

Chapter 3**Animation, Palettes, and Plots**

Chapter Overview

Animation

- Starting Animation
- Animation Controls
- Virtual Memory Animation

FTP Options

- Connect
- Get Loop
- Disconnect

Color Palette Support

Color Palettes

- Loading Palettes
- Modifying Palettes
- Saving Modified Palettes
- Restoring the Palette
- Displaying the Palette

Plots

- XY Graphs
- Mouse Usage for Making Selections
- Contour Plots
- 3D Plots

Chapter Overview

This chapter covers more advanced display options in NCSA ImageTool, including animation, palette modification, and plots.

Animation

Animation is an integral part of NCSA ImageTool. The program uses the information in the text fields of the Control window for loading animation images, just as it does for individual images. In most cases, the file specification matches more than one file.

NCSA ImageTool displays the animation sequence at the origin point of the canvas. If the file specification does not match any files, the file sizes conflict with the dimensions, or some type of file error occurs during animation, an error message is displayed in the Message window.

Starting Animation

Located under the Image menu is the Animate submenu (Figure 3.1). The submenu contains the default option, Regular size, and a Zoom (2X) option which initially magnifies individual frames by a factor of two in each direction.

Figure 3.1 Animate Submenu



NOTE: Besides selecting animation size from the Animate submenu, you can also initiate a regular size animation from the Image text field by pressing CONTROL-A at the end of the file specification.

Animation Controls

When you select an animation type, five new buttons appear in the Control window. They are labeled Pause, Last, Next, +, and -. Use the left button to activate these control buttons.

Pause Button

The Pause toggle temporarily stops the animation. You will want to pause the animation when you want to perform some other operation on the images; i.e., magnifying the image, loading an alternative palette, etc.

Last and Next Buttons

While also in pause mode, you can use the Last and Next buttons to sequence through images.

+ and - Buttons

The + and - buttons control the animation speed, speeding it up or slowing it down, respectively.

Cancel

Cancel quits the animation mode.

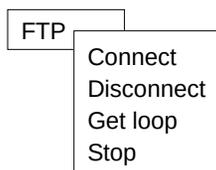
Virtual Memory Animation

If all of the images for an animation do not fit in the available physical memory, the images are swapped out to disk until they are needed. This transfer creates a great deal of network traffic if your disk is mounted on the network, and a great deal of disk I/O activity in any case, often causing mouse tracking to slow down. If this happens, you can click the Pause button, then perform any necessary action such as slowing down the animation or canceling the operation.

FTP Options

Further expanding the animation options of NCSA ImageTool is its built-in network communications capabilities. By using the FTP (File Transfer Protocol) menu (Figure 3.2), you can connect to a remote machine and grab images as they are being created.

Figure 3.2 FTP Menu

**Connect**

Before you can transfer images from a remote machine, you must establish a connection to the machine generating or containing the images. To do so:

1. Select Connect from the FTP menu. A dialog box prompts you for the name of the host machine.
2. Enter the name of the host in the text field labeled Host name.
3. Click the OK button to continue.

Text in the tty window describes the file transfer. The messages displayed vary from system to system. This is an example of what you might see in the tty window:

```
ftp cray
Connected to cray
220-cray FTP Server. Report Problems to ajc@uxc.cso.uiuc.edu
Name (cray:redman):
```

4. Enter the appropriate user name for the remote machine at the Name prompt.
5. Enter the password, if necessary, and possibly an account or other necessary codes.

After entering all of the required information, you should see a message that looks like this:

```
230 Logged in.
```

If a message like this does not appear, it may be necessary to re-enter the user name and password. If this message does appear, the connection is successful, and you may continue to perform one of the other operations from this menu. FTP runs in the tty window. Use the FTP commands available on your machine to change directories on the remote machine, change options, and so on.

Get Loop

Once the connection is established, you can use the Get loop option. Get loop transfers the file whenever it becomes available. The images are displayed in the form of an animation sequence on the canvas as they are acquired.

Select Get loop from the FTP menu and a dialog box appears. The images' filenames are expected to end with a string of digits such as `denap009`. This naming scheme is useful for sequencing animation images.

Specify an increment in the dialog box. This increment is added to the image filename to create the filename for the subsequent frame in the sequence. The next field, labeled Interval (sec), specifies the maximum allowable time to complete the file transfer. FTP times out if the transfer is not complete in this period of time. If images are large, you may need to increase this value in order to avoid timing out in the process of transferring the files. Zoomed image has two settings: on and off. If it is on, the images are magnified by a factor of two before being displayed.

The filename in the Image text field of the control panel specifies the first file to be transferred. The next file to be obtained is determined automatically by NCSA ImageTool. The numeric suffix on the original filename is incremental by the amount that

you specified in the Increment field of the dialog box. The name in the Image field changes to the name of the file presently displayed.

This process continues until you select Stop from the FTP menu.

Disconnect

Select Disconnect from the FTP menu to close the connection with the host machine. Select Stop to cancel the Get loop option before you disconnect.

Stop

This option cancels the Get loop operation. In the tty window, a message is displayed such as:

```
Get loop stopped
```

If you do not cancel the Get loop option before disconnecting, NCSA ImageTool continues to try to receive images, unsuccessfully.

Color Palette Support

NCSA ImageTool supports using, modifying, and creating color palettes. You can load, change, and save color palettes. For detailed information on the file format of color palette files, see the section, "File Formats," in Chapter 2.

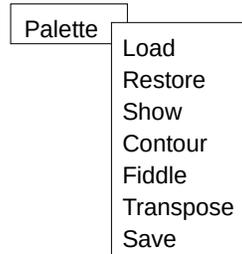
Color Palettes

The Sun Workstation can display 256 colors from a palette of over 16 million colors. You can change most of the 256 colors to any one of the other available colors. Some entries are reserved by the system and cannot be used by NCSA ImageTool. The first four entries in the color palette are used for foreground and background colors, window colors, and text.

Loading Palettes

You can use palette files to initialize your Sun Workstation's hardware color table. The section, "File Formats," in Chapter 2 describes the file format. To load a new color palette, select Load from the Palette menu (Figure 3.3).

Figure 3.3 Palette Menu



NCSA ImageTool tries to read colors from the file entered in the Control window's Palette text field. If the filename does not end in `.pal`, the program automatically appends `.pal` to the filename. If NCSA ImageTool can't find this file cannot be found, an error message appears in the Message window. Otherwise, the color hardware is initialized using the colors from the palette file.

Alternately, to directly load the palette from the Palette text field, press CTRL-L at the end of the palette filename.

Modifying Palettes

You can alter the currently active palette using NCSA ImageTool's palette editing capabilities: Contour, Fiddle, and Transpose. Selecting either Contour or Fiddle switches to a mode Contour and to have a special effect. To exit either of these modes, click the right mouse button.

Contour Mode

Using the contour mode, you can set entries in the palette to white. To use contour mode:

1. Select Contour from the Palette menu.
2. Select a contouring functions by clicking the left or middle mouse button in the Canvas area.
3. Depress the left mouse button to set the color under the mouse on the Canvas to white. Alternatively, move the mouse off of that point to restore its color.
4. Release the mouse button to permanently set the color under the mouse to white.

To use the color initially under the cursor, instead of white:

1. Hold down CTRL when you press the left mouse button. While the middle mouse button is pressed, NCSA ImageTool clears randomly selected colors and leaves others in place. This creates a contouring effect.

Fiddle Mode

The fiddle mode reduces or expands the range of the spectrum in the color palette, depending on the mouse location on the Canvas. To manipulate the palette:

1. Depress the left button.
2. Move the mouse toward the top of the Canvas to expand the spectrum.
3. Move the mouse toward the bottom of the image to reduce the range of the spectrum.
4. Move the fiddle horizontally to shift the spectrum to the right or left.
5. Select Transpose from the Palette menu to flip the color palette. After flipping the palette, the mouse buttons operate normally.

Notice also that while you hold down the middle mouse button you can rotate the palette in a wrap-around fashion.

Saving Modified Palettes

After altering a palette, you may want to save it for future use by selecting Save from the Palette menu. A dialog box appears. Use the text field labeled Palette to enter the name for the new palette file. Click OK to continue the operation or Cancel to abort.

Restoring the Palette

Use the Restore option in the Palette menu to restore the palette to its original state. Any modifications that you have made since you last saved will be lost.

Displaying the Palette

It may help you to display the palette when in this mode so that you can see the effect of your actions. Use the Show option from the Palette menu to display a color strip at the origin point on the Canvas. Once the colors are displayed, you can remove them by selecting Cut or Clear from the Edit menu.

Plots

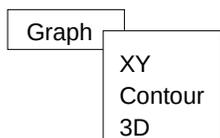
In addition to using color to display data, NCSA ImageTool also provides other plotting capabilities, such as XY graphs, contour, and 3D plots.

XY Graphs

To create a Cartesian graph:

1. Choose the XY option from the Graph menu (Figure 3.4).

Figure 3.4 Graph Menu



A new frame and window appear, as well as a dialog box.

2. Fill in the text field first, then enter the minimum and maximum horizontal and vertical dimensions into the fields labeled Xmin, Xmax, Ymin and Ymax.
3. Enter the minimum and maximum data values for the plot in the Gmin and Gmax fields.
4. Click OK to continue or Cancel to abort the operation. If you select OK, the new window remains on the screen. Otherwise, it disappears.

If you've selected OK, proceed with the following steps to select a slice of the image (on the Canvas) that you would like to have plotted.

5. Depress the left mouse button while dragging the mouse over a line of data values you want plotted.
6. Release the mouse button. A line appears over the area you have just drawn across (if one doesn't, try clicking the middle mouse button). If the line is not acceptable, redraw the line by repeating this process. The previously selected line disappears when you start to draw a new one. The data values represented by the colors under the line are used for the plot.
7. Click the Draw button to plot the points under this line.

Notice the other control buttons in the window. Scale specifies the values previously entered at the dialog box. Note that the data range does not have to be in the range 0 to 255, even though the actual data values displayed fall in this range.

Clear clears the plot window, Print prints the plot on the postscript printer specified using the Options menu, and Done removes the

window and returns to normal processing. The text field contains the text that creates the title of the plot.

To produce multiline graphs, draw horizontal or vertical lines parallel to one another in the image and select Draw after you select each line.

NOTE: If NCSA ImageTool does determine that the lines you've drawn are parallel, the XY plot canvas does not clear to draw the additional lines; it is drawn over the existing plot.

Mouse Usage for Making Selections

When making contour or 3D plots, you'll often be making selections within your images using mouse buttons. The middle mouse button drags a selection box; clicking outside of this selection cancels the selection.

If instead of clicking outside the box you press the middle mouse button inside the box, the cut and paste functions are performed on the selection, and you can drag the selected area to a new location on the canvas.

Alternately, holding down CTRL and pressing the middle button with the mouse inside the selection box performs the copy and paste operations simultaneously.

Clicking the right mouse button on the canvas undoes the original selection.

Contour Plots

To create a contour plot:

1. Select a rectangle from an image to be plotted using the middle mouse button. (You can also use the middle button to extend your selection area.)
2. Select Contour from the Graph menu. A window appears that displays some buttons and a text field.
3. Enter the values at which you would like contour lines to be drawn in the Contour levels text field. You can enter as many or as few values as you like; the more values you enter, the more contour lines you'll see.
4. Click the Draw button. NCSA ImageTool draws the contour plot in the Canvas area of the plotting window.

To clear this Canvas, click the Clear button. (The image remains on disk if you have saved it there.)

You can also Print the contour plot to the postscript printer you've designated using the `Set laser printer default` item in the `Options` menu. If you haven't specified a default laser printer, a dialog box appears.

Clicking on Done removes the window and returns to normal processing.

3D Plots

To create a 3D plot:

1. Select a rectangle that you would like to plot using the middle mouse button. (You can also use the middle button to extend your selection area.)
2. Select the 3D plot option from the Graph menu. A plot window appears.
3. Enter the yaw, pitch, and roll values in their respective text fields. These three elements compose the viewing angle for a 3D image. Specifically, *yaw* is the rotation around the x axis, *pitch* is the rotation around the x axis, and *roll* is the rotation about the z axis. The defaults are 10, 40 and 5, respectively.
4. Click Draw to plot the selected rectangle. Click Draw again to change the yaw, pitch, and roll and replot the data.

Pressing the Clear button clears the plot window's Canvas, while the Print button prints the plot to a postscript printer. Clicking Done returns NCSA ImageTool to normal operation.