

# The Design Explorer

## The Ashlar-Vellum User Newsletter

First Quarter, 2008

### Ashlar-Vellum Turns 20

In January Ashlar Incorporated celebrated the 20th anniversary of its founding by Dr. Martin Newell, Dr. Dan Fitzpatrick and Grant Munsey in Sunnyvale, California. Dr. Newell, the most influential person in CAD usability, was a researcher at Xerox PARC during the 1980s. His research on the interaction between computer and user contributed to the development of such important tools as the graphical user interface and the mouse. After leaving Xerox PARC, Dr. Newell envisioned a "heads up" interface for computer graphics that freed the user to focus on designing without being distracted by the

software. His technology became the cornerstone for Ashlar-Vellum's revolutionary user interface known as the Drafting Assistant™.

Ashlar-Vellum's renowned interface and family of design tools has earned the loyalty of industrial designers and conceptual thinkers for twenty years. "From the beginning, Ashlar-Vellum has provided highly intuitive and easy to use tools that let designers quickly capture and present their ideas," says Robert Bou, president of Ashlar-Vellum.

In 1988 Ashlar Incorporated was founded. Version 1.0 of

Vellum® 2D was released in 1989, followed by the introduction of Vellum 3D in 1991. In 1998 Vellum Draft and Vellum Solids were introduced into the product line. In 2001, Ashlar added Vellum to its company name and rebranded their products as The Designer Elements™, including Cobalt™, Xenon™ and Argon™ for 3D modelling and Graphite™ for 2D/3D drafting.

Today, Ashlar-Vellum continues to develop 2D and 3D software to facilitate organic workflow and ideation required for great design.

### Cobalt, Xenon and Argon v8 Release for Windows

The Windows version of Cobalt, Xenon and Argon v8 was released January 28th and is posted to the website

for immediate download. To download the released version go to [www.ashlar.com/v8](http://www.ashlar.com/v8). We continue to make progress on

the Mac versions. Expect Xenon and Argon v8 to be released shortly for Mac, with Cobalt to follow a little later.

### New Hot Topics & FAQs

There's a new section on our website for Hot Topics and Frequently Asked Questions. If you haven't checked it out, you'll want to do it soon. It's a great place to find a number of industry issues and how they relate to Ashlar-Vellum users. You'll notice that some of the



text from today's newsletter is included there for easy reference. Most of these articles are generated by questions from customer emails. If there are things you'd like to see addressed, please let us know. The easiest way is to simply send an email to [sales@ashlar.com](mailto:sales@ashlar.com).

## Support for Die and Box Design

There are three options for creating die cuts using software based on Ashlar-Vellum Graphite technology. All of them support both Mac and Windows.

The first option is to use Graphite plus the Box Library from Rules Software.

See:

<http://www.rulesoftware.com/>

The Box Library is not individually listed on their website but can be purchased for about US\$895 by contacting Rules. This option is good for creating die lines for die cuts to drive a sample table or can be processed through die design software to layout the steel cutting rule, etc.



The second option is to use Box Vellum Graphite by Comnet in Japan.



See:

<http://c11cjyl0.securesites.net/eng/bvg5.html>

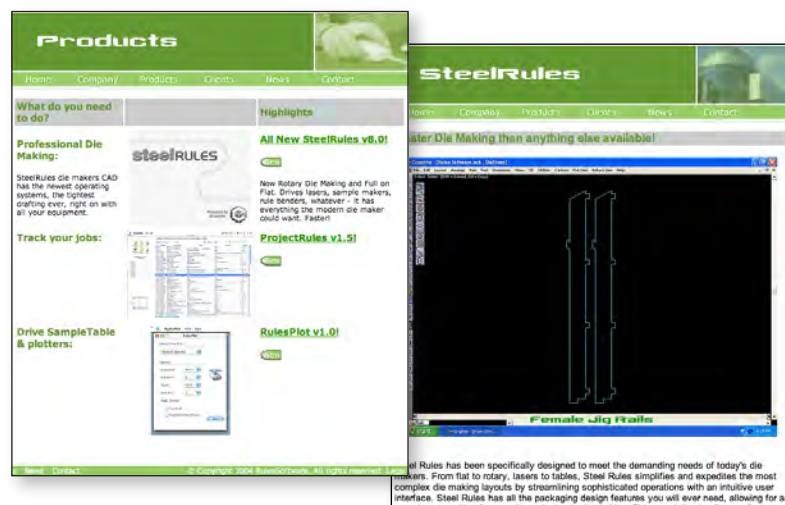
This uses a special version of Graphite, a box library, plus some special features for box design.



The third option is to use SteelRules, also by Rules Software (see above).

See:

<http://www.rulesoftware.com/ProductsPages/Products.html>



SteelRules is based on a special version of Graphite with additional features for full box and die design.

## Reading AutoCAD's DWF Files

Please bear in mind that Autodesk invented the DWF format as a non-editable format to view an AutoCAD file. Anyone who creates a DWF file does so with the express purpose of preventing its import into other systems to edit or change the file.

DWF is Autodesk's own PDF, so to speak. It is an imprecise format that gives an exact visual representation but intentionally does not provide precision geometry.

Since there are always hackers who want to crack file formats, just for the sheer challenge of doing so, it is possible to find programs cracking DWF to DXF.

There are legitimate file viewers to see DWF files available on both Mac and Windows.

For Mac:

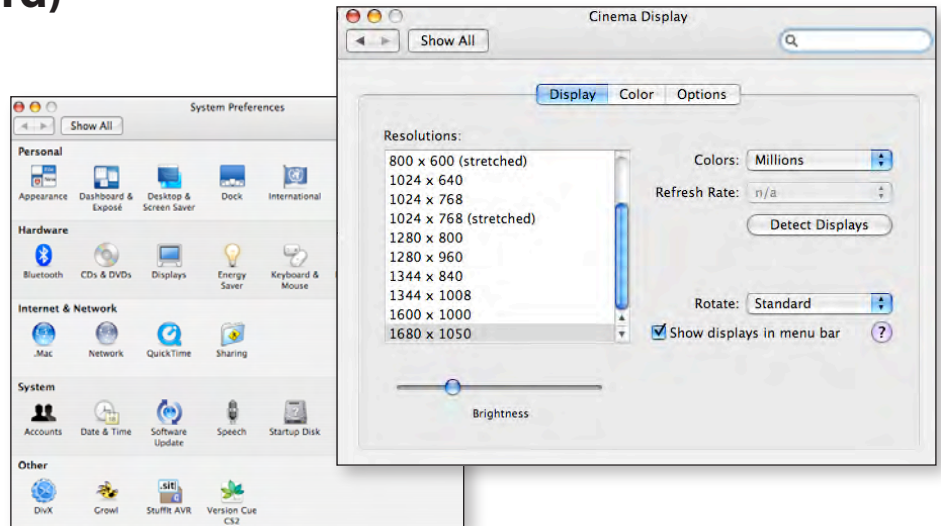
<http://www.macdwf.com/>

For Windows:

<http://www.autodesk.com/designreview>

## Graphite v7 & v8 Disappearing Palettes in Mac OS X 10.3/.4/.5 (Panther, Tiger, Leopard)

Some Mac OS X users have occasionally experienced tool palettes disappearing when clicked upon in Graphite v7 or v8. The simple solution to this is to do the following. Under the Apple logo in the upper left of the screen, open the System Preferences then click on Displays. Under the Display tab, change your colours to Millions. The upcoming Xcode versions should not have this problem.



## Services to Know About

We've come across a couple of great services that we think people like you might want to know about.

### Ontrack Data Recovery

Have you ever had a hard drive crash and needed to recover the data? Or needed to get a file that was carefully archived long ago on to a tape cartridge, magneto optical drive or other medium that you no longer own the hardware to read? Whether you require on-site emergency services, remote data recovery

or do-it-yourself software, Ontrack is worth knowing about. Free quotes are available. See their website at [www.ontrackdatarecovery.com](http://www.ontrackdatarecovery.com).



### Datawitness

Datawitness offers a way to certify, sign off and archive legally-binding messages, contracts and files via email that are witnessed by an independent third party. This is a great way

to send project contracts, design deliverables and communications where "he said, she said" needs to be avoided. At only \$4 per submission, stored for 35 years or more, it's easier than a certified letter and you don't have to stand in line at the post office. Learn more at [www.datawitness.com](http://www.datawitness.com).



## Welcome Dmitriy Belous

Dmitriy Belous is the newest member of our technical support team. He comes from Zhovti Vodi, southeast of Kiev, Ukraine. He is a professional designer and was a

Cobalt user at a Kiev design firm prior to joining Ashlar-Vellum. We are pleased to have Dmitriy aboard.



## What you Need to Know about Adobe's PDF

Ashlar-Vellum's technical department is often asked, "How do I import and edit a PDF into Cobalt (or Xenon or Argon)?" It's a good question with a very complex answer.

First, be aware that files captured to Adobe's Portable Data Format (PDF) are usually not intended to be manipulated later in different CAD systems. The reason for using a PDF is to preserve the visual integrity of the document while providing access for easy review and markup, and at the same time preventing unauthorized changes to the data.

In certain cases, however, it is possible that the creator of the PDF file intended that the data be available for editing. In this case they must take specific steps to ensure that the appropriate type of PDF is generated, or that a specific attachment is inserted into the PDF.

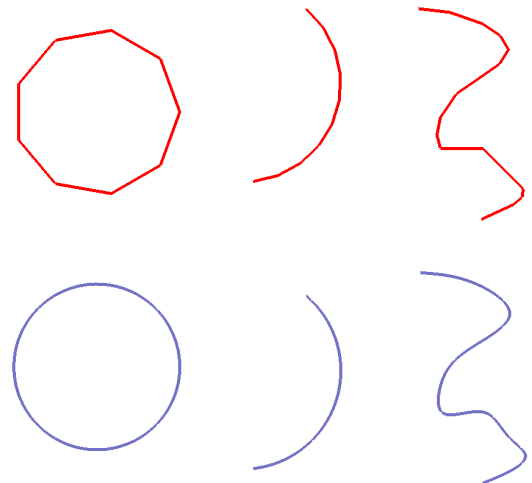
### **The Eight Types of Data for Adobe PDF version 8**

As we consider this issue, let's look at the background of PDF. PDF is essentially a "data carrier" that accepts many types of data. The PDF display software then interprets and displays this data exactly as it was accepted, regardless of operating system, system preferences, installed fonts or the program used to create the document.

There are eight types of data that can be captured and displayed in a PDF file. There are five types of basic data that are generated by "printing to" PDF and three types of advanced data that can only be generated outside the normal "print to" process. They are listed below.

#### **Basic Data**

1. 2D bitmaps, including photographs and images.
2. Text, stored as actual text with a reference to an external font.
3. Text, stored as actual text along with the font subset embedded into the file.
4. Text, stored as 2D vectors with "paths." These paths are collections of 2D vectors that are connected end to end.
5. Tessellated 2D vector data, containing thousands of line segments, generally rounded to the nearest 1/65,536 of the maximum vector length. Tessellation is created when a precise geometric shape is broken into a series of small line segments that will display and print as something that approximates the appearance of the original.



On top, tessellated 2D vector data created from precise geometric shapes below.

#### **Advanced Data**

6. Analytic 2D vector data, precisely defined, including lines, rectangles and splines.
7. Tessellated 3D data, a collection of 3D triangles, which are a tessellated approximation of the 3D model with coordinates rounded to a fraction of the model size. This data is stored in either U3D (part of international standard ECMA-363) or the tessellation subset available in Adobe's proprietary PRC format. Tessellated storage is more appropriate for technical illustrations and animation where data precision is less of an issue, however, the state of the art of current technical illustration software that uses

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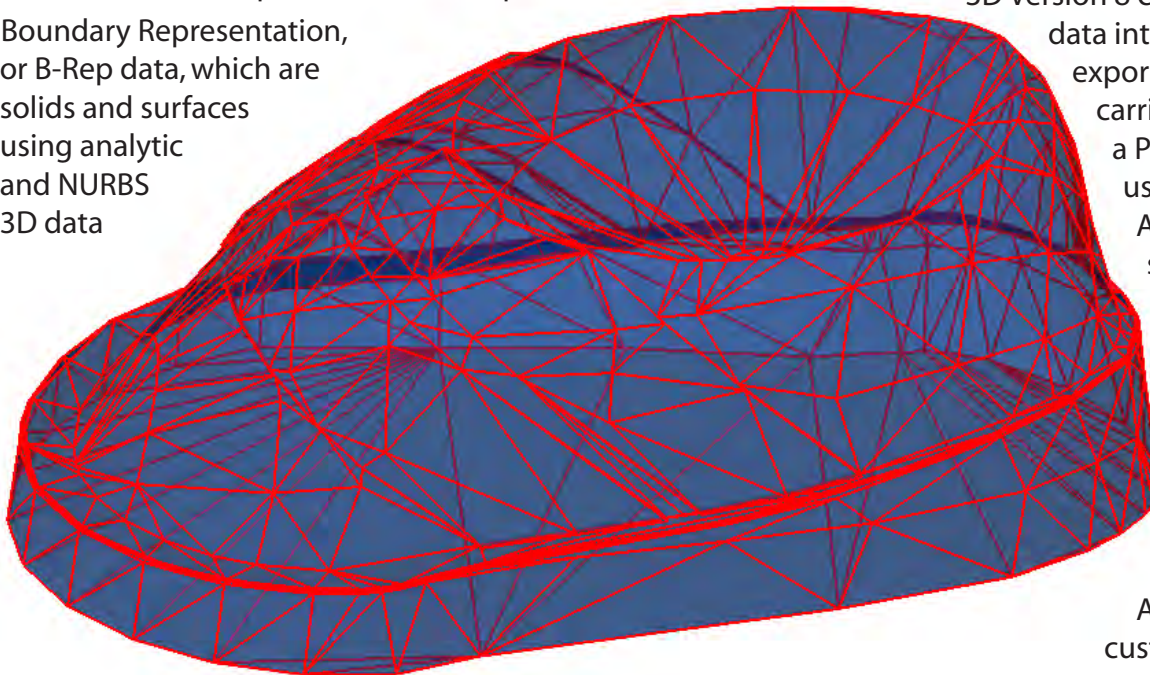
tessellated data is too limited for many technical illustrators. Also, if the data is stored in Adobe's PRC format then only Adobe products can display it, and only Adobe Acrobat 3D on Windows can export it.

- 8. Boundary Representation, or B-Rep data, which are solids and surfaces using analytic and NURBS 3D data

exported to STEP or Parasolid files). Also, since the data is stored in Adobe's PRC format, only Adobe products can display it, and only Adobe Acrobat 3D on Windows can export it.

just tessellated data, so that the precision geometry can be extracted from the PDF and used for preparing detailed technical illustrations or for further editing.

At this time only Adobe Acrobat 3D Version 8 can insert PRC data into a PDF or export PRC data carried inside a PDF file in a useful format. Acrobat 3D sells for about US\$700 and is exclusively for Windows, which leaves Mac users (50% of Ashlar-Vellum's customer base) out in the cold.



Tessellated 3D data from a 3D model.

with coordinates rounded to user-selectable resolutions of .1mm, .01 mm, or .001mm. This data is stored in Adobe's proprietary PRC format, a highly compressed format that retains accurate geometry and topology. PRC is better suited for files demanding higher downstream precision such as for FEA or driving a milling machine's CAM software (once exported to STEP or IGES files), or performing further editing in precision 3D CAD software (once

### **A Closer Look at PRC**

Adobe acquired Trade Technologies France and their Project Reviewer Compressed, or PRC, file format in 2006.

PDFs are only as valuable as the data that is stuffed inside by the person creating them. PRC is Adobe's proprietary 3D data format for carrying either tessellated or precision data inside PDF. Using the PRC format to represent precision B-Rep data, PDFs can now be more than just pretty pictures. The PRC format uses B-Rep data, not

So how do CAD users get PRC data into the PDF file format? At the moment the only software that can import, create and display it is by Adobe and they're not telling. It is a proprietary, unpublished specification. Many Adobe documents refer to the PRC format as being published, but at the time of the writing of this article, it is not.

To date, Adobe provides two methods for getting PRC data out of the source CAD software and into a PDF. Both require you to own Acrobat 3D running

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under Windows. The first way is to import it from any of the formats listed in the box on the right. The second way is to use one of the plug-ins shipped exclusively with Acrobat 3D for other software programs which specify embedded PRC data when creating PDFs.

### **Extracting PDF Data to Use in Ashlar-Vellum 3D Modelling Programs**

So how do Ashlar-Vellum users get precision data out of a PDF and into Cobalt, Xenon or Argon? That depends

on whether it is 3D or 2D data. If precision PRC data was not stuffed into the PDF carrier or a precision format attachment was not included with it, then it was never intended for the data to be imported and manipulated by a different user.

#### **3D Data**

Remember, that without a specific attachment, it is only possible to extract precision 3D data from a

#### File Formats Imported into Adobe PRC Supporting B-Rep:

- ACIS
- Autodesk Inventor
- Catia v4 and v5
- IDEAS
- IGES
- JT
- NX
- OneSpace
- Parasolid
- Pro/Engineer
- Rhino
- Solid Edge
- SolidWorks
- STEP

PDF into another CAD package under two conditions: first, if, and only if, the precise B-Rep data was originally stuffed into the PDF by the creator of the

data; and second, if you own Acrobat 3D. Assuming both of those conditions are true, open the PDF in Acrobat and right click on the 3D object. Export it as STEP, which is the best of the three possibilities.

#### **2D Data**

To extract tessellated and vector

2D data there are several PDF to DWG/DXF software products on the market including ones from AnyDWG Software, Inc. and Aide CAD System Incorporated. These sell for approximately US\$180 for a single user and are for Windows only. Bear in mind

that these products tend to be very finicky and don't recognize some data, causing them to crash frequently. Also remember that in general the

2D data in a PDF was "printed to" the file which results in all the complex 2D entities like arcs, circles and splines being tessellated into thousands of line segments. Additionally, complex 2D entities like dimensions have been broken into lines and text, and generally are not grouped.

### **Exporting to PDF from within Cobalt, Xenon or Argon**

Cobalt, Xenon or Argon v8 SP0 currently create 2D PDFs using analytic 2D vector data whenever possible. Some items can only be done as tessellated 2D vector data. Text is stored as text with a reference to the fonts. Since the fonts are not embedded, the fonts may be substituted on the target system. To avoid this substitution, open the saved PDF in Adobe Acrobat and turn on font embedding, then save it again with the embedded fonts. When creating a PDF within Cobalt, Xenon or Argon it is also possible to embed both native Ashlar-Vellum files and other exported file formats such as DXF, ACIS or STEP in the PDF envelope.

It is currently not possible to embed PRC format data from within Cobalt, Xenon or Argon because this is an unpublished

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specification. If PRC data is necessary, open the PDF in Adobe Acrobat 3D and import an Ashlar-Vellum-exported ACIS or STEP file into it.

### **Future Plans for PDF from within Ashlar-Vellum Software**

The Ashlar-Vellum product management and development

teams are currently looking for ways to support PRC data from within Cobalt, Xenon and Argon without requiring customers to own Acrobat 3D, nor run exclusively on Windows. We envision that PDFs created in future versions would have not only model-to-sheet views with 2D drawings, but also inserted 3D objects, that when activated,

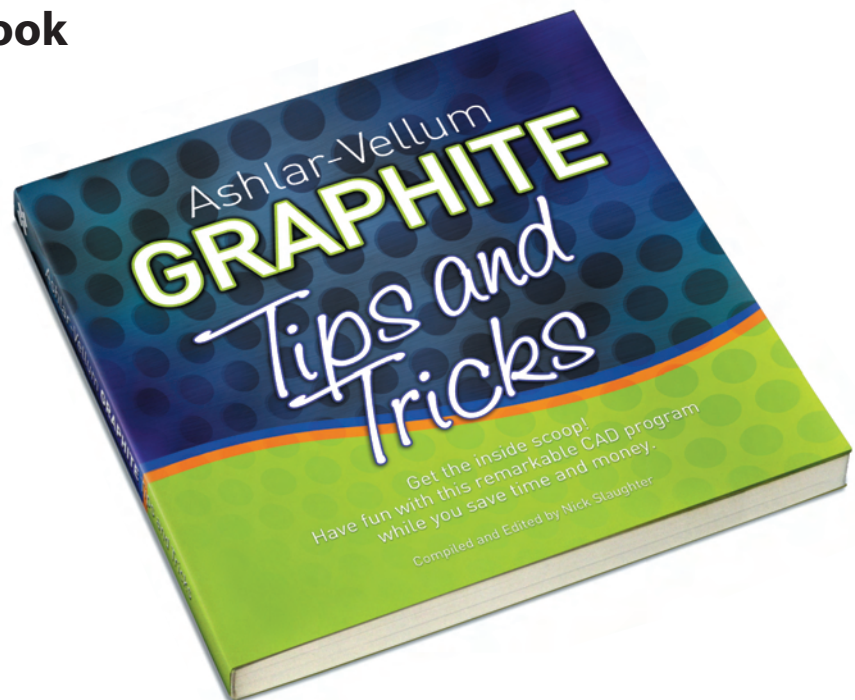
would display 3D tessellated data so that they can spin and be viewed from all angles.

If Ashlar-Vellum can reverse engineer or license the PRC format from Adobe then PRC data would be included in addition to tessellated data at the user's choice.

## **Graphite Tips & Tricks Book**

Do you want to get the very most out of using Graphite? You'll want the *Graphite Tips & Tricks* book. For just \$49.95, this easy to follow book will make you a real power user. In no time you'll learn how to do things like:

- 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 centre lines
- Create solid-looking 2D flattened images of 3D parts



- Trace over artwork
- Display angular dimensions greater than 180°
- Unfold a 3D object into a flat pattern

Over 80 power tips in all. Even experienced users are amazed at the great techniques that they

never knew before saving them time and money.

Order *Graphite Tips & Tricks* through your reseller or directly from Ashlar-Vellum at: [www.ashlar.com/sections/products/tips-and-tricks/tips-and-tricks.html](http://www.ashlar.com/sections/products/tips-and-tricks/tips-and-tricks.html).

## Does Cobalt, Xenon or Argon do Sheet Metal?

While the current versions of Cobalt, Xenon and Argon do not have specific sheet metal commands, thousands of sheet metal designs are created every year in Ashlar-Vellum products.

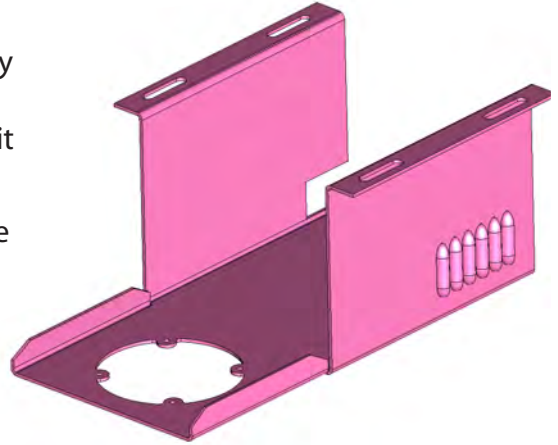
It's true that several of our competitors have specific "sheet metal" commands. In reality, these not only limit your design approach, they merely create a "pseudo" flat pattern, which will be deleted or adjusted for by the professional sheeting metal software necessary to actually run the final manufacturing job. This is not due to an error in their software but rather to the impossibility of knowing the exact machine requirements. Specific machine variables require adjustments to bend allowances, set backs, reliefs, radii, etc.

Using Cobalt, Xenon or Argon you would instead do this:

1. Simply use any of our standard tools to create the final form of the part desired.
2. Use sharp corners rather than rounded or bent ones.
3. Apply a blend or radius to the inside of the corners and then to the outside.
4. Leave out the tabs for strain relief or create them using the standard cut out tools.
5. Then transfer the 3D model

to any professional sheet metal software, such as any of those listed in the box below, which will prepare it for manufacturing by:

- Designating which is the controlling surface in terms of bending.
- Deleting all non-controlling surfaces leaving only the shell.
- Replacing all bends with appropriate breaks.
- Replacing all strain relief notches with their own notches.
- Selecting the appropriate bend compensation and strain relief to specifically account for the following at the time the job is run:
  - o The specific metal stock on hand.
  - o The temperature of all things involved.
  - o The specific tools on hand.
  - o The speed of the machines on that day.
  - o The idiosyncrasies of the particular machine.
- 6. After all of the above are accounted for, then the appropriate, flat, sheet metal pattern is generated by the professional sheet metal product.



Since the professionals running the machines are always going to adjust for their equipment and stock, it is much better to simply design the part you want in the end and leave the actual sheet metal layout to the them. Even if everything could be designated at the time of design, it is impossible to compensate for specific manufacturing variables which change daily on the shop floor.

The Ashlar-Vellum product management team is considering how best to add further support for sheet metal design in future versions of the software.

### Professional Sheet Metal Software Providers





## Does Ashlar-Vellum Support FEA?

Ashlar-Vellum exports data to any number of Finite Element Analysis (FEA) programs. The issue is getting the data to the target program.

Graphite exports to 2D FEA programs using DXF or IGES. These FEA programs mesh the drawings themselves, breaking the geometry into tiny triangles and squares.

Cobalt, Xenon and Argon export to 2D or 3D FEA programs. The data can be handled in these FEA programs any of three ways:

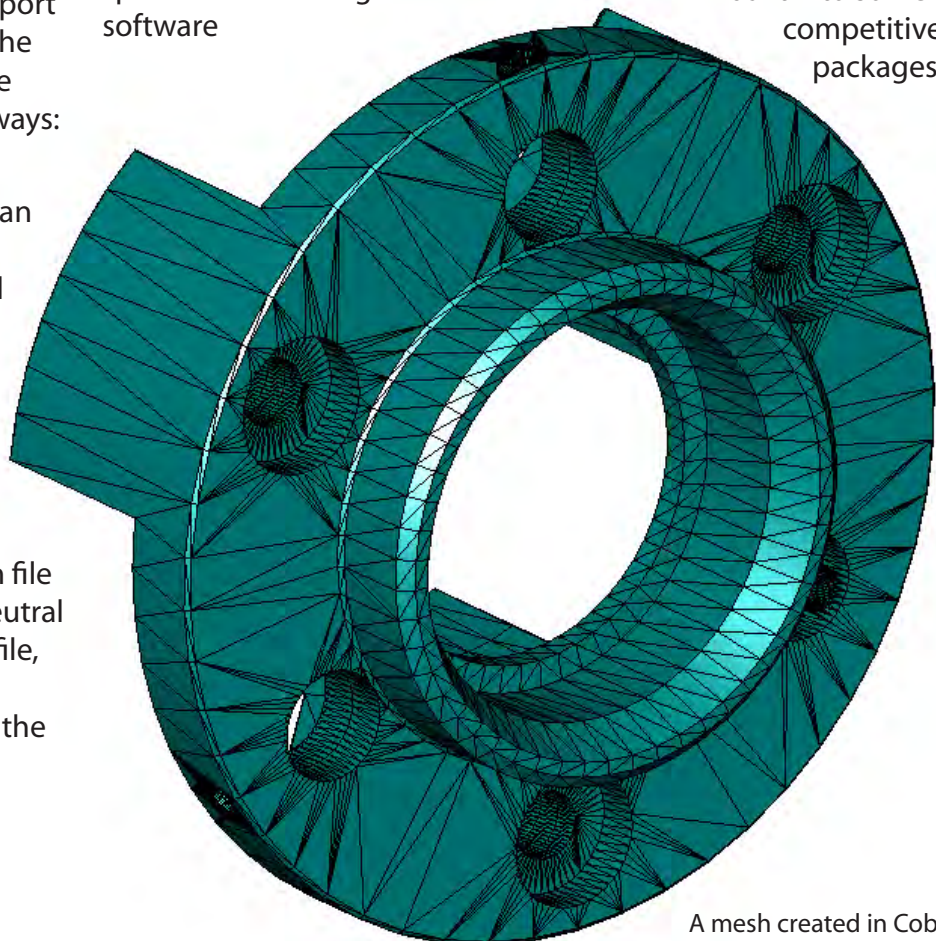
1. A 3D model created in Cobalt, Xenon or Argon can be brought into the FEA program as a solid model in kernel format, such as ACIS SAT or Unigraphics X\_T, and the FEA program creates the mesh directly on the solid model.
2. A Cobalt, Xenon or Argon file can be brought in as a neutral or industry-standard 3D file, such as STEP or IGES, and the FEA program creates the mesh on the data.

3. A mesh file is created in Cobalt, Xenon or Argon and exported as a DXF or STL file.

Exporting an already meshed drawing can assure acceptance, but letting the FEA software do the meshing allows customized resolution and adaptive meshing. The intricacies of meshing are so important that many professionals use specialized meshing software

costing upwards of \$30,000. The process runs Design->Mesh ->Analyze.

FEA tools should be used by professionals trained in the strengths and weaknesses of various meshing and analysis technologies. FEA is a serious science best left to professionals using something more than the "light" FEA features built into some competitive CAD packages.



A mesh created in Cobalt, Xenon or Argon.

## Design to Production in One



*DesignJourney's core business is the production of their highly acclaimed ORIDJINoffice modular furniture system, but when one of their best customers called and requested some custom accessories for their workstations, DesignJourney was delighted to accommodate.*

Designed in Xenon, the ORIDJINoffice workstations are a fresh approach to the modern office cubical. Using the original Xenon files, designer Michael Golino and his team were able to easily utilize the existing shapes to create the printer table and coffee table designs requested by their customer. Then, Xenon's photo-realistic rendering capabilities let Golino create beautiful design illustrations that were emailed to his client for review.

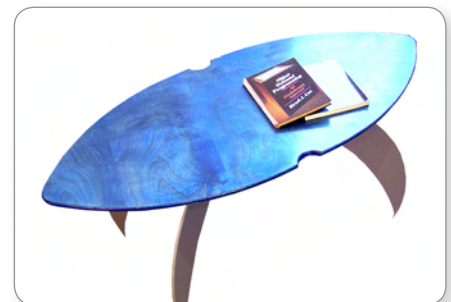
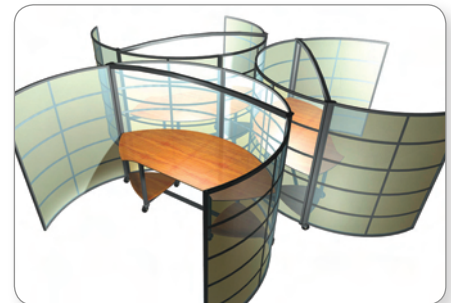
To DesignJourney's amazement, "We had anticipated doing several versions before design approval, but the initial group of illustrations we sent were compelling enough that the client enthusiastically accepted our first effort. From request to design approval was less than a week."

Xenon made all aspects of the production phase fast and accurate. DesignJourney utilized existing construction methods to quickly build the new tables. Commented Golino,

***"Xenon allowed us to go from design to production with virtually the same file."***

A CNC router cut out all of the wood surfaces. A CNC plasma cutter cut out the metal legs of the coffee table. Shop drawings of the welded steel frame for the printer table were also generated from the same file used to create the design.

Golino adds, "As a designer I used to start all of my projects in a sketch book. Now I always start with Xenon."



The printer table and coffee table (top and bottom) are custom accessories created for the ORIDJINoffice workstation (centre).

**Background/Contact:**

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