

The Design Explorer

The Ashlar-Vellum User Newsletter

Third Quarter, 2006

Argon™ Huge Success with Girlstart

The Argon tutorial created especially for the Girlstart day campers was a tremendous success at both week-long camps, June 19th-23rd and 26th-30th. Each girl designed and rendered her own 10" vase in Argon with professional looking results.

On Friday morning, Robert and Julie Bou got a few minutes to talk to the girls about careers related to 3D modeling and answer questions. "Imagine creating things like this to be sold in West Elm, Pottery Barn or William Sonoma," Julie told the team of wide-eyed 11-13 year old girls. "Or maybe you'll design a heart valve or a space ship or a new telephone." Robert talked about how the software did things in 3D and how it was first invented

by Martin Newell, who came from Xerox Palo Alto Research Center. He described Xerox PARC as a place where people go to work and think about the future all day. "I want to work there!" shouted several of the girls in unison.



Service Packs Available

Cobalt™, Xenon™ & Argon™ v7 sp2

The latest service pack for Cobalt, Xenon and Argon is almost ready to download. Those with v7 licenses will be receiving an email with a link. Service Pack 2 has two major highlights:

- Major fixes to the entire Model to Sheet sections.

- Administrator privileges no longer required to run due to file placement.

Graphite™ v7 sp3

The service pack for Graphite v7 is also almost ready to download. An email with a link will be sent to all v7 users. Included in Graphite's service pack are:

- Support for AutoCAD 2004, 2006 DXF/DWG.
- Mouse scroll wheel support for zooming.
- Administrator privileges no longer required to run due to file placement.

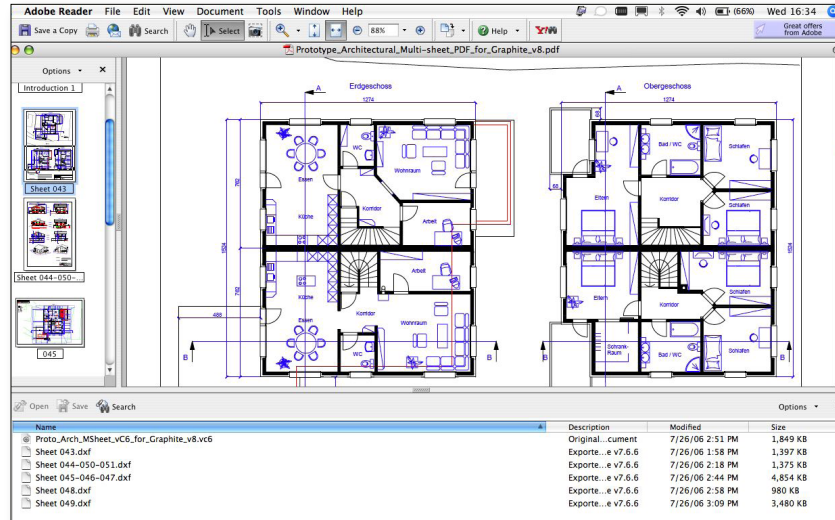
Graphite v8 Preview



Graphite v8 is moving toward beta testing and is still on schedule to release to users sometime in the fourth quarter of this year. The following are some of the features found in Graphite v8.

- Updated user interface.
- Gradient background color.
- Resizable dialog boxes.
- Fly-out tool palettes.
- Dockable tool palettes.
- Mid-point Line tool.
- Universal Binary support for the Intel Mac.
- Support for file names over 32 characters long.
- AutoCAD 2007 DWG/DFX support.
- Direct, multi-sheet PDF creation with optional imbedded DXF export.
- New installer.

Several of these features have been previewed in greater detail in customer emails. In case you missed them they're featured here.



A multi-sheet PDF with embedded DXF and VC6 file.

Create Multi-sheet PDF Files with Embedded DXF and VC6

It's the same old dilemma: CAD files do not archive or email well and PDF files don't allow further CAD editing or machining.

With the upcoming Ashlar-Vellum Graphite v8 you can create multi-sheet PDFs directly from within Graphite and embed DXF and VC6 files directly in the file.

CAD files make lousy archive files because there's no way to embed system-specific features such as line styles, text fonts and hatch patterns. They are also difficult to email as some email systems change them to a text file. You can never be sure what you're drawing will look like from one computer to another.


PDFs email easily. They accurately reproduce fonts, line styles and patterns, but allow no access to manipulate the source data for editing, printing or manufacturing. In Graphite v8 you'll be able to create multi-sheet PDFs drawn from multiple models in the same file. Optionally embed a Graphite file or even a DXF export file directly in the file. Now everything for an entire project can be emailed safely, displayed accurately and archived conveniently.

Use Adobe Acrobat to further enhance your file, inserting and replacing pages, commenting and marking changes or tracking revisions.

To see a sample of a multi-sheet PDF with embedded Graphite and DXF files go to: <http://www.ashlar.com/get8/more.html>.

Spacebar Panning

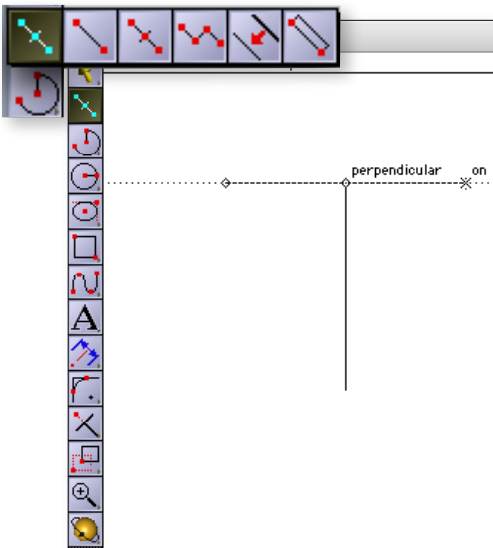
In Graphite v8 use the spacebar to activate dynamic pan.

1. Place the cursor over the portion of the drawing to move.
2. Hold down the spacebar. The cursor changes to the hand. 
3. Move the cursor in the drawing area in any direction.
4. The drawing dynamically moves with you at the same zoom level.

Mid-point Line Tool

The Mid-point Line Tool is previewed here as prototyped in our v7 user interface.

Use the Mid-point Line Tool to create a line that starts from the center and dynamically draws in both directions until the endpoint is clicked.



The Mid-point Line tool creates a line starting from the center that is dynamically drawn in both directions until the endpoint is clicked.

To use it:

1. Select the Mid-point Line Tool from the Line tool palette.
2. Click the first point.
3. Drag the cursor in one direction and the line grows symmetrically in the opposite direction.
4. Click again at the desired length.

New Installer

Graphite v8 features a new installation program that lets you quickly check to see if a new update is available from the website, then download and install just the update not the entire program. This allows you to:

- Keep your designated Preferences.
- Keep your registration code in place.
- Quickly install patches.
- Download smaller files.

Graphite v8 Presale

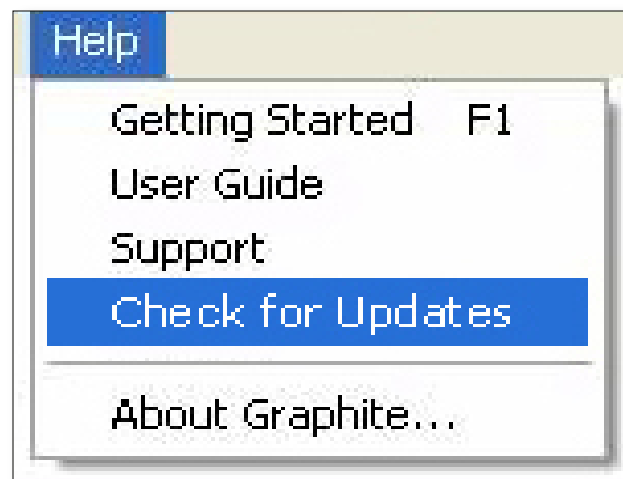
With the release of v8 the retail price of Graphite will increase to US\$1495. This means that upgrades will be \$495 to \$695 depending on the version you're upgrading from.

Preorder your upgrade by September 30 and save.

- Upgrade from Graphite v7 to Graphite v8 for just \$435.
- Upgrade from Graphite v6 or previous Vellum products to v8 for just \$610.

Cobalt and Xenon v8 Users to get Graphite v8

Remember, Cobalt and Xenon users get a courtesy copy of Graphite. When you upgrade to Cobalt or Xenon v8, you'll also get Graphite v8.



The new v8 installer in Graphite lets you easily check for update to the software.

Announcing Cobalt, Xenon & Argon v8

The new release of Cobalt, Xenon and Argon is expected in the first quarter of 2007. The following new features are anticipated in this release, however, this list is still subject to change:



Feature	Co	Xe	Ar
Conditional equations.	Co		
Feature arrays.	Co		
Real-time section profiles and cutaway views in edit window.	Co		
Enhanced rib tool.	Co		
Photo-rendered model-to-sheet views.	Co	Xe	
Non-photorealistic sketch rendering for stills and animations.	Co	Xe	
Real-time environment maps in edit window.	Co	Xe	
Graphite v8.	Co	Xe	
Real-time zebra, normal, curvature & draft check in edit window.	Co	Xe	Ar
Real-time display in 3D of imported scanned hand sketches.	Co	Xe	Ar
Direct support for imprinting profile sketches onto surfaces and solids to create surface sub-divisions.	Co	Xe	Ar
Accelerated Phong and Gouraud shading options for fly-by and walk-through animations.	Co	Xe	Ar
Accelerated Phong and Gouraud shading options for render to file.	Co	Xe	Ar

Feature	Co	Xe	Ar
Photo-realistic environment maps for stills and animations.	Co	Xe	Ar
Photo-realistic sunlight (from location and date/time) for stills and animations.	Co	Xe	Ar
Photo-realistic florescent lights and area lights for stills and animations.	Co	Xe	Ar
Enhanced arrow and move tools that directly move faces and edges in solids without using the specialized local face tools.	Co	Xe	Ar
Photo-realistic material changes displayed in real time in the edit window.	Co	Xe	Ar
Spacemouse-device support (Mac).	Co	Xe	Ar
Multiprocessor photo-realistic rendering & animation on OS X.	Co	Xe	Ar
Direct, multi-sheet .pdf creation with optionally embedded .dxf and .co/.xe/.ar files.	Co	Xe	Ar
Updated interface with dockable tools and palettes.	Co	Xe	Ar
New installer.	Co	Xe	Ar
Universal binary support of the Intel Mac.	Co	Xe	Ar

Preorder your Upgrade Now and Save

With the release of v8, the retail prices of Cobalt, Xenon and Argon will be going up. Special incremental pricing has been established. Each month between now and the end of January, the price increases. Now is the time to buy new v7 licenses and preorder your upgrades to v8.

Customers on our email list have received special offers already. If you haven't received an email from us, call your Ashlar-Vellum Channel Partner or contact our sales department directly at sales@ashlar.com or + 1 800 877 2745 for special pricing. The sooner you do it, the more you'll save.

Lighting Techniques for Great Photo-realistic Rendering

by Troy Starkey, Paradigm Design Associates

Rendering is all about simulating the real world as much as possible. If you are rendering something sitting on your table, think about everything that is going on in the room. What is around the object? Where is the light coming from? Is there light coming from different places around the room? How bright is it? What color is the light? What do the shadows look like? What is reflecting in the object? What kinds of highlights are on the object? All of these things are the result of lighting and the environment. Novice users often don't take the time to consider these things and then try to replicate them. It's no wonder most beginners' renderings don't look very good.

Lighting and the scene are the most important things to start with when setting up a rendering. Once the lighting and the environment are correctly set up, everything else falls into place.

Let's start our discussion with setting up basic lighting, how, and why. Photographers have known about the importance of light for a very long time, and they have developed some reliable techniques for setting up good lighting in a photography studio. Virtually all of a photographer's techniques are used in 3D rendering.

We'll start with a discussion of light types and how to set up your model. Then we'll move on to the most basic setup, called the **3-point light** setup. Most rendering starts with this setup, and then evolves into more advanced lighting setups. We'll talk about those more advanced set ups later in this article.

Lighting Types

There are three basic types of lights in Cobalt, Xenon and Argon. Here are some examples of what each one does, and how or why to

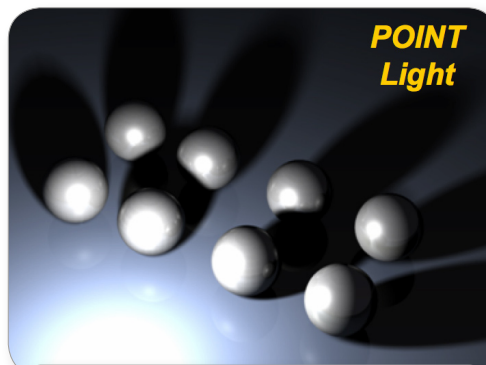
use each type. They can each be used in variations of the lighting setup we are about to learn.

Point lights are like light bulbs where the light emanates in all directions from a central spot. Notice how the shadows go off in different directions. Also notice how the shadows become softer the further from the object they get.

Spot lights can be aimed, like a flashlight, and have similar shadow qualities to the point light. Spot lights focus the light onto one area.

Distant lights are different, however. These are meant to simulate outdoor sunlight. They have very few settings, cast even light throughout the scene, and the shadows all go in the same straight direction.

Continued...



The three basic light types found in Cobalt, Xenon and Argon each emit light in a different way and are used together to create dramatic lighting effects.

Setting up the Model

To get started, create or open an existing object. Don't worry about any materials on the object. Make sure to add a simple floor under your object by creating a large rectangular surface or thin block.

Be sure to turn off or delete any existing lighting in the file you may have. In Cobalt, Xenon and Argon this happens automatically when you add your first light from the lights palette. One light, however, is left on, which is the *ambient* light.

The settings for this are found under the **View>Ambient Light Settings**. Just turn the slider all the way to zero to shut this light off.

Now you're really ready to begin the light setup.

Step 1: Add your first light, the main light or the KEY light.

The Key light provides the primary lighting for the object and scene. It should generally be the brightest.

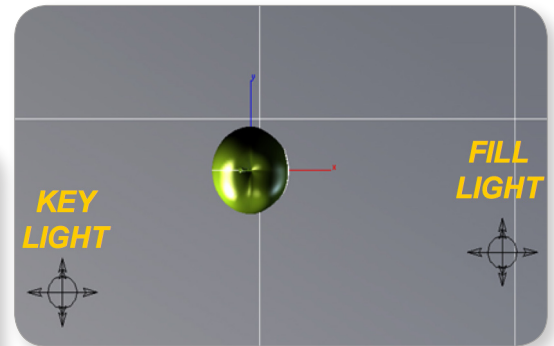
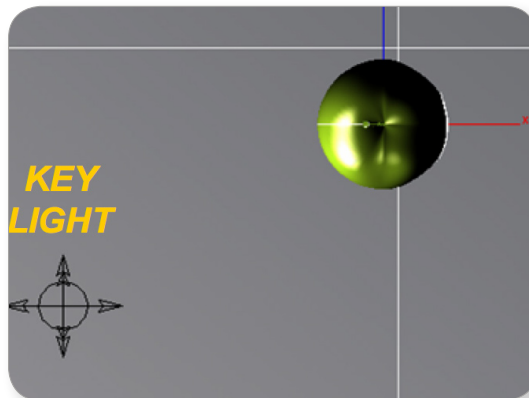
Start with the Point light. This is the simplest and most basic light to use and understand. Remember, it is like a light bulb, where light emanates in all directions out from the center.

When placing this light, consider where you would like most of the light on your object, and likewise, where the main shadow will fall. For example, will the main lighting be from the left of the object with the shadow falling to the right, or will the light be on the right with the shadow falling to the left? Usually this light should be situated fairly high above the model, around 45 to 60 degrees relative to the ground, if you were to

draw an imaginary line from the center of the light to the center of the object and then measure the angle.

As mentioned, this light should be very bright, but also consider the shadow. Sharp-edged shadows don't usually look very realistic, so set the light's shadow to be either *medium* or *soft* on the shadow settings.

Continued...



The Key light is placed in front of the object and to the left. Notice how dark the shadow areas are in this rendered image.



The Fill light is placed on the opposite side from the Key light, where the shadow falls. The Fill light helps to brighten the harsh shadow areas, and also adds a secondary highlight on the object.

Step 2: Add a secondary light, called a **FILL** light.

Since the main light will now cast a very harsh, dark shadow and a high contrast between the lit and unlit sides of the object, the fill light comes to the rescue to brighten those dark areas a bit.

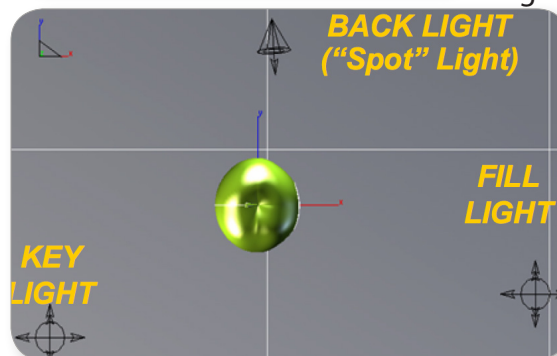
Use the point light again and place it somewhere on the dark side of the object so that it brightens that area. This light should not be too bright because you do not want to overpower the main light or wash out the object. Generally you should make this light about 1/4th the overall brightness of the main light.

Place this light lower than the main light, somewhere around 25 to 40 degrees above the object.

Make the shadows on this light either soft or completely blurry. This will give a nice subtle, secondary shadow, but won't overpower the main shadow.

Step 3: Add a third light, called a **BACK** light or **RIM** light.

This light is actually somewhat optional, but it can have a very important purpose and add a lot of depth and dimension to the rendering. As its name suggests, this light is meant to be placed behind the object, and its purpose is to create a highlight or rim along the top, back edge of the model. Think of a crescent moon as a good example. The



The Back light is placed low behind the object, and is pointed toward the shadow side of the object. Notice the rim of light that is created along the upper back edge and upper right back edge of the object.

reason for doing this is that it helps add a three dimensional feel to the model, and also helps make the model stand out from the background, especially if the background is dark.

Use the point light for this and place it somewhere on the back side of the object so that it creates a highlight area along the back and top of the object. This light can be bright, possibly even as bright as the main light. Just make sure that it doesn't cause a shadow that competes with the main shadow. Sometimes it is

helpful to shut the shadow off altogether on this light.

This light should be fairly low so that it will skim the top of the object. You may have to experiment with the placement a bit to get it just right.

That's it. This is the basic 3-point light setup.

Next, let's explore lighting, settings for the lights, and other lighting setups in more depth.

Using the **SPOT** Light

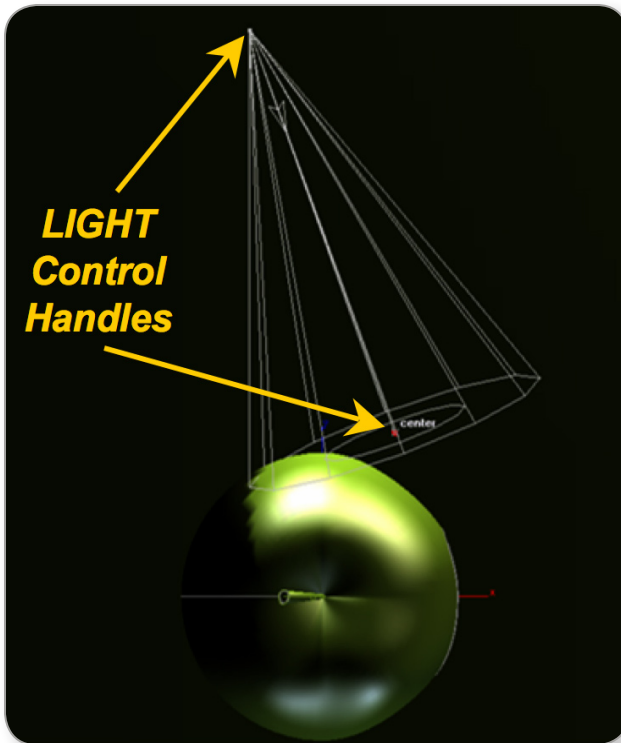
The Spot light is often a good choice for the back light. It was used in the previous images in this article. For example,

let's imagine your scene had a wall behind the object. In this rendering you decide not to have much light cast onto that wall. If you used the Point light for the back light, then a lot of light would be shining onto the wall, since light from a point light goes in all directions. To prevent this use a light that can be aimed, such as the Spot light.

Use the drop down menu in the Edit Objects dialog box to change the back light that's currently in the scene to the Spot Light option.

In order to aim the light, select the light and turn on control handles for the light. Use **Edit>Show Points** just like you do with other

Continued...



Use the Spot light's control handles to aim the lights as desired.

objects in Ashlar-Vellum software, such as lines or splines. Now you will see some control points on the light that can be selected and dragged. Select the one that is out in front of the light, and then drag that until it points where you want it.

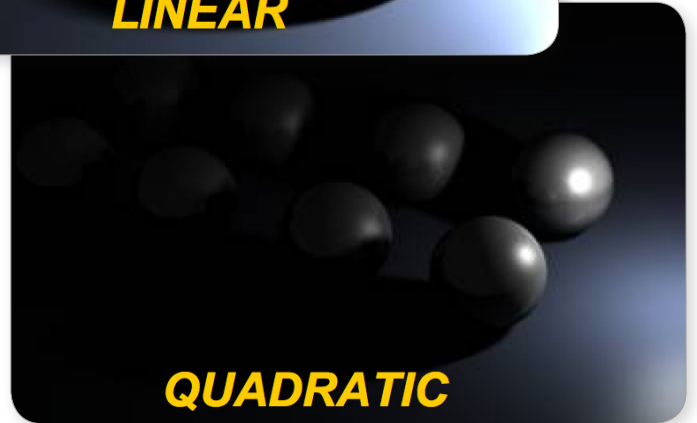
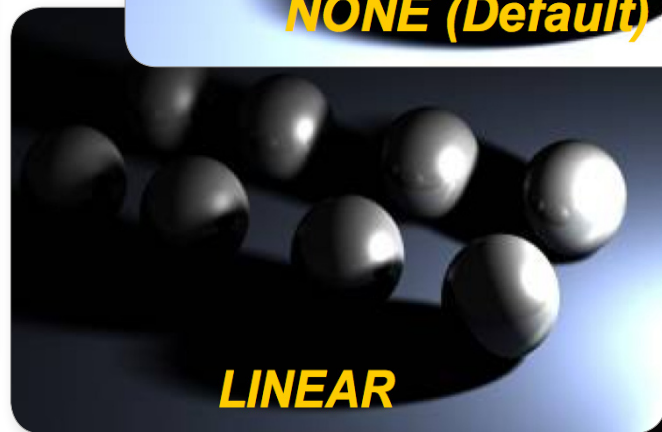
Next let's talk about some of the other options that are available for the lights.

Attenuation Settings

In the real world, light decreases in brightness the further away from the source it gets. In rendering, this is simulated and referred to as *attenuation* or *fall-off*.

In Ashlar-Vellum software, there is an attenuation option in the Edit

Objects dialog, with 3 main settings: *None* (the default), *Linear*, and *Quadratic*. Actually, there are two versions of the linear and quadratic settings called *clamped* or *unclamped*, which are meant for small or large scenes. In truth though, you will very rarely be able to visually see a difference in most renderings, so for simplification, we just need to know the difference between the settings *None*, *Linear*, and *Quadratic*.

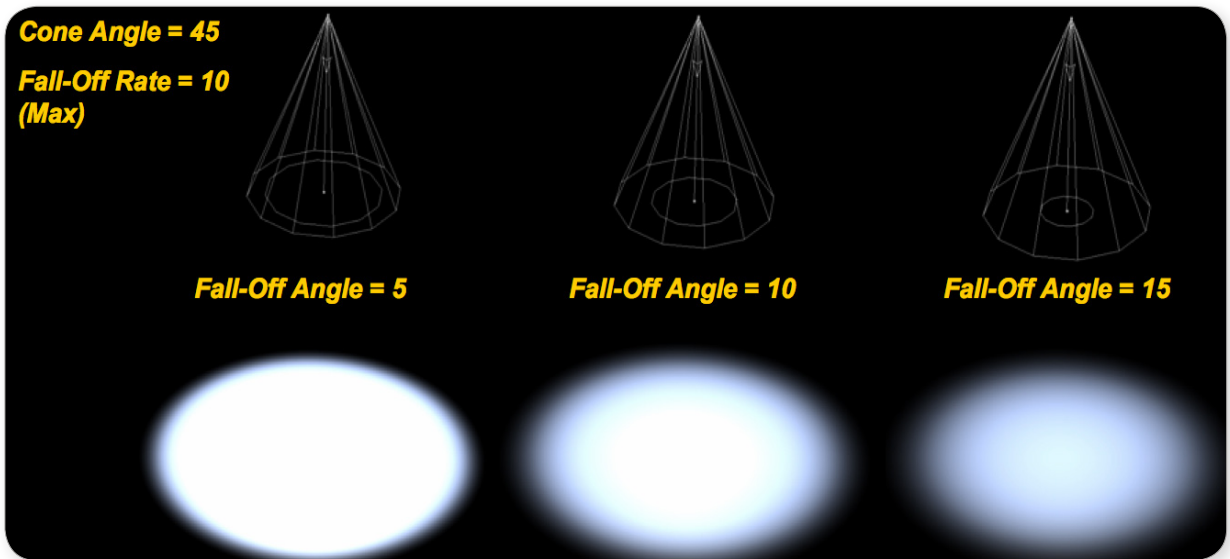


Attenuation settings in Cobalt, Xenon and Argon include None, Linear and Quadratic. Each simulates a different type of fall-off.

To get right to the point, Linear is the setting used most of the time in general renderings. This is the setting used in the previous apple renderings. It simulates a steady, even fall-off in the brightness of the light throughout the scene. The default option of None is not

Continued...

very realistic since the light brightness does not change no matter how far it is from the source. This setting tends to wash-out the rendering with too much light, so Linear is usually the best choice.



Additional Spot light options include cone angle, fall-off angle and fall-off rate as shown here.

Quadratic concentrates the light to a small area, and the light very quickly diminishes to nothing. Good uses for this setting are special situations like an LED or glowing display panel, where you do not want the light to brighten the overall scene, just make a small area appear to glow.

Spot Light Options

The Spot light has additional options that the other lights do not. It has options for Cone Angle, Fall-off Angle, and Fall-off Rate. Basically a spot light will be brightest in the center, and then fade to no light at the edge of the light cone. That's what these settings control.

Cone Angle = The overall angle of the outer light cone.

Fall-Off Angle = The angle between the outer cone and one side of the inner cone.

Fall-Off Rate = How fast the light fades from full brightness at the

center to no light at the edge (the gradient).

Continued...

Lighting Glossary

3-point light setup: the most basic lighting set up including a key, fill and back light.

Ambient light: light that comes from an unspecified source.

Attenuation: the fall-off in brightness the further from the light source.

Back light: the tertiary light that adds depth and dimension by creating highlights. Same as rim light.

Distant light: light that is cast evenly throughout a scene with shadows all in the same direction.

Fall-off: the attenuation or decrease in brightness the further from the light source.

Fill light: the secondary light for an object or scene that brightens dark areas and softens shadows from the key light.

Key light: the primary light for an object or scene.

Linear: an attenuation setting that simulates steady even fall-off in the brightness in a scene.

Point light: light that emanates in all directions from a central spot.

Quadratic: an attenuation setting that concentrates the light in a small area and quickly diminishes to nothing

Rim light: see back light.

Spot light: focusable light that is aimed in one area.

Advanced Setups

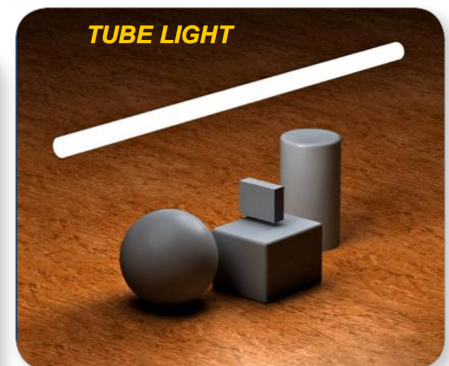
Here is an example of how the 3-point light setup progresses into more advanced setups. It's the same basic concept, except there are now multiple lights used for the Key light, as well as multiple lights for the backlight. The reason for using multiple lights in a cluster for the key light is that it helps produce better highlights as well as more realistic shadows. The shadows have a darker area underneath the object, plus they fade out more as they get further away from the object. The multiple backlights are used to create a more dramatic and even rim of light along the back of the object. Additionally, this scene has added an extra over-head light to simulate an overhead source such as a hanging lamp. The lights have also been slightly colored.

Here is what the final rendering with textures looks like with that lighting setup.

In closing, below is a teaser of some new types of lights that will be coming to version 8 of the Ashlar-Vellum Cobalt, Xenon and Argon 3D modeling products.



The final rendering with advanced lighting set up and textures.



Cobalt, Xenon & Argon v8 will include area and tube lights.



An example of a more advanced lighting set up with multiple Key and Back lights.

Lighting is only the first step in creating great photo-renderings. Other factors that make great photo-renderings include scenes and environment, and materials. Both topics are too large to be included here, but will be covered in future articles in the *Design Explorer*.

Argon in Surface Fabrication

Argon will be featured in the spotlight section of September's *Surface Fabrication* magazine. To check it out, go to www.surfacefabrication.com.

SURFACE | Fabrication

Greg's Podcast

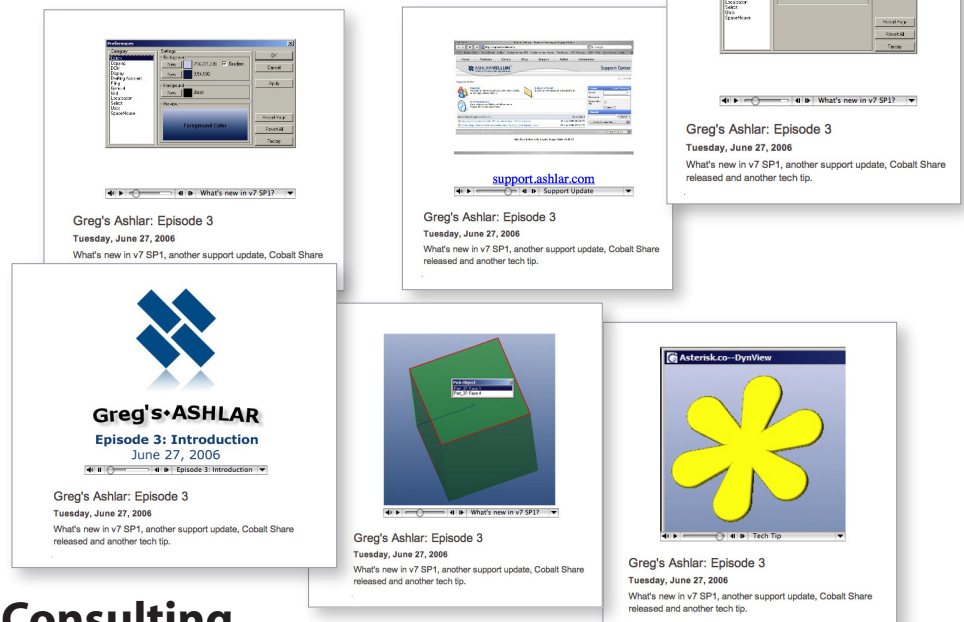
Have you heard Greg Morgan's newest Podcast? If not, it's an absolute must for a great run-through, of what was included in Cobalt, Xenon and Argon v7 SP1, released in May. Greg is Ashlar-Vellum's Product Manager. He gives you the inside scoop on:

- Gradient color backgrounds.
- File open times.
- Copy as instance feature.
- Layout settings for Model to Sheet.
- User pen styles.
- Chamfering faces.
- Gaps detected function.
- Enhancements to the tangent circle tool.
- Flip direction options for chamfering.

- Right mouse click to copy a surface's history.
- Fixes to the print preview dialog box.

Greg also includes a nice tech tip, an update on our new support site and highlights Cobalt Share.

If you haven't already subscribed, go to www.ashlar.com and click on **Community>Podcasts**. Under Greg's Ashlar, choose Episode 3.



Training & Quick Start Consulting

Do you ever wish you had someone to show you more about Ashlar-Vellum products? There are several options:

Local Training

Consult your Ashlar-Vellum Channel Partner. They provide great training classes in their local area.

Ashlar-Vellum Classes

Attend an Ashlar-Vellum training class in our offices in Austin, Texas. Classes are held throughout the year for Graphite, Introduction to 3D Modeling and Advanced 3D Modeling. You'll find the schedule on the website at <http://www.ashlar.com/sections/products/services/training/training.html>.

The cost for each 3-day class is \$1500/person.

Quick Start ConsultingSM

This web- and phone-based service offers private tutoring in one-hour increments of US\$150 per hour. Now you can get just the amount of help you need to get the project finished.

Don't Forget about Rental Options

Need a short-term license to Ashlar-Vellum software for a temporary employee or a brief project? Ashlar-Vellum now has yearly and monthly rental pricing through our web store. While buying a permanent license is least expensive in the long run, rentals provide a lower cost of entry without a long-term commitment.

One-year Rentals

One-year rentals are available with or without physical material delivery. Major upgrades are included in the rental price (electronic download only). Up to 50% of the total current continuous rental fees may be applied toward 50% of the permanent license price.

	Physical	E-only
Cobalt	\$1693.69	\$1596.00
Xenon	\$1192.69	\$1095.00
Argon	\$ 492.69	\$ 395.00
Graphite	\$ 492.69	\$ 395.00

All prices in US\$

Monthly Rentals

Monthly rentals are electronic download only. No physical materials are shipped. Full physical materials may be purchased separately for \$129.95, or a CD only for \$8.25, plus shipping. First and last month rental is required to begin, then the monthly fee is automatically billed to your credit card. Major upgrades are included in the rental price (electronic download only). Cancel any time. No refunds. Up to 50% of the total current continuous rental fees

may be applied toward 50% of the permanent license price.

Cobalt	\$159.95 (\$319.90 first/last months on inception)
Xenon	\$109.95 (\$219.90 first/last months on inception)
Argon	\$ 39.00 (\$ 79.90 first/last months on inception)
Graphite	\$ 39.00 (\$ 79.90 first/last months on inception)

All prices in US\$



New Web Banner Enhances the Bottom Line

The banner on the home page of www.ashlar.com has recently been updated. It links to a supporting page that talks about how Ashlar-Vellum software is designed to enhance a company's bottom line. For example:

- If you're more concerned about getting the job done than wielding the top selling brand of CAD or 3D design software, look carefully at the Ashlar-Vellum product line.
- If you're responsible for signing the checks each month and need every member of your team at top productivity, Ashlar-Vellum

software is for you.

- If your reputation depends on customer satisfaction driven by successful design revisions, you'll love Ashlar-Vellum programs.
- If you need to think through a design in 3D and have all the tools available at all times

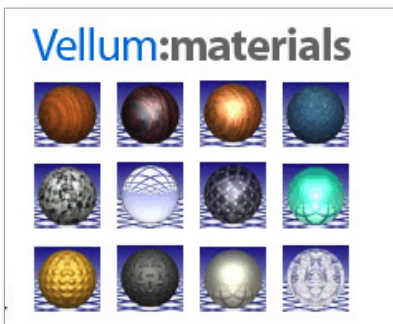
to do your job, Ashlar-Vellum is the only software that lets you do just that.

For 30% of the people we're 10 times more efficient than any other software, 100% of the time. Don't believe us? Try the others then [download a demo](#) and experience it for yourself.



Ashlar-Vellum Accessories

Vellum:materials is a collection of prototype surfaces and finishes that reduces the amount of work involved in rendering virtually any kind of computer-generated object, from kitchen countertops to medical instruments. This library of natural and manmade materials and finishes features over 300 choices on one convenient CD. The collection includes wide selections of ceramics, metallic paints, plastics, metals, fabrics, woods, leather, glass, and much more. Samples are suitable for use on architectural forms, furniture, industrial products, art objects, new product designs—nearly anything that can be conceived using Ashlar-Vellum's 3D modeling software products. US\$100.



Vellum:decals is a set of commonly used decals that saves time when rendering computer-generated objects. Vellum:decals has over 300 designs for use with Ashlar-Vellum Argon, Xenon and Cobalt, including: AV, computers,

digital, hazard, keyboard, recycle, shipping, signage and telephone. US\$100.

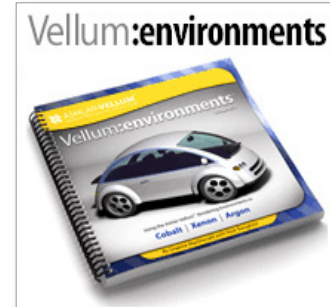


Vellum:tracks is a collection of 13 original royalty-free music tracks to enhance movies made in Cobalt, Xenon & Argon, or any other 3D software that makes movies. Music can be edited to any length using an audio editing program. Give your presentations that final touch of professionalism they deserve. See the website to hear the tracks. US\$100.



Vellum:environments is a set of 15 virtual photography studios with large smooth surfaces, pre-lit for easy modification. There are also step-by-step instructions for getting the best

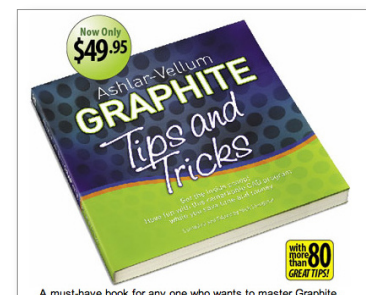
results while rendering, illustrated explanations, and a trouble-shooting guide. US\$100.



Graphite Tips & Tricks is a book that offers power-users all kinds of useful insider's information for saving time. Learn how to:

- Easily access a floating tool palette.
- Quickly create annotated leaders.
- Place radius, diameter and angular dimensions at precise locations.
- Instantly create tangent and perpendicular lines.
- Create non-associative detail views.
- Effectively use macros.
- Create smart walls along their center lines.
- Create solid-looking 2D flattened images of 3D parts.

US\$49.95.



A Designing Machine



Wallace Beaudry is a machine designer, or maybe more accurately, a designing machine. He holds 40 patents, runs three companies and has designed and manufactured not only scores of products, but also the machines and tooling to manufacture those products.

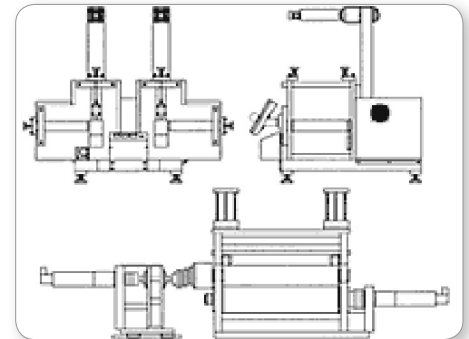
Since 1993 Beaudry has used Ashlar-Vellum software to design equipment used in the packaging, medical and electrical fields around the world. The unique Vellum interface is incredibly productive for conceptualizing new products and drawing the machines to manufacture them. Says Beaudry, "The geometry engine is phenomenal." Beaudry especially loves the fluid way in which the Drafting Assistant allows him to intelligently reference previously designed geometry to create new geometry. That's handy when making production tools.

Beaudry's companies produce everything from adhesive labels to flexographic printing machines; from cardiac defibrillation electrodes, to rotary cutting dies. He says,

"When I work, my train of thought is centered on the design and development of a product. With Ashlar-Vellum software I can quickly get that idea on paper and that's of great value to me. If I had to use AutoCAD to design, I'd lose my train of thought."

Tooling is a critical factor for each of his companies. Ashlar-Vellum software allows Beaudry to efficiently accomplish tooling production, factoring complex machinery such as stretch fixtures for wound dressings. Beaudry also finds the built-in translation tools that export directly to his CNC machine to be especially helpful.

Ashlar-Vellum software maximizes Beaudry's productivity in every step, enabling him to design more in less time. Because he can leverage his geometry and design process, he moves through product design to machine design, and on to tooling design in order to produce the important products that have an impact on the world around him.



Wallace Beaudry uses Ashlar-Vellum software for machine design (above), tools like these rotary drums (middle), and product design like this wound dressing (bottom). One software program lets him effectively do it all.



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