

URBAN SIMULATION &

Visual Technologies

Policies and Procedures

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3D Studio MAX

AutoCAD Import / Export

1. Typical DWG Import settings are as shown in Fig. 1

Objects by Layer derives object names from ACAD Layer names and therefore offers continuity between ACAD and Max project files.

Convert to single objects is checked. This produces one object for each layer name.

Weld is unchecked. Vertices that are welded while importing often cause face normals to be flipped non-uniformly.

Auto-smooth is checked. Set smooth angle to 30.0

Surface deviation Curved objects should be imported with settings that maintain an appropriate curvature as described below.

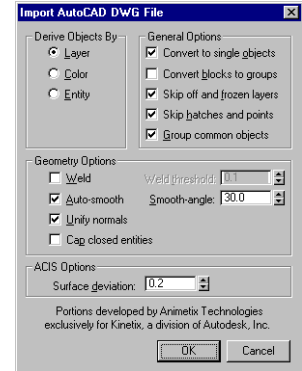


Figure 1

2. Typical DXF Import settings are as shown in Fig. 2

Fill Polylines will create faces on closed polylines.

3. When using irregular shapes where curves are critical, they should be imported as regions rather than closed splines. Importing splines offers no control on surface deviation. Surface deviation does effect regions and solids.

Surface Deviation Guidelines

- | | |
|-----------|---|
| 1.0 | Default (lower values produce more faces and therefore smoother curves) |
| 1.0 | Box objects |
| 1.0 - 0.5 | Columns or poles (smoothing will hide faceted sides) |
| 0.5 - 0.2 | Curved planes (sidewalks, curbs, and arches) |

4. Splines may be imported as construction objects or as surfaces where curves are not critical. Splines have no faces and import more quickly than regions or solids. MAX will create faces on a closed spline when mapping is applied.
5. When preparing a large AutoCAD project for transfer to MAX, use “Wblock” to save partial DWG files. This simplifies the processing tasks, minimizes conversion time and can avoid potential errors.
6. Use “Wblock” to create separate DWG files for curved or complex objects. These complex objects should be on their own layers. Example: BL_COLUMNS, PK_CURBS.
7. When blocks have been used for objects such as columns they should be exploded before importing them to MAX. This will produce one object in MAX per the layer name. If they are not exploded, each block will create a separate object with an identical name. From AutoCAD, “Wblock” all block objects. Open the new file, explode the blocks, then import that file to MAX.

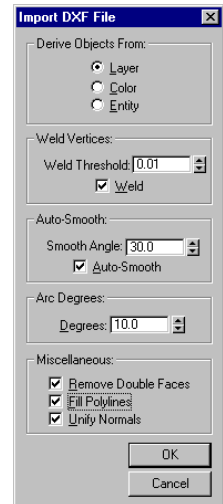


Figure 2

Material Management

Maps = bitmap files (JPG or TGA)

Material = consist of maps and settings assigned in the Material Editor.

MAPS

On the Server there are two locations for maps.

```

\\VISUAL_SERV\Common\Maps\
\\VISUAL_SERV\Projects\ProjectName\Maps\
    
```

Use the Common\Maps\ directory for common bitmaps such as grass or pavement. Do not add project specific maps such as custom floors or wall coverings to this directory. When a new project is developed, copy the useable bitmaps from the Common\Maps\ directory on the server to a new Projects\ProjectName\Maps\ directory. Rename the copied maps with a prefix that is descriptive of the project. New or edited maps will be progressively created as required. Save new bitmaps that are **unique to the project** in the Projects\ProjectName\Maps\ directory. If a newly created map could be **used on any project**, save a copy of the map to the Common\Maps\ directory.

MATERIAL LIBRARIES

Material libraries are maintained in a similar way. A Common material library is kept in the Common\Maps\ directory on the Server. This library includes basic materials and complex materials such as Reflective Glass, Water, 2d Trees, and Grass.

A Material library for projects will be saved in the Projects\ProjectName\Maps\ directory on the Server. Generate the project library using the “Browse from Scene” and “Save As” option in the Material Editor. This will be done at progressive intervals during the course of production in order to save a history of materials. There is no need to maintain a current project material library since it is automatically saved in the MAX file.

MATERIAL SETTINGS

1. Alpha map settings:

Diffuse	Bitmap	Filtering	=	Pyramidal
		Mono channel	=	RGB Intensity
		Alpha source	=	None Opaque
Opacity	Mask ... None			
	Mask ... Bitmap	Filtering	=	Pyramidal
		Mono channel	=	Alpha
		Alpha source	=	Image Alpha

2. Reflective Glass settings:

Use a Standard Material
 Diffuse color — R:75, G:110, B:95
 Reflection 30% — Flat Mirror (Fig. 3)

3. Use the 2 sided option only when necessary. When rendering keep Force 2-Sided turned OFF. 2-Sided materials take longer to render.



Figure 3

Modeling

1. When preparing a spline to be used as a loft object or loft path, set the loft parameters to Shape Steps = 0, Path Steps = 0. This reduces the number of faces on straight segments and offers control of smoothness on curved segments. Before lofting, vertices may be added to spline segments to create smooth curves.
2. For objects with high polygon counts, use the Optimize modifier with Bias set at 0. Preserve: Material Boundaries and Smooth Boundaries should be ON.
3. Collapse the modifier stack for objects that are finalized. Collapse all object modifiers before rendering. Save a backup version before collapsing.

Scene Environment

1. The preferred drawing scale for AutoCAD and MAX is 1 Unit = 1 Inch. AutoCAD models are created in full scale and may use dimensions as low as 0.1". If MAX units equaled 1 foot, then 0.1" in AutoCAD would equal .0083 units in MAX. This would compromise model accuracy and require a lower tolerance than MAX is suited for. For example, if faces are layered 0.2" apart this would become .016 units. Faces this close together may appear coincident, producing undesirable effects.
2. Use a dome object for the sky. The size should be large enough to produce a level horizon line in any camera view. If the dome is too small the horizon could appear as an arc.
3. The sky tube object is to be self illuminated at 80% and excluded from all lights.

Lighting

1. Ambient light should be set to zero.
2. Use 6 omni lights arranged in a “jack” formation to provide ambient diffuse lighting. Intensity values for these lights should be $V = 125$, Multiplier = 1.0. All objects are to be included in the omni lights Except the Sky Tube object. These lights are saved in a file called “Omni Light Jack.MAX”. Scale the jack formation so that it lies just outside of the sky tube.
3. On Exterior scenes, use a Directional light to simulate the sun casting shadows. Set the falloff cone to encompass all objects in the scene that are to be casting shadows and turn Overshoot ON. This will illuminate the entire scene while casting shadows only within the falloff cone.
4. Directional light intensity values are $V = 255$, Multiplier = 1.0. Changing the multiplier value has a dramatic effect on intensity. Leave this at the default setting of 1.0 whenever possible. Other settings are as shown in Fig. 4.

Cast Shadows is ON.

Use global settings is OFF.

Use shadow maps is ON.

Map Bias varies based on scale of environment. Start with 6.0 if 1 unit = 1 inch. Start with 0.1 if 1 unit = 1 foot.

Size can range from 2000 to 6000. Higher values produce sharper shadows and increase rendering time. A light that is distant from objects in the scene requires a higher value to produce defined shadows. Set the light close to the objects to produce sharp shadows while keeping the size value to a minimum.

Sample Range set to 2.0. Default is 4.0. Higher values sharpen shadows and increase rendering time. Increase this setting if shadow edges appear jagged.

Absolute Map Bias should be turned OFF for still rendering and turned ON for animations. Shadows can flicker if it is turned OFF for an animation. (ref p.20-29)



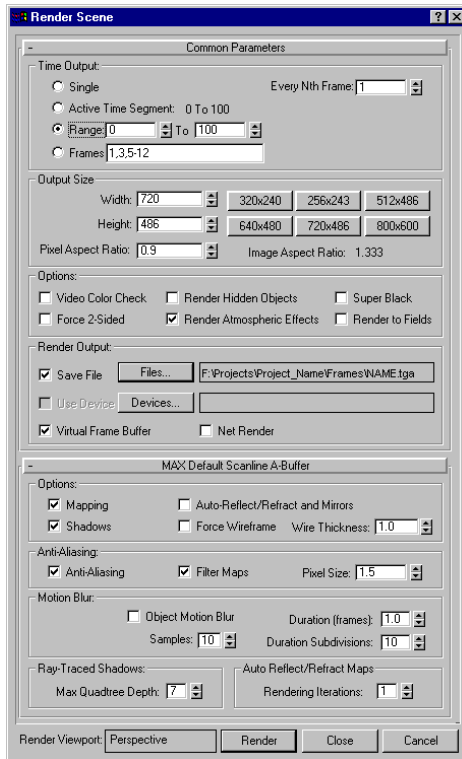
Figure 4

Rendering

1. Typical output settings.

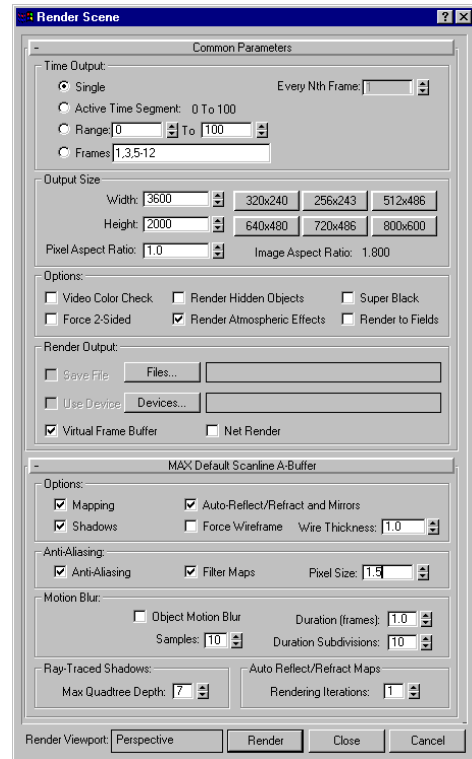
<u>Format</u>	<u>Resolution</u>	<u>Aspect Ratio</u>	<u>Pixel Size</u>	<u>Frames/Sec</u>
Still Shot TGA's	3600 x 2000	1.0	1.1	N/A
AVI's	640 x 480	1.0	1.1	15
TGA's for VHS	720 x 486	0.9	1.1	30
RLA's	720 x 486	0.9	1.1	30

Force 2-Sided should be turned OFF to reduce render time.



Typical Animation Render Settings

Figure 5



Typical Print Render Settings

Figure 6

2. Render all animation frames as 720 x 486. This is preferred for frames being transferred to VHS format. A resolution of 720 x 486 is also suitable when converting frames to 640 x 480 AVI's or QuickTime's.
3. For RLA file output, turn on the Z-depth and Object channels. This allows for video post editing. MAX Objects must be numbered before frames are rendered in order to save the objects channel. Number each object separately in its G-Buffer setting in the Properties dialog box.
4. Frame rate should be determined based upon the desired length of the animation and the smoothness required during playback. Also consider also how much time is allotted for rendering.

5. Don't waste time when doing test renders.
 - a. Use a shaded viewport
 - b. Render using Region, Blowup or Object
 - c. Render at lower resolutions
 - d. Turn shadow casting OFF when not evaluating shadows
 - e. Turn reflection mapping OFF when not evaluating reflections

6. When rendering an animation, take time to verify ALL settings. It's better to sacrifice minutes or hours in the beginning than to process the frames a second time.
 - a. When rendering to segments on multiple machines, copy the latest MAX file to each workstation. If modifications are made, re-copy the file.
 - b. Clear all bitmap paths except those necessary for rendering.
 - c. Run a test rendering of 5-10 frames per 100. That's every 10th - 20th frame.

7. Render Settings
 - a. Anti-Aliasing: Anti-aliasing smoothes the jagged edges that occur along the edges of diagonal and curves lines when rendering. Turn off only when you are rendering test images and greater speed is more important than image quality.
 - b. Filter Maps: Turns on or off the filtering of mapped materials. Leave on unless you are making test renderings and want to speed up rendering time and save memory.
 - c. Pixel Size: Smoothes the edges of objects for broadcast-quality rendering. The range is between 1.0 and 2.0. You can set this up to 2.0 if you first set the Pixel-Size Limit option in the Rendering page of the Preferences dialog. 2.0 provides the best quality but slows down rendering. Use 2.0 only if the 1.5 setting is insufficient because it can cause

8. Material Settings
 - a. SuperSample: Super-sampling performs an antialiasing pass on the material for making especially smooth specular highlights. This is an extra degree of processing that is often needed when using thin bump maps or rendering to high resolutions. If you are seeing scintillating, jagged bumps then you should turn super-sampling on to make the result smooth. Super-sampling is not processed when Antialiasing is turned off in the production renderer.
 - b. As a rule, turn on super-sampling only when you notice artifacts in the final renderings, because this option requires considerably longer to render (although it does not require any additional RAM).
 - c. Tip: The Raytrace map and Raytrace material both perform their own super-sampling. If you use Raytrace map to create reflections or refractions, turning on this option significantly increases rendering time, because the material is super-sampled twice. In general, don't use SuperSample with raytraced reflections or refractions unless you experience problems with aliasing in specular highlights or bump maps.

9. Bitmap Setting
 - a. Filtering: Selects the method of pixel averaging used in antialiasing the bitmap. Summed area filtering yields generally superior results but requires much more memory. Pyramidal filtering is quite adequate for most purposes.

AutoCad

Modeling

1. Generally, construction of buildings should be done with solids rather than faces. This produces fewer objects and greater editability.
2. Because curved objects have more faces, objects such as sidewalks or arches should be limited to faces only where they are visible. To create these as solid extrusions would double the number of faces while the backside would never be seen.
3. Avoid large irregular splines such as outlines of parking lots or lakes. Divide it into smaller sections or use a rectangular plane that lies no less than 0.2" below surrounding objects.
4. Create glass as a region rather than a box. This produces fewer faces and simplifies reflection mapping in MAX.
5. Use blocks for repeated objects such as columns. This will keep the DWG file size down and allow for quick block redefinition.
6. Use a scale of 1 Unit = 1 Inch while creating a model. If it is necessary to re-scale a model so that 1 Unit = 1Foot, use a scale factor of (/ 1.0 12), not .0833. Scaling from feet to inches is x12.

Layers

1. AutoCAD layer names should indicate the Location of the object and the Material to be applied. If possible, these layer names should be identical to the texture file names. The following example is a possible naming convention.

<u>Location of the object</u>	<u>with Material to be applied</u>	<u>Texture name</u>
BL_*** = Building	BL_CASTSTONE	CASTSTONE
	BL_GLASS_E	GLASS
ST_*** = Site	ST_ROAD	ROAD
	ST_GRASS	GRASS
PK_*** = Parking	PK_CURB	CURB
	PK_SWALK	SWALK

2. Layers for GLASS should be separated according their location on common planes. Example: BL_GLASS_N, BL_GLASS_W, etc. to designate North and West planes.
3. Objects with curves such as round columns, arches and curbing should be kept on their own layers. This offers more control when importing to MAX.

Exporting a DWF (Drawing Web Format)

Go to the options dialog box and make sure that the "Include Layer Information" dialog box is checked off. This allows people viewing the file over the Internet to turn off any layers they wish.

No layer that is turned off will be exported.

"Named views" will also be exported. It may be helpful to generate useful named views related to the clients interest.

No layer name will be exported if it has zero entities present on it.

MicroStation (as a resource for 3D MAX models)

DWG Export

There are several ways to organize Levels such as; by color, by material, by line type, etc. For files being passed off for 3D model creation, follow a standard that correlates Level numbers/names with OBJECT types. Object management is essential when creating a rendered 3D environment. Keep common objects on the same Level. For example all "sidewalks" should be on a Level designated for "sidewalks".

Examples of objects to be put on separate levels:

Site Plans: Parking Stripes, Curbs, Sidewalks, Roads, Medians, Water, Pavers, Trees, Shrubs,
Buildings: Walls (separate by material), Glass, Framework, Roof,

Typical linework practice:

Snap to the end points of lines. Do not leave mathematical gaps on lines that are intended to be continuous.

Avoid overlapped lines, duplicate lines, and leaving extraneous line segments or points.

3D modeling:

Organize Level designations based on Object Material not on Construction or Plotting line weights. For example: a two-tone building exterior should use two levels - one for each color.

Not one Level for all walls.

Keep geometry simple. Do not model intricate detail on something that will only be seen from a distance. Model for a visual effect, not for a construction detail.

Tolerance Problems

End points of Microstation lines are not joined (maybe 50% of the time) and so far it seems they cannot be joined in Microstation. I'm working on finding a way to get a high percentage of lines joined and closed without extensive maintenance.

Changing the resolution in the working unit parameters will get end points closer but there are still gaps.

Because Microstation is leaving gaps between line segments on "closed" polylines, it is requiring other software packages to perform a "weld" to close the gaps.

Along the path of translation to 3D Studio Max there are various places to set a weld tolerance that yield similar results. Because this is a global setting applied to varying distances between vertices, problems will remain regardless of what setting you use. If it's too low, end points that should be joined won't be. If it's too high, end points that shouldn't be joined will be.

Edit*

Compression

Digital video and individual frames or pictures are sometimes compressed.

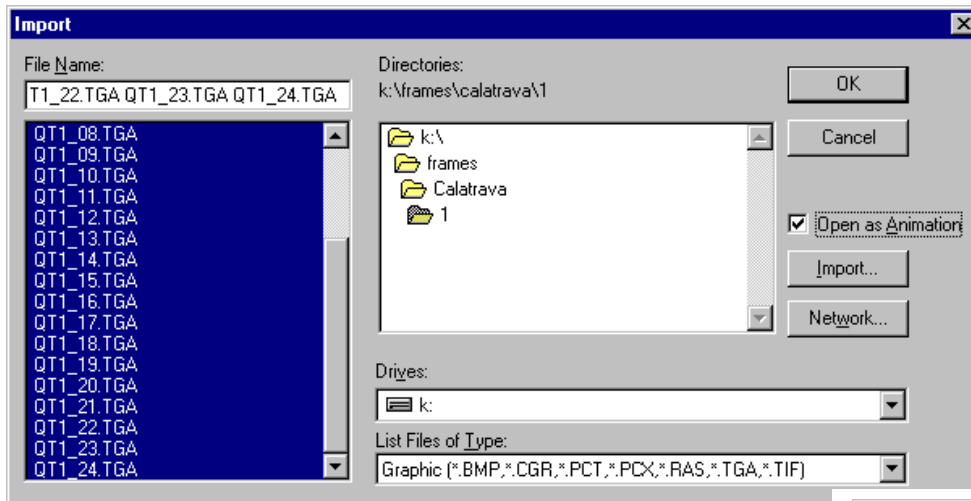
Importing Animations

An animation is rendered as a sequence of fields or frames. Typically we render these as either JPEG, TGA (Targas), or RLA.

In order to use these frames to produce a video, they need to be imported into edit*. This simple process can take quite a bit of time because during the import into edit, each of the frames are compressed. This compression is what allows edit to play the frames back in real-time.

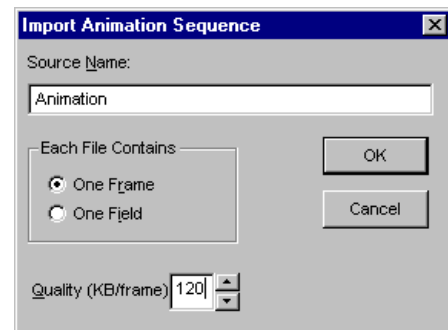
Importing a Targa (TGA), JPG, and other frames

Certain frames are supported by edit* directly. To import these types of frames into edit, open or create a job, open or create a bin, then in the bin window click on import. Select the frames you would like to import. Make sure “Open as Animation” is checked, then click on OK.



Name the animation source name, indicate if each file contains a Frame or a Field, enter the Quality, then click on OK.

You'll know whether each file contains a Frame or a Field by the way the animation was rendered. If the animation was “rendered to fields” then you would select “One Field”, otherwise you would select “One Frame.” Ask your supervisor or the person in charge of rendering the animation if the animation was rendered to fields.



The Quality will typically be 120 KB/frame, but other circumstances may require you to select a different quality. The maximum you should select for real-time dual stream playback (which is anything that involves transitions in the final product) should be kept at 120KB/Frame. You can render all transitions and you might be able to get away with 300KB/Frame, but this has never been tested. The current equipment has only been tested at 200KB/Frame as a maximum.

Importing a RLA Frame

Because edit* does not support RLA frames directly, you will have to import RLA frames with an indirect approach.

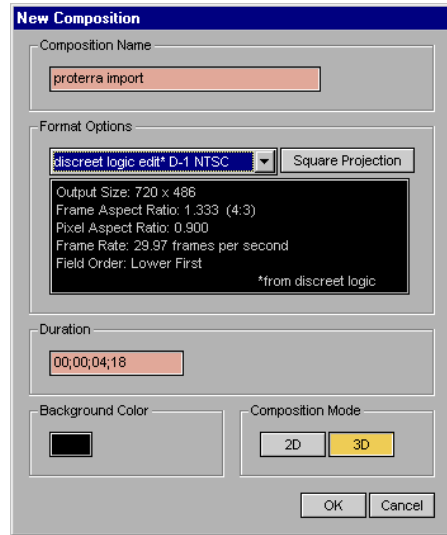
Since effect* does support RLA frames, and can render to an edit* bin, we will use effect* to import RLA frames into edit*.

Start by opening effect* and create a new project (or use an existing one if you've already made a project that contains the frames you're wanting to import into edit*.

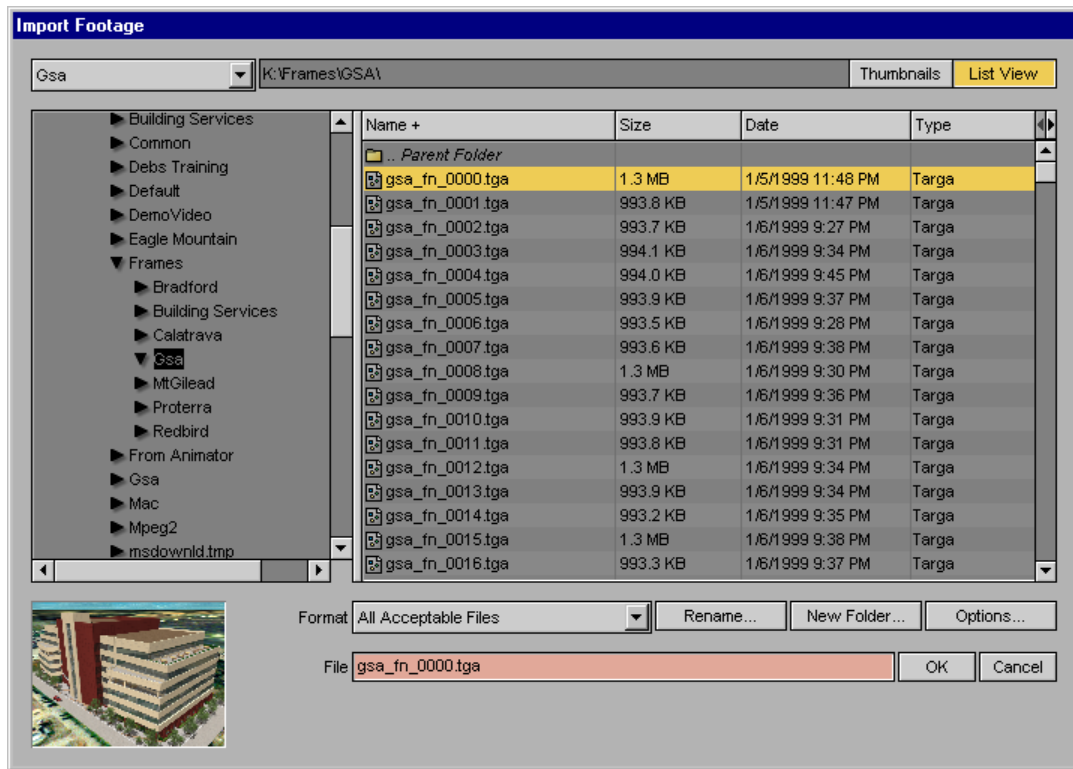
The picture to the right shows most of the settings that should be used for animations, except the duration and composition name should be changed.

Composition Name will be the name of the file you save this project as in effect*.

Duration can be entered in as frames and effect* will convert the number into timecode. Notice that this number is correct for 30 frames per second, even though we've chosen a 29.97 frames per second as our frame rate.



Next, we need to import the frames into the effect* project. Do this by clicking on File, Import Footage... in the menu. Although we're importing an entire sequence of frames, you only need to highlight the first frame in the sequence and click on OK.



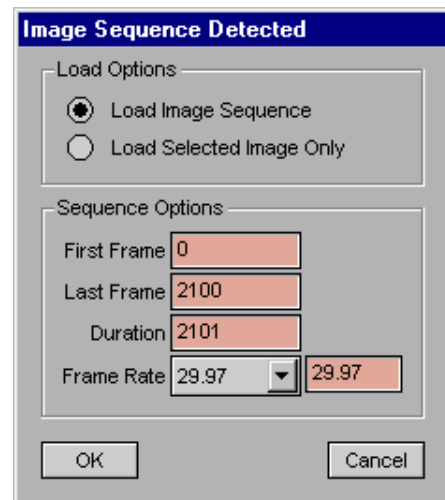
Then you can select the first frame, last frame (or duration) plus the frame rate. If you would like to import only a single frame, you are given that option here also.

Notice that the image to the right depicts that we're importing at a 29.97 frame rate. This is to take complete advantage of every frame that was rendered.

If we specified a different rate, we would drop some of the frame that we rendered, which is considered a waste of precious resources.

Any changes in frame rates should be implemented by edit*, so these parameters are correct, even if the animation was rendered at 15 or 24 FPS.

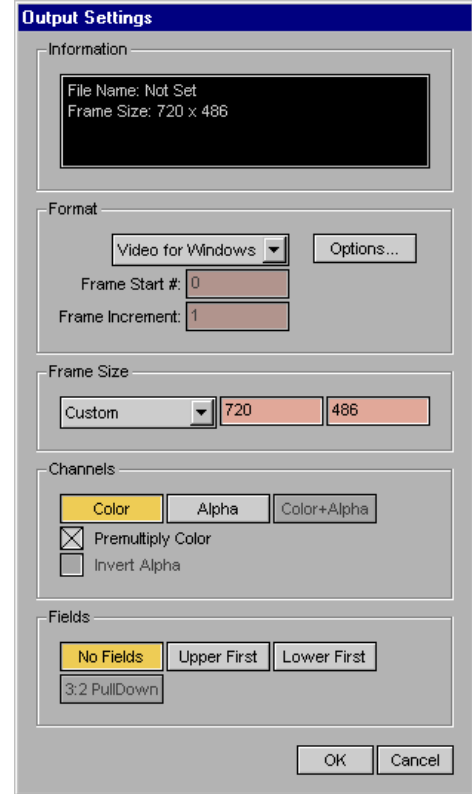
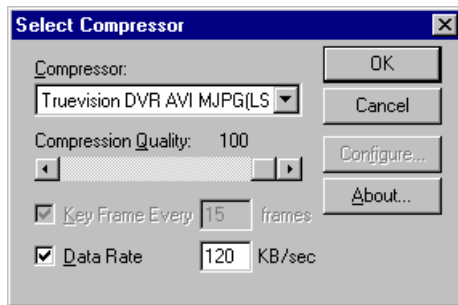
After the animation has been imported, you can feel free to make any color, gamma, or other corrections to the animation at this point. Once you're ready to export the animation to edit*, click on File, Render...



Click on the “Output Options” button and make sure they match the settings to the right.

Next, click on OK and click on “Render to Bin...” This will allow you to enter the edit* job, bin and source name, as well as a description of the source, the scene and take number. Scene and Take are typically not used by our workflow, so you can leave them at defaults or use them in a different way that what was intended.

When you click on “OK” you will be presented with another option window like the one shown below. Use the settings given unless you have a good reason for using something else.



Note the compressor used. This is the only compressor you can use when exporting (or rendering) an animation, sequence of frames, or a video clip to an edit* bin.

Change the information on the cover page to contain the information you would like. For the body of your report, use Styles such as Heading 1-5, Body Text, Block Quotation, List Bullet, and List Number from the Style control on the Formatting toolbar.

This report template is complete with Styles for a Table of Contents and an Index. From the Insert menu, choose Index and Tables. Click on the tab you would like. Be sure to choose the Custom Format.

Building a Movie File

We support three basic types of movies for computer playback. All three can be burned to a CD-ROM and distributed. There are strengths and weaknesses for each one.

Comparison of Movie Types

We can build Audio Video Interleave (AVI), QuickTime, and Motion Pictures Expert Group-1 (MPEG-1) Movies.

AVI's are typically left alone. The only advantage of creating an AVI is because it produces almost the same quality as QuickTime movies and the creation is performed through a single step in edit*, even if audio is included with the movie. This disadvantage of using AVI as the movie format is frame scrubbing (moving quickly around in the animation in realtime in a non-linear fashion) is not possible, and typically only Windows operating systems support the file format.

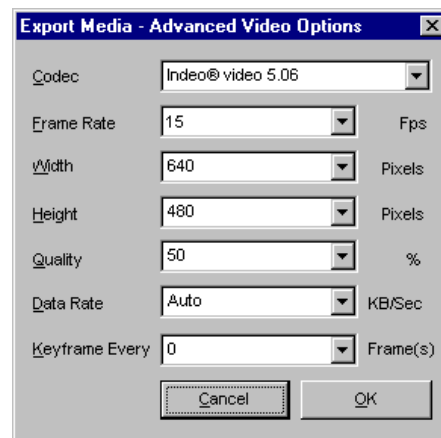
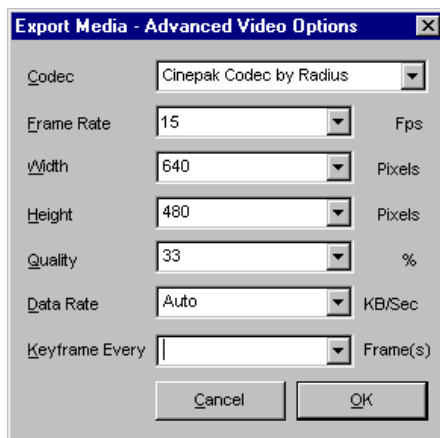
MPEG-1 movies produce a very low bandwidth movie, suitable for placing long animations onto a single CD-ROM, but requires special playback software. If you produce an MPEG-1 with audio, it will require a two-step process. MPEG-1 is a very widely used movie format, so it could probably be used for nearly any operating system. The primary drawback is its low resolution / bandwidth which equates to lesser quality. Scrubbing is allowed, but just barely.

QuickTime takes longer to produce because it requires an intermediate step, and may require two intermediate steps in order to produce a QuickTime with audio. QuickTime is playable on nearly any platform, typically without installing any additional software. Scrubbing through a QuickTime is easily accomplished. This makes this movie format the choice for showing animations in front of a client or prospect as a method of demonstrating our capabilities.

Building an AVI

AVI's are built simply by exporting directly from an edit* program. If the clip you want to export is not in a program and is only in a bin, you'll have to make a new program (File, New, Program) then drag the clip from the bin to the program. If the clip is a sequence of frames and hasn't been imported into a bin yet, see "Importing Animations" on page 9.

Highlight the area you want to export in your edit* program by marking your In and Out points, then click on Tools, Export, Media...



Change the Video to the Codec you would like to use, then click on More Video Options. The previous page shows the two main Codecs we use and their settings. Click on OK, then change the file name and the video folder to a name that makes sense, preferably in 8.3 format if you're burning a CD-ROM.

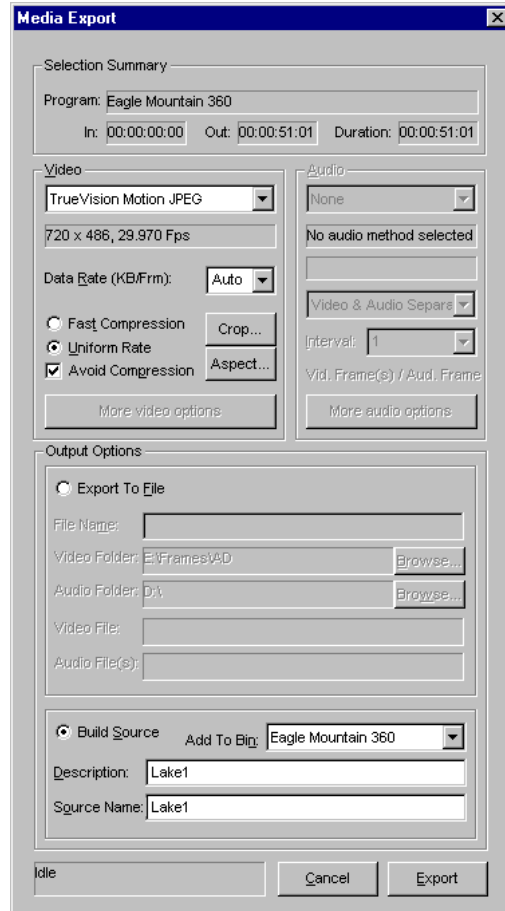
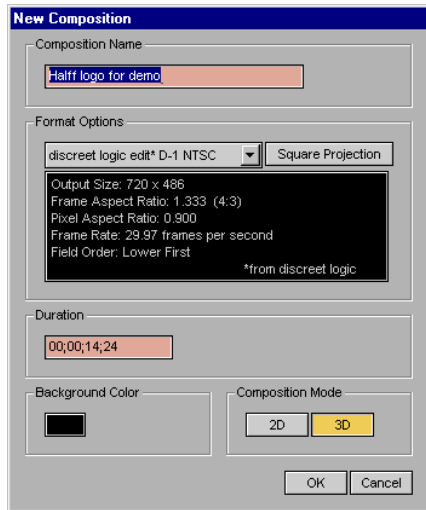
Building a MPEG-1

Export your video as described above, except choose the MPEG-1 600Kbps as the compressor instead of Cinepak or Indeo.

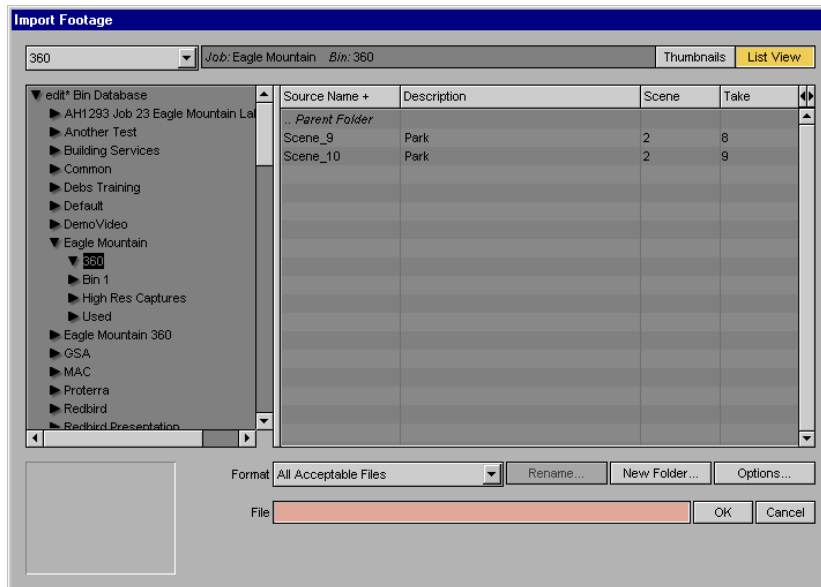
Building a QuickTime

Export a video as described above, except choose TrueVision Motion JPEG as the compressor, check the option “Build to Source” and select a Bin and enter a description and source name.

Once you’ve rendered your video to a bin, you can open effect*, and create a new project based on the settings below. The duration will vary, depending on the length of your animation.

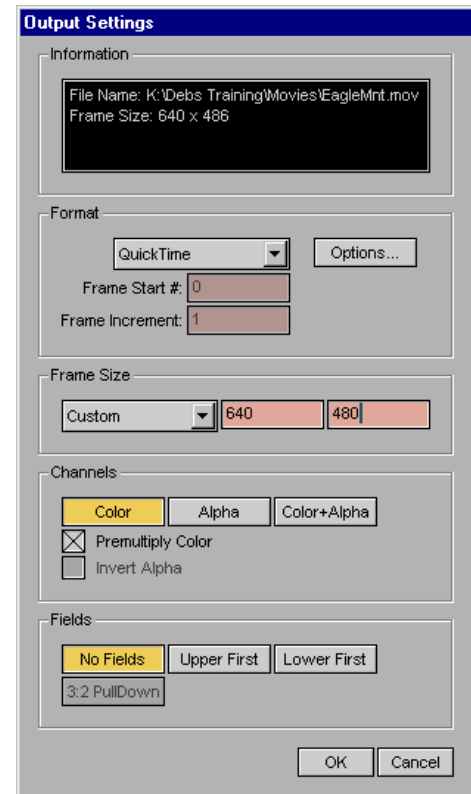


Insert the footage from the edit* bin by clicking on File, Import Footage. You can navigate to the top of the list to the edit* Bin Database, then select the Job, Bin, and the footage.



Next, render the footage to a QuickTime by clicking on File, Render. Click on Output Options and modify the format to QuickTime, modify the Frame Size, and verify the rest of the settings are as shown to the right.

Click on Options and modify the frame rate to 15fps. You don't want to keyframe every N Frames, but you probably want to limit the data rate. I don't have good settings so you'll have to play around to figure out the best setting. Remember that a single spin CD-ROM runs at around 100-150K/second, so assuming a QuadSpin CD-ROM you'll want to limit the data rate to 400k/second.



Front Page

Uploading the Web Site

When you've made changes to the web site, it will need to be uploaded. The important items to remember are the FTP site, the user-id, and the password.

The FTP site is <ftp://ftp.digiweb.com>, the User-ID is "half", and the password is "albert". Please don't give this password out, since it allows anyone to hack into our web site and make changes. Please realize that this user-id is different than the user-id used to access the FrontPage web, which is "admin", and the password is Michael's administrative password. He may change it in the root web site for FrontPage on the Editor machine, so you'll have to ask him to get the current password. In FrontPage, open the web site you want to publish, then click on Publish. It may ask you for a user-id and password, but they're list above.

If you cannot connect, more than likely it's because the editor is using a static IP address. You'll have to change the IP address to DHCP, reboot, then try to upload the web site. If that doesn't work, you may have to contact MIS or Michael to determine what's causing the problem.

Lightscape

Modeling for Lightscape

1. Avoid hidden vertices. Keep a coincident edge along adjacent or intersecting faces. See User Guide p8-40.
2. Keep meshes as simple as possible. Avoid long narrow faces.
3. Delete as many hidden back faces as possible.
4. Avoid self-illumination on materials unless the material is for a light fixture.
5. Make lighting objects with BOTH common fixtures AND lumen values as instance blocks or groups, not just instances of common lights or instances of common fixtures.
6. Note - When exporting to Realspace, smoothness on a Lightscape material produces a mirror effect.
7. Changes to geometry including light locations can only be made in a Preparation file. Any updates to lights or materials made to a Lightscape Solution .ls file cannot be saved back as a Preparation .lp file. If you need to make numerous changes to lights or materials it's probably best done in the Preparation file order to keep it up-to-date.

Shadows

1. Shadow artifacts can be managed by taking additional steps during the modeling process. Some artifacts may be unavoidable or may simply not be worth the additional effort to eliminate them. As in MAX, some objects/faces need to be excluded from casting shadows.

Shadow Leaks

- 2a. Being as explicit as possible about object edges during the modeling process leads to a better solution in Lightscape. This has not been a significant issue in MAX and therefore did not necessitate the additional modeling refinements.
- 2b. A second way to alleviate the shadow leaks is to decrease the minimum mesh spacing to trigger adaptive subdivision so that the edge is properly defined. The problem with this approach is that the system generates a large number of elements to render some insignificant parts of the model. Also, shadow leak may remain and still need to be fixed by occluding faces or actually changing geometry by relocating vertices.
- 2c. A third approach is to ray trace the light. With this approach you can keep the sparser mesh. However, this approach is only good for single images. Ray tracing light sources also adds time to the ray tracing process. I haven't noticed this to be a quick fix for shadow leaks. Needs more testing.
- 2d. The final way to alleviate the shadow leak problem is the simplest. You can ignore the surface causing the shadow leak. If one surface is directly on another surface, such as a light switch panel on a wall, you can set the surface on top to be non-occluding. The light simply passes through the surface and does not cast any shadows. In this kind of situation, the non-occluding approach is the easiest and most efficient. This works well in many or most cases but again, some leaks will require changing geometry by relocating vertices.

Streaky Shadows

3. Jagged shadow boundaries can be avoided by ray tracing the light sources. Ray tracing can add a significant amount of processing time. You can set the ray tracing option even after the radiosity solution is complete. In this way you can first evaluate the solution from a particular view before deciding which shadows or light sources you need to refine in the final image.

4. If a surface is made up of many oddly proportioned surfaces such as long skinny triangles, the mesh generated by the initiation process may also be made up of many oddly proportioned elements. This tends to increase the jagged shadow boundary and shadow leak problems by making the shadow edges appear streaky. If your interest is in a good radiosity solution for interactive manipulation, you may want to try to create the original surfaces from more regularly shaped components during the modeling stage.

VT Local Network

Drive Mapping

<u>Drive</u>	<u>Local</u>	<u>Network</u>
A:	A: Floppy Drive	A:
B:	-----	B: -----
C:	C: Local HD	C:
D:	D: Local HD	D:
E:	E: Local CD	E:
F:	F: Local Zip	F: \\SERVER\ZIP_Drive
G:	-----	G: -----
H:	H: Local HD	H: \\ANIMATOR\H_Drive
I:		I: \\VOL1 on DAL
J:		J: \\VOL2 on DAL
K:	K: Local HD	K: \\EDITOR\K_Drive
L:		L: \\ANIMATOR\D_Drive
M:		M: \\EDITOR\D_Drive
N:		N: \\IMAGER\D_Drive
O:		O: \\MODELER\D_Drive
P:		P: \\SERVER\D_Drive
Q:		Q: -----
R:		R: -----
S:		S: -----
T:		T: \\CD_Tower\K_Drive (1)
U:		U: \\CD_Tower\ (2)
V:		V: \\CD_Tower\G_Drive (3)
W:		W: \\CD_Tower\P_Drive (4)
X:		X: \\CD_Tower\I_Drive (5)
Y:		Y: \\CD_Tower\J_Drive (6)
Z:		Z: \\CD_Tower\L_Drive (7)

Directory Structure

The C: drive is reserved for programs and system files.

Use other local drives for project and user files.

Save ALL project files under the PROJECTS directory. Directory names should generally follow the structure shown.

WORKSTATIONS

PROJECTS	Root of Projects directory
PROJ_NAME	Name of the project
DOC	Documents, Storyboard, Notes, etc.
DWG	AutoCAD files
REF	Originals, Resource files
NOT_USED	Old files saved for backup
FRAMES	Animation TGA's, RLA's
IMAGES	General image files
PSD	Photoshop files
TEST	Test renders
TGA	Targas
MAPS	MAX maps used only in the scene
DEVELOPMENT	Misc. maps
PSD	Psd's with multiple layers for possible revisions
SCANS	Scanned images
NOT_USED	Old files saved for backup
MAX	3D MAX files
DEVEOPMENT	Misc. files
UPDATES	Subsequent additions or revisions
NOT_USED	Old files saved for backup
PRINTS_ MM-DD-YY	Images with date to be printed
PSD	Photoshop files used to create final TGA's
TGA	TGA's created from PSD files
XFER	Transfer files, DWG, DXF, AI, 3DS

SERVER

COMMON	Root of Common project files
MAPS	Bitmaps common to any project
PROPS	Root of Props directory
FOLIAGE	Foliage available for any project
VEHICLES	Vehicles available for any project
PROJECTS	Root of Project Archive
PROJ_NAME	Project Name
MAPS	Maps unique to this project (not common)

Note: Always put all bitmaps used in the scene of a project in its corresponding directory called "MAPS" on the Server.

Network Rendering Setup

The “LMHOST” file needs to be modified every time you add or change a computer.

It then needs to be copied to a floppy and taken to each machine in the network rendering domain. At each machine go to Control Panel > Network Neighborhood > Protocols tab, double click on TCP/IP, go into WINS Address, make sure “enable LMHOSTS” is checked, then select “import LMHOSTS” and import the LMHOSTS file you copied to floppy.

For any machine that’s not hooked up to the render server domain:

1. Add a new IP address to the LMHOSTS file on the animator.
2. Add user AH1291 with administrative privileges for the computer.
3. Modify the LMHOSTS file for the Animator, Visual_Serv, and the new computer as described above.
4. Modify the TCP/IP address of the new computer according to the new LMHOST file.
5. Install 3D Studio MAX.
6. Authorize the program by entering the authorization code with the “Authorize” program in the Kinetix group.
7. Copy all the plugins from the [\\VISUAL_SERV\MAX\PLUGINS](#) and PLUGCFG to the local 3DSMAX2.5\PLUGINS and 3DSMAX2.5\PLUGCFG directories.
8. Configure the Bitmap path in MAX to be directed to appropriate texture directories.
9. Shell to DOS, go to the MAX directory and enter SERVER -I
10. In Control Panel > Services, select 3DS MAX then select Startup and modify to use AH1291 with no password for the logon ID.
11. Reboot the computer.
12. Before starting a render, make sure any new plugins are copied to all machines.
13. Make sure the textures are copied to all machines.
14. Update all machines with 3DS MAX INI files to point to the right texture directory.

Ref. File: \\Animator\Animator C\WINNT\system32\drivers\etc\lmhosts

```
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows NT.
#
# This file contains the mappings of IP addresses to host names. Each entry should be kept on an
# individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one space.
#
# Additionally, comments (such as these) may be inserted on individual lines or following the machine
# name denoted by a '#' symbol.
#
# For example:
#
# 102.54.94.97                rhino.acme.com    # source server
# 38.25.63.10                x.acme.com       # x client host

127.0.0.1        localhost
192.168.11.2     POSTOFFICE
38.223.203.2     POSTOFFICE
38.223.203.2     POSTOFFICE.HALFF.COM
38.155.194.2     POSTWORTH
38.155.194.2     POSTWORTH.HALFF.COM
38.155.194.2     POSTWORTH.FORTWORTH.HALFF.COM
38.155.191.2     POSTHOUSTON
38.155.191.2     POSTHOUSTON.HALFF.COM
38.155.191.2     POSTHOUSTON.HOUSTON.HALFF.COM
207.43.220.10   POSTMCALLEN
207.43.220.10   POSTMCALLEN.HALFF.COM
207.43.220.10   POSTMCALLEN.MCALLEN.HALFF.COM

# The following machines are for network rendering

10.10.10.1      ANIMATOR
10.10.10.2      MODELER
10.10.10.3      EDITOR
10.10.10.4      OLIVO-XXX
10.10.10.5      NIELSEN-371    # Dottie
10.10.10.6      TRAUT-146
10.10.10.7      WALLACE-666    # Lynn / Color Printer
10.10.10.8      DECARTES
10.10.10.9      DOWNS-371
10.10.10.10     MCCALL-377
10.10.10.11     OLIVO-374
10.10.10.12     HUGHES-246
10.10.10.13     MPJ-999        # VU's
10.10.10.14     ZABALA-376
10.10.10.15     MEYER-356
```

File Formats and Codecs

Image File Properties

Format	Layers	Paths	Channels	Resolution	Application
PSD	Y	Y	3+	Any	Master file for composited image creation
JPG	N	Y	3	Any	24bit - Standard textures in MAX Print files for FTP transfer
PNG	N	N	3,4	72 default	32bit - Alpha textures in MAX
RLA				Any	Animation frames with selectable objects
TGA	N	N	3,4	72 default	Print files Animation frames 32bit - Alpha textures in MAX
TIF	N	Y	3+	Any	Scans

Tips and Tricks

Creating a 3D Model from a Photo

1. In Photoshop, prepare images to be used for the top, front, back and side views.
2. In AutoCAD use Insert Raster Image.
3. Trace the outlines of each view with a Pline
4. Rotate, scale and place the outlines on appropriate coordinate planes to create the 3D object.
5. Extrude each pline, then use a boolean intersection to produce a single object.
6. Explode the Solid so that it becomes faces. (keep copies of the Plines and Solid for reference)
7. Create new layers for each side and assign appropriate faces to new layers.
8. Save file and Import into MAX.
Apply mapping to the object.

Applying an Aerial Map to a Ground Plane

When using an aerial photograph applied to a ground plane, use only the degree of resolution that is necessary. Apply higher resolution images near the site and lower resolution images beyond the site. Refer to proposed camera shots and paths to determine areas that need high resolutions. The following procedure describes how to apply an aerial image at multiple resolutions to a subdivided ground plane.

1. In Photoshop, start with the image at the highest resolution required.
2. Name this file "Aerial"
3. Make a selection of the entire image and choose "Make Work Path".
4. Save the work path. Name it "Low Res".
5. Choose "New Path". Give it the name "Hi Res".
6. Draw a path around the area to be Hi Res.
7. Save the "Aerial" file.
8. With the Hi Res area selected choose "Copy".
9. Create a new file, save it as "Aerial Hi", and choose "Paste".
10. Return to "Aerial" file and change the image size to low res.
11. Save a copy of the file. Name it "Aerial Low"
12. Export Paths to Illustrator.
13. In MAX, import the Illustrator .AI file.
14. On the Low Res object apply mapping to fit.
15. Apply the "Aerial Low" material to the object.
16. On the Hi Res object apply mapping to fit.
17. Apply the "Aerial Hi" material to the object.

Converting a Scanned Raster Image to a DWG File

1. Scan the image as a grayscale photo and save as a TIF file.
2. In Photoshop, raise the contrast to eliminate gray areas.
3. With a magic wand, select all black areas.
4. Select "Make Work Path" to outline the selected area.
5. Export paths to Illustrator.
6. From MAX, import the Illustrator .AI file.
7. Export the MAX file as a DWG.

Defining a Project

General Project Data

Virtual 3D models can be generated based on anything from a conceptual sketch to a complete set of working drawings. By starting with detailed information we will be able to produce a more accurate model and environment. Any printed materials or CAD files we receive will assist in creating the best possible representation of your project. Please use the following outline as you consider the resources you are able to provide.

Building Plan

Exterior

- Exterior Elevations
- Roof Plan
- Wall Sections
- Exterior Finish Schedules
brick, stone, roof, paint, etc.

Interior

- General Floor Plan
- Reflected Ceiling Plan
- Interior Elevations
- Interior Finish Schedules
flooring, brick, paint, wood, etc.
- Fixture Plan
furnishings, etc.

Misc Details

- Signage
- Logos
- Ornamental Features

Special Request

- Environment
- Vehicles
- Foliage
- People
- Feature Emphasis
- Animation
- Camera Paths
- Character Animation
- Special Effects

Site Plan

- Elevation Contours
- Grading Plan
- Site Details
- Traffic signs
- Landscape Plan

Topographical Data

Electronic files derived from flown topographical data should conform to the following specifications.

1. AutoCAD R14 or earlier DWG format.
2. All contour lines to be in 3D at appropriate Z elevation.
3. All contour lines to be continuous vector ploylines without breaks.
4. Use a second layer name designation on each fifth contour line.
5. Elevation text labels on each fifth contour line. No line breaks.

Task List

Project Summary

Project name:	Duration:
Project number:	Audience:
Address:	Presentation format:
Phone:	Date required:
Contacts:	

HOURS PRE-PRODUCTION

_____ Proposal

- Initial client meeting
 - What resources will the client provide?
- Preliminary staff meetings
 - Project analysis – resources, responsibilities
 - Scheduling
- Estimating cost and completion date

_____ Storyboard

- Client Meetings
 - Script – narrative, screen text, highlights

_____ Periodical reviews

- Client Meetings
 - Camera path revisions
 - Storyboard / Script revisions
- Staff Meetings
 - Progress review
 - Schedule adjustments

_____ Secretarial

- Project file management
- Transmittal records
- Phone log
- Contacts
- Job numbers

_____ Acquiring reference information

- Electronic files or drawings from client or contractors
- Materials and color samples
- On site photography
- Internet resources

HOURS

PRODUCTION

_____ **Reference material preparation**

CAD file cleanup

_____ **Modeling** (first time, no revisions)

Bldg's (detailed)
Bldg's (primitives)
Bldg pads w/ sidewalks
Parking Islands, medians
Decorative pavers
Roads
Highways
Topology
Aerial ground plane

_____ **Props**

Stock props or Custom

_____ **Texture Creation**

Scanning
Photo editing
Building materials
Site / Environment textures
Aerial ground plane

_____ **Texture Library Creation**

Library organization

_____ **Texture Mapping**

Projection maps on objects

_____ **Object Placement**

Vehicles
Foliage
Light poles
People
Traffic signs

_____ **File Conversions**

Transfers between applications and platforms

_____ **Lighting**

Shadow analysis
Direction of seasonal sunlight

_____ **Camera Path**

Path
Coordination with script

HOURS **POST-PRODUCTION**

_____ **Post-Production**
Voice-over
Synchronization with camera path
Highlights
Screen Text

_____ **Prints**
Setup
Color prints
Xerox
Glossy

_____ **Archiving**
CD burning
Tape Backup

_____ **Non-Chargeable**
File Management
Timekeeper
Office clean-up
Personal scheduling (other task)

_____ **Total Man-hrs**

HOURS **MACHINE TIME**

_____ **Processing Frames**
Machine time (_____ min. total, ___/fps, _____ min/frm, = _____ hrs = _____ days)

_____ **Layoff, Dubbing**
Accom
VHS
Beta

_____ **Total Machine-hrs**

_____ **Estimated Time to Complete =**

Animation - Level of Detail

Low-End Detail

Buildings

Existing buildings modeled from photography.

Site

Ground plane, roads and parking lots as co-planer 2D surfaces.
(Suitable for aerial camera paths)

High-End Detail

Buildings

Proposed buildings modeled from construction drawings or CAD files.
Proposed buildings modeled from conceptual sketches or artist renderings.
Reflective glass.

Site

Modeled from CAD files of 3D topographical data.
Modeled from hand-drawn contour lines.

Roads

Topographical
Medians, Curbs, Stripes
Bridges & Overpasses

Parking lots

6" high 3D curbs
Parking stripes
Handicap ramps, stripes
Decorative pavers

Post production

Audio track – Narrative with Background music
Screen text, Highlight effects

Storyboard

Camera Paths
Feature Emphasis

Scripting

Narrative script
Voice talent
Music

Additional Props

Vehicles
 Hi Res. \$\$ per 25
 Lo Res. \$\$ per 25
Foliage \$\$ per 25
Light poles \$\$ per 25
People \$\$ per 25
Traffic signs \$\$ per 25
Walls, Fences, Monuments

Description of Current and Future Services

This may or may not include:

- Print ripping (Preparing and printing first copy of a print job, typically requiring color adjustments and other “digital to analog” conversions.)
- Web page authoring
- Digital media creation
- Data format transformations
- Web programming
- Active Server Pages
- Java
- JavaScript
- VBScript
- Document scanning
- Hand coloring of site plans
- Brochure layouts
- Graphic artistry (Digital & Manual)
- Page publishing
- Software Development
- Visual Content Delivery
- Scripting and Plug-ins for improved computer / human performance
- 3D Computer Animations
- 2D Computer Presentations
- PowerPoint
- Internet / Intranet Standalone Web Sites
- Digital to Analog to Digital Conversions
- VHS Presentations
- Time Compressed Video
- Video Capture for Edit
- Print to (S)VHS
- Non-Linear Digital Video Editing
- Digital Special Effects
- Raw Photo Editing & Manipulations
- 3D Computer Still Rendering (“Virtual Photos”)
- 2D Digitally Colorized CAD files
- Printer (Inter office) Hardware Maintenance
- Printing (Outsourced 4 Color & Digital)
- Quality Control
- Data Transfer

Conversion Factors

Area and Distance

1 Mile = 5280 Feet

1 Acre = 208.7' x 208.7' = 43,560 Sq. Feet

1 Sq. Mile = 27,878,400 Sq. Feet

1 Sq. Mile = 640 Acres

Speed

<u>Miles/Hour</u>		<u>Feet/Second</u>		<u>Miles/Hour</u>		<u>Feet/Second</u>
1	=	1.466		35	=	51
10	=	15		40	=	58
15	=	22		45	=	66
20	=	29		50	=	73
25	=	36		55	=	80
30	=	44		60	=	88
				65	=	95

Software Records

Registration

Autodesk
Kinetix

Authorization & Registration 1-800-551-1490
Main 1-800-879-4233 Support 1-800-225-6531 \$65/call

3D Studio

3D Studio MAX Rel. 2.5
Serial Number: 660-99060452
CD Key: T731
Authorization Code: 35A5BB06

3D Studio VIZ Rel. 2.0
Serial Number: 660-99067467
CD Key: X2YG
Authorization Code: 2E208C1B

AutoCAD

AutoCAD Rel. 14
Serial Number: 110-99570268
Authorization Code:

SoftDesk 8.0
Serial Number: 110-99596413
Authorization Code:

Architectural Desktop Rel. 14
Serial Number: 110-99950514
CD Key: 4P44
Authorization Code:

Photoshop

Photoshop 5.0
Serial Number: PWW500R7121577-110

Lightscape

Lightscape 3.1.1
Serial Number: 6294772771

Edit

Edit 4.5

Serial Number	3901366035
License Code:	56B4E0D6-U80
Authorization Code:	6E7F1ABC-C73

Effect

Effect 2.0

Serial Number	6507834952
Dongle Number	05-00008201
License Code	631C0ED9-U80

Paint

Paint 2.0

Serial Number	6128215065
Dongle Number	04-00008090
License Code	DFDB1E9A-D67

Truevision

Targa 2000 SDX Card

Serial Number	57480494
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Debabelizer

Debabelizer 4.5

Serial Number	75393-834580-684892
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Crystal 3D Vortex

Crystal 3D Vortex Ver. 1

Serial Number	RB41-0050-0383
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Crystal 3D Impact!

Crystal 3D Impact! Ver. 1

Serial Number	
Authorization Code	CG03p63414

Diskeeper

Diskeeper 4.0

Serial Number	W4-42778
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Boris FX

Boris FX

Serial Number	D3F301-75850MA-72523
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Troubleshooting

AutoCAD

AutoCAD license not available.

ARX

Load

PWD13.ARX

PWDADMIN

MPM.PWD, MSM.PWD

Release License

OK

Dialog boxes are not visible.

Change the variable FILEDIA from 0 to 1.

SETVAR, FILEDIA = 1

3DS MAX

1. MAX crashes when saving a file.
On some computers MAX will crash when saving a file on top of itself. One factor in the problem could be saving to an NTFS drive. Try saving MAX files to a different drive.
2. Render fails when preparing lights.
If the file is VERY large it could be insufficient memory. Try changing the environment settings.

Windows NT

To Disable Busmastering

1. Open "file manager".
2. Under the NT directory (winnt), open the "system32" folder.
3. Execute "REGEDT32.EXE".
4. Under "HKEY_LOCAL_MACHINE", open the "SYSTEM" folder.
5. Open the "CurrentControlSet" folder.
6. Open the "Services" folder.
7. Open the "E159x1" folder. (If you have more than 1 adapter, you need to repeat steps 7-15. The folders are named E159x2, E159x3, etc.)
8. Open the "Parameters" folder.
9. Choose the "Add Value" option in the "Edit" pull-down menu.
10. Type "Busmaster" for the Value.
11. Check that the Data type is "REG_SZ".
12. Click on the "OK" button.
13. Type "no" in the string box.
14. Click on the "OK" button.
15. Check the registry to verify that the following line was added: "Busmaster:REG_SZ:no"
16. Shut down and restart the machine.

To verify that busmastering has been disabled:

1. Open the "Administrative Tools" and run the "Event Viewer".
2. Click on the first occurrence of "E159x".
3. The Event Detail should read, "BusMaster support has been turned "OFF" for slot xx.", where xx represents the slot number for the configured adapter.

Job Responsibilities

Digital Video Editor

The Digital Video Editor, or editor, is responsible for nearly all output that goes to the client. Hours, months, and maybe even years can go into an animation or video product, and it's the editor's job to make sure it looks as good as it can on its final presentation media.

This responsibility makes the job of the editor extremely important, and can make or break the final presentation. Use the wrong clips in a video and the wrong idea may be conveyed. Using the wrong settings in compressing animations, whether it be for digital video or for AVI or QuickTime movie creation, can easily make animations unplayable or aesthetically displeasing.

It has also historically fallen on the editor's list of responsibilities to maintain network-rendering configurations as well as provide animators with feedback on machine performance and video quality based on rendering settings.

Quicktime Video:

Continuous bandwidth codec

Good for scenes where no objects should be degraded more than another. Example: Argent animation where portions of ground compress independently of other objects in the scene, causing it to look out of synch with the rest of the animation.

Indeo Video 5.0x and 4.4

For most videos, use the medium setting. This seems to get the best quality with the best bandwidth.

MPEG-1:

From edit, use the MPEG-1 600Kb/sec setting. Don't touch the audio settings, let it use the defaults.

Note: for some the MPEG-1 that is created cannot be run using the Xing player. Instead, use the Microsoft Media Player 2.