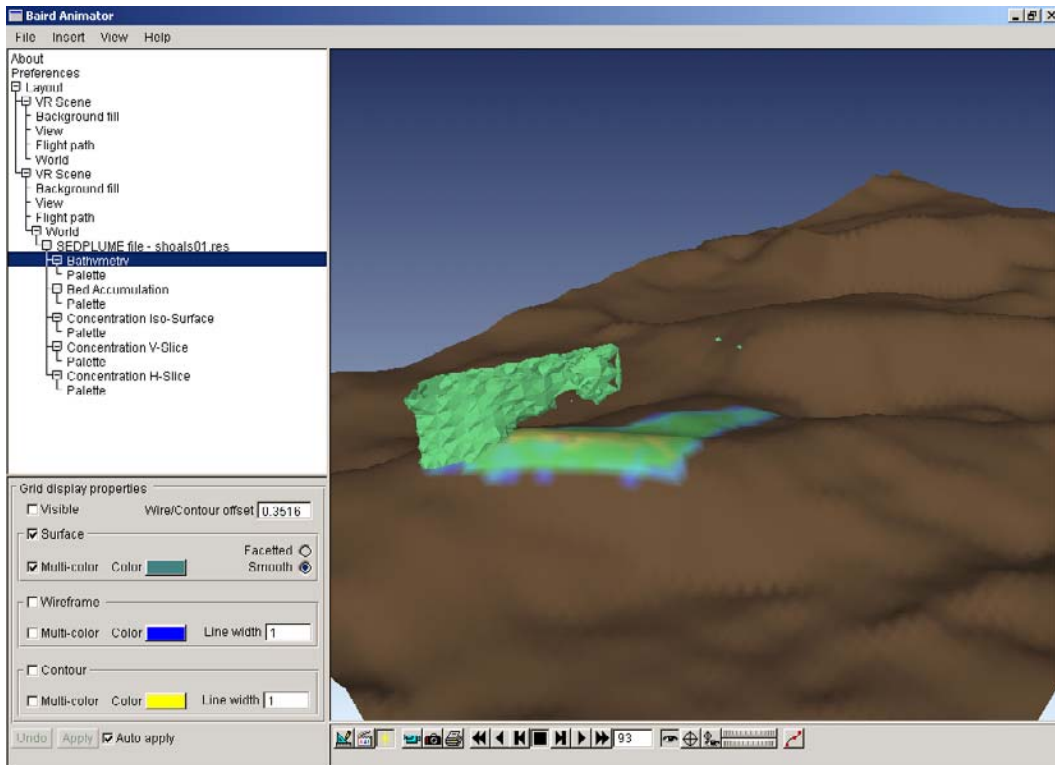


Baird Plume Animator

Prepared for U.S. Minerals
Management Service



CREATED BY BAIRD SOFTWARE
www.bairdsoftware.com

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PREFACE

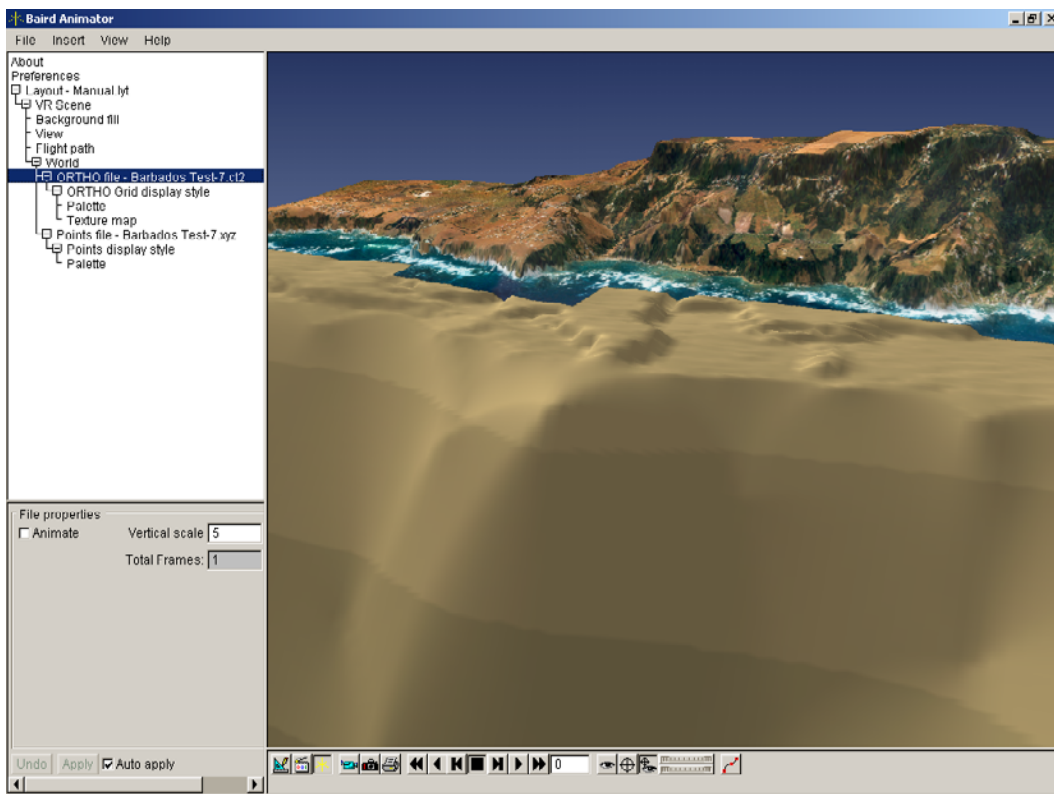
Conventions used in this book.

When asked to use the mouse, you will be directed to click, control-click, right-click, drag, etc.

- click — designates clicking with the left mouse button.
 - control-click — designates holding the Control <CTRL> key down on your keyboard and simultaneously clicking with the left mouse button.
 - right-click — designates clicking with the right mouse button.
 - drag — designates dragging/moving the mouse while holding down the left mouse button.
-

1 INTRODUCTION

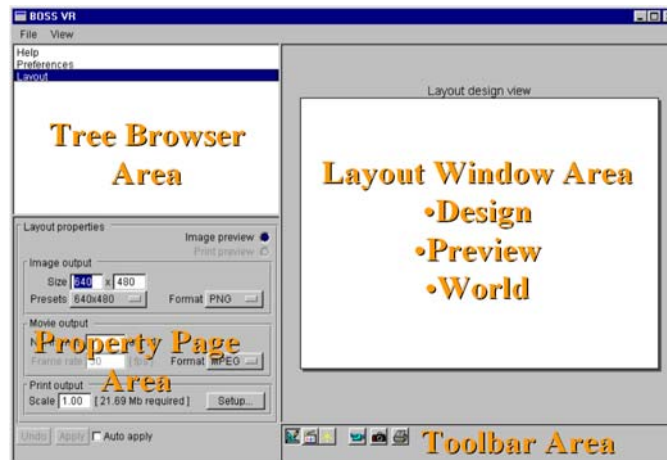
Baird Animator is a versatile 3 dimensional visualization environment for static and dynamic datasets. It was developed by Baird Software, a division of Baird & Associates Coastal Engineering. This program is designed to visualize bathymetric grids and results files generated by the MMS Plume Model, and includes features such as animated flights through the model data and animation recording. The following documentation will guide you through the features and utilities the software offers.



2 OVERVIEW OF THE BAIRD ANIMATOR ENVIRONMENT

The Baird Animator workspace environment is broken into 4 primary control areas to optimize the speed and ease from which a user can navigate the functions of the application.

1. Tree Browser
2. Property Pages
3. Layout Window
4. Toolbars



TREE BROWSER

The Tree Browser operates in tandem with the Property Pages below. When a Tree Browser Item is selected (highlighted) its corresponding properties are displayed in the Property Pages. Other features of the Tree Browser such as pop-up menus are described later.

PROPERTY PAGES

The Property Page for a selected Tree Browser Item is used to control the attributes of the related item. This area allows the user to modify a wide range of environment variables and change specific features of the selected Property Page.

LAYOUT WINDOW

The Layout Window contains three sub-windows, which the user can toggle between. The Design, Preview and World windows give the user 3 different perspectives for working with the data and setting up the rendered scene.

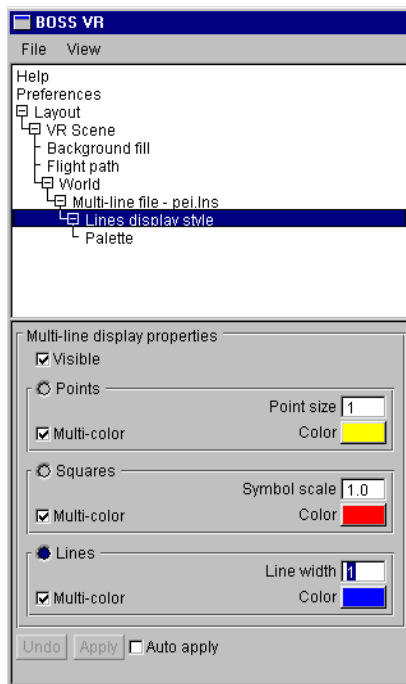
TOOLBARS

The Toolbar is designed for quick point and click control of the workspace. The handy buttons control some of the more common and practical features of the application that allow the user to navigate the workspace in a timely fashion.

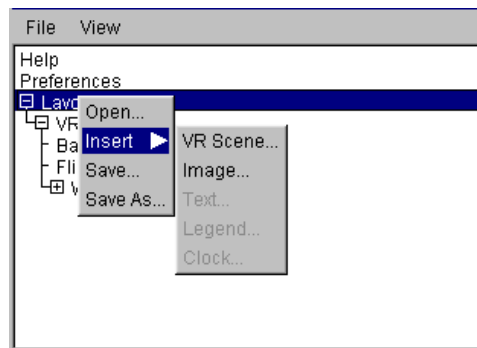
TREE BROWSER

When a user selects an item from the Tree Browser the corresponding property page will be displayed below. A tree item will appear highlighted when selected. A plus or minus box that precedes the title of a tree item represents an item which contains sub-items. The sub-item(s) are displayed by default but can be hidden from view by a left mouse click over the +/- box of the appropriate parent item.

The Tree Browser contains 2 principle levels: *Layout* and *Figure*. Each level contains sublevels that control their respective characteristics of the application. In the example to the left the Figure is of type VR Scene, which contains a World filled with any number of graphical objects.



An additional feature of the Tree Browser is a right-clicked activated context-sensitive menu, which provides functions appropriate for the selected item.




PROPERTY PAGES

COMMON FEATURES

Auto apply

Note: When the *Auto apply* box has been checked each change to a Property is immediately applied to the workspace. When the *Auto apply* box is **not** selected a number of variables can be changed, but the workspace will not reflect these changes until the user selects the *Apply* button. *Undo* is only available when Auto Apply is not selected. which will revert to the state of the most recent Apply. The *Apply* and *Undo* buttons affect all changes made to all property pages.

 Color buttons are used to edit the mono-color features of the associated property page characteristic.

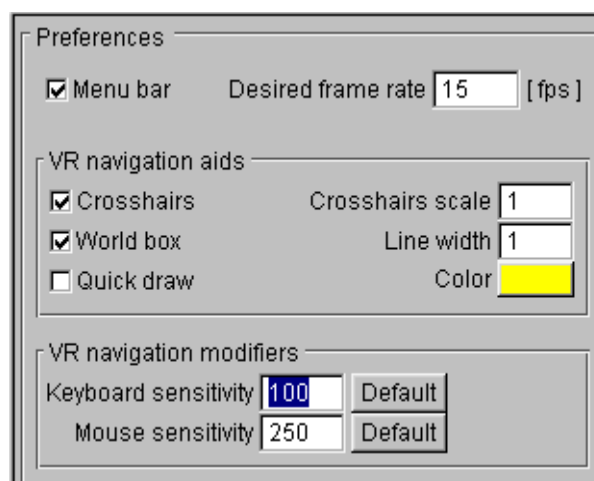
Multi-color

The Multi-color feature when selected (check box is checked) will apply the color palette to associated rendering style. When the Multi color feature is off, the mono-color displayed on the Color button is used.

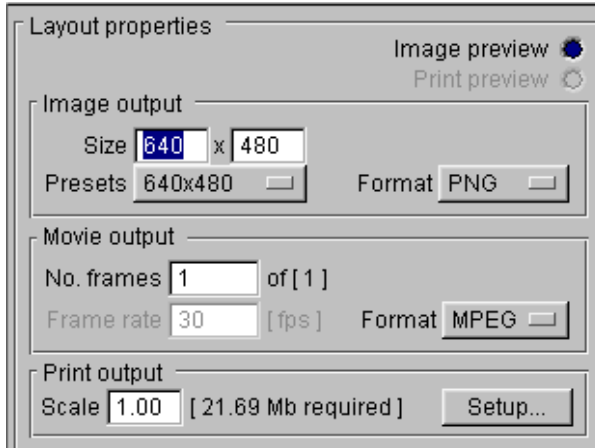
Default buttons will restore the original setting of the attribute.

PREFERENCES

Preference property page enables the user to modify basic navigational settings that are primarily used in the World Window.



LAYOUT PROPERTIES



Layout property page allows the user to set parameters for printing, image capture and movie recording format.

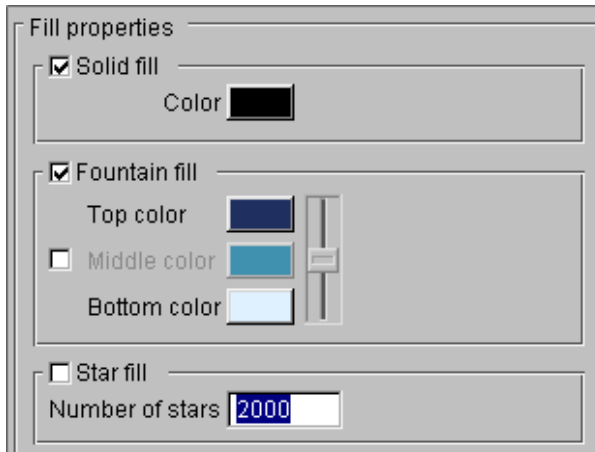
Please refer to “Printing, Image Capture and Animation Recording”.

FLIGHT PATH PROPERTIES

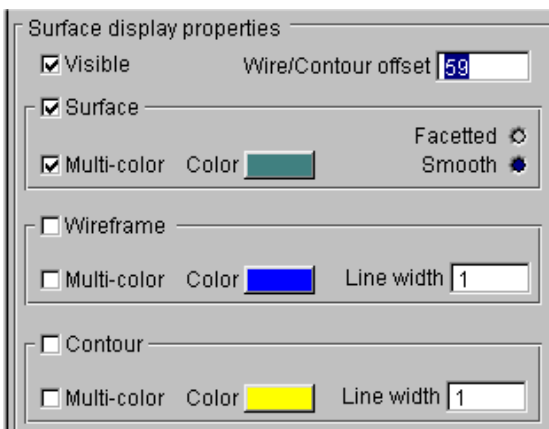
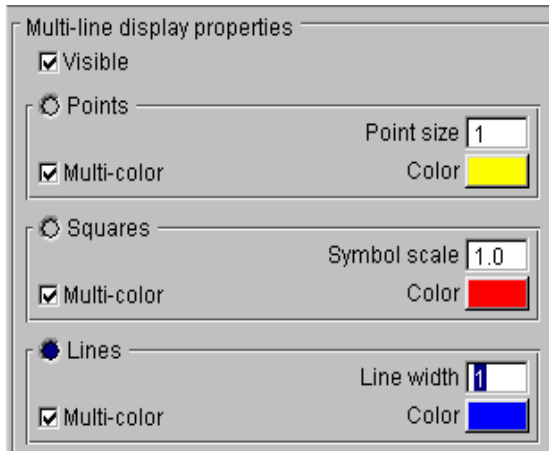
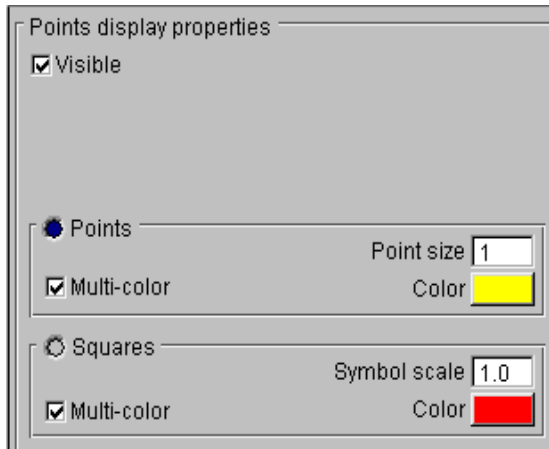
Please refer to “Create and Edit a flight path”.

BACKGROUND FILL PROPERTIES

The Background fill Properties controls the color and style of the background that is used when viewing data. The Solid fill property is a mono color background. Fountain fill is a blend of 2-3 colors with the added feature of varying the level of



blending. Star fill applies a sky of stars over the background color. The user may edit the number of stars used to create this background style. All 3 options can be activated at once and are rendered in the order (Solid, Fountain, Star) as they appear on the page.



POINTS PROPERTIES

The Points Properties allows the user to edit the variables associated with point or XYZ data types. The Points and Squares rendering style are toggled functions and can be scaled independently. Both styles share the color palette but respective mono colors are unique.

LINE PROPERTIES

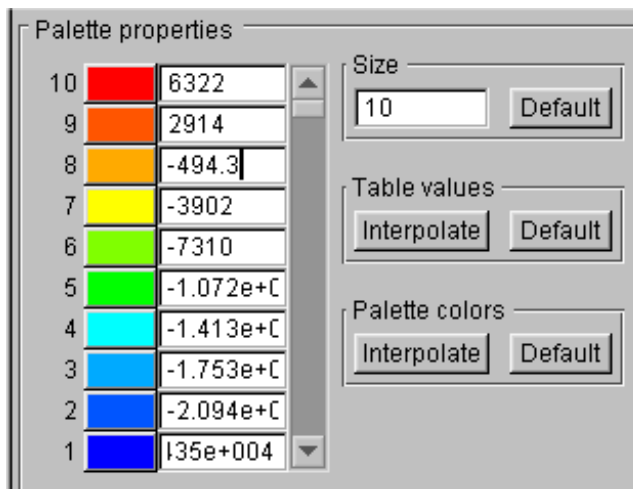
Similar to the Points Properties the Line page allows the user to render both Points and Squares styles from the ordered line data. The additional feature of this type is ability to render the data in Lines style.

SURFACE PROPERTIES

Surface or TIN data type are controlled by the Surface Properties. The page contains 3 rendering styles: Surface, Wireframe, and Contour. Each of the 3 styles can be rendered simultaneously and modified independently. The Surface style enables the user to toggle between Facetted and Smooth rendering. The Wireframe and Contour style share an additional vertical offset feature, (Wire/Contour offset) which is a useful tool when rendering more than one style at a time.

PALETTE PROPERTIES

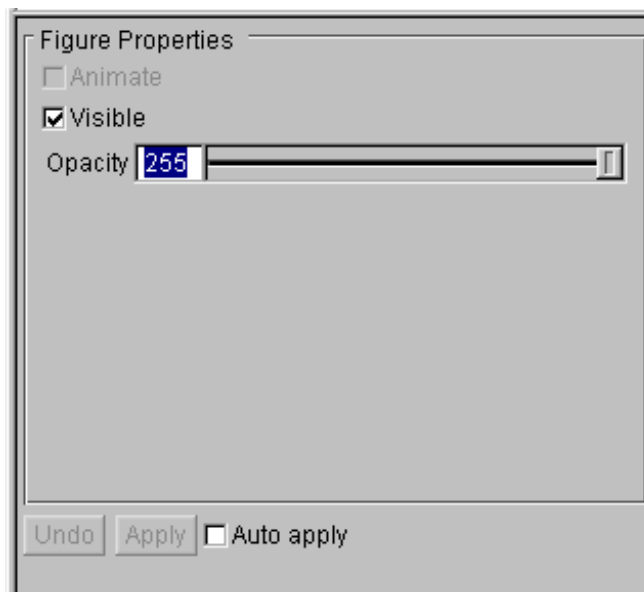
The Palette page controls the spectrum for all multi-colored styles of an object and, for grid or mesh objects, the number of contour levels as well.



The user can linearly interpolate the palette table values between the first and last values. Likewise, colors are interpolated using HSL methods.

Individual values can be edited by entering in the input fields. Clicking a color button, will pop-up a color selector dialog with the added feature of adjusting the opacity of the color.

FIGURE PROPERTIES



The Figure Properties contains 2 basic functions. The first is Visible, which displays or hides a figure from view and output. The second property, Opacity, controls the alpha value for images. The additional figure feature, Animate, controls playback of dynamic data.

LAYOUT WINDOWS



The 3 buttons illustrated above, from left to right, toggle the Layout Window Area from **DESIGN, PREVIEW & WORLD WINDOWS**, respectively.

PREVIEW WINDOW

The Preview Window is the actual layout view of the loaded data that will be used for printing, image and animation recording. This window displays the relative size and position of the dataspace that was set in the Design Window and the aspect ratio (view) of the data controlled in the World Window.

WORLD WINDOW

This window is the virtual reality world used to handle and manipulate data. The World has 2 primary functions:

- Modify the 3D view
- Create and edit flight paths

This window fills the entire work area and thus does not maintain the same aspect as the output format.

DESIGN WINDOW

This window does not actually display the data that has been loaded into the workspace but represents each object, data or image, as a sizable box. The primary function of the Design Window is to load, order and position data or images as desired.

The design window contains important functions to help the user modify the final dataspace that will be used for the specified output format.

The layout window (on the following page) is an illustration of a workspace that contains two figures:

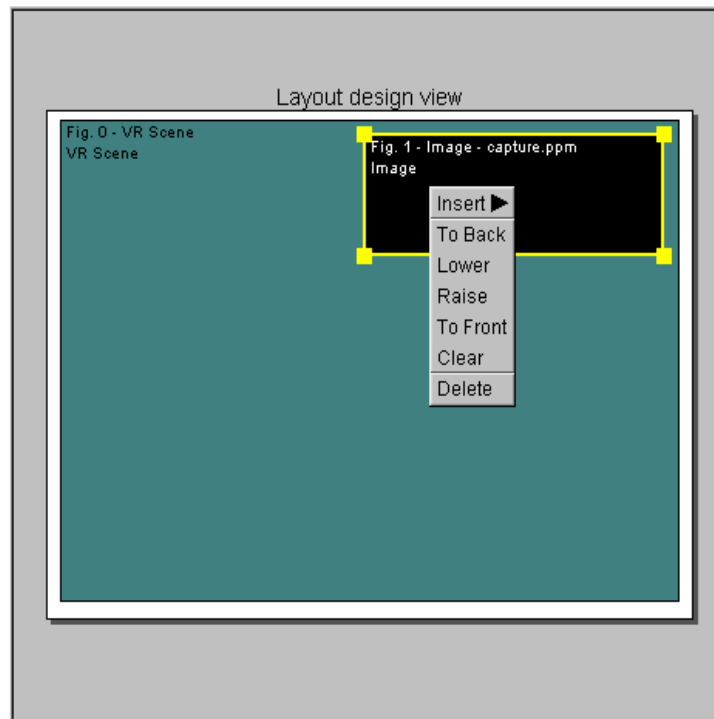
- 1) Fig 0 – VR Scene
- 2) Fig 1 – Image

The enumeration of “Fig” represents the order in which the data was added to the workspace with 0 denoting the first. The right-click context-sensitive menu functions are as follows:

1. Insert: inserts data into the workspace
2. To Back: place the selected figure(s) behind all other figures
3. Lower: lowers the figure one level
4. Raises: raises the figure one level
5. To Front: place the figure in front of all other figures
6. Clear: clear the “selection” of a figure(s)
7. Delete: deletes the figure and all associated tree browser items and Properties from the workspace.

To modify a figure select the desired object with a left mouse-click. A selected figure will be illustrated by a yellow outline and small square sizing handles at each corner. To move an object press and hold down the left-mouse inside the figure area and drag the object to reposition. To size the figure press and hold down the left-mouse over the small square sizing handles at a corner and stretch the object to the desired size.

For multiple figure sizing and positioning hold down the [CTRL] and use the left-mouse to select or de-select figures, then size or position the grouped item as described for single figures above. Multiple figure selections can also be done by holding down the [SHIFT] key and dragging the left-mouse to outline an area that completely contains the desired figures.



TOOLBARS

The toolbar below illustrates all possible features and tools that the user may access from this area. Note that different combinations of control buttons will be displayed depending on the editing mode and current layout window from which the user is working. All the buttons below are mouse activated and response is immediate, they do **not** respond in a modal fashion.



LAYOUT WINDOW TOOLBAR

These 3 options, from left to right, set the view window to:



1. *Design Window,*
2. *Preview Window,*
3. *World Window.*

OUTPUT TOOLBAR

The 3 buttons above, from left to right:



1. *Movie Record*
2. *Image Capture*
3. *Print*

ANIMATION CONTROL TOOLBAR



Animation of the camera path is controlled by four buttons on the toolbar, which represent **REWIND**, **STEP-BACK**, **STOP**, **STEP-FORWARD** and **PLAY**, from left to right.

VIEW CONTROL TOOLBARS:

VIEW / NAVIGATION MODE TOOLBAR



Above, 3 buttons, from left to right, control the method of view control VIEW POINT, FOCAL POINT, and VIEW VECTOR (both VIEW POINT and FOCAL POINT), respectively.

DISTANCE TOOL



Two Roller controls modify the viewing distance. The top roller is for coarse changes and the lower roller is for finer changes to the distance from the Focal Point to the View Point .

FLIGHT PATH EDITOR



This button turns on, or off, the editing of the flight path. If there is no current flight path, a default flight path is quickly applied to the workspace. When the button is in the down position the flight path is in edit mode as described in the Flight Path section.

MOUSE AND KEYBOARD CONTROLS



The functions of the mouse buttons for Baird Animator are as follows:

- Right button: used for making context-sensitive menu selections.
- Left button: activates all other interaction widgets.

The keyboard arrows can be used to duplicate the functions of the mouse.

VIEW DRAG AND DROP

This allows you to move the selected view component in XY by clicking with the left mouse button and dragging the mouse within the **World** window.

For the VIEW POINT, dragging up moves the VIEW POINT farther from the FOCAL POINT while dragging down moves it closer. Dragging to the left causes a counterclockwise rotation while dragging right, clockwise. These effects can be combined while dragging by moving the mouse diagonally.

For the FOCAL POINT, dragging works the same way as for the VIEW POINT but rather it is the position of the FOCAL POINT that is changed in XY.

When *VIEWING VECTOR* (*both VIEW POINT-FOCAL POINT*) is selected, both components are changed simultaneously so dragging works a bit differently. The movement of the VIEW POINT and FOCAL POINT together result in the following changes to the viewing vector. Dragging down moves the viewing vector forward within the dataspace and dragging up moves backward. Dragging left moves the scene to the left or the view to the right and dragging right moves the view to the left.

By holding down the [CTRL] key while dragging, you can alter the altitude of the selected view component. The cursor will appear as a vertical, two-way arrow while doing this. Dragging the mouse up moves the selected component down while dragging down, moves the component up.

SHORTCUT FOR ROTATION

Viewing the same FOCAL POINT from different VIEW POINT positions is required so often that a shortcut for rotating the VIEW POINT has been provided. From the view control pop-up menu (in the World Window) select *Rotate Clockwise* or *Rotate C-clockwise*. Then select the desired degree of rotation from the common angles provided. Selecting an angle rotates the VIEW POINT in the XY plane around the FOCAL POINT. This is particularly useful when in an overhead type view.

VIEWS

PRE-DEFINED VIEWS

There are two functions that display useful pre-defined views. They are all accessible from the pop-up menu from within the World Window. The two preset views; Plan View and South View are described below.

PLAN VIEW

This is a bird's eye view of the dataspace. The north direction is pointed up, the Focal point is centered, and the entire dataspace is visible.

SOUTH VIEW

This is the default view when the World window is first presented. This is a full-dataspace view from the south. Similar to Plan view, the South View displays the north direction pointed up and the Focal point is centered.

VIEW HISTORY

The view history is a stack of previously visited views. An entry is added to the stack each time the view is changed. The view history is controlled from the keyboard and navigated as follows:

- Home key → first stored view
- End key → last stored view
- Page Up → previous stored view
- Page Down → next stored view

MISCELLANEOUS VIEW FEATURES

The *Reset* function in the World Window pop-up menu recalculates the world limits and all view parameters, then sets the view to a new default perspective. This may need to be done whenever an object with substantially different coordinates is displayed. It is not done automatically you may want to preserve the current view.

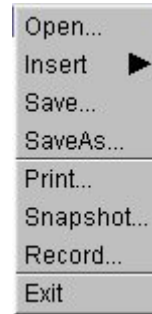
NOTE:

If ever it seems that the view has disappeared, it is probably the result of having two objects with greatly differing coordinates displayed simultaneously. The reason for this is that the size of the dataspace has been enlarged to encompass both objects, which are relatively very small. This situation should be avoided.



MENUS

FILE MENU



The File menu features are:

- Open: Opens a Baird Animator layout file with extension *.lyt.
- Save: Stores the present workspace including all data and associated properties.
- SaveAs: Identical to Save but the user selects a file name and location to store the workspace.
- Print: Prints the contents of the workspace as displayed in the Preview Window.
- Snapshot: Captures an image of the workspace as displayed in the Preview window.
- Record: Creates an animation of the flight path through the workspace.
- Exit: Terminates the application.

VIEW MENU



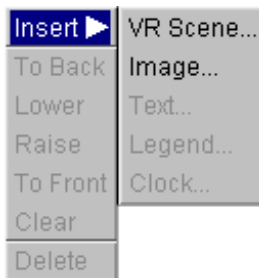
The view menu simply allows the user to toggle between Design, Preview and World in a similar fashion to the buttons found in the toolbar.

3 WORKING WITH BAIRD ANIMATOR

LOADING DATA

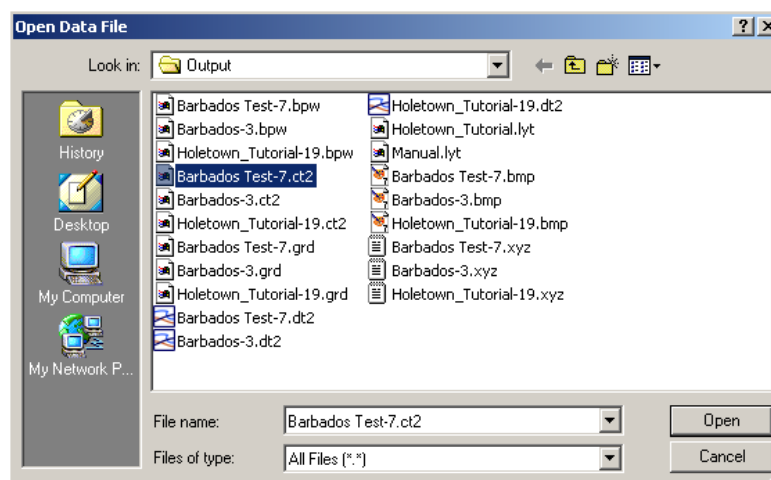
The application has 4 methods to load data into the workspace environment:

1. The File menu
2. The pop-up menu in the Design Window
3. The Layout Tree Browser item
4. Command line

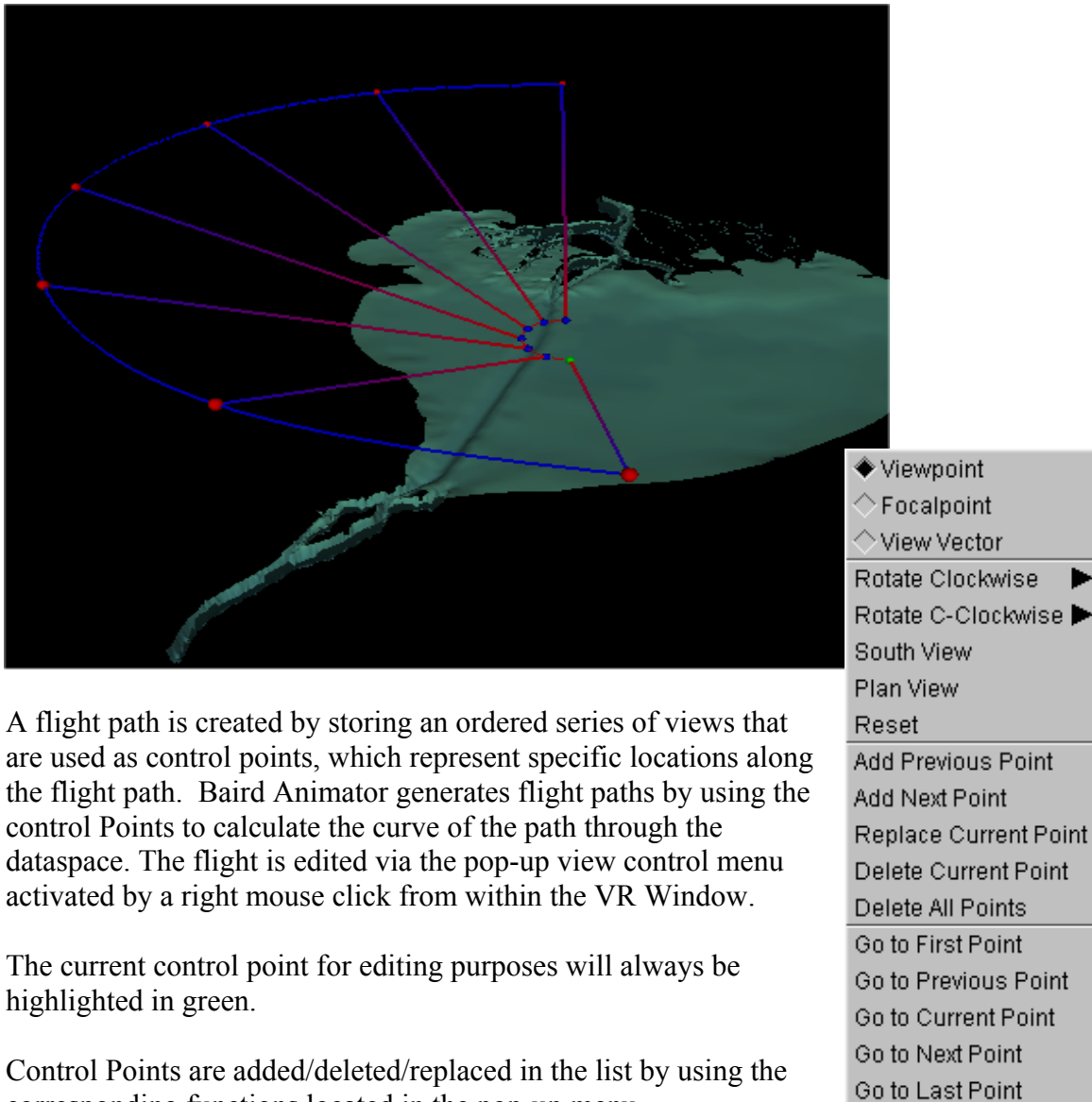


Use the Right mouse to activate pop-up menu from one of the first 3 areas listed above. Load the desired data as follows:

Select *Insert » VR Scene* to load model grid files exported from SDA, or *Insert » Image* to load image files. Next use the standard file selector to locate and open the file you wish to load into the workspace environment. Upon a successful load a new VR Scene or Image item will appear in the Tree Browser and the current viewing window will render its respective representation of the data.



CREATE AND EDIT A FLIGHT PATH



A flight path is created by storing an ordered series of views that are used as control points, which represent specific locations along the flight path. Baird Animator generates flight paths by using the control Points to calculate the curve of the path through the dataspace. The flight is edited via the pop-up view control menu activated by a right mouse click from within the VR Window.

The current control point for editing purposes will always be highlighted in green.

Control Points are added/deleted/replaced in the list by using the corresponding functions located in the pop-up menu.

To insert Control Points, adjust the view to the desired path starting Point and click on either “*Add Previous Point*” or “*Add Next Point*”. Whenever a new Point is added, it becomes the current control Point. Subsequent additions will be inserted either before or after the current Point.

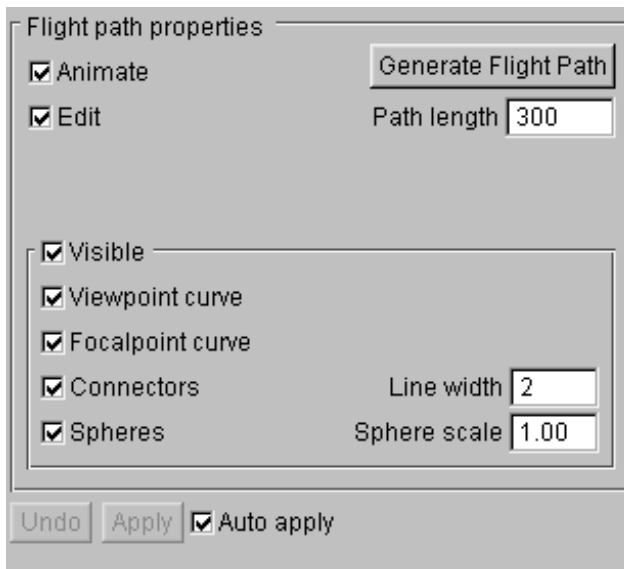
Note: You may add additional Points along the present flight path simply by a double left mouse click while Pointing to the desired location on the curve. To extend the curve simply click beyond the end of the present curve.

The *Delete Current Point* will remove the current selected Point from the flight path. *Delete All* will remove the all the Points, therefore the entire flight path. The *Replace Current Point* function replaces the view associated with the current control Point to that of the current view within VR Window.

The features called Goto ‘some’ Point causes the current view to change to that of the selected control point. When the flight path is in edit mode the keyboard can be used to navigate through the control points in exactly the same fashion as the View History controls described in the previously section.

Home key → first control point
End key → last control point
Page Up key → previous control point
Page Down key → next control point

The Goto Point and keyboard features are most useful for cycling through the Points to examine the views in succession.



The flight path can be rendered using a variety of different attributes, which are controlled from the Flight Path Properties.

The most important of these attributes is the Path Length that controls the total number of steps or views that will be used in the flight path. The more steps the smoother the flight path will appear to be.

MODIFYING CONTROL POINTS

Edit the camera path by checking the button Edit box of the Flight Path Property Page.

Move the cursor over a control point and click on the point to make it active. When you click on a point it will change color to become a green sphere. Using the left mouse button, click and drag the Control Point to the new desired position. As you move the control point, only its horizontal XY position changes. Holding down the Control <CTRL> key will constrain the move movements to only change the Z (vertical) value of a control point.

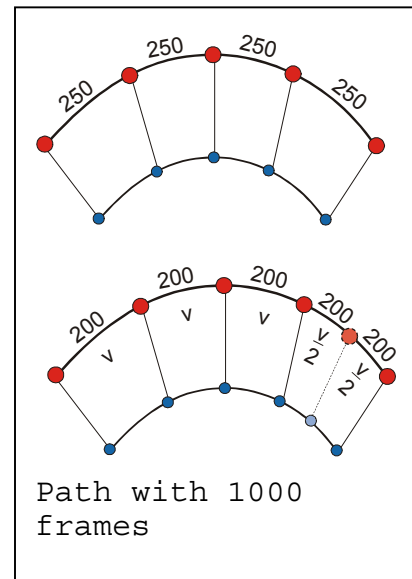
DISTRIBUTION OF CONTROL POINTS

Adjusting the spacing between the camera control points can vary the speed of the camera's movement through the scene. By clustering the spacing of camera control points it is possible to slow the camera's movement.

For example, with a starting flight path set to 1000 frames and 5 control points equally spaced (creating 4 equal segments), each segment is 250 frames, so the camera will move at a constant speed through the entire path. If the path is edited and a new control point is added exactly mid-way along the last segment, each segment would now represent 200 frames in the final animation, causing the camera to move slower through the last 2 segments.

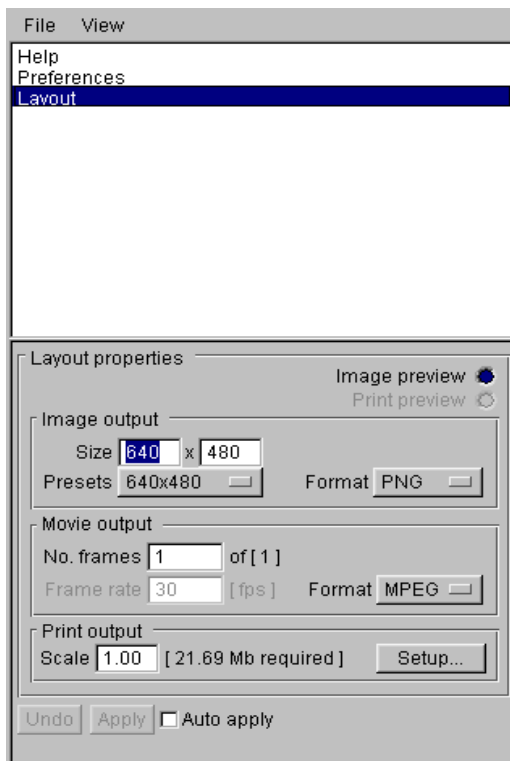
The total number of control points can be adjusted at any time when the flight path **edit** feature is on.

(see property page above)



OUTPUT: PRINTING, IMAGE CAPTURE AND ANIMATION RECORDING

All output format characteristics are managed from the Layout Properties. The Layout page, as with all property dialogue boxes, has modal or non-modal functionality. Remember that any changes must be applied (*Apply*) to the environment before they are actually used.



Layout Properties allows the user to modify the characteristics for printing, image capture and movie recording format.

Image Output controls the size (width by height in pixels) and image type (Format) including extension of the file.

Movie Output controls the number of frames that will be recorded from the total frames used to create the Flight Path. (See Create and Edit Flight Path).

Print Output allows the user to scale the output as well as redirects the user to the standard *Setup* controls of the associated hardware. Scaling the output reduces the memory required to render the off-screen bitmap.

Each of the three different output utilities can be quickly executed through the Toolbar buttons below. Alternatively the user may use the File menu to achieve the same results.

1. Movie Record
2. Image Capture
3. Print



The Preview Window illustrates all objects and images in the order, position and relative size that they will appear in the desired output format. **Note** that the texture map must be turned **off** in order to animate or image capture.

GLOSSARY

| | |
|---------------|---|
| <i>AVI</i> | – Audio Visual Interlaced, MS Windows format |
| <i>BMP</i> | – BitMap 24-bit RGB image |
| <i>FLIC</i> | – Flic file is an animation file created by Auto-desk |
| <i>FRAMES</i> | – A series of images |
| <i>GIF</i> | – Graphic Interchange Format, animated |
| <i>JPEG</i> | – Joint Photographics Experts Group |
| <i>MNG</i> | – Multi- image Network Graphics |
| <i>MPEG</i> | – Motion Pictures Expert Group |
| <i>PNG</i> | – Portable Network Graphic |
| <i>PPM</i> | – Portable Pixmap |
| <i>VR</i> | – Virtual Reality |