in one direction, then another time with all triangles facing in the opposite direction. This will obviously slow down performance and this is why two-sided materials are never used in computer games or other performance critical rendering engines.

However, some modeling programs support this, and some objects are built using them, so turning this feature off, may produce holes in certain objects.

If you experience sudden holes or missing parts in a model, chances are that these triangles are flipped the wrong way. The best solution for optimal performance would be to re-model these objects at the source, that is, to flip the missing polygons.

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### 3.1 NAVIGATION POINTS

Press 'N' on the keyboard at any time to add the current camera position to the gallery. You can later access this position by clicking on the name. You can store up to 13 navigation points.

To rename a navigation point, press 'ENTER' while having the navigation point selected in the list.

The current physics mode (walking or flying) is stored in a navigation point. Both perspective mode and orthographic mode (F8) can be stored.

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### 3.2 WALKTHROUGH ANIMATIONS

Hold down 'SHIFT' and press 'R' to enter and exit record mode. Press the left mouse button to start and stop the recording. A pause/play symbol will indicate if you are recording or in pause mode.

A new clip will be generated with every start/stop pair. The clips are available in the gallery interface. The clips can be deleted, renamed and moved up or down in the list.

To rename a clip, press 'ENTER' while having the clip selected in the list, press 'ENTER' again when done.

When the 'SEQUENCER' option is on, all clips in the list will be played in sequence.

Clips can be played and stopped by clicking on their name in the clip list.

Clips can also be played and stopped from the current position using the 'P' key.

Use **SHIFT + P** to play from top of sequence.

Playback can be interrupted at any time by interacting with the camera yourself.

Both perspective mode and orthographic mode (F8) can be recorded.

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### 3.3 SCREENSHOTS

Press 'F5' to print the current view to a 24-bit .bmp. The image will have the same resolution as your current viewport ( your desktop resolution ).

The .bmp file will be saved with a unique name into the folder 'Program Files\Zermatt\Zermatt3\Screenshot\' when running Zermatt 3.0. When print screenshots from a stand-alone .exe file, the screenshot will be saved into the same directory as the .exe.

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### 3.4 MEASURE TOOL

Press 'M' to enable the measure tool.

The three-dimensional distance from the camera to the world point at the center is computed and displayed as 'View Distance'.

To measure the distance between two three-dimensional points, click the Left Mouse Button to pick two points. The resulting distance is computed and displayed as 'Measured Distance'.

(COMING SOON: Perpendicular Locking : Option to force the measurements to the triangle face normal.)

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### 3.5 ORTHOGRAPHIC VIEW

Press 'F8' to enable the orthographic view. Use the mouse to rotate the model. Use the mousewheel to zoom in/out. Hold down the Right Mouse Button and move the mouse to pan over the model.

Stereoscopic rendering is currently not supported in orthographic view.

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### 3.6 SPECIAL KEYBOARD COMBINATIONS

Holding down Z then pressing ESCAPE will quit.

Holding down SHIFT and CONTROL at the same time will activate lightspeed, X10 faster than run.

Holding down the right mouse button while flying will make you stay on a fixed altitude. This is useful when recording the camera flying over a building for example.

Holding down the right mouse button while walking will lock the view horizontally for a perfectly straight perspective.

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### 3.7 USING A CUSTOM SKYBOX

To use a custom skybox, you need to replace the six skybox textures in:

`\Program Files\Zermatt\Zermatt3\Skybox\`

The six images need to be exact 90 degree projections.

The textures must be in .bmp format.

It is also recommended that you provide images with powers-of-two dimensions, such as 1024x1024, to avoid Zermatt having to rescale your textures.

Skybox textures are not compressed in Zermatt 3.0 since they often has smooth gradients that does not compress well. The skybox images will be stored as uncompressed in your .exe file.

**Terragen v0.9.43 was used to generate the Zermatt 3.0 skyboxes.**


**Just render out 5 images XN,XP,ZN,ZP,YP.bmp and make sure the sun heading in Terragen is set to 0 for the azimuth control in Zermatt 3.0 to behave correctly.**

**It is recommended to provide the texture YN.bmp as well to avoid rendering artifacts. For example you can just set it to a plain color.**

**Here is how to set up Terragen for skybox rendering to Zermatt 3.0:**

### Rendering Control

**Image**



Render Preview

Land  Sky

Detail

Render Settings...

Image Size... 2048 x 2048

Render Image Animation...

Last Image: View Save

Camera  Terrain units  Metres

x y z (alt)

Camera Position

Fixed Height Above Surface

Target Position

Fixed Height Above Surface

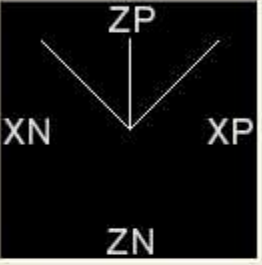
head pitch bank

Camera Orientation

Use Mouse Buttons to describe the camera's view.

Left button positions the Camera, and Right button positions the Target.

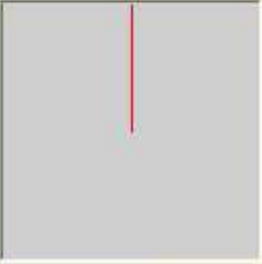
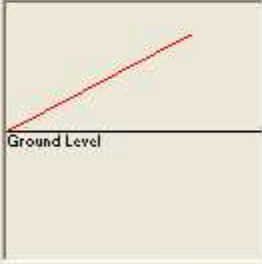
Camera Settings...



Exposure  Zoom

### Lighting Conditions

Open... Save...

Ground Level

Sun Heading  Sun Altitude

Terrain Casts Shadows

Clouds Cast Shadows

Shadows in Atmosphere

Shadows on Water

Effects...

Accessories...

Direct Sunlight | Background Light | Sun's Appearance | Lighting of Atmosphere

Control if and how Sunlight is diminished and reddened by Atmosphere and Clouds.

Specify Sunlight Colour

Sunlight Strength

Effect of Atmosphere

Realistic Sunlight Penetration System

Where cloud-casting not used, use uniform shadow:-

Percent Cloudcover

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## 3.8 SETTING CAMERA LIMITS

If you want to restrict where the camera can go/fly here is what you should do:

Construct a simple box that defines the space where the camera can be. The box should be axis-aligned. It does not matter what material you are using. You must name the box 'zlimits' or 'ZLIMITS'.

Zermatt 3.0 will detect this mesh name during import and restrict the camera to this volume.

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## 3.9 CONSOLE COMMANDS

Press ESCAPE to enable the Zermatt 3.0 interface.

Press the console button, the one just under the ESCAPE button, next to the 1 button.

This will enable the console. You can write into it then press ENTER to store a command.

To set a state, write the command followed by '1' to enable, or '0' to disable.

For example, to enable the Measure Tool key 'M', write the following into the console then press ENTER

**K\_M 1**

And to disable

**K\_M 0**

'K\_M' is the command and '0' and '1' is the value you set it to.

**NOTE: Zermatt 3.0 console only produces capital letters. To write underscore '\_' use RIGHT SHIFT.**

Here are some other Zermatt 3.0 flags that can only be set via the console:

Enable/disable the Walk/Fly key 'F':

**K\_F 1**

**K\_F 0**

Enable/disable the Screenshot key 'F5':

**K\_F5 1**

**K\_F5 0**

Enable/disable the Perspective/Orthographic key 'F8':

K\_F8 1

K\_F8 0

Enable/disable if the skybox should rotate with the sun azimuth:

S\_ROT 1

S\_ROT 0

Enable/disable the skybox from rendering:

R\_SKY 1

R\_SKY 0

#### Other commands

To set the background color when the skybox is disabled you write:

'R\_COLOR R,G,B,A' where R,G,B,A is the Red, Green Blue and Alpha value as floats in the range 0.0 to 1.0.  
The alpha value does not matter.

To make a magenta background you would write:

R\_COLOR 1,0,1,0

To make a muted red background you would write:

R\_COLOR 0.4,0,0,0

To make a 50% grey background you would write:

R\_COLOR 0.5,0.5,0.5,0

To set the eye height of the camera you write:

'C\_EYE VAL where VAL is the height in meters.

Eye height values between 1.4 and 2.0 are accepted.

To set the camera to the default eye height of 1.7 meters you would write:

C\_EYE 1.7

To set the camera position you write:

'C\_POS X,Y,Z where X,Y,Z is the camera position in x,y,z Zermatt 3.0 coordinates, in meters.

Note that the z axis is negative.

To set the camera to a position 100 meters in x, at eye height and 140.5 meters in z you would write:

C\_POS 100,1.7,-140.5

To set the camera physics tolerance you write:

'C\_TOL VAL where VAL is the camera tolerance to the nearest polygon in meters.

Values in the range 0.1 - 0.4 are valid. Default is 0.25.

To set the tolerance to 0.25 meter you would write:

C\_TOL 0.25

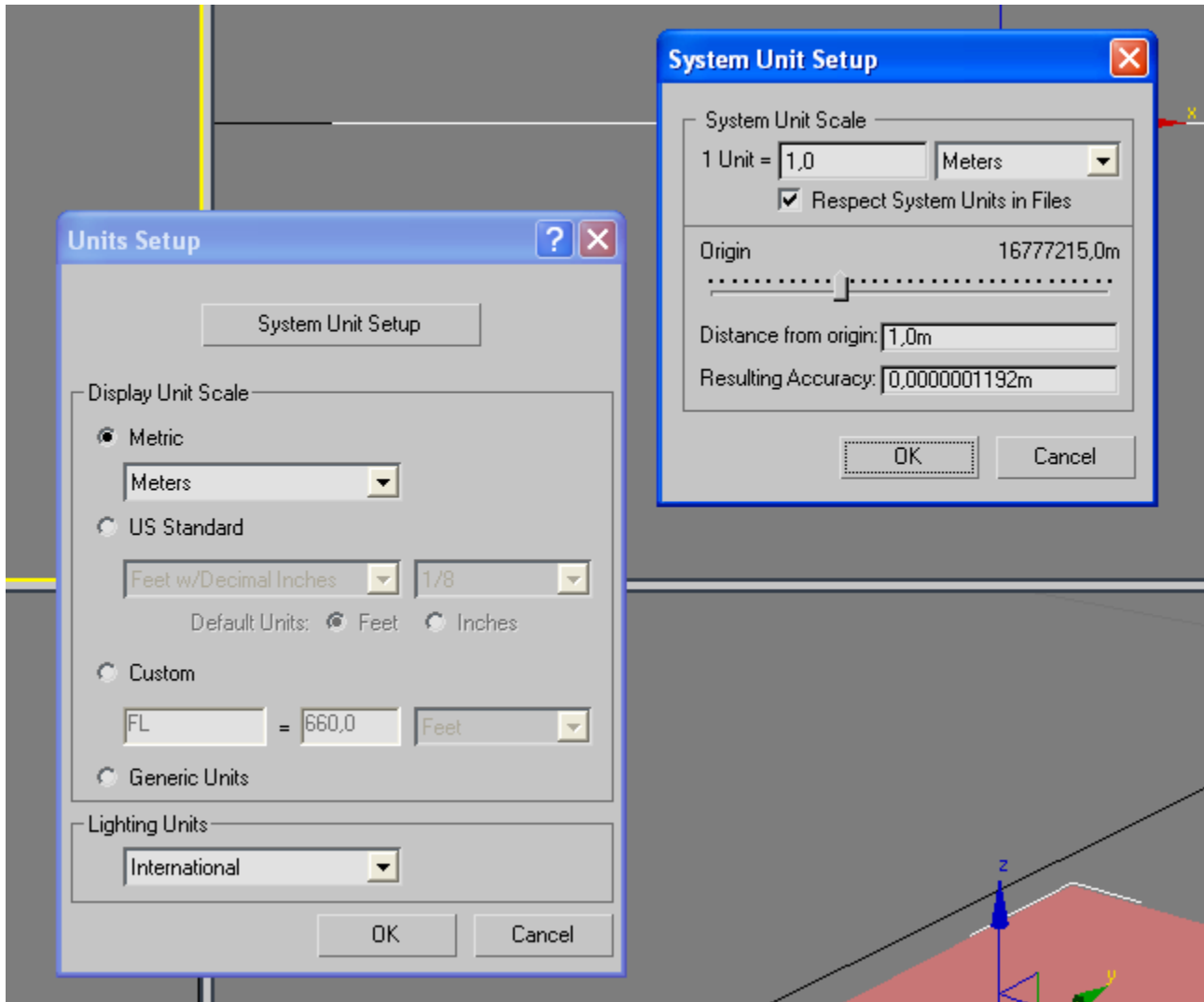
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## 4.1 CONFIGURING 3DS MAX

Here is how to set up the scale in 3ds Max 8.



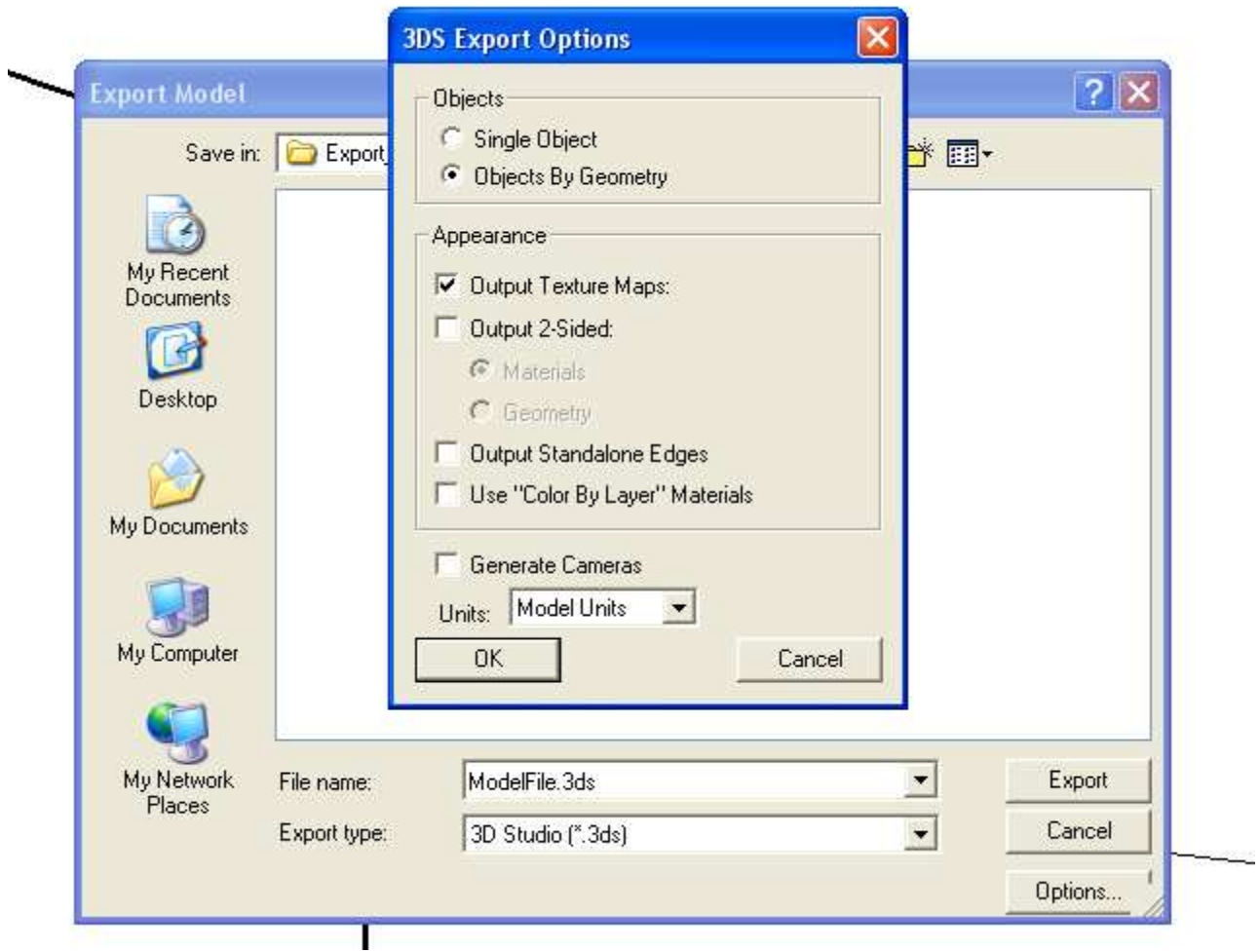
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## 4.2 CONFIGURING SKETCHUP

Here is how to export a .3ds from Sketchup that will work with Zermatt 3.0.  
One unit in the model must represent 1 meter.



You have to make sure you put any texture maps into the same folder as the .3ds file so that Zermatt 3.0 can find them.

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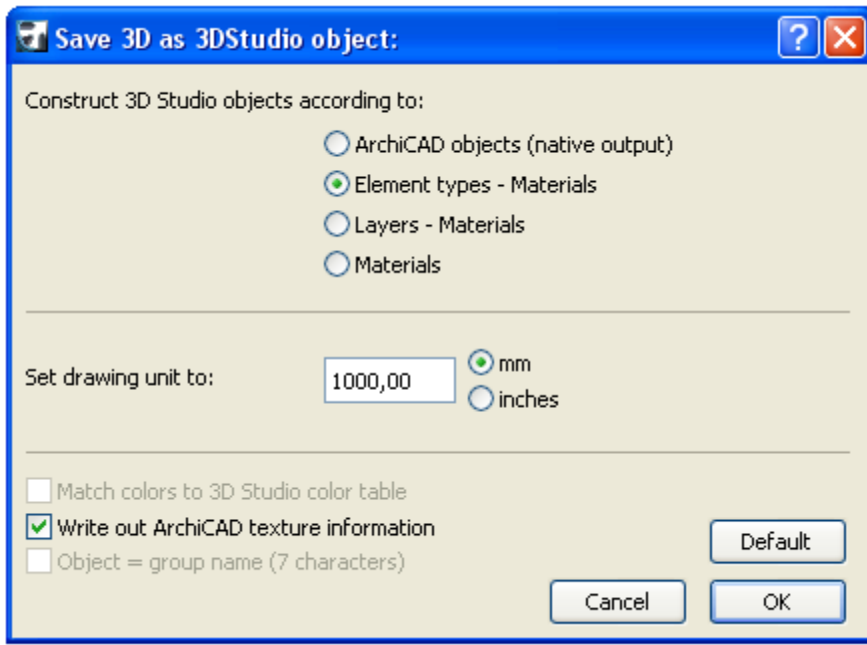
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### 4.3 CONFIGURING ARCHICAD

Here is how to export a .3ds from ArchiCAD that will work with Zermatt 3.0.

Choose Save 3D - '3DStudio File', create a new folder and save the .3ds in it. The textures will be saved into the same folder as the .3ds therefore it is good to create a new directory for every model you export.



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## 5.1 WALKING THROUGH DOORS

To disable the physics on an object, for example a door, so that you can walk through it, there are two approaches:

1. Put the word 'door' into the objects actual (mesh) name or in the objects material name.

Zermatt 3.0 will scan through each objects name and it's material name during import, and exclude all objects that contains 'door' from the physics engine.

Here are some examples of names that would not collide with the camera:

doorobject  
MatrDoor  
\_DoorObj  
objdoor23  
DooRmat

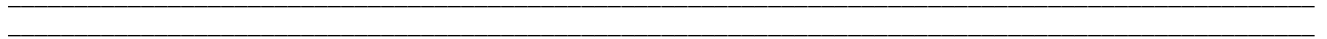
**NOTICE:**

There is a limit of 10 characters in the mesh name for a .3ds file. So if you name a mesh 012346789DOOR, the door part will be truncated and Zermatt 3.0 will no be able to detect the door.

Some programs may alter the names of your objects during export to .3ds.

**2.**

Objects that has a transparent material (either by having the transparency value set according to section 2.8 in this document or by having a 32-bit texture assigned) are always excluded from the collision/physics engine. So another way to avoid collision would be to assign a 32-bit texture to an object, then have a 100% white alpha channel which would still render the object completely solid.



## 5.2 MAXIMIZING PERFORMANCE

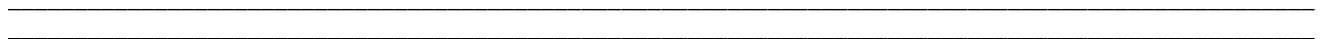
**[x] Set sorted transparency to 0 when importing your 3ds model.**

Transparent materials, when imported with 'sorted transparency' are slower to render than any other objects, since they cannot be rendered in larger groups. Instead they have to be render one object at a time to guarantee correct depth sorting.

**[x] Avoid using two-sided materials.**

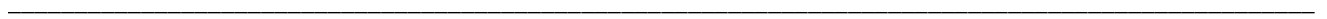
Using two-sided materials means every object has to be drawn twice, in effect cutting your framerate in half. Always try to use models that will look correct without having to be rendered as two-sided.

**[x] Set your graphics card driver's OpenGL option 'Vertical Sync' to 'Application Controlled'.**



## 5.3 VERTICAL SYNC

You should set your graphics card driver to allow Zermatt 3.0 to control 'Vertical Sync' or setting it to OFF. This will often improve performance, since with Vertical Sync ON, your computer will render the scene at your computer monitors refresh rate. Which is something like 60 hz. Your computer may be able to render the scene at 600 hz (fps). Especially the physics calculations will benefit from extra cpu cycles not syncing with the monitor.



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**VISIT [WWW.ZERMATT.SE](http://WWW.ZERMATT.SE) FOR THE LATEST VERSION OF THIS  
DOCUMENT**

**ZERMATT AB 2008**

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