USER MANUAL

INTRODUCTION TO VISTAPRO

GETTING STARTED

Vistapro 3.0 Installation

Before installing Vistapro, you should be aware that Vistapro requires a minimum of four megabytes of memory to run and at least six megabytes to access the new AGA modes. If you are installing Vistapro onto floppies, format three blank disks before installing Vistapro (leave them with the name Empty). If you are installing onto a hard disk, Vistapro (including its associated DEM files, sample scripts, etc.) takes approximately three megabytes of hard disk space.

If you have DCTV or HAM-E display devices and are installing Vistapro for the first time, select Intermediate as your user level when the Installer prompts you. The appropriate support files will then be installed for you.

Insert the Vistapro Program Disk into any available disk drive. Double click on the disk icon to open it. Double click on the Install icon found on the Vistapro Program Disk. The Installer will ask you several questions about your system and whether or not you want Vistapro installed on floppies. After installation is complete, you are ready to run Vistapro 3.0.

A Quick Tour

Vistapro makes pictures of landscapes from two different types of data. Pictures of real landscapes are made from U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data. You can also explore billions of imaginary fractal landscapes generated from data produced by Vistapro itself. Starting with the control screen, you see a rectangular picture bordered by gray on the left two-thirds of the screen. This contains a topographic map of a landscape that you can explore. Vistapro's topographic map uses shades of green to represent the lowest altitudes, browns to represent the middle altitudes, and gray-whites for the highest altitudes. You control Vistapro using the buttons on the right side of the screen.

To get acquainted with Vistapro, move the red crosshair to the Camera button and click the left mouse button. Note that the Camera button appears to be indented, which means that the crosshair will now place the camera (the small n on the map) when you click the left mouse button over the

topographic map. Note that the X, Y and Z coordinates within the boxes next to the X, Y and Z buttons, change each time you click on a new camera location. The Z coordinate shows the altitude of your camera. It is automatically set to 30 meters above the point that you clicked on. When you have your camera placed where you want it, add several hundred units to the Z altitude by clicking on the numerical value and typing in the new number. The extra altitude puts the camera far enough above the surface to reduce the size of polygons in the foreground. Next, click on the Target button, then click on the topographic map to place the target. A small + appears on the map to identify the target location. The manual contains information on how to use all the other controls but for now, click on the CMap button. This causes Vistapro's Color Control Panel to appear. This control panel is used for adjusting the colors, contrast and brightness used to paint the landscape. Since this is merely a tour, don't change any of the settings. Click on OK at the bottom left part of the screen to return to the primary control screen. Using the right mouse button, go to the top left part of the primary control screen to view Vistapro's pull down menus. Don't select any right now. Again, the manual describes their use in detail. Click Render on the bottom control panel and wait. Vistapro will render (draw and color) a rough (big polygon) view of the target you have chosen. After it has rendered the picture, a click on any part of the screen returns you to the primary control screen. Notice that the default Poly value is 8. This is the roughest and fastest view. It helps you quickly reset the camera view and lighting until you think you have it the way you want it. The lower Poly values increase the rendering time as they yield a more detailed picture. Now that you know your way around Vistapro, you may wish to take a few minutes to follow the tutorials. We designed the tutorials to teach by doing. When you have finished the tutorials, you will have an intuitive understanding of Vistapro which will increase your ability to use the program. The remainder of this manual is a reference text for your use should you need detailed information about a particular feature.

What is Vistapro?

Vistapro is a three-dimensional landscape simulation program. Using U.S. Geological Survey (USGS) Digital Elevation Model (DEM) files, Vistapro can accurately recreate real world landscapes in vivid detail. As a fractal landscape generator, Vistapro can create landscapes from a random seed number. Often these landscapes are more

interesting than those found in the real world. Vistapro supports over four billion different fractal landscapes. Simply by changing a number, you can create whole new worlds. Vistapro is also a tool. Besides simulating real and imaginary landscapes, it allows extraction of a certain amount of data from the DEM files. You can use the program

output as an educational tool, as well as a research tool for the study of topography. In addition, by simply clicking on several buttons, you can create rivers and lakes in a landscape where none existed previously. Vistapro converts DEM files to Turbo Silver data which will enable you to import them into Imagine or similar ray tracing programs to add stunning realism to ray tracings. For instance, you can add a house that you have worked on in a favorite rendering package to a real world landscape. Imagine being able to place an architectural creation on top of Mount St. Helens or on an island in the middle of a fractal landscape!

How Vistapro Works

Vistapro uses a combination of artificial intelligence, chaotic math and a user definable set of values to simulate landscapes in their natural state. At present, the USGS has converted about 40% of the United States and its territories to DEM files which can potentially be used with Vistapro. Vistapro is a single frame generator, meaning that it acts like a camera; every time you point the camera and click, it renders a new view of the landscape. You can view landscapes from a practically infinite combination of heights, angles and distances. Using the combination of user controllable values and Vistapro's built-in routines, you can make landscapes as realistic or as surreal as you desire. It is easy to alter tree and snow lines, haze, exposure, rivers, lakes and light sources to customize the appearance of the landscape. Vistapro uses data derived from United States Geologic Survey Digital Elevation Mapping files for generating its images. These files contain coordinate and elevation data at 30 meter (roughly 100 ft.) increments. Each Small Vistapro DEM file contains about 65,000 elevation data points and generates 130,000 polygons. A Large Vistapro DEM file contains about 256,000 data points and generates 512,000 polygons, and a Huge Vistapro DEM file contains about 1,000,000 data points and generates over 2,000,000 polygons. Vistapro doesn't know anything about what covers the terrain. It doesn't know where the trees, roads or buildings are. It does its best to color each polygon (based upon a few numbers that you input) in a realistic way. However, it can't draw each rock and tree. Adding texture

and trees can result in images containing as many as a hundred times as many polygons as the landscape by itself.

Some Uses for Vistapro

Vistapro is not only of interest to scientists and engineers. Artists, writers, teachers, game designers, travelers and people just looking for hours of entertainment will appreciate Vistapro. Artists can design realistic scenery as backgrounds for their artwork. Writers can create worlds and see them through their character's eyes. Geography, geology and meteorology teachers can use Vistapro to breathe life into their subjects. Game designers can make realistic or surrealistic scenery for backgrounds in their games. Travelers, hikers and backpackers can preview their journeys. Vistapro can be pure entertainment. Explore fascinating terrains that you might never have a chance to see or visit distant planets that man has not yet trod. Build new worlds that exist nowhere except in the imagination and then visit them as if they were really there. On the other hand, there are many scientific and business applications for Vistapro. Environmentalists, surveyors, geologists, architects and engineers will all find Vistapro a useful adjunct to their work.

NOTES ON VISTAPRO

VISTAPRO ON ACCELERATED AMIGAS

The program selection

Vistapro is for those who have standard Amiga 500's, 600's, 1000's or 2000's without an accelerator board. We optimized the program selection Vistapro.881 for use with a 68020 or 68030 AND a 68881 or 68882 math co-processor or with a 68040. Vistapro.881 will NOT run without a math co-processor or on a 68000 based machine. Both programs are otherwise identical. The correct version of the program is automatically installed based upon your answers to the Installer program.

We strongly advise using an accelerated machine with Vistapro. On an unaccelerated machine, renderings can take from several hours to several days, depending upon the complexity of the rendering. With an accelerated machine (68040/25 MHz), renderings can take anywhere from ten minutes for a relatively simple 700,000 polygon image to three hours for a complex ten million polygon image.

Vistapro Landscapes

All Vistapro Landscapes on the disk have the file protection mode set to read only This assures that you will not accidently delete a landscape. The Protect function on your Workbench allows you to reset the protection. You may set normal protection by typing Protect <filename> rwed where <filename> is the name of the file you want to change. Do not type the < or > characters.

Vistapro Stack Requirements

Vistapro contains some recursive routines which may require large amounts of stack space. If Vistapro is run via its icon from the WorkBench, you needn't worry about the stack it has already been set up in the Vistapro.info file. If Vistapro is run from a CLI or Shell, you must ensure that you run Vistapro with enough stack memory. From the CLI or Shell you can type Stack to see the current default stack setting. The usual default value is 4000 bytes. (The Lake function is the only function requiring much stack space. If you do not use the Lake function, you don't need to increase the stack beyond the 4000 byte default.) Otherwise, if the current stack setting is fewer than 50000 bytes, we suggest raising it. If it is very much larger, consider lowering it, especially if your machine is short of memory (see Loading Vistapro below). To set the default stack size, click once on the Vistapro icon. Select the Information item from the Icon menu (WorkBench 2.04 or later) or the WorkBench menu (WorkBench 1.3). In the resulting window, type 50000 and then Return in the string gadget labelled Stack. Vistapro is now ready to use. If you are using Large or Huge mode, 50000 may not be enough stack space for all lakes. You may want to try 60000 bytes in Large mode and 120000 bytes in Huge mode.

Loading Vistapro from the CLI or a Shell

Before starting Vistapro from a CLI or Shell, be sure the default stack size is set to at least 50000 (type Stack 50000 from the CLI or Shell). You can start Vistapro from any CLI or Shell by typing Vistapro from the directory where Vistapro is located. You can force Vistapro to load a particular landscape by including its device:path/name on the command line. Some possible examples:

```
Vistapro ElCap.dem
Vistapro df0:CraterLake.dem
```

Vistapro dh0:Vistapro/Landscapes/Mons.dem

You may, of course, simply type Vistapro and load a landscape via the Load menu.

Vistapro Startup Preferences

When it first loads, Vistapro looks in the S: directory for a script file with the name Vistapro.prefs. This script file can be used to set up Vistapro to the modes that you use most frequently. It is a standard Vistapro script file and can use any of the Vistapro script commands.

Limits of Vistapro's World

Hypercube Engineering created a fast mixed integer and floating point 3-D engine for use in Vistapro. Vistapro displays landscapes properly, when the Camera and Target are kept within -2000000000 and +2000000000 (on all three axes). Placing the camera or target outside this range or underground may result in distorted images or no images at all.

Speeding Up Vistapro

There are two ways to speed up Vistapro: strategy and brute strength. After you have used the program for a while, you will learn to r[22;23;24m[1;3v[2"z[3mead[22;23;24m[1;3v[2"z the lower to see if you are obtaining the picture you want. When the scene is properly positioned and lighted, and when you have set the tree line, snow line and water levels where you want them, then, and only then, render the picture at the time-consuming full resolution mode. Using the Place Control Panel to select the location of grass and trees rather than having Vistapro generate them randomly can reduce rendering time by half or more.

The alternative method for speeding up Vistapro's rendering process is to add power to your machine. Vistapro has been programmed to use every available computing resource as efficiently as possible. The time consuming rendering process is a function of the enormous amount of computation that Vistapro must do, not any lack of optimization of the program itself. Vistapro automatically looks for and uses whatever processing resources you supply. When you add an accelerator board or upgrade to a faster machine, Vistapro takes advantage of the additional processing power without any adjustment or request on your part.

Texturizing the landscape can take a significant amount of time, as can the Tree and Grass functions. We suggest test rendering without those functions active to prove the scene and then, when you are satisfied with the layout, add the Texturization and Trees.

Realistic ray traced CAD objects, detailed 3-D animations and realistic landscapes are all a part of the emerging software categories called virtual reality, artificial reality and simulation. These categories all require immense computational capacity but, as the cost of computing power continues to plummet, these types of programs will become the standard. As a Vistapro user, you are pioneering virtual reality exploration and it is admittedly a bit tedious on an unaccelerated machine. But, looked at another way, it is amazing that this type of rendering can be done at all, let alone on a personal computer. Until the advent of Vistapro, landscape renderings of such realism were only available to users of workstations and supercomputers for secret government projects.

MAKING THE MOST OF VISTAPRO

Making a stunning landscape in Vistapro requires the combined eye of a photographer and the artistic sense of a painter, but here are a few tips which can help improve your first attempts.

Lighting

Experiment with the lighting. If the light is coming from behind the camera, scenes may appear rather flat. There won't be a strong feeling of three dimensionality. You can create dramatic shadowing effects by choosing the proper lighting direction and angle. With the power of Vistapro, you can choose to light the scene in ways which could never occur in the real world or, if you are a purist, you can select the correct solar position for the particular season, geographic location and time of day. Our Distant Suns planetarium program (or most other astronomy programs) can easily calculate such solar lighting conditions in order to correctly set the light, target and camera position to obtain maximum realism in your rendering. If you just leave the lighting to chance, you may find that shadows cover your scene and it does not look as good as it could. We find that setting the light source (the sun) at 45 to 90 to the left or right of the camera gives the best results. For example,

if the camera is facing due north, placing the sun at the southeast, east, southwest or west usually makes the best pictures. Placing the sun directly behind the camera usually results in a lack of three dimensionality and contrast, although there are times when this is the desired effect. Back-lit scenes (for example camera facing north, sun shining from the north) can also yield interesting images.

Snow and Tree Line Setting Considerations

If you know the normal range of snow line for the season that you are viewing and at what altitude the tree line begins, you can use Vistapro in a very realistic way. Tree line varies with latitude until, in arctic regions, it reaches sea level. Snow levels vary with the weather and altitude. A little research at the local library or even listening to the weather on the evening news will allow you to increase the realism in Vistapro landscape rendering. Of course you needn't follow the real world as an example. You are free to set the tree and snow lines wherever you want. You may want to see a landscape as it might have looked during the last ice age or how it might look after severe global warming from the greenhouse effect!

Changing colors

Use the Color Control Panel to change the colors, contrast and exposure used to render the landscape. Most landscapes shipped from Virtual Reality Laboratories have shades of green for lower elevations, brown for middle elevations and white for upper elevations. Try changing the Tree colors to pinks and whites. This makes them look like flowering fruit trees in the spring. Change them to reds, browns and yellows for an autumn scene.

Foreground fat polys or jaggies

Since the accuracy of the data limits the detail that Vistapro can display, some of the foreground features will contain fat polys or jaggies Vistapro builds all images with polygons millions of polygons per scene. The polygons are all about the same size but those near the camera appear very large on the screen, just as an object very near you looks large, while when it is far away, it looks very small. There are several ways to reduce this effect. One of the simplest is to raise the camera a few hundred meters above the ground. If you use the mouse to position the camera, it is automatically set thirty meters above the landscape.

Since the nearest polygon (the one right under the camera) is only thirty meters away it will look very large (if it is within the field of view). If you raise the camera 300 meters it will look about ten times smaller.

A second method is to use the Textur function. This actually consists of two functions, shading and altitude texturing. Shading texture is the same as the Textur function in Vistapro 2.0, which breaks nearby polygons into several smaller pieces and renders each at a slightly different shade giving them a marbleized appearance. Altitude texture fractalizes the polygons into groups of smaller polygons and adds fractal texture as well as shading. Altitude texture can result in extremely realistic ground texture, especially for cliffs and desert sand.

Another way to hide foreground polys is to use the Tree function. Trees are made of many small polygons and can obscure the large polygons of the ground underneath them.

If you are looking at a small portion of the landscape you might consider using the Enlarg function to blow that section of landscape up to twice its size.

A third method to hide fat polys is to use Gouraud shading. This blends the edges of the polygons with each other, eliminating the sharp color change from one polygon to the next and provides a beautiful artistic interpretation of the scene. This shades even very large foreground polygons into oblivion. Shading Textur and Gouraud shading can be combined to generate even more interesting details. The use of Gouraud shading with Altitude Textur is not recommended.

Sometimes there is a small bump immediately in front of the camera that blocks a large part of the scene. Moving the camera a few meters higher may be enough to move the bump out of the field of view, or you might move the camera far enough forward to get the bump behind it.

A note about aesthetics

Remember, there is no more a right way to use Vistapro than there is a right way to use a camera. A child using a camera or Vistapro may derive a lot of knowledge and entertainment from a result which would not please a more professional artist. Like the natural world it imitates, Vistapro gives the artist an unlimited number of choices for portrayal. What looks great to one person may not appeal to the next.

Fractals imitate the way nature looks, but they are not the same. They have no knowledge of geology, plate tectonics or erosion. So, whatever pictures you produce with Vistapro will be interpretive because Vistapro is producing an artificial reality to begin with. The philosophical and aesthetic ramifications of virtual reality construction are immense. Vistapro is an early forerunner of a medium of art and expression as powerful and unique as photography for creative work.

For many years after their introduction, photographs sparked lively debate about whether or not they were art Computer art and virtual reality simulation seem destined to foment a similar debate.

Exploration with Vistapro

As a virtual reality simulator, Vistapro allows you to explore landscapes that you will probably never be able to explore first hand. We hope that most of you will have the opportunity to visit a few of the national parks but it is highly unlikely that any of us, except those who are now children, will have the chance to tour the caldera of Mons Olympus on Mars. As we are able to convert more of the data already available from planetary probes and undersea explorers, Vistapro will allow you to explore forbidding and alien landscapes decades, or even centuries, before the first human explorer is able to take tourist snapshots. By giving its users the ability to wander about distant landscapes, rendering true perspective pictures of their choice, Vistapro and later progeny will free humanity from its current boundaries long before such explorations are commercially feasible.

Your own data

Vistapro can be used to visualize any kind of surface which can be represented as a two dimensional array of integers (up to 1024x1024). Scanning tunneling electron microscope data is an example of such data think of it as a tiny, tiny landscape! You might even be able to convert your backyard into Vistapro format!

VISTAPRO MENUS

If you are not familiar with how to use menus on the Amiga, simply click on the right mouse button when Vistapro is displaying the control screen. This shows a title bar at the top of the screen. Continue to hold down the right mouse button and move the crosshair to one of the selections in the title bar. Continuing to hold down the right mouse button, drag it down the menu. Notice that it illuminates various selections or causes another sub-menu to appear. Continue holding down the button, until you illuminate your choice. Release the button to select that choice.

There are seven menus in Vistapro: the Project menu, which controls the size of the topographic map, printing and supplies information about the program; the Load and Save menus, which control loading and saving of files; the GrModes menu, which controls the display and monitor modes that are available with Vistapro; the Script menu, which controls script creation and execution; the ImpExp menu, which controls importing and exporting data to and from programs other than Vistapro; and the IQuality menu, which allows you to choose predefined image quality settings.

Note: Many of the following menu items involve the use of a file requestor. Vistapro can use two different file requestors. If you are using version 2.0 or newer of AmigaDOS, Vistapro defaults to using the standard ASL file requestor. If you are using an earlier version of AmigaDOS, the Vistapro file requestor is the default. You may specifically disable the ASL requestor with the script command NoAslRequestor. The Vistapro.prefs script file in the S: directory, which Vistapro looks for and executes on startup, would be a logical place to use this command.

The Vistapro file requestor contains a space to enter the name of the directory where you keep files of the given class (i.e. the Landscape directory for landscapes, or the Pic directory for IFF images), a window containing a partial listing of the contents of that drawer and a scroll bar to the right of the window for scrolling the contents of the window, a space for the name of the file you are dealing with, and a list of common device names where you are likely to find the drawer (i.e. DF0:, DH0:, RAM:).

PROJECT MENU

Landscape Size

Small

The Small size landscape sets up a 258 x 258 topographic map region. It works on most Amigas with at least three megabytes of available RAM, and is used to load single

Vistapro Landscape files.

Large

The Large size landscape sets up a 514 x 514 topographic map region. It works on most Amigas with at least 4.5 megabytes of available RAM, and is used for loading up to four small Vistapro Landscape files or any single Vistapro Landscape file up to 514 x 514 data points in size. It is for use with Vistapro "X" series contiguous landscapes to load large contiguous regions. You may also load a small landscape and enlarge it with the Enlarg function to render with more apparent detail. See Enlarg function.

Huge

The Huge size landscape sets up a 1026 x 1026 topographic map region. It works on most Amigas with at least eight megabytes of available FAST memory and is used for loading up to sixteen small Vistapro Landscape files or any single Vistapro Landscape file up to 1026 x 1026 data points in size. The Huge size landscape is used with Vistapro "X" series contiguous landscapes to load large contiguous regions. You may also load a small landscape and enlarge it twice with the Enlarg function to render in very fine detail. See Enlarge function.

Auto

Postpones setting up a topographic map region until it checks the header of the Vistapro landscape file next loaded with Load VistaPro DEM. At that time a topographic map region is set up to match the size of the file to be loaded.
Print

The Print menu item allows you to export Vistapro renderings directly to your printer. It prints whatever is on your View screen, so you can use Load IFF to load an image into memory and then use Print to send it to your printer.

About VistaPro

The About VistaPro menu item tells you about the program Vistapro, the authors and the publisher.

About Landscape

The About Landscape menu item tells you about the currently loaded landscape, including the file name, the landscape name, and any available comments about the landscape. This information comes from the header contained at the beginning of Vistapro's landscape files. If you generate a fractal landscape and save it, the header will contain information about the fractal setting used to generate the landscape,

which you can use for your own future reference.

About Image

The About Image menu item tells you about the image last rendered, including the number of polygons used and the time it took to render.

Quit

The Quit menu item closes down Vistapro and returns you to the WorkBench.

LOAD MENU

The Load menu allows you to load a Vistapro DEM landscape file, Vistapro ColorMap header or image file. The Drawer name is the name of the drawer in which you keep your landscapes, ColorMaps or images and the Device is the disk where you keep this drawer. On a single floppy system, the drawer name contains the name of the disk, followed by a colon ":", followed by the name of the drawer where you keep landscapes, ColorMaps or images.

Load VistaPro DEM

The Load VistaPro DEM menu item allows you to load a Vistapro DEM Landscape file into Vistapro. This can be a landscape that comes on the Vistapro disk, a landscape that you have previously saved or a landscape from a Vistapro expansion disk. Note that the landscapes that come with Vistapro and those that are on the Vistapro expansion disks are write protected to avoid the possibility that they will accidentally be overwritten by a Save VistaPro DEM command. To unprotect these images (you probably will never need to do this), type Protect <landscape>.dem rwed at the CLI or SHELL prompt, replacing <landscape> with the name of the landscape you wish to unprotect.

If you have set the size to Large or Huge, a grid of landscape regions is displayed in the topographic map region. When you select the Load Vistapro DEM menu item and have previously selected Large or Huge, you will be asked to choose a placement mode. Manual mode allows you to point to the quadrant of the topographic map you want to load the landscape into, regardless of whatever else may be there. Auto looks at the coordinate information in the header of the landscape and tries to place it correctly in relation to

other landscapes already loaded. If Vistapro cannot place the landscape, it will warn you that the landscape is out of range. The Auto feature works only with "X" series Vistapro DEMs.

Load Region

With Load Region, Vistapro loads the requested landscape file into the lower left corner of the topographic map region and then searches the current landscape directory for other landscapes that are located within the current topographic map region. The Load Region function requires the "X" series Vistapro landscape files. Vistapro's Load Region function searches all files in a given directory for additional landscapes to load into the current topographic region. It determines which landscapes to load by examining the header of each landscape. The header has information about the file's longitude and latitude. We highly recommend that you install different landscape sets into different directories. That way Vistapro will have fewer files to examine when you load a region. There is also the possibility that some data from other planets will overlap areas of the earth or that a DEM file you have modified (Vistapro saves the current landscape's coordinates along with its other data) will load in on top of unmodified data. You wouldn't want Vistapro to have to search through thousands of files to find the four that fit into the current area! Also, the file requestor takes quite a while to fetch all the file names when there are thousands of files in a directory.

Load ASCII USGS DEM

The Load ASCII USGS DEM menu item loads the requested ASCII file as DEM data from the US Geologic Survey (USGS), using Vistapro's default color map. DEM data is available from the USGS for much of the United States.

Load Binary DEM

The Load Binary DEM menu item loads the requested binary file as DEM data. It is useful for porting digital data not in DEM format into Vistapro or for those of you trying to create your own landscapes. Vistapro's binary format is very simple. Each file consists of a number of signed 16 bit integers (Motorola format on the Amiga hi byte first, low byte second) in sequence. The first integer in the file is loaded at the lower left (south-west) corner , the second to

the right (east) of the first, etc. When the south-most row is finished, the next row up (north) is loaded. Data continues until all rows have been filled. A Small Vistapro landscape consists of 258x258 (rows x columns) integers (133,128 bytes). A Large Vistapro landscape consists of 514x514 integers (528,392 bytes). A Huge Vistapro landscape consists of 1026x1026 values (2,105,352 bytes). If your data is less than the required size from left to right (east to west) you will have to either pad to the required length or scale your data to fit. The file need not have enough data to fill all rows; if the file is short the top part of the landscape will simply be left with altitude 1.

Load CMap

The Load CMap menu item allows you to load an existing ColorMap onto a landscape that you have already loaded. This does not affect the Landscape DEM data in memory, just the color palette information. You can load a ColorMap from another Vistapro DEM Landscape file or from a Vistapro ColorMap file that you have saved previously. See Color Control Panel for more information on ColorMaps.

Load Clouds

The Load Clouds menu item loads a cloud map for use with the Clouds function. The requested file must have been previously saved with the Save Clouds menu item in the Save menu and have a filename extension of .CLD. See Cloud Control Panel for information about creating cloud maps.

Load IFF

The Load IFF menu item loads standard Amiga IFF files and IFF HAM files, regardless of resolution.

Load IFF 24

The Load IFF 24 menu item loads Amiga Commodore standard 24 bit IFF files, regardless of resolution. They must be no more than 768 pixels wide or 484 pixels tall. Smaller images are loaded toward the top left corner. After loading the 24 bit image data, Vistapro draws the image to the display screen at the current display settings.

SAVE MENU

The Save menu allows you to save a Vistapro DEM, ColorMap, cloud map, Turbo Silver Object or rendered image file. The

Drawer name is the name of the drawer in which you want to save your file and the Device is the disk where this drawer is located. On a single floppy system, the drawer name contains the name of the disk, followed by a colon ":", followed by the name of the drawer where you will find the images, i.e. MyDisk:Pics. On a hard disk you might use something like Work:Vistapro/Pics.

Save VistaPro DEM

The Save VistaPro DEM menu item allows you to save a randomly generated fractal landscape as a Vistapro DEM Landscape file. This file will not contain surface features such as lakes and rivers. It saves the ColorMap currently in effect along with the landscape.

Save Extended DEM

Vistapro has an extended DEM format which allows you to save all the current settings of the program along with the DEM data. This data includes colors, shades, camera and target positions, script mode, haze level virtually every setting in the program. This is useful when continuing an aborted animation. Extended DEM files range from 300KB to 400KB each for Small landscapes and up to four megabytes for Huge landscapes.

Save CMap

The Save CMap menu item allows you to save the current Color Control Panel settings as a Vistapro ColorMap. This does not save the DEM landscape data, resulting in a much smaller file. You may want to keep several different ColorMaps around so that you can quickly load them into any landscape. See Color Control Panel for more information on ColorMaps.

Save Clouds

The Save Clouds menu item saves the current cloud map to a file whose extension is .CLD.

Save IFF

The Save IFF menu item saves an image in standard Amiga IFF format using the current settings of the GrModes menu. You can load these images into paint programs such as DPaint IV for non-HAM renderings or DigiPaint 3 for HAM renderings. The picture saved is the one currently on the View screen.

This is usually the scene that has just been rendered or redrawn.

Save IFF24

The Save IFF 24 menu item saves an image in Amiga 24 bit IFF format, with the image width and height the same as the currently displayed image. For example, if you are displaying in LoRes, no interlace and no overscan, this saves a 320x320 IFF24 file.

Save RGB

The Save RGB menu item saves the rendered image in the format output by Sculpt-Animate 4D. Vistapro produces only 746x484 pixel files. They are given the base-name supplied by you with.ored,.ogrn,.oblu extensions used by the Mimetics framebuffer program, version 1.01. For example, if you select PIC as the base picture name, Vistapro produces PIC.ored, PIC.ogrn and PIC.oblu.

Vistapro can execute an AmigaDOS control file after generating each frame of an animation. Vistapro passes the name of the data file just produced (IFF, IFF24 or RGB

format) to the scripting function. The control file can run whatever programs you want to process the picture. For example, you can run the Mimetics Framebuffer program in command-line mode to encode the picture and then delete the file.

```
.k FILE/a
c:fbuf -e <FILE>
c:Delete <FILE>.ored
c:Delete <FILE>.ogrn
c:Delete <FILE>.oblu
```

If you have a single-frame recorder, you could also send a command to step the recorder, etc.

This function is available only if you start up from the CLI or a Shell.

Save Turbo Silver

The Save Turbo Silver menu item allows you to save the current landscape as a Turbo Silver Object file. Vistapro saves landscapes as Turbo Silver Objects at all levels. This is because Vistapro saves a landscape as a series of Turbo

Silver Objects rather than a single one. Vistapro saves landscapes at all polygon sizes. If Vistapro hasn't yet colored the landscape, it will inform you of this and give you the choice of letting Vistapro color the landscape at the current setting or aborting the save.

When you select Save Turbo Silver, Vistapro draws an eight by eight grid over the topographic portion of the screen. You can then select a portion (or all) of the landscape by clicking with the left mouse button on the upper left hand corner of the area that you want saved as a Turbo Silver object. A rubber band box will appear. Position the mouse at the lower left corner of the area you want saved. This is the area within the box. Click again with the left mouse button.

Please note that these Turbo Silver objects are of extreme complexity and require a good deal of memory to render using Turbo Silver or Imagine. A polygon size 2 landscape requires at least seven megabytes of memory to render with Turbo Silver and a complete polygon size 1 landscape requires more than thirty megabytes. We suggest that you clip only the regions that you actually need, in order to save memory, or render at a larger polygon size (lower resolution).

GRMODES MENU

GraphicsPanel

The Graphics Panel menu item opens the Graphics Control Panel, which is used to specify display and monitor modes, image and display sizes, and use of special display hardware (DCTV, Firecracker24, HAM-E). See the Graphics Control Panel section for information about its use.

BackGround

You can have Vistapro load a 24 bit IFF file as a background before rendering. For example, you could load a picture of a cloudy sky as a background, turn off the Sky function in Vistapro and then render the landscape. The clouds will be visible anywhere that the landscape doesn't overwrite them. The IFF24 file should be 768x484 pixels.

ForeGround

You can have Vistapro load a 24 bit IFF file as a foreground after rendering. For example, you could load a picture of a

dashboard as a foreground. Any pixel that is black (R=0, G=0, B=0) in the IFF24 file is considered transparent. Any non-black pixel will overwrite the rendered image. You can create 24 bit IFF background and foreground images from regular IFF files using the View->RGB function. You can also use ASDG's Art Department Professional package, or ImageMaster by Black Belt Systems.

Show Render

The Show Render menu item allows you to watch Vistapro render images on the View screen. The default palette is used during rendering; the image is updated to the final palette when rendering is complete. This function slows down the rendering process.

SCRIPT MENU

Vistapro's scripting controls allow creation of multiple unattended views of a landscape. The most common use for scripts is the creation of animations. Scripts are lists of camera and target positions which are landscape independent. You can use the same script for several different landscapes or you can change the settings for the current landscape re-executing the script. Script control allows changes to be made to the landscape without having to rebuild the script every time. For instance, if you want to change the light source direction, or if you want to see a landscape from several views with and without water, all that you have to do is make the appropriate changes and execute the proper script.

Vistapro 3.0 supports many script commands which allow you to control most functions of the program from within a script file. You can only generate these commands by editing the script file with a text editor (Amiga's ED, TxEd, CED, etc.). The commands have the following form:

```
CommandName:  argument(s)  comment
```

for example:

```
CameraX: 1234 Set Camera X position to 1234
VerticalScale: 1.2 Scale landscape to 1.2
Render: Render landscape
```

The CommandName parameter can be uppercase, lower case or mixed case, and must have the trailing colon. Missing

numerical arguments are treated as a 0. Comments are, of course, optional.

You can also access all of the script functions with ARexx. For a complete list of commands as well as instructions on how to use the ARexx interface in Vistapro, see the ReadMe.ARexx file on your Vistapro Disk1.

Generate

The Generate function allows you to make a quick linear path from the current camera position to the current target position. This is most useful for generating simple straight-line paths for animations. When you select this option, Vistapro asks for the name of the script file to generate. It then asks for the number of frames. If the camera is 1000 meters from the target and you select 100 frames, the camera will move 10 meters closer to the target in each frame. The Bank, Heading and Pitch remain constant (the camera continues to point at the target). If you select the name of an existing file Vistapro will ask you if you want to delete the file or abort the operation. We recommend putting script files in a script subdirectory, usually Work:vistapro/script. For more complex scripts, you can use MakePath, a stand-alone script generation utility available from Virtual Reality Laboratories.

Create

The Create menu item makes a new script. When Create is selected, Vistapro displays a file requestor from which you select the device where you want to save the script, the drawer you want to put the script in and the name of the script. If you attempt to create an existing file, Vistapro overwrites that file. After the script name is entered, Vistapro creates a blank script file and opens it for use with the Add option.

Open

Open retrieves a previously created file for appending new frames. When Open is selected, Vistapro displays a file

requestor from which you select the script to open.

Add

Add appends the current camera and target positions to the script that is currently open.

Preview

The Preview menu item allows you to see the path that your script will follow on the topographic map. When selected, Vistapro displays a file requestor from which you select the script to preview. After selecting the script, you are given the choice of previewing in 2-D or 3-D mode. In 2-D mode Vistapro draws a sequence of dots on the topographic map to indicate each camera location (one dot for each frame). In 3-D mode Vistapro renders a real-time, 3-D wire frame preview in the topographic map area.

Execute

Execute causes Vistapro to execute a selected script, creating a picture for each frame in the script file. When Execute is selected, Vistapro displays a file requestor from which you select the script to execute. After the script is selected, Vistapro displays another file requestor for a base picture file name. It saves pictures as the base name plus a five digit number. For instance, if you supply Pic as the base name, Vistapro will save the pictures as Pic00000, Pic00001, Pic00002 and so on.

Anim Mode

IFF

In IFF mode Vistapro produces IFF files in the selected display format for each frame. If you started up from the CLI or a Shell, Vistapro then spawns the Execute program to execute an AmigaDOS script (filename = DoFB.iff) which can do whatever you want. Remember that each file will have the base name plus a five digit frame number.

IFF24

In IFF24 mode Vistapro produces 24 bit IFF files. These file will be in the resolution selected from the Graphics Control Panel. If you started up from the CLI or a Shell, Vistapro then spawns the Execute program to execute an AmigaDOS script (filename = DoFB.iff24) which can do whatever you want. Vistapro displays the frame in LoRes/ non-interlace/ non-overscan format so that you can see what you are generating. Remember that each file will have the base name plus a five digit frame number.

RGB

In RGB mode Vistapro produces 24 bit RGB files as used by the Mimetics framebuffer program. If you started up from the CLI or a Shell, Vistapro then spawns the Execute program to execute an AmigaDOS script (filename = DoFB.rgb) which can do whatever you want. Vistapro displays the frame in LoRes/non-interlace/ non-overscan format so that you can see what you are generating. Remember that each file will have the base name plus a five digit frame number.

VANIM

Vistapro does not directly support the Amiga's standard ANIM format. You must use some other ANIM file generator to convert Vistapro's IFF files into ANIM files.

Vistapro does directly support its own proprietary animation format (Vistapro ANIM or VANIM). Our format has both advantages and disadvantages.

The advantages are:

1) VANIM animations limit you to available disk space, not memory size. If you have an 800MB disk you can play an 800MB animation.

2) Each frame has its own color palette.

3) You can play animations backward, forward, single-stepped, jump-stepped, etc.

The disadvantages are:

1) Animation files are about twice as large as regular Amiga ANIM files.

2) Playback of animations with large frame sizes can be as slow as two frames per second.

Vistapro always produces a file with a list of the picture names that it generates. The name of this file is PICBASE.list where PICBASE is the base picture name selected by you when you started the animation script. For example if you select DH0:ANIM/PIC as the base name, Vistapro would produce a sequence of pictures with the following file names:

```
DH0:ANIM/PIC00000
DH0:ANIM/PIC00001
DH0:ANIM/PIC00002
```

and the file DH0:ANIM/PIC.list would contain those full names. This is the format used by the popular MakeAnim

program. If you are creating an animation in RGB mode, the file names would be:

```
DH0:ANIM/PIC00000.ORED
DH0:ANIM/PIC00000.OGRN
DH0:ANIM/PIC00000.OBLU
DH0:ANIM/PIC00001.ORED
DH0:ANIM/PIC00001.OGRN
DH0:ANIM/PIC00001.OBLU
DH0:ANIM/PIC00002.ORED
DH0:ANIM/PIC00002.OGRN
DH0:ANIM/PIC00002.OBLU
```

IMPEXP MENU

For a complete description on how to use the following functions, please see the ReadMe.tutorial file on the Vistapro Disk1.

Col->IFF

Color table to IFF. This function outputs Vistapro's internal table of polygon colors to an IFF file. With Col->IFF (and IFF->Col), you can place individual trees, rivers, cliffs, etc. anywhere you want. When Vistapro renders an image, it uses thousands of polygons to produce the image. Internally each polygon is assigned a color which relates to the physical features of the landscape. For example, shades of green for trees, blues for water, whites for snow, etc. These colors are for internal representation. When the image is actually rendered, the colors specified with the CMap Palette are the ones used for the picture. When the Col->IFF option is selected, Vistapro saves its internal color table to an IFF file which can then be loaded into a paint program and modified. (Deluxe Paint works quite well. We recommend using the 320x200 LoRes mode.)

For example, to add a row of trees to a landscape you would:

1) Load a Vistapro DEM file into Vistapro

2) Adjust tree line, snow line, etc.

3) Select Col->IFF from the Property Menu. Select a name for the output file. Answer OK to the "Need to calculate" requestor if it pops up.

4) Start up DPaint and load the file created in step 3.

5) Using the color green, draw a line on the landscape.

6) Save the IFF picture.

7) To load the new colors onto the landscape, from Vistapro

select IFF->Col and specify the file given in step 3.

8)Render as usual.

Since the colors that appear in the IFF file represent the terrain types assigned to each polygon within Vistapro, not the actual colors of the rendered image, they will always be the same.

The colors are assigned as follows:

#	color	terrain type
0	black	not used
1	white	not used
2 - 6	blues	Water1 Water5
7	tan	Beach
8 - 11	browns	Tree1 Tree4 without trees
12 - 15	greens	Tree1 Tree4
16 - 19	tans	Bare1 Bare4
20 - 23	whites	Snow1 Snow4
24 - 27	grays	Cliff1 Cliff4
28 - 31	RYGB	Buildings

Buildings can be created using either this function or the Place Middle Control Panel.

IFF->Col

IFF file to color table. This is the opposite of Col->IFF. It loads the selected IFF file back into Vistapro's color table. Vistapro will then render the landscape with the terrain types that were specified in the IFF file. WARNING: if you change a setting that requires re-coloring after loading the IFF file, the landscape will be re-colored, overriding the loaded colors.

Alt->IFF

The Alt->IFF function is similar to Col->IFF. It converts the topographic map currently loaded as an IFF picture, where each elevation is represented as a color. When you select Alt->IFF, Vistapro asks for a file name to which to save the picture. After the picture has been saved, it can be edited in a paint program (DeluxePaint works fine) essentially you will be painting the contour map. The table below describes the color palette that Vistapro saves with the IFF picture.

#	color	terrain type
0	blue	altitude 0, sea level
1 - 11	greens	lowest land altitudes
12 - 22	browns	middle altitudes
23 - 30	grays	highest altitudes
31	varies	used internally to indicate meters

between each contour

The IFF file produced has only 31 colors to encode elevations so only crude editing of landscapes is possible using this function. When you load an IFF file back in, using IFF->Alt, you will see discrete steps in the rendered image. You can use Smooth or Frctlz to reduce or eliminate the steps. For more precise editing of landscapes you should use TerraForm, a stand-alone landscape editing utility which is available directly from Virtual Reality Laboratories.

IFF->Alt

IFF->Alt is the reverse of Alt->IFF. It loads an IFF file into Vistapro as a topographic map. This is one of the most powerful functions in Vistapro. With this feature, it is possible to digitize topographic map, paint in elevations between the contour lines and import the finished picture into Vistapro as a landscape. See Tutorial Three in the Tutorials Manual for step by step instructions on how to use this function.

It is suggested that you use Smooth or Frctlz to reduce or eliminate the steps caused by the limited number of altitudes encoded in the IFF file. Note that color 31 is used to indicate the scaling of each step, i.e. each step is N times the value indicated by color 31. N is calculated as follows:

$$N = 256 * Red + 16 * Green + Blue$$

If color 31 is Red=0, Green=1, Blue=5 then N is 0*256 + 1*16 + 5, or 21. So Color 0 represents 0 meters, Color 1 represents 21 meters, color 2 represents 42 meters.

View->Col

View->Col converts the current image on the View screen into Vistapro's internal polygon color table. The colors used in the image are used on the polygons when Vistapro renders. The image is scaled (squished or stretched) to fit onto the full landscape area.

View->Alt

View->Alt converts the current image on the View screen into altitude data. There are two modes of operation: Intensity and Color.

In Intensity mode the intensity of each pixel is converted into an altitude. The darkest pixels get the lowest altitudes and the lightest pixels get the highest altitudes.

In Color mode the color numbers are translated into

altitudes. The actual colors mean nothing. Color 0 gets the lowest altitude, color 1 is a little higher and color 31 is the highest.

The image is scaled (squished or stretched) to fit onto the full landscape area.

This function works properly for LoRes, HiRes and HalfBrite modes. HAM is not supported and will give unpredictable results.

View->RGB

View->RGB converts the current image on the View screen into the internal 24 bit virtual frame buffer. It is useful for converting IFF files into 24 bit IFF for the BackGround and ForeGround functions. The View image is scaled to fit the 768x484 virtual frame buffer. For instance a 320x200 IFF image is enlarged to 768x484 to fit the virtual frame. This function works properly for LoRes, HiRes and HalfBrite modes. HAM is not supported and will give unpredictable results.

IQUALITY MENU

The IQuality menu offers a quick way to set functions on the control panels to predefined settings, resulting in different levels of quality for rendering images. The Low, Medium, High and Ultra menu items are mainly for casual users so that they won't have to search through the manual for the most frequently used settings at the various image quality levels. The User Configuration item can be used in addition to the Vistapro.prefs script file which is executed on startup. User Configuration is intended to be used by more advanced users to customize Vistapro.

The items in the IQuality menu execute standard Vistapro scripts which reside in the Script directory. The script names are iq_low.script, iq_med.script, iq_high.script and iq_user.script. These configuration scripts can be edited using any text editor. Remember to save them as ASCII.

Low

The Low menu item sets Vistapro up for fast but relatively crude renderings. It is useful for test renderings to check camera and target locations.

Medium

The Medium menu item sets Vistapro up for medium resolution renderings. It is useful for slower machines or for "proof of concept" renderings.

High

The High menu item sets Vistapro up for high resolution renderings and results in good quality images. It is not quite the best quality possible, but it is faster than the absolute best settings.

Ultra

The Ultra menu item sets Vistapro up for the absolute highest resolution renderings possible. It can take hours to render an image, even on a fast machine, but the result is worth the time it takes.

User Configuration

The User Configuration menu item allows you to define your own preset display parameters. To use this menu item to customize your use of Vistapro, edit the file iq_user.script, found in the Script directory, using any text editor (remember to save it as ASCII). This script uses the standard Vistapro script commands.

CONTROL PANELS

The Vistapro Control Panels (on the right side of Vistapro's main screen) are split into four main sections, which we shall call the Upper, Middle, Lower and Bottom Control Panels. In addition, there are five control panels that are accessed by pressing buttons on the main control panels and one that is accessed by choosing the Graphics Panel item in the GrModes menu. They are: the Color Control Panel, Place Control Panel, Stereo Image Control Panel, Tree Control Panel, Cloud Control Panel, and Display Control Panel. All of these panels are described below.

CONTROL PANELS AND TOPO MAP

The map on the left side of the main screen represents a landscape area which has been loaded into Vistapro. The small_ symbol on the map is the target. The small x symbol is the camera.

UPPER CONTROL PANEL

Target

The Target represents the point at which you are aiming the camera. Its location is measured in meters from the lower left corner of the topographic map and in meters above sea level. After selecting the Target button on the Upper Control Panel, place the mouse pointer anywhere over the landscape and click the left mouse button, setting a new target position in the X and Y direction. The Z, or height, value is set to the elevation of the landscape at that X, Y coordinate. That is, the Z value in the Target represents the actual elevation of the landscape at that point. As an alternative, you can place the target precisely by entering coordinates directly into the X, Y and Z value windows. To change a value, select the appropriate value window by clicking the left mouse button in the value window. Use normal editing techniques to change the window values (Backspace, Delete, etc.). See also Locking Functions.

Camera

The Camera represents the location of a hypothetical camera used to take a scenic picture. Its location is measured in meters from the lower left corner of the topographic map and in meters above sea level. The X coordinate is from left to right on the topographic map. The Y coordinate is from bottom to top of the topographic map, and the Z coordinate is in meters above sea level. Select Camera on the Upper Control Panel. By placing the pointer anywhere over the topographic map and clicking the left mouse button, you can select a new camera position in the X and Y directions. The Z, or height, value changes with the elevation of the

landscape. The Z value of the camera is set to an elevation 30 meters above the landscape. Alternatively, you can place the camera precisely by entering coordinates directly into the X, Y and Z value windows. To change a value, select the appropriate value window by clicking the left mouse button inside the value window. Use normal editing techniques to change the window values (Backspace, Delete, etc.). See also Locking Functions

Locking Functions

Other tools that you can use with both the Camera and Target functions are the X, Y and Z locks. Use the locks when you want to restrain the target or camera from moving in one or more directions. For instance, if you want to move the camera to a new location on the landscape without changing its altitude, depress the Z lock and then click on a new camera location. You will see that the X and Y coordinates

of the Camera have changed but that the Z value has remained unchanged. Of course there are two other ways of achieving this same result: you could simply type the new X and Y locations into the Camera X and Y string gadgets or you could click the mouse on the new camera location (with the Z lock not set) and then type in the desired altitude. Vistapro will restrain both the camera and target X, Y and Z values as long as the locks are depressed.

P

The P button shows you what the camera sees as a wire frame perspective. This is useful for getting a preview of the features your picture will contain. While in the wire frame preview mode, you can rotate (point) the camera by clicking where you want the camera to point in the preview area. For instance, if the camera is pointing at the top of a mountain and you would rather look at the base, place the mouse pointer at the base of the mountain and click the left mouse button. Vistapro will rotate the camera and render the new wire frame view.

You can also adjust the focal length of the camera lens by pressing the up-arrow key to zoom in a little or the down-arrow key to zoom out a little. Each time you press the key, the camera will zoom in or out a little more.

While in the wire frame preview mode you can not access the control panel or the menus. To exit wire frame preview mode, click anywhere outside the wire frame preview area and the topographic map will return.

dR

DR displays the distance in meters between camera and target. This distance is the radius from the target. You can use this value to step closer to or away from the target, just as you might do when taking a photograph.

When you type in a new distance value, Vistapro changes the camera's X, Y and Z coordinates to match the desired distance as well as it can. The Bank, Heading and Pitch values are not changed.

dX

DX displays the difference between camera and target X coordinates. You can change this value by entering a new

value in the dX numerical gadget. Changing this value moves the camera to reflect the new distance. The Heading and Pitch of the camera may also change to keep the camera pointed at the target.

dY

DY displays the difference between camera and target Y coordinates. You can change this value by entering a new value in the dY numerical gadget. Changing this value moves the camera to reflect the new distance. The Heading and Pitch of the camera may also change to keep the camera pointed at the target.

dZ

DZ displays the difference between camera and target Z coordinates. You can change this value by entering a new value in the dZ numerical gadget. Changing this value moves the camera to reflect the new distance. The Heading and Pitch of the camera may also change to keep the camera pointed at the target.

The following descriptions use an airplane as a model.

Bank

Bank controls the rotational angle of the camera along its longitudinal axis. Imagine an airplane floating in space. You can describe the longitudinal axis as an invisible line drawn from the tail of the airplane to its nose. A rotation that causes one wing to dip and the other to raise is a rotation around the longitudinal axis. A positive rotation around this axis causes rotation in a clockwise fashion. The left wing raises and the right wing lowers. Note that when the plane (camera) banks in one direction, the view that is rendered appears to have rotated in the opposite direction.

Head

Head describes the rotational angle of the camera around its Z axis relative to the landscape. Imagine an airplane floating in space. You can describe its Z axis as a line drawn from the top of the airplane through its middle to its bottom. A rotation around this axis causes the airplane to turn right or left. Positive rotation causes the airplane (camera) to turn right.

Pitch

Pitch is the rotational angle of the camera around its wing axis. Once again, imagine an airplane floating in space. A line drawn from the tip of one wing to the tip of the other describes the wing axis. A rotation around this axis causes the airplane's nose to move up or down, with positive rotation causing the nose to go up.

Range

The Range numerical gadget causes Vistapro to not render portions of the landscape. If a positive value is entered, Vistapro will not render parts of the landscape farther away from the camera than that value (in meters). If the value is negative, Vistapro will not render any part of the landscape closer than the equivalent positive value. A value of zero turns this function off.

For example, entering 1000 causes Vistapro to not render any part of the landscape more than 1,000 meters away;1000 causes any part of the landscape closer than 1,000 meters to be not rendered. Entering 0 causes Vistapro to render all of the landscape (Range is disabled). Range is relative to the camera's location; it follows the camera during animations.

The Range function can be quite useful for testing script files to make sure that the camera doesn't run into nearby obstacles. Set the Range value to something like 500 meters and run a script. Frames will generate very quickly since far fewer polygons are being drawn.

We don't know of any good reason to use negative values, but it was easy to implement so we tossed the function in!

MIDDLE CONTROL PANEL

SeaLvl

By setting the sea level, you can sink the landscape into the sea to that level. All points below this level become sea level (0 meters) and all points above this level have that value subtracted. For example, if you select 1,000 meters as sea level, all points below 1,000 meters sink to 0, 2,000 meters sinks to 1,000 meters, 3,000 meters sinks to 2,000 meters, etc.

Vistapro asks if you would like to erase rivers and lakes (if present) when it generates a new sea level and if you would like to add waves on the ocean. Vistapro will need to color and shade the landscape again.

Vistapro has a button for selecting sea level. Click on the SeaLvl button and then select the level by clicking on the topographic map. You can also specify the sea level explicitly by typing the value into the string gadget immediately below the SeaLvl button.

TreeLn

The TreeLn button is used to set the timber line, the altitude above which there are no trees. The timber line is a "fuzzy" value. Just as in nature, some trees will appear above the tree line and some bare areas will appear below it. Vistapro's AI rules compensate for features of the landscape. Trees generally will not cover the face of a cliff even though the entire cliff may be below the tree line. Trees may grow upward in the bottom of a valley (more water is available at the bottom of a valley) and a ridge will tend to be devoid of trees (ridges tend to dry out from exposure to the wind).

If none of the tree types (Pine, Oak, Palm, or Cactus) are selected in the Tree Control Panel (accessed by pressing the Tree button), Vistapro does not actually draw the trees, it just uses the under tree colors to color the ground. (The under tree colors are Grass 1 through Grass 4 on the Color Control Panel.)

Use the TreeLn button to select the tree level. Depress the TreeLn button and then click on the topographic map at a location which has the desired altitude. You can also specify a tree level numerically by typing a value into the string gadget located below the TreeLn button.

SnowLn

The Snow Level is the lowest elevation in meters where Vistapro will cover the landscape with snow. The Artificial Intelligence (AI) rules in Vistapro use this value to calculate where to use the snow colors. Vistapro compensates for cliffs, ridges, valleys, rivers and lakes in an attempt to mimic natural snow cover. Snow colors don't have to be the colors of snow. You can use any colors you like. Just keep in mind that the snow colors will be placed on the landscape following the AI rules for snow. For instance, you can set the snow colors to shades of grey to make mountain tops look like barren rock. The barren rocky areas will appear to flow down into valleys just as snow would.

You can use the SnowLn button to select the snow level.

Depress the SnowLn button and then click on the topographic map at a location which has the desired altitude. You may also specify the snow line numerically by typing a value into the string gadget located below the SnowLn button.

HazeDn

In the real world, the farther away an object is, the more it is occluded by the atmosphere. The haze function in Vistapro simulates this effect adding to the three-dimensional feel of the resulting image. You can specify how thick the haze is by changing the HazeDn value. (You can also change the color of the haze see Color Control Panel.) Enter the haze value by typing a number in the string gadget below the HazeDn button. A value of 0 completely eliminates the haze effect; small values (below 100) give very little haze, medium values (100-1000) give medium haze and high values (over 1000) create very thick fog.

You can also automatically calculate the haze value by pressing the HazeDn button. Vistapro will generate a value based upon the distance between the camera and the target. The closer the two are, the thicker (higher value) the haze. We tried to arrange it so that setting the haze value this way generates haze that first becomes significant at distances about the same as that between the camera and target.

Lake

Lake generation adds lakes to a landscape. Select Lake on the Middle Control Panel. Then, using the mouse, place the pointer on the landscape at the desired lake level and click the left mouse button. For example, if you place the pointer in a shallow valley at 2,100 meters, water will begin to fill the valley until it reaches the 2,100 meter level, as it would in nature. If there is any portion along the edge of the valley that is below the 2,100 meter level, water will spill out of the valley and begin to flood other parts of the landscape. This may not be the desired effect and it should be kept in mind when using the Lake function. If there is uncertainty about the height of any portion of the landscape, you can move the mouse pointer around any suspect areas and watch the Z value on the status line to find the lowest point in the pass to determine the maximum safe altitude for creating the lake. Lake generation can be aborted by positioning the mouse over the Abort button at the right of the Bottom Control Panel and clicking the left mouse button.

To create a lake, press the Lake button and then click on a starting point on the topographic map. Vistapro will open a requestor indicating the level to which the lake will fill

(the altitude of the point you clicked on). You can change the level to a higher value if you wish. You will see the lake being created on the topographic map in black. Once the lake has been completed the black lake will be redrawn in blue.

River

Vistapro's River function creates rivers which flow downhill from the selected starting point. If a river reaches a depression it slowly fills the depression, creating a pond or lake, until it overflows. The river continues to flow down hill until it reaches the ocean or the edge of the topographic map. Although you can always fill a lake using the River function, it is generally faster to fill lakes using the Lake function.

To create a river, press the River button and then click on a starting point on the topographic map. You will see the river being created on the topographic map in black. Once the river has been completed, the black river will be redrawn in blue.

If you start a river on an existing river or lake, the river will continue until it reaches sea level or the edge of the topo map. A new river (one started where there was not a river or lake to start with) will also stop at any existing water. This allows you to create many tributaries to a river without the main river getting very wide and deep. If you want the main river to get very wide, start a new river on top of the old one as many times as you like. It will grow wider with each iteration.

You will generally want to start rivers at the head of a valley, but it is possible to start a river anywhere on the topographic map.

River generation can be stopped by pressing the Abort button in the Bottom Control Panel.

Stars

Vistapro can generate stars in the night sky. To enable this feature, select the Stars button from the main control panel. You will be asked if you would like double width stars, then double height stars. This makes the stars brighter and more visible in LoRes modes. To disable the stars function, select the Stars button again. When you

enable stars, Vistapro displays them in the sky whenever it renders a scene. Vistapro automatically changes the sky color to black and changes the haze and sky-haze colors to dark shades. The star patterns are randomly generated and bear no resemblance to the real night sky as viewed from earth. Stars may not show up well in LoRes and HAM modes

(because of antialiasing), unless you use double width and/or double height stars.

Some recommended settings to use with stars enabled:

Item	Red	Grn	Blu
Sky	00	00	00
Haze	10	10	10
SkyHaze	10	10	20
Haze value (250)			

For a sundown effect:

Item	Red	Grn	Blu
Sky	00	00	30
Haze	10	10	10
SkyHaze	60	00	00
Haze value (250)			

Sky

The Sky button turns the rendering of the sky on and off. When the Sky button is depressed, Vistapro renders the sky. When it is not depressed, the sky is not rendered. If you have an alternate image that you would like to load in place of the sky, turn the sky off before rendering and use the BackGround function to load a backdrop.

Horiz

Technically, the horizon is that line in the distance where the sky touches the ground or ocean. In order to create a horizon in the distance, Vistapro draws a large disk from the camera out to the horizon. We refer to this disk as the "horizon" The Horiz button turns the rendering of the horizon on and off. When the Horiz button is depressed, Vistapro renders a horizon over which the landscape is then rendered. When loading a background, this can be used to eliminate the horizon line that is visible when you look off the edge of a landscape.

Tree

Select the Tree button to display and activate the Tree Control Panel. See Tree Control Panel for a description of its features.

Roads

When the Roads button is depressed, Vistapro renders roads placed using the Place Control Panel.

Bldgs

When the Bldgs button is depressed, Vistapro renders buildings placed using the Place Control Panel.

Valley

The Valley function governs how much trees and grass grow in the bottom of valleys above the normal tree line and how much snow tends to reach down below the snow line into valleys. It is also used by the Strtch function to exaggerate peaks and valleys. When you press the Valley button, a requestor appears asking you for the valley scale. The scale value determines how much Valley effect is used. The default value is 100. A value of 200 doubles the effect and a value of 50 reduces it by half. Next, a requestor appears asking for valley size. The size is the width in data points over which the Valley effect operates. Think of it as a small window passed over the landscape, affecting the area beneath it. The default value is 8.

Cliffs

The Cliffs function controls what portion of the landscape is colored with the Cliff colors during rendering. When you press the Cliff button, a requestor appears asking for a cliff threshold value. The threshold value is the slope at which Vistapro begins using Cliff colors to color the landscape.

Stereo

Select the Stereo button to replace the Main Middle Control Panel with the Stereo Image Middle Control Panel, which is used to generate left and right images for display with alternate shutter glasses. See Stereo Image Middle Control Panel for a description of its features.

Smooth

The Smooth function smooths or erodes the landscape, removing the harsher, more jagged edges of hills and mountains. Smoothing often improves the appearance of landscapes and it is especially useful when dealing with fractal landscapes. You should use the smoothing function sparingly with DEM files if data integrity is important, as it distorts data. Pressing the Smooth button on the Middle Control Panel invokes the smoothing function. This is a repeatable, refining function, which can be run over and over again, smoothing (eroding) the landscape more on each pass. Smoothing is also used to obtain snow covered peaks. Because of the design rules of the AI algorithms, as is also true in nature, it is very rare that the summits or peaks of mountains are completely snow covered. It is more often the case that due to the steep nature of the cliff faces and other contributing aspects, such as wind and snow weight, snow does not cover the peaks of most mountains. However, since it may be desirable artistically to create a completely snow-covered mountain, smoothing mountains often gives this effect.

Shrink

The Shrink function shrinks Large and Huge landscapes to the next smaller size, Large or Small, respectively. The Shrink function requires an additional buffer to copy the new map data and will report an error if there is not enough memory to open this buffer. Small landscapes are ignored by this function.

Enlarg

The Enlarg function allows you to select a portion of the landscape and enlarge it to fill the entire topographic area. The intermediate data points are either filled with the average of the points around them or filled with duplicates of the nearest point. To invoke this function press the Enlarg button. You will see a box that follows the mouse cursor around the screen. Place the box over the section that you want to enlarge and press the left mouse button. Vistapro will open a requestor near the top of the screen asking you to select either Interpolate (average) or Duplicate mode. Select the desired mode and the area inside the box will be enlarged to fit the entire topographic area. Any rivers, lakes, or oceans will be lost.

The difference between the two modes is best described by an

example. Consider the side of a small hill viewed in cross-section. In Interpolate mode the hill doubles in size in all dimensions and the side of the hill remains smooth. In Duplicate mode the hill also doubles in size but it becomes stepped.
Interpolate mode: "in between" data is the average of surrounding points.

Duplicate mode: "in between" data is the same as surrounding points.

LockP

The LockP button locks the color palette. Normally, Vistapro generates the best color palette that it can for each image based on the terrain it is rendering. This can cause some flickering in animations as the same areas change color slightly from frame to frame. By locking the color palette, you guarantee that the colors will be consistent between frames of an animation. When you select the LockP button, the palette is locked at the current settings. You should generate a typical frame before locking the palette to ensure that the palette contains a reasonable cross-section of colors.

Clouds

Select the Clouds button to display and activate the Cloud Control Panel. See Cloud Control Panel for a description of its features.

Place

Select the Place button to replace the Main Middle Control Panel with the Place Middle Control Panel, which is used to place individual clumps of grass, trees, buildings and roads onto the landscape. See Place Middle Control Panel for a description of its features.

VScale

Vistapro can vertically re-scale any landscape. Typing a number into the VScale string gadget causes Vistapro to scale the landscape by that amount. For example, if you type 2.0, Vistapro stretches the landscape vertically so that mountains are twice as tall, etc. Values between 0.0 and 1.0 cause Vistapro to flatten the landscape. Values less than 0 cause the landscape to flip over (valleys become ridges,

mountains become pits) before Vistapro scales them. Elevations on the landscape are multiplied by the VScale value. Landscapes can be saved after scaling.

You can generate some interesting effects with the scaling function. You can flip landscapes upside down by using negative values. Scaling mountains so that the tops exceed 32,767 meters and then scaling them back down to normal results in mountains with big pits or calderas. Scaling to very large values can even cause several layers of this effect resulting in a mountain inside a collapsed mountain inside a collapsed mountain. Scaling mountains down until they are very small and scaling them back up results in stepped mountains.

CMap

Select the CMap button to display and activate the Color Control Panel. See Color Control Panel for information about specifying colors.

STEREO MIDDLE CONTROL PANEL

The Stereo Image Middle Control Panel is used to generate the left and right images necessary for stereo viewing with alternate shutter glasses.

Right

When the Right button is pressed, Vistapro adjusts the camera to the right by the value in the Displacement gadget so that it appears that you are looking at the landscape through your right eye.

Center

When the Center button is pressed, Vistapro centers the camera back into its normal viewing position.

Left

When the Left button is pressed, Vistapro adjusts the camera to the left by the value in the Displacement gadget so that it appears that you are looking at the landscape through your left eye.

Displacement

The value in the Displacement gadget represents the amount that each "eye" is shifted from the center of the view. It is greatly exaggerated from the actual distance between your eyes in order to give a better three dimensional effect.

Merge

The Merge function takes two previously generated images and interleaves them so that they can be displayed with shutter type 3-D glasses.

OK

The OK button accepts your stereo image settings and returns you to the Main Middle Control Panel.

PLACE MIDDLE CONTROL PANEL

The Place Middle Control Panel is used to place individual clumps of grass, trees, buildings and roads onto the landscape. While it is active, all other control panels are disabled because the topographic map is zoomed to a resolution which is not recognized by gadgets on the other panels.

OK

The OK button accepts your placed objects and returns you to the Main Middle Control Panel.

Zoom

The Zoom function zooms you in on a portion of the topographic map to allow more precise placement of objects. Press the Zoom button. A rectangle will follow the mouse around the topographic map. When the rectangle encloses the portion of the map that you are interested in, press the left mouse button and the map will zoom that area to fill the topographic map part of the screen.

Draw

The Draw function allows you to change the elevation of individual data points relative to their current elevation. The amount of change is the value in the box below the Draw button. This function allows for crude editing of the landscape and primary use is editing out minor anomalies in

the USGS DEM data.

Quit

The Quit button returns you to the Main Middle Control Panel without accepting any changes that you may have made.

Clear

When the Clear button is pressed, Vistapro erases any existing grass, trees, buildings or roads from the currently loaded landscape.

Lock

The Lock functions prevent Vistapro from generating random grass or trees which might obscure individually placed objects. To prevent generation of random grass, press the Lock button which is directly above the column of Grass buttons. To prevent generation of random trees, press the Lock button which is directly above the column of Tree buttons. There are no similar buttons for buildings and roads since they are not generated randomly.

Remove

The Remove function restores all placed objects to the locations they had when the Place Middle Control Panel was opened. In other words, it is an "undo" function.

Grass1 - 4

The Grass1 - 4 buttons allow you to place individual clumps of grass with the corresponding elevation colors. Clumps of grass are shown on the topographic map as a small square filled with the appropriate Grass color. For example, to place a clump of grass of color Grass 1 (see Color Control Panel for information about landscape colors), press the Grass1 button on the Place Middle Control Panel. Then click with the left mouse button at the point on the landscape where you wish to place a clump of grass.

Tree1 - 4

The Tree1 - 4 buttons allow you to place individual trees with the corresponding elevation colors. Trees are shown on the topographic map as a small square filled with the appropriate Tree color. For example, to place a tree of

color Tree1 (see Color Control Panel for information about landscape colors), press the Tree1 button on the Place Middle Control Panel. Then click with the left mouse button at the point on the landscape where you wish to place a tree.

Bldg1 - 4

The Bldg1 - 4 buttons allow you to place individual buildings with the corresponding elevation colors. Buildings are shown on the topographic map as a small square filled with the appropriate House color. For example, to place a building of color House 1 (see Color Control Panel for information about landscape colors), press the Bldg1 button on the Place Middle Control Panel. Then click with the left mouse button at the point on the landscape where you wish to place a building.

Road1 - 4

The Road1 - 4 buttons allow you to place individual roads with the corresponding elevation colors. For example, to place a road of color Road1 (see Color Control Panel for information about landscape colors), press the Road1 button on the Place Middle Control Panel. Click with the left mouse button at the point on the landscape where you wish a road to begin, then click again with the left mouse button at the point where you wish it to end. A row of road symbols will appear between the points that you clicked on.

LOWER CONTROL PANELS

The Lower Control Panels consist of four separate control panels overlaid on a common space.

Main

The Main button enables and displays the Main Lower Control Panel. See Main Lower Control Panel for details.

Lens

The Lens button enables and displays the Lens Lower Control Panel. Use it to select the type of lens the camera uses. See Lens Lower Control Panel for details.

Frac

The Frac button enables and displays the Fractal Lower Control Panel. Use it to generate random fractal landscapes. See Fractal Lower Control Panel for details.

Light

The Light button enables and displays the Light Lower Control Panel. Use it to select the direction and intensity of the light source. See Light Lower Control Panel for details.

MAIN LOWER CONTROL PANEL

Poly

With a Small landscape, Vistapro produces 131,072 polygons at its finest resolution. With a Large landscape, Vistapro produces four times as many polygons (524,288). With a Huge landscape, sixteen times as many polygons (2,097,152). The Polygon Size function controls the relative coarseness of the landscape image. A size of 8 generates 1/64th as many polygons (1/8th on each axis) as a size of 1 and they are 64 (8 x 8) times as large. That is, a Small landscape can consist of 131,072 size 1 polygons, 32,768 size 2 polygons, 8192 size 4 polygon, or 2048 size 8 polygons. You can use the larger polygons to generate quick previews of landscapes. Then, when you are satisfied with your camera and target placement, use smaller polygons. The smaller the polygons, the longer it takes to render the image. The larger the polygon size selected, the less detail that will show up in the image, because Vistapro is displaying only a fraction of the full data. The lower resolutions (higher poly number, i.e. 4 or 8) are useful for quick test renderings to check the landscape for color, light placement and exposure settings.

Dither

Vistapro generally colors landscapes by altitude. The lowest altitudes are colored with Tree 1 through Tree 4 colors, middle altitudes are colored with Bare 1 through Bare 4 colors, the highest altitudes are colored with Snow 1 through Snow 4 colors. Each of the 130,000 triangles that make up the landscape is assigned a color based on its altitude and several other factors.

The Dither value determines the "fuzziness" of the division between color bands. A setting of 0 makes the tree and snow lines very sharp boundaries. The default setting of 128 gives a moderate amount of dithering of the colors. A large value, like 1000, makes the colors so dithered that there is no visible relationship between altitude and color. To set this value, click the mouse pointer on the Dither string gadget on the Main Control Panel. Change the number from the

keyboard. Useful values range from 0 to 1000.

Textur - O L M H

Vistapro can add additional texture to polygons near the camera by breaking them into smaller pieces and coloring each piece a slightly different shade. This adds artificial detail to nearby areas. There are four different levels of detail: Off, Low, Medium and High. They are selected by the O, L, M and H buttons below the Textur label. Pressing one of these buttons brings up a panel which gives you a choice of Shading or Altitude texturing. The higher the detail level, the longer a picture takes to render but the more detailed it will appear.

Shading texture breaks nearby polygons into several smaller polygons and shade each polygon separately, giving the landscape smoother transitions of shade and color and making large polygons less visible. Shading texture works well with Gouraud shading to eliminate a computer generated look in landscapes and give more of an "artistic" appearance.

Altitude texture fractalizes the polygons into groups of smaller polygons to add texture. These smaller polygons are then individually shaded and colored. Altitude texture produces the most realistic looking landscapes. Gouraud shading is not recommended to be used with Altitude texture as it tends to smooth out the fractal effect.

PixDth

Dithering at the pixel level increases the apparent number of colors in the display. Vistapro uses a dithering method which allows you to set the amount of dithering used within the display. It can be set anywhere from no dithering to so much dithering that you no longer recognize the picture.

Bound

The bounding function allows you to mark off a rectangular area of the landscape. Vistapro then renders only the parts of the landscape inside the bounded area. This is useful when you want to examine details in a small portion of the landscape or eliminate parts of the landscape that you know will not be visible.

To use this function, select the Bound button. On the topographic map, click the mouse pointer at one corner of the desired region. Move the pointer to the opposite corner notice that a rectangle follows the mouse as you move it. Click at the second corner. A black box is drawn on the topographic map to indicate the bounded area. To turn off the Bound function, click on the Bound button again. The button pops up and the black box disappears.

BFCull

Normally, with Vistapro's camera placed over the landscape, the back sides of mountains are not visible to the camera; only the fronts of mountains (the parts facing the camera) are seen. Since the backs of mountains aren't visible, it makes sense not to render them. The BFCull button enables Back Face Culling, a technique of detecting the back faces and not rendering them.

Under some conditions you may need to see the back faces of objects. For instance, with the camera underneath the landscape or with the camera in the area surrounding the topographic map, some back faces will be visible to the camera. You can disable back face culling under these conditions if you choose.

Blend

Blend helps reduce the coarse texture of distant parts of the landscape. When you select the Blend button, Vistapro draws each polygon with a weighted average color of that polygon and the three polygons that border it. This reduces the aliasing of distant polygons. It also reduces the color saturation of polygons, so its use is optional.

GShade

Gouraud shading produces smooth looking surfaces without obvious triangles. It requires about 50% more time to render a landscape with Gouraud shading than without it. Gouraud shading gives a brush like feeling to the landscape, as if an artist painted it using oils, rather than the Amiga playing with numbers. Besides filtering out large polygons, it adds mood to the landscape. The foreground may appear blurry with Gouraud shading.

LENS LOWER CONTROL PANEL

The camera lens functions available on the Lens Lower Control Panel represent the lens type of Vistapro's imaginary camera.

Port

The Port function looks to the left to allow generation of images that can be pieced together to form a panorama, at

least on three sides. This function is intended to be used together with the Strbrd and Forwrd functions.

Forwrd

The Forwrd function looks straight ahead to allow generation of images that can be pieced together to form a panorama, at least on three sides. This function is intended to be used together with the Port and Strbrd functions.

Strbrd

The Strbrd function looks to the right to allow generation of images that can be pieced together to form a panorama, at least on three sides. This function is intended to be used together with the Port and Forwrd functions.

Wide

The Wide lens gives a 90 field of view. It allows you to see a wide area with minimal spherical distortion. The Wide lens has a FclLn value (similar to the focal length of a real camera) of 16.

Zoom

The Zoom lens has about half the field of view of the Wide lens (about 45), or you may think of it as having twice the magnification. It allows you to zoom in on the target. Very little distortion is noticeable. The Zoom lens has a FclLn value of 32.

FclLn and Fld OV

The FclLn value is similar to the focal length of a real camera. It represents the width of the field of view or the amount of magnification. The lower the FclLn value, the wider the field of view. The higher the FclLn value, the narrower the field of view and the greater the magnification.

The lowest valid FclLn value is 1. This is an extremely wide angle lens with severe spherical distortion. Values below 8 are generally impractical but sometimes interesting to try. You can set the FclLn to as high as 30000, but such high numbers are only useful when the camera is very far from the landscape (a million meters or so). You will probably use FclLn values from 16 to 100 in normal situations.

The Fld OV value is the approximate angle of the camera's field of view in degrees. While the Lens Lower Control Panel is active, the field of view is indicated on the topographic map as two lines radiating out from the camera position. FclLn and Fld OV are tied together. That is, when you change one value, the other also changes automatically to reflect the new setting.

FRACTAL LOWER CONTROL PANEL

Random

Random landscape generation allows creation of a vast number of completely artificial landscapes. Vistapro supports over four billion random fractal landscapes. Each different number in the Fractal Landscape Number window below the Random button represents a different landscape. You can use both positive and negative numbers. A number such as1,231,541 creates a different landscape than its positive counterpart, +1,231,541. Select Random on the Fractal Lower Control Panel. Notice that a new number appears in the Fractal Landscape Number window. Vistapro now proceeds to create a new landscape. After a time, depending on the speed of the system running the program, a new landscape appears. If this landscape is one which you may want to use again, be certain to write down the number so that you can generate it again, or save the landscape using the Save VistaPro DEM menu item. To recreate a desired landscape, simply reenter its number in the Fractal Landscape Number window and Vistapro will create the same landscape again. This conserves disk storage space. You may enter any number into the Fractal Landscape Number window and explore landscapes in this fashion. Various methods include using special dates such as birthdays (without hyphens or slashes, i.e. 52262 rather than 5-22-62), holidays and anniversaries. Keep a list of numbers for those landscapes that prove to be interesting so that you can share them with other owners of Vistapro. Like the fingerprints of the four billion inhabitants of this planet, some Vistapro scenes may look similar, but, upon closer examination, each one is individual and distinctive. Fractal landscape generation is affected by the fractal dimension and fractal divisor settings.

Fractal Landscape Number

This string gadget (located below the Random button) is used

to enter the number of the fractal landscape you wish to generate. It also displays the random number generated when you press the Random button. Vistapro uses this number to generate fractal landscapes. To enter your own value, position the mouse pointer over the gadget and press the left mouse button. The pointer disappears. Type in your number from the keyboard and press Return. Vistapro then generates that landscape. Note that the fractal dimension and fractal divisor values are also used to generate the landscape.

Island

There are two modes for generating fractal landscapes, Island and Floating. In Island mode the altitude of the four edges of the fractal landscape are the same. This allows you to create islands by setting the sea level higher than this edge altitude. See the SeaLvl function for details on its operation. In Floating mode, the four edges of the landscape are allowed to float that is, they are allowed to vary in altitude. Floating mode landscapes look like they were clipped out of a larger area similar to real-world DEM landscapes.

If the Island button is depressed, fractal landscapes are generated in Island mode, otherwise they are generated in Floating mode.

FrDim

The FrDim value controls the fractal dimension (height and roughness) of the fractal mountains. This value is used for subsequently generated fractal landscapes. Typing in a new value does not affect the current landscape unless you regenerate it. The default value is 100. Larger values generate taller, rougher landscapes. Smaller values generate flatter, smoother landscapes.

Frctlz

You can fractalize the current landscape to add fractal detail to them. If the FrDim is set to a low value, the effect of this is to smooth the landscape. If the FrDim is set to a high value, the landscape becomes rougher. The fractal divisor buttons (1, 2, 4, and 8 immediately below the Fractlz button) control the scale at which the fractalization occurs. At lower values, fractal noise is added only at very small scales the landscape will be basically the same shape, but rougher. At higher values the

landscape will start looking rougher at larger scales and may no longer resemble the original landscape.

Fractal Divisor

The fractal divisor buttons are the four buttons located between the Fractlz and Strtch buttons. They are labeled 1, 2, 4, and 8. The values they represent are used by the fractal generation routines. When Vistapro generates a fractal landscape (after you press Random or enter a value into the Fractal Landscape Number gadget), it uses the current divisor setting. The smaller the fractal divisor, the larger the features of the landscape. At a setting of 1, very large mountains are generated. At 8, many small mountains are built. For the Fractlz and Strtch functions, the divisor value represents the frequency at which the existing landscape data is sampled in order to generate a new landscape. See the sections for Fractlz and Strtch for more details.

Strtch

The Strtch function changes landscapes by stretching existing features vertically. Peaks grow taller, valleys and pits grow deeper. The scale at which this happens is controlled by the fractal divisor buttons (1, 2, 4, and 8 immediately above the Strtch button). At lower values, only the smallest features are stretched. At higher values, only the larger features are stretched. You can stretch landscapes over and over again to create a caricature of the original landscape.

LIGHT LOWER CONTROL PANEL

The light source direction is the direction from which the sun is shining and it is used in combination with the exposure, contrast and shadow settings to determine the location and depth of shadows when generating an image. This function moves the sun.

When this panel is selected, several concentric circles are drawn in black over the landscape. These circles are reference points for you to use to visually estimate the declination of the sun. The circles are labeled with the declinations that they represent: 75, 60, 45, 30 and 0 above the horizon. A line (the Sun Vector) is drawn from the center of the "bullseye" toward the edge of the landscape. The direction of the line indicates the azimuth (direction

around the horizon) from which the sun is shining. The length of the line indicates the declination of the light source. Think of the Sun Vector as a stick stuck in the center of the landscape which is pointing at the sun. Since the topographic map is being viewed from directly overhead, the longer the stick appears, the closer the sun is to the horizon. If the stick appears very short, it is pointing nearly straight up.

NSEW

Use the North, South, East, and West buttons (labeled N, S, E, and W) to quickly set one of four standard lighting positions. These buttons are positioned so that you can easily see from which direction the sun is shining. When using one of these positions, the sun is 45 above the horizon. Using these pre-programmed directions speeds up the shading phase of rendering when shadows are enabled. After clicking on one of these buttons, the Sun Vector (the line radiating from the center of the "bullseye") changes to indicate the new direction.

Custom

The Custom button allows you to have complete control over the direction and angle of the light source. Selecting this button causes the sun vector to follow the mouse pointer as you move it around the screen. This represents the position of the sun in the sky. Think of the line as a stick pointing at the sun from the center of the landscape. Since you are looking down onto the landscape from above, the longer the stick is, the closer the sun is to the horizon, and the shorter the stick is, the closer the sun is to being directly overhead. The stick points in the direction of the sun. When you have located the desired direction and angle, a single click with the left mouse button locks it in place. Using a custom light source may increase the amount of time required to complete the shading phase of the rendering process when shadows are enabled.

Exager

The Exager (Exaggeration) button enables exaggerated shading. Imagine a ball with a light shining on it from above. The top of the ball faces the light and appears very bright. Points farther down the sides of the ball reflect less light and appear darker. Halfway down the side, the light no longer shines on the surface and it is in shadow.

Exaggerated shading increases the rate at which the shades darken around the sides of the ball. This technique can add detail to the image by exaggerating small irregularities on the landscape. You will probably want to disable this function when setting the sun at low declinations, since the exaggeration makes flat areas appear very dark.

Azimth

Use the Azimth gadget to set the direction of the sun (in degrees from South). Zero degrees is due south, 90 is due west, 180 is due north and 270 is due east. Note that this differs from the heading, which is measured from due north, as is common in navigation.

Declin

Use the Declin gadget to set the declination, the angle from the horizon, from which the sun shines. Zero degrees of declination puts the sun right on the horizon, while 90 puts the sun directly overhead. This is similar to the way Pitch is measured for the camera.

In astronomy, this value is usually called altitude (measured in degrees from the horizon) rather than declination. It was decided that the term altitude might be confusing since it is also used to describe the altitude of the camera (measured in meters). Be aware that the usage of the word declination here is not technically correct.

Rough

The Rough gadget sets the apparent roughness of the landscape when it is rendered. Vistapro accomplishes this by adding a scaled random number to the shade of each polygon, so that some of the polygons are darker than normal and some are lighter. By doing this, large flat areas appear to have a little more detail than they otherwise might. To set this value, click the mouse pointer on the Rough string gadget. Change the number from the keyboard and press Return. Useful values range from 0 to 300, with higher values giving rougher appearing landscapes. Very large roughness values result in unnatural shading. This is used in conjunction with the Textur function.

Shadow

Vistapro has the ability to render landscapes with shadows.

True shadows are very difficult and time consuming to render, so Vistapro uses a quick, less precise method. Only the landscape itself casts shadows; trees do not cast shadows. Shadows are not cast outside the area of the topographic data. Shadows are enabled when the Shadow button is depressed. The shading phase requires more time when shadows are enabled.

BOTTOM CONTROL PANEL

Render

Clicking on the Render button starts the generation of a new picture using the current settings in the control panels. Vistapro performs several functions while rendering. It displays its progress at the bottom of the screen in the status window. For most functions, there is a continuously updated status count so that you can monitor Vistapro's progress. (See Vista Status Window for more information.) You can abort the rendering process by pressing the Abort button.

Redraw

The Redraw button redraws the image onto the View screen in the current resolution/mode set by the GrModes menu. This only works for the image last rendered or 24 bit image you loaded with the Load IFF 24 menu item.

Vistapro uses two different algorithms for drawing in HAM mode. If the polygon size is set to either 4 or 8, it employs a crude but fast algorithm. When using HAM mode, more HAM artifacting is noticeable at these polygon sizes. HAM artifacting is the colored spikes that can appear in a HAM image at sharp contrast transition boundaries. If the polygon size is set to 1 or 2, Vistapro uses a more precise method which results in less HAM artifacting.

View

When the rendering is complete, Vistapro automatically displays the image. If you have returned to the Control Panel, you can redisplay the image with the View button.

Abort

Use the Abort button to stop the rendering process and River and Lake generation. With Lake generation, Vistapro removes

the lake from the landscape, which may result in the erasure of River data that it overlaid when generating the lake. When generating a river, Abort simply stops flowing the river. It will remove the river if you press the No button in the Accept River? requestor which appears when you press the Abort button. The Abort button may not appear to be pressed when you press the mouse button, but it will still be active and will abort the current function.

TREE CONTROL PANELS

GENERAL TREE CONTROL PANEL

The Tree Control Panel gives you to control over random generation and rendering of trees (as opposed to trees placed individually using the Place Middle Control Panel). The Tree Control Panel has two modes, a General mode, which gives you control over the tree's general appearance, and an Expert mode, which gives you more precise control over trees at different elevation levels.

The central portion of the panel is divided into five subpanels, one for each type of tree that Vistapro can draw and one for grass. The settings in each of these sections determine whether the given type of tree or grass will be rendered within each Tree color elevation zone and their size and density. The bottom portion of the Tree Control Panel is divided into four subpanels, one for each type of tree. These subpanels control the amount of detail with which each type of tree is drawn within each Tree color elevation zone.

EXPERT TREE CONTROL PANEL

OK

When you press the OK button, Vistapro accepts and saves any changes that you have made in the Tree Control Panel and returns you to the main control panels.

Off

The Off button disables rendering of trees without changing the settings in the Tree Control Panel and returns you to the main control panels. This function can be used to reduce the time needed to make test renderings before turning trees back on for a final rendering.

Expert

The Expert button opens the Expert portion of the Tree Control Panel.

Txture

The Txture button enables fractal texturing in the branches and leaves of all trees and grass.

2-D

The 2-D button causes two dimensional trees (as in Vistapro 2.0) to be rendered. Grass is not affected by this function.

3-D

The 3-D button causes three dimensional trees to be rendered.

Tree Type Subpanels

The subpanels controlling pine, oak, palm and cactus are organized identically to each other. Each has five rows of gadgets (labelled 1, 2, 3, 4 and All) which control generation of the given type of tree within the corresponding Tree color elevation zones (Tree 1 Tree 4). Settings in the top (All) row affect all trees of the given type, regardless of elevation. There are four columns of gadgets relating to different aspects of rendering trees.

Tree Type

The leftmost column consists of four buttons labelled for the type of tree the subpanel controls and an All button. When one of the Tree Type buttons (Pine, Oak, Palm or Cactus) is depressed, Vistapro renders that type of tree in that Tree color elevation zone. For example, if you depress the Pine button in row 1 of the pine subpanel, Vistapro will generate and render random pine trees in all areas of the landscape which have the color Tree 1. Depressing the All button causes trees of the given type to be rendered in all Tree colored elevation zones.

Generation of trees of a given type in a given elevation zone is independent of generation trees of the same type in other elevation zones. Also, more than one type of tree can be rendered within a given elevation zone.

Size

The numeric gadgets in the Size column determine the approximate size (in meters) of trees of the given type within the given elevation zone. Fifty meters may seem quite

large for most trees, but, with thirty meters between landscape data points (as in most Vistapro DEMs), fifty meter tall trees will seem consistent with the surrounding landscape. To change a tree size, click in the appropriate Size gadget, change the value from the keyboard. The top value in the column controls the tree Size at all elevations. For example, if you set it to 50, it changes the size of all trees of the given type to 50 at all elevations. Changing the Size value in one of the other rows affects the trees at the given elevation only, the top value then represents the average size of the given tree type.

Density

The numeric gadgets in the Density Column determine what proportion of data points that could contain a tree of the given type actually do contain a tree. This value is out of a possible maximum of 256. That is, a density of 128 means that 50% of the possible data points will actually contain trees. The actual effect of this is a bit tricky to describe, as it depends on the number of tree types being rendered in a given elevation zone. For example, the actual density of pine trees at elevation 4 is the value in the Pine Density 4 gadget times the probability that a pine tree, rather than an oak, palm or cactus, will be drawn at any given point. To change a tree density, click in the appropriate Density gadget, change the value from the keyboard. The top value in the column controls the tree Density at all elevations in a similar manner to the top value in the Size column.

Leaves

The buttons in the Leaves column determine whether or not leaves are rendered on trees of the given type in the given elevation zone. For autumn or winter scenes, you may wish to have some trees which are devoid of leaves. The All button turns leaves on for trees of the given type at all elevations.

Grass Subpanel

The Grass subpanel is laid out a little differently than the Tree Type subpanels, but the first three columns (Grass, Size, and Density) serve the same functions as the corresponding columns in the Tree Type subpanels.

The Spread column determines the amount of grass in each individual clump. Spread values range from 0 to 256. Lower Spread values result in just a few blades of grass at a given point, while higher values can result in hundreds of blades at a single point. The blades are randomly distributed to nearby points so that grass is spread about the polygon rather than being concentrated in a single spot.

The top value in the Spread column controls the grass Spread at all elevations in a similar manner to the top value in the Size and Density columns.

3-D Detail Subpanels

The four 3-D Detail subpanels, one for each tree type, at the bottom of the Tree Control Panel are organized identically to each other. As in the Tree Type subpanels, there is a row for each of the four Tree color elevation zones and one for all of the zones. There are two columns of buttons which control the detail with which trees are rendered. The settings in these subpanels only apply if the 3-D button is depressed. By varying both the Density and Crown settings, you have ultimate control over tree rendering.

Detail - L M H U

The L(ow), M(edium), H(igh) and U(ltra) buttons in the column below the Detail label determine the level of three dimensional detail, i.e. how many levels of branches and leaves, with which trees of the given type in the given elevation zone are rendered. A setting of L results in trees with relatively sparse foliage while a setting of U results in trees with dense foliage.

As an example, to get pine trees with heavy foliage in the lower elevations and light foliage in the higher elevations, you might depress the H buttons in rows 1 and 2 of the Pine 3-D Detail subpanel, and the L buttons in rows 3 and 4. For trees with the same level of detail regardless of elevation, use the buttons in the row labelled All.

Crown - L M H U

The L(ow), M(edium), H(igh) and U(ltra) buttons in the column below the Crown label determine the "crown level" of trees of the given type in the given elevation zone. Crown level is the likelihood that an individual branch will be rendered. A setting of L results in a 50% probability that any given branch will continue. The probability is 75% at M, 87.5% at H and 93.75% at U.

CLOUD CONTROL PANEL

The Cloud Control Panel allows you to determine how Vistapro renders clouds. It is accessed by pressing the Clouds button

on the Main Middle Control Panel. All other control panels are inactive while the Cloud Control Panel is displayed.

OK

The OK button accepts your cloud settings and returns you to the main control panels.

Enable Clouds

When the Enable Clouds button is depressed, Vistapro renders clouds above the landscape. If it is not depressed, clouds are not rendered.

Fractal Detail

The Fractal Detail button adds fractal detail to the clouds. This results in more realistic looking clouds.

Cloud Parameters

The four items in the Cloud Parameters subpanel determine the appearance of rendered clouds.

Density

The cloud Density value determines the amount of clouds that are generated. Density values range from 0 to 100. Low Density values result in few clouds, high values result in a larger cloud mass. Change this value by clicking in the numeric gadget, typing a new value and pressing Return.

Hardness

Cloud Hardness determines the "fluffiness" of the clouds. Low Hardness values result in softer, puffier clouds, high values result in clouds with sharper edges. Change this value by clicking in the numeric gadget and typing a new value.

Altitude

The cloud Altitude value determines the altitude of the cloud mass. It is adjusted if the camera is too near to or above the clouds. You cannot place the camera above the clouds. Change this value by clicking in the numeric gadget and typing a new value.

Cloud Size - 1 2 3 4

The Cloud Size buttons determine the size of clouds generated by the Random Clouds function. A setting of 1 results in a few large cloud masses, while a setting of 8 results in a large number of small cloud masses.

Cloud Source

The two buttons in the Cloud Source subpanel determine what Vistapro uses for a cloud map (think of this as a kind of topographic map for clouds) when rendering clouds. Cloud maps generated with either of these functions can be saved with the Save Clouds menu item and used with any landscape.

Random Clouds

The Random Clouds function generates a random cloud map. The sizes of the random clouds are determined by the Cloud Size setting.

DEM->Clouds

The DEM->Clouds function turns the currently loaded landscape into a cloud pattern. The peaks in the landscape become clouds and the valleys become holes in the clouds. You can create a cloud map based on one landscape, save it using the Save Clouds menu item and then use it with a different landscape. Or, you can use the cloud map with the landscape that generated it, giving you a sort of mirror image of the landscapes in the clouds above it.

One interesting use for the DEM->Clouds function is sky writing. Create an IFF file containing text, then load it into Vistapro as a landscape using the IFF->Alt menu item in the ImpExp menu. Now use this landscape to generate a cloud map using DEM->Clouds and the text becomes clouds (or holes in the clouds, depending on the colors used in your IFF file). See IFF->Alt for information about creating landscapes in this manner.

COLOR CONTROL PANEL

The Color Control Panel controls palette selection and a variety of other functions. This panel is accessed by pressing the CMap button on the Middle Control Panel. Both the R(ed), G(reen) and B(lue) sliders and the H(ue), S(aturation) and B(rightness) sliders on the left part of

the Color Control Panel allow you to select and mix colors. The center part of the panel is devoted to those aspects of landscape coloration which are under your control. The OK button loads your selections and returns you to the main Vistapro Control Panels. The various features of the Color Control Panel are described below.

Colors

The Color Palette is used to change the color ranges for Sky, Cliffs, Snow, Bare Earth, Vegetation (Trees and Grass) and Water. These are the colors of the polygons that make up the landscape. Each of the colors are shaded and faded by Vistapro as it renders the landscape.

For example, an apple may be a uniform shade of red, but the side that faces the light is brighter than the side that faces away from the light. The apple fades toward haze color as you move it farther into the haze. Even though there are only a few different object colors in Vistapro, each of the colors may produce hundreds of shades.

Vistapro maps Bare, Tree and Snow colors to the landscape fundamentally by elevation. Vistapro gives the lowest elevations Tree colors, middle elevations Bare colors and high elevations Snow colors. The same is true for each of the four colors within each segment. The lowest elevations are assigned the color Tree 1, slightly higher elevations Tree 2, and so forth. The designation of colors as Tree, Bare and Snow is arbitrary.

You can, for instance, make them all different shades of red for a Martian landscape, or any colors desired for an especially bizarre picture. The boundary between the different zones is fuzzy. For instance, setting the tree line at 1000 meters does not mean that everything below 1000 meters will be Tree and everything above it will be set to Bare or Snow. The local shape of the landscape and some random dithering affect all the colors.

Vistapro uses Cliff colors for portions of the landscape where the terrain is very steep. The color Cliff 1 is used for slightly steep regions, Cliff 2 for steeper portions and so on through the range of cliff colors. Beach color is used for the boundary (if any) between the sea and the land. Vistapro uses Water colors for rivers and lakes. Water colors 1 and 2 are assigned to flat bodies of water. Water colors 3 and 4 indicate rapids on rivers. Waterfalls are

Water 5. Horizon color is the color of the region surrounding the Elevation Model Data. This color need not be the color of the sea or of water at all. Depending upon the effect desired, it might be green to match the lowest landscape colors.

Sky color is simply the color of the sky. You can obtain an interesting effect by making Sky and Horizon colors black and by setting the Haze value to 0. This creates landscapes that appear to be floating in space. Sky Haze is the color that the sky fades to in the distance. Haze is the color that land and water fade to in the distance. Keep in mind that the thickness of the haze (or magnitude of the haze effect) is set by the HazeDn setting on the Middle Control Panel. You can produce another interesting effect by setting Haze and Sky Haze to black and the HazeDn value to a high number like 300. This makes the landscape look like a night scene lit by a light behind the camera.

Exposure and contrast are set with the Exposure and Contrast controls. Higher Exposure settings lead to brighter pictures. Higher Contrast settings lead to more contrast in the images. Only the R(ed) slider is used to control Exposure and Contrast settings.

OK

The OK button returns you to the main Vistapro Control Panels using the changes you have made.

Spread

The Spread function provides for a smooth series of color changes from one color to another. To use the Spread function, click on the upper color, click on Spread and then click on the lower color. As an example, suppose you want the lowest elevation of brush to be a dark green and the highest to be a light green. You would set the Brush 1 color to a light green, the Brush 4 color to a dark green and use Spread to fill in the colors for Brush 2 and Brush 3.

Quit

The Quit button returns you to the main Vista Control Panel, resetting the colors back to what they were before you entered the Color Control Panel.

Copy

The Copy button copies a color from one palette segment to another. Click on the color you want to copy, then click on Copy and, finally, click on the color you want to change. The second color is changed to be the same as the first.

Swap

The Swap button swaps two colors. Click on one of the colors you want to swap, then click on the Swap button and, finally, click on the color with which you want to swap. The colors swap places.

Sound

Fractal music generated by Vistapro is a musical rendering of the values of the polygons that Vistapro uses to generate the final image before display. It is the sound of fractal mathematics in action.

GRAPHICS CONTROL PANEL

OK

Pressing the OK button accepts your settings for your next display and returns you to the main control panels.

DISPLAY MODES SUBPANEL

LoRes

The LoRes button tells Vistapro to display the next image in LoRes mode. It does not change the width of your image, although it changes the display width. This can result in displaying only a portion of your image if the Image Width and Display Width differ greatly.

HiRes

The HiRes button tells Vistapro to display the next image in HiRes mode. Under AmigaDOS 1.3, this is typically 640 to 768 pixels, depending on the amount of overscan that you request. Under AmigaDOS 3.0, it varies depending on the overscan and monitor mode that you select. The HiRes button is selected automatically when Super HiRes is selected, since inside AmigaDOS, the SuperHiRes flag contains the HiRes flag.

HAM

The HAM button tells Vistapro to display the next image in 4096 color HAM mode. The exception to this is that under AmigaDOS 3.0 on an AGA Amiga, if HAM-8 is selected, HAM is also selected because the HAM flag is part of the flags that designate HAM8. Under AmigaDOS 1.3, HAM is always LoRes in width but, under AmigaDOS 3.0, that restriction does not exist.

EHB

The EHB button tells Vistapro to display the next image as an ExtraHalfBrite image. This gives you 32 colors plus 32 shades of those colors, for an apparent 64 colors. Under AmigaDOS 1.3, EHB can only be used in LoRes mode.

Interlace

The Interlace button tells Vistapro to display the next image in Interlace mode. Interlace works nicely for images. The flicker that is noticeable with text on some Amiga screens is not apparent when displaying rendered images.

AmigaDOS 3.0 Buttons

The following buttons require AmigaDOS 3.0 Version 39 of the Graphics.library to operate. Vistapro looks at the version number of your Graphics.library in order to decide whether or not to attach these buttons to the Graphics Control Panel. If you do not see them, it is probably because you are running a pre-AGA Amiga. If you upgrade your Amiga, you will find that these buttons automatically become available to you.

Super HiRes

If you do not yet have AmigaDOS 3.0, you will not see the Super HiRes button. This button tells AGA Amigas to display the next image in SuperHiRes mode. This can be as many as 1448 pixels wide, depending on the mode. Vistapro automatically looks at the version of AmigaDOS on your machine to decide whether or not to install this button.

256-C

The 256-C button tells Vistapro to render the next image in the new AGA 256 color mode. This mode cannot be used at the same time as HAM, HAM-8, EHB or Productivity. Vistapro

automatically deselects those modes which are not compatible with it. 256-C requires AmigaDOS 3.0 or higher.

HAM-8

The HAM-8 button tells Vistapro to render the next image in the new 256,000 color HAM8 mode. This mode cannot be used at the same time as the 256 color mode, EHB or Productivity. Vistapro automatically deselects those modes that are not compatible with it. HAM-8 requires AmigaDOS 3.0 or higher.

Productivity

The Productivity button tells Vistapro to render the next image in Productivity mode. This mode requires one of two monitor settings, Multiscan or Euro72. None of the other monitor types support it. Productivity mode is 640 pixels wide with no horizontal overscan.

AmigaDOS 3.0 Monitor Modes

Under AmigaDOS 3.0, Vistapro recognizes which monitor mode you are using and opens screens for display which are appropriate to that monitor mode. Under releases of AmigaDOS prior to 3.0, Vistapro uses only NTSC or PAL screens, as appropriate.

IMAGE AND DISPLAY SIZE SUBPANEL

Image Width

The Image Width integer gadget contains the current width of the next image to be rendered. You can enter a value here or have it filled in automatically by clicking on any of the numbered Overscan Width & Height buttons. This is the actual image width, not the width that is displayed. Vistapro renders images up to 4096 pixels wide, providing that it can find enough memory. Typically, the memory required for the 24 bit image buffer is image Width x Height x 3. This does not count Vistapro's normal overhead or the memory needed for a Large or Huge DEM.

Image Height

The Image Height integer gadget contains the current height of the next image to be rendered. You can enter a value here or have it filled in automatically by depressing any of the numbered OverScan Width & Height buttons.

Display Width

The Display Width integer gadget contains the current width of the screen that the next image will be displayed on. It is typically rounded to the nearest 16 bits.

Display Height

The Display Height integer gadget contains the current height of the screen that the next image will be displayed on.

OverScan Width & Height Buttons

The OverScan Width & Height buttons are organized in two rows of four buttons each. The text on the buttons changes depending on the other settings on the Graphics Control Panel. The first row contains width settings, with the leftmost button being the default setting (no overscan) and the rightmost button being the maximum overscan setting for the current mode settings. The middle two buttons represent compromise settings. These buttons set both the Image Width and the Display Width and are offered as a shortcut to filling out the image and display sizes manually. The second row, similarly, contains height settings. When Vistapro first starts up, it is in LoRes, non-interlace mode and the buttons are as follows:

```
320 352 368 384
200 216 241 242
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SPECIAL HARDWARE SUBPANEL

DCTV

Off

Turns off DCTV modes. Each special hardware mode is locked into place. You cannot choose Firecracker24, for example, if you have already chosen DCTV. You must turn DCTV off first. This is also true of the specifically Amiga modes, such as HAM, HAM8, EHB, Productivity and SuperHiRes.

3 Bit

Turns on DCTV 3 bit plane mode for display.

4 Bit

Turns on DCTV 4 bit plane mode for display.

Firecracker24

Off

Turns off the Firecracker24 display mode.

1 Mon

Turns on the Firecracker24 display for use on a system with a single monitor. Image and display sizes are set to 768x482.

2 Mon

Turns on the Firecracker24 display for use on a system with a separate monitor for the Firecracker24. Image and display sizes are set to 768x482.

HAM-E

Off

Turns the HAM-E display mode off.

On

Turns the HAM-E display mode on.

COLORS

Sky

Sky is the primary color that Vistapro uses in generating the sky. Haze and Sky Haze alter this color when appropriate.

Cliff 1-4

Cliff 1-4 are the primary colors that Vistapro uses in generating cliff regions in a landscape. Cliff 4 is used for the steepest cliffs and Cliff 1 the least steep. Vistapro uses shades of these colors when these areas are in shadow.

Snow 1-4

Snow 1-4 are the primary colors that Vistapro uses in generating regions of the landscape that are above the snow line. Snow 4 is the highest elevation above the snow line and Snow 1 is the lowest. Vistapro uses shades of these colors when these areas are in shadow.

Bare 1-4

Bare 1-4 are the primary colors that Vistapro uses in generating regions of the landscape that lie between the tree line and the snow line, and that are not as steep as cliffs. Bare 4 is the highest such elevation and Bare 1 the lowest. Vistapro uses shades of these colors when these areas are in shadow.

Tree 1-4

Tree 1-4 are the primary colors that Vistapro uses when drawing trees. As with Snow, Tree 4 is used for trees at the highest elevation and Tree 1 for the lowest. Vistapro uses shades of these colors when these areas are in shadow.

Beach

Beach is the primary color that Vistapro uses to separate the bottom of the brush area from any sea that has been generated. Vistapro uses shades of this color when these areas are in shadow.

Horizon

Horizon is the primary color of the area that is at sea level surrounding the topographic data.

Water 1-5

Water 1-5 are the primary colors that Vistapro uses for rivers and lakes. Water 5 is used for the fastest water and Water 1 the most placid. Vistapro uses shades of these colors when these areas are in shadow.

SkyHaze

Vistapro adds Sky Haze color to the sky near the surface, depending upon the amount of haze selected. There is a smooth transition from Sky color to Sky Haze color as the sky approaches the horizon in the distance.

Haze

Vistapro adds Haze color to land areas based upon the distance from the camera and the amount of haze selected with the HazeDn value.

Grass 1-4

The colors Grass 1-4 are used to draw the ground underneath trees whether or not trees are enabled. We find that brown or dark green shades look most natural. As with trees, Grass

1 is used at the lower elevations and Grass 4 at the higher elevations. Blades of grass are drawn with a combination of Grass and Tree color.

Bark 1-4

Bark 1-4 are used to draw tree trunks and larger branches. They are usually set to dark brown but you might also select whites (Birch trees) or other colors.

House 1-4

Vistapro can draw rectangular buildings (sorry, no doors or windows!) where House 1-4 colors are placed on the landscape. The house colors are selected using these colors. Vistapro uses shades of these colors when these areas are in shadow.

Note: houses can be placed on the landscape using either the Place Middle Control Panel or the Col->IFF and IFF->Col functions.

Under House 1-4

Vistapro uses House 1-4 to draw the ground underneath houses. You might use black to simulate asphalt, white to simulate concrete or green to simulate grass. The under house colors are also used to color roads.

Exposure

Exposure is similar to the F-stop and shutter speed on a camera lens. The higher the exposure, the lighter the final image.

Contrast

Contrast regulates the contrast of the final image. High contrast makes the darker areas very dark and the lighter areas very light. Low contrast lessens the difference between the dark and light areas.

THE VISTAPRO STATUS WINDOW

The Status Window is the area just below the topographic map. Vistapro uses this area to give you messages about what it is doing while rendering. It also indicates the mouse position while in the Camera/Target placement modes. The

following sections describe the messages that are displayed in the Status Window.

X, Y, Z :

The X, Y, and Z values displayed in the status window while you are moving the mouse pointer over the landscape are the X, Y, and Z coordinates of the landscape under the pointer. If you think of north as the top of the screen, the X coordinate represents the distance in meters east of the left edge of the topographic map. The Y coordinate represents the distance in meters north of the bottom edge of the topographic map. The Z coordinate represents the elevation above sea level in meters of that point on the topographic map.

Generate:

Vistapro is generating a new fractal landscape.

Color

Vistapro is calculating the colors of the polygons which comprise the landscape based on their altitude and the topography of the terrain. Vistapro does coloring whenever you modify the snow line, tree line or sea level, or if you render an image at a smaller polygon size than before.

Cliffs

Vistapro is placing cliff colors on the steep areas. Recalculating cliffs takes place whenever you change snow or tree lines, or if you render an image at a smaller polygon size than before.

Shade

The Shade function is calculating the amount of light reflected by each polygon. Vistapro recalculates shade when you draw a river or lake, select a smaller polygon size, smooth the landscape or vary the light position.

Tree

During the Tree function, Vistapro calculates the location of trees and grass for inclusion during the Render function.

Grass

When trees or grass are locked out during coloring, Vistapro uses the Grass function to place trees and grass.

Sky

During the Sky function, Vistapro is drawing the sky, including sky haze effects. This may take several seconds and Vistapro does not display a counter.

Horizon

During the Horizon function, Vistapro draws the ground, ocean or space that surrounds the DEM portion of the view. Because of the haze effect, this requires several seconds.

Render:

Vistapro is drawing DEM polygons. The image cannot be seen as it is being drawn, unless you select Show Render from the GrModes menu, because it is drawn to a virtual screen. We designed Vistapro in this manner to increase its rendering speed and the flexibility of its output. The virtual screen format makes drawing polygons very fast, especially since the final display may be in any of the Amiga's display modes. In the final step, Vistapro converts the image from the virtual screen to display on the real screen. The image is transferred to the Ami[22;23;24m[1;3v[2"z[1mg[22;23;24m[1;3v[2"za's the top to the bottom of the screen. Vistapro draws the virtual image with 24 bits of color information (16 million colors). Vistapro does its best to convert the 16 million possible colors in the virtual screen to the limited number of colors on the real screen.

In HAM mode Vistapro uses two different algorithms for drawing the real screen. If the polygon size is set to either 4 or 8, Vistapro uses a crude but fast algorithm. If the polygon size is set to 1 or 2, it uses a more precise but slower method.

Vistapro calculates steps like coloring and shading only to the level of detail required for the current polygon size. Vistapro saves the results of these calculations in memory, so that it will not have to recalculate them later. The program does not recalculate these tables when switching from a small polygon size to a larger polygon size. It uses the data from the small polygons to draw the larger polygons. Therefore, Vistapro does not have to recalculate

tables if you re-select the smaller size polygons. Once Vistapro has made the calculations for small polygons, it will not color or shade renderings with large polygons exactly right. However, this is preferable to recalculation because it saves time. Large polygon sizes are usually used for previewing, so it doesn't matter if the image generated is not precise. You can force Vistapro to recalculate the color tables for large polygons by changing the tree line or snow line. Even entering the same value again forces recalculation. To force reshading, change or reset any of the Light Control Panel functions.

VIEWER

Viewer is a proprietary animation player written by Hypercube Engineering and distributed by Virtual Reality Laboratories, Inc. It allows you to play VANIM files at up to 13 frames per second from your hard disk. It has a very simple straightforward interface and is quite easy to use. To use Viewer, simply type Viewer. Select the animation you wish to view from Viewer's Load menu.

You can control the speed with which Viewer plays your animation by pressing the number keys on your main keyboard. (Not the numeric keypad!!!) The number 1 is slowest and the number 0 is fastest. The numbers between 1 and 0 represent increments of speed change.

You can use the numeric keypad to control the direction that your animation plays, as well as single frame, skip ten frames, go to beginning and go to end.

Exit from the Viewer program by pressing the ESC key.

When viewing a large animation, it helps to have a lot of disk buffers. Use the AmigaDOS AddBuffers command to add disk buffers. We recommend about two buffers for each frame of the animation. For example, a 500 frame VANIM file (24 megabytes in HAM, no interlace or overscan), on drive DH0: should have about 1,000 disk buffers. This can be accomplished by typing AddBuffers DH0: 1000 at the AmigaDOS Shell or CLI prompt. You only need to do this once each time you re-boot your Amiga. A thousand buffers consumes about half a megabyte of memory.

APPENDIX A

What are Fractals and Fractal Geometry?

by Daniel Wolf Ph.D.(Author and Publisher of Fractal Pro, President of MegageM.)

The concept of fractal geometry is the basis of Vistapro's capacity to generate imaginary scenes. Many computer graphics enthusiasts, especially in the Amiga community, have become interested in fractal graphics through programs such as Vistapro, FractalPro, and public domain Mandelbrot and scenery programs. The popularity of fractal graphics using personal computers traces back to the appearance of stunning images of the Mandelbrot Set (a type of fractal object) on the cover of Scientific American in August of 1985. That widespread exposure of these strangely beautiful abstract objects led many amateur and professional programmers to the original source book on fractals: The Fractal Geometry of Nature by Benoit Mandelbrot. While fractals and fractal geometry have become hot buzz words in the computer graphics field, it is not exactly obvious what they are. The following description is simplified, and interested students and readers should read Mandelbrot's

book on the subject.

We owe the word "fractal" to Mr. Mandelbrot, a mathematician and Fellow at IBM's Watson research organization in New York. Fractal refers to objects with fractional dimensions. That is, objects which don't really fit into the ordinary world of things like lines (one dimensional), surfaces (two dimensional) and solids (three dimensional). Fractals are objects which fit in between these normal dimensional objects. Mandelbrot took an interest in a long-neglected area of mathematics which originated at the turn of this century. Some devotees of geometry at that time began to study lines which didn't behave like ordinary lines.

If you read Mandelbrot's book you'll become familiar with some of the mathematical history of things like Peano curves, Hilbert curves, and Koch snowflakes. What makes these objects so strange, and what led Mandelbrot to look deeper, are two properties: these lines tend to fill up a two dimensional surface (they act as if they are something between lines and planes) and their appearance seems to be identical no matter how much they are magnified. Magnified small portions of these fractal lines tend to look like the whole unmagnified line. Odd indeed! Mathematicians at the turn of the century tended to call such objects pathological and didn't have a good way of integrating them into the rest of mathematics, especially geometry. Geometry was mostly dominated by the study of well behaved, smooth, simple forms like lines, planes and solids. Mandelbrot made a systematic study of these weird fractional dimension geometric forms

and helped bring them into the mathematical fold. Mandelbrot also showed how these objects are models of many things found in the natural world, like surface textures of mountains, coastlines of islands and branching designs of plants, trees, blood vessels and lung tubes (bronchi).

If you want a mental picture of how Vistapro exploits fractal geometry to generate natural looking land surface textures, take the following mental journey into the process of crumpling a sheet of paper:

1. Imagine a flat triangular sheet of paper.

2. Divide the sheet into a small number of sub-triangles.

3. Randomly select some of the intersection points and raise or lower them (by a large amount) above the original plane of the flat sheet.

4. Now divide the sub-triangles into smaller sub-triangles.

5. Randomly raise and lower some of the newly created corner points like you did in step 3, but by a smaller amount than in step 3.

6. Keep repeating steps 4 and 5, making smaller and smaller sub-triangles, and raising and lowering corner points randomly by smaller and smaller amounts at each step.

7. Stop when you've reached a point where each smaller division into sub-triangles can't make any more difference in appearance on a limited resolution display like a computer monitor.

8. Now color all the little sub-triangles by a method which makes the highest corner points white (snow on the mountain tops), lower ones brown and green (mountain sides with trees) and the lowest ones blue (a lake at the bottom of the mountain valley).

If we perform steps 4 and 5 using some regular (non-random) technique, in the end the highly crumpled surface would be a lot like the first fractals explored by Mandelbrot; they would look similar at any degree of magnification at which they are viewed. The introduction of randomness to the process makes them look similarly random at different degrees of magnification.

If you are interested in further exploring fractal geometry, here are some great books:

The Fractal Geometry of Nature (by B. Mandelbrot), The Beauty of Fractals (by H. Peitgen and P. Richter) and The Science of Fractal Images (by H. Peitgen and D. Saupe).

APPENDIX B

THE LANDSCAPES

Most of the landscape DEM files were obtained from the U.S. Geological Survey (USGS) and are accurate to within 30 meters. Some of the files were assembled to fit into Vistapro and therefore may not be perfect where they are joined. The following is a partial listing of the DEMs included with your Vistapro package.

ElCap.dem

ElCap is a section of Yosemite Valley in California out of which rises El Capitan, a very large (about 1000 meters) granite cliff formation at coordinate 2520,5760 (X, Y) in the DEM data. This landscape was created by joining together two USGS DEM files and then clipping out the section of interest. A small "scar" that runs North/South where the USGS data did not quite line up can be seen. The joining scar is most apparent in the Valley with the sun shining from the east or west at approximately 3400,4980. This DEM file is as accurate as the original USGS data.

HalfDome.dem

The HalfDome section of Yosemite Valley contains the famous granite formation know as Half Dome at location 5100,7260. The method used by the USGS to digitize the terrain led to some distortion at the top and edges of Half Dome. The jaggy bump at the top of Half Dome is a USGS artifact. This DEM file is as accurate as the original USGS data since it was simply clipped out of a DEM file.

CraterLake.dem

Crater Lake is the caldera of an ancient volcano in Oregon. The walls of the caldera rise approximately 1250 meters from the bottom of the lake to the top of the caldera. The DEM data includes the underwater elevations. The lake fills the caldera to a level about half way up the walls. The mound near the west edge of the caldera is Wizard Island. It is separated from the edge by the lake. The circular mound near the top of the caldera is completely submerged. The lake can be filled with water using the Lake function of Vistapro. Clicking the mouse button about halfway from Wizard Island to the edge of the caldera gives approximately the right water level. In order to include the entire lake in the file, everything was adjusted down by a factor of 0.6. Therefore, to convert elevations or distances into actual meters, take the values given by Vistapro and divide them by 0.6.

MSHB.dem & MSHA.dem

Mt. St. Helens is the volcano in Washington that blew its top on May 18, 1980. The explosive eruption was preceded by amounts of intense earthquake activity. A 150 meter bulge started to grow in April at a rate of five meters per day. A

magnitude 5.1 earthquake set into motion the collapse of the bulge and the following explosion. Winds from the blast were calculated at 670 miles per hour. Almost everything within eight miles of the blast was obliterated. Virtually all trees were flattened at distances up to nineteen miles from the volcano. Significant amounts of volcanic ash fell as far as one thousand miles away. The new crater is about three kilometers wide and 700 meters deep. The "before" data was generated from stereo photographs taken in 1979. The "after" data comes from photographs taken late in 1980.

Mons.dem

Olympus Mons is a huge volcano on the surface of Mars that is roughly twice as tall as Mt. Everest on earth! It is about 500 kilometers in diameter and rises approximately eighteen kilometers above the surrounding landscape. The original DEM file which contains the entire volcano is over four megabytes! The DEM file included here contains only the interesting caldera portion of the volcano. The technique used by the USGS to generate this kind of extra-terrestrial data creates extensive artifacting which results in raked lines in the landscape. One or two smoothing passes will remove these artifacts. The data on the vertical axis is exaggerated by four times to make the landscape more dramatic. Elevations are measured from an arbitrary reference, since there is no sea level on Mars.

Julia.dem & Mandelbrot.dem

Julia and Mandelbrot landscapes are artificially generated by a mathematical algorithm. You may have seen Julia sets and Mandelbrot sets displayed as colors on a two dimensional screen. If you have a Mandelbrot generation program that handles Julia sets, or a Julia generation program, the locations are as follows: The Mandelbrot is 1.255525 real 0.381060 imaginary, with a diameter of approximately 0.007; the location of the Julia set is 0.75 real 0.11 imaginary, relative to the Mandelbrot set.

Vantage.dem

This is a portion of the Columbia River in the state of Washington that forms the north portion of Wanapum Lake. It is located in Ginkgo State Park near Vantage, Washington.

Arrowhead.dem

This is the Lake Arrowhead region of the San Bernardino Mountains in Southern California. The low lying region forms a lake in the shape of an arrowhead, hence its name. The lake was formed by the addition of a man-made dam, which is not part of the DEM data, so it is impossible to fill the lake without flooding the landscape below.

SanLuisObispo.dem

This is the area that we see when we look out our windows. Virtual Reality Laboratories is located toward the southeast portion of the topographic map. The mountains are not of spectacular height, but they form quite a pleasing landscape.

SanGorgonio.dem

This is south of the Big Bear Lake region of the San Bernardino Mountains in Southern California. It contains Mt. San Gorgonio, a 3500 meter peak in an area known as the San Gabriel Wilderness.

BigSur.dem

This is the Big Sur area along the coast of north central California, just south of the Monterey Peninsula. It contains Pfeiffer Big Sur National Park. It is one of the more beautiful camping areas in California and contains one of the southernmost groves of redwoods.

MorroBay.dem

This is the data set for Morro Bay, one of our local tourist attractions on the central coast of California. There is a large rock that juts up into the fog called Morro Rock. It is visible as a mound in the northwest corner of the topographic map.

MtBaldy.dem

Contrary to popular belief there is no such mountain as Mt. Baldy in southern California. That is the name of the village on the slopes of Mt. San Antonio. This DEM is located in the San Gabriel mountains south of Wrightwood.

MtAdams.dem

This contains Mt. Adams, in the southern portion of Washington state. It is part of the Mt. Adams Wilderness and is a good example of a volcano, reaching from a height of over 3700 meters at its peak.

APPENDIX C

GLOSSARY OF TERMS

AI

Artificial Intelligence. The ability of a program to incorporate expert judgement enabling it to imitate intelligent decision making.

Aliasing Artifacts

Objects which appear in a landscape which are not derived from mapping data. They may reside in the data or they may be formed as a result of the program.

Caldera

The crater at the top of a volcano.

Deluxe Paint

A paint program published by Electronic Arts.

DEM

A Digital Elevation Model or DEM is a model of a landscape reduced to three dimensional digital coordinates.

Digi Paint

A paint program published by NewTek and used to display or modify IFF picture files created by Vista.

Digital Elevation Model

A Digital Elevation Model or DEM is a model of a landscape reduced to three dimensional digital coordinates. It is commonly abbreviated as DEM.

Dithering

Dithering is a program function which blurs the boundaries between polygons in order to more closely simulate realism in landscape creation.

Pixel dithering is a technique used at the pixel level to create the illusion of more colors than can actually be displayed. This is done by intermixing, or dithering, pixels of different colors.

Fat Polys

Foreground polygons which are relatively larger than the polygons in distant scenes are called Fat Polys. Fat Polys

are a function of perspective and the accuracy of the data being rendered.

Fractal

Fractional dimension. Most math deals with whole numbered dimensions. One dimension is a line. Two dimensions are a surface. Three dimensions are a solid. Four dimensions are a space-time solid and so on. Fractals deal with non-whole numbered dimensions and fractal geometry is capable of producing pictures which are remarkably similar to natural phenomena, particularly geological shapes.

Fractal Pro

A professional level fractal program published by MegageM.

HAM

Hold and Modify. A technique used to display more colors than the 4096 that the Amiga normally handles.

Haze

Haze is the atmospheric occlusion that increases with the distance between the eye and the target.

IFF

IFF is the standard graphic file format used on the Amiga.

Jaggies

Partial polygons which produce jagged lines often at the ridge line of a landscape and sometimes in the foreground. Jaggies distort the realism of a scene.

Olympus Mons

A volcano on Mars. Olympus Mons is an extremely vast feature. The base of the volcano covers an area the size of Nebraska. Olympus Mons also has a feature which is unique within the solar system. The base of the volcano is well within the thin atmosphere of Mars. The peak of the volcano is virtually above the Martian atmosphere, allowing launch to orbit by magnetic acceleration. A tramway could be constructed from the base of Mons Olympus to the top of Mons Olympus. Liquefied carbon dioxide, water, hydrogen and

oxygen (condensed from the atmosphere) could then be transported for magnetic rail launch into orbit at the top. A return from space could be accomplished with aero-braking. Therefore, Mons Olympus could become the basis for a Martian space transportation system which would not require rockets.

Polygons

The basic geometric units with which Vistapro renders landscapes. A polygon is a two dimensional shape having at least three linear sides.

Ray Tracing

A method of image generation in which a hypothetical ray of light is projected, reflecting off the target and ultimately colliding with the camera.

Topography

The science of drawing maps representing the surface features of a region.

Topology

The study of shapes.

Turbo Silver

Turbo Silver is an art program published by Impulse. It allows display and manipulation of three dimensional objects including landscapes exported by Vistapro.

USGS

United States Geological Survey. The USGS has created three dimensional maps of much of the United States, some undersea landscapes and some extra terrestrial landscapes. Much of the work done by USGS is in the public domain and can be adapted for use with Vistapro.

APPENDIX D

VISTAPRO SCRIPT LANGUAGE

The use of Vistapro can be nearly completely automated, internally through Vistapro animation scripts and externally through ARexx. Command syntax is identical for both Vistapro script commands and Vistapro ARexx commands.

VISTAPRO SCRIPTS

All Vistapro scripts must start with the line

```
Vista Script File
```

This tells Vistapro that the following ASCII text is in Vistapro script format. If this line is missing, Vistapro will complain that the file is Not a Valid Vistapro Script File! and will not attempt to run the script. After the first line, Vistapro script commands are listed, one command per line. Vistapro 3.0 accepts both Vistapro script commands and the old Vista (the original version of Vistapro) commands. The one exception to this is the original Vista script command containing Camera X, Y and Z locations and Bank, Heading and Pitch values. Vistapro and Vista script commands can be mixed within a single script. Several example scripts are included on your Vistapro disk in the Script drawer.

Note that you cannot Preview a script with the new extended commands.

VISTAPRO SCRIPT COMMANDS

Legend

<filename> Replace with a complete path name (e.g. DF1:x.dem)

<pattern> Replace with a pattern for matching. Use #? and ? for matching if you are using the ASL file requester.(e.g. #?.DEM). Use * for matching if you are using the Vistapro file requester (e.g. *.DEM)

<n> Replace with a number representing a Tree elevation (1..4).
Example when the command shows Grass<n>On, and you want to turn the Grass on at elevation 2, then you would use Grass2On.

<#arg1> Enter a numeric argument here. (e.g. 123)

Altitude2IFF <filename>

Save the current topographic region as an IFF image with the colors of the image directly related to the elevation of the landscape. See the description of the Alt->IFF menu command in the Vistapro Menus chapter of the user manual.

AnimSaveIFF

Save the images rendered while running a script as a series of numbered IFF images. The actual filename is entered as the Base Picture Name, either as another script command, or when script execution is initiated by the Execute menu item.

AnimSaveIFF24

Save the images rendered while running a script as a series of numbered IFF 24 bit images. The actual filename is entered as the Base Picture Name, either as another script command, or when script execution is initiated by the Execute menu item.
AnimSaveRGB

Save the images rendered while running a script as a series of numbered RGB images. The actual filename is entered as the Base Picture Name, either as another script command, or when script execution is initiated by the Execute menu item.

AnimSaveVANIM

Save the images rendered while running a script as parts of a single VANIM animation file. The actual filename is

entered as the Base Picture Name, either as another script command, or when script execution is initiated by the Execute menu item.

BackFaceCullingOff

Render all polygons regardless of whether or not they are visible. This slows down rendering considerably and is usually not desirable.

BackFaceCullingOn

Do not render polygons which are determined to be on the back side of hill and will be hidden by other polygons closer to the camera. This is the default mode for Vistapro.

BackgroundFile <filename>

Load a 24 bit IFF file as a background prior to rendering an image. You must be sure to turn off the Sky (and possibly the Horizon) before rendering, or the sky will overwrite the loaded image. This is used for composite rendering of images such as the moon rising behind Mt. St. Helens.

Bank <#arg1>

Sets the camera bank angle, which in turn affects the Target X, Y and Z location. If you want to turn the camera upside down, point it due east and down at an angle of 3[22;23;24m[1;3v[2"z[1 following script commands:

```
Bank -180.0
Heading 90.0
Pitch -30.0
```

BlendOff
BlendOn

Turn blending off or on. The BlendOn and BlendOff commands determine how much color blending is done between adjacent polygons.

BuildingsOff
BuildingsOn

Turn off or on rendering of buildings placed with the Place Middle Control Panel.

Cactus<n>CrownHigh
Cactus<n>CrownLow
Cactus<n>CrownMedium
Cactus<n>CrownUltra

Set the Crown density for cactus at elevation Tree <n> to High, Low, Medium or Ultra.

Cactus<n>Density <#arg1>

Sets the Density of cactus at elevation Tree <n> to <#arg1>.

Cactus<n>DetailHigh
Cactus<n>DetailLow
Cactus<n>DetailMedium
Cactus<n>DetailUltra

Set the Detail for Cactus at elevation Tree <n> to High, Low, Medium or Ultra.

Cactus<n>LeavesOff
Cactus<n>LeavesOn

Turns Leaves off or on for Cactus at elevation Tree <n>.

Cactus<n>Size <#arg1>

Sets the size of Cactus at elevation Tree <n> to <#arg1>.

CameraX <#arg1>

CameraY <#arg1>
CameraZ <#arg1>

The Camera commands set the Camera X, Y and Z locations. These commands also adjust the Bank, Heading and Pitch. The following example sets the Camera at (1234,1234) at elevation 1000:

```
CameraX 1234
CameraY 1234
CameraZ 1000
```

ClearPlace

ClearPlace clears the tables used by the Place commands. This has the effect of removing all previously placed objects.

CliffThreshold <#arg1>

The Cliff Threshold is the minimum angle of the slope of terrain to be colored with the Cliff colors. An <#arg1> value of -1 disables the drawing of cliffs.

CloudAltitude <#arg1>

The CloudAltitude is the altitude above sea level at which clouds are drawn. The location of the camera also affects cloud altitude.

CloudDensity <#arg1>

The CloudDensity command determines the amount of the landscape that will be converted to clouds. A high density results in a very overcast sky and a low density results in a few small clouds. The cloud density range is 0 - 100.

CloudHardness <#arg1>

The CloudHardness command determines how "puffy" or "fluffy" clouds appear. A low value results in more texture in the clouds and a high value results in flatter looking clouds.

CloudLoad

CloudLoad tells Vistapro to use the currently loaded landscape as the pattern for generating clouds. Typically, you would use LoadDEM or GenerateFractal to load a DEM into the topographic map, and then use CloudLoad to generate a cloud map using that landscape.

CloudOff
CloudOn

Disable or enable rendering of clouds. CloudOn and CloudOff determine whether or not clouds are rendered in the sky.

CloudRandom

CloudRandom generates a random cloud pattern.

CloudTextureOff
CloudTextureOn

Turn off or on texture in clouds.

Color2IFF <filename>

Color2IFF saves the current color table as an IFF image which is as wide in pixels as the current topographic map is in data points, and as high in lines as the current topographic map is in lines.

DefaultDirAlt2IFF <pathname>

DefaultDirAlt2IFF <pathname> sets the directory that you want Vistapro to point to when using the Alt2IFF function. It can end in ":", "/" or "". (i.e. IFF:, DH0:IFF/, or DH0:IFF)

DefaultDirBasePic <pathname>

DefaultDirBasePic <pathname> sets the directory that you want Vistapro to point to when saving animations. It can end in ":", "/" or "". (i.e. PIC:, DH0:PIC/, or DH0:PIC)

DefaultDirCol2IFF <pathname>

DefaultDirCol2IFF <pathname> sets the directory that you want Vistapro to point to when using the Col2IFF function. It can end in ":", "/" or "". (i.e. IFF:, DH0:IFF/, or DH0:IFF)

DefaultDirIff2Alt <pathname>

DefaultDirIff2Alt <pathname> sets the directory that you want Vistapro to point to when using the IFF2Alt function. It can end in ":", "/" or "". (i.e. IFF:, DH0:IFF/, or DH0:IFF)

DefaultDirIff2Col <pathname>

DefaultDirIff2Col <pathname> sets the directory that you want Vistapro to point to when using the IFF2Col function. It can end in ":", "/" or "". (i.e. IFF:, DH0:IFF/, or DH0:IFF)

DefaultDirLoadBinary <pathname>

DefaultDirLoadBinary <pathname> sets the directory that you want Vistapro to point to when using the LoadBinaryDEM function. It can end in ":", "/" or "". (i.e. DEM:, DH0:DEM/, or DH0:DEM)

DefaultDirLoadCloudMap <pathname>

DefaultDirLoadCloudMap <pathname> sets the directory that you want Vistapro to point to when using the LoadCloudMap function. It can end in ":", "/" or "". (i.e. CLOUDS:, DH0:CLOUDS/, or DH0:CLOUDS)

DefaultDirLoadCMap <pathname>

DefaultDirLoadCMap <pathname> sets the directory that you want Vistapro to point to when using the LoadCMap function. It can end in ":", "/" or "". (i.e. DEM:, DH0:DEM/, or DH0:DEM)

DefaultDirLoadDEM <pathname>

DefaultDirLoadDEM <pathname> sets the directory that you want Vistapro to point to when using the Load Vistapro DEM function. It can end in ":", "/" or "". (i.e. DEM:, DH0:DEM/, or DH0:DEM)

DefaultDirLoadIff <pathname>

DefaultDirLoadIff <pathname> sets the directory that you want Vistapro to point to when using the Load IFF function. It can end in ":", "/" or "". (i.e. IFF:, DH0:IFF/, or DH0:IFF)

DefaultDirLoadIff24 <pathname>

DefaultDirLoadIff24 <pathname> sets the directory that you want Vistapro to point to when using the Load IFF24 function. It can end in ":", "/" or "". (i.e. IFF24:, DH0:IFF24/, or DH0:IFF24)

DefaultDirLoadRegion <pathname>

DefaultDirLoadRegion <pathname> sets the directory that you want Vistapro to point to when using the Load Region function. It can end in ":", "/" or "". (i.e. DEM:, DH0:DEM/, or DH0:DEM)

DefaultDirLoadUSGSDEM <pathname>

DefaultDirLoadUSGSDEM <pathname> sets the directory that you want Vistapro to point to when using the LoadUSGSDEM function. It can end in ":", "/" or "". (i.e. USGS:, DH0:USGS/, or DH0:USGS)

DefaultDirSaveCloudMap <pathname>

DefaultDirSaveCloudMap <pathname> sets the directory that you want Vistapro to point to when using the Save Cloud Map function. It can end in ":", "/" or "". (i.e. CLOUDS:, DH0:CLOUDS/, or DH0:CLOUDS)

DefaultDirSaveCMap <pathname>

DefaultDirSaveCMap <pathname> sets the directory that you want Vistapro to point to when using the Save CMap function. It can end in ":", "/" or "". (i.e. DEM:, DH0:DEM/, or DH0:DEM)

DefaultDirSaveDEM <pathname>

DefaultDirSaveDEM <pathname> sets the directory that you want Vistapro to point to when using the Save Vistapro DEM function. It can end in ":", "/" or "". (i.e. DEM:, DH0:DEM/, or DH0:DEM)

DefaultDirSaveExtDEM <pathname>

DefaultDirSaveExtDEM <pathname> sets the directory that you want Vistapro to point to when using the Save Ext DEM function. It can end in ":", "/" or "". (i.e. DEM:, DH0:DEM/, or DH0:DEM)

DefaultDirSaveIff <pathname>

DefaultDirSaveIff <pathname> sets the directory that you want Vistapro to point to when using the Save IFF function. It can end in ":", "/" or "". (i.e. IFF:, DH0:IFF/, or DH0:IFF)

DefaultDirSaveIff24 <pathname>

DefaultDirSaveIff24 <pathname> sets the directory that you want Vistapro to point to when using the Save IFF24 function. It can end in ":", "/" or "". (i.e. IFF24:, DH0:IFF24/, or DH0:IFF24)

DefaultDirSaveRGB <pathname>

DefaultDirSaveRGB <pathname> sets the directory that you want Vistapro to point to when using the Save RGB function. It can end in ":", "/" or "". (i.e. RGB:, DH0:RGB/, or DH0:RGB)

DefaultDirSaveTurboS <pathname>

DefaultDirSaveTurboS <pathname> sets the directory that you want Vistapro to point to when using the Save TurboS

function. It can end in ":", "/" or "". (i.e. TURBOS:, DH0:TURBOS/, or DH0:TURBOS)

DefaultDirSaveVANIM <pathname>

DefaultDirSaveVANIM <pathname> sets the directory that you want Vistapro to point to when using the Save VANIM function. It can end in ":", "/" or "". (i.e. PIC:, DH0:PIC/, or DH0:PIC)

DefaultDirScript <pathname>

DefaultDirScript <pathname> sets the directory that you want Vistapro to point to when using the Script Execute function. It can end in ":", "/" or "". (i.e. SCRIPTS:, DH0:SCRIPTS/, or DH0:SCRIPTS)

Dither <#arg1>

The Dither setting determines how much the elevation colors overlap each other in the landscape. A value of 0 gives sharp transitions from Tree to Bare, and Bare to Snow. This looks very unnatural. A value of 100 causes the elevation colors to intermix somewhat, generating a more natural looking scene.

Enlarge <#arg1> <#arg2> <#arg3>

The Enlarge command takes a piece of the landscape (one fourth of the total landscape) with the lower left corner at X=<#arg1>, Y=<#arg2> and enlarges it to fill the entire landscape. If <#arg3>=0, Vistapro fills in the intermediate data points by interpolating (averaging) elevation points. If <#arg3>=1, Vistapro fills in the intermediate data points by duplicating them, resulting in "fat" data points.

ExagerationOff
ExagerationOn

Disable or enable exaggerated shading. Exaggeration lightens the light areas and darkens the shadows in a landscape.

Exec <cli command line>

Exec <cli command line> executes the AmigaDOS <cli command line> and returns to Vistapro.

FieldofView <#arg1>

The FieldofView command sets the Fld OV value in the Lens Lower Control Panel to <#arg1> (in degrees). A 9[22;23;24m[1;3v[2"z[1m view is the default, which corresponds to a focal length of 16. Changing the field of view makes a corresponding change in the focal length.

FocalLength <#arg1>

The FocalLength command sets the Fcl Ln value in the Lens Lower Control Panel to <#arg1>. The default setting is 16, which is equivalent to a 9[22;23;24m[1;3v[2"z[1m0[22;23;24m[1;3v[2"z f of view is 4[22;23;24m[1;3v[2"z[1m5[22;23;24m[1;3v[2"z. Smaller number larger numbers set a narrower field of view. This is similar to a zoom lens on a camera.

ForegroundFile <filename>

The ForegroundFile command loads a 24 bit IFF file of the same dimensions that the current display mode is set to. This image overlays the rendered image, with black portions of the foreground image being transparent.

FractalDimension <#arg1>

The FractalDimension command sets the roughness of fractal mountains for landscapes created with GenerateFractal and for the Fractalize function.

FractalDivisor1
FractalDivisor2
FractalDivisor4
FractalDivisor8

Sets the fractal divisor to 1, 2, 4 or 8.

Fractalize

The Fractalize command adds roughness to the landscape. The amount ofroughness is determined by the fractal dimension and the fractal divisor.

GenerateFractal <#arg1>

The GenerateFractal command generates the fractal landscape which corresponds to the seed value <#arg1>. The same seed value, with all other fractal settings also the same, always produces the same landscape.

Grass<n>Density <#arg1>

Sets the Density of Grass at elevation Tree <n> to <#arg1>.

Grass<n>Off
Grass<n>On

Turn rendering of Grass off or on at elevation Tree <n>.

Grass<n>Size <#arg1>

Sets the Size of Grass at elevation Tree <n> to <#arg1>.

Grass<n>Spread <#arg1>

Sets the Spread of Grass at elevation Tree <n> to <#arg1>.

GShadeOff
GShadeOn

Turn Gouraud shading off or on. The GShadeOn and GShadeOff commands determine whether or not Gouraud shading is used when the landscape is rendered.Gouraud shading is particularly effective when used with the Shading type of texture.

Haze <#arg1>

Sets the amount of haze between the target and the camera to <#arg1>.

Heading <#arg1>

The Heading command sets the camera heading angle, which in turn affects the target X, Y and Z location. To turn the camera upside down, point it due east and down at an angle of 3[22;23;24m[1;3v[2"z[1m0[22;23;24m[1;3v[2"z, use the following scri

Bank -180.0
Heading 90.0
Pitch -30.0

HorizonOff
HorizonOn

Turn rendering of the horizon off or on. HorizonOff is useful when using the Load Background function.

IFF2Altitude <filename>

IFF2Altitude loads the IFF image <filename> as an elevation map. The file have the same dimensions as the current topographic map.

IFF2Color <filename>

IFF2Color loads the IFF image <filename> into the ColorMap that Vistapro uses to decide what elevations areas of the landscape are at.

IslandModeOff
IslandModeOn

Disable or enable island mode for generating fractal landscapes. When island mode is off, the generated landscape is similar to one clipped out of a regular landscape. When

island mode is on, the generated landscape typically lies both above and below the sea level, creating islands when the sea level is set to 0.

LandscapeAuto

LandscapeAuto postpones setting the topographic map size until the header of a DEM file is read. Vistapro then sets the size of the topographic map to the size of the DEM being loaded.

LandscapeHuge

LandscapeHuge changes the topographic map size to Huge. You can still load Small and Large landscapes, but they will only fill part of the topographic map area.

LandscapeLarge

LandscapeLarge changes the topographic map size to Large. You can still load Small landscapes, but they will only fill part of the topographic map. You cannot load Huge landscapes.

LandscapeSmall

LandscapeSmall changes the topographic map size to Small. You cannot load Large or Huge landscapes.
LensForward

LensForward points the camera point at the target. This is the default mode.

LensPort

LensPort points the camera to the left of the target just

enough that images rendered with Port and Forward just match at the edges.

LensStarboard

LensStarboard points the camera to the right of the target just enough that images rendered with Forward and Starboard just match at the edges.

LightingRoughness <#arg1>

LightingRoughness sets the value in the Rough gadget in the Light Lower Control Panel to <#arg1>.

LoadBinaryDEM <filename>

LoadBinaryDEM loads the binary file <filename> as a DEM file.

LoadCMap <filename>

LoadCMap loads the file <filename> as the palette used to determine how to color polygons based on elevation.

LoadDEM <filename>

The LoadDEM command requires a path name as well as a filename, unless the file is contained in the current directory. If you are running from the Vistapro drawer and wish to load the DEM file ElCap.DEM, the following command would be used:

LoadDEM Landscapes/ElCap.DEM

LoadRegion <filename>

LoadRegion loads a DEM region using the file <filename> as the lower left hand corner DEM.

LoadUSGSDEM <filename>

LoadUSGSDEM loads a the file <filename> as a USGS ASCII DEM.

LockGrass

LockGrass turns off random generation of grass. This is useful when placing clumps of grass by hand.

LockPalette

LockPalette locks the view screen's color palette. The LockPalette and LockUnPalette commands determine whether or not Vistapro generates a new palette for each image, or uses the same palette as for the last image it rendered.

LockTrees

LockTrees turns off random generation of trees. This is useful when placing trees by hand.

LockUnPalette

LockUnPalette unlocks the view screen's palette. The LockPalette and LockUnPalette commands determine whether or not Vistapro generates a new palette for each image, or uses the same palette as for the last image it rendered.

MakeLake <#arg1> <#arg2> <#arg3>

The MakeLake command starts filling a lake at the point X=<#arg1>, Y=<#arg2> on the landscape and attempts to fill the lake to elevation Z=<#arg3>.

MakeRiver <#arg1> <#arg2>

The MakeRiver command starts water flowing at the point X=<#arg1>, Y=<#arg2> on the landscape. The river follows the terrain until it reaches sea level or the edge of the landscape.

NoASLRequester

NoASLRequester sets Vistapro to use its own file requestor rather than the standard ASL file requestor. This is effective only under AmigaDOS 2.0 or higher.

Oak<n>CrownHigh
Oak<n>CrownLow
Oak<n>CrownMedium
Oak<n>CrownUltra

Set the Crown density for Oak trees at elevation Tree <n> to High, Low, Medium or Ultra.

Oak<n>Density <#arg1>

Sets the Density of Oak trees at elevation Tree <n> to <#arg1>.

Oak<n>DetailHigh
Oak<n>DetailLow
Oak<n>DetailMedium
Oak<n>DetailUltra

Set the Detail for Oak trees at elevation Tree <n> to High, Low, Medium or Ultra.

Oak<n>LeavesOff
Oak<n>LeavesOn

Turns Leaves off or on for Oak trees at elevation Tree <n>.

Oak<n>Size <#arg1>

Sets the Size of Oak trees at elevation Tree <n> to <#arg1>.

Palm<n>CrownHigh
Palm<n>CrownLow
Palm<n>CrownMedium
Palm<n>CrownUltra

Set the Crown density for Palm trees at elevation Tree <n> to High, Low, Medium or Ultra.

Palm<n>Density <#arg1>

Sets the Density of Palm trees at elevation Tree <n> to <#arg1>.

Palm<n>DetailHigh
Palm<n>DetailLow
Palm<n>DetailMedium
Palm<n>DetailUltra

Set the Detail for Palm trees at elevation Tree <n> to High, Low, Medium or Ultra.

Palm<n>LeavesOff
Palm<n>LeavesOn

Turns Leaves off or on for Palm trees at elevation Tree <n>.

Palm<n>Size <#arg1>

Sets the Size of Palm trees at elevation Tree <n> to <#arg1>.

PatternAlt2Iff <pattern>

PatternAlt2Iff selects the pattern used in the file requestor for the Alt2IFF function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternBasePic <pattern>

PatternBasePic selects the pattern used in the file requestor when saving an animation sequence. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternCol2Iff <pattern>

PatternCol2Iff selects the pattern used in the file requestor for the Col2IFF function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternIff2Alt <pattern>

PatternIff2Alt selects the pattern used in the file requestor for the IFF2Alt function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternIff2Col <pattern>

PatternIff2Col selects the pattern used in the file requestor for the IFF2Col function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadBinary <pattern>

PatternLoadBinary selects the pattern used in the file requestor for the Load Binary DEM function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadCloudMap <pattern>

PatternLoadCloudMap selects the pattern used in the file requestor for the Load Cloud Map function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadCMap <pattern>

PatternLoadCMap selects the pattern used in the file requestor for the Load CMap function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadDEM <pattern>

PatternLoadDEM selects the pattern used in the file requestor for the Load Vistapro DEM function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadIff <pattern>

PatternLoadIff selects the pattern used in the file requestor for the Load IFF function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadIff24 <pattern>

PatternLoadIff24 selects the pattern used in the file requestor for the Load IFF24 function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadRegion <pattern>

PatternLoadRegion selects the pattern used in the file requestor for the Load Region function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternLoadUSGSDEM <pattern>

PatternLoadUSGSDEM selects the pattern used in the file requestor for the Load USGS DEM function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveCloudMap <pattern>

PatternSaveCloudMap selects the pattern used in the file requestor for the Save Cloud Map function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveCMap <pattern>

PatternSaveCMap selects the pattern used in the file requestor for the Save CMap function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveDEM <pattern>

PatternSaveDEM selects the pattern used in the file requestor for the Save Vistapro DEM function. If the ASL

requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.
PatternSaveExtDEM <pattern>

PatternSaveExtDEM selects the pattern used in the file requestor for the Save Ext DEM function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveIff <pattern>

PatternSaveIff selects the pattern used in the file requestor for the Save IFF function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveIff24 <pattern>

PatternSaveIff24 selects the pattern used in the file requestor for the Save IFF24 function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveRGB <pattern>

PatternSaveRGB selects the pattern used in the file requestor for the Save RGB function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveTurboS <pattern>

PatternSaveTurboS selects the pattern used in the file requestor for the Save TurboS function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternSaveVANIM <pattern>

PatternSaveVANIM selects the pattern used in the file requester for saving VANIM animations. If the ASL requestor is active, the pattern should be of the form #?.EXT, where

EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PatternScript <pattern>

PatternScript selects the pattern used in the file requestor for the Execute Script function. If the ASL requestor is active, the pattern should be of the form #?.EXT, where EXT is the file extension. (e.g. #?.DEM for landscapes) If the Vistapro requestor is active, the pattern should be of the form *.EXT.

PictureFile <filename>

PictureFile sets the Base Picture Name. The PictureFile command requires a path name as well as a filename, unless the files are to be created in the current directory. If you are running from the Vistapro drawer and wish to set the base picture name to MyPic, use the following command:

PictureFile Anims/MyPic

Pine<n>CrownHigh
Pine<n>CrownLow
Pine<n>CrownMedium
Pine<n>CrownUltra

Set the Crown density for Pine trees at elevation Tree <n> to High, Low, Medium or Ultra.

Pine<n>Density <#arg1>

Sets the Density of Pine trees at elevation Tree <n> to <#arg1>.

Pine<n>DetailHigh
Pine<n>DetailLow
Pine<n>DetailMedium
Pine<n>DetailUltra

Set the Detail for Pine trees at elevation Tree <n> to High, Low, Medium or Ultra.

Pine<n>LeavesOff
Pine<n>LeavesOn

Turns Leaves off or on for Pine trees at elevation Tree <n>.

Pine<n>Size <#arg1>

Sets the Size of Pine trees at elevation Tree <n> to <#arg1>.

Pitch <#arg1>

The Pitch command sets the camera's pitch angle, which in turn affects the target X, Y and Z location. To turn the camera upside down, point it due east and down at an angle of 30 degrees, use the following script commands:

```
Bank -180.0
Heading 90.0
Pitch -30.0
```

PixelDither <#arg1>

The PixelDither command determines how much dithering is used at the pixel level when rendering an image.

PlaceBuilding<n> <#arg1> <#arg2>

This places a building of elevation type House <n> at X=<#arg1>, Y=<#arg2>.

PlaceGrass<n> <#arg1> <#arg2>

Place a clump of grass of elevation type Grass <n> at X=<#arg1>, Y=<#arg2>. Make sure to Lock grass (in the Place Middle Control Panel or with the LockGrass command) so that random grass generation does[22;23;24m[1;3v[2"z[1m[3m[4vε[22;23;24m[1;

PlaceRemove <#arg1> <#arg2>

PlaceRemove removes any object placed at X=<arg1>, Y=<#arg2>.

PlaceRoad<n> <#arg1> <#arg2>

Place a road segment of elevation type <n> at X=<#arg1>, Y=<#arg2>.

PlaceTree<n> <#arg1> <#arg2>

This places a tree of elevation type Tree <n> at X=<#arg1>, Y=<#arg2>. The variety of tree is undefined, as there may be more than one variety at any given elevation. If you want a specific variety of tree, then set one variety at each elevation and place by elevation type. Elevation is arbitrary and is only used to calculate random tree types. Make sure to Lock trees (in the Place Middle Control Panel

or with the LockTrees command) prior to rendering if you are placing trees by hand into your landscape, so that random tree generation does not overwrite your work.

PolygonSize1
PolygonSize2

PolygonSize4
PolygonSize8

Sets polygon size to 1, 2, 4 or 8. The PolygonSize commands set the rendering density for polygons. The smaller the number, the more (and smaller) polygons are used in building the image.

Rem <comment>

The <comment> is ignored and treated as a comment.

Render

Render, redraw and save picture. The Render command does not take any arguments. The original Vista script command contains an implicit render. The original script line

```
1234, 1234, 1000, 70.0, 55.0, 40.0
```

is equivalent to the following extended script commands:

```
CameraX 1234
CameraY 1234
CameraZ 1000
Bank 70.0
Heading 55.0
Pitch 40.0
Render
```

RewriteImage

The RewriteImage command duplicates the last image rendered without going through the process of rendering it again. This is useful in making animations pause at a particular location, or in making "in place" animations as we did with the Lightning.script anim.

RoadsOff
RoadsOn

Turns off or on rendering of placed roads.

SaveClouds <filename>

Saves the current Cloud Map into <filename>.

SaveCMap <filename>

Saves the current ColorMap into <filename>.

SaveDEM <filename>

Saves the current topographic map into <filename> as a

Vistapro DEM file.

SaveExtDEM <filename>

Saves the current topographic map, ColorMap, Color Table, Shade Table, Cloud Map and other pertinent info into <filename> as an Extended Vistapro DEM file.

SaveTurboSilver <filename>

Saves the current topographic map into <filename> as a series of Turbo Silver 3-d objects.

SeaLevel <#arg1>

The SeaLevel command sets the sea level to elevation <#arg1>. If <#arg1> is below the current sea level, the landscape is lifted out of the sea. If <#arg1> is above the current sea level, the landscape is flooded to that level and the resulting landscape elevations are lowered.

SetAltitude <#arg1> <#arg2> <#arg3>

The SetAltitude command changes the elevation at the point X=<#arg1>, Y=<#arg2> to the value Z=<#arg3>. This command does not exist in the control panels or menus. It is a very powerful command, which allows you to actually modify the features in a landscape or even create one from ARexx or a Vistapro script.

SetColorBare<n> <#arg1> <#arg2> <#arg3>

Set color Bare <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorBark<n> <#arg1> <#arg2> <#arg3>

Set color Bark <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorBeach <#arg1> <#arg2> <#arg3>

Set color Beach to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorCliff<n> <#arg1> <#arg2> <#arg3>

Set color Cliff <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorClouds <#arg1> <#arg2> <#arg3>

Set color Clouds to the RGB values <#arg1>, <#arg2> and

<#arg3>.

SetColorContrast <#arg1> <#arg2> <#arg3>

Set Contrast to the RGB values <#arg1>, <#arg2> and <#arg3> (only Red is used)

SetColorExposure <#arg1> <#arg2> <#arg3>

Set Exposure to the RGB values <#arg1>, <#arg2> and <#arg3> (only Red is used)

SetColorHaze <#arg1> <#arg2> <#arg3>

Set color Haze to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorHorizon <#arg1> <#arg2> <#arg3>

Set color Horizon to the RGB values <#arg1>, <#arg2> and <#arg3>.
SetColorHouse<n> <#arg1> <#arg2> <#arg3>

Set color House <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorSky <#arg1> <#arg2> <#arg3>

Set color Sky to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorSkyHaze <#arg1> <#arg2> <#arg3>

Set color Sky Haze to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorSnow<n> <#arg1> <#arg2> <#arg3>

Set color Snow <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorTree<n> <#arg1> <#arg2> <#arg3>

Set color Tree <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorUnderHouse<n> <#arg1> <#arg2> <#arg3>

Set color -House <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

SetColorUnderTree<n> <#arg1> <#arg2> <#arg3>

Set color -Tree <n> to the RGB values <#arg1>, <#arg2> and

<#arg3>.

SetColorWater<n> <#arg1> <#arg2> <#arg3>

Set color Water <n> to the RGB values <#arg1>, <#arg2> and <#arg3>.

ShadowsOff
ShadowsOn

Turn shadows off or on. When you turn shadows on, objects like large rocks or pillars cast shadows based on the location of the sun. Trees never cast shadows.

ShowRenderOff
ShowRenderOn

Turns the display while rendering mode off or on. This is the same as the Show Render item in the GrModes menu.

SkyOff
SkyOn

Turns the rendering of the sky off or on. Clouds and/or

stars are rendered in the sky if the sky is selected and turned on. Clouds and stars are not rendered if the sky is off. CloudOff is used in conjunction with the Load Background command.

Smooth

The Smooth command averages the area around each data point, smoothing out fat data points and steps.

SnowLine <#arg1>

SnowLine sets the lowest elevation (approximately, see Dither) to which snow will be allowed to fall to <#arg1>.

Stretch

The Stretch command exaggerates features of the landscape, making low points lower and peaks higher.

SunAzimuth <#arg1>

The SunAzimuth command sets the direction from which the sun is shining to <#arg1> (in degrees). An azimuth of 0 degrees is due north, 90 degrees is due west, 180 degrees is due south and -90 degrees is due east.

SunDeclination <#arg1>

The SunDeclination command sets the angle at which the sun

is shining to <#arg1> (in degrees from directly overhead). An angle of 30 degrees is high in the sky, 45 degrees is halfway up the sky, 60 degrees is a morning or evening sun, and 90 degrees is sunrise or sunset.

TargetX <#arg1>
TargetY <#arg1>
TargetZ <#arg1>

The Target commands set the target X, Y and Z locations. These commands also adjust the bank, heading and pitch. The following example sets the Target to (4567,4567) at elevation 0:

```
TargetX 4567
TargetY 4567
TargetZ 0
```

TextureHigh <type>
TextureLow <type>
TextureMedium <type>

The Texture commands set the texture to <type>, where <type> is either Shading or Altitude, with the given amount of texturizing (High, Low or Medium). Shading texture modifies the shading between polygons to provide a smooth transition. This works well with Gouraud shading to provide an artistic rendering of the landscape. With Altitude texturing, polygons are further fractalized into smaller segments with an apparent increase in detail. This detail looks quite realistic, but is not "true" detail, just Vistapro trying to guess what the area between data points might look like if the data were actually available. This can produce near photographic renderings.

TextureOff

Turns texturization off.

Tree<n>CactusOff
Tree<n>CactusOn

Turn Cactus off or on at elevation Tree <n>.

Tree<n>None

Don't render trees of any type at elevation Tree <n>.

Tree<n>OakOff
Tree<n>OakOn

Turn Oak trees off or on at elevation Tree <n>.

Tree<n>PalmOff

Tree<n>PalmOn

Turn Palm trees off or on at elevation Tree <n>.

Tree<n>PineOff
Tree<n>PineOn

Turn Pine trees off or on at elevation Tree <n>.

Tree2d

Render two dimensional trees.

Tree3d

Render three dimensional trees.

TreeCactusAll

Turn on Cactus at all elevations and turn off all other tree types.

TreeCactusOff
TreeCactusOn

Turns Cactus off or on at all elevations. Does not affect any other trees.

TreeDensity <#arg1>

The TreeDensity command sets the tree density to <#arg1>. The higher the number, the more trees are rendered. This affects all trees. To set the density of individual tree types at specific elevations, use the specific command for that tree type. (e.g. Pine3Density <#arg1>)

TreeLeavesOff
TreeLeavesOn

Turn tree leaves on at all elevations for all tree types.

TreeLine <#arg1>

Treeline sets the highest elevation (approximately, see Dither) to which trees will be allowed to grow to <#arg1>.

TreeNone

Turn off all tree types at all elevations.

TreeOakAll

Turn on Oak trees at all elevations. Turn off all other tree types at all elevations.

TreeOakOff
TreeOakOn

Turn Oak trees at all elevations off or on. Other tree types are not affected.

TreePalmAll

Turn on Palm trees at all elevations. Turn off all other tree types.

TreePalmOff
TreePalmOn

Turn Palm trees at all elevations off or on. Does not affect any other tree types.

TreePineAll

Turn on Pine trees at all elevations. Turns off all other tree types.

TreePineOff
TreePineOn

Turn Pine trees at all elevations off or on. Does not affect any other tree types.

TreeSize <#arg1>

TreeSize sets the average size of rendered trees in meters. This can be used to set all of the tree sizes at the same time. Tree types at different levels can be sized independently of each other using the specific type and elevation commands. (e.g. Pine2Size <#arg1>)

TreeTextureOff
TreeTextureOn

Turns texture off or on for rendering all trees at all elevations.

UnLockGrass

Permits the random generation of Grass while rendering, provided that Grass is turned on at one or more elevation zones.

UnLockTrees

Permits the random generation of Trees while rendering, provided that Trees are turned on for one or more tree types at one or more elevation zones.

VerticalScale <#arg1>

The VerticalScale command multiplies each elevation point by the scale value<#arg1>. If the result is greater than 32767, the elevation point becomes negative, going below sea level.

VideoAGA256

Sets the video mode to 256 color using the AGA chipset. Requires an Amiga with an AGA chipset and version 39 or newer of graphics.library.

VideoDBLNTSC

Sets the monitor mode to DBLNTSC. Requires a monitor that is capable of handling this mode. Also requires an Amiga with an AGA chipset and version 39 or newer of graphics.library.

VideoDBLPAL

Sets the monitor mode to DBLPAL. Requires a monitor that is capable of handling this mode. Also requires an Amiga with an AGA chipset and version 39 or newer of graphics.library.

VideoDCTV

Sets the video mode to DCTV 4 bit plane mode. Requires the presence of dctv.library in the LIBS: drawer to operate. Also requires a DCTV video display device for display.

VideoDCTV3

Sets the video mode to DCTV 3 bit plane mode. Requires the presence of dctv.library in the LIBS: drawer to operate. Also requires a DCTV video display device for display.

VideoDCTV4

Sets the video mode to DCTV 4 bit plane mode. Requires the presence of dctv.library in the LIBS: drawer to operate. Also requires a DCTV video display device for display.

VideoDisplaySize <#arg1> <#arg2>

Sets the size of the current display to Width=<#arg1> and Height=<#arg2>. The maximum display size varies, depending on the monitor mode currently active. In no case will the display size be allowed to be greater than the maximum allowed for that monitor. This does not affect the image size or mode.

VideoEHB

Sets the video mode to ExtraHalfBrite. The image and display sizes are not affected.

VideoEuro36

Sets the monitor mode to Euro36. Requires a monitor that is capable of handling this mode. Also requires an Amiga with an AGA chipset and version 39 or newer of graphics.library.

VideoEuro72

Sets the monitor mode to Euro72. Requires a monitor that is capable of handling this mode. Also requires an Amiga with an AGA chipset and version 39 or newer of graphics.library.

VideoFirecrackerOff

Turns off the Firecracker24 display board. Requires a Firecracker24 board to operate.

VideoFirecrackerOn1

Turns on the Firecracker24 display board to single monitor mode. Requires a Firecracker24 board to operate.

VideoFirecrackerOn2

Turns on the Firecracker24 display board to dual monitor mode. Requires a Firecracker24 board and a second monitor to operate.

VideoHAM

Sets the video mode to HAM. Requires that HiRes be not set unless you have the AGA chipset and version 39 or newer of graphics.library.

VideoHAM8

Sets the video mode to HAM8. Requires an Amiga with an AGA chipset and version 39 or newer of graphics.library. Does not affect the image size or the display size.

VideoHamE

Sets the video mode to HAM-E. Requires that the Hame.library be present in the LIBS: drawer for rendering, and that the HAM-E display device be present for display.

VideoHiRes

Sets the video mode to HiRes. Requires the presence of the AGA chipset and version 39 or newer of graphics.library if HAM mode is also set. Does not affect the image or display

size.

VideoImageSize <#arg1> <#arg2>

Sets the size of the current image to Width=<#arg1> and Height=<#arg2>. The maximum image size is 4096x4096 or the maximum that available memory will allow. This does not affect the display size or mode.

VideoInterlaceOff
VideoInterlaceOn

Turns the Interlace video mode off or on. This does not affect the image or display size.

VideoLoRes

Sets the video mode to LoRes. This does not affect the image or display size.

VideoMultiscan

Sets the monitor mode to VGA. Requires a monitor that is capable of handling this mode. Also requires an Amiga with an AGA chipset and version 39 or newer of graphics.library.

VideoNTSC

Sets the monitor mode to NTSC. Requires a monitor that is capable of handling this mode.

VideoOverscan <#arg1> <#arg2>

This is the same as VideoDisplaySize and is present for compatibility with earlier scripts.

VideoPAL

Sets the monitor mode to PAL. Requires a monitor that is capable of handling this mode.

VideoProductivity

Sets the video mode to Productivity. Requires an Amiga with an AGA chipset and version 39 or newer of graphics.library. Requires a monitor that can handle Productivity mode.

VideoSuper72

Sets the monitor mode to Super72. Requires a monitor that is capable of handling this mode. Also requires an Amiga with an AGA chipset and version 39 or newer of graphics.library.

VideoSuperHires

Sets the video mode to SuperHiRes. Requires an Amiga with an AGA chipset and version 39 or newer of graphics.library. Requires a monitor that can handle SuperHiRes mode. This does not affect the image or display sizes.

View2Altitude

View2Altitude converts the current contents of the view screen to an altitude map and places it in the topographic map.

View2Color

View2Color converts the current contents of the view screen to the ColorMap to be used for further rendering.

View2RGB

View2RGB converts the current contents of the view screen to the 24 bit RGB frame buffer used by Vistapro.

APPENDIX E

VISTAPRO TUTORIALS

To use the following tutorials, Vistapro must be installed on your hard drive or on floppies. If you have not already done so, please refer to the installation instructions in your Vistapro User's Manual.

These tutorials have been written with the idea that you will start at the beginning and work your way to the end. Descriptions are more extensive at the beginning and become less involved as the tutorials progress. The idea is that, through using Vistapro, you will become increasingly familiar with the program. If you skip sections and find something to be unclear, you will likely find clarification in an earlier section.

TUTORIAL 1: THE BASICS

Running Vistapro

In order to run Vistapro, start at the WorkBench. Open the Vistapro drawer and start Vistapro by double clicking on the Vistapro icon. Vistapro is ready for you to start using it when you see a screen with gray control panels on the right and an empty green topographical map on the left.

A Quick Introduction

When Vistapro is first loaded, it starts with a flat landscape. Although i[22;23;24m[1;3v[2"z[1m[3m[4v⌈[22;23;24m[1;3v[2"zs quick look at it. Locate the Render button at the lower left corner of the Bottom control Panel. Move the mouse pointer to the Render button. Press and release the left mouse button to activate the Render button.

You should now see a sequence of status messages on the screen in the blue area immediately above the topographic map. Exactly what these messages mean is described in the Vistapro User's Manual. For now, simply note that Vistapro needs to make some calculations before drawing the landscape. After a few seconds, you should see the screen switch to the View screen. At first you will see a black screen and then Vistapro will begin to draw the rendered image in "venetian blind" style. If you look closely, you will see a small pyramid off in the distance. At Vistapro's current settings (assuming that you haven't changed anything), the pyramid will be barely discernable.

It's not much to look at, but you just rendered your first Vistapro image. To switch back to the control panels and topographic map, click on the left mouse button. Now let's go on to something more interesting.

Loading a DEM Landscape

To load a landscape, position the mouse pointer over the Load menu at the top of the screen. Press and hold down the right mouse button. The Load menu will drop down to reveal several options. Move the mouse pointer (while still holding the right button down) to the first option, Load VistaPro DEM, and release the mouse button.

You should now see the Load DEM file requestor. The file requestor is used whenever a file is to be loaded or saved.

The OK button is the file requestor's confirm button. Clicking on the OK button or double clicking on a file name tells Vistapro to go ahead and load the selected file.

The Cancel button is used to exit the file requestor without taking any action. Clicking on it with the mouse tells Vistapro not to load any file (or save one if the file requestor was invoked by a save menu option).

The terms text gadget and numerical gadget are used throughout this tutorial. A text gadget is a field that accepts text entered using the keyboard and a numerical gadget accepts numbers entered with the keyboard. To begin entering information in a text or numerical gadget, click on it with the left mouse button. To abort entry, click on the Cancel button.

At the center of the file requestor, you will see the

filename window. It should be displaying a list of DEMs and directories (the names with Drawer in the right column), Vistapro and Vistapro.info files. If there are more files than will fit in the window, you can use the drag gadget to the right of the filename window to scroll up and down the list.

You should be looking at a list of files whose names end with .DEM. Find the file Tutorial.DEM and double click on it. You could have typed the file name directly into the filename text gadget, but for small lists it is much faster to click on the name with the mouse.

The screen will now switch back to the topographic map and control panels, and Vistapro will begin loading the landscape. This could take several seconds.

Once Vistapro is finished loading the landscape, you see a topographic view of the landscape in the rectangular area at the left of the screen.

The topographic map is colored by elevation. Dark greens represent the lowest elevations, browns represent the middle elevations and gray-whites the highest. Move the mouse

pointer over the landscape. Notice that the X, Y and Z values in the Status Window (located below the topographic map) change as the mouse moves. The X and Y values represent the location of the pointer on the map and the Z value represents the elevation of the terrain directly under the pointer.

Setting Camera and Target

When you rendered the flat landscape at the beginning of this tutorial, you used the default camera and target positions. Let's take a look at how to move your viewpoint.

Look at the very top of the topographic map. You will see a small black square. This is your camera position on the landscape. At the very bottom of the map is a small black cross (+). This is your target position (the point at which the camera is aimed).

Look at the X, Y and Z gadgets located below the Camera button on the Upper Control Panel. The values in these gadgets represent the location of the camera on the landscape.

To move the camera position, click on the Camera button. Move the mouse pointer over the topographic map to a position where you might like to stand if you were taking a photograph of the landscape. When you have found this point, click once with the left mouse button to set the camera location. Notice that the black square is now at the location that you selected.

If you would like to be above the surface, as if on a tall ladder, click on the numerical gadget below the Camera button and to the right of the Z button. Enter the altitude (the height of the camera on the ladder). This raises you off the surface of the landscape but leaves you at the same location. Now you need to tell Vistapro which direction to point the camera when it takes a picture. Do this by clicking on the Target button with the left mouse button, positioning the mouse at the point at which you want to aim the camera, then clicking the left mouse button again. You can change the vertical position of the target in the same way you did for the camera position.

Let's pick a point to look at. If you have been following this tutorial from the beginning, the landscape Tutorial.DEM should already be loaded and displayed in the topographic map area.

This landscape has five distinct features. Two at the top, one in the center and two at the bottom. Most landscapes do not look like this. This landscape was made especially for this tutorial.

Click on the Camera button. Now click on the blue square in the center of the landscape. Your camera X, Y and Z positions are set. Look at Z value under the Camera button. Notice that it is 30. When setting a camera position, Vistapro sets the Z value to thirty meters above the landscape. In this case, the landscape under the camera is at 0 meters above sea level. Let's lift the camera a bit higher. Click on the Z numerical gadget under the Camera button and enter the number 5 from your keyboard. The Z position of the camera should now be 530.

To set the target, click on the Target button and then click on the oddly shaped object at the top left corner of the topographic map.

Viewing Your Camera Position

Immediately below the label Poly on the Main Lower Control Panel, you will find four buttons which are labelled 1, 2, 4 and 8. These buttons are used to determine the size of the polygons which Vistapro uses to draw the landscape. Only one of these buttons can be selected at a time. If you simply wish to get an idea of your camera position, click on the 8 button. This causes Vistapro to use large polygons and fewer of them. The larger the Poly setting, the less detail the resulting image has. The advantage of rendering an image with less detail is that it takes less time to render.

Another way to decrease rendering time is to click on the LockP button located on the Middle Control Panel. This prevents Vistapro from calculating a new color palette (which can be time consuming). Before rendering your final image, you will want to unlock the color palette (click on LockP again) so that Vistapro will calculate the best colors to use for the image.

Let's take a quick look at the landscape. Click on the 8 button. Click on the LockP button just to speed things up. Now click on the Render button and wait while Vistapro renders the landscape.

As you can see, the landscape looks very blocky, but gives you an idea of your camera position. Return to the topographic map and the control panels by clicking on the left mouse button. At this point, you can change your camera and target positions as described above and re-render until you have a camera position that you like. Once you are satisfied with the camera position, select a smaller Poly setting and click on the Render button.

Try rendering using each of the Poly settings. You will notice that a Poly setting of 1 can take a bit of time to render. This is why it's a good idea to use the larger and

faster settings to fine tune your camera position.

To abort a rendering in progress, simply click on the Abort button with the left mouse button.

Adjusting the Camera Lens

Your imaginary camera also has an imaginary lens. In order to zoom it in or out, click on the Lens button on the Lower Control Panel. The Lower Control Panel changes to become the Lens Lower Control Panel. There are two buttons on the right side of this panel labelled Wide and Zoom.

The Wide button is the default selection and has a "focal length" similar to a wide angle lens on a real camera.

Click on the Zoom button. Now click on the Main button to get the Main Lower Control Panel back. Click on the Render button. The object (mound) that the camera is aimed at should now be larger.

Click the left mouse button to return to the control panels. Click on the Lens button again. At the right side of the Lens Control Panel is a numeric gadget labelled Fcl Ln for focal length.

Making a Smoother Image

When rendering a landscape, even at Poly size 1, you will often see small triangles in the portions of the image close to the camera. This is because the USGS data used to make the Vistapro DEM files is made up of elevation points that are about thirty meters apart. When that distance is more than one pixel wide, that part of the landscape is rendered as a triangular block. There are several methods of hiding these blocks when rendering.

Blend

Blending smooths the changes in color from polygon to polygon, causing the small polygons to be less apparent, especially in the distance. To use blending, click on the Blend button on the Main Lower Control Panel before rendering an image. The button will remain pushed in until you click it again to disable it.

Gouraud Shading

Gouraud shading smooths the boundary between polygons, making it a lot less apparent that they are even there. It also eliminates sharp transitions from one color to another, giving images more of the quality of an artist's rendition. Enable Gouraud shading by pressing the GShade button on the Main Lower Control Panel before rendering an image. The button will remain pushed in until you click it again to disable it.

Dither

There are two methods of dithering available in Vistapro.

The first blends the elevation colors, reducing the sharpness of the snow and tree lines. This is controlled by clicking on the numerical gadget labelled Dither on the Main Lower Control Panel and entering a new value. Large values result in more dithering, small values result in less.

The second dithering method is pixel dithering, which mixes slightly different colored pixels to simulate more colors than the screen can actually display. Pixel dithering is control by clicking on the numerical gadget labelled PixDth on the Main Lower Control Panel and entering a new value. Large values result in more dithering, small values result in less. It is possible to add so much dithering as to make the resulting image entirely unrecognizable.

Experiment

Spend some time experimenting with the Vistapro functions we have discussed. Try changing the camera and target locations and rendering at different Poly settings with different blending functions. After you have a good feel for the operation of the program, go on to the next tutorial.

TUTORIAL 2: MAKING A PRETTIER PICTURE

Before you start this tutorial, you should have Vistapro running and the DEM file Tutorial.DEM loaded. If you do not, refer to Tutorial 1.

Loading an IFF Image

Before we further explore Vistapro's features, let's take a look at a saved IFF image of the Tutorial.DEM landscape.

Select the Load IFF option from the Load menu (at the top of the screen). You should now see a file requestor. If you are unfamiliar with the file requestor, refer to the Loading a DEM Landscape section of Tutorial 1.

Find the file Tutorial.IFF. Double click with the left mouse button on this filename. Vistapro will load and display the IFF image. The image that you are now looking at was created using the Tutorial.DEM landscape and several of Vistapro's options. Through the use of Vistapro's functions, this relatively dull landscape has been prettied up a bit.

Let's examine some of the functions which were used to give this image its look. To get back to the topographic map and

control panels, click the left mouse button.

Adding Texture

Artificial detail can be added to a landscape using the Textur buttons. They are located on the Main Lower Control Panel beneath the Textur label. There are four buttons, only one of which can be active at a time. The buttons are labelled O, L, M and H (Off, Low, Medium and High). When you press the L, M or H button, Vistapro asks you if you wish to use one of two texturing methods, Shading or Altitude. Shading texture breaks the polygons in the image into smaller polygons and shades each of them separately, resulting in smoother transitions of shade and color and reducing the visibility of larger polygons. This works well with Gouraud shading to eliminate the computer generate look and give a more artistic appearance. Altitude texture fractalizes each polygon into smaller polygons to add texture. This results in more realistic images.

The higher the Textur setting, the more Vistapro breaks up the displayed polygons into smaller pieces. Try rendering images using each of the Textur settings.

Setting the Timber Line

Locate the TreeLn button on the Middle Control Panel. Immediately below it is a numerical gadget. The number in this gadget represents the timber line, which is the elevation above which there are no trees. As in nature, the timber line is a fuzzy value. Some trees will appear above the timber line and some bare areas will appear below it.

An elevation can be entered into the numerical gadget, or you can use the TreeLn button to set the timber line by clicking on the TreeLn button and then clicking on the topographic map at a point which has the desired elevation.

If none of the tree types (Oak, Pine, Palm or Cactus) are selected in the Tree Control Panel, Vistapro does not actually draw trees. Instead, it uses the Tree colors to color the ground. Refer to the Vistapro User's Manual for more information about trees.

Try rendering the current landscape with different values for the timber line.

Drawing Trees

With the Tree functions, you can specify whether or not Vistapro draws trees on the landscape. Trees can be drawn on the landscape anywhere Tree colors are used (see Timber Line above).

Trees are time consuming to draw and may take from two to twenty times as long to render as the same scene without any trees.

To draw trees and specify the types of trees to be drawn, click on the Tree button on the Middle Control Panel. A full screen control panel will appear which contains options for controlling the use of trees.

Setting Tree Density

Click on the Tree button to bring up the Tree Control Panel. Click on the button which is labelled All and which is located above the column of buttons which are all labelled Palm. Palm trees will now be drawn in all four of the Tree colored elevation zones.

Click on the numeric gadget labelled Size, located immediately to the right of the All button that you just depressed, and enter 50 from your keyboard. This set the height of the trees to fifty meters. Now click on the next numeric to the right, labelled Density, and enter a number between 0 and 256.

Click on the Leaves button in the Palm subpanel to have Vistapro draw leaves on the trees. Click on the Txture button in the upper right corner of the panel. Finally, click on the OK button to accept your settings and close the Tree Control Panel.

Setting the Snow Level

The snow level is the lowest elevation at which Vistapro covers the landscape with snow. As with the timber line, this is a fuzzy value.

The snow level can be entered directly into the numerical gadget beneath the SnowLn button, or you can click on the SnowLn button and then click on the topographic map at a point which has the desired elevation.

Adding a Lake

To add a lake to your landscape, first select a location for the lake. It needs to be an area of the landscape which is surrounded by terrain of higher elevation. Move the mouse around until you find the lowest point in the surrounding terrain. Click on the Lake button on the Middle Control Panel and then click on the landscape at an elevation slightly lower than that of the lowest point of the surrounding terrain. If you select a higher point, the lake would spill over into other areas of the landscape where you might not want it to be. If you don't like the lake as Vistapro has filled it, select the No button on the Accept

Lake requestor which appears after the lake has been filled.

Adding a River

The River button is used to create rivers that flow downhill from the selected starting point, following the terrain. Rivers continue to flow downhill until they reach the ocean, the edge of the topographic map or until they run into another river. Placing a river on top of an existing river widens the existing river.

To select a river location, click on the River button on the Middle Control Panel and then click on the landscape at the point at which you wish the river to start. As with lakes, if you don't like the generated river, select the No button on the Accept River requestor which appears after the river has been generated.

Changing the Haze Level

The haze level refers to the amount of haze that appears between the camera, target and the horizon. With a haze level of 0, the horizon is crystal clear, but you lose a little of the three dimensional depth of the image. To set or change the haze level, click on the HazeDn (haze density) button on the Middle Control Panel. Vistapro generates a haze density value based on the distance between the camera and the target. You can also enter a value directly in the numerical gadget immediately below the HazeDn button.

Setting the Light Direction

To change the direction of the light source, click on the Light button on the Lower Control Panel. A series of concentric circles will be drawn on the topographic map. Each circle represents the angular altitude of the light source in degrees. Notice a line radiating out from the center. This line represents the direction of the light source.

You should also see a new panel in the place of the Lower Control Panel. On the left side of the Light Lower Control Panel are buttons labelled N, E, S and W for setting the most simple light directions. They set the light source direction to north, east, south or west at 45 degrees above the horizon.

If you want the light to come from one of these directions,

click on the button which represents the appropriate direction. However, if you want the light to come from another direction, click on the Custom button. Move the mouse pointer over the topographic map. Notice that the end point of the light source direction/altitude line follows the mouse pointer as you move it over the map. When you have

the line at the desired direction and altitude, click the left mouse button. You can also enter values directly into the Azimth (direction) and Declin (altitude above the horizon) numeric gadgets.

Shadows and Exaggeration

The other two buttons on the Light Lower Control Panel are labelled Shadow and Exager.

When the Shadow button is selected, Vistapro takes the light source direction into account and creates shadows on the landscape.

The Exager button exaggerates the shading of the landscape. When it is selected, the rate at which shadowed areas are darkened is increased.

Changing Colors

Vistapro allows you to change its color map. This allows you to fine tune your image to get that perfect look of realism. It also allows you to tamper with nature. Imagine flaming red snow or pink lakes and rivers. By altering the color map, you can drastically change the look of a landscape. Before changing colors, make sure that the LockP button is not selected. If the button appears to be depressed, click on it to raise it.

To change the colors, click on the CMap button in the Middle Control Panel. This activates and displays the Color Control Panel. It has two columns of buttons on its right side labelled with the names of landscape features. To the left are R(ed), G(reen) and B(lue) slider bars and H(ue), S(aturation) and V(alue) slider bars. To change the color of a landscape feature, click on the appropriately labelled button and use the slider bars to change its color.

To accept the new colors and exit the Color Control Panel, click on the OK button. If you don't wish to keep any of your changes, click on the Quit button.

At this point, you might wish to read over the Color Control Panel section of the Vistapro User's Manual. After you have done so, experiment with different colors until you find a set that you would like to save.

Saving a Color Map

The Vistapro color map can be saved using the Save CMap option in the Save menu. When you select this menu item, a file requestor is displayed with a list of CMap files in the filename window.

Click in the File text gadget and enter the file name TESTCMAP.DEM. This is the name that the current color map will be saved under. Click on the OK button and Vistapro will save your color map.

Loading a Color Map

Let's load a different color map. Select the Load CMap item from the Load menu. A file requestor should appear. Click on the file TUTCMAP.DEM and click on the OK button.

Set the camera and target positions and render an image. As you can see, the landscape looks quite different.

Select Load CMap again and load the file that you previously saved as TESTCMAP.DEM.

Saving a Rendered Image

Now that you know how to create beautiful and bizarre images, the next step is saving your masterpiece for viewing at a later date.

Using the techniques covered in earlier sections, render an image that you would like to save. Select Save IFF from the Save menu. In the resulting file requestor, click on the File text gadget and enter MYPIC.IFF. Now click on the OK button. Your picture will now be saved and can be viewed using the Load IFF menu item or by using any any Amiga paint or viewer program.

Creating a DEM from an IFF File

Select IFF->Alt from the ImpExp menu. Load the file TUTORIAL_ALT.IFF from the IFF directory. VistaPro will perform some calculations and convert the IFF picture into a

DEM landscape. Since this IFF picture only has 32 colors in it, there are only 32 possible elevations for this DEM. This means that the differences in the colors are discrete and so are the elevations. After converting an IFF to a landscape, the landscape looks like a stack of pancakes offset from one another. To alleviate this unnatural appearance, use the Smooth button on the Middle Control Panel to eliminate the stair-steps (you may have to do this a few times to make the landscape more realistic).

You might have noticed that the IFF image that you loaded was far too symmetrical to be real. In fact, this picture was rendered with MathVision and altered with DeluxePaint III. This was used to show that the IFF->Alt function can use any valid IFF file, not limited to topographic maps.

Modifying the Landscape

Let's add a park to our newly converted landscape. In the middle of the landscape, there is a slight depression next to a flat area. Click on the Lake button, then click anywhere within the depression where the Z value in the status window reads around 50. VistaPro will fill in the depression with a lake and ask you if you wish to accept it. If you don't like the lake (perhaps it overflowed for example), select No on the Accept Lake? requestor.

After accepting a suitable lake, we'll need to add some man made features to the park. Click on the Place button to replace the Middle Control Panel with the Place Control Panel. Click on the Zoom button on the the Place Control Panel. Drag the mouse over the topographic map. A magnify box follows the mouse. Click the left mouse button in the center of the map and Vistapro will zoom into that portion of the map. Select the Road1 button on the Place Control Panel and click the left mouse button at the point where you want the road to start. Move the mouse and click the left button again to select the road's end point. VistaPro will now draws a line on the topographic map for your new road. If you would like a park surrounded by roads, draw in other roads to make a bounding polygon.

How about some buildings adjacent to your park? Select from the various Bldg buttons to tell Vistapro that you wish to place some buildings. Place buildings on the landscape by clicking the left mouse button; each click places one building where the mouse cursor is. Add some trees in the middle of the polygon using the same technique with the Tree

buttons. If you would like the trees that you have "planted" to be the only trees drawn on the landscape, select the Lock button located directly above the column of Tree buttons. This locks the current trees and keeps VistaPro from randomly placing trees across your landscape.

When you are finished, click on the OK button on the Place Control Panel to accept the place objects and return to the Main Middle Control Panel.

Click on the Roads and Bldgs buttons on the Main Middle Control Panel to depress them and enable the rendering of the roads and buildings that you just placed.

Open the Tree Control Panel by clicking on the Tree button and select tree types for the various Tree elevation zones.

To compare a rendered image to the same view in the tutorial image, select User Configuration from the IQuality menu. If you have already altered the IQuality user script, set VistaPro to:

	Target	Camera
X	3962	4080
Y	3808	2460
Z	611	6035

Polygons: 1

Graphics Mode (in the Graphics Control Panel, accessed by selecting Graphics Panel from the GrModes menu): LoRes, EHB, Interlace, 384x484.

These are the settings used to render the image TUTORIAL_2.IFF in the IFF drawer.

Note that the buildings and roads do not have any detail and are for aesthetic value only.