

The Design Explorer

The Ashlar-Vellum User Newsletter

First Quarter, March 2006

Greg's Ashlar Podcast



Check out Greg Morgan's podcast.

Ashlar-Vellum product manager, Greg Morgan, has started podcasting. Podcasts are audio and video episodes that can be downloaded to your iPod or simply enjoyed on your computer. *Greg's Ashlar* is Morgan's own corner providing the inside scoop on the products, development and lots of other cool things about Ashlar-Vellum software. Get to Greg's free podcast through the iTunes website or to www.ashlar.com and click on **Community>Podcasts**. Subscribe to this free podcast to be automatically notified when new episodes are available.



Au Makes the Cover of Forbes

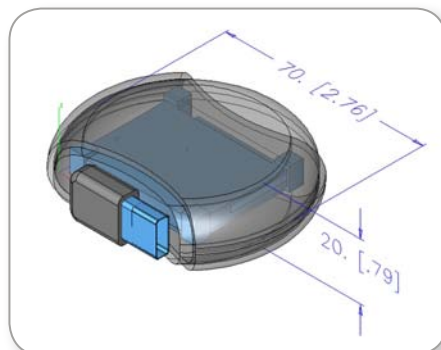
Congratulations to Nelson Au, Cobalt user and designer of the Seagate pocket hard drive, for "making the cover" of *Forbes* magazine in January along with CEO Bill Watkins. Au designed the popular hard drive in Cobalt.

He particularly loved the way Cobalt presented shaded dimensional drawings with transparency, allowing the client to visualize the inner workings and verify precise fit of the components. Check out the new

banner on our home page at www.ashlar-vellum.com to see how we've acknowledged Au.



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Quick Start ConsultingSM

Ashlar-Vellum is in the midst of rolling out a new service in the United States. Quick Start Consulting is a new web- and phone-based, one-on-one tutorial service purchased in one-hour increments at US\$150 per hour.

The idea is to give someone that little bit of extra hand-holding needed to quickly make them productive. It's like having a friend in your office say, "Let me show

you just a couple of things that will really make this program easier."

We are looking for several power users in any time zone who would like to contract with us to provide this service to new users. If you'd like to make a few extra dollars doing something you already know and love, please contact Shane Walker shane.walker@ashlar.com.

Support for Intel Mac

Ashlar-Vellum's development team is working to support our entire CAD and 3D modeling product line on the new Macintosh computers using the Intel processor. We have had an early Mac-Intel development machine in our office since it was first available and will continue the enormous task to port our code, negotiating obstacles with our technology partners as we go. No timeframe for release is currently announced.

Cobalt, Xenon, Argon and Graphite have all been tested and operate on the Intel Mac under the Rosetta emulator. Any initial problems found by Ashlar-Vellum were reported to Apple and have been resolved by them. We will continue further testing and are confident that Apple will be able to fix any issues in Rosetta.

Christopher Griffin, Ashlar-Vellum's VP of Software Development, commented, "Since we are

Arnold CAD Named Ashlar-Vellum Channel Partner of the Year

Switzerland's Arnold CAD has been named Ashlar-Vellum's Channel Partner of the Year for 2005. In the past year Walter Arnold has done a huge amount to increase communications with his customers throughout Switzerland, Germany, Austria and Lichtenstein. In the fall he added Karl Gisler, an experienced

sales professional. He has also opened a new training facility in Altdorf, Switzerland. This quarter, Arnold CAD will be one of our first international channel partners to send this edition of *The Design Explorer* user newsletter to his customers in their native language. Congratulations Walter. We wish you all the best for 2006.



It's like having a colleague show you a couple of things to make the program easier.

porting our products to Xcode anyway, this comes at an opportune time." Robert Bou, president of Ashlar-Vellum, further added, "Our history of supporting both Mac and Windows puts us in an excellent position to make this happen."



Congratulations Walter Arnold.

Hot Fix 3 Released for Download

Hot Fix 3 for Ashlar-Vellum Cobalt, Xenon and Argon v7 has been released and is available for immediate download from our web site at:

<http://www.ashlar-vellum.com/v7>

Hot Fix 3 specifically addresses:

- Issues with the positioning of flyout palettes
- Shortcuts activating wrong tools
- Hatching irregularities
- Idiosyncrasies with model-to-sheet

- Various crash conditions
- Inappropriate part orientations
- A number of other bugs

Previous issues addressed in Hot Fixes 1 and 2 are also wrapped into Hot Fix 3.

A CD was mailed to all customers who normally receive physical materials. E-only customers did not automatically receive a CD but can purchase one for US\$8.25 plus shipping if needed.



Service Pack 1 Approaching Count Down

The Ashlar-Vellum development department is hard at work on Service Pack 1 for Cobalt, Xenon and Argon. A beta version was released to Quality Assurance for first round testing in early February. Ashlar-Vellum Product manager, Greg Morgan, commented, "This will be a good release. It's more than just bug fixes. There's going to be a lot of

little things that people have been asking for."



Along with Service Pack 1 will come an updated version of Cobalt Share, our free utility that allows those who do not own a copy of Cobalt, Xenon or Argon to open, view, print and export these files. Look for SP1 and Cobalt Share sometime around the end of the second quarter.

Update on Legal Matters

Germany

The appeal of POSH GmbH (formerly Vellum GmbH) of the court's ruling in favor of Ashlar-Vellum's ownership of the Ashlar logo and the bricks has been denied. Because it was considered a frivolous appeal, they are not allowed to appeal to Germany's equivalent to the Supreme Court.

We are preparing to file the next phase regarding unauthorized use of our software.

Holland

The time has expired for Desaro BV (formerly Vellum Benelux, BV) to appeal the court's decision in favor of Ashlar-Vellum's claim on all logos and all versions of the

Vellum Classic software. We have received information in order to calculate damages.

Japan

Our lawyers have sent the second official warning letter. We will now begin to file a case against Concepts Technology in one or more phases.

Avoiding the ACIS Error Monster *Or How to Build Models that Really Work*

You're hard at work putting the finishing touches on a model when suddenly it won't shell or the edges can't blend. On the screen, as if out of the black

lagoon of 3D hell, looms the dreaded ACIS Error. Horrors! How was this monster invoked and how can you avoid becoming the object of his evil eye ever again?

While there are a large number of specific conditions that will spawn that demonic creature known as the ACIS Error, most stem from the same three root causes.

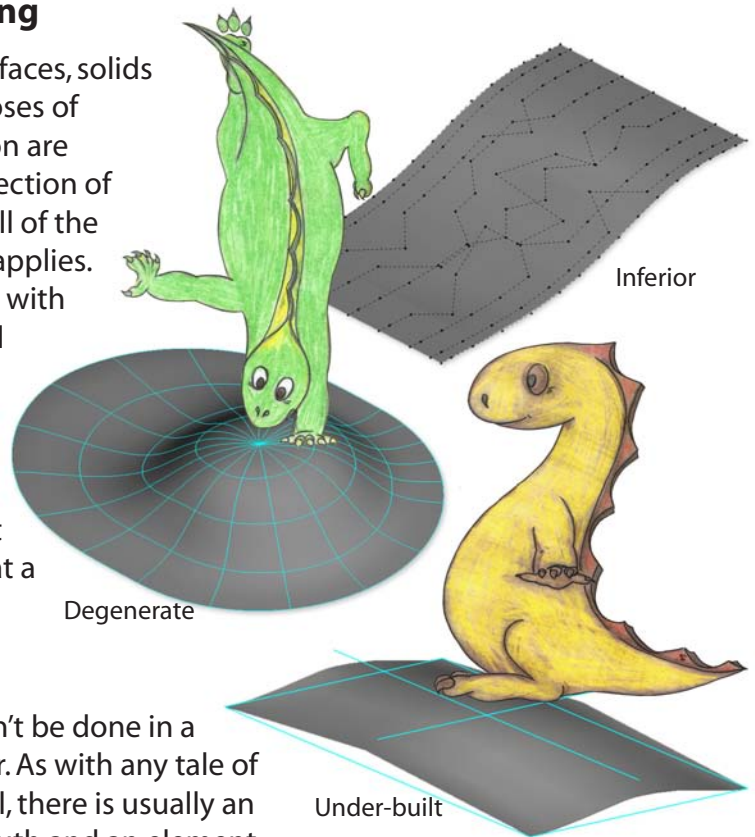
The Three Mortal Sins of Three-D Modeling

The three surface conditions that breed evil within your 3D modeling files are very specific:

1. Under-built or exact-built surfaces
2. Degenerate surfaces
3. Imported inferior surfaces

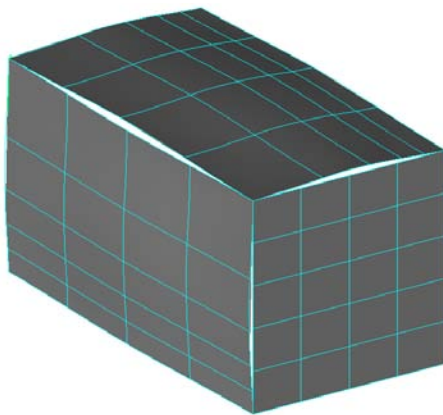
A little knowledge presented in the following pages will help you avoid all three, and therefore walk in the way of the light, avoiding the dark side that only leads to modeling death. Be aware that while this article

speaks of surfaces, solids for the purposes of this discussion are merely a collection of surfaces, so all of the information applies. Any problem with a solid model would have appeared in a surface modeling program, just one surface at a time.



Don't Assume Surface Modeling is Safe

Some people think that surface modeling software will get things



While surfaces may appear water-tight, in reality they may not be when closely inspected.

done that can't be done in a solid modeler. As with any tale of good and evil, there is usually an element of truth and an element of falsehood. It is true that surface models are developed one surface at a time, which promotes the understanding of what works and what doesn't. In solid modeling, surfaces are handled as a group so if something is wrong, you won't know which surfaces are the specific problem. Ashlar-Vellum Cobalt, Xenon and Argon all have tools to determine what is wrong with a surface or solid

model. What is untrue about surface modeling is that the resulting surface model is always water-tight and manufacturable. Since you can only look at the surface-to-surface interactions, it's possible for them to look correctly matched and you will assume everything is safe, only to have another monster rear its ugly head in manufacturing, this time as an enormous failure.

Under-built or Exact-built Surfaces—The Bane of Modeling Existence

The most common evil in 3D modeling is usually the under-built surface, or one that is built to the exact size and then shrinks when offset. The key problem is that many surface tools, in all brands of 3D modeling software, don't tell you that you're constructing a mathematically difficult, if not impossible, situation. They simply assume you know what you're doing.

The *Net Surface* tool is one of the most misunderstood and therefore most dangerous beasts because not only does it create under-built surfaces, but it will create a surface with edges that are not where you think they're going to be. It appears to draw the surface to the curves or wires, but does not. Treacherously it uses the

curves like springs to pull the net surface toward it, but the surface "gives" and doesn't lie along the wires. If you move a curve you'll see that while the wire influences it, the edge of the curve is not drawn exactly to the edge, leaving a gap that will cause problems downstream.

Then, if you create another surface using the original wire, it won't actually be touching where you think that it does. Of course, many a knight in shining armor has attempted to slay this dragon by using the created edge instead of the wire to build the new surface. While this works part of the time, there is still a chance for mortal failure because the net surface is an under-built surface and when an offset is applied, it may shrink

too much or not expand enough to accommodate the offset.

When a surface shrinks too much in offset, ACIS is required to use it anyway and will attempt to grow the surface. Depending on the original wires, mathematical order and a bit of black magic, it may not be able to grow it and will instead conjure the ACIS Error.

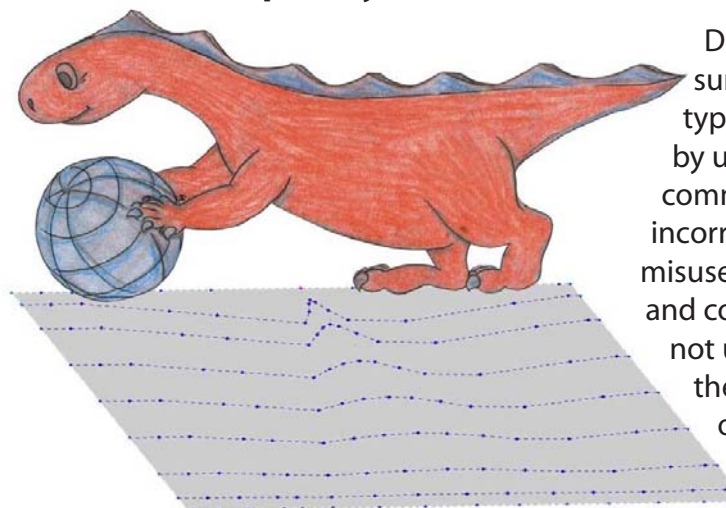
The best defense in this condition is to overbuild the surface and use trimmed surfaces. When ACIS offsets a trimmed surface and it shrinks too much, ACIS looks at the untrimmed surface and can see the way in which the surface needs to grow to mathematically complete the operation.

Degenerate Surface—Beyond the Point of Depravity

While it is possible for Cobalt, Xenon and Argon to appear to create surfaces with zero edges, such as a sphere, or two edges such as a cylinder, in reality, by the NURBs definition, each have four edges.

All surfaces by definition are 2D and by convention the directions are called U and V local to the surface, not X and Y which are global to the 3D object.

Turning on the isoparms show the U and V directions. Look carefully. When the U and V lines converge it is an edge not a

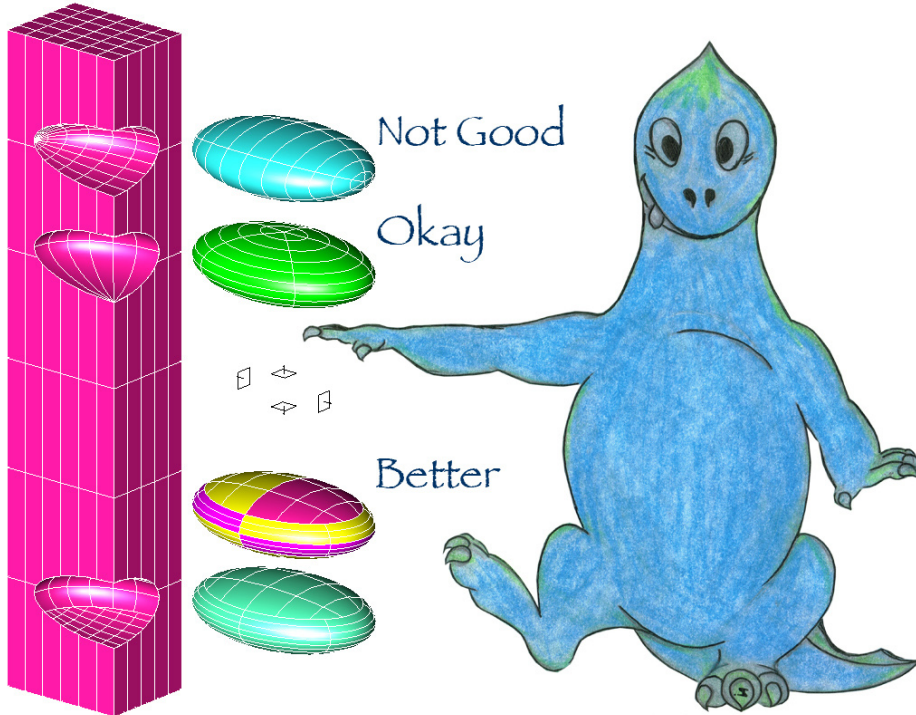


point. If any points along an edge of a surface are too close together, the surface is called degenerate.

Degenerate surfaces are typically caused by using surfacing commands incorrectly, such as misuse of the sphere and cone primitives, or not understanding the ramifications of surface tools such as *Skin*, *Ruled*, *Two-rail*

Sweep and *Lathe*, or solid tools like *Lathe*, *Two-rail Sweep* and *Section Solids*.

Continued...



When subtracting an ellipsoid from a block, redefine the ellipsoid so that the degenerate edge is no longer along the block edge exactly.

This can cause destruction in older Computer-aided

Manufacturing and Computer Numerical Control Machining

Imported Inferior Surfaces—Those Foreign Devils

Models imported from other modeling software may be inferior for several reasons. They may be under-built, they may contain degenerate surfaces, or they may be “heavy,” or contain too much extra data that is perhaps in conflict with itself.

entire edge does not come to a point, but somewhere in the surface there is a mathematical point that you may not see, causing the smooth surface to become “bunched,” as shown in the illustration.

There is a special case of degenerate surfaces where an

To guard against evil when importing a foreign file, use the *Verify* tool in Cobalt, Xenon or

Slay the Monster, Rescue the Model, Be a Hero

The green-eyed ACIS Error monster no longer has to plague your existence, ravage your models and wreck havoc in your

designs. Once you understand these guidelines and avoid these mortal sins you have complete flexibility within Cobalt, Xenon

systems which simply can't calculate degenerate surfaces. It is also a major source of evil within Cobalt, Xenon and Argon when the degenerate surface interacts with another surface at the point of degeneration.

For example, examine an ellipsoid showing the isoparms. Where the isoparms converge on the ends are potential trouble spots as these are infinitely small edges, not points.

Therefore, when you subtract the ellipsoid from a block in such a way that the degenerate edge lies along the edge of another surface this creates a potential hazard.

To defend against this situation, redefine the ellipsoid so that the degenerate edge no longer lies along the other edge exactly.

Argon to report and attempt to repair grossly bunched surfaces. Another good defense is the *Simplify Objects* tool, which looks at the NURBs and turns them into analytic surfaces, simplifying the definition of the surface. The *Rebuild* tool rebuilds complex surfaces into simple NURB surfaces if possible.

and Argon to create anything you want in any way you choose.

Not Your Daily Grind

Prior to finding Graphite, John Bicht of Versalab spent 15 years coping with AutoCAD's rigidity and MicroStation's counter-intuitiveness. "The problem was," said Bicht, "you had to figure out the position and dimensions of something before you were even sure you wanted it in the design." Frustrated, he gave up on CAD and went back to paper and pencil. "Programs like AutoCAD may suit draftspeople," comments Bicht, "but never designers."

In the late '90's Bicht discovered Ashlar-Vellum software and immediately fell in love. He soon upgraded to Graphite, though he continued using only its 2D capabilities. "I can state absolutely that if not for Graphite I would still be using paper and pencil." Working in Graphite, Bicht created the M3 Espresso System.

"I quickly learned how to actually be more fluid in Graphite than I was on paper. I was able to make a complicated machine layout and derive detail drawings faster and easier than I could ever have done on a drawing board."

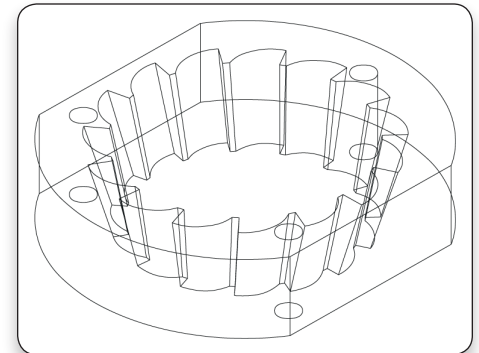
The initial M3 design utilized a set of commercially available metal burrs for grinding the coffee, known for producing superior flavor. Two sets of burrs had been used in the prototypes and now with sales pending, Versalab placed an order for 15 additional sets from the Italian manufacturer. Unfortunately, the Italians had stopped making the burrs. Versalab had fully assembled grinders with no mills. After much negotiation, the Italians offered to make 200 sets of burrs, prepaid, at \$100 per set, scheduled for one-month delivery.

Faced with a \$20,000 problem that Bicht knew would never be delivered in 30 days, he sat down with Graphite, and having never used Graphite's 3D capabilities, in an hour and a half figured out how to create the complex 3D drawings of the conical-shaped burrs for this first-class coffee grinder. The 3D drawings were quickly converted to IGES files and sent to a water-jet tooling company who manufactured the mills in a fraction of the time and cost.

For the next version of the M3, Bicht is moving from Graphite to Xenon. He will start generating interest among coffee connoisseurs using photo-realistic renderings prior to ever building a physical prototype. Says Bicht, "Ashlar-Vellum allows us to make the M3 Espresso System the most amazing espresso equipment anywhere in the world."



The M3 Grinder's revolutionary design eliminates all residual grounds so there are no oxidized remains from previous grindings.



Bicht created the complex 3D drawings for the M3's conical-shaped burrs in about an hour and a half, never having used Graphite's 3D capabilities before.

Background/Contact:

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In the Spirit of Great Design



Celso Santos and Christian Albanese of Rio 21 Design have good reason to be proud of their Spirit beach umbrella. Like all residents of Rio de Janeiro, Brazil, Celso and Christian have spent their lives on the city's famous beaches. It is only natural that these innovative designers would come up with a new umbrella with three unique features solving several common problems.

The first thing you notice about this sunshade is that it opens inside out. This lets it react naturally in strong winds. Since its purpose is to protect from the sun, not the rain, this makes perfect sense.

Sunshades take off along the beach at the first gust of wind because they are not anchored securely into the sand. Yet increasing an umbrella's grip is not an easy task, even for the "tall and tan and young and handsome... boy from Ipanema." The Spirit solves this problem with a levered handle to easily auger the unique heliod tip down into the sand. The top half of the articulated shaft then snaps into place with a 90° turn, and the party begins.

But as simple as these design concepts may sound, Rio 21 spent months researching, designing in Cobalt, prototyping, and testing eight different concepts for screws and threads to auger into the sand. "The first attempt was a complete flop," said Celso. "We describe it now as a sand moving tool." After much effort, they came up with two prototypes that worked perfectly. The problem was that they were made of sinterized steel or aluminum casting, making the cost too high. They decided the tip had to be produced in plastic. Returning to Cobalt, they redesigned the spiral specifically for injection molding manufacturing and this time found success.

Next, they needed a handle that made it easy to bore the tip in the sand. Again, the first design, a crank, was rejected in favor of a lever that flipped into place allowing both hands to screw it into the beach. Flip the handles into the vertical position and the top portion of the shaft with the umbrella snaps into place with a twist.

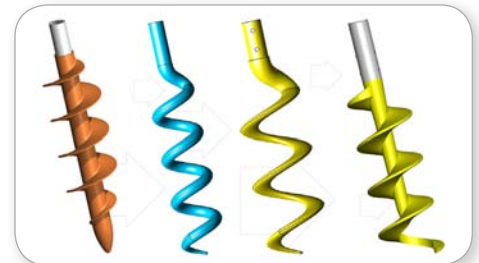
Celso and Christian concur:

"We thought that it was very important to tell everybody that we used Cobalt from the beginning to design every detail of this product. Besides being technically perfect, it is a tool that allows us to communicate with clients, suppliers and consumers."

Shortly after release, the Spirit won Germany's coveted iF International Forum Design award for leisure and lifestyle.



The award-winning Spirit sunshade.



From left to right, the first "sand moving tool," the perfect but too expensive steel prototypes and the final injected polypropylene tip.



The over-injected handles easily screw the tip into the sand, then flip vertically to receive the upper shaft.

Background/Contact:

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