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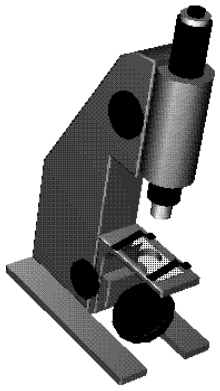
CHAPTER 1 ● TriSpectives at a glance

This chapter summarizes the most important features of TriSpectives. Use this chapter for quick orientation. If you want examples of the features in this chapter, refer to the *TriSpectives Getting Started Guide* and the *TriSpectives User Guide*.



In this chapter

- Overview of TriSpectives
- 3D documents
- Catalogs
- IntelliShapes
- Models
- Positioning shapes and models
- Toolbars
- The scene and the page

- Animation

Overview of TriSpectives

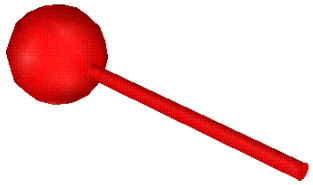
TriSpectives is a full-featured 3D modeling tool for product designers, graphic illustrators, and anybody else who needs 3D graphics. TriSpectives lets you create professional quality 3D models using simple techniques that anyone can master.

Drag and drop model building

In TriSpectives, you assemble a model from basic geometric forms called *IntelliShapes*.

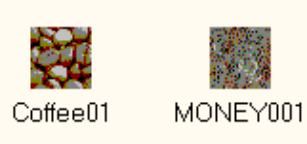
IntelliShapes

To build a model, you drag IntelliShapes from the TriSpectives catalog and drop them in the *3D scene*. Since the shapes are intelligent, they know how to join to form a model. For example, here's a model composed of two shapes:



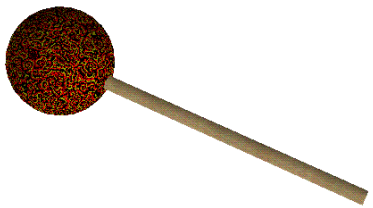
Model with two shapes

Once you have the shapes in place, you can add colors, textures, lighting, and animation effects. These items come in catalogs, just like shapes. The next illustration shows some entries in the Textures catalog, which contains surface textures.



Textures

You can drag these textures into the 3D scene and drop them on the surfaces of your model. Here's an example:



Model with surface textures

3D illustration

The abilities of TriSpectives go beyond model building. If you're a graphic designer, you might not use the program to build models at all. Instead, you can use TriSpectives to create company logos, advertisements, brochure illustrations, and other graphic images.

TriSpectives and the outside world

There are many applications for TriSpectives models outside of TriSpectives itself. It's easy to incorporate your models in reports, spreadsheets, email messages, and many other kinds of documents. It's especially easy to share a model with another program that supports OLE (Object Linking and Embedding) 2.0.

For example, you might want to illustrate a product specification sheet with a model of the product. If your word processor supports OLE 2.0, this task is very simple. You create the specification sheet as a document in your word processor. Then, you can drag the model from TriSpectives and drop it into the word processing document.

Furthermore, you can incorporate graphic images from other software in TriSpectives documents. TriSpectives can read files from popular CAD (Computer Aided Design) programs, drawing packages, and many other applications.

3D documents

Like your word processor, TriSpectives creates *documents*. A 3D model is a typical TriSpectives document. A document can also include text, 2D drawings, and other elements.

3D modeling is the main point of TriSpectives, however. For this reason, you can use the term *3D document* to distinguish the output of TriSpectives from word processing documents, spreadsheet documents, and so forth.

Types of documents

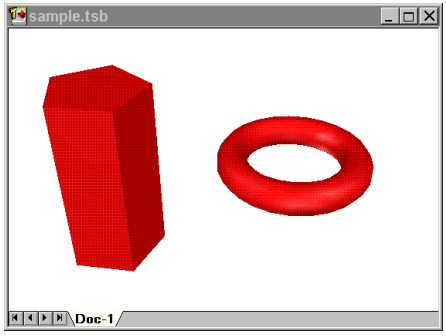
For all their variety, TriSpectives documents fall into two categories:

- **The 3D scene**, where you create 3D models.
- **The 3D page**, where you combine models and other elements to create finished illustrations.

Each kind of document has its own work area within the main TriSpectives window.

The scene

The scene is a view into three-dimensional space. It's the place where you build and edit models. Here is a scene:

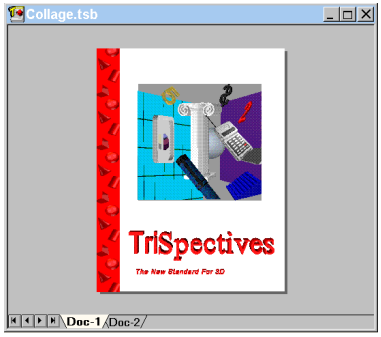


3D scene

To create a model, you drag shapes, textures, and other items from the TriSpectives catalogs and drop them into the scene. The above illustration shows a scene with two shapes. It's typical of what you see at the beginning of a project.

The page

Once you build or acquire the models for your project, you can display them on the page:



3D page

The page is your work area when you want to create a finished illustration. Use it as a backdrop for models, text, 2D drawings, and other elements.

The WorkBook

A WorkBook is a collection of 3D documents, like the page and the scene in the previous illustrations. In most cases, the documents in a WorkBook are related. They might be for a particular project or client.

Each document in a WorkBook occupies its own window. Each document window has a tab for easy access.

▶ ***To work with a particular document, click its tab.***

When you create a new document, TriSpectives gives its tab a generic label like Doc-1. You can change the label to something more meaningful.

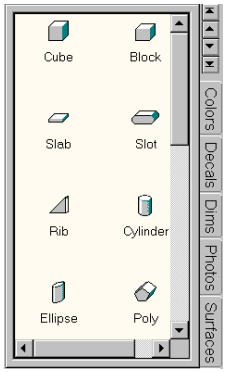
▶ ***To change the label on a document tab:***

1. **Right-click the tab to see its pop-up menu.**
2. **Choose Rename on the menu.**
3. **Enter a new label on the dialog box that appears.**
4. **Choose OK.**

TriSpectives stores the contents of a WorkBook in a file that ends with the extension .tsb. For example, if you have a collection of 3D models and other documents for a client named Big Industries, you could store them in a WorkBook file with the name big.tsb.

Catalogs

A catalog is a collection of resources such as models and surface textures. The TriSpectives window includes a catalog browser that makes it easy to work with catalogs and their contents.



Catalog browser

▶ ***To see the contents of a particular catalog, click its tab.***

If you don't see the tab you want, you can scroll through the available catalogs using the navigation buttons in the browser. Some catalogs may contain too many items to display in the browser at one time. Use the scroll bar to browse the contents of the catalog.

▶ ***To work with an item in a catalog, drag it from the catalog and drop it in the scene or on the page.***

The drag-and-drop technique works with models, shapes, colors, text, and all the other resources that come in catalogs. Once you start creating your own models and illustrations in TriSpectives, you can organize them in catalogs.

- ***To place a model or other item in a catalog, drag it from the scene or page and drop it in the catalog.***

  In addition to individual objects, you can store an entire scene or page in a catalog.

- ***To place a scene or page in a catalog, drag the document tab and drop it in the catalog.***

  Along with the standard catalogs that come with TriSpectives, you can create new ones and use them to organize your work. For information on the menu commands that create catalogs, save their contents, and perform other operations, see “Catalogs menu” in Chapter 2.

IntelliShapes

IntelliShapes are the 3D forms that you combine to create models. TriSpectives uses their intelligence to simplify the model building process. When you join two shapes, TriSpectives knows how they fit together and positions them in the best way. When you edit a model by moving one of its shapes, TriSpectives knows where the shape can go and where it can’t.

For examples that show how to combine IntelliShapes into models, see Chapter 3, “Models,” of the *TriSpectives User Guide*. The rest of this section describes the tools you use to change the size and orientation of a shape.

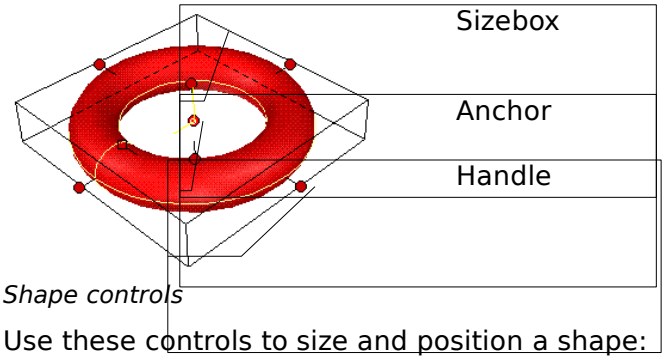
Working with IntelliShapes

Every IntelliShape—whether it’s part of a model or on its own—has controls for sizing and positioning.

- ***To see the controls for a shape:***

  1 Select the Edit IntelliShapes tool on the Selection toolbar.

2 Click the shape.



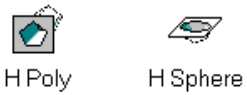
Shape controls

Use these controls to size and position a shape:

- **Sizebox**: The sizebox encloses the shape and defines its boundaries. You can change the dimensions of the sizebox using the handles or by editing the property sheet for the shape.
- **Handles**: Each surface of the sizebox has a red handle. Use these handles to change the size of the shape. Drag a handle in or out to make the shape bigger or smaller.
- **Anchor**. The anchor shows where one shape joins another. You can use the anchor as a reference point when you drag a shape across others in a model. The lines that emerge from the anchor show how the shape will orient itself when you drop it on another shape.

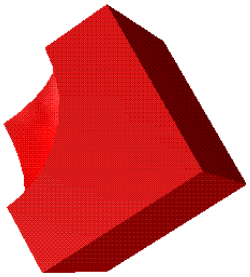
Holes

Most of the items in the TriSpectives Shapes catalog add substance to your model. Others remove it. The latter shapes are called *holes*.



Holes

If you drop a spherical hole onto a cube, the results look like the following illustration.



Cube with hole removed

Custom shapes

To create a custom shape, you draw a 2D figure or *cross-section* and then extend it into the third dimension. There are four techniques for turning a 2D cross-section into a 3D shape. The following sections describe them.

Extrusion

This process pulls a 2D cross-section outward along a perpendicular axis. For example, you can extrude a square to get a cube.

▶ ***To create a custom shape using extrusion:***

1 Choose the Extrude Shape tool on the 3D Shapes toolbar.

2 Click in the 3D scene.

TriSpectives displays the Extrude Shape wizard.

3 Choose Finish on the wizard.

TriSpectives displays a 2D drawing grid in the scene. You also see the Edit Cross-Section dialog box.

4 Draw a 2D figure.

Use the Line, Circle, and other drawing tools. For more information on the 2D tools and examples

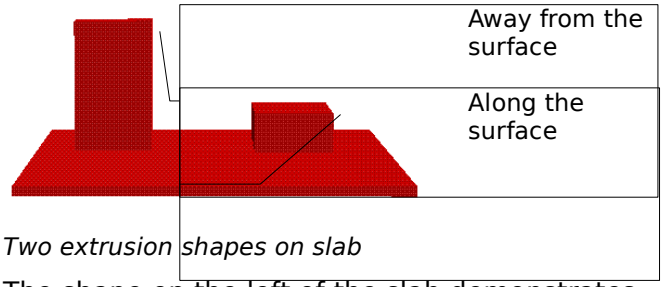
of using them, see Chapter 4, “2D Drawing,” in the *TriSpectives User Guide*.

5 When you’re done drawing, choose Finish Shape on the Edit Cross-Section dialog box.

The Extrude Shape wizard gives you a number of options for extrusion. On page 1 of the wizard, you can choose the orientation of the new shape. This option is helpful when you add an extrusion shape on top of an existing shape. Your choices are:

- Extrude the new shape along the surface of another shape.
- Extrude the new shape away from the surface of another shape.

The next illustration shows both choices.



Two extrusion shapes on slab

The shape on the left of the slab demonstrates extrusion away from a surface. The shape on the right comes from extrusion along the surface. Both shapes have the same 2D cross-section.

You can use either method to add material to a model or to create a hole. Page 2 of the Extrude Shape wizard offers these options as well as a third: creating a stand-alone shape that isn’t part of another model.

Spinning

Use this method to create a custom shape by rotating a 2D cross-section around an axis. The process is very much like extrusion.

▶ ***To create a custom shape through spinning:***

1 **Choose the Spin Shape tool on the 3D Shapes toolbar.**

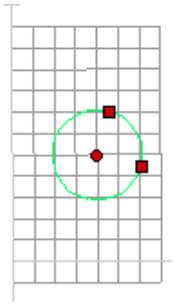
2 **Click in the 3D scene to see the Spin Shape wizard.**

3 **Choose Finish on the wizard to see a 2D grid with a rotation axis.**

4 **Draw a 2D figure.**

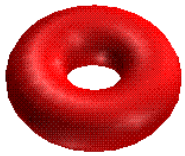
5 When you're done drawing, choose Finish Shape on the Edit Cross-Section dialog box.

In step 4, it's important to note the position of your drawing relative to the axis. For example, when you create a torus, the size of its hole depends on the distance between the original circle and the axis of rotation. In the following illustration, the circle is two units away from the axis.



2D cross-section

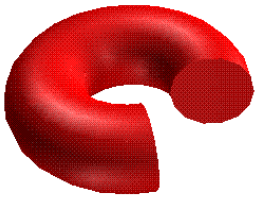
After spinning the shape, the resulting torus has a hole that's four units in diameter.



Torus from above cross-section

The Spin Shape wizard offers the same options for orientation and volume that you get during extrusion. For details, see "Extrusion" on page 12.

When you spin a 2D cross-section, the resulting 3D shape has a handle that doesn't appear on other shapes. This handle—which has a square tip—lets you adjust the angle of rotation for the spinning operation. By dragging the handle, you can remove part of the shape, as shown in the next illustration.



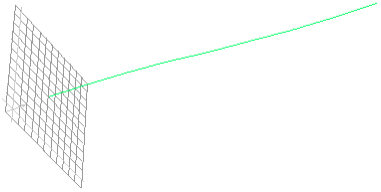
Torus after dragging rotation handle

Sweeping

This process is like extrusion and spinning in that you extend a 2D cross-section into the third dimension. Extrusion and spinning, however, move a cross-section along a predetermined path. In sweeping, the path can be a line, a series of line segments, a curve, or anything else you can create with the 2D drawing tools.

▶ ***To create a custom shape through sweeping:***

1. **Choose the Sweep Shape tool on the 3D Shapes toolbar.**
2. **Click in the 3D scene to see the Sweep Shape wizard.**
3. **Choose Finish on the wizard to see a 2D drawing grid with a default path.**



2D grid with initial path

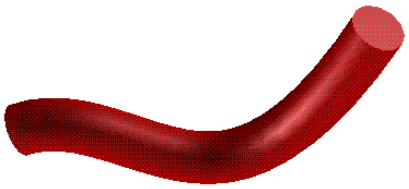
4. **Use the 2D drawing tools to create a cross-section.**
5. **Choose Finish Shape on the Edit Cross-Section dialog box.**

TriSpectives displays a second grid along the path.

6 **Use the 2D drawing tools to create a path.**

7 **Choose Finish Shape on the Edit Sweep Path dialog box.**

TriSpectives moves the cross-section along your path to create the final shape.

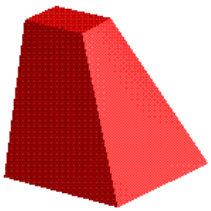


Sweep shape

Lofting

The first three methods of creating custom shapes use a single 2D cross-section. With lofting, you can define as many cross-sections as necessary. You place these cross-sections along a straight or curved path and TriSpectives connects them to create the final shape.

The next illustration shows a loft shape. The shape has two rectangular cross-sections connected by a straight line path.



Loft shape

▶ ***To create a custom shape through lofting:***

1 **Choose the Loft Shape tool on the 3D Shapes toolbar.**

2 **Click in the 3D scene to see the Loft Shape wizard.**

   The wizard prompts you for the number of 2D cross-sections you want to use to create the 3D shape.

3 **Enter the number of cross-sections in the field on page 1 of the wizard.**

   For example, the previous illustration of a loft shape uses two cross-sections to define the ends of the shape. You can have as many intermediate cross-sections as you need.

4 **Choose Next to see page 2 of the wizard.**

5 **Choose one of the following cross-section types:**

   - Rectangles
   - Circles
   - Custom

1 **Choose one of the following path types:**

   - Straight line
   - Circular arc
   - Bezier curve

1 **Choose Next to see page 3 of the Loft Shape wizard.**

   Like the other custom shape wizards, this page gives you the opportunity to create holes, stand-alone shapes, and so forth.

2 **Choose Finish.**

3 **If you chose custom cross-sections in step 5, draw them using the 2D drawing tools.**

   This process is the same as it is with the other custom shape techniques. You draw as many cross-sections as you specified in step 3. When you’re done drawing a cross-section, choose Next Section on the Edit Loft Cross-Section dialog box.

10 If you're creating custom cross-sections, choose Finish Shape on the Edit Loft Cross-Section dialog box.

If you choose circles or rectangles for the cross-section, TriSpectives automatically generates a block or cylinder. In this case, you can create a custom 3D shape by editing its component cross-sections.

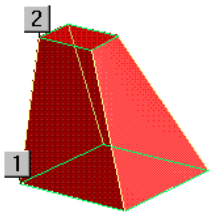
▶ ***To edit the cross-sections in a loft shape:***

1 Choose the Edit IntelliShapes tool on the Selection toolbar.

2 Right-click the shape to see its pop-up menu.

3 Choose Show Cross-Sections on the pop-up menu.

TriSpectives displays the cross-sections that define the shape. Each one has a button.



Loft shape with cross-sections

4 Click the button for the cross-section you want to edit.

TriSpectives displays green handles that let you drag and resize the cross-section.

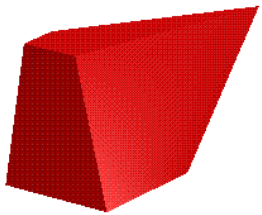
5 Edit the 2D cross-section by dragging its handles.

If you want to edit the cross-section on a grid using the 2D drawing tools, right-click a handle and choose the Edit on grid option from the pop-up menu.

6 If necessary, edit other cross-sections in the shape.

7 **When the components of the shape are in their correct form, click in the scene outside the shape.**

The next graphic shows the result of editing a cross-section in the loft shape from the previous illustration.



Loft shape with resized cross-section

Working with the sections of an IntelliShape

When you extrude, spin, or sweep a 2D form into 3D, the resulting shape has at least three components.

- **Start section.** The start section is the initial cross-section you create with the Extrude Shape tool or one of the other tools that starts a shape-creation wizard. The start section initially contains the anchor.
- **End section.** After you extend the shape into 3D, the end section is the one on the opposite end from the start section.
- **Side section**. The side section is the surface between the start and end sections.

To find the start section of a 3D shape, select the shape and look for the position of the anchor. If the anchor isn't in its original location, you can still find the start section. Right-click the shape and choose Edit Cross-Section from its pop-up menu. TriSpectives highlights the start section.

In many cases, you won't need to bother with the differences between the various sections in a shape. They become important, though, in the beveling and shelling operations. These processes let you refine the

structure of a shape by rounding off its edges and hollowing it out. For example, the next set of steps shows how to round off the edges of a shape.

▶ ***To blend the edges of a shape's start section:***

1. **Select the shape.**
2. **Right click the shape to see its pop-up menu.**
3. **Choose IntelliShape properties on the pop-up menu.**
4. **Select the Bevel tab on the property sheet.**
5. **In the list of edge selections, choose Start Section Edges.**
6. **Choose the Blend button.**
7. **In the Radius field, enter 5 for the blend radius.**
8. **Choose OK.**

Text shapes

Use the items in the Text catalog to create 3D text.

Text in 3D scene

▶ ***To add 3D text to a scene:***

1. **Drag one of the items from the Text catalog and drop it in the scene.**

   You see a shape with generic text and an edit box.

2. **Use the edit box to change the contents and format of the 3D text.**

   The edit box behaves like a word processor. Add, delete, and change text using the keyboard and the Text Tools.

3. **When you're done editing the text, click in the scene outside the edit box.**

You can change the size of the text editing area by pulling one of the side shape handles. This action can reformat the text and change how it wraps around the ends of lines. To make the text thicker, drag the front or back handle.

You can also modify other settings using the property sheet for the text shape. For examples of working with text shapes, see Chapter 5, "Text," in the *TriSpectives User Guide*. For details on the property sheet for text shapes, see "Text Properties" in Chapter 3 of this manual.

Models

A model is a 3D representation of a real or imaginary object. TriSpectives can work with three kinds of models:

- **IntelliShape models**. This kind of model is a collection of IntelliShapes. For example, you could build a model table by combining a slab shape with four cylinders. You can modify the size, texture, and other characteristics of each IntelliShape in a model.
- **Facet models**. These models have a single component. When you change the color, size, or other attributes of a facet model, your changes affect the whole object. Facet models usually come from another program.
- **Unevaluated IntelliShape models**. These are IntelliShape models in a simpler, one-piece form. TriSpectives can display an IntelliShape model in this form when you first drop it in a scene or page. You can leave the model in this form if you don't need to edit the individual shapes. If you want access to the component shapes, you need to *regenerate* the model. When you select a shape, TriSpectives prompts you for permission before regenerating.

  TriSpectives uses different colors to highlight the three kinds of models. For information, see "Recognizing pointers and highlight colors" on page 27.

Selecting the parts of a model

As you assemble a model, you can work on three levels of detail:

- **The model as a whole**. For example: a model chair composed of a slab, cylinders, and other shapes.

- **Individual shapes in the model**. For example: a slab shape that forms the seat of the chair.
- **One surface, edge, or vertex of a shape**. For example: the upper surface of the chair seat.

  During the model-building process, you often move from one level to another. For example, you might select the whole chair model to set its dimensions. Then you could select the top surface of the seat to give it a leather texture.

  TriSpectives has three methods for selecting the parts of a model:

- The mouse.
- The Selection tools.
- The WorkBook Browser.

Selecting objects with the mouse

This method is handy for quick, random access to any part of a model.

▶ ***To select a model or one of its components with the mouse:***

1. **Make sure that nothing on the scene or page is selected.**

   If you see anything with handles or highlighted outlines, click on a blank area of the page or scene to clear the selection.

2. **Make sure the Edit IntelliShapes and Edit Surfaces tools on the Selection toolbar are inactive.**

   If either button is depressed, click it to make the tool inactive.

3. **Point to the object you want to select.**
4. **Use the appropriate number of mouse clicks for the object.**

- Click once to select the model as a whole. TriSpectives highlights the model and displays its anchor.
- Click twice to select one shape within the model. Instead of quickly double-clicking, pause briefly between the two clicks. TriSpectives highlights the shape and displays its handles.
- Click three times to select a surface, edge, or vertex. TriSpectives highlights the item.

1 **To stop the selection process, click in the scene outside the model.**

Using the Selection tools

In some situations, you work with a series of similar objects. For example, you might want to select and bevel each edge of a model diamond ring.

The Selection toolbar has two buttons that choose a default editing mode.

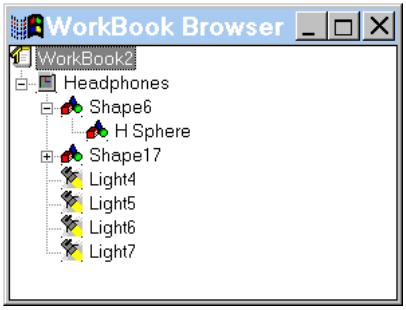
- **The Edit IntelliShapes tool**. Choose this tool to work with IntelliShapes. When this tool is active, each click on an IntelliShape model selects one of its component shapes.
- **The Edit Surfaces and Edges tool**. Choose this tool to work with surfaces, edges, and vertices. Each click selects one of these items.

Using the WorkBook browser

The WorkBook browser displays the contents of your WorkBook in a tree structure. You can review the structure of your documents and select individual objects.

▶ ***To see the WorkBook Browser, choose its option on the View menu.***

Here’s how the Browser displays a sample WorkBook:



WorkBook Browser

The hierarchical display in the Browser shows these items:

- The current WorkBook.
- All documents (scenes and pages) in the WorkBook.
- Every group of models, if there are any.
- Each model in each document.
- Every IntelliShape in each model.

If you see a plus or minus sign at one level of the display you can click it to expand or contract the tree. For example, if you see a plus sign next to a model, you know that there are multiple shapes at the next level. Click the plus sign to see the shapes that make up the model.

You can also select and name items in your WorkBook using the Browser.

▶ ***To select an object using the WorkBook Browser:***

1. **Right-click the entry for the object in the WorkBook Browser.**
2. **Choose Select from the pop-up menu.**

When you return to your scene or page, the object you chose in the WorkBook is the current selection.

▶ ***To name a shape or model:***

1. **Click the WorkBook entry for the shape or model to select it.**
2. **Click the name of the entry to see an edit box.**
3. **Enter the new name in the edit box.**
4. **Press Enter.**

Recognizing pointers and highlight colors

TriSpectives uses a number of visual cues to inform you about the status of a document and its content. For instance, when you drag an object from a catalog, the shape of the mouse pointer shows what the results will be when you drop the object.

- **Model pointer**. This pointer is a solid block. When it appears, the solid object you drop becomes a separate model. (Hole IntelliShapes are an exception; they always become part of another model.) This pointer appears by default when you drop the initial object in a blank scene. You can work with models at any time by deactivating the Edit IntelliShapes and Edit Surfaces tools on the Selection toolbar.
- **IntelliShape pointer**. This pointer resembles an IntelliShape with handles. When it appears, the object you drop joins with the object you drop it on to form a model. If you drop the object by itself in space, however, you get an IntelliShape with a sizebox and handles. This pointer appears if the current selection in the scene is an IntelliShape. It also appears when the Edit IntelliShapes tool is active.
- **Facet model pointer**. This pointer is like the model pointer except that the faces of the block contain separate facets. This pointer appears when you configure TriSpectives to drop IntelliShape models in facet form when you drop them in the scene. For information on this capability, refer to the “Models tab” section in the entry on the Options property sheet in Chapter 3.
- **Style pointer**. This pointer looks like a paint brush. It appears when you drag a texture, color, decal, or other image out of a catalog.

  When you select a model, shape, or other object, TriSpectives highlights it with a colored outline. By default, TriSpectives uses different colors and other visual cues for different kinds of objects.

  Note*: The colors in the following list are the default ones that appear when you first install TriSpectives. You can create your own color scheme for highlighted objects and many other elements of the TriSpectives display. Use the Color settings on the Options property*

sheet. For information, see the entry on this property sheet in the next chapter.

- **IntelliShapes**. When you select an IntelliShape, TriSpectives highlights it in yellow. You also see a sizebox with handles that let you change the dimensions of the shape.
- **IntelliShape models**. When you select a model with IntelliShape components, TriSpectives highlights it in cyan. You also see the model's anchor and two orientation lines. Note that many IntelliShape models appear in facet form initially.
- **Facet models**. When you select a facet model, TriSpectives highlights it in white. You also see a sizebox with handles.
- **Unevaluated IntelliShape models**. When you select this kind of model, TriSpectives highlights it in white.
- **Surfaces, edges, and vertices**. When you select one of these items, TriSpectives highlights it in green.

Combining shapes to form a model

Most model-building projects begin by dropping one shape on top of another. This action can have two outcomes.

- A single model composed of two shapes. The advantage of this method is that you can work with all the components in the model at once. For instance, you can round off all the edges of the model or make the entire thing transparent.
- Two models, each consisting of a single shape. This method lets you apply model properties such as transparency and bumpiness to the independent shapes. For example, you might use one shape for a window frame and another for the glass in the window. You can make the glass transparent and leave the frame opaque.

You can get the results you want by setting up the proper conditions before you drop one shape on another.

▶ ***To create a single model from two shapes:***

1. **Drag the first shape from a catalog and drop it in the scene.**
2. **Choose the Edit IntelliShapes tool on the Selection toolbar.**
3. **Drag the second shape from the catalog and drop it on the first one.**

Instead of choosing the Edit IntelliShapes tool in step 2, you can select the first shape so that its sizebox and handles appear. If you don’t take either action, the two shapes become independent models.

Working with groups of models

In some projects, you can save time by working with two or more models at once. For instance, you might want to move a chair, lamp, and sofa to a different location in a room. You can perform three separate operations or group the models together and move them all at once. You can also group models to give them all a particular color or texture with a single drag-and-drop operation.

Groups can contain other groups. For example, you could combine desks and other furniture into an office group. If you create multiple office groups, you can combine them into a suite group or building group.

▶ ***To combine shapes in a group:***

1 Select a model.

2 Hold down the Shift key.

3 Select the other models in the group.

4 Choose the Group tool.

Once you define a group you can act on all its members at once. For instance, if you press the Delete key, all the models disappear.

▶ ***To select a group, click one of the models in the group.***

Every model in the group is highlighted. Any action you perform affects all the models in the group.

▶ ***To add a model to a group:***

1 Select the group.

2 Select one of the models in the group.

3 Drop another model in the scene.

The new model in step 3 becomes part of the group.

▶ ***To remove all models from a group:***

1 Select the group.

2 Choose the Ungroup tool.

Making copies of models

Many models contain two or more identical or very similar objects. For example, you might build a model of an opera house with a row of identical columns along the front facade. Once you create a model in TriSpectives, it's easy to make as many copies as you need.

▶ ***To copy a model:***

1. **If the Edit IntelliShapes or Edit Surfaces tool is active, click it to deselect it.**
2. **Right-drag the model.**

   As you drag, you see an outline of the original object follow the mouse pointer.
3. **Drop the outline in the position where you want to place a copy.**

   You see a pop-up menu of relocation options.
4. **Choose Copy Here from the pop-up menu.**

   TriSpectives creates a duplicate of the original model at the point where you released the mouse.

You can position the new object using the techniques described in "Positioning shapes and models" on page 35.

The right-drag method works with IntelliShapes as well as models. You can right- or left-drag a shape across the surface of another one in a model. If a standalone shape doesn't move, you may need to change its drag positioning behavior. This option appears on the Interaction tab of the IntelliShape property sheet. For more information, see the entry for this property sheet in Chapter 3.

Making negative models

Most of the models you build with TriSpectives are solid objects. These “positive” models add material to other objects when you combine them. In some cases, however, you may want to create a “negative” model that removes material from another object.

For example, suppose you want to build a model engine with empty spaces for the valves. TriSpectives has a simple method for creating a valve-shaped hole—or an empty space of any kind—in a solid object.

▶ ***To create a negative model:***

1. **Build the model you want to appear as an empty space in another object.**

   For example, build the model of the valve that you want to appear as a hole within an engine. At this stage, the valve is a solid object like most models.

2. **Drag the model and drop it in a catalog.**
3. **Double-click the catalog entry for the model to edit it in a 3D scene.**
4. **Select the model in the 3D scene.**
5. **From the Shape menu, choose Set Operation.**
6. **On the Set Operation dialog box, choose Remove Material and click OK.**
7. **Close the 3D scene.**

At this point, the model in the catalog is a negative one. When you drop it on another object, it removes a hole in the shape of the original model.

Positioning shapes and models

Much of the work in model building involves getting the pieces into position. Consequently, TriSpectives has a number of tools and techniques for this purpose.

Measuring the position of an object

Though you can position most models and shapes visually, you sometimes need to place an object at an exact location. For example, you may need to locate a light fixture six feet above the floor and eight feet from the corner of a room.

Measuring the position of a model in a scene

TriSpectives measures the position of a model from the center of the scene. It measures distances along three directions: the length (L), width (W), and height (H) of the scene. This method is like locating an object in a room by measuring the distance along two walls and the height above the floor.

Measuring the position of a shape within a model

Each model in a scene contains individual shapes. TriSpectives measures the position of the shapes in a model from the corner of the model's sizebox.

Measuring the position of a model within a group

You can work with two or more models at once by combining them using the Group tool. When you group models together, TriSpectives measures the position of an individual model from the corner of the group's sizebox.

Measuring with the anchor point

To measure the location of an extended object like a chair or lamp, TriSpectives needs a point of reference

on the object. The object's anchor point serves this purpose. For example, the anchor point of a model lamp might be the center of its base. To position the lamp in a room, you could measure the distance from the corner of the room to the anchor of the lamp.

Basic positioning using the mouse

The easiest way to position a shape or model is by dragging it into place.

▶ ***To position a shape or model using the mouse***:

1 Select the appropriate editing mode.

If you want to position a shape, choose the Edit IntelliShapes tool on the Selection toolbar. You can also click the shape twice if no Edit tools are active. To position a model, deactivate the Edit tools.

2 Drag the object and drop it in its new location.

This simple method assumes that you can judge the correct location in step 2. If you need to place the shape in a precise position, use one of the following techniques.

Changing the position and orientation of the anchor

You can change the position or orientation of an anchor by moving or rotating it from its current location.

▶ ***To move an anchor by editing its position value:***

1 Right-click the anchor to see its pop-up menu.

2 Choose Move Anchor from the pop-up menu to see the Move Anchor dialog box.

3 Enter the new length, width, and height distances in the Move Anchor dialog box.

TriSpectives will move the anchor forward, sideways, and up by these distances.

4 Choose OK.

TriSpectives moves the anchor to the new location. If you want to move the anchor back to its original location, repeat the above procedure but use negative numbers in step 3. For example, if you moved the anchor by 100 units, enter -100 to move it back.

▶ ***To reorient an anchor by spinning it around the up/down axis:***

1 Right-click the anchor to see its pop-up menu.

2 Choose Spin Anchor from the pop-up menu to see the Spin Anchor dialog box.

3 Enter a new value in the Angle field.

4 Choose OK.

The anchor spins the anchor around its up/down axis by the angle you entered in step 3.

▶ ***To reorient an anchor by flipping it around the forward/backward axis:***

1 Right-click the anchor to see its pop-up menu.

2 Choose Flip Anchor from the pop-up menu to see the Flip Anchor dialog box.

3 Enter a new value in the Angle field.

4 Choose OK.

The Move From-To tool

This tool provides a quick way to position and align two objects. Like the TriBall, it combines movement and rotation functions in one tool. The TriBall works with a single object, however.

▶ ***To align one object with another using the Move From-To Tool:***

1 **Select the object you want to move.**

2 **Choose the Move From-To tool on the 3D Shapes toolbar.**

3 **Click a point on the object you want to move.**

4 **Drag a line from its point of origin on the initial object and drop it on another object.**

   TriSpectives joins the two objects so that the point at the start of the line matches the point at the end. A yellow marker appears to indicate that the these two points remain matched until you stop working with the tool.

5 **If necessary, repeat steps 3 and 4 to align two additional points on the two objects.**

   Drag another point from the initial object and drop it on the second object. TriSpectives aligns the two new points while maintaining the relationship between the first pair.

6 **If necessary, repeat steps 3 and 4 to align two more points.**

The idea behind the Move From-To tool is that you can move an object into any position relative to another object by applying successive constraints. With the three drag-and-drop operations—one each for each pair of points—you remove a degree of freedom until the initial object doesn't have anywhere to go. With a little practice, you can easily position two objects exactly the way you want.

SmartSnap

As you drag a shape across the surfaces of a model, TriSpectives can provide visual feedback about your current location. For example, when you line up one shape with the edge of another, TriSpectives highlights the edge with a green line.

This technique is called *SmartSnap*. The following instructions show how to use SmartSnap to find the correct location for a shape.

▶ ***To place a shape using SmartSnap:***

1. **Select an IntelliShape that's attached to another IntelliShape.**
2. **Hold down the Shift key to enable SmartSnap.**

3 **Click and drag the shape in the direction of the edge, center point, or other location you want.**

   For precise positioning, drag the part of the shape that you want to align with the other shape.

4 **When you see the green highlight, drop the shape.**

For an example of working with SmartSnap, see "SmartSnap" in Chapter 3 of the *TriSpectives Getting Started Guide*.

***Note**: TriSpectives uses green as the default color for SmartSnap highlights. You can choose another color using the Color settings on the Options property sheet. For information, see the entry on this property sheet in the next chapter.*

SmartDimensions

SmartSnap is helpful when you need to align two shapes precisely at an edge, center point, or other location. Sometimes, however, you need to choose a position based on precise measurement. For example, you might want to place one shape exactly 4.5 inches from the edge of another shape.

For precise positioning, use *SmartDimensions*. These tools help you set the distance or angular relationship between the parts of your model.

***Note**: SmartDimensions are a feature of TriSpectives Professional.*

▶ ***To add SmartDimensions to a shape***:

1 **Select the Edit IntelliShapes tool on the Selection toolbar.**

2 **Right-click the shape to see its pop-up menu.**

3 **Choose Add SmartDimensions from the pop-up menu.**

   You see the Add SmartDimensions dialog box.

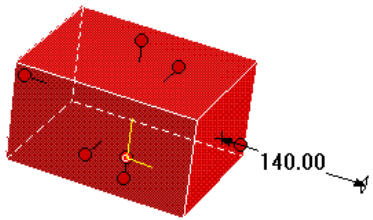
4 **On the dialog box, select Angle or Distance measurement.**

5 **Enter the number of SmartDimensions you want.**

Use the field with the label How Many Should Be Added?

6 **Choose OK.**

In the following illustration, the block shape has one SmartDimension for measuring distance.



Shape with SmartDimension

When you first create a SmartDimension, one end is on the shape and one end is free. Before you can use the SmartDimension, you need to move the ends into position.

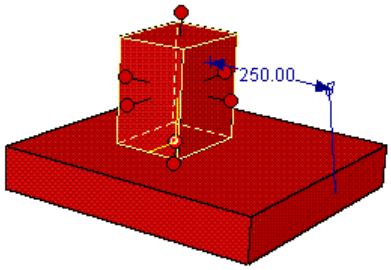
▶ ***To position the ends of a SmartDimension:***

1 **Drag the free end of the SmartDimension and drop it on the feature of interest.**

Drag the end by its arrowhead. For example, to measure the distance between the shape that contains the SmartDimension and a surface on another shape, drag the free end to the appropriate surface. Let SmartSnap help you. As you drag, TriSpectives highlights corners, center points, and other key spots.

2 **Drag the other end of the SmartDimension and drop it at the appropriate position on the shape of origin.**

Again, let SmartSnap help you.



SmartDimension in place

Once the ends of the SmartDimension are in place, you can use two methods to move the shape into position.

- **Measurement**. Drag the shape into position. As you drag, the current distance or angle value appears in the SmartDimension. Drop the shape when the measurement is correct.
- **Direct entry**. Right-click the numeric measurement and choose Edit This SmartDimension from the resulting pop-up menu. Enter the correct distance or angle in the dialog box that appears.

For an example of working with SmartDimensions, see “Using SmartDimensions” in Chapter 3 of the *TriSpectives User Guide*. For more information on SmartDimensions, see “SmartDimension Properties” in Chapter 3 of this manual.

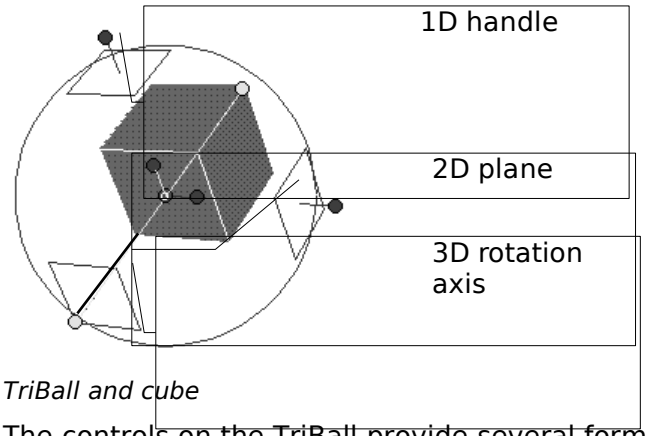
The TriBall

The TriBall is one of the most powerful tools in TriSpectives. It’s a universal positioning device. Use it to move or rotate an object into any position.

▶ ***To see the TriBall:***

1. **Select the object you want to position.**
2. **Choose the TriBall tool on the 3D Shapes toolbar.**

The next illustration shows the TriBall with a cube.



TriBall and cube

The controls on the TriBall provide several forms of rotation and movement.

- To move the object along one of the three axes of its local coordinate system, drag a 1D handle. TriSpectives displays a measuring line that shows the current distance from the object to its point of origin.
- To position the object on a 2D plane, drag a 2D handle.
- To rotate the object around an axis, click a 1D handle to highlight an axis and drag inside the TriBall. TriSpectives displays the current angle of rotation.
- To freely rotate the object in any direction, make sure that no 1D axes are highlighted and drag inside the TriBall.
- To rotate the object around the center point of the TriBall, drag the circle at the edge of the TriBall.

  For precise positioning, you can move the TriBall itself before moving the object. This technique helps you get the TriBall controls into the correct position.
- To move the TriBall, drag its anchor. The anchor is the circle at the center of the TriBall.
- To rotate the TriBall, drag one of its rotation handles. These handles emerge from the anchor.

For example, you may want to rotate an object around an axis that doesn't correspond to any of the handles on the TriBall. Rotate the TriBall until a 1D handle lines up with the axis you want.

Attachment points

An attachment point is a target point on the surface of a shape or model. You can drop other objects on an attachment point for precise positioning.

▶ ***To add an attachment point to a shape:***

1. **Select the Edit IntelliShapes tool on the Selection toolbar.**
2. **Select a shape to receive an attachment point.**
3. **Choose the Attachment Point option on the Insert menu.**
4. **Click the shape where you want to place the attachment point.**

   A highlighted attachment point appears where you clicked in step 4.

When you drag an object over an attachment point, the object snaps in place. Once you drop an object on an attachment point, it stays there and follows the attachment point if you move it. You can also drag an attachment point of one shape to an attachment point of another shape.

The scene grid

TriSpectives can display a reference grid to help you position objects in the 3D scene.

▶ ***To display the scene grid:***

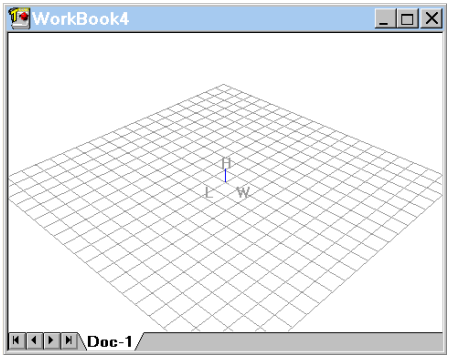
1. **Right click in the scene to see its pop-up menu.**
2. **Choose Scene Properties from the pop-up menu.**

3 **Choose the Show tab on the Scene Properties sheet.**

4 **Select the Scene Grid option.**

5 **Choose OK on the Scene Properties sheet.**

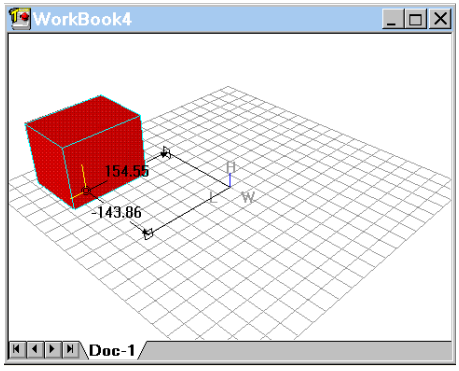
Here's a 3D scene with the grid:



Scene grid

Notice the letters H, W, and L—for Height, Width, and Length—on the three axes that originate from the center of the grid. In some cases, you can position an object just by orienting it along the lines of the grid. In other cases, it helps to see precise measurements.

▶ ***To measure distances on the grid, choose the Scene Grid Dimensions option from the Show tab on the Scene Properties sheet.***



Scene grid with dimensions

The measuring lines show the current distance between the object and the center of the grid. Each of the three lines measures the distance along one of the dimensions in the coordinate system. Drag any surface of the object to reposition it with respect to the length and width axes. Drag the square handle above the anchor to change the height of the object.

You can also reposition the object by editing the scene grid measurements.

▶ ***To position an object using scene grid measurements:***

1. **Right-click the value of the measurement to see its pop-up menu.**
2. **Select Edit Value, the only item on the pop-up menu, to see the Edit Distance dialog box.**
3. **Enter a new value in the Distance field of the dialog box.**
4. **Choose OK.**

Annotation dimensions

An *annotation dimension* is a line that shows the distance between two locations on your model. You can use them for reference during the model-building process and then delete them when you create the final image for output.

In most cases, however, annotation dimensions remain as a design element in the final output. They appear most often in technical illustrations. These drawings provide detailed information about an object including its proportions.

TriSpectives has three kinds of annotation dimensions:

- **Linear**. This tool measures the distance between any two points in the display.

- **Radial**. This tool measures the radius between a center point or axis and another point on a circular curve or cylindrical or spherical surface.
- **Angular**. This tool measures the angle between two planes.

  These three tools appear in the Dims catalog.

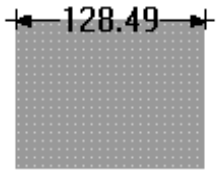
▶ ***To add an annotation dimension to the 3D scene:***

1 Drag one of the entries from the Dims catalog and drop it in the scene on the point where you want to begin measurement.

The annotation dimension appears as a line or arc.

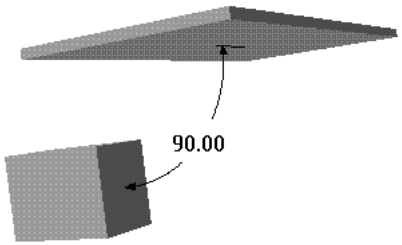
2 Drag the free end and drop it on another point or surface.

The next illustration shows a Linear annotation dimension.



Linear annotation dimension

Here's an annotation dimension that measures the angle between two planes:



Angular annotation dimension

Since annotation dimensions are primarily for display instead of modeling, they behave differently than positioning tools such as the TriBall and the scene grid. You can position the text of an annotation dimension by dragging its value. You can also reorient annotation dimensions to display measurements along the horizontal or vertical axis of the screen. Use the Look At tool to choose the desired viewing orientation. Then

drag the text and use the horizontal and vertical options to annotate the model as desired.

▶ ***To reorient an annotation dimension:***

1. **Right-click the dimension to see its pop-up menu.**
2. **Choose Horizontal or Vertical from the pop-up menu.**

You can also add a label to an annotation dimension. Use this feature to clarify the purpose or meaning of a measurement.

▶ ***To add a label to an annotation dimension:***

1. **Right-click the dimension to see its pop-up menu.**
2. **Choose Annotation Dimension Properties from the menu.**
3. **Choose the Annotation tab on the Annotation Properties sheet.**
4. **Enter a label in the Prefix text field, the Postfix text field, or both.**

   The text in the Prefix field appears before the value in the annotation dimension. The text in the Postfix field appears after the value.

● Toolbars

Standard tools

The Standard tools perform housekeeping functions such as printing and saving files.

Standard toolbar

The New tool. Use this tool to create a new TriSpectives WorkBook.

The Open tool. Use this tool to open an existing TriSpectives WorkBook. Choose a WorkBook file from the Open dialog box.

The Save tool. Use this tool to save the contents of your current WorkBook in a disk file. If the file doesn't have a name, TriSpectives prompts you for one.

The Print tool. Use this tool to print the active document; that is, the 3D scene or page that appears in the TriSpectives window.

The Print Preview tool. Use this tool to see how the active document will appear when you send it to the printer.

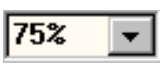
The Cut tool. Use this tool to remove the current selection—such as a model or IntelliShape—from your document. The item you cut goes onto the Windows clipboard. You can retrieve it using the TriSpectives Paste tool or the equivalent tool in another application.

The Copy tool. Use this tool to make a copy of the current selection and place it on the Windows clipboard. You can retrieve it using the TriSpectives Paste tool or the equivalent tool in another application.

The Paste tool. Use this tool to retrieve an item from the Windows clipboard and place it in your document.

The Undo tool. Use this tool to reverse the effects of the last action you performed in TriSpectives. For example, if you delete an item, choose the Undo tool to get the item back.

The Redo tool. Use this tool as a compliment to the Undo tool. It restores your document to the state it was in before you used the Undo tool.



The Zoom tool. Use this tool to move your viewpoint towards or away from the 3D page. The page itself and its contents don't change. Enter a zoom factor in the box or choose a value from the drop-down list. This tool isn't available in the 3D scene.

The Help tool. Use this tool to see online help information about a feature in the TriSpectives window.

Select the Help tool, then click the feature of interest.

The Text Tools

These tools change the appearance of 3D text. To create 3D text, use one of the items in the Text catalog. When you drop a text shape in a document, you see an edit box where the Format tools are available.

Text Tools toolbar

The Fonts tool. Use this tool to choose a font for the text selection.

The Font Size tool. Use this tool to choose the text size in points.

The Bold tool. Use this tool to display the text selection in boldface type.

The Italic tool. Use this tool to display the text selection in italic type.

The Align Left tool. Use this tool to align the text selection along the left margin of the text box.

The Align Center tool. Use this tool to center each line in the text selection between the right and left margins.

The Align Right tool. Use this tool to align the text selection along the right margin of the text box.

The Grow tool. Use this tool to increase the size of the text selection. Each time you click the Grow tool, the text changes to the next point size for its font.

The Shrink tool. Use this tool to decrease the size of the text selection. Each time you click the Shrink tool, the text changes to the previous point size for its font.

The 2D Drawing tools

The buttons on the 2D Drawing toolbar help you create 2D graphics. In TriSpectives, a 2D image is called a *cross-section*. For examples of creating cross-sections, see Chapter 3, “2D drawing,” in the *TriSpectives User Guide*.

2D Drawing toolbar

The Line tool. Use this tool to draw a line. The drawing method depends on the setting of the Angle-Distance Drag Mode tool. In rectilinear mode, click at one end of the line and drag to the other end.

The Circle tool. Use this tool to draw a circle. Click at the center of the circle and drag along its radius to the perimeter. The resulting circle has two handles. One lets you change the diameter of the circle. The other lets you deform the circle to make an ellipse.

The Arc tool. Use this tool to draw a semi-circular arc. The drawing method depends on the setting of the Angle-Distance Drag Mode tool. In rectilinear mode, click at one end of the arc and drag to the other end. The handles that appear let you reposition the arc or change its radius.

The Bezier tool. Use this tool to draw a Bezier curve. The drawing method depends on the setting of the Angle-Distance Drag Mode tool. In rectilinear mode, each click extends the curve in a continuous manner. The handles that appear let you pull the parts of the curve to change its shape.

The Fillet tool. Use this tool to round off the corner where two lines meet. Click the corner and drag toward the middle of the cross-section. The farther you drag, the more rounded the corner becomes.

The Mirror Curves tool. Use this tool to create a mirror image in a 2D cross-section. Draw the elements of the cross-section including a line for the axis of symmetry (the mirror line). Select all the elements you want in the cross-section. Then select the Mirror tool and click the axis. TriSpectives duplicates the elements of the cross-section symmetrically around the axis.

The Project Edges to Drawing Grid tool. Use this tool to create 2D items which are projections of a 3D surface. Choose the tool then click a surface on the shape. By default, the new 2D items are construction geometry. To use them in creating a shape, hold down the Control key when you click the shape.

The Angle-Distance Drag Mode tool. This tool lets you select one of two drawing methods. In the default *rectilinear* mode, the mouse pointer defines a pair of X and Y coordinates, which TriSpectives can display as you drag. In *angle-distance* mode, the pointer defines different measurements at different parts of the drawing process. To draw a line, you click to mark the starting point of the line and drag to set its angle. Then you click and drag a second time to define the length of the line. The resulting line connects the point where you first clicked the mouse and the point where you released it at the end of the process. The Arc and Bezier tools use corresponding methods for drawing in angle-distance mode.

The 3D Shapes tools

These tools help you create 3D shapes and assemble them into models. For information on the custom shape tools—the block of four tools in the middle of the toolbar—refer to “Custom shapes” on page 12.

The 3D Shapes toolbar

The Select tool. Use this tool to select objects in a scene or on a page. For information on working with the Select tool, see “Selecting the parts of a model” on page 23.

The Extrude Shape tool. Use this tool to create a custom shape through extrusion. This process extends a 2D cross-section into the third dimension along a perpendicular axis.

The Spin Shape tool. Use this tool to spin a 2D cross-section around an axis of rotation and create a custom 3D shape.

The Sweep Shape tool. Use this tool to define a 2D cross-section and path. TriSpectives creates a custom 3D shape by moving the cross-section along the path.

The Loft Shape tool. Use this tool to create a custom 3D shape out of two or more 2D cross-sections.

The TriBall Positioning tool. Use this tool to position or rotate an object. The TriBall has a number of features that give you precise control over the location of every shape and model in your document. For more information, see “The TriBall” on page 42.

The Move In-Out tool. Use this tool to change the vertical position of an object on the 3D page. Drag up to raise the object off the page or down to lower it towards the page.

The Move From-To tool. Use this tool to quickly align two shapes. Choose this tool and then click a point on one shape and drag it to a corresponding point on a second shape. As you drag, TriSpectives draws an arrow that shows where the two shapes will connect. When you release the mouse, the two shapes move into alignment. If necessary, you can repeat this process two more times to align lines and planes.

The Group tool. Use this tool to associate two or more models in a group. To specify which models go into the group, hold down the Shift key and select each model. Then choose the Group tool. You can change all the members in the group at once. For instance, if you press

Delete, all the models disappear.

The Ungroup tool. Use this tool to break the association of models in a group. When you choose the tool, the group members regain their status as individual objects.

The Camera tools

The Camera tools move the TriSpectives camera. The camera represents your viewpoint as you look into a 3D scene.

Camera toolbar

The Pan Camera tool. Use this tool to move the camera across a 2D plane in front of the model in the scene. Drag up, down, right, or left to move the camera in the same direction.

The Orbit Camera tool. Use this tool to rotate the camera around the focus point in the scene. Drag through the center of the display to orbit in the corresponding direction. Drag along the sides of the display to rotate and change which way is up.

The Dolly Camera Forward or Backward tool. Use this tool to move the camera down a straight path into a 3D scene. Drag up to go into the scene and down to go out. The effect is like physically traveling through a model.

The Walk Camera tool. Use this tool to explore your model. Click in the scene and drag up to move in, down to move out, and left or right to spin in the appropriate direction. To look up or down, hold the Shift key and drag in the appropriate direction.

The Zoom Camera tool. Use this tool to zoom the camera lens towards or away from the model. Drag up to zoom in or down to zoom out.

The Window Zoom tool. Use this tool to quickly zoom in and fill the display with part of the scene. Choose the

tool and then click and drag across the diagonal of a rectangle in the scene. TriSpectives zooms in on the contents of the rectangle.

The Fit Scene tool. Use this tool to move the camera to a position where the entire model fits within the scene.

The Look At tool. Use this tool to reposition the camera to point directly at a surface of a model. Choose the tool, and click the surface.

The Target Camera tool. Use this tool to reorient the camera so that an object is centered. Choose the tool and then click a point on the surface of the object. This point becomes the center of the viewing area.

The Selection tools

Along with the Select tool on the 3D Shapes toolbar, these tools help you select and work with the objects in a document.

The Selection toolbar

The Edit IntelliShapes tool. Use this tool to select and work with the IntelliShapes in a model. When this tool is active, the Select tool chooses shapes instead of models or surfaces.

The Edit Surfaces and Edges tool. Use this tool with the Select tool to select surfaces, edges, and vertices.

The WorkBook Browser tool. Use this tool to display the WorkBook Browser. The Browser displays the documents, models, and shapes in the current WorkBook as a tree. When you select an item in the Browser, you select the corresponding object in the WorkBook.

The Timeline tools

These tools control animation.

The Timeline toolbar

The On tool. Use this tool to activate the others on the Timeline toolbar. It’s like turning on the power switch on a VCR.

The Play tool. Use this tool to start an animated sequence.

The Stop tool. Use this tool to stop the motion of an animated model.

The Rewind tool. Use this tool to return to the beginning of an animated sequence.

The Timeline tool. Use this tool to follow and control the progress of animation. When you click Play, The slider tracks the position of the current frame. Drag the slider to move forward or backward.

The scene and the page

TriSpectives has two kinds of 3D documents: pages and scenes. Both occupy document windows in the main TriSpectives display area. Furthermore, you can use a lot of the same tools and techniques when working with either kind of document. Aside from these similarities, the scene and page differ in purpose and function.

- The scene is where you assemble models; the page is where you combine models and other elements to create illustrations.
- When you look at the page and its contents, your point of view remains fixed. In a scene, you can vary your point of view using the camera.
- Some tools work in the scene but not the page and vice-versa. For example, the Camera tools work in the scene but not on the page.

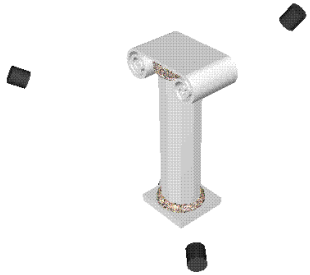
For illustrations of the scene and the page, refer to “3D documents” on page 5. This section covers some useful techniques for working with the page and the scene.

Lights

Every 3D scene and page contains light sources that illuminate the objects in the document. By default, the light sources themselves are hidden. You can reveal them, however. Once they’re visible, you can change their position, color, and other properties.

▶ ***To make the light sources visible:***

1. **Right-click in the 3D scene or page to see its pop-up menu.**
2. **From the pop-up menu, choose Scene or Page Properties.**
3. **On the Scene or Page Properties sheet, choose the Show tab.**
4. **Check the Lights box.**
5. **Choose OK.**



Scene with lights

Once a light source is visible, you can drag it to a new location to change the angle of light on the model. You can also change the color and other characteristics of a light source using its property sheet.

▶ ***To add a new light source:***

1. **From the Insert menu, choose the Light option.**
2. **Click in the scene or page at the point where you want the light.**

   TriSpectives displays the Insert Light dialog box.
3. **Choose the Directional or Spot light option**

For an example of working with lights, see “Adding light to your model” in Chapter 3 of the *TriSpectives Getting Started Guide*.

SmartRendering

Rendering is a term from computer graphics that refers to the process of displaying a 3D image on a flat screen. During the rendering process, TriSpectives determines how to display the shapes, textures, and other elements in your model in the most convincing, realistic way.

The process can take a lot of time and processor power. In particular, when you drag or rotate a model, the display may take a moment to catch up with the mouse. The lag becomes more noticeable with complex models and slow processors.

To keep your work moving as quickly as possible, TriSpectives uses *SmartRendering*. This technique determines the appropriate rendering style on the fly as you work.

For example, suppose you are working with a complex model with a lot of shapes and textures. When the model is stationary, you can see all its details. However, if you move or rotate the model, TriSpectives may revert to a simpler form of rendering. It can turn off textures, shading, and other features to keep the display moving.

▶ ***To enable SmartRendering:***

1 Right-click in the scene or page to see its pop-up menu.

2 Choose Scene or Page Properties on the menu.

3 Select the Rendering Tab.

4 Check the Allow Simplification box.

You can also choose rendering styles manually. For more information, refer to the entry in the next chapter for the Scene Properties or Page Properties sheet. Both sheets have a Rendering tab with various options.

Text boxes

You can add 3D text to the scene or the page. If you're working in a scene, drag one of the items from the Text catalog and drop it in the scene. This technique works on the page, too. TriSpectives also has a text-editing feature that's specifically for the page.

▶ ***To add text to a page:***

1. **From the Insert menu, choose Text Box.**

   The pointer changes to a crosshair.

2. **Define the perimeter of the text box.**

   Click and drag from one corner of the text box to the opposing corner. When you release the mouse button, TriSpectives displays an edit box with a cursor and sample text.

3. **Enter the text you want to display on the page.**

4. **Click on the page outside the text box.**

Embedding a page in the scene

In most cases, the page and the scene are separate areas for different kinds of work. Combining them, however, can create striking results. For example, you might create an advertisement on the 3D page and then place the page on top of a model of your product.

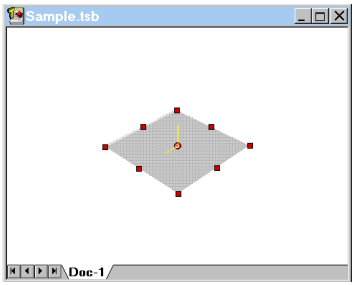
▶ ***To insert a blank page into a 3D scene:***

1. **While working in a 3D scene, choose Page from the Insert menu.**

2. **On the Insert Page dialog box, select In current scene.**

3. **Choose OK.**

TriSpectives inserts a page in the 3D scene.



Page within scene

You can now work with the embedded page as if it were a separate shape in the scene.

▶ ***To create an illustration on a page within a scene:***

1. **Double-click the page.**
2. **TriSpectives displays the full page in a new WorkBook window.**

   You can switch back and forth between the window with the page and the one with the 3D scene. This technique helps you evaluate the progress of your illustration by looking at it in the context of the 3D scene. To see the scene, choose the name of its WorkBook from the Window menu. To see the page, choose Embedded Page in Shape#. (The # symbol stands for the shape number that TriSpectives assigns to the embedded page.)
3. **Add models, text, and other elements to the page to create an illustration.**
4. **When you're done working on the page, choose Close from the File menu.**

   TriSpectives returns to the 3D scene, which now contains a page with your illustration.

In addition to creating a new page using the above technique, you can use an existing document.

▶ ***To add an existing page to a 3D scene:***

1. **Open the WorkBook that contains the page.**
2. **Drag the tab for the document with the page and drop it in a catalog.**
3. **Close the WorkBook.**
4. **Open the WorkBook with the 3D scene.**
5. **Drag the icon for the page from the catalog and drop it in the scene.**

Embedding a scene on the page

An embedded scene is similar to the standard 3D scene you use to build models. TriSpectives lets you embed scenes on the page to create a layered effect. For example, you might place a scene with a car model on top of a scene with a bridge.

▶ ***To add an embedded scene to a page:***

1. **From the Insert menu, choose Scene.**

   TriSpectives displays the Insert Scene dialog box.

2. **On the Insert Scene dialog box, choose On current page.**
3. **Choose OK.**

   TriSpectives displays a bounding box around the embedded scene.

4. **To work in the scene, double-click in the bounding box.**

   TriSpectives displays a new WorkBook window for the 3D scene. At this point, you can drag a model into the scene from a catalog or build a new model.

You can switch back and forth between the window with the page and the one with the 3D scene. To see the page, choose the name of its WorkBook from the Window menu. To see the scene, choose Embedded

Scene in Shape#. (The # symbol stands for the shape number that TriSpectives assigns to the embedded scene.)

5 **When you're done working in the embedded scene, return to the page by choosing Close on the File menu.**

As an alternative to creating a new scene within the page, you can embed an existing scene and its contents.

▶ ***To add an existing scene to a 3D page:***

1 **Open the WorkBook that contains the scene.**

2 **Drag the tab for the document with the scene and drop it in a catalog.**

3 **Close the WorkBook.**

4 **Open the WorkBook with the 3D page.**

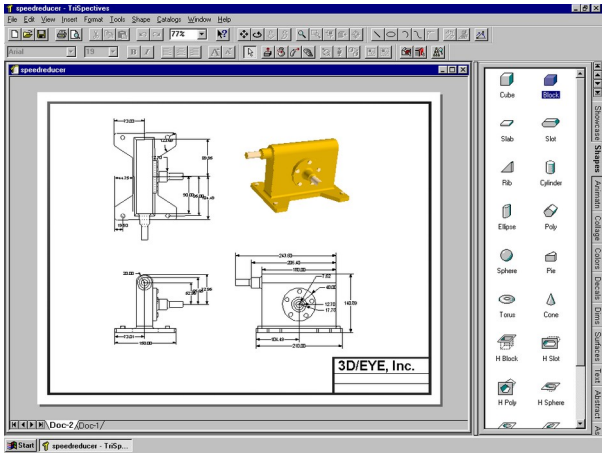
5 **Drag the icon for the scene from the catalog and drop it on the page.**

The process may be simpler than these steps suggest. For example, both the scene and the page may be in one WorkBook. You might also have a catalog of scenes.

For an example that uses embedded scenes, see "Creating a collage" in Chapter 5 of the *TriSpectives Getting Started Guide*.

Technical illustrations

A technical illustration shows projections and detailed information about a product, machine part, or other object.



Technical illustration

TriSpectives has a number of tools for creating technical illustrations:

- Hidden line drawings
- Annotation dimensions
- Embedded scenes

***Note**: Hidden line drawings are a feature of TriSpectives Professional.*

The process of making a technical illustration involves both the scene and the page. You may go back and forth between the two and experiment with various settings until you get the results you want. The final illustration is an embedded scene within the page.

The following steps give a general procedure for building a technical illustration. Depending on the nature of your work, you may omit some of these steps or perform them in a different order.

▶ ***To create a technical illustration:***

1 Build a model in the 3D scene.

2 Use the Look At tool to select the surface of the model that will appear at the front of the illustration.

3 **Attach annotation dimensions to the model.**

For information, see “Annotation dimensions” on page 46.

4 **Set the dimensions to display horizontal or vertical measurement.**

When you create a hidden-line drawing, TriSpectives displays only the annotation dimensions that are perpendicular to the eye. For further information, see “Annotation dimensions” on page 46.

5 **Save the scene in a catalog.**

Drag its tab and drop it in the catalog.

6 **Insert a page document in your WorkBook.**

7 **Drag the scene you saved in step 4 from its catalog and drop it on the page.**

8 **Display the property sheet for the embedded scene.**

Right-click in the scene and choose Embedded Scene Properties.

9 **Select the following on the Drawing Style tab of the Embedded Scene Properties sheet:**

- Hidden Line
- Make Background Transparent
- Show Annotation dimensions, and choose a font size appropriate for the size of the model.

1 **Select the Camera tab on the Embedded Scene Properties sheet.**

2 **Choose the Orthographic option.**

3 **Choose OK.**

Your model appears as a hidden-line drawing on the page.

TriSpectives Professional includes a catalog of common technical illustration templates. Use these templates to

create your own drawings using standard sizes and formats. The next steps give a procedure for working with templates. They assume that you have a completed 3D model with annotation dimensions stored in a catalog.

▶ ***To work with a technical illustration template:***

1. **Choose the tab for the Drawings catalog.**
2. **Open the WorkBook browser.**
3. **Drag a template from the catalog and drop it on the WorkBook icon in the browser.**

   This action creates a new page document in the WorkBook.
4. **Double-click on the framed embedded scene in the template.**

   This action opens a window that contains the embedded scene.
5. **Drag your model from its catalog and drop it in the scene.**
6. **Use the Fit Scene tool to fit the model in the scene.**
7. **Close the embedded scene.**
8. **Right-click on the embedded scene in the page and choose Embedded Scene Properties.**
9. **Choose the Camera tab.**
10. **In the Scale field, enter a scale that is appropriate for your model.**

    The value in this field represents the number of page units that equal one model unit.
11. **Choose OK.**

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● Animation

Once you build a model, you can make it move using the animation features in TriSpectives. For example, you might create a model car with a hood that pops open.

The animation features in TriSpectives fall into several groups:

- **SmartMotions**. For simple animation like spinning and bouncing, use these pre-defined effects.
- **The SmartMotion Editor**. For more complex animation, use this tool. It works like a multi-track tape recorder in a recording studio.
- **The Timeline Toolbar**. When you've created an animated sequence, use the Timeline tools to play it.

For information on the Timeline tools, see page 58.

Using SmartMotions

SmartMotions are the easiest way to animate a model.

▶ ***To create animation with SmartMotions:***

1. **Drag a SmartMotion icon from the Animation catalog and drop it on a model in the 3D scene.**
2. **Choose the On tool on the Timeline toolbar.**
3. **Choose the Play tool on the Timeline toolbar.**

   TriSpectives plays the animated sequence from beginning to end.

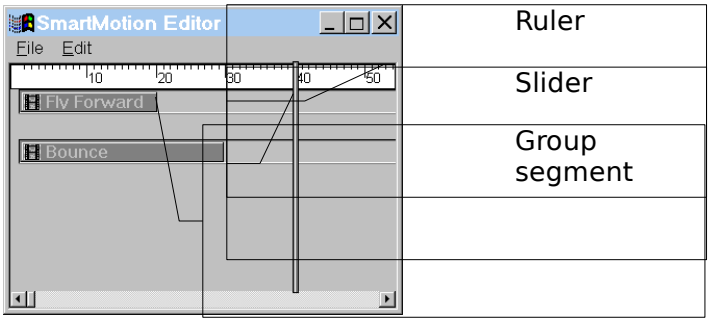
In step 1, you can drop the SmartMotion on the blank area of the 3D scene. The result is that TriSpectives animates all models in the scene. They all perform the same motion.

You can combine two or more SmartMotions for compound animation. For example, you could drop the Grow and Width Spin items on a model to make it get bigger as it spins.

Using the SmartMotion Editor

Use the SmartMotion Editor to create sophisticated, multi-layered animation. It lets you combine and coordinate individual animated sequences to produce lifelike movement.

▶ ***To see the SmartMotion Editor, choose its option on the View menu.***



SmartMotion Editor

The SmartMotion Editor window includes the features in the following list.

- **Ruler**. This tool measures the number of frames in the animated sequence.
- **Slider**. When you play an animated sequence, this marker moves from left to right, indicating the current number of frames since the start. You can also drag it to move to a particular point in the animation.
- **Group segment**. This rectangle represents an animated sequence. Each group segment consists of a model segment and one or more motion segments. In the above illustration, the Fly Forward group segment is 20 frames long. It starts at frame zero and ends 20 frames later.

▶ ***To adjust the duration of an animated sequence, drag one end of the group segment.***

For example, suppose that a group segment ends at frame 20 and you want to extend it to frame 40. Drag the right edge of the segment and drop it under the number 40 on the ruler.

You can also reposition the entire segment to set its starting time.

▶ ***To change the starting time of an animated sequence, drag the group segment until its left end is under the appropriate mark on the ruler.***

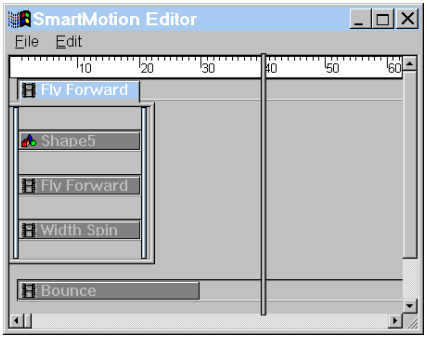
The group segment encapsulates a number of components.

▶ ***To see the contents of a group segment:***

1 Right-click the group segment to see its pop-up menu.

2 Choose Expand on the pop-up menu.

For example, the next illustration shows an expanded group segment with one model segment and two motion segments.



Contents of group segment

You can position and size the individual motion segments just as you can with the group segment.

For example, suppose you want the Fly Forward motion segment to begin immediately after the Width Spin motion segment. The Width Spin motion segment starts at the beginning of the animated sequence and goes for 20 frames. Drag the Fly Forward segment to the right and drop it when its left edge is under the 20 mark on the ruler.

In addition, the expanded view gives you access to property sheets for every item in the group segment.

For more information, refer to “Segment Properties sheet” in Chapter 3.