

Jul/Aug 2003

augiworld

The Official Publication of Autodesk User Group International

The Dawn Of An Era

*How Design Web Format
(DWF) fits into Autodesk's
10-year strategy*



- **Case Study**
Document Management
- **Why Collaboration
Makes Sense**
- **The Best of the Guilds**

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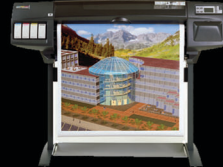
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800ps 42"	CALL	

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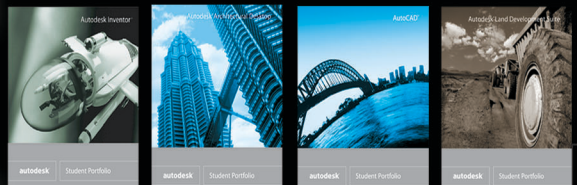
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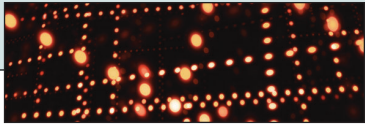
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Editorial

Managing Editor

Marilyn Law
marilyn.law@augiworld.com

Technical Editor/PaperSpace Editor

John Clauson
john.clauson@augi.com

Contributing Editors

Richard L. Binning
Rachael Dalton-Taggart
Beth Garrison
David Kingsley
Chris Lindner
Elise Moss

Production

Tim Varnau
tim.varnau@augiworld.com

Circulation

Scott McFarlane
scott.mcfarlane@augi.com

Advertising

Dan Teeter
dan.teeter@augiworld.com

Controller

Larry Teeter
larry.teeter@augiworld.com

Publisher

Rich Uphus
rich.uphus@augiworld.com

AUGI Board of Directors, 2003

John Clauson, *President*
R. Yoshi Honda, *Sr. Vice President*
David Kingsley, *Secretary*
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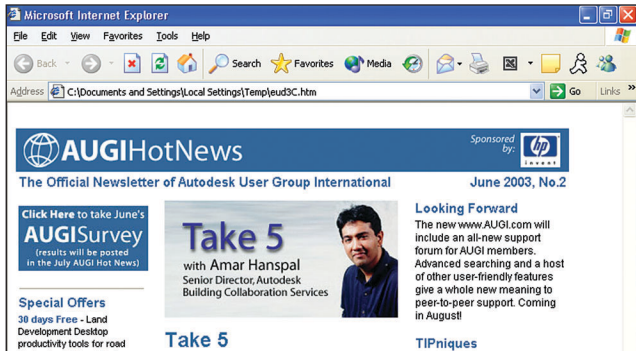
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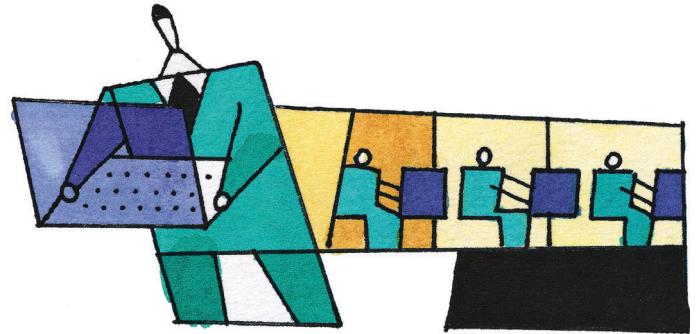
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Address C:\Documents and Settings\Local Settings\Temp\leud3C.htm

AUGI HotNews
The Official Newsletter of Autodesk User Group International
June 2003, No.2

Click Here to take June's **AUGISurvey**
(results will be posted in the July AUGI Hot News)

Take 5
with Amar Hanspal
Senior Director, Autodesk
Building Collaboration Services

Looking Forward
The new www.AUGI.com will include an all-new support forum for AUGI members. Advanced searching and a host of other user-friendly features give a whole new meaning to peer-to-peer support. Coming in August!

Special Offers
30 days Free - Land Development Desktop productivity tools for road design from Robert Steltman
Free Batch CAD to PDF evaluation from CADzation
Attn: LUG Officers! Free Batch CAD to PDF AcroPlot licenses to use as giveaways from CADzation
0% Financing from Autodesk on Autodesk Software!
Free trial - Convert 2D building designs to 3D models provided by IDEAL.com
Free trial versions of AutoCAD 2004 and AutoCAD LT 2004 are now available

Announcements
Autodesk seeks AEC and manufacturing drawings
Get Ready for Autodesk University 2003

To update your preferences regarding e-mails from AUGI, go to <http://www.augi.com/myaugipreferences.asp>.

A restyled AUGI newsletter hit AUGI members' e-mailboxes in May. The "new and improved" AUGI HotNews is being retooled from the ground up with new editorial content including links to the Web, an eye-pleasing, easy-to-read layout, and an improved distribution mechanism.

"The purpose of AUGI HotNews has always been to provide the members with technical information, news about Autodesk, its products, and the products and services available from the Autodesk community," says Chris Lindner, HotNews Manager. "It was time for an upgrade."

Everybody Gets It

One of the first improvements AUGI wanted to make was in the area of distribution. The goal is to make AUGI HotNews readily available to all AUGI members. AUGI created a system to facilitate dissemination of the newsletter. The result is that all AUGI members—regard-

less of geographical location—receive AUGI HotNews every month.

To Educate and Inform

Another area dramatically improved in the revamped AUGI HotNews is editorial content. While recognizing that reminders of upcoming events, calls for AUGI member input on surveys, and requests for volunteerism from the AUGI ranks all have their place in any organization's newsletter, AUGI sought to offer its members more. So, along with such typical newsletter fare as upcoming events, dates, and quick news items, AUGI HotNews features editorial content designed to educate and inform AUGI members.

Some of the regular editorial features included in every issue of Hot News are:

CAD industry

- TIPniques: A tips & tricks column
- LUG Nuggets: Information of interest to Autodesk local user groups
- AUGI Around the Globe: An update on AUGI's activities outside of North America
- Meet the Board: Profiles of members of the AUGI Board of Directors
- Special Offers: Notices of free demos, limited-time offers, and other price promotions from the Autodesk community
- Announcements: Upcoming events and other news
- Survey: Every issue includes an invitation to members to participate in an online survey. Survey results will be published in the following issue along with a new survey for that month.



Readership tracking from the two issues (May and June) published thus far is revealing.

"One of the things we have learned from the new HotNews is that it is being read by the majority of AUGI members. It's also quite obvious to us that there is an intense interest in technical articles. The TIPniques (tips & tricks) column is a big hit, as is the technology trends column by HotNews sponsor Hewlett Packard," notes Lindner.

Give 'Em What They Want

A clear preference for technical content on the part of AUGI HotNews readers will lead to an increase in technical fare in upcoming issues. AUGI will work with its own members as well as members of the Autodesk community to develop editorial content that appeals to all readers. "We want to give the AUGI members information that is relevant to them," declares Lindner. "Bill Gates is quoted as saying, 'Irrelevancy is a much greater danger than inefficiency.' We've improved the efficiency of HotNews delivery, but we are equally

interested in the content of what we deliver. Feedback from the membership is very valuable to us and helps drive the content in each issue."

Better Than a Pop-Up

Another new section that will appeal to AUGI HotNews readers is Special Offers from members of the Autodesk community. These offers include software discounts, free trials and demos, special pricing options, and more. In the May and June issues, readers were informed about more than a dozen different offers from



Autodesk and the Autodesk community.

"We make certain that every issue of AUGI HotNews has Special Offers, an exclusive service designed to help AUGI members," says Lindner. "Rather than loading down HotNews with advertising,

Special Offers provides a way for readers to learn about a product they weren't aware of, save money on the purchase of a product, or 'try before they buy' a product."

And It Looks Good, Too

Appearance matters, and the new AUGI HotNews features a pleasing layout, complete with relevant graphics and an easy-to-read, columnar format. Upon opening the AUGI HotNews "message" in their e-mailboxes, members are presented with the newsletter's front page. From there, a single click on any of the article headlines takes them to www.AUGI.com to read the articles. A click on any of the Special Offers takes them to the developers' websites where they can obtain more information or accept the offer.

As summer heats up, so does AUGI HotNews. If you haven't already seen it, be sure to check out the next issue. As always, your feedback is welcome and your editorial submissions and ideas are gratefully accepted. Contact Chris Lindner (hotnews-manager@augi.com) with suggestions and comments.

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John Clauson

Odds and Ends

This month we have a few tidbits that might help to make life in your shop just a little easier. There are other solutions available, some no doubt more elegant, but these have worked well for several years.

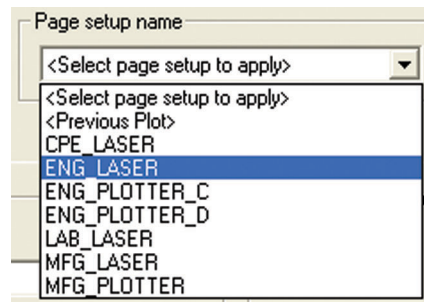
Easy plotting with multiple networked plotters

We all just love it when old routine operations have to be dramatically changed to accommodate changes in software, don't we? Oh, sure, especially if we are CAD managers with a few "challenged" users in our shops, or just simply don't seem to have time to retrain our people at the apparent whim of some developers. Frankly, those gripes leapt to mind when I first saw the new plotting functionality in AutoCAD 2000. Though we are now entering the AutoCAD 2004 era, the solutions I found may still be helpful to some newer CAD managers or work groups.

Way back in the AutoCAD 2.18 days I had struggled to understand the basics of plotting AutoCAD drawings reliably and predictably. Those concepts worked fine for about a dozen years, notwithstanding the early R12 driver problems, until the expanded plotting functionality in AutoCAD 2000. With all those new features and controls came a longer learning curve, which is just what my users didn't need at the time. My dilemma was how to help users to do their usual plotting to our selection of network devices without taking the time to teach them all the intricacies first.

Prior to AutoCAD 2000, users at my company would be presented with a simple dialog box that listed the network plotters and printers. Selecting the desired device executed an AutoLISP routine that made a host of settings and completely populated the Plot dialog box. All they had to do was hit OK unless they had a specific change in mind. It was a veritable "no brainer" that instantly became useless with AutoCAD 2000.

With some help from Autodesk Product Support, we decided to use page setups to populate the plot dialog box with defaults for our various network plotters. In the most visible change from the former procedure, users would first select the appropriate page setup from the list box. Those setups were named for the plotters to which they applied, so the users were still selecting destination plotters in a way. They bought the process after only a few false starts, by the way.



I had two issues to solve to make this work. First, how would I populate the dialog box with fresh page setups each time? I wanted to import the setups with every plot command; otherwise they wouldn't be defaults, would they? Second, how would we deal with page setup information that was saved in the drawings we got from customers or vendors?

In a shared network location I created "plot_set.dwg," a drawing that contains all the desired page setups with appropriate defaults in model space and paper space for all of our network printer/plotters. I then put the following code into the menu for the plot command and tool button.

```
[&Plot...
Ctrl+P]^C^C(command "insert"
"K:/mdt6/support/plot_set") (c
ommand) (command "purge" "b"
"plot_set" "no") (princ);plot
```

Why the Insert and Purge steps? This method ensures that existing setups with the same names as those being brought in will be overwritten; importing the setups with the "psetupin" command will not. The inserted file is then purged to avoid retaining the unnecessary block definition.

There surely are other ways of achieving these ends, but this one works well and was relatively simple to set up. Users only have to know that the very first step is always to select the page setup for the desired printer/plotter.

We use "plotconfigs.dvb" to remove the page setups in drawings we receive from outside sources. To use it, copy the file into a folder in the AutoCAD search path. You can use the Macro commands on the Tools pull-down menu to load and run the routine, or you can put it in the startup suite with the APPLOAD command. I put the following code in our menu.

```
[Remove Page Setups]^C^C^P-
vbarun
PlotConfigHandler.ConfigHandl
er.RemovePlotConfigurations
```

That code should all be in one line.

Quick background toggle

Several of my AutoCAD users use screen captures to illustrate test reports and other documents created in a variety of software. The found that changing the background to white and then back again was quite laborious. "Btoggle.dvb" is a little VBA program that toggles the background between black and white, either in paper space or model space.

Here's the menu code we use to run the program.

```
[Toggle background]^C^C-
vbarun BackgroundToggle.tog-
gler.BackgroundToggle
```

That code should also be in one line. The program could be easily modified to toggle between different colors in case you use some other standard background besides black.

Downloads

All the items mentioned in this article are available for downloading at <http://www.augi.com/educate/publications/paperspace/psdownload.asp>. Look for "CAD Manager July/August '03."

John Clauson is CAD Manager at Indak Manufacturing Corporation and President of AUGI.



Case Study

Document Management

A New York company faces challenges when dealing with decades-old paper documents at wastewater treatment plants. A document management product provides a solution

Hazen and Sawyer, a large environmental engineering and scientific company based in New York City, manages the design and refurbishment programs for numerous wastewater treatment plants. The company, which is ranked 94th among the country's top 500 design firms by ENR (Engineering News Record), and 14th for wastewater design, uses AutoCAD for its project design and refurbishment.

Eager to protect its hard-earned reputation, Hazen and Sawyer saw a need for better document management within the company. The large number of new documents for existing projects combined with the old documents attributed to each project resulted in the need for a document management product that handled all project drawings and documentation easily and logically.

Controlling Document Flow

In 1999, the company integrated Alchemy by IMR, Englewood, Colorado, to streamline document management, information flow, and minimize reproduction of costly paper drawings. The experience of these combined products for streamlining design and communication of design documentation has been fruitful and rewarding for the company.

Some facilities that are under Hazen and Sawyer's care are more than 100 years old and the information associated with them is at least that old. Most existing sites are documented solely through old paper drawings and specifications. The paper often fades and cracks during storage, causing problems when the attempt is made to capture the information for reuse. Faded and cracked drawings are virtually impossible to "trace" over, and need to be scanned so that digital tracing can be performed in AutoCAD by consultants and engineers. Once scanned, these drawings are managed and organized in Alchemy so they can be retrieved quickly and combined with new AutoCAD drawings created for the project design.

The Alchemy document management system handles a wide variety of documents, including native AutoCAD files, to be collected, organized, retrieved, and accessed through a secure repository. Once any document is stored in the Alchemy repository, the



Project Splash Screen on project CDs for a waste water project, created using Alchemy. This splash screen initiates the organization of all project documents for the project bid, including AutoCAD drawings, photos, images, video, and other attached documents. A waste water project of this size requires the logical management of thousands of project documents and drawings. Alchemy provides the methodology and technology to organize and track the progress of documents as they are created, accessed, and viewed.

administrator can define its hierarchy, including naming conventions and indexing methods. All data is securely held within the repository, but the strong organizational tools allow for rapid search and retrieval of documents as well as reproduction of the data in an organized format onto CDs and DVDs for distribution to other recipients and offices.

Hazen and Sawyer looked at a number of document management solutions and selected Alchemy because of its ability to handle all file types, including AutoCAD DWG formats. By having Alchemy as the base management solution, the scanned information, originally confined to one set of paper drawings, can be searched, retrieved, and viewed. This information is stored along with the newer DWG drawings and any other documentation that applies to each specific project such as specifications, change orders, shop drawings, videos, photos, written analyses, reports, etc.

"We are glad that we chose Alchemy," says Harold Kohlmann, PE, DEE, senior engineer, at Hazen and Sawyer. "It was implemented within days and has proved to be a foundation for successful management of complex and massive project and drawing data."

Easy Access

With seats of Alchemy implemented across half of the engineering stations, the design team found it could access design and engineering information with a few mouse clicks. Copies of the Alchemy data-

bases can then be made for distribution or the databases can be installed on a network for all authorized personnel to use. This ensures that the critical data surrounding these important public facilities is stored digitally and can be shared instantly with anyone who needs access to it.

"Since we have been using Alchemy, the retrieval of information is less time consuming and results in a more accurate representation of the existing conditions than ever before," says Kohlmann. "A recent project for a wastewater treatment plant resulted in a database of historical drawings that span seven CDs. These CDs have been incorporated on one DVD for ease of use."

Other Uses

Alchemy does not simply assist with internal document management procedures. It also helps significantly with RFP (request for proposal) work where documents need to be sent out to receive bids on a contract. One particular contract required Hazen and Sawyer to send multiple copies of more than 1,000 drawings to various prospective bidders. This process was expedited by Alchemy's ability to organize and create CDs that contained all the critical information in one, small, easy-to-use package.

Alchemy also allows secured access to the enterprise data through flexible repository access options: LAN/WAN or portable media such as CD and DVD. And because Alchemy is easy to learn and use, effective searches can be performed with little or no training. Hazen and Sawyer has begun using Alchemy to create and organize DVDs containing basic information on multiple projects. One project currently involves more than 4,000 documents that are organized on a single DVD. All the information is immediately retrievable with Alchemy's tools.

Hazen and Sawyer's clients now get CDs and DVDs containing files in addition to fewer paper copies, which makes a substantial difference in storage needs, accessibility of the data, and ease of use.

More information about Alchemy by IMR can be found at www.imrgold.com or by calling (303) 689-0022.

Rachael Dalton-Taggart is based in Denver, Colorado.

More Bang For the Buck

A free Autodesk Inventor benchmark helps you determine exactly what your workstation needs in order to achieve peak productivity

AUGI has recently released a new AUGI Gauge for use with AutoCAD 2004 (see AUGI Gauge article in PaperSpace section of this issue). The AUGI Gauge is a benchmarking tool that allows users to test how their hardware and operating system react to the latest release of AutoCAD.

Autodesk Inventor users have an even bigger need for a benchmark test. Autodesk Inventor requires much more in the way of resources and many users aren't clear on exactly how their machines measure up.

Sean Dotson, an avid Autodesk Inventor user, has developed a benchmark test users can download free from his website at www.sdotson.com. The benchmark will run on Autodesk Inventor 5 and above. Sean's test consists of a Visual Basic module that automatically tests your machine and creates a report. You can then post your results on Sean's forum, so others can see how they stack up.

Why Test?

Benchmark testing helps you to:

1. Compare apples with apples

Because everyone runs the same test and Sean's test is automated, your results are pure. The only differences will be the operating system and hardware used.

2. Eliminate possibilities

How many times have you reacted to a slow workstation by simply adding memory, installing a new operating system, or upgrading the CPU? And then, having spent the money and taken the time to tear apart your system to "improve" your workstation, been disappointed with the results?

Justify Expenditures

Walking into your boss's office and demanding a better workstation usually does not work. Most managers want to see some tangible reasons for upgrading and some assurance that the upgrade will actually result in faster design times and better turn-around on projects. Sean has done a great job of listing the results from users, so you can compare your test results and figure out the best solution for your situation.

How the Benchmark Works

The benchmark runs seven different tests, described below.

- Benchmark #1 draws a 1cm x 1cm square and then extrudes it 1cm deep. It then saves this as c:\cube.ipt
- Benchmark #2 draws 100 1cm x 1cm squares
- Benchmark #3 extrudes these 100 squares by 1cm each making 100 cubes
- Benchmark #4 creates a cylinder using faceted sides by means of the client graphics object (no features or sketches are used)
- Benchmark #5 places 100 occurrences of cube.ipt into an

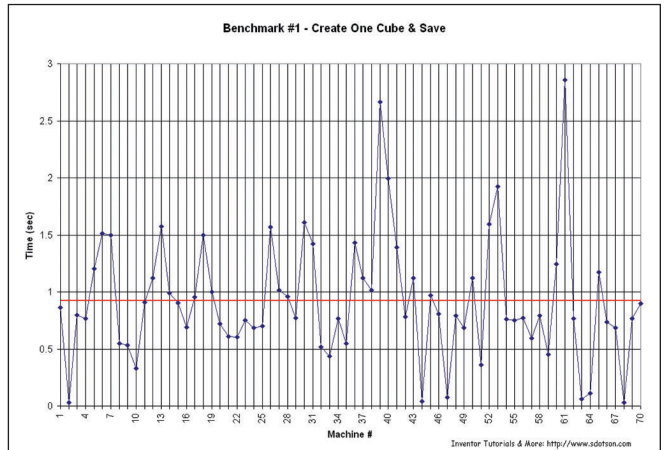
assembly each rotated by 45 degrees (looks neat)

- Benchmark #6 grounds each occurrence of each cube
- Benchmark #7 rotates the array 720 degrees in 50 steps

In order to ensure decent results, you shouldn't be running any other applications that might compete for resources while you run the test. The test itself can take as long as fifteen minutes depending on your system. You don't need to babysit the workstation during the test. If you like, you can launch the test and then go to lunch or a meeting while the test is running.

To give you an idea of how the benchmark works, let's look at just the results on Benchmark Test #1.

The first benchmark test opens an ipt file, draws a 1 cm x 12 cm square and extrudes it 1 cm. It then saves it as 'cube.ipt.



As you can see from the chart, the type of hardware and operating system can play a big difference in the results you get.

The best results came from Workstation 44 (0.0391s):

Machine 44

0.0391|31.697|1.541|7.580|1.502|0.791|103.740

OS: Windows 2000 SP2

Inventor Rev: 5.3

Service Pack: SP2

Swap File Size (Virtual Memory)

Initial/Max: 1536/1536

Make (if no brand enter custom) Custom

Processor: AMD XP 2000

Dual?: No

HD Size/Free: 55.8 Gb / 51.5 Gb

HD Type (IDE/RAID/SCSI): IDE

RAM: 1024 Mb

Video Card: PNY Quadro4 XGL550

Comments:



The worst result was Machine 61, which completed the same test in 2.8555 seconds.

Machine 61

2.8555|122.387|4.527|22.313|38.074|98.422|11.176
OS: Windows 2000 pro SP1
Inventor Rev:5.3
Service Pack:1
Swap File Size (Virtual Memory)
Initial/Max:384.852 / 666,088
Make (if no brand enter custom)HP Vectra
Processor: Intel P3 733 Mhz
Dual?:no
HD Size/Free:4.09 Gb / 617 Mb
HD Type (IDE/RAID/SCSI):IDE
RAM: 195.056 Mb
Video Card: INTEL 82815 16 Mb
Comments:

Analyzing the Results

When you compare these two machines, what strikes you? Both machines are running an IDE hard drive, so you can throw that out as a factor. The fast workstation is running the same operating system as the slowest workstation—Windows 2000—so we can eliminate that as a factor. Machine 44 and Machine 61 are both running Inventor 5.3.



Next we see the differences: Machine 44 is using a much faster CPU, more RAM, and a beefier video card.

How can we tell which of these factors comes into play? Well, we can look at some of the other machines that participated in the benchmark.

Let's look at another P3 machine, Machine 3, which completed Benchmark Test #1 in 0.7969 seconds.

Machine 3

0.7969|84.203|3.828|13.375|3.469|1.625|3.406
OS: Windows 2000
Inventor Rev: 5.3
Service Pack: sp2
Swap File Size (Virtual Memory)
Initial/Max: 1500/3000 Meg
Make (if no brand enter custom): Custom
Processor: P3-800
Dual?: YES
HD Size/Free: 37.2G/33.8G
HD Type (IDE/RAID/SCSI): IDE
RAM: 1000MB
Video Card: Oxygen GVX1 32MB
Comments:

This machine has a 32MB video card and a lot more RAM.

So is it the video card or the RAM? Let's look at another machine, Machine 14, which completed Benchmark Test #1 in 0.9922 seconds.

Machine 14

0.9922|157.055|5.248|16.564|49.672|130.447|2.584
OS: Windows 2000
Inventor Rev:5.3
Service Pack:2
Swap File Size (Virtual Memory)
Initial/Max:1000MB
Make (if no brand enter custom)Supermax
Processor:P3 660MHz
Dual?:No
HD Size/Free:20 GB
HD Type (IDE/RAID/SCSI):IDE
RAM:512MB
Video Card:GeForce2 MX 400 64MB
Comments:

This machine has less RAM than Machine 3, more RAM than Machine 61, but a better video card than both of them.

This indicates to me that the video card plays a bigger part in the type of performance you will get out of your machine than how much RAM you have.

This is confirmed when we look at the specs for Machine 23, with a time of 0.75 seconds.

Machine 23

0.7500|87.709|3.557|36.719|31.198|80.990|2.203
OS: Windows 2000 SP3
Inventor Rev: 5
Service Pack: 2
Swap File Size (Virtual Memory)
Initial/Max: 3G / 3G
Make (if no brand enter custom) Dell
Processor: P3 800MHz
Dual?: No
HD Size/Free: 18GB See comments
HD Type (IDE/RAID/SCSI): IDE
RAM: 512M
Video Card: ELSA Gloria II 64M Drivers:
nVidia 6.13.10.2832
Comments:

The major difference between Machine 23 (0.75 s) and Machine 14 (0.9922 s) is the CPU speed. Machine 23 is a P3 800 and Machine 14 is a P3 660.

The person who sits in front of the computer is the greatest resource a company has. Every second spent waiting for a system to react to a command is money down the drain. Benchmark testing allows you to check your system and compare results so you can optimize your workstation with the least expense.



Elise Moss has worked for the past 20 years as a mechanical designer in Silicon Valley, primarily creating sheet metal designs. She has written articles for Autodesk's Toplines magazine, AUGI's PaperSpace, DigitalCAD.com, and Tenlinks.com. She is President of Moss Designs, creating custom applications and designs for corporate clients.

She has taught CAD classes at DeAnza College, Silicon Valley College, Evergreen Valley College, and for Autodesk resellers. Autodesk has named her as a Faculty of Distinction for the curriculum she has developed for Autodesk products. She can be contacted via email at elise_moss@mossdesigns.com. More information about the author and her work can be found on her website at www.mossdesigns.com.

The Dawn Of An Era



» Why Autodesk's DWF (Design Web Format) is an integral part of a 10-year strategy to improve communication across the lifecycle of a project. An interview with Tony Peach, DWF Evangelist

AW: What is DWF and when was it created?

Peach: DWF originally stood for Drawing Web Format, but has since been renamed Design Web Format. It was created six years ago. When the Internet began to take off and bandwidth was small, we were looking for a way of enabling people to communicate design information over low-bandwidth Internet. The idea behind it was that most people with large DWGs couldn't afford to send them over the Internet. So Autodesk created a format that would enable that to happen. That was the original purpose behind DWF creation.

AW: And six years ago, collaboration as it is thought of today wasn't on the table either, was it?

Peach: That's correct. People weren't out there saying, "I need to collaborate and I need DWF." What they were really concerned with was getting a file of information and being able to print it out. Or getting it from "A" to "B" in an easier way than printing it and using Federal Express.

AW: How was DWF received in the beginning?

Peach: Actually, it was received pretty well. Autodesk put some marketing effort



behind it and numerous companies invested in it early on. It was a format that worked really well...it was compressed and at that time, when you compared it to a DWG, it was much smaller. It was accepted, people really liked it, and the viewers took off.

Then it started to cycle up again during the dot-com days when the Internet really took off. We had Buzzsaw out there and people started to push again on the concept of communicating design data digitally and managing smaller sets of drawings. So it took off again at the beginning of that, but it didn't really get further along than it had been.

This is, I would say, our third, final—and successful—coming of DWF as a standard.



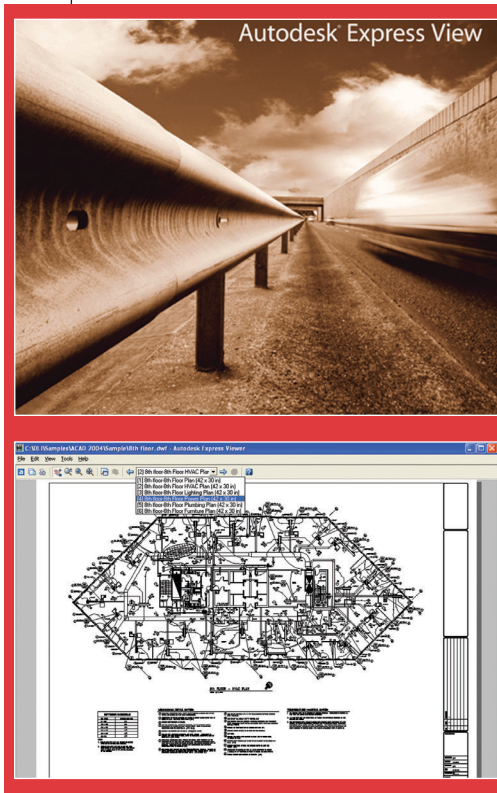
The truth is that it is being heavily used. There are millions of downloads of *WHIP!*, our original viewer, out there. We introduced a new viewer, Autodesk Express Viewer, on December 12, 2002. There have been more than 450,000 downloads of this viewer and we're averaging more than 5,000 per day. So we know it's being used. We know that companies download one (viewer) and distribute it to numerous other companies. We've had people tell us they've distributed as many as 10,000 to others. We know people are using DWF and leveraging the viewer.

The interesting thing is that we don't know—and we'll never know—many of the people that end up with our viewer. They're way downstream of an AutoCAD or an Autodesk Inventor customer. But they happen to be part of a community that Autodesk is concentrating on for the next decade, which is improving the ability to communicate design information across the lifecycle of any project or product. Carol Bartz and the other executives talk about how the next decade is about lifecycle management and that goes from conceptual design through regular design, through iterations of improvements and as-builts, all the way through facilities management.

One of the reasons Autodesk is investing again heavily in DWF and viewers is that DWF is a foundation component to lifecycle management. DWF will be the communication medium for sending design information around once design data leaves the design phase of lifecycle management. The Autodesk staff associated with viewers and DWF has grown by three times, we have people working with every product team in the company to ensure that every Autodesk design application publishes to the standard format that we're setting up.

AW: I noticed that nearly every major Autodesk product supports DWF 6.0, your newest version. Is that a first for Autodesk?

Peach: Yes, it is. In fact, we just released the DWFWriter. It's a Windows system printer driver for Autodesk Revit that will let users take any of their Revit views and sheets and create DWF files that support multiple-page documents and intelligent cross-page hyperlinks. It's a fast, efficient



way to distribute design information to anyone who needs it. So Autodesk Revit, which is our newest product acquired last year, supports the DWF 6.0 format.

AW: Let's talk about DWF 6.0. What are some of the significant features in this new release?

Peach: In versions prior to DWF 6.0, there was a one-to-one relationship between a DWG and a DWF. When you created a DWF out of AutoCAD or any AutoCAD-based product, it would create a single DWF for each layout in that document. It was a one-to-one relationship.

In DWF 6.0, we redesigned the format in such a way that now it's a many-to-one relationship. The big advantage is that now if you have a single DWG with five different layouts in it, you can publish it into a single DWF. Now take that another step. What you tend to find is you'll have many different engineers working on lots of different things for one single project. I can now bring in hundreds of different DWGs—each that has a variety of layouts—and publish that into one single DWF. What that DWF now represents is a project drawing set.

In an architectural office or a design office, they take E-size sheets, staple them all together on the left and it's really nothing more than a book of drawings. That's exact-

ly what DWF has turned into—an electronic document set for a project. Let's expand that...say you now have an electronic set and say you are at 25 percent completion of a particular project. If you have a 25-sheet book of E-size documents, you'd have a 25-sheet DWF. Once you begin redlining, you can redline across all those different documents and send that information back. In the future, you'll not only be able to redline, but you can pass that to someone else and they can redline on top of your redlines. So now you get into the iterative process of going through the design cycle.

I want to make it clear that DWF is the format for the communication of the information. It will not manage it. DWF won't know when everything has been adjusted and tweaked. That's what services like Buzzsaw are for.

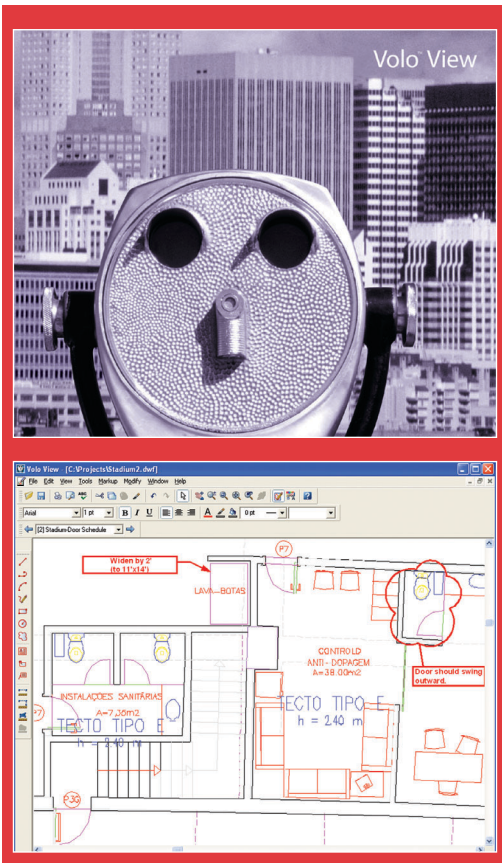
AW: What viewers does Autodesk offer to enable users to read DWF files?

Peach: Let's start with Express Viewer. It's a free downloadable viewer. The purpose of creating Express Viewer is twofold. One is that it only views DWF files. Because of that, we were able to keep the size of the viewer very small. It's 2MB, which makes it easy to download if you're sitting in a hotel room or wherever, on a small bandwidth line. Its sole purpose in life is to enable you to view the document—the DWF file—based on what the person who published it wanted you to see. The other piece of that is that it enables you to print in a variety of ways, whether it's fit to page or tile, but the most important one is print to

One of the reasons Autodesk is investing again heavily in DWF and viewers is that DWF is a foundation component to lifecycle management.

scale. If the document was created in an E-size sheet and you wanted to print that from the DWF, you'd get exactly that at scale.

So Express Viewer is really aimed at anybody who needs to communicate across the stream of lifecycle management, whether it's someone really close to the design cycle or it's as far away as the facilities manager of a building.



The other viewer we offer is VoloView. It does a variety of things. It not only views a DWF file, but it also views a DWG file, DXF file, all of the Autodesk Inventor file formats, and a variety of raster formats. It's large in size because in order to get 100 percent full fidelity of a DWG or an Autodesk Inventor file, you actually must have the underlying engine of AutoCAD or Autodesk Inventor there to read that.

Not only does it read all of those file formats, but it also does redline, markup, measure, and it allows you to do plotting as opposed to just printing. It allows you to create a redline markup file that could be incorporated back into AutoCAD. So there are a variety of tools in there that are associated with a close linkage to the design engineers. What you're allowing people to do is work on the native file format. You're allowing them to take in a DWG, to look at it, turn things off and on and get a different view of what they may be looking at whereas with the DWF, that capability doesn't exist. There's a price attached to Volo View. The SRP is \$195, but as a special price promotion we're offering it at \$49 for a limited time.

AW: Step through the process of how redline/markup using Volo View gets incorporated back to the master AutoCAD file.

Peach: The way the process works today is you print to a piece of paper, someone takes a red pen, marks on it, sends it back to the designer and the designer figures out what was marked and puts it back into the design document. With Volo View, what you do is redline right on top of whatever file it is and you add the info—text or sketch or whatever it might be.

There are three artifacts that can be created out of Volo View. One is a piece of paper, so that you can continue to communicate that way. The second is a DWF file that will contain the redline markups that, by the way, can then be taken down to the viewer if you need other people to take a look at it. The third is an RML file or redline markup file, which is a specialized DWF that has only the redlines in it. Today, the only way to bring that back into AutoCAD is to import that RML file. But in the future, redline/markups will be completely incorporated into a DWF and, therefore, at some point AutoCAD and the other products will have to be able to read a DWF file.

AW: You're saying the future...as in the next version?

Peach: I would just say the future. Redlines are already incorporated inside a DWF. But if we're talking about lifecycle management and you look at the vision—in order to complete the cycle, the upstream publishing information or applications have to understand the downstream communication continuum. That is, if you have a DWF, then the upstream applications need to be able to interpret that information. So that's the completion of the cycle, and that's where paper fails.

AW: I can see where the capabilities of Adobe's PDF and Autodesk's DWF are similar. But how are they different?

Peach: That's a good question. PDF has been around for ten years. For eight or nine of those years they've been focused on document-based publishing out of Microsoft Word, Excel, etc. And they're excellent at it. I definitely want to give Adobe credit.

When we were looking at and re-evaluating DWF, we actually spent time evaluating PDF to decide whether to leverage or drop DWF completely. We came to the realization

that we'd have a huge dependency on Adobe to the put the format and viewers out sooner—a more rapid cycle. They would have to re-architect PDF to deal with some of the information in the design realm. We decided it would be better to stick with DWF.

Now one of the reasons it made sense to stick with DWF from a technology standpoint is that DWF is designed specifically to accommodate design information. Autodesk understands design, we are a CAD company, and we're good at that. If you create a PDF and a DWF out of AutoCAD, the DWF is anywhere from one-tenth to one-third the size of the PDF file. That's because we know what's inside the file—we know how to deal with compression, we know how to deal with the data in a way that allows us to compress it to a much greater degree statistically.

Secondly, we have concepts within the design realm that are not applicable to a text-based document. Let's start with one: ninety-nine percent of a Word document is right in front of you—you read it. But in a design document, there's quite a bit behind it that isn't visible.

Take, for example, a line. Do I know the length of that line? Well, if the dimension is not on it and you produce a PDF, unless you know the scale of it and you actually create the document at the scale that the document is to be created at based upon the AutoCAD DWG file, you'll never know that scale. When a DWF is created, it knows that it's a point in space, it knows the length of that vector, and it knows you can measure it. So right out of the gate I can tell you what the length of that line is inside of Volo View or inside of another product. So that DWF contains a piece of information associated with the coordinate system of a CAD system.

To take that a little further, look at the GIS industry. Everything in GIS is done off some type of world coordinate system. When you measure a building, you're measuring it from some spot in a street. In order to deal with that you need to know what that spot is in the world. It becomes more critical in that space.

Think about things like layers, property sheets, or another simple example—views inside of AutoCAD. There are many drawings or layouts where you have five to six views on one document and the reason you do that is so you can zoom in, you get exact information, maybe it's a link from a large part to a detail of that part. Those are all considered views, and PDF doesn't have a concept of a view. There are more examples I could give, but the point is that DWF provides additional design data.



AW: Talk about the DWF 6.0 Toolkit. What does it contain and who will use it?

Peach: DWF has always been an open standard, so we've always given away a free toolkit that tells you how to read and write a DWF file. We make that available to anyone—it's up on our website and anyone who wants to leverage it can use it. A wide variety of people use it including developers that are part of the Autodesk network and want to leverage a DWF as part of their lifecycle. I've seen numerous large corporations that leverage it for their own internal purposes and embed it right into some of their own Windows applications.

The other thing you need to be aware of is that AEV or Autodesk Express Viewer is also free and it has an API. Not only do you get something that tells you how to read and write a DWF, but now you have a tool that is an ActiveX control that will enable you to embed into any other Windows system application.

AW: What is your mission as DWF Evangelist?

Peach: First I'd like to stress that Autodesk has invested a lot of time and

effort and is totally committed—from the top to the bottom—to supporting DWF. One of my jobs as evangelist is to see that every product in the company follows the corporate initiative and executes upon it. It's hard to get groups that make no money off of creating a DWF to prioritize it up. But that's my job. And that's one of the reasons why you see every product in the company doing it now and then improving it moving forward.

It kind of goes back to PDF if you look at its history. (Dr. John E.) Warnock, the founder of Adobe, was the sole believer in PDF. For eight years it did nothing—it just sucked money and resources out of the company. Then over about the last three years, it has really taken off and now it's a \$300 million business for Adobe.



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DWF™

Now, do I believe DWF will create any kind of money like that? No. It's zero dollars, but it speaks volumes to the reason Autodesk is doing this—to improve the communication across the lifecycle of any project and to really start trying to enhance our customers' experience around our design applications.

Marilyn Law is managing editor of Augiworld.



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Why Collaboration Makes Sense



» A tight economy, a SARS scare, and other factors have companies, their suppliers, and their customers looking seriously at Autodesk Streamline. An interview with Autodesk's Dr. Andrew Anagnost

AW: When was Autodesk Streamline 5 released and what are the significant features in the new release?

Anagnost: It was released June 15. One of the new features is support for RFQs (Request for Quotes) inside Streamline, so someone can automatically generate a

request for quote to work with a supplier. Another new feature is that we now allow a Pro/Engineer user to publish to Streamline as well. That capability is available as a free download to our Streamline users.

AW: Why do you offer the Pro/Engineer support?

Anagnost: Because the major mission of Streamline is supplier collaboration, some suppliers may be using Pro/Engineer to do their part designs. When we look into our install base and find overlap, it's almost always with Pro/Engineer. So having the Pro/Engineer user able to publish his or her data to Streamline makes it easier for our customers to complete their projects.

AW: What other enhancements will Streamline users see in this new release?

Anagnost: There is now an offline viewer for Streamline files. Streamline uses DWF (Design Web Format) and

Package Files, which are lightweight files used for collaboration. These files have all the viewable information of a design including a parts list and other related properties. Currently, the user has to log on to view everything in the package file, but now we've made available the offline viewer as part of an automatic download. When they log on to Streamline 5, Streamline automatically downloads this viewer to their desktop and it allows them to view files without being connected.

One important new feature for Autodesk Inventor users is that Streamline 5 will be integrated with the Autodesk vault, which is offered as a free download for Autodesk Inventor Series subscribers in July. The vault does check-in, check-out, versioning, and where-used searches—all of the things vaults do so well.

Streamline 5's integration with the Autodesk vault means that a customer using this vault can set it to automatically publish from Autodesk Inventor to Streamline when a part or an assembly is changed. So, for instance, if a user is working with a certain supplier on a particular part that the supplier is going to build, the combination of vault and Streamline ensures that the supplier always accesses the latest information about that design. If the designer checks out this part in the vault, makes a change, and checks it back into the vault, the vault publishes to Streamline automatically and the supplier is notified. It's just another one of the pieces of the workflow that we're working on to make sure our customers do the right thing and get the most out of their collaboration solution.

AW: Collaboration, as a concept, has been around for a while. In the beginning, it seemed to be more theory than practice...that is, not a lot of actual users, but people could see the potential. What factors do you believe led to the acceptance—and use—of collaboration technology such as Streamline?

Anagnost: There are a couple of ways of looking at collaboration. If you're thinking of it as an in-process design process, you're right—it's really more theory than practice. But we're finding that people don't do a lot of broad-based collaboration outside their company while they're working on initial designs. Many of our customers, especially those in the mass market—small and mid-sized businesses—are dubious about the benefits of that.

Where collaboration is becoming a useful practice, not just a theory, is when you are working with a very remote or even moderately remote supplier. I'll give you an example. Genlyte

Thomas, a billion-dollar manufacturer of lighting fixtures, does almost all of its own engineering in-house, but almost all of its manufacturing—the machining of the part, the bending of the metal, the adjustments to the design for manufacturability—happen offshore. So what they need to do is keep that flow going 24/7 as best they can. Collaboration sites such as Streamline allow them to do that. And in that respect, collaboration is a useful tool that is gaining acceptance.

Now, the next problem people use it for is collaboration with their customers—letting their customers see what they've done and see it earlier on in the design process. But that benefit is second, with supplier collaboration being a strong number one.

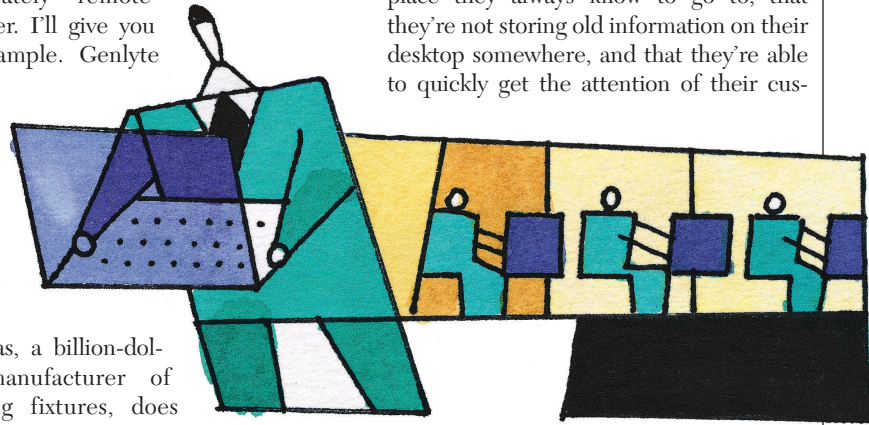
AW: Is collaboration with customers something that you are seeing used today?

Anagnost: Yes, and it's a very simple collaborative step. Streamline removes the need for Federal Express, rolled-up drawings, and the time lag associated with all of that. If you're working with a local customer, the benefit can be measured in days. But if you're working with a remote supplier, the benefit can be measured in weeks. So that's really how Streamline delivers core value to a customer/manufacturer collaboration. It just cuts money immediately out of the expense line and adds some time to the time line.

AW: What other cost-saving benefits are there for manufacturers really watching the bottom line right now?

Anagnost: Besides the two I just talked about—cost of paper communications and the time associated with it—there is the derived benefit of having a central place for collaborating with suppli-

ers—eliminating rework. This is a big deal. It means that the suppliers are always accessing the latest information in the place they always know to go to, that they're not storing old information on their desktop somewhere, and that they're able to quickly get the attention of their cus-



tomers at the drawing level. That eliminates having to call customers and try to explain changes over the telephone, then fax or mail drawings.

This way, it's all immediate. The supplier knows when they go to the project site that they're getting the latest information, so you've already dramatically increased the chance that they're getting the right information. And two, they can make comments right there, right at the point of information, and the customer—the supplier's customer, which is the manufacturer—can reply to it.

So those three savings of cost and time of paper communications and eliminating errors are all things that affect the bottom line of manufacturers.

Frankly, I think if anything has increased interest in technology such as this, it's the hard times. There are all sorts of communications challenges right now. There's a lot of Asian outsourcing of core manufacturing and, at this time, some of our customers have cut back on travel to Asia, and there are economic problems with travel in general—there's fear and uncertainty. With the changing economic climate, I think you're going to see a lot of interest in collaboration tools over the next year.

AW: What are the barriers to mainstream acceptance?

Anagnost: Well, one of them is that not everyone has an Internet connection. That's hard to believe, but it's true to some extent. Two, there's this paper-based cultural acceptance that says if I don't roll it up in a tube and Federal Express it, I didn't really communicate. That's an obstacle to mainstream acceptance.



Dr. Andrew Anagnost

AW: Is Internet access all the person on the “other end” needs?

Anagnost: They need an Internet connection and Internet Explorer 5.01 or above. They don't need anything else. We've designed Streamline to work with lightweight data and streaming technologies that even let people work effectively over relatively degraded connections.

AW: Are there any other factors standing in the way of full-scale acceptance of collaboration technologies?

Anagnost: People had to come to realize what the business benefit was. But what is happening in these particularly constrained times is they are feeling pressure from their customers to do things cheaper and faster and they're starting to realize the benefits of these technologies. These customers now have to realize that there are process automation solutions that help them with some of these profit margin problems.

There's a cultural obstacle that I think is starting to be overcome, purely because of the economic conditions. When you're humming along, everyone talks about cost-cutting, but nobody does it. And then when you're not humming along, you're suddenly scrambling to decide where you can cut costs. Sometimes they don't realize there's a technology solution that costs less than cutting jobs, which undermines their core competency. Instead, they should look at a solution that costs a fraction of that, but recovers those costs and more.

AW: Does Streamline, or collaboration tools in general, present any special CAD management difficulties or problems?

Anagnost: Some of the CAD manager's concerns will be with Internet access and firewall issues, and the CAD manager is going to end up having to reconcile all of that. Also, the CAD Manager will be responsible for administering the site, setting up permissions, deciding who has access and to what type of information. Fortunately, the tools are simple to do that, but that would be a new job for a CAD manager in this world.

In addition, if they want to work in a world where the vault we provide to them works with the Streamline site, the CAD manager is ultimately going to have the responsibility to ensure that it works inside of the customer's site.

The benefits are huge, of course, because if the vault controls when the information is updated at the Streamline site, you always know it's right. But the CAD manager will have to deal with increased system complexity. You can almost see a world where CAD managers start to look a lot more like IT managers. A lot of our customers, especially in the mid-market, have that already — their CAD manager is also their department IT manager.

Of course, it's Autodesk's job to make sure these tools are really easy for the CAD manager to administer, install, and maintain. And we're committed to doing that.

AW: How does Streamline address any security issues?

Anagnost: There are two aspects to this. One, the Streamline hosting environment is set up with the same kind of security environment that online banking has—the hosting environment and infrastructure is identical in scope, security, and technology to what online banking companies use to host their operations. If people are comfortable about banking online, they should be comfortable hosting supplier information online.

That said, some companies are still nervous. So we tell them to use only published information—not native design informa-

tion—when they're using Streamline. That's why we have Streamline Package Files; that's why we have DWF. Then all that people can do is view, markup, and measure. They don't have the native design information and they can't re-purpose it.

AW: That seems like an easy workaround.


Anagnost: Yes, and it's an important workaround. They can only view, measure, and print it, but they can't change it.

AW: Are there instances where a user would be forced to put native design information up on a Streamline site?

Anagnost: Some users want to actually pass the design file to their manufacturer for CNC programming and things like that. In that case, they'd put the native design information up there. But that's their call, and we offer a very secure environment for doing that.

AW: Talk about Autodesk's plans to make Streamline work more closely with existing PDM systems.

Anagnost: The vault that I talked about earlier is a component of a PDM system. PDM systems do a couple of things—one is vaulting and it's why people most often buy PDM systems. Number two is what it does for workflow and release management — PDM decides when a design should be passed off to someone else for certain approval. And, three, PDM does integration with other enterprise systems within the company such as ERP or MRP. A PDM system also can often handle the handoff from engineering to an ERP system.

The major integration of Streamline and PDM is getting the information out to the supplier for access and collaboration. It's the tool or the function that the customer will use to do that. So a PDM system controls the data, and Streamline shares it with the supplier. 



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The Best of the Guilds



» Excerpts from the Guilds, AUGI's online support forums



From the Map Guild

Match Your Settings

Q: I have two drawings, *svy.dwg* and *trans.dwg*. When I Xref *svy* into *trans* the drawings align differently than when I Xref *trans* into *svy*. Why is that?

A: The reason this happens is the variable `INSBASE` is not set the same in both drawings. Set `INSBASE` to `0,0,0` in both drawings and they will align correctly.

From the AutoCAD Guild

An AUGI Exchange Answer

Q: I have a drawing in which my line-types with text are displaying the text mirrored and out of position. I've tried blocking out everything and inserting it into a new drawing, checked all the UCS gizmos and doo-dads and can't figure it out. I even went so far as to save it as an R12 .dxf file and when I opened that everything looked OK for a few commands then it started acting stupid again. Any thoughts?

A1: After some prompting by Michael Farrell I was able to track the problem down to a piece of mirrored text. Reversing the direction of the lines didn't help. Mirroring had no effect. Going into the properties of that one piece of text and turning *Backward* to *No* solved everything.

Another user was able to fix one of his older drawings by putting a piece of text in and setting the *Backward* to *No* and it fixed his as well. Stupid computer, why doesn't it do what I want instead of what I tell it...

A2: A LISP file that is an updated version of "REV.LSP" was put on the AUGI Exchange. It will reverse the direction of selected lines and lwpolylines. This will only fix the mirrored problem though. If possible always use the Standard text style and make sure its style is always set to zero.

You should let us take a look at the line-type definitions in question, with a description of the text style. There is another lisp file, "LT_thief.lsp" that will give you the current linetype definition. This was from an ATP course offering.

Blinded by the White

Q: OK...this is strange. I have a drawing, and everything on the screen is white. All the text, lines, polylines, etc. Every entity color is set BYLAYER. If I highlight an entity, it lists the color BYLAYER. It even shows that the color is yellow, or red, or what have you... but it still appears WHITE on the screen...

Any idea? These are not blocks, or xrefs, text, arcs, lines, polylines.

A: My guess is that you're in PaperSpace and the Display Plot Styles box is checked in the Page Setup dialogue.

Hatch Problems

Q: Hatching in clients drawing will not START at relocated UCS origin. Drawing a line from new origin works, but hatch will not start from new origin.

A: SnapBase





Stop the Zoom

Q: How does one stop a zoom extents when switching to model space in a viewport?

A: UCSFollow set to 0 in the viewport

From the AutoCAD LT Guild

HELP! for This User

Q: HELP! I need to insert a .jpg or .tiff into a format to get a set of drawings out. I have attempted to insert using OLE but I get an error stating Failed to create object. Make sure the object is entered in the system registry. This happened for both the .jpg and .tiff entry attempts. HELP!

A1: Use copy/paste to insert the image into the drawing if you have any idea that the drawing will be shared outside the network resource and you don't want to send along the image file with the drawing.

A2: If you are on a network and all users will be mapped to the same drive letter, then use !SlingShot, which is a wonderful program for inserting and managing images in AutoCAD LT. It is available from <http://www.drcauto.com/slingshot/index.html>

From the LISP Guild

Create a Command Reactor

Q: I am wondering if it is possible to create a command reactor that will set drawing units. I would like (hands clenched and saying a prayer) one of two things to happen.

1) A global reactor that will change units to our company standard after EVERY AutoCAD command except the UNITS command. The units will be changed by

reading USER Integer variables that are set by our company drawing setup LISP routine.

2) A reactor that will monitor the units, and when they change (as AutoCAD has always mysteriously done), make sure they get set back to company standards.

I'm really not sure if either option is viable. Can a Reactor react to EVERY command with a list of commands to omit as explained in option 1?

Or, can a Reactor monitor the LUNIT, AUNIT, LUPREC, and AUPREC system variables and make sure they remain set to company standards (as read from the USER Integer variables I explained above)?

A: I can't help you with the reactors, but I can possibly explain the units changes. If you are running LDDT (and my guess is that ADT does this too only in reverse) the

units will be reset to decimal after most commands to ensure the data is in the correct format for LDDT's data keeping. You can prevent this by setting units with the `acdwgsetup` command. This has to be run for each drawing.

From the Autodesk Architectural Desktop Guild

Slab Subtraction

Q: How can you subtract info out of a floor slab? I have a slab that has a 12'x14' ramp in it. The ramp will recess down into the floor slab.

A: Add a mass element, right triangle, that mimics the size and location of the ramp. Right click on the slab and select Tools -> Boolean from the menu. Select the mass element and then the Subtractive option.

The Best of the Guilds is compiled by Beth Garrison, AUGI board member and International Development Coordinator.

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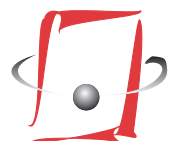
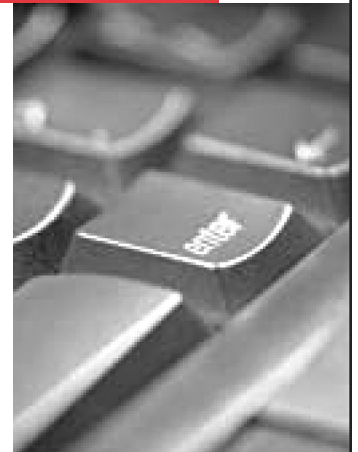
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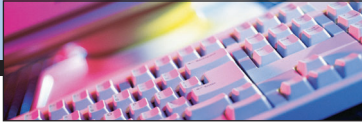
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The AUGI Gauge

"My AutoCAD is running slow," he said, "what did you change?" For a CAD Manager, this comment falls somewhere between whining and accusing. For the end user, though, the perception of speed (or lack of it) is very real. There are times when either of these parties would like to confirm or refute this assessment of AutoCAD's performance. Benchmark applications are designed to take the guesswork out of determining a system's performance. Facts and numbers are stubborn things, so regardless of how slow your system feels, it's helpful to have something that's not influenced by that swiftly approaching deadline.

Background

The AUGI Gauge has been around for a number of years, dating back to 1996 with AutoCAD Release 14. A lot has changed since then. Let's see...in '96 we didn't have multiple document support, the array dialog, 3DOrbit, multiple layout tabs, OTracking, and other necessities in life! It was time for the AUGI Gauge to change as well. Autodesk took the existing Gauge about two years ago and began updating it for testing their development efforts with the next release of AutoCAD, which at that time was AutoCAD 2004. The results of their updates to the Gauge are now available to you as AUGI Gauge 2004.

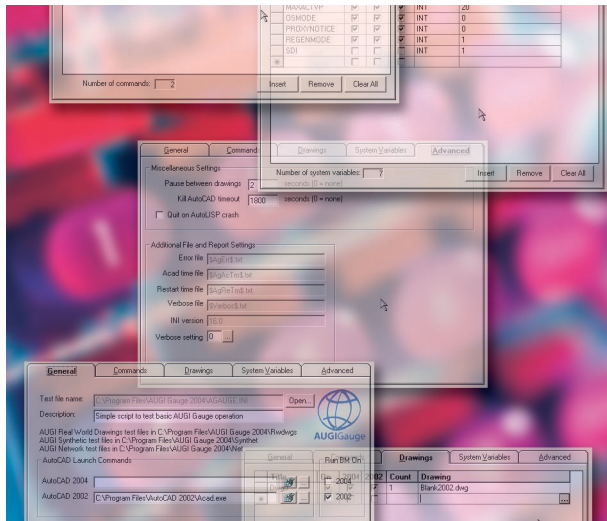
Installation

Before wading in too far, the system requirements should be considered. Then again, if you are already running AutoCAD 2002 or 2004, you've probably met the system requirements! Here are the specifics:

For AutoCAD 2000/2000i/2002

- Windows 98/Me, or Windows NT 4.0/2000/XP
- Pentium-based PC with 133 MHz processor
- 32MB of RAM minimum, 64MB recommended

- 100MB disk space for typical installation
- 64MB available for swap space
- 800 x 600 x 64 graphics card and color monitor
- Pointing device (mouse or digitizer)



For AutoCAD 2004

- Windows NT 4.0 (SP6a)/2000 Professional/XP Professional, XP Home or XP Tablet PC
- Pentium III or later based PC with 500 MHz processor minimum, 800 MHz recommended
- 128MB of RAM minimum
- 300MB disk space for typical installation
- 1024 x 768 minimum graphics display resolution with True Color
- Pointing device (mouse or digitizer)

Installation for AUGI Gauge is web-based. Not only will you need web access to download the installer, AUGIBench.exe (40KB), you will need web access during the installation. When launched, the installer begins downloading the required components from the MSI file, which resides on www.augi.com. The full install downloads a 90MB file, which when uncompressed will require about 296MB of your hard drive. You can save 100MB if you elect not to install the AutoCAD 2002 drawing files. If you choose to install the

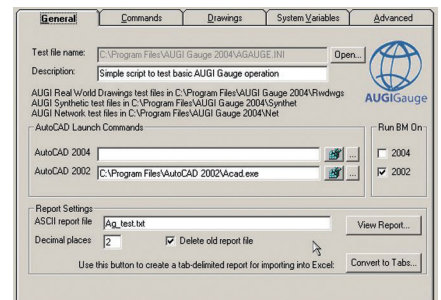
benchmark engine only (without any of the tests or drawings), this will only require about 2.2MB of drive space.

Once the installation begins, it's quite similar to most other application installs. You are given options for the destination (default: "C:\Program Files\AUGI Gauge 2004"), which AUGI Gauge tests you want installed, and which AutoCAD test scripts to include. A shortcut is automatically placed on your desktop. After the installation, you may notice that the Gauge has claimed ownership of the INI file type. The INI file is now recognized as an "AGAUGE Document." This can be changed back to the original association, but it is handy when doing lots of testing to be able to double-click on an INI file and launch the Gauge.

Gauge Interface

The interface for the AUGI Gauge, like AutoCAD's plot dialog box, is efficient once you get familiar with it. The test options are logically grouped on five tabs. You define a test by specifying what drawings to include, the commands to run on them, any system variables to include and a handful of advanced settings. Let's look at each tab in detail.

The General Tab



This tab contains the main settings that tell the Gauge where AutoCAD is installed, where to save the test settings, and where to place the results.



All the test options that populate the dialog box were read from the INI file listed in the "Test File name" box.

You will need to tell the Gauge where each version of AutoCAD is installed. Click on the "registry" icon, and the Gauge will attempt to pull the path from your Windows registry. If you have both 2002 and 2004 installed on your system, you can run a test on either version separately or perform the test on both versions consecutively. In this case, the AutoCAD 2004 will run first. This "back-to-back" testing is not recommended, though. More on that later.

The ASCII report file will be placed in the same folder as the test script. If you uncheck the "Delete old report file," then data from the current test will be appended to the report file indicated. We'll look more into the contents of the report file later.

The "Convert to Tabs" button lets you convert the current report file—an ASCII format (for easy readability)—to a tab-delimited ASCII format (for importing into a spreadsheet or database). A dialog asks you to specify the name for the "tab-

delimited report file." If you pick an existing file, the report will be appended to the contents of the existing file.

The Commands Tab

General		Commands			Drawings	System Variables	Advanced
Title	On	2004	2002	Count	Command		
AsyGSolid	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1	(CoolArray "SOLID" 32 32)		
LyrColorStd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1	(CoolLaysColor 32 11)		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

Number of commands: 2 Insert Remove Clear All

This tab is where you specify the commands to be performed during the test session, and how many iterations to perform of each command.

The command string may be AutoLISP code, as shown above, or you can use syntax that is quite similar to AutoCAD's script and menu macros. As with other customizable parts in AutoCAD, the best way to understand how these work is to look at the examples provided. And there

are quite a few excellent examples to use as a reference. This dialog only shows two commands, but the Synthetic test (Augi_Syn.ini) contains 105 commands!

Here's an example that tests the time it takes to reload all raster images in the current drawing:


```
^t._IMAGE _Unload * ^t._IMAGE
_Reload *
```

The ^t is the code to toggle the benchmark timer on or off. In this example, it turns off the timer when it unloads the images, then turns it back on to time the reload. This timer toggle code makes it easier to do "set up" work before any operation that you want to time, or "clean up" work after an operation. By default, the timer is always on when a new command turns the timer it off.

To create your own commands, you will need to be familiar with the "command line version" of any AutoCAD command that typically displays a dialog box, as well as the sequence of any command you want to test. Again, if you've created scripts or

(continued on page 22)

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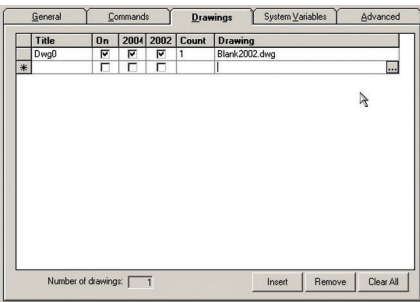
(continued from page 21)

menu macros before, this is nothing new. In the example above, the IMAGE command is prefixed with a dash, to insure that no dialog box is displayed. If you prefix any “dialog box command” (UNITS, LAYER, etc.) with a dash, you will get the command line version. There may be an exception or two, but as a general rule it will work.

The limit for the length of the command strings has been raised from 256 to 1024. The longest command string in the examples provided was 410 characters long, so your testing can be rather complex. As you begin to customize your own tests, I encourage you to share the scripts, drawings, and results with other AUGI members via the AUGI Exchange (<http://www.augi.com/empower/exchange>).

As shown in the image above, AutoLISP is also supported as part of the test scripts. If you are a ‘Lisper, take a look at the AutoLISP code that comes with the Gauge. The file, agauge.lsp, includes some Gauge-specific functions that can be used in developing custom scripts. See the online documentation for more details.

The Drawings Tab



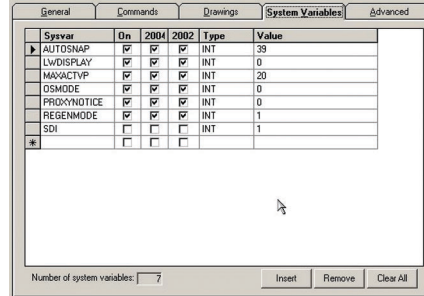
This tab is pretty straightforward. Here you select the drawings that the commands and system variables will be performed on during the benchmark. One of the strengths of the Gauge is that it allows users to test AutoCAD using their own drawings, as opposed to other benchmarks that require you to use prepackaged test files.

To add drawings, pick on the ellipses that show up when you click in the “Drawing” field. A new empty row will be automatically inserted each time you add a drawing to the list. The “Insert” button at the bottom of the dialog doesn’t insert a drawing into the list, it adds a new row to place a drawing in. The number of drawings displayed at the bottom of the dialog doesn’t update reliably. It changes when

you click the Insert button, but this really only counts the number of rows, not the number of filled rows.

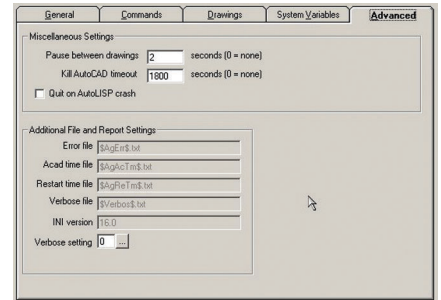
When selected, the drawing’s filename is placed in the Title field, and the full path is placed in the Drawing field. You can edit the contents of the Title field, and strip off the path in the Drawing field, as this screenshot shows.

The System Variables Tab



This tab allows you to “force” certain AutoCAD system variables to be set to specific values for your tests. This is useful in cases where a system variable exists in 2004, but not in 2002. You can use the same test script, just uncheck the variable for 2002.

The Advanced Tab



On the Advanced Tab, you have the ability to control a number of subtle options for the current test session. The file and report names shown are for information only; they cannot be modified. The verbose setting is useful for debugging a test script. Keep in mind that anything that is echoed to the command line will affect the overall speed of the test. So, be sure and set this back to 0 after the debugging is completed.

Saving Your Test

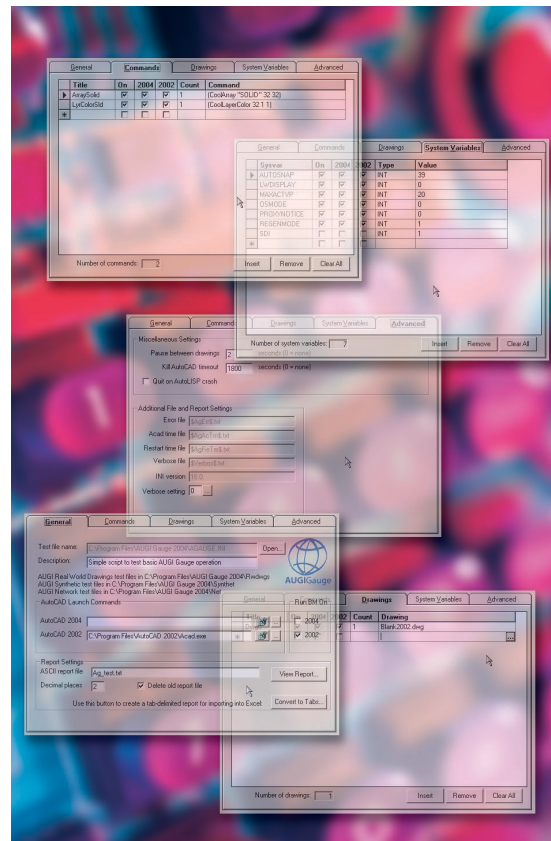


At the bottom of the Gauge dialog are the buttons to Save the current test settings and to Launch the Gauge. Any changes made to the test settings must be saved before you can launch the Gauge. To save the test to a file other than the one listed in “Test file name” box, use the “Save As” option on the File pulldown menu.

Running the Gauge

The AUGI Gauge initially launches with a basic test script, AGauge.ini. It has one drawing, a couple commands, and a few system variables. After the install, run this test just to make sure everything installed properly. Then you can begin more involved testing.

The first time you run a test, AutoCAD will report that the “AUGI Gauge benchmark testing” profile doesn’t yet exist, and will create it for you. Then sit back and watch. Depending on the test you run, it’s an interesting display!



Results

Let's take a look at the report file generated by the AGauge.ini test. All the basic information is there: filename, date, time, etc. The OS is included, but there is no other system information. It would be nice if the Gauge would include other system information (RAM, free drive space, video resolution, etc.). Some of these system components are often considered critical factors related to AutoCAD's performance.

In preparing this article, I ran the AGauge.ini test on both AutoCAD 2002 and AutoCAD 2004 in one session. The report is shown below. The time of the whole test and the times for each individual command are reported.

```
--- Agauge.exe launched AutoCAD 5/14/2003 10:33:12 PM [Dwg = Dwg0]

----- Agauge.lsp v.16.a.00 started 5/14/03 10:33:28 PM -----
Platform: 15.06 Microsoft Windows NT Version 5.1 (x86)
INI file: C:\Program Files\AUGI Gauge 2004\Agauge.ini
DWG file: Blank2002.dwg
Total number of objects in drawing:          0

Command      Avg      Max      Min      Tot      Iter
-----
ArraySolid   1.72     1.72     1.72     1.72     1
LyrColorSld  3.93     3.93     3.93     3.93     1

#----- Agauge.lsp finished 5/14/03 10:33:33 PM -----#
AutoCAD launch time:  9 seconds
AutoCAD quit time:   1
Elapsed time:        17 (NOT for comparison-includes test overhead)
##----- Back to Agauge.exe 5/14/2003 10:33:36 PM -----##

--- Agauge.exe launched AutoCAD 5/14/2003 10:33:36 PM [Dwg = Dwg0]

----- Agauge.lsp v.16.a.00 started 5/14/03 10:34:10 PM -----
Platform: 16.0 Microsoft Windows NT Version 5.1 (x86)
INI file: C:\Program Files\AUGI Gauge 2004\Agauge.ini
DWG file: Blank2002.dwg
Total number of objects in drawing:          0

Command      Avg      Max      Min      Tot      Iter
-----
ArraySolid   2.07     2.07     2.07     2.07     1
LyrColorSld  4.48     4.48     4.48     4.48     1

#----- Agauge.lsp finished 5/14/03 10:34:16 PM -----#
AutoCAD launch time: 10 seconds
AutoCAD quit time:   3
Elapsed time:        20 (NOT for comparison-includes test overhead)
##----- Back to Agauge.exe 5/14/2003 10:34:19 PM -----##
```

It is not obvious which version of AutoCAD the results represent. The "Platform:" information includes the AutoCAD version number (2002 is version 15.06, 2004 is version 16.0).

The results can be imported into a spreadsheet to better analyze them for possible inconsistencies. There is an AUGI Gauge Reporting Tool named "AUGI Gauge Report.xls" that was part of the previous AUGI Gauge. It has not been thoroughly upgraded or fully debugged. I was unable to successfully import a report. I am working with Autodesk for a corrected version.

Documentation

I've referred to the online documentation a number of times in this article. And, I must admit, I referred to it a number of times during the writing of this article as well. The Gauge contains some excellent documentation. It not only includes the obvious information about the Gauge itself, but also has useful information about performing successful benchmarks. Here are a few of the "best practices" that are recommended:

- Disable all screen savers.

- Disable any procedures enabled by other loaded applications that may impact performance of a running test (specifically MS Office's FindFast).
- Run each test at least three times to verify consistency of results.
- It is advisable to test only one version of AutoCAD at a time.
- Run individual test cycles only after clean reboots.

Suggested Use

If you are looking for some ideas for different benchmark tests, here are a few suggestions. First, run the Gauge on your system as it currently is. As mentioned in the "best practices," run it multiple times. This will give you a point of reference for comparing the results of future tests.

If you have some extra (compatible) RAM lying around, and have an empty memory slot or two, add some RAM and run the tests again. Compare the results. If there's no extra RAM around, borrow some from another computer after hours. Please make sure you have your CAD Manager's blessing before cracking the case on your computer!

I've always been curious about the effects of the "object sorting methods" on performance, if any at all. I plan to create a simple test that includes the SORTENTS system variable with various settings. Perhaps you would like to test the effects of the "incremental save percentage," or the speed of a certain font. What effect does the amount of video RAM or the resolution of your display have on AutoCAD? The AUGI Gauge can help you determine this. I look forward to seeing other test ideas shared on the AUGI Guilds.

Conclusion

Benchmarking is a true science and much more involved than we can explore in this article. As you can see from the "best practices," it will require time, patience, attention to detail, and close review of the results. For most of the AUGI membership, the new AUGI Gauge 2004 should be more than adequate for getting the most out of your AutoCAD installations.

Chris Lindner is owner and operator of onebutton cad solutions of Newark, Ohio. onebutton cad solutions provides training, consulting, and custom programming services. Chris was the 2002 AUGI Top DAUG and serves on the AUGI board of directors.

My Road to Revit



If your architectural education was anything like mine, your professors were kind enough to simplify your academic workload so that you had only four or five different assignments at once. These were all relatively bite-size, except for the major thesis problems. Doubtless the design tasks also came with the note that “cost is no object.” The idea was that students shouldn’t have to worry about such real-world concerns; that’s what internship is supposed to address.

I don’t think I’ve ever had a client tell me they didn’t care what their building would cost. There have been plenty who gave me that impression—right up till the moment we opened their construction bids. It’s also been a long time since I had only four or five different “bite-size” work assignments at the same time. Currently my firm, a small general architectural practice in central Maryland, has 20 projects at some stage of active design or construction; 21 projects in short-term—holding awaiting decisions, comments, funding, or permits; and 12 on long-term hold for various reasons. Just keeping track of all these is a major task in itself. And then there are personnel issues, marketing efforts, collections, insurance, and continuing education. The list goes on.

I also teach CAD part time at a local community college. I’m fond of telling my students—despite the description above—that I’m essentially lazy, and always on the lookout for the easiest way to get my work

done. It helps to know how to draw something “the hard way,” because then you have an appreciation for why the software works the way it does. But it also helps to know the shortcuts, because the less time I have to spend on a task, the more productive I can be. And that translates into higher profits.

That’s why I got into AutoCAD in 1988: the promise of being able to do more in the same amount of time. Why draw it again if I’ve already drawn it once? But as much as I enjoyed the reduction in repetitive drafting, the increased accuracy, and the more consistent graphic presentation, CAD was not living up to its potential. So much of CAD was still mired in the same 2D world of architectural hand-drafting: floor plans evolving from preliminary functional bubble diagrams; elevations projected from underlaid plans; building sections traced from elevation outlines; schedules compiled from detailed plans. And as construction documents came together, a massive coordination effort was required just to make sure detail references were correctly numbered and scheduled information was correct, because mistakes led to change orders, embarrassment, and professional liability.

There should be some way, I day-dreamed, of designing a building model in the computer and generating the floor plans, elevations, and details automatically from the model. After all, floor plans are

really horizontal cross-sections through the building, with the floor viewed from above; reflected ceiling plans are similar. Elevations are straight-on views normal to the building face.

Over the years I tried several programs that promised these kinds of features, but each fell short. Either they were only halfway realized, or they were unaffordable, or they were too complex, or they were incompatible with AutoCAD (compatibility with AutoCAD is a must for coordinating with consulting engineers).

It was at the 2000 AIA Convention in Philadelphia that I saw a CAD product introduced which, among all the competing tools there, seemed to come closest to my ideal. Revit allowed the architect to design from the beginning in 3D, with every aspect of the model easily modified as the design progressed. This “parametric” approach allowed those changes to be accomplished without the need to coordinate them from one view to the next, because every view was generated by the same singular model.

I was even more impressed to find that the program came with an easy rendering package and a limited cost-estimating component. The financial and customer support package was attractive too: for a relatively low monthly investment of \$199, you could subscribe to the program and have unlimited phone support from Revit’s staff of architects—and you could stop and start up the subscription again as workload demanded. Online training was also offered, and a very ambitious quarterly upgrade schedule was anticipated. I have to admit the pugnacious attitude of Revit’s management, in taking on the AutoCAD juggernaut, was entertaining. And because it could import and export AutoCAD files, my misgivings about compatibility issues were moot.

In a very short time I was using the program to produce quick schematic designs that could be rendered and presented to clients. At first it did have some serious limitations—no specific site or structural modeling tools, limited component families (“design content” to Autodesk Architectural Desktop users), no built-in multiuser ability, no phasing or demolition capability. But it was so easy to learn, the support was great, the subscription cost was incremental, and I was soon hooked. I still was using AutoCAD for construction

documents for most of my projects, but as I got more familiar with its different approaches, I gradually started staying with Revit all the way through into CDs.

Much has changed in three short years. The shortcomings listed above have been addressed, often in direct response to user comments. The upgrade schedule has slowed to about half of its initial pace (still very rapid compared to other products). The monthly subscription is a faded memory. Probably the biggest change was on the business side, with Autodesk's purchase of Revit in April 2002. Although it was a shock to many Revit users, this action brought the program legitimacy in the realization that the parametric, single-building-file approach was recognized by Autodesk's futurists as

the direction of choice. I find myself now spending much more time in the design phase of a project, and about the same as before in the CDs—but much less in the final coordination.

Any Revit user will tell you there is still plenty of room for improvement. I'm not worried: I know Autodesk Revit's working on it.

Dean R. Camlin, AIA, has been a practicing architect in central Maryland since 1986. His six-person firm designs buildings ranging from residential additions up to offices, industrial buildings, parking garages, schools, and libraries. He has used AutoCAD since 1988 and Revit since 2000. He teaches CAD part time at Carroll Community College in Westminster, Maryland.

VBA Foundations

Welcome back for another look at VBA Foundations for AutoCAD. This issue will look at the concept of Events in greater depth. I mentioned in the last installment that events are at the heart of VBA and the AutoCAD object model has already enabled many objects with the ability to react to specific events. I also told you that with a beginner's understanding of events, one can create new events for objects to react to. If you have not been downloading the long version of this series of articles from the PaperSpace downloads page (at www.augi.com/educate/publications/paperspace/psdownload.asp), I would encourage you to do so. We will be looking at even more code in this issue than ever before. So, let's get started.

Events are notifications, or messages, that are sent out by whatever application you happen to be working in—AutoCAD in our example—to inform you about something or activity, or to alert you that something has happened or is about to happen. If you look up the definition of an event in the Microsoft Developer Network documentation you will find the following:

An action recognized by an object, such as a mouse click or key press, for which you can define a response. An event can be caused by a user action or a Visual Basic statement, or it can be triggered by the system.

Looking at these descriptions and definitions we see that AutoCAD itself is antic-

ipating specific actions and providing a mechanism to allow us to add to, modify, or ignore these specific actions. AutoCAD itself provides three categories of events.

Application Events

These events are directly related to changes in AutoCAD's state and the application environment. These include changes to the AutoCAD window itself such as the user minimizing or maximizing the window. Additional examples include documents being opened, saved, printed, and closed. Other integrated applications such as an AutoLISP or ARX routine when called, loaded, cancelled, and unloaded are also tracked as Application Level events. *Note: Application Level events are not automatically loaded when a VBA routine is run. See the download for an example of creating, loading, and using Application Level events.*

Document Events

These events are directly tied to the drawings opened by AutoCAD. Specifically, a document event is triggered when changes occur within or to an AutoCAD drawing (*.dwg), the objects this drawing contains, or the window in which it is displayed. Some of the document level events are duplicates of the application events allowing you, the programmer, additional control and notifica-

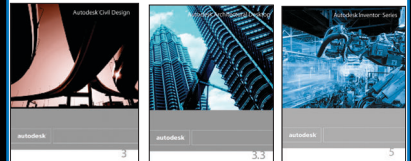
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(continued from page 25)

tion down to the specific file. Examples of Overlapping Document events include Begin and End events for saving, closing, plotting, and running LISP routines. Additional Document Level events include Document Window changes, Object level changes, and Shortcut menu notifications. *Note: Document Level events ARE automatically loaded in the "ThisDrawing" module, which is contained in every VBA routine by default.*

Object Events

This event is triggered when an individual object type is modified. Although, Object Level events are limited to a single event, modified, they can be declared for virtually any of the 40+ types of objects used in AutoCAD or any of the vertical products. *Note: Object Level events are not automatically loaded when a VBA routine is run. It can be initiated in the same manner as the Application Level events. See the long version download for more information.*

All right, so now that we have a better understanding of what an event is and what types of events are available, lets learn how can we make use of them. For this we can turn to our old friend the "sub-routine" or procedure. A subroutine that is written specifically to respond to an event is called an "Event Handler." These event handlers are executed automatically every time their associated event or "trigger" is encountered. This works precisely as one would think.

Remember the example we looked at in the last installment involving the Document Level event—the right click? We wrote a simple subroutine to display a message box containing the AutoCAD application caption. We then added the "Right Click" event handler that called our subroutine. Once this routine was loaded, every time we right-clicked our mouse inside the drawing window, AutoCAD responded by running our subroutine which displayed the caption. The only other thing we need to know about event handlers is that some of the events when triggered will also pass in parameters to the event handler. Parameters such as the "Command" name, passed by value as a string, is passed into both the "AcadDocument_BeginCommand" and "AcadDocument_EndCommand" event handlers. These parameters are passed in to the associated handlers as a method to provide additional information about the trigger or event that occurred.

In order to use events in a controlled and safe manner, we must follow some recommendations and rules. Because event handlers are notifications in real time of events or triggers that occur in the application or document, they are often triggered in the middle of another command or activity so care must be exercised in how we respond to them. The following rules are provided for your use.



Do not rely on the sequence of events. Associated Begin and End triggers will follow each other in the correct order, however, performing a "Save" command may or may not call the "BeginCommand" before the "BeginSave" event. Likewise, the "EndCommand" and "EndSave" events are not guaranteed to follow each other in any consistent manner. You can rely on the fact that a "BeginSave" will always fire before an "EndSave" event and a "BeginCommand" will always fire before an "EndCommand" event: just don't mix them up.

Do not rely on the sequence of operations. Entities and modifications to entities are not always written to AutoCAD's database in the same order as they were acted on in the Application.

Do not attempt any interactive functions from an event handler. Simply put, do not try to get information from the user, the application, or use SendCommand functions from inside an event handler.

Do not launch a dialog box from within an event handler. This rule is similar to the rule above, since a dialog box is typically displayed to gather information. You may display message boxes as notification as most of the online help examples show.

Do not write data to the object that issued the event. This is a BIG no-no! It is already open for write since it is being modified. You can, however, read information from the object in question.

Do not trigger the same event. We don't want a sub that calls itself and calls itself and call itself, etc. This can cause an infinite loop that will eventually crash once your memory is exhausted.

Remember that no events will be fired while AutoCAD is displaying a modal dialog.

In summary, AutoCAD provides some built-in notifications called events, which you, the programmer, can respond to. These events are associated with three categories: Application Level Events, Document Level Events, and Object Level Events. All of these events have associated "event handlers," which will be automatically executed when their associated event is triggered by the user or the application. Additionally, we have listed some basic rules to help guide you in using these events successfully.

As always, use the online help to further explore these concepts as necessary. Download the longer version of this article, the eleventh in the twelve-part VBA series, to get a more in-depth treatment and "hands-on" examples using these concepts. The full-length versions of the articles in this series are available for downloading at www.augi.com/educate/publications/paperspace/psdownload.asp. If you are really stumped, please send in your questions to the VBA Guild or to me at rbinning@attbi.com. See you on the AUGI Guilds or in the next issue of *Augiworld* magazine coming soon to a mailbox near you.



Richard L. Binning is the CADD Coordinator for the Haskell Company in Jacksonville, Florida, where he acts as a liaison between the Information Technology Department user groups and functional departments, and Upper Management. Richard also coordinates and conducts in-house training and manages large-scale, off-site training for CADD users. He oversees the automation and customization of AutoCAD for 120 CADD users at Haskell, and is also an adjunct faculty member at the Technology Institute of the South, his local ATC.



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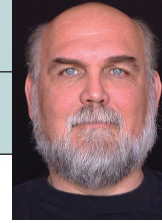
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Back In The Day



David Kingsley

Take a Little Trip with Me

Sometimes an article demands itself to be written and will not leave the forefront of your mind. We're going to take a little diversion this issue, partly because I have been on a long vacation, and as a result have some things to say about how humans interface with their daily environment. I think this is something most CAD users have to consider in their work, so I'm stretching just this once.

My wife and I just returned from the United Kingdom where we traveled through England, Wales, and Scotland in a small RV, or "motor-caravan." The British camping experience is significantly different from that in the United States. We go as far away from the city as we can and at our destination put as much space as we can between us and other campers. Our ideal camping trip requires isolation and as few facilities as possible. A store 50 yards from our campsite is a turn-off.

The Brits travel much shorter distances and expect much less space and more services at their destinations. All campsites have AC power, a convenience store, laundry, dishwashing, and bathing facilities, all 3-star ratings minimum. Some had heated swimming pools and "camper only" pubs. But let's get to the meat of this article. We could learn a lot from the European way of life. "Petrol" is about \$6 a gallon in Britain, so energy conservation is far more visible on a daily basis than it is in the U.S. Showers in campsites are coin-operated, limiting hot water use, and light switches are on timers.

I love the European lifestyle, but there are a few things they could learn from us. Plumbing is at the top of that list. You British-Americans know what I mean, there is no defense (all in fun now...). In older buildings, which most are, plumbing was retrofitted. Much of the plumbing is surface-mounted and exposed to view. Most sinks have separate hot and cold faucets—mixing valves are rare.

During a morning hygiene routine in the camp bathhouse, a British gentleman kindly pointed out that, "You Americans always wash your hands under the faucet

stream, and we always draw a basin of water to the proper temperature." Without hearing me speak a word, he pegged me for an American by watching me repeatedly scald my hands.

How to turn a simple shower into a theme park ride

Sometimes, a seemingly unrelated set of circumstances come together to create a condition that no one in his right mind would consciously design. With that in mind, you will realize that this is a true story.

We arrived at a beautiful camp 6,000 feet up in the mountains near Inverness, Scotland, just before dark. Inverness is about 54 degrees north latitude, putting it well north of the U.S. mainland, but south of Alaska. Suffice it to say that it was a brisk April evening. We sought out this campsite because of its 4-star restaurant noted for its malt scotch selection. The plan was to get cleaned up and have a square meal.

The camp shower stalls were quite small, very unlike the author. Surface-mounted plumbing and a large lever-operated valve used up six inches of valuable space. The showerhead pointed straight down from the ceiling with no side to side adjustment, so there was no way to get out from under the stream. The valve was difficult to adjust from ice cold to scalding hot. I had to set the water temperature before stepping in.

Once I was in the shower, I turned and felt the valve lever touch my side and realized that I had just moved it. In the split second it took for me to realize the consequences of that action, all traces of warmth left the shower stream. I instinctively covered the showerhead with my hand, which only served to concentrate the stream into an ice-cold torrent that ran down my arm to other more temperature-sensitive parts of my body. I managed to get the temperature readjusted in a few seconds, only to spin the other way round and knock it up to hot, which fortunately was not hot enough to injure me, but 40-degree temperature swings a few seconds apart are never any fun.

After gathering my wits, I deduced that to get through this, I would have to plaster myself in the corner against two cold ceramic tile walls as I turned around, as so not to hit the valve again. I managed to perform this unnatural act "successfully" three or four times, when all of a sudden the water temperature plummeted again. I thought I had lost my concentration and bumped it, but no amount of twisting the valve would get me any hot water! A good ten seconds into this it dawned on me that the coin-operated shower had expired, and it did not turn off the water, it turned off only the HOT water! To be sure, this was a cruel and unusual punishment for allowing the meter to expire.

I stood in the cold mountain air fumbling through my pocket looking for a 20p coin. The Brits use eight coins on a daily basis, soon to be nine, and Americans use only four. As I rummaged through the huge handful of coins, without my glasses, trying to remember which one was the 20p, inexplicably the lights went out. As you get older your eyes take more time to adjust from light to dark. I was essentially blind. Again, in a few seconds it dawned on me why the light switch felt so funny. It was a large round button that you pushed in about a half inch. It was on a timer, too.

Let's summarize here. To save a few watts of power, I had to be doused in ice water and wander shivering and naked in the dark searching for the light switch in a strange room. My attitudes about energy conservation were being seriously tested.

Was Murphy a Scot?

I guess the tie-in to CAD here is more about design than CAD usage. Try to think through the possible set of circumstances that your client may experience when interacting with your design. I realize now that Murphy's is an international law.

David Kingsley is the creator of CADPlayer Streamed On Demand CAD Courseware (www.cadplayer.com) and currently serves on the AUGI Board of Directors. He can be reached at david.kingsley@augi.com.



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