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Tips and Tricks for Adobe® Acrobat 3D


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Just for Tech Docs

Using Acrobat 3D Toolkit in technical documentation and illustration environments

by Robert Green

In the last two issues of *Acrobat Insider*, I talked about how using Adobe® Acrobat® 3D Toolkit can benefit engineers, designers, and CAD specialists. In essence, 3D Toolkit functions as a 3D CAD Swiss Army knife with an array of tools to blend a wide variety of data into a neutral format and provide an easy-to-use, yet more secure collaborative environment.

In this issue, I explain what the technical illustrator and technical writing communities can do with the design data furnished by their engineering/CAD colleagues and how Acrobat 3D Toolkit allows you to repurpose that data. In a guided tour format, I show a typical eight-step workflow process. If you're an engineer, **consider forwarding this issue to your colleagues in the Tech Pubs department.**

Note: For more information on some of the concepts I cover in this edition, read the October ([Issue #7](#)) or November ([Issue #8](#)) issues after you've finished. Another good source of information is the set of [tutorials on the 3D Toolkit](#), available from Adobe.

Declaring Your Independence

As a mechanical engineer myself, I've had to provide a lot of assistance to technical writers and illustrators over the years — typically, because of the information barrier presented by the CAD systems we used. The tech writers couldn't read my CAD files so I had to translate and manipulate CAD data to produce something they could use. The situation was a hassle for the illustrators because they didn't want to bother me every time they needed engineering data, but they were forced to because of the software we all had to

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This free downloadable executable contains several updated dynamic link libraries (DLLs) that provide support for more recent versions of CAD file formats when using Adobe Acrobat 3D and the 3D Toolkit. [Click here to download the update.](#)

IN THIS ISSUE

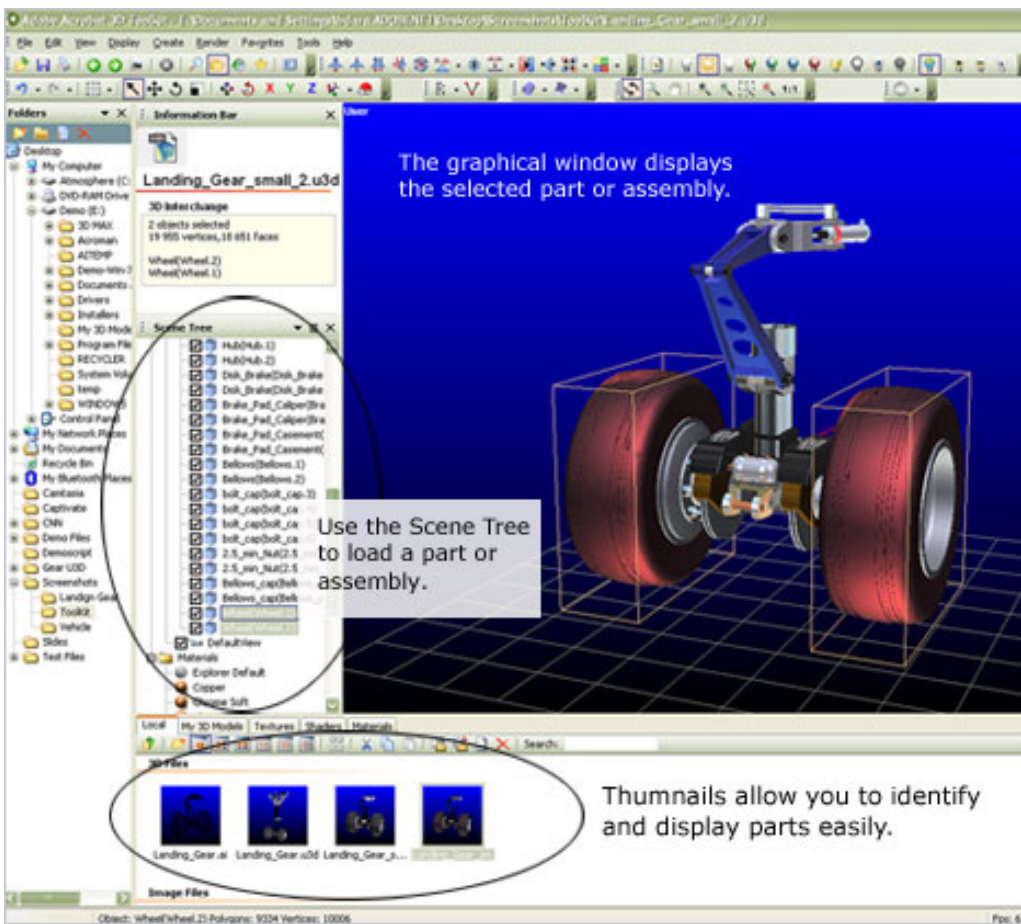
An eight-step workflow in Acrobat 3D Toolkit for tech docs professionals.

use.

With Acrobat 3D Toolkit, this entire mess goes away because tech writers and illustrators can easily read in the CAD parts/assemblies they need directly with no intervention from engineering whatsoever. In fact, the only restriction is that the parts/assemblies be accessible.

Step 1: Explore the Interface

To get started, simply fire up the software and explore the interface. (If you already have a PDF file open, simply right-click a model to start Acrobat 3D.) The Scene Tree uses an Explorer-like navigation tree to locate files, and a graphical window displays the assemblies and parts. Visualization is performed via toolbars that use familiar move, pan, and zoom controls along with arithmetic analogies like planes and axes. Along the bottom of the interface you can display the parts that form the assemblies in thumbnail format.



The Scene Tree and graphical window make it simple to load in and view parts/assemblies, while toolbars and thumbnail views (top and bottom, respectively) allow easy zooming and part identification.

If you've ever used a 3D-centric visualization or CAD tool, you should get acclimated very quickly. And even if you haven't used an assembly-based CAD system, you should be able to open and view assemblies/parts in Acrobat 3D Toolkit in about five minutes. After experimenting with the interface, you're

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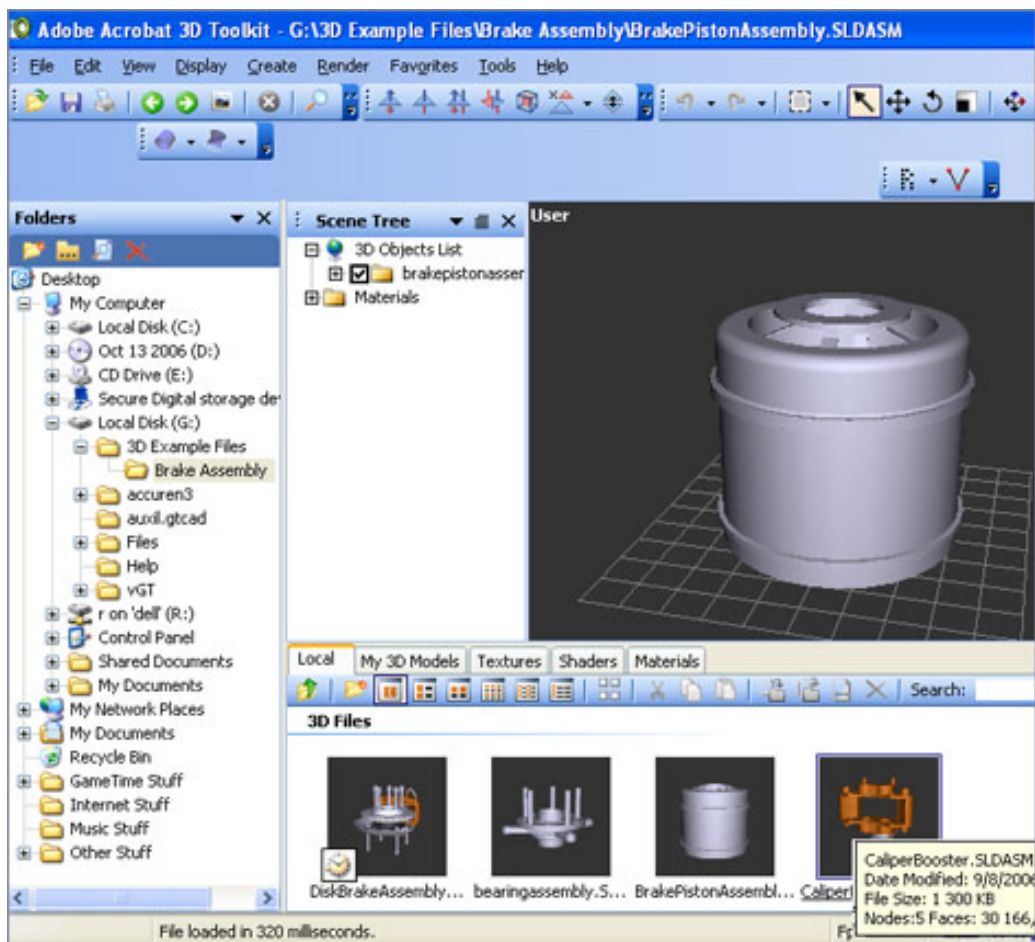
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ready to load in some CAD geometry and start controlling it.

Step 2: Import Your Data

Before you can do anything with your design in 3D Toolkit, you first have to load the geometry. To do so, start 3D Toolkit and drag and drop the top-level assembly into the 3D Toolkit graphical window for quick conversion. Then click the Local tab in the bottom panel and double-click an assembly/part to import it. (If you don't have access to the CAD data, ask the engineer to save you a copy and skip to Step 4 below.)



Getting CAD geometry into 3D Toolkit is simple. Just navigate to the folder/directory where the CAD data is and then drag and drop the thumbnail of a part into a newly created "scene" of parts.

Once the assembly/part is open, switch your attention to the Scene Tree and expand the assembly scene to see all parts in the assembly. Clicking a part in the assembly scene displays the control frame for that element in the graphic. Conversely, clicking a component in the graphic automatically highlights that part or assembly in the Scene Tree panel.

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FREE UPGRADE TO V. 8

Adobe Acrobat 3D Version 8 software will be available in spring 2007. Purchase the current version of Acrobat 3D (Version 7.0), and receive a free upgrade to Version 8. [Click here](#) to learn more.

Cool tip: Click the F11 key to toggle between the default view and full screen to enhance visualization.

Once you have a feel for the software, you may want to adjust panel sizes, toolbar positions, or other viewing parameters to suit your preferences. The next time you use 3D Toolkit, your desktop settings will be retained and you'll be able to quickly reopen files you've saved rather than having to re-import the original design.

Step 3: Save Your Work

Once your parts/assemblies are loaded in, you need to know how to save your work for later use. While Acrobat 3D Toolkit supports a variety of formats, the preferred format is U3D (Universal 3D). This increasingly prevalent ECMA International standard file format allows portability of 3D information in non-CAD environments. (To learn more, visit the ECMA website at <http://www.ecma-international.org/publications/standards/Ecma-363.htm> .)

By saving the file in U3D binary format, you not only retain all scene settings but greatly compress the file as well (making a native CAD file as much as six times smaller). This makes the file easier to email, upload or download using FTP sites, or copy across network connections for collaborative functions (depending on your settings). To save the file, choose Save As from the File menu and then select 3D Interchange (*.u3d) in the Save As Type drop-down list.

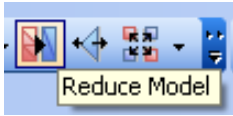
Step 4: Simplify by Removing Non-Essential Parts

Let's say your design includes a bunch of parts that aren't key to visualizing a design, yet add to the size and complexity of the assembly. Examples might be internal parts like bearings, extra nuts and bolts, and covers or housings. By eliminating these objects from your assembly scene and then updating your binary U3D file, you'll create an even more compact file for collaboration.

To remove parts from the assembly scene, right-click the part in the scene list and select Delete Objects from the menu. If you just want to hide a part or group of parts to reduce visual clutter — not eliminate them completely — select one of the Hide commands on the same right-click menu instead.

Cool tip: Hiding parts allows for an infinite number of "what if" scenarios and can be used very effectively as a show-and-tell tool.

Step 5: Reduce Model Resolution



You can tighten things up even more by reducing the geometric precision of your model to meet the needs of your document, a technique referred to as polygon reduction or “tessellation” of geometry. The idea is that when it comes to visualizing data, there’s no point in using geometry that’s more complex than needed to convey the concept to the reader. So if reducing the quality of visual images can compress file sizes in a way that your users won’t even notice, why not do so?

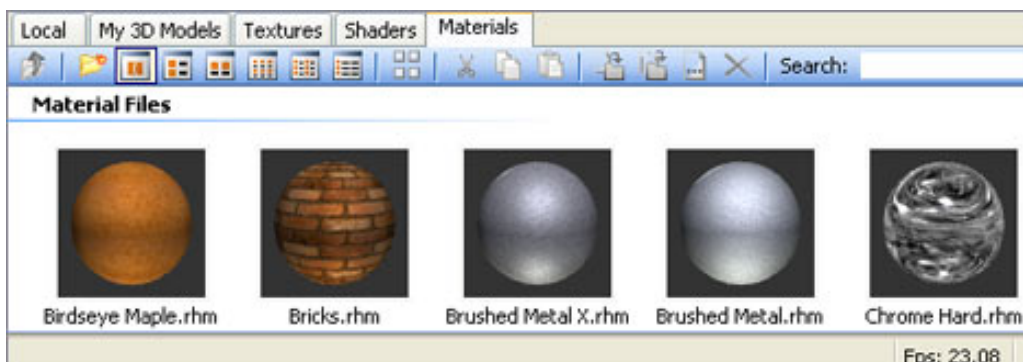
To reduce a part's tessellation, click the part you want to modify (either in the graphical viewer or in the Scene Tree), and then click the Reduce Model Tool on the CAD Tools Toolbar. Click Process, and then in the Reduce Model dialog box, use the visual slider to experiment with reducing the size of the model. It’s hard to know how much the size can be reduced until you actually see a difference in image quality. Try a few different settings and see how much reduction you feel is acceptable. Then save your U3D file. The changes will be maintained for you automatically.

Cool tip: Use the Save As command to save several different versions of U3D files with different reduction values. Keep the original uncompressed copy at full resolution so you can easily retrieve it later if necessary.

Step 6: Add Materials

The next step is to add realism to your model using materials. If you’ve used any kind of visualization program before, you should find the process very straightforward. Acrobat 3D Toolkit provides a wide selection of predefined materials that you can use immediately; you can also edit or add materials of your own.

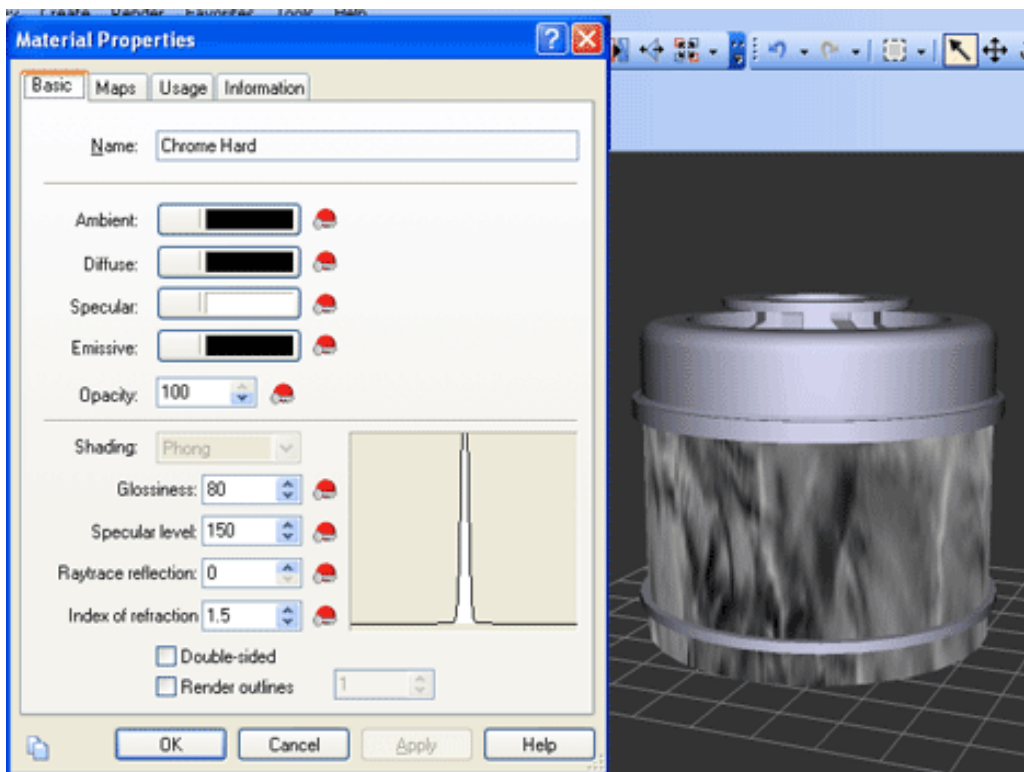
First, click the Materials tab at the bottom of the interface to display the materials selections. (Use the tools on the Materials tab to change the display to list format, tiles, or large thumbnails, as I’ve done below.) Take time to set up the interface the way you want. Then drag and drop the material swatch from the Materials panel onto the part(s) in the scene you want to apply the material to.



Here the material swatches are shown as thumbnails. To apply a material, drag and drop it onto the part(s) you want to edit.

Cool tip: To create your own materials, use predefined materials with similar properties. For example, to create a nickel plating material, start with a medium-finish material like aluminum and tweak the material properties as necessary.

After dragging a material onto a part, you will see immediate visual evidence that the material has been applied. To adjust the material's appearance, use the Material Properties dialog box (right-click the material in the Scene Tree and select Material Properties). Experiment with the materials editor to change gain texture, reflective properties, opacity, and more. As you make the material edits, your changes are automatically saved to the material file and will be available the next time you open this file.

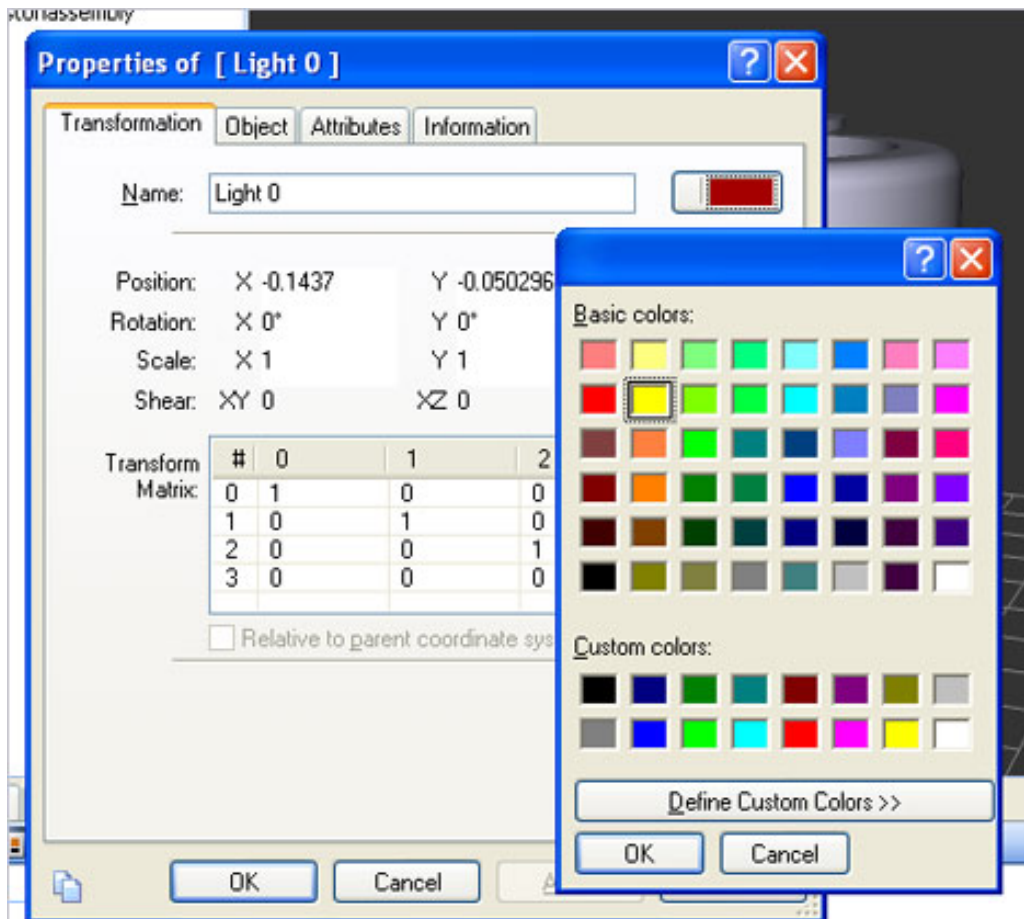


Here the chrome material has been applied and is being edited. The Material Properties dialog box controls parameters like reflections, opacity, etc. It takes practice to get the materials just the way you want.

Cool tip: The definition for each material is stored in its own file with the extension .RHM (for example, CHROME.RHM), which can be shared with other users. To find the folder containing the materials files, just search your machine for the extension *.RHM.

Step 7: Manipulate Lighting

Before rendering your image, you need to set up the lighting. The most straightforward way to generate a light set is to use the Editable Lights command (Create menu). You can double-click each light definition in the Scene Tree and use the Properties dialog box to change parameters like color (shown below), positioning, shadows, or lighting types, just to name a few possibilities. Getting the hang of editing lights is really a matter of experimentation, but once you set them, they are saved in your open U3D file and you'll never have to set them again.



Use the Editable Light command to create a set of lights with properties you can modify, including coloring and rendering.

Step 8: Generate Raster or Vector Output

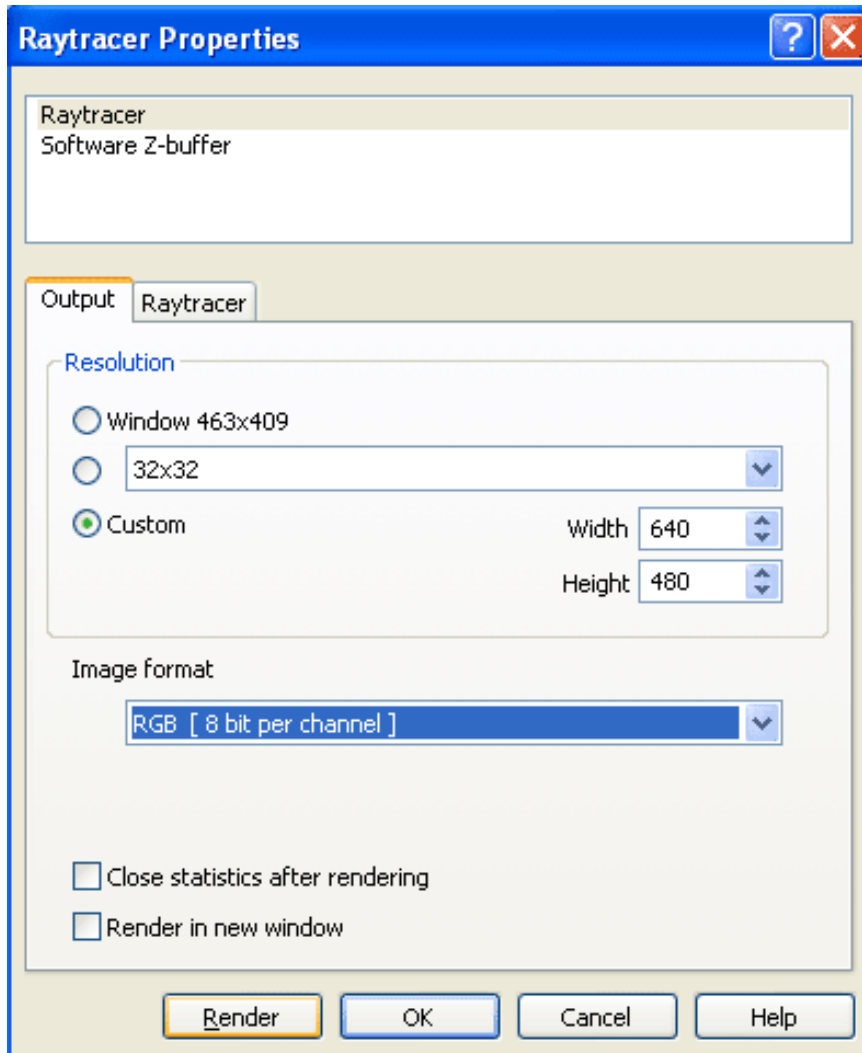


Now it's time to show the results of your rendering efforts. To

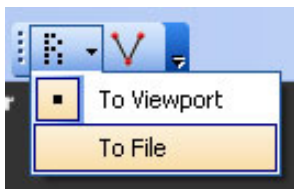


produce vector and raster outputs, you use the Illustration Toolbar.

Clicking the Raster Illustration Tool displays the Raytracer Properties dialog box, where you can specify resolution and color density (“Image Format”). Take some time to experiment with the values and see what works for you. Starting with small sizes and low color densities will yield faster results and smaller files, which can be perfect for scratch graphics in PowerPoint presentations or Word documents. Conversely, higher color settings and larger files yield better-looking results for applications like catalogs.



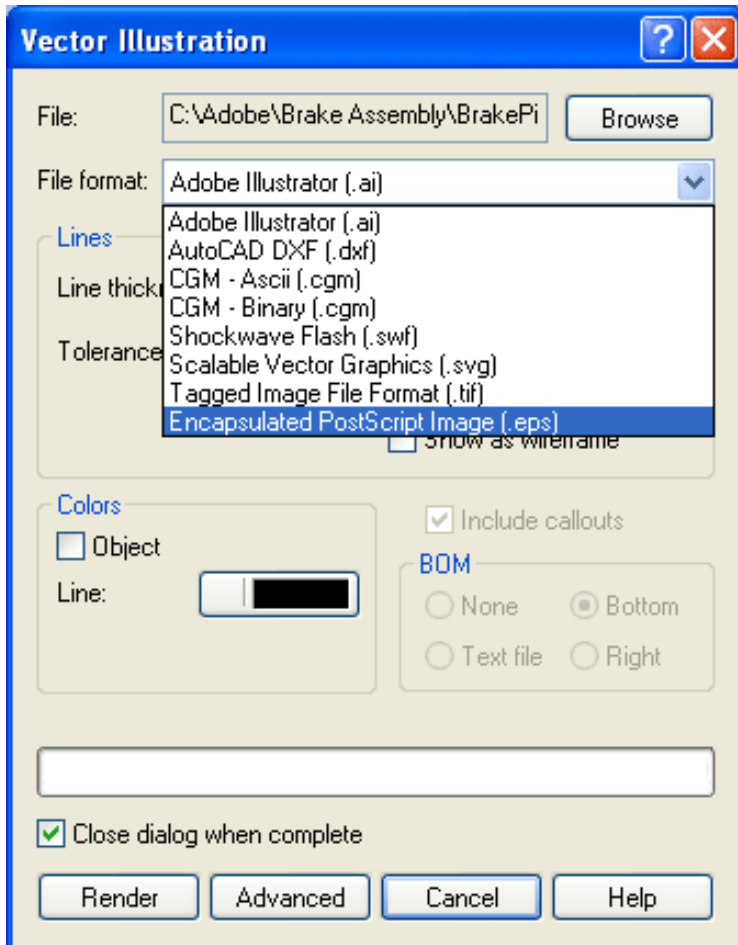
The Raytracer Properties dialog allows you to set the size and resolution of the rendering while using the scene viewer as a previewer.



After you set the values, press the Render button and a draft rendering will appear in the graphical window. Change the values as many times as you like until you get a draft rendering you're happy with. If you select the **To File option** on the Raster Illustration Tool, you can pick the raster format and file name for the file that will store your

rendering.

Generating vector output works almost identically to the raster file process, with a few interface exceptions. Clicking the Vector Illustration Tool displays the Vector Illustration dialog box, which gives you access to a wide variety of industry-standard formats. After making your selections, simply click Render and wait for the results.



To create a vector file, simply select your file type and set a few basic options.

To optimize or enhance your vector file, click the Advanced button to modify more properties specific to the file type you've chosen. Again, some experimentation is in order to get things just the way you want them.

Summing Up

All in all, I think most people who've used visualization or illustration tools should be able to get up to speed on the 3D Toolkit features we've covered in this issue in a matter of a few hours. I'm an engineer with a CAD background and very little illustration knowledge and I've been able to use the tools, so I know that an experienced illustrator should do well.

Next Time ...

In the upcoming issue of *Acrobat Insider* I'll explore the new Acrobat 3D update (available for [free download now](#)); I'll also explain how to create animations and exploded views.

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About the Author

Robert Green (rgreen@greenconsulting.com) performs CAD programming and consulting throughout the United States and Canada. He is a regular contributor to *Cadalyst* magazine. Robert lives in Atlanta, Georgia.

Details and Availability

For a full list of features and system requirements, visit the [Adobe Web site](#). Microsoft Windows® 2000 with Service Pack 2, Windows® XP Professional or Home Edition, or Windows XP Tablet PC Edition is required for use with Acrobat 3D. Acrobat 3D for Windows, available on CD-ROM or by download, is \$995. **

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