Exporting Images, Animations, and CAD Files

IN THIS CHAPTER

>> **Creating 2D views of your model as TIFFs, JPEGs, and PNGs**

>> **Exporting the kind of movie file you need**

>> **Exporting a CAD-friendly DWG file**

Awesome 3D models need to be shared. The folks who create SketchUp understand this, and the software includes a multitude of ways to share your models with other people and programs. Want to send a JPEG of your newly modeled custom home to your parents? How about a movie that shows what it's like to walk through that home? Need to turn your house model into a CAD-friendly DWG file for the builder? SketchUp can do all this and more.

SketchUp Make (the free version) can export raster images and movies. SketchUp Pro can export raster images and movies, along with vector images, CAD files, and a bunch of other 3D formats. This chapter covers the basics that most SketchUp Make or Pro beginners will need: common raster image formats, basic video formats, and CAD files.

Exporting 2D Images of Your Model

Both SketchUp Make and Pro can export 2D views of your model as *raster* images, which are images made of lots of tiny pixels. When you're exporting an image, it's helpful to know a little bit about graphics file formats in general. If you're already an aficionado about these sorts of things, or if you're in a big hurry, you can skip ahead to the section "Exporting a raster image from SketchUp."

TIP   If you have SketchUp Pro, you also have LayOut, which offers a much better way to export images. In fact, LayOut may be able to replace whatever application is the reason you're trying to export an image in the first place. Take a look at Chapter 14 for an introduction to LayOut.

Introducing raster versus vector files

Pictures on your computer are divided into two basic flavors: *raster* and *vector*. The difference between these two categories of file types has to do with how they store image information. Here's the one-minute version:

>> **Raster:** Raster images are made up of dots. (Technically, these dots are *pixels,* just like the pixels that make up images you take with a digital camera.) Raster file formats consist of information about the location and color of each dot. When you export a raster, you decide how many dots (pixels) it should include, which directly affects how big the image can be displayed. SketchUp exports TIFF, JPEG, and PNG raster images; the Windows version also exports BMPs, although that's nothing to get excited about. You can read more about raster images in the sidebar "Understanding rasters: Lots and lots of dots," later in this chapter.

>> **Vector:** Vector images consist of instructions written as algorithms. These algorithms describe *how* to draw the image to whatever software tries to open it. The major advantage of using vector imagery (as opposed to raster) lies in its *scalability* — vectors can be resized larger or smaller without affecting their image quality, whereas rasters lose quality if you enlarge them too much.

TECHNICAL
STUFF   SketchUp Make can export only raster images, but SketchUp Pro can export vectors in both PDF and EPS file formats.

Exporting a raster image from SketchUp

The process of exporting an image of your SketchUp model is fairly straightforward. Depending on which format you choose, the export options are slightly different, but we address them all in this

section.

Follow these steps to export a raster image from SketchUp:

1. **Adjust your model view until you see exactly what you want to export as an image file.**

   SketchUp's raster image export is *WYSIWYG* — What You See Is What You Get. Basically, your entire modeling window view is exported as an image, so use the navigation tools or click a scene to set up your view. Use styles, shadows, and fog to make your model look exactly the way you want it to. To change the proportions of your image, resize your SketchUp window. Follow these steps to do so:

   a. *Windows only: If your SketchUp window is full screen, click the Minimize button in its upper-right corner.*

   b. *Drag the Resize tab in the lower-right corner of your SketchUp window until the modeling window is the right proportion.*

   In Figure 13-1, we want to export a wide view of a house, so we adjust the proportions of the modeling window until things look right.

   TIP   You may be wondering whether *everything* in your modeling window shows up in an exported raster image. The red, green, and blue axes don't, which is good, but guides do, which is usually bad. If you don't want your guides to be visible in your exported image, deselect Guides on the View menu.

2. **Choose File ⇒ Export ⇒ 2D Graphic.**

   The File Export dialog box opens.

3. **Select the file format you want to use from the Format drop-down list.**

   TIP   Before you choose JPEG by default, know that this file type isn't always the best choice. For a complete description of each format (as well as recommendations for when to choose each), see the section "Looking at SketchUp's raster formats," later in this chapter.

4. **Choose a name and a location on your computer for your exported image.**

5. **Click the Options button.**

   The Export Options dialog box opens, where you can control how your image is exported. Figure 13-2 shows what this dialog box looks like for each of SketchUp's raster file formats.

6. **Adjust the settings in the Export Options dialog box.**

   Here's a description of what the settings do:

   • *Use View Size:* Selecting this check box tells SketchUp to export an image file that

contains the same number of pixels as are currently being used to display your model on-screen. If you plan to use your exported image in an e-mail or on-screen presentation (such as PowerPoint), you can select Use View Size. However, manually setting the width and height is better.

- *Width and Height:* When you don't select the Use View Size check box, you can manually enter the size of your exported image. Because this process requires a fair amount of figuring, we devote a whole section to it; take a look at "Making sure you export enough pixels," later in this chapter, to find out what to type into the Width and Height boxes.

- *Anti-Alias:* Because raster images use grids of colored squares to draw pictures, diagonal lines and edges can sometimes look jagged and, well … lousy. *Anti-aliasing* fills in the gaps around pixels with similar-colored pixels so that things look smooth. Figure 13-3 illustrates the concept. In general, you want to leave anti-aliasing on.

- *Resolution (Mac only):* This is where you tell SketchUp how big each pixel should be, and therefore how big (in inches or centimeters) your exported image should be. Pixel size is expressed in terms of pixels per inch/centimeter. This option is available only when the Use View Size check box isn't selected. See "Making sure you export enough pixels," later in this chapter for help choosing a resolution.

- *Transparent Background (not for JPEGs):* You can export a TIFF or PNG file with a transparent background, which can make selecting your model in an image editor easier. Exporting your image with a transparent background is also a nice way to use image-editing programs like Photoshop to drop in a sky and ground plane later.

- *JPEG Compression (JPEG only):* This slider lets you decide two things at the same time: the file size of your exported image and how good the image will look. The two are, of course, inversely related; the farther to the left you move the slider, the smaller your file will be, but the worse it will look. Never set JPEG compression to less than 8 — your models take too long to build for you to make them look terrible on export.

7. **Click OK to close the Export Options dialog box.**

8. **Back in the File Export dialog box, click the Export button to export your raster image file.**

   You can find your exported file in whatever location on your computer you specified in Step 4. What you do with it is entirely up to you — you can e-mail it, print it, or use it in another software program to create a presentation.

   Don't be alarmed if the export process takes longer than you think it should. If you export a pretty big image (one with lots and lots of pixels), the export takes a while. Take the opportunity to call your mother — she'll appreciate it.

SketchUp modeling window

Exported image

FIGURE 13-1: Adjust your view and your modeling window until things look the way you want them to in your exported image.

Export options for TIFF, PNG, and BMP files

Extended Export Image Options   ✕

Image Size

☑ Use view size

    Width: 1029   pixels

    Height: 369   pixels

Rendering

☑ Anti-alias

☐ Transparent Background

                    OK   Cancel

Export options for JPG files

Export JPG Options   ✕

Image Size

    ☑ Use view size

        Width: 1029   pixels

        Height: 369   pixels

Rendering

    ☑ Anti-alias

JPEG Compression

    Smaller file ————————⌡ Better quality

                    OK   Cancel

FIGURE 13-2: The Export Options dialog boxes for TIFFs, PNGs, and BMPs (left) and JPEGs.
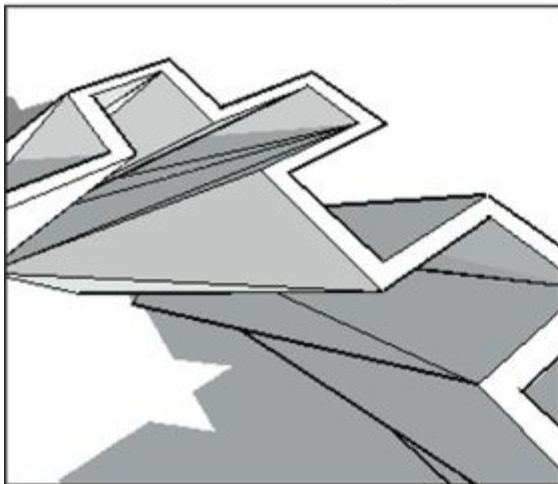
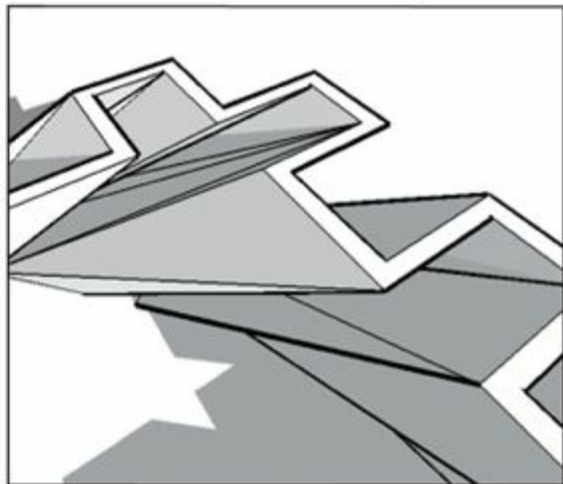## No anti-aliasing   With anti-aliasing

FIGURE 13-3: A view of the same image with anti-aliasing off (left) and on.

UNDERSTANDING RASTERS: LOTS AND LOTS OF DOTS

When you look at a photograph on your computer, you're really looking at a whole bunch of tiny dots of color, or *pixels*. These are arranged in a rectangular grid called a *raster*. Digital images that are composed of pixels arranged in a raster grid are *raster images*, or *rasters* for short. Have a look at the first image in the figure below for a close-up view of a raster image. Here are some things to keep in mind about rasters:

- **Rasters are everywhere.** Almost every digital image you've ever seen is a raster. TIFF, JPEG, and PNG are three of the most common raster file formats, and SketchUp exports them all.

- **Rasters are flexible.** Every two-dimensional image can be displayed as a raster; a grid of colored squares is an incredibly effective way of saving and sharing picture information. As long as you have enough pixels, any image can look good as a raster.

- **Rasters take up a lot of space.** If you think about how raster images work, it takes a lot of information to describe a picture. Digital images are made up of anywhere from thousands to millions of pixels, and each pixel can be any one of millions of colors. To store a whole picture, a raster image file needs to include the location and color of *each* pixel; the bigger the picture is, the more pixels are needed to describe it, and the bigger the file size gets.

- **Rasters are measured in pixels.** Because every raster image is made up of a specific number of pixels, you use a raster's *pixel dimensions* to describe its size. If we told you that we e-mailed you a photograph that was 800 x 600, you could expect to receive a picture that is 800 pixels wide by 600 pixels tall. (See the following figure.) Pixels don't have a physical size on their own — they're just dots of color. You determine a picture's physical size by deciding how big its pixels should be; this is referred to as *resolution* and is generally expressed in terms of *pixels per inch (ppi)*. Check out the section "Making sure you export enough pixels," later in this chapter, for the whole scoop.

Why use pixels instead of inches or centimeters to describe the size of a digital image? It all has to do with how computer screens work. Because not all screens display things at the same size, it's impossible to predict how *big* an image will look when it shows up on someone's computer. Depending on the person's display settings, an 800-x-600-pixel image may be a few inches across, or it may take up the whole screen. Giving a digital image's dimensions in pixels is the only accurate way of describing how "big" it is.
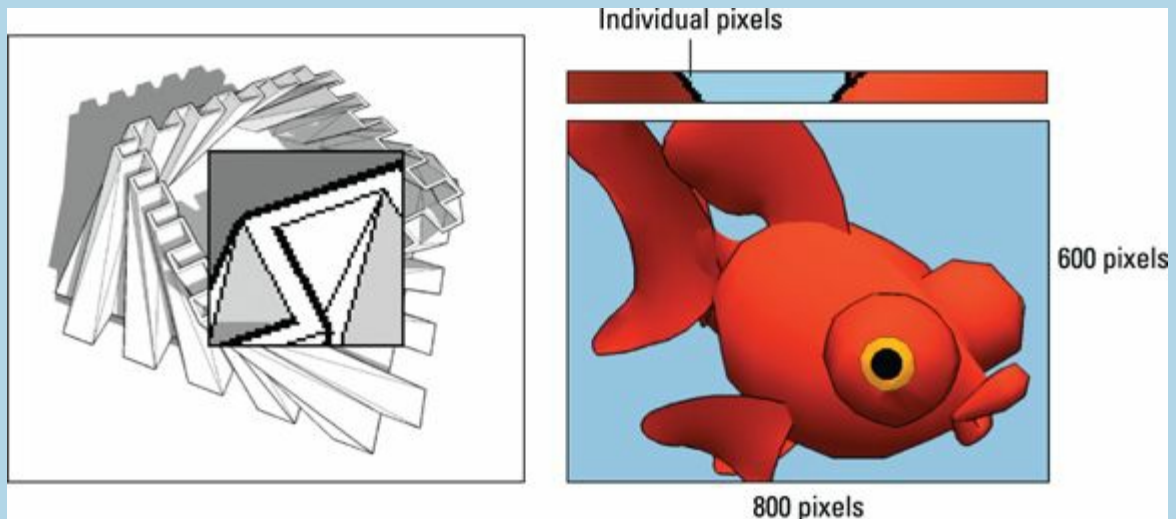
Looking at SketchUp's raster formats

So you know you need to export a raster image from SketchUp, but which one do you choose? You have four choices in Windows; three of them are available on the Mac. The following sections give

you the details.

When you export a raster image, you're saving your current view in SketchUp to a separate file somewhere on your computer. As a raster image, that file consists of tiny, colored dots, or *pixels* — more pixels than you can shake a stick at. When you look at all the pixels together, they form an image.

Tagged Image File (TIFF or TIF)

TIFFs are the stalwarts of the raster image file format world; everyone can read them and just about everyone can create them. *TIFF* stands for Tagged Image File Format, but that's hardly important. Here's everything you need to know about TIFFs:

>> **When image quality is important, choose TIFF.** Unless file size is a concern (because, for example, you need to send an image by e-mail), always export a TIFF if you need a raster image. For everything from working in Photoshop to creating a layout in InDesign or QuarkXPress, a TIFF can provide the image quality you need.

>> **TIFFs don't compress your image data.** That means they don't introduce any garbage like JPEGs do, but it also means that they're really big files.

>> **Pay attention to your pixel count.** If you're exporting a TIFF, you're probably looking for the best image quality you can get. And if that's the case, you need to make sure that your TIFF is "big" enough — that it includes enough pixels — to display at the size you need. Have a look at "Making sure you export enough pixels," later in this chapter, for more information.

Joint Photographic Experts Group (JPEG or JPG)

JPEG stands for Joint Photographic Experts Group, which makes it sound much fancier than it really is. Almost every digital image you've ever seen was a JPEG (pronounced *JAY-peg*); it's the standard file format for images on the web. Check out these JPEG details:

>> **When file size is a concern, choose JPEG.** The whole point of the JPEG file format is to compress raster images to manageable file sizes so that they can be e-mailed and put on websites. A JPEG is a fraction of the size of a TIFF file with the same number of pixels, so JPEG is a great choice if file size is more important to you than image quality.

>> **JPEGs compress file size by degrading image quality.** This is known as *lossy* compression; JPEG technology basically works by tossing out a lot of the pixels in your image. JPEGs also introduce a fair amount of pixel garbage; these smudges are *artifacts,* and they're awful.

>> WARNING **JPEG + SketchUp = Danger.** Because of the way the JPEG file format works, JPEG exports from SketchUp are particularly susceptible to looking terrible. Images from

SketchUp usually include straight lines and broad areas of color, both of which JPEG has a hard time handling. If you're going to export a JPEG from SketchUp, make sure that the JPEG Compression slider is *never* set less than 8. For more details, see the section "Exporting a raster image from SketchUp," earlier in this chapter.

Portable Network Graphics (PNG)

REMEMBER Hooray for PNG! Pronounced *ping*, this graphics file format is our hero. Unfortunately, it isn't as widely used as it should be. If we had our druthers, every raster export from SketchUp would be a PNG. Why? Because, at least as far as SketchUp is concerned, PNG combines all the best features of TIFF and JPEG. PNG details are as follows:

» **PNGs compress image data *without* affecting image quality.** As a *lossless* compression technology, PNGs are smaller files than TIFFs (just like JPEGs), but they don't mess up any pixels (totally unlike JPEGs). Granted, PNGs aren't as small as JPEGs, but the difference in image quality is worth a few extra bits.

» **If you're exporting an image for someone who knows a thing or two about computers, choose PNG.** The truth is that some software doesn't know what to do with a PNG, so using it involves a risk. If you plan to send your exported image to someone who knows what he's doing, go ahead and send a PNG — he'll be impressed that you're "in the know." If the recipient of your export is less technologically sophisticated, a JPEG or TIFF file may be a safer choice.

TECHNICAL STUFF The PNG file format wasn't developed to replace JPEG or TIFF; it was supposed to stand in for *GIF* (Graphics Interchange Format), which is a file type that SketchUp doesn't export. Without going into too much detail, folks use JPEG for images like photographs and GIF for things like logos. Because exported SketchUp views usually have more in common with the latter, PNG (the replacement for GIF) is the better choice. So why can't PNG replace JPEG and TIFF? For most photographs (which are the majority of images on the web), JPEG is better than PNG because it produces smaller files, which in turn yields faster load times when you're surfing the Internet. TIFF is more versatile than PNG because it supports different *color spaces*, which are important to people in the printing industry. For reasons that are beyond the scope of this book and that aren't relevant to exports from SketchUp, PNG is still the best — if not the safest — choice.

Windows Bitmap (BMP)

Windows Bitmap, or BMP, files are old school; they can be used only on Windows, and they're big. If a BMP were a car, it would be an old van with a rusted-out floor. As you can probably guess, we don't recommend using BMPs for anything.

Making sure you export enough pixels

With raster images, it's all about pixels. The more pixels your image has, the sharper the image is, and the bigger it can be displayed or printed. Figure 13-4 shows the same image three times. The first image is 150 x 50, meaning that it's 150 pixels wide by 50 pixels high. The second image is 300 x 100, and the third is 900 x 300. Notice how the image with more pixels looks a lot better? That's the whole point of this section.

150 x 50 pixels

300 x 100 pixels

900 x 300 pixels

FIGURE 13-4: More pixels yield a much more detailed image.

TIP   Why not always export a truckload of pixels, just in case you need them? There are two reasons:

>> Image exports with lots of pixels take a long time to process.

>> Raster images are very big files. If you want to share an image digitally via e-mail or the web, you want enough pixels to make the image look good on-screen but not so many that your

recipient acquires a few gray hairs or gums up their Internet connection trying to download the image.

How many pixels you need to export depends on what you're going to use the image *for*. Very broadly, you can do two things with your image:

>> Display or project it on a screen, digitally.

>> Print it.

In the next two sections, we talk about each of these possibilities in detail.

Exporting enough pixels for a digital presentation

If you plan to use your exported image as part of an on-screen presentation, it's helpful to know what computer monitors and digital projectors can display:

>> The smallest, oldest devices currently in use have images that are 1024 pixels wide by 768 pixels high.

>> At the other end of the spectrum, high-end, 30-inch LCD monitors display 2560 x 1600 pixels.

So it stands to reason that if you're exporting an image that will be viewed only on-screen, you need to create an image that's somewhere between 800 and 2500 pixels wide. Table 13-1 provides some guidelines on image sizes for different digital applications.

TABLE 13-1 Suggested Image Sizes for On-screen Use

How the Image Will Be Used	Image Width (Pixels)
E-mail	400 to 800
Website, large image	600
Website, small image	200
PowerPoint presentation (full screen)	800 or 1024 (depends on projector)
PowerPoint presentation (floating image)	400

Understanding resolution: Exporting images for print

REMEMBER Images that you want to print need to have lots more pixels than ones that are going to display only on-screen. That's because printers — photo, inkjet, laser, and offset — all operate very differently than computer monitors and digital projectors. When you print something, the pixels in your image turn into microscopic specks of ink or toner. To make a decent-sized print of your exported image, it needs to contain enough *pixels per inch* of image. An image's pixel density, expressed in pixels per inch (ppi), is its *resolution*. What kind of resolution you need depends on three things:

>> **The kind of device you print to:** For home inkjet printers, you can get away with a resolution of as little as 150 ppi. If your image will be appearing in a commercially produced book, you need a resolution of at least 300 ppi.

>> **How far away the image will be from the audience:** There's a big difference between a magazine page and a trade-show banner. For close-up applications, a resolution of 200 to 300 ppi is appropriate. Large graphics that will be viewed from several feet away can be as low as 60 ppi.

>> **The subject matter of the image:** Photographic images tend to consist of areas of color that blur together a bit; these kinds of images can tolerate being printed at lower resolutions than drawings with lots of intricate detail. For images with lots of lines like SketchUp models, it's best to work with very high resolutions — 300 to 600 ppi — especially if the image will be viewed close-up.

Table 13-2 provides some guidelines for exporting images that will be printed.

TABLE 13-2 Recommended Resolutions for Prints

How the Image Will Be Used	Image Resolution (Pixels/Inch)	Image Resolution (Pixels/Centimeter)
8.5-x-11 or 11-x-17 inkjet or laser print	200 to 300	80 to 120
Color brochure or pamphlet	300	120
Magazine or book (color and shadows)	300	120
Magazine or book (linework only)	450 to 600	180 to 240
Presentation board	150 to 200	60 to 80
Banner	60 to 100	24 to 40

TIP   Keep in mind that the biggest raster image that SketchUp can export is 10,000 pixels wide or tall (whichever is greater). This means that the largest banner image, printed at 100 ppi, that SketchUp can create is about 100 inches wide. To make larger images, you need to export a *vector* file, which requires SketchUp Pro and is beyond the scope of this book.

Follow these steps to make sure that you export enough pixels to print your image properly:

1. **In the Export Options dialog box, make sure that the Use View Size check box is deselected.**

   To get to the Export Options dialog box, follow Steps 1–6 in the section "Exporting a raster image from SketchUp," earlier in this chapter.

2. **Decide on the resolution that you need for your exported image. (Refer to Table 13-2.)**

   Keep the resolution in your head or scribble it on a piece of paper.

3. **Decide how big your exported image will be printed, in inches or centimeters.**

   Note your desired physical image size, just like you did with the resolution in the preceding step.

4. **Multiply your resolution from Step 2 by your image size from Step 3 to get the number of pixels you need to export:**

   TIP   Resolution (pixels/in or cm) × Size (in or cm) = Number of pixels

   In other words, if you know what resolution you need to export, and you know how big your image will be printed, you can multiply the two numbers to get the number of pixels you need. Here's an example: 300 pixels/inch × 8 inches wide = 2400 pixels wide.

   To export an image that can be printed 8 inches wide at 300 ppi, you need to export an image that's 2400 pixels wide. Figure 13-5 gives an illustration of this example.

   TIP   SketchUp's default setting is to make your exported image match the proportions of your modeling window; that is, you can type only a width *or* a height, but not both. If you're on a Mac, you can manually enter both dimensions by clicking Unlink (which looks like a chain). You can always click it again to relink the width and height dimensions later.

5. **Type the width *or* height of the image you want to export, in pixels.**

   It's usually pretty hard to know *exactly* how big your image will be when it's printed, and even if you do, you probably want to leave some room for cropping. For these reasons, you might add 15–25 percent to the number of pixels you'll need. For example, if an image calls for 2400 pixels, you might export 3000 pixels, just to be safe.

   TIP   If you're on a Mac, things are a little easier because SketchUp's designers built a pixel calculator into the Export Options dialog box. Just enter your desired resolution in the appropriate spot, change the Width and Height units from pixels to inches or centimeters, and type your desired image size. SketchUp does the arithmetic for you.

6. **Click OK to close the Export Options dialog box.**
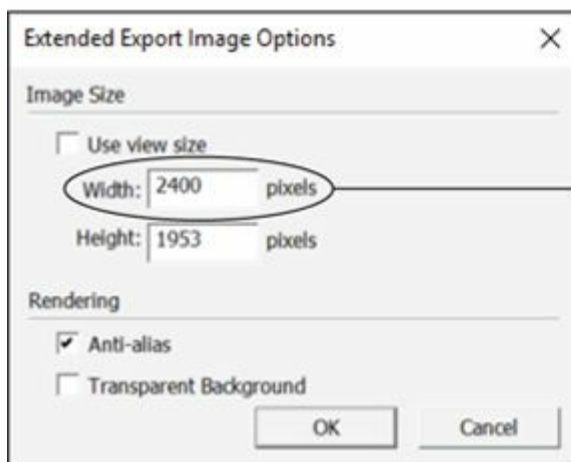
FIGURE 13-5: To figure out how many pixels you need to export, multiply the resolution by the physical size.