AUGI**World**

The Official Publication of Autodesk User Group International

Autodesk 2008 Products Have Arrived!

Autodesk unveiled new versions of several major products and others got new identities to go along with their makeovers

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- Revit: Lead or Get Out of the Way
- Evaluating the Need to Upgrade
- Principles of a Solid CAD Standard

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Autodesk 2008 Products Have Arrived!

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The CAD Manager

Principles of a Solid CAD Standard

It seems that every time a CAD manager is asked, "What is your #1 priority?" the answer is usually CAD standards. In a recent poll on my www.caddmanager.com site I asked, "What was your greatest accomplishment in 2006?" Twenty-three percent stated that their #1 achievement was CAD standards. Then my survey asked, "Where will you focus most of your time and efforts in 2007?" and the number one answer was—you guessed it—CAD standards (37 percent). Clearly, CAD standards are on the minds of CAD managers. Therefore, I'll begin a series on that topic, beginning with this article.

I always like to get some conceptual things down in writing before I begin any process to ensure that everyone knows my perspective. My perspective defines the playing field for my decisions.

I have reviewed and created many standards over the years. I am actually a collector of standards. If you visit me, you would see they are hiding behind my office door in a stack of boxes. In these boxes are some standards that appear to have more pages than a Harry Potter novel. Some have charts and graphs and definitions and illustrations. Some have checklists, procedures, processes, patches, workarounds, and more. Some are only one page long. Some aren't even written—they are DWG files to use as templates.

Each one was developed from the writer's viewpoint. Some are written so that they can be a step-by-step procedure. Some are written with high-end users in mind while others as if the intended reader had never used CAD. All were written, hopefully, to unify the CAD environment and output.

Here are a few principles that I have developed after many years of working with CAD standards. I keep these in mind when I review or write a standard.

The standard is an ideal—it may never reach perfection

I have found that many firms get tied up in trying to make a perfect standard. They try to get everything just right and think through every last option before they publish the standard. This can get tedious and put a damper on momentum. Once you are on a positive progressive path, the trick is to publish while the momentum is still there.

Don't get too bogged down in the details. No standard is ever perfect or completely done. If you have that frame of mind, then you will publish what you think is a perfect standard and be very tempted to never change anything again. Thinking that you have a perfect standard actually makes it drift toward irrelevance. Your standard will get stale and you may still think it is perfect. Your standard will be outdated, but you will still think it is relevant.

So get it into your mind that the standard is always about 85-95 percent complete. There will always be room for improvement. I suggest you shoot for "almost perfect, but not quite."

The standard is a target to be hit, not a path to follow

My feeling is that a CAD standard should paint the target, but not go so far as to define how you hit it. This allows some flexibility within your user base so they can be innovative in seeking to follow it. When your team needs to get the right layer or folder set up, they may use a variety of ways to do it. You should be looking for productive ways of getting things done and share tips and tricks, but don't make them part of the standard. Publish them separately so they can change as you find new and better ways of doing things.

The standard is not a "how to" manual

I suggest that you keep this concept in mind: "Tell them what, but don't tell them how." Stay away from too many "how-to" topics. Only include "how to" if the process is exacting and critical. If your firm has demanding one-way-only issues, then include them. Some of these rigid areas might include how to fill out the title block or schedules.

Keep it stable, but not static

While the standard is not to be set in stone, it should also not have frequent

Once you are on a positive progressive path, the trick is to publish while the momentum is still there.

major changes unless new releases call for large-scale edits or you have not made multiple smaller changes for a while. In other words, keep it stable by not updating it too often. Users will get frustrated if it continually changes. A good rule of thumb would be to not change more than half a page for every month since the last change. So if you have not edited your standard for four months, then try to change only about half of four pages or topics. This is just a general guideline. But keep in mind that changes require communication and training. People need to unlearn the old and learn the new. This is even tougher if your staff doesn't regard the changes as an improvement.

Base it on the current release

Make sure your standards are current to the newest software release you are using. Some of us have been using CAD long enough to have some methods and standards that were developed in prior releases. Make sure that the standard reflects the way things should be done today, not yesterday. Obviously you need to review and change your standard for new releases. For Autodesk products, this may be as often as once a year. If a new release comes out and you don't upgrade, then don't change your standard for that release.

The standard should not handcuff creativity

There are many things that can limit the creativity of your team, but your standard should not be one of them. In fact, I think that a solid standard encourages creativity. It takes away the time-consuming task of searching, guessing, or creating a standard. It makes unity of output in the process of CAD easier. It frees up people to think about the design or the fabrication or the engineering, where they should spend their time thinking and rethinking.

The standard should be brief, but effective

Get to the point. Don't include a lot of useless introduction information on a given topic. State the facts and move on. Don't develop it as a narrative. Don't bury the details in long paragraphs. Your standard should be a quick reference guide from which users can quickly get the information they need and then get back to being productive.

The standard is a tool to increase productivity

Keep this as the main focus of your standard. I have told people that if I could be more productive without my standard, I would throw it out. But I am not about to do that because the standard promotes productivity. I can automate tedious tasks when I know that every file will be constructed in the same fashion, so it would take a lot to get me to toss mine. That said, I may briefly set it aside to "get the job out the door," but I would quickly go back and repair any deviations to the standard.

The standard should have a long-term focus

The overall environment of your CAD operation must have a long-term focus and your CAD standard should reflect that. By always looking at the long-term effect of your efforts, you will make progress. Your standard will improve, step-by-step, until you have a well-oiled, productive platform for every user, every project, and every office.

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Evaluating the Need to Upgrade

S pring is right around the corner and that means a new suite of Autodesk products have arrived for subscription members. So the first question is always "What's new?" The next question is the more difficult one: "What's in the new release for me and my company?"

When AutoCAD® 2007 came out, it was touted as the "3D" release. Well, it certainly lived up to its promise! There were dramatic improvements, from editing and modifying 3D solid models to enhance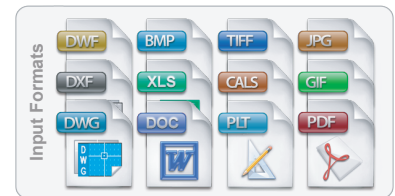d visualization tools. It was truly a leap forward for the AutoCAD user. But what was the migration rate of users moving to 3D? Was there a huge swing in the pendulum of this design adoption?

Everyone needs to evaluate each new product release and decide whether to adopt it, or not, through an investigative approach. What are the key factors to be considered? Let's take a look at a logical approach to evaluating new product functionality.

Do your research

1. Read the critiques.

Have you ever gone to a movie that the critics loved but you hated? There are dozens of critiques and reviews about the new 2008-based products. There is an overview in this issue of *AUGIWorld*, with in-depth reviews to follow in the next issue. Read them. But don't take those reviews as the answer that applies to you. Those reviews are useful in that they help point you to the major feature sets. Read and save this information.

2. Download and read the white papers and testimonials.

Go to the Autodesk website and download the posted white papers. These papers

Everyone needs to evaluate each new product release and decide whether to adopt it, or not, through an investigative approach.

give you the fat and skinny on the new software. They also give you information on the intended audience of the release. Read the testimonials, too. These are quotes and success stories by real users.

3. Attend a launch event, webcast, or podcast.

As soon as we have First Customer Ship ("FCS" as it's known), there is a fast and furious rush by every dealer to host a multitude of "launch events." These events consist of some live presentations, AVIs, and PowerPoints filled with feature sets and benefits. There are even webcasts and podcasts posted so you can watch them at your leisure. Consider viewing these casts from multiple presenters. Every presenter will have a slightly different slant from the others. Note those differences.

4. Explore the new features.

The "What's New?" or the New Features Workshop dialog box is the first thing people see when they fire up the new version of the software. This dialog box is packed with AVI and video files as well as processes and techniques for using the new feature set in its designed use. Use it. If you're not on subscription, go to the Autodesk website and request a 30-day trial version to play with. It's free!

5. Take an update training class.

Get your hands on the software. There is no better way to get a feel for the software than to get training. I always recommend taking a class from an authorized Autodesk Training Center (ATC). Check the ATC locator on autodesk.com for those that are "2008 ready." These ATC sites are recognized for their trainers having taken approved 2008 training and passing a feature-based exam. They know the software and can provide insight that is use-based, not sales-based.

6. Ask for an on-site review.

A review consists of someone examining your current design process and providing a summary of recommendations of how the new release applies to you. Your local Autodesk Value-Added Reseller can do this, as well as an Autodesk Training Center. If you don't have a relationship with either, you can do a regional search through the autodesk.com website. Once that on-site review has been completed, you can request a demo or presentation of the software, but insist that at least a portion of it be conducted with some sample data from your existing project files. Provide these files to the presenter well in advance. This will give you a sense of the software's applicability to you.

Evaluate your research

Now that you've taken my six-step approach to evaluating the software, it's time to plan what does and does not make sense to implement. As the first big step, I like to take all the applicable feature sets from my research and put them into one of these two buckets: Personal Productivity Features and Company Productivity Features.

Personal productivity features

Personal productivity means setting measurable objectives and goals for your personal use of the software. It also means focusing on the aspects of the software that do not change the methods and standards of the company.

For example, in AutoCAD, I still find hundreds of people who are not using Object Snap Tracking. Instead, these people are using construction lines. Using Object Snap Tracking will improve your personal productivity without affecting the company standard. Whether everyone uses it as a method to accurately create drawings doesn't affect the final drawing. You'll just get the drawing done faster using Object Snap Tracking.

Company productivity features

Company productivity means a dramatic change to the company standard, practice, or method. This type of adoption involves the greatest amount of time and resources to ensure a smooth transition as it creates a shift in the company standard.

For example, adopting a 3D design methodology using AutoCAD 2007 is a radical change in the company method and standard if only 2D drawings are currently being designed. To change to 3D methods requires buy-in from multiple departments, from management to your vendors, contractors, and IT department. This may not be easy to do. It is also the key reason why people are slow to adopt these radically different changes to the software. Implementing 3D is a major shift in the company's design process. It takes time to plan, pilot, and migrate to a completely new methodology. It is also disruptive to the current design method as projects still need to be completed. There is always an initial negative effect on productivity.

Implementation plan

The key to an implementation plan is choosing which aspects of the new or existing software will be incorporated into daily use and those which will not. The plan sets the stage for the incorporation of the software and assurance that it's being used properly and effectively. This is the only way to get true productivity gains.

So as you begin to look at the new suite of 2008 products from Autodesk, it is important to do your research. Evaluate the feature sets and determine the relevance to you of those features for adoption.

Finally, determine which features are easily incorporated for personal productivity and those that are dramatic shifts in your company methods. Remember, it's the major shift in company standards and methods that are disruptive to your company's current productivity. Do not approach this shift without a comprehensive implementation plan, as well as a commitment from all departments, divisions, management, and your IT department.

Good luck – and until next time, don't close that dialog box!

Matt Murphy is a member of the Autodesk Training Center Advisory Board (ATCAB) and a Certified Technical Trainer (CTT). He teaches Train the Trainer workshops and, Auto-CAD productivity seminars at Autodesk University, AUGI CAD Camps and private companies. He can be reached at matt.murphy@ACADventures.com.

Autodesk 2008 Products Have Arrived!

Autodesk unveiled new versions of several major products and others got new identities to go along with their makeovers

Just as the couture crowd eagerly anticipates Fashion Week in NYC, so too do Autodesk® product users look forward to the late-Winter/early-Spring arrival of Autodesk's newest products and product upgrades. In mid-February, at a first-ever event dubbed World Press Day, Autodesk unveiled the latest versions of its products.

Beginning in the next issue (May/June), *AUGIWorld* will highlight individual products and explore the new features, functions, and product enhancements in-depth. Until then, here's an overview of the announcements.

The name game

One of the most obvious changes involves a number of name changes to products in the Autodesk® Revit® product family and other products.

According to Autodesk, the products were renamed to help customers more easily identify product line alliances. "We renamed the products to clarify that they are part of the Revit or AutoCAD families of products and so that they would more clearly align with customers' needs. It makes it easier for them to choose the right software or solution," says Jim Lynch, vice president of marketing, Autodesk AEC Solutions.

Here, at a glance, are the name changes.
- Revit Building becomes Revit Architecture
- Autodesk Revit Systems is now Revit MEP
- Autodesk Architectural Desktop will be known as AutoCAD Architecture
- Autodesk Civil 3D has been modified slightly to AutoCAD Civil 3D.
- Autodesk Building Systems is now called AutoCAD MEP

Enhancements & new features

AEC Solutions
AutoCAD 2008

Key enhancements to the latest release of Autodesk's venerable AutoCAD® software include improvements to annotation scaling, layer properties per viewport, enhanced tables, text formatting, and multiple leader creation and alignment.

Many of these enhancements were the result of customer input from sources including the AUGI Wish List. According to Abhijit Singh, product manager for AutoCAD 2008, some 30 items from the AUGI Wish List (August 2005 through June 2006 lists) were incorporated into the newest version of AutoCAD (see sidebar "AUGI's Wishes Are Granted").

AutoCAD Architecture 2008

Formerly Autodesk® Architectural Desktop, AutoCAD® Architecture 2008 makes it easier for users familiar with AutoCAD to automate drafting tasks so design documentation can be completed more easily. A standout feature is New Drawing Compare, which uses color-coded displays to show items on a drawing that have been changed, added, or deleted by other members of the design team. Changes to items such as styles, fire ratings, or other non-graphical properties also can be tracked. This feature is available through the Autodesk Subscription program.

AutoCAD MEP 2008

AutoCAD® MEP 2008 (formerly Autodesk Building Systems) is AutoCAD-based software for mechanical, electrical, and plumbing (MEP) engineers, designers, and drafters. New features include automation of MEP systems design, layout and documentation, including single line plumbing, electrical layout, and piping; a part wizard to speed part creation; international metric content, and improved display control for construction documentation.

AutoCAD Civil 3D

AutoCAD® Civil 3D (formerly Autodesk Civil 3D) is AutoCAD-based software for civil engineers, designers, surveyors, and drafters. The new release, AutoCAD Civil 3D 2008, eliminates much of the tedious step-by-step development of plans. At the same time, the software helps speed execution of design changes and facilitates
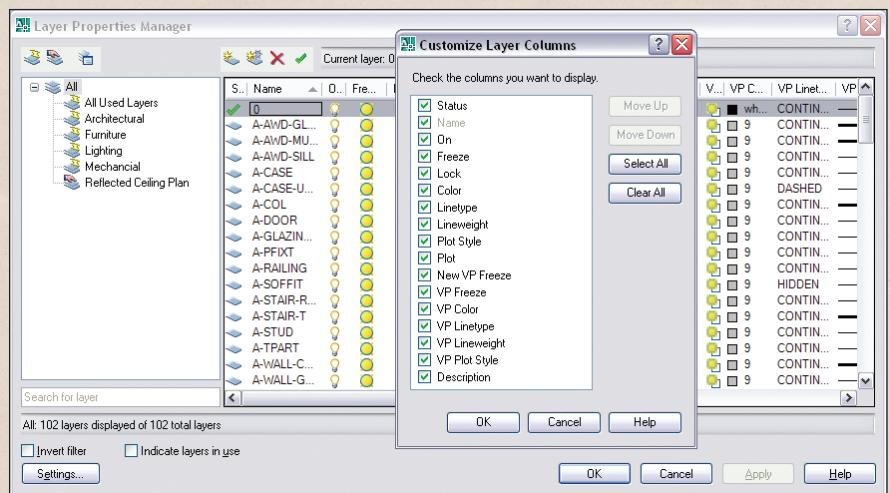
AutoCAD Architecture

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AUGI's Wishes Are Granted

The AUGI Wish List, which allows AUGI members to suggest Autodesk product improvement ideas, was a significant factor in the AutoCAD 2008 release, according to Abhijit Singh, product manager for AutoCAD 2008. "The number one Wish List item from the August 2005 list is Multiple Leaders, which is a brand-new feature in AutoCAD 2008," says Singh. The new multiple leader panel on the dashboard has enhanced tools that automate the creation of multiple leaders and the orientation of the leaders (tail or content first) with the notes.

In all, some 30 AutoCAD Wish List items were incorporated into the newest AutoCAD release. Here are just a few:

- Spell check improvements (#3 on the August 2005 list) – the new spell check engine "zooms" to the misspelled word.
- Improvements in tables, layout manipulation, paragraph spacing in MText, and simplified ways to add sheets to a layout were all items in the August 2005 Wish List and are all incorporated into the 2008 release.
- Item #4 on the February 2006 Wish List – Hide Crossing Dimension – is addressed in AutoCAD 2008.
- Break Symbol in Dimension (#3 on the June 2006 Wish List) has also been included in AutoCAD 2008.

Four of the top 10 items from the Inventor Wish List (July 2006) were included in Autodesk Inventor 2008. For example, Design Doctor now highlights reference owners; there is improved content center performance; bend direction is now shown on bend lines in the flat pattern; and there is added multi-component placement.

For more information on the AUGI Wish List, visit http://www.augi.com/communities and the AUGI Forums at www.augi.com/forums.

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evaluation of multiple design scenarios.

Autodesk Design Review 2008

Autodesk® Design Review is now available as a free download from the Autodesk website. This software streamlines the collaboration process with viewing, measuring, and markup tools, which do not require CAD software or knowledge to utilize. Improvements have been made to design review, automation of design information, and viewing, printing, and search designs.

Autodesk Impression makes debut

Autodesk has formally introduced Autodesk® Impression, a tool that enables the creation of presentation-ready graphics directly from DWG and DWF files. According to Autodesk, Impression users will produce high-quality illustrations and renderings that have a hand-drawn look.

Revit family

Autodesk announced new releases of several products in the Revit family as well as improved interoperability with animation and visualization technology such as Autodesk® 3ds Max and Autodesk® VIZ software. Here are some of the key changes.

Revit Architecture 2008

Purpose-built for building information modeling (BIM), Revit® Architecture mirrors the real world of buildings, so architects and designers work holistically, rather than with isolated elements such as floor plans, sections, and elevations. Revit Architecture 2008 also delivers improved management of linked model information and improved DWF file specification support; Google Earth Plug-In for publishing Revit models to Google Earth mapping functionality; and better interoperability with Autodesk 3ds Max animation software to help drive design consensus across project stakeholders.

Revit Structure 2008

Revit® Structure 2008 makes it easier for structural engineers, designers, and drafters to design and visualize their structures. Building on the Revit platform's parametric change management technology, the
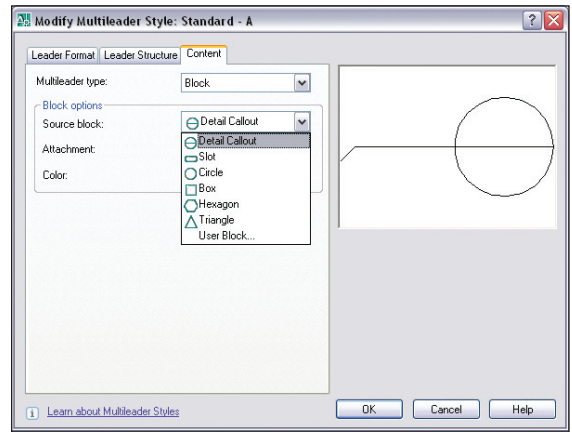
Multiple Leaders was an AUGI Wish List item which has been added to AutoCAD 2008
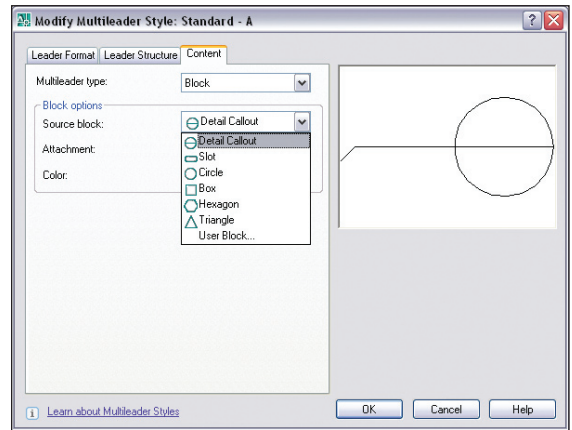
The new multiple leader panel on the dashboard has enhanced tools that automate the creation and orientation of the leaders

latest release lets structural engineers create building information model and related construction documentation more easily.

Revit MEP 2008

Revit® MEP 2008 delivers BIM for the MEP engineering market with improved features to support building performance analysis and better decision making. Revit MEP 2008 is available as part of AutoCAD Revit MEP Suite, which combines Revit MEP 2008 for systems information modeling and AutoCAD MEP 2008 (formerly Autodesk Building Systems) for MEP documentation. Important features in Revit MEP 2008 include parametric change management; automated exchange of engineering design information; and integrated building performance analysis for sustainable design.

The Revit platform can be used with design visualization and conceptualization tools built on the same technology as Autodesk's film, gaming, and product design software. These tools, together with Autodesk simulation and analysis applications, allow users the flexibility to optimize and improve their designs before they are

built, helping to save time and money, improve quality, and foster innovation.

Support for AutoCAD continues

With all the talk of BIM and Revit, 3D product adoption, and so on, AUGI members—many of whom are faithful AutoCAD users—need not worry about declining support for AutoCAD. That support will continue, assures Jim Lynch, vice president of marketing, Autodesk AEC Solutions. "We will continue to support both our 2D and 3D customers in the years to come. The last thing we want to do is force our customers who are using AutoCAD or AutoCAD-based solutions to move to BIM and the Revit platform before they're ready. We want to support the way they are currently working, but make sure they understand the value of BIM and know it is where Autodesk sees the industry going."

Complete AEC solution

By bringing products such as AutoCAD Civil 3D into the AEC "family" and working at issues such as improved interoperability among its products, Autodesk claims a more complete solution for the AEC industry. "We're positioned to offer a more complete solution to the AEC industry than any other vendor, with the Revit platform for building information modeling in the building industry, plus the addition of Civil 3D, as well as Buzzsaw and Constructware software and services for collaboration," says Jay Bhatt, vice president of Autodesk AEC Solutions. "By bringing together applications that address customers' needs from conceptualization through design, structural and MEP engineering, civil engineering, construction and facilities management, we are providing a comprehensive portfolio intended to help them redefine traditional design and building processes."

Manufacturing solutions

In addition to Autodesk's upgrades for AEC, its manufacturing-related solutions saw major enhancements as well. Following are new feature highlights.

Autodesk Inventor

With Autodesk Inventor® 2008, Autodesk addresses a key customer concern, according to Amy Bunszel, director of Inventor Product Management at Autodesk. "Many companies must maintain large capital equipment for 10, 20, sometimes 30 years. Often this involves mid-life upgrades to replace outdated components, reduce operating costs or meet new environmental regulations. Until now, companies in this position were faced with a difficult problem—how do you use modern 3D design processes and still control the costs of updating all the manufacturing and maintenance documentation?"

Autodesk's answer to that dilemma, says Bunszel, is an Inventor feature called DWG TrueConnect. "With DWG TrueConnect, customers can create drawings in the DWG standard while retaining all the benefits of drawings created from 3D Inventor models. With DWG True-Connect, drawing views in the DWG file have full associativity to the 3D design data so drawings update automatically when changes are made to the 3D design. Using this technology, customers can share DWG files with manufacturing partners to provide view, plot, and measure with levels of visual fidelity that exceed the capabilities of traditional translation," Bunszel explains. Customers can now redesign subassemblies using Autodesk Inventor 2008 and then integrate the new drawing views directly into the original AutoCAD drawings.

Additional improvements to Autodesk Inventor include interoperability with Autodesk AliasStudio, which will enable users to quickly and reliably transfer concept designs into Inventor; and upgrades to sheet metal design, ribbon cable design, and sketch productivity tools.

Other Manufacturing Solutions

Autodesk released fully enhanced versions of these complementary manufacturing solutions.

AliasStudio – now interoperable with Inventor, AliasStudio comprises tools for the conceptual design process.

Showcase – this interactive tool facilitates informed decision-making using realistic imagery from 3D design data and an environment in which to present and review designs.

AutoCAD Electrical – an application built specifically to design and document electrical control systems.

AutoCAD Mechanical – a 2D mechanical design and drafting application that features standards-based libraries of parts and content, automation tools, and associative-detailing of Autodesk Inventor models.

Autodesk Productstream – software that automates the release management process by managing engineering changes and bills of materials.

Stay Tuned

Look for in-depth reviews of the Autodesk 2008 releases in the May/June issue of *AUGIWorld*.

- AUGIWorld Staff Report

Lead or Get Out of the Way

Software tools demand constant change—morphing is part of the digital system. More and more information is being packed into less and less space, and this process shows up in building design as much as in computer hardware. If designers do not keep up, they fall behind. Methods have evolved—and expectations are evolving with them.

More companies than ever are working across national and continental borders. A working knowledge of transnational standards is becoming necessary, and not just for Canadians or members of the European Union. Metric and inch/foot conversions are easy nowadays—how about managing annotation symbols and dimensions to South American, South African, South Asian, or South Australian requirements?

Plans, elevations, sections, and schedules are no longer enough. Clients and regulatory agencies are demanding output from designers that would have been unthinkable a few short years ago—multiple 3D views, animations, sun, and shadow studies. Have you recently used an animated walkthrough or walk-around to show a client or review board the exterior of a proposed project? Better get used to it!

Printed or printable output is now not the only deliverable requirement. If you were required to bid for a design job based on providing IFC or gbXML data, would you know how? I recently received an email from a company facing exactly that on a proposal for renovations to the famed Sydney Opera House. Their question: How quickly could they get productive with Revit Systems?

Revit is now an international platform with three distinct legs: architectural, structural, and MEP (mechanical/electrical/plumbing). Whether your firm designs buildings as large as airports or as small as single-family houses, I see the day coming soon when you will consider your toolkit incomplete with only one type of Revit application in-house—that is, if you intend to lead your market.

Climate change=design challenge

There is no longer any serious debate about the fact that human activity, primarily the combustion of fossil fuels for transportation and power generation, is warming the planet. We live in a closed system and as a species our waste is now quantifiably affecting the atmosphere. The solution to this recognized problem runs in two tracks: different fuel sources and higher fuel efficiency.

The call is now loud and clear for what is called Green Building or Sustainable Design, the idea that the built environment does not have to contribute to greenhouse gas pollution. Both tracks I mentioned above come into play. First, buildings of all types can and should be made as fuel-efficient as possible.

Certifications and standards, both voluntary and mandated, will drive this effort in coming years. Building designers are starting to produce designs that certify compliance with energy consumption ratings, just like computer monitors.

Owners of existing office towers are finding that efforts to make their buildings more energy efficient, combined with investment in green energy sources, are cutting carbon emissions at no additional cost. Aware management can combine public responsibility with fiscal prudence—and find business opportunity in the process.

Simple matters such as meeting insulation and glazing specifications go a long way in this effort. More complex or tech-savvy techniques, such as heat loss calculations and airflow analysis, are now available directly in design software, specifically Revit Systems. Third-party applications that interact with Revit are coming on line for

Energy Analysis	
Condition Type	Heated and cooled
Space Type	Office - enclosed
Use Data in Energy Analysis	☑
Occupancy Unit	Number of people
Number of People	1.338414
Area per person	141.61
Base Design Power Load on	Actual
Design Power Load per area	0.00 W/ft²
Calculated Power Load per area	1.41 W/ft²
Actual Power Load	0.00 W
Base Design Lighting Load on	User Specified
Design Lighting Load per area	1.34 W/ft²
Calculated Lighting Load per area	1.34 W/ft²
Actual Lighting Load	0.00 W
Total Heat Gain per person	200.000 Btu/h
Sensible Heat Gain per person	0.000 Btu/h
Latent Heat Gain per person	200.000 Btu/h
Temperature	72.00 °F
Heating Capacity	4909.000 Btu/h
Heating Capacity (Calculated)	4909.000 Btu/h

Figure 1 – Standard Room Properties in Revit MEP contain energy analysis parameters. These properties will import into Revit Architecture and export to energy analysis applications.

quantifying power consumption, carbon emission, and pollution analysis for building models in the design stage.

Of course, the most sophisticated design tools do not make for good design or responsible habitation. I have seen "executive" (less charitably named McMansion) houses in upstate New York, a very cold climate, with large expanses of window glass facing the frigid wind from Canada, radiating heat through their uncurtained windows out into -10ºF weather. Similarly, I have seen bloated houses in Australia with large windows facing the fierce afternoon sun at +100ºF and air conditioners running constantly. The inhabitants of both those suburbs may as well toss money outside. They are paying, quite literally, to heat up the environment.

The other track for green design—and here is a challenge for designers the world over—is to start thinking of buildings as power-generating units rather than simply power consumption locations. Large buildings are being designed that very nearly supply their own power needs. Residences have been designed for both cold and hot climates that use little or no external fuel source to maintain a comfortable interior

environment. Costly? Sometimes. Difficult? Nearly always. Viable business opportunities? On an unprecedented scale.

The cost of solar cells is steadily coming down and will fall farther as government research funds grow in response to public pressure for affordable alternate power options. Smart electricity meters are now allowing buildings with solar panels installed to feed the local power grid when usage is less than generation. How's that for cutting the carbon footprint of a design project?

Rooftop-sized, wind-driven electricity generators are being designed and tested as well. Don't like wind farms out in fields by the highway? Put one on the roof of your local school!

Electricity grids dependent on centralized, polluting, poisonous, or militarily vulnerable power sources are fossils in every sense. Dispersed power generating systems can soon begin to replace these expensive 20th century relics. "Smarter and smaller" applies here as well.

Get with the program

If the greenhouse gas issue is going to be solved, green design will be a part of the

solution. Moving toward building designs that factor in macro-scale environmental concerns along with the traditional focus on structure, appearance, traffic, and internal environment will be a major shift over the coming years. That will take smart, dedicated people working hard in the public interest with the best tools available. Today's design tools can process and provide information on the scale that is necessary for informed environmental decisions.

If your firm has or is looking at the Revit platform, know that your designers can now create, manage, report, and interchange with others the specifications that make your designs special, valuable, durable, and responsible.

Chris Fox is the Revit editor for AUGIWorld, and has written numerous articles on Revit Building and Revit Systems. Chris recently moved from the US to Australia and is leading training classes in Revit through corporate, collegiate, and technical school contacts there. You can reach him at lcfox@archimagecad.com.

Cracking the VL (Visual LISP) Barrier

Many of you have heard of AutoLISP® and even use AutoLISP-created routines on a daily basis to help improve the accuracy of your drawings or decrease the amount of time it takes to complete a task. There are hundreds of functions in AutoLISP that you can use to automate tasks in AutoCAD® (along with the hundreds of commands that come with AutoCAD), but did you know that, starting with AutoCAD 2000, there were hundreds if not thousands of new functions that became accessible through AutoLISP in the form of Visual LISP®?

Visual LISP is based on AutoLISP, but allows you to access COM libraries that are installed on your computer to harness the power of AutoCAD and other applications in many new and exciting ways. COM, which stands for Component Object Mode, allows you to access the methods, properties, and constants of object libraries that can be used to manipulate applications, documents such as drawings or word processing files, and even the Windows operating system.

> ## Starting with AutoCAD 2000, there are hundreds if not thousands of new functions that became accessible through AutoLISP in the form of Visual LISP®

This article introduces you to the world of using AutoCAD software's COM library and the Visual LISP functions of AutoCAD to create and manipulate a circle object in model or paper space. The Visual LISP functions and COM library are very powerful as they allow you to create and manipulate an object without using different commands. Moreover, they allow you to work in a layout other than the current one to make sure that you get the exact results you are looking for each and every time the routine is run.

Opening the lines of communication

Visual LISP requires a little more work to create and manipulate objects in a drawing, but the rewards at the end are much greater. Visual LISP gives you greater access to objects in a drawing that aren't available using AutoLISP. One of the first things you need to do when working with Visual LISP is to tell AutoCAD that you

want to work with the methods, properties, and constants that are part of the AutoCAD object library. During this process, AutoCAD loads a series of functions that begin with VL. To load the VL functions, you use the function VL-LOAD-COM, which doesn't require any arguments.

After the VL functions have been loaded, you need to create a reference to AutoCAD (yes, I know it might seem silly because you are using AutoCAD, but it must be done). To get a reference to the AutoCAD application object you use the function VLAX-GET-ACAD-OBJECT, which doesn't require any arguments. Once you have a reference to the AutoCAD application object, you can access the application window and the drawings that are currently open.

To learn about what methods/functions and properties are accessible from the AutoCAD application object or any other object that is returned by a VL function, you can use the VLAX-DUMP-OBJECT function, which takes up to two arguments. This first argument is the object and the second is an optional Flag to display properties only or methods and properties.

```
;; Load the VL functions
(vl-load-com)

;; Get a reference to the AutoCAD application object
(setq acObj (vlax-get-acad-object))

;; Display available properties for the object
(vlax-dump-object acObj)

;; Display available properties and methods for the object
(vlax-dump-object acObj T)
```

Below is a sample of what is returned to the command window after the VLAX-DUMP-OBJECT function is used on a reference to the AutoCAD application object.

```
; IAcadApplication: An instance of the AutoCAD application
; Property values:
;   ActiveDocument = #<VLA-OBJECT IAcadDocument 0141bfe0>
;   Application (RO) = #<VLA-OBJECT IAcadApplication00d077b4>
; Methods supported:
;   Eval (1)
;   GetAcadState ()
```

Some properties can be changed while some properties are read-only. Read-only properties display (RO) after the property name. For example, Application is a read-only property in the example output above. In this example output, there are two methods that are part of the application object, Eval and GetAcadState. The number of arguments that a method requires is displayed in the

set of parenthesis after the method. Actually, this isn't completely accurate as each method requires the object that it is to work with as the first argument when working with a method. To find out the argument that you need for a method, open the ActiveX and VBA Reference online help files. To open the help files, click Help > Additional Resources > Developer Help and select ActiveX and VBA Reference from the Contents tab.

From the help file you can find out that the Eval method requires a string value and that is a value that is surrounded by " ". In this case, the string value is a piece of VBA code. Below is an example of using the Eval method to display a Message Box with the text "Yes or No" and the buttons Yes and No.

```
(vla-eval (vlax-get-acad-object) "MsgBox \"Yes or No\", 4")
```

The above sample isn't very useful because it doesn't return a value other than nil, but there are some situations when using Eval to execute VBA code can be useful. Accessing a property of an object is very similar to that of working with a method, but you use methods that start with either VLA-GET to retrieve a value or VLA-PUT to set a value for a property. Below is an example of getting the current drawing that is open in AutoCAD.

```
(setq acCurDWG (vla-get-activedocument (vlax-get-acad-object)))
```

Once you have the current drawing you can create or modify objects that are stored within. Objects that you can create might be a new circle or a block definition. You can even do some sort of drawing setup with dimension styles and layers.

Working with arrays

As you have seen, Visual LISP introduces some new objects that are specific to drawing files, preferences, or even the AutoCAD application, among others. As you work with Visual LISP you will encounter groups of variables called arrays. Arrays are defined with a specific data type such as strings, objects, a number in the format of an integer (whole number) or double (float/number with decimal places), or a catch-all type called a variant. Arrays are similar to a point list, but they are structured much differently and therefore require some special attention. Arrays are used to specify the center point of a circle, the end point of a line, or any other argument that you might need a coordinate value along with working with other methods and properties of some objects.

An array is a collection of an element, and the elements in an array begin with the index of 0 (zero), just like a list does in AutoLISP. To create an array you don't use the LIST function. Instead, use the VLAX-MAKE-SAFEARRAY function and specify the type of data the array will hold. Then once you create the array you have to fill it with values using the VLAX-SAFEARRAY-FILL function. Below is an example to create an array that will hold the coordinate values 2.5,6.25,0.

```
;; Create an array of doubles with three elements
(setq cenPt (vlax-make-safearray vlax-vbdouble '(0 . 2)))

;; Assign the element 0 with 2.5, 1 with 6.25 and 2 with 0
(vlax-safearray-fill cenPt '(2.5 6.25 0.0))
```

Using specific data types is important when working with VL functions at times, and this is something that you didn't have to worry about doing when working the AutoLISP.

Creating a circle with Visual LISP

The circle example below shows how to create a reference to the AutoCAD application, current drawing, current space, and then a new circle object. Once the new circle object is created, you can manipulate the object. The example below shows changing the color of the object to blue.

```
;; Load the VL functions
(vl-load-com)

;; Create a Circle using Visual LISP
(defun c:circVL ( / acObj curDWGObj spObj cenPt circObj)
 ;; Get a reference to the AutoCAD application object
 (setq acObj (vlax-get-acad-object))

;; Create a reference to the current drawing
 (setq curDWGObj (vla-get-activedocument acObj))

;; Get a reference to the current space
 (if (= (vla-get-activespace curDWGObj) acModelSpace)
  (setq spObj (vla-get-modelspace curDWGObj))
  (setq spObj (vla-get-paperspace curDWGObj))
 )

;; Create the center point for the circle
 (setq cenPt (vlax-make-safearray vlax-vbdouble '(0 . 2)))
 (vlax-safearray-fill cenPt '(2.5 6.25 0.0))

;; Create a circle at 2.5,6.25 in a radius of 3.125
 (setq circObj (vla-addcircle spObj cenPt 3.125))

;; Change the color of the circle to blue
 (vla-put-color circObj 3)

;; Zoom extents
 (vla-zoomextents (vlax-get-acad-object))
 (princ)
)
```

Other resources

You might feel overwhelmed with Visual LISP at first, based on the number of methods, properties, and constants that are available and the processes involved. However, once you begin working with it, you will be able to enhance your existing routines with new functionality. As I mentioned earlier in the article, this is simply an introduction to working with the Visual LISP functions that come with AutoCAD. There are many other object libraries out there that will allow you to work with applications such as Microsoft Word and Excel to export bills-of-material information or generate quotes based on the information in the drawing. If you are a CAD manager, you can even find object libraries that help you set up and manage the computers on which AutoCAD is running on by configuring desktop shortcuts or setting up support paths.

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Linear Quantities Made Quick

In the lifecycle of nearly every project, there will come a time when quantities must be calculated, regardless if they are a part of a review agency's requirements or in-house assurance that your project isn't over budget. And calculating quantities is, quite simply, no fun. Granted, base AutoCAD® offers some impressive tools to automate calculating the number of blocks inserted in a drawing, but still, what about linear features such as lines arcs and polylines? Calculating the total linear feet for each diameter of waterline in a project could easily take hours using commands such as PEDIT and LIST. At the end of it all you kick back in your chair and say to yourself, "There has to be a better way."

There is, in fact, a better way and it is found within Autodesk Map® 3D software. With Map 3D, it is possible to calculate linear quantities in a matter of minutes as opposed to hours. Making such a time savings possible are Map 3D's topologies. By design, topologies are technically a GIS tool, but with a little imagination they can quickly become an engineer's best friend.

Understanding topologies

By definition, topologies are a set of geometric connections between objects. While the definition may be a little cryptic, if one takes a moment to think about it, nearly everything illustrated in a set of engineering plans falls into this category. Take, for example, a waterline design. The numerous pipes (objects) will be assembled together (geometric connections) to ultimately construct a complete water system. Using a "Network Topology," statistics (including length) for such a waterline system can be calculated in a matter of minutes.

Autodesk Map 3D allows for three distinct topology types: node, network, and polygon. The different topology types mirror the different ESRI shapefile types of point, polyline, and polygon. Which topology to use will be determined by the type of entities with which you are working. In our case, we're interested in calculating the total length of waterline in our design. For linear features such as waterlines, a network topology is best suited for our scenario.

Structuring your drawing

Although individual entities can be se-

lected and added to a topology, breaking items such as your 6- and 8-inch waterlines onto two separate layers will streamline the creation of your topology. While it may seem elementary, taking a quick moment to ensure no extraneous linework is contained on your layer(s) to be calculated will, of course, ensure an accurate quantity. Taking a couple extra minutes to structure your drawing as outlined above from the beginning will make up-to-the-minute quantities possible during your next design charette.

Creating a network topology

Similar to AutoCAD in the way it makes commands available in numerous ways, topologies can be created in one of two ways: using the Map Explorer in the Map Task Pane or by working through the Map menu itself. Both methods have advantages, but to keep things simple and concise, we'll work through the Task Pane in this article.

1. Open the Map Task Pane – The Map Task Pane loads by default with Map 3D (although you may have disabled it). Use the "MAPWSPACE" command to turn the Map Task Pane back "on" if you have closed it.

2. Set your Task – The "Map Explorer" task pane will be needed to create a topology. Do note the slight interface change between the Map 3D 2006 and Map 3D 2007 releases. Map 3D 2006 uses tabs on the side of the interface—similar to tool palettes. Instead of tabs on the side of the interface, Map 3D 2007 (Figure 1) has a pull-down at the top of the interface explicitly labeled "Tasks."

3. Create your Topology – One of the options in the Map Ex-

Figure 1 – The Map Explorer Task Pane

Figure 2 – Create a Network Topology

plorer task pane is "Topologies." To create topology, right-click on the "Topologies" option and select "Create" (Figure 1).

4. Specify your topology type – As discussed earlier, there are three distinct topology types available within Map 3D: Node, Network, and Polygon. From the "Select Topology Type" dialog box, select the "Network" radio button. The title of the dialog box should update to read "Create Network Topology – Select Topology Type" (Figure 2).

5. Give your Topology a Name – Although you will likely discard your topology after calculating its length, you still must give it a name. Use something logical. If calculating the length of an 8-inch waterline, a logical name may be "WATR-08IN" (Figure 2). You may also choose to provide a description, though it does not affect the functionality of the topology command. Press the [Next] button.

6. Select what to calculate – Upon pressing the [Next] button you will be presented with the "Select Links" dialog (Figure 3). Quite simply, the "Select Links" dialog is merely asking what entities you wish to add (and ultimately calculate the length of) to your topology. Within the create topology command there are four distinct ways objects can be selected: all objects, by object, by layer, or by class.

In this case we're interested in calculating the total length of an 8-inch waterline. Thanks to a little work up front, this particular drawing has a separate layer for each pipe diameter. For that reason I can simply select the layer name that contains my 8-inch water pipes (C-WATR-UNDR-08IN).
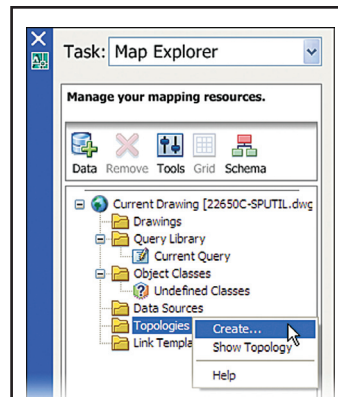
Figure 3 – Selecting Links (Objects)
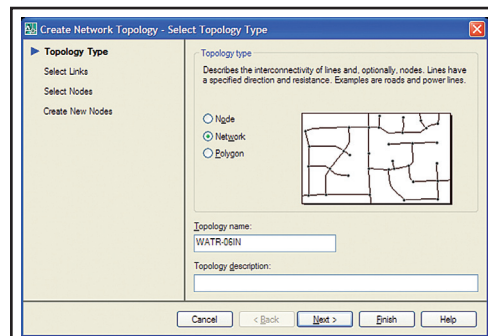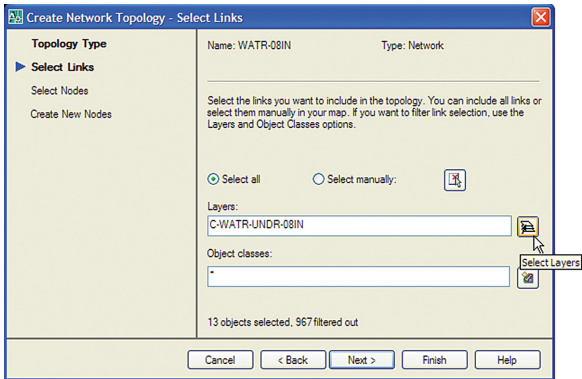
Had this drawing not been structured with each pipe diameter separated onto its own layer, the manual selection method could have been used. Objects may be added to the topology manually by clicking the button to the right of the "Select Manually" radio button. If you hover over the button the tooltip will read "Select Links."

7. Finish your topology – Even though create topology has a couple more dialog boxes, enough information has been provided for Map to generate a linear quantity desired. Thus, at this point we can press the [Finish] button.

8. Gathering your Quantity – With your topology now defined, statistics can be calculated on it. Back at the "Map Explorer Task Pane," right-click on the name of your topology and select "Statistics" (Figure 4).
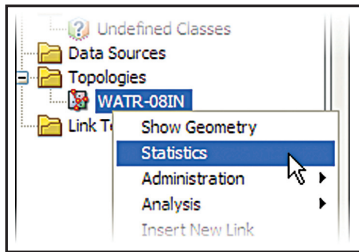
Figure 4 – Calculating Statistics

9. And the number is… – After selecting "Statistics," a new dialog will appear. The "Topology Statistics" dialog will display a number of statistics about your topology. Admittedly, most will be interested in but one number—the total.

Command line version

An interesting fact about Map 3D is the way most Map commands have the ability to function in a textual command line-based interface. Consistent with most standard AutoCAD commands, prefixing the command with a hyphen "-" will suppress its graphical dialogs, and inherit a command line-only functionality. Most humans will prefer the graphical dialogs. On the other hand, by using the command line, regularly calculated linear quantities have the potential to be automated with a script.

The two Map 3D commands used in this article were MAPTOPOCREATE and MAPTOPOSTATS. Adding a hyphen to the -MAPTOPOCREATE command will allow a topology to be created from the command line. It's important to note the command prompts for the MAPTOPOCRE- ATE command are not in the same order as the dialog boxes. The command line version of the command asks for nodes to be selected first. Nodes were not used in our scenario, and thus can be skipped over in the command line version of the command. Be sure to add linear entities as links when using the command line.

Unfortunately, there is no command line equivalency of the MAPTOPOSTATS command. Although the command cannot be controlled from the command line, it doesn't make knowing the command a worthless bit of trivia. Typing MAPTO- POSTATS (without a hyphen) at the command line will result in the launch of its graphical dialog. Tagging this command at the end of an automation script would still guide a user to the right place, allowing him or her to quickly calculate a linear quantity.

It's no secret that the engineering design process is iterative. Despite that known fact, clients rely on design teams to provide accurate and up-to-date take-offs to ensure their project are on budget. Traditionally, municipalities are also eager to know these same quantities for purposes of budgeting future maintenance costs. Although the topology tools are more focused toward GIS, they can prove invaluable on the engineering side by saving both time and money.

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So You Want to Be a Machine Designer?

What exactly is a machine designer, what does a machine designer do, and do I really want to do that?

Now that I have posed the questions, I need to answer them. Moreover, I need to share how Autodesk Inventor® and AutoCAD® help machine design. If your background is similar to mine, well, a few of you may relate to this and others will read this and wonder how they can do this, too. When the door opened, I entered and fell into the world of custom machine design. When you see a door to knock on, you do, and if it opens, you step through eager to give what you have learned, and to be open to learning new concepts. Always take the opportunity to learn something new every day; some days you may get the opportunity to learn several new things or, perhaps, to re-learn something you have forgotten (or forgotten on purpose!).

The basics

Okay, so let's get this on the road. First, what is a machine designer? There are many areas in which we design machines, I design machines to automate a repetitive manufacturing process. A customer brings to us a concept of what he needs to automate. After the part or the assembly is reviewed, we start the process of designing a machine to do what the customer needs.

When the job packet arrives on my desk, I review the specifications and review the
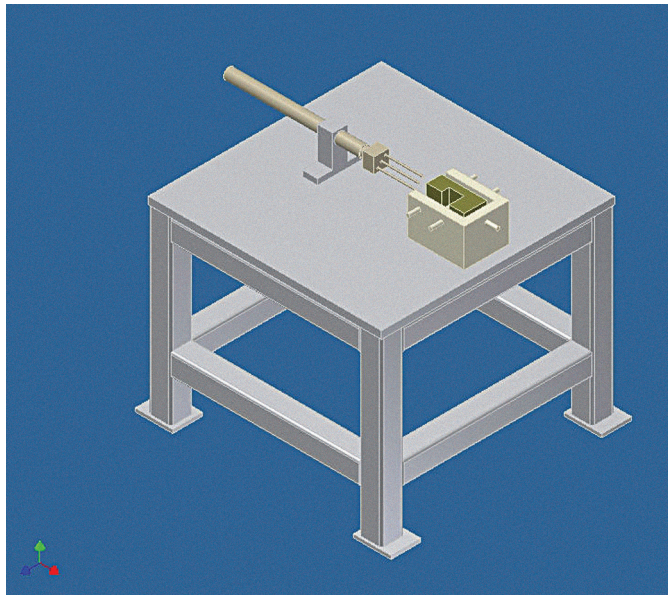
Figure 1
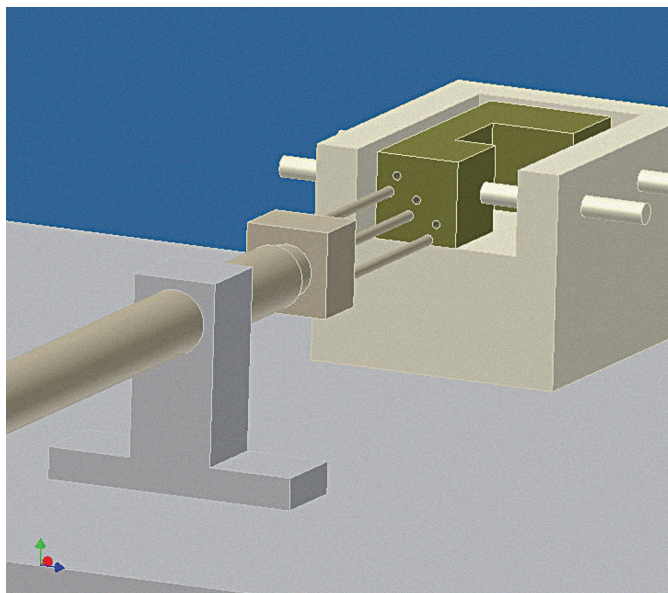
Figure 2

drawings for the completed part or assembly. When I start designing, I like to have the part file as a solid model from the customer. I can then integrate that file into my design. That way, there will be no miscommunication between what the customer needs and the machine we deliver.

It is determined that you need to use pneumatic cylinders to automate the process so you select your favorite supplier. Go to that supplier's website, go through the selection process, and download the solid model. Most suppliers provide the ability to download solid models. I prefer to use step files, then sat files. Some suppliers offer native Inventor files.

When designing a new machine, do not attempt to design the whole machine at one time. That will be overwhelming and you'll make very slow progress. One machine I designed required about 10 holes to be drilled. I set the part about 4 inches off the top; we used pneumatic drills. I sat one drill inline with one hole and designed a base to hold the drill. Then I moved to the next hole. After I lined all the drills and designed all the drill supports, then I designed supports for the part. Again I'm working one area at a time.

After I was satisfied with all the drills and part position and determined the ease to load and unload the part, I designed the machine frame. The height needs to be at a productive po-

sition. You could always design the frame, then return to the frame and adjust the height. I would rather design the frame last (less rework).

Speaking of rework, when designing custom machines, you must always allow for some rework in the overall design process. Some rework comes after your design is completed and it is presented during the design review or kick-off meeting. After the other team members have reviewed your design, there are normally several very good comments or suggestions. Each suggestion must be considered—some may make assembly easier, some may allow for easier machining, and some may allow for a better design.

One of the last features I add are the mounting holes in the mounting base plate. Position and locations of the various components change, features change, and,

If there is a need for unattended operation, a magazine could be added with an indexer to drop parts into the fixture as needed and an ejector could be set to drop the part out of the bottom, down a chute, and into a tub. An operator would need to load the magazine and then exchange the full tub for an empty tub as needed.

Complex machine design

With a more complex machine, I do much the same thing—start at one location and work my way around, as stated above. A very complex machine can be overwhelming. I read a book about eating an elephant. If you look at the whole elephant, there is just too much and you have no idea where to start. You start by cutting the elephant into pieces and you start eating the elephant one piece at a time. Before you know it, you've eaten the whole elephant. Elephants

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Always take the opportunity to learn something new every day

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again, there is less rework by adding the mounting holes in the base plate last.

Hint: One of the last drawing items to add to the base plate drawing are the center lines. Due to a large number of holes, I normally use the hole table to list all the holes. When selecting the hole locations, it is much easier not to have the centerlines. With the centerlines in place, it is easy to select the centerline and not the center of the hole (and, no, they are not the same). Try it and see how it is listed in the chart. In addition, with centerlines you have to zoom in tighter to the holes; which means you have to pan around the base plate a lot more, which takes a lot more time. When you have completed the hole chart, add the centerlines for all the holes.

The figures included with this article illustrate a simple machine. There is a block that needs three holes drilled and tapped in one end. I have frame and machine base with a position fixture. The fixture is set with several adjusting rods, which allow for proper positioning of the part with alignment with the drill. There would be a clamp that would be attached to the block. This clamp would be used to hold the part in position during drilling.

are huge, and will take time to eat, so pick a spot and get started. It's a similar thought process with complex machine design—you pick a spot at which to begin and work on it one piece at a time, and before long, you have designed a complex machine.

The payoff

After you have designed a machine or two, and have seen them built and run (hopefully with very little changes), you feel good. For me it's rewarding when the machines are built, tested, customer run off, and shipped. I work with a team of individuals, machinists, builders, and fabricators. Remember you, like me, may be a designer, but it takes others to machine the parts and talented builders to assemble and test it.

David Keener is a Design Engineer for SMT Industries in Sidney, Ohio, and also an Adjunct Professor at Edison Community College in Piqua, Ohio. He has been using AutoCAD for more than a decade and Autodesk Inventor for more than two years. He can be reached at d_keener@smtind.com.

Inside the CUI
(Custom User Interface)

When this "thing"—the CUI—first came out, I had mixed emotions. On one hand, I was making a good little living creating custom menus for people and I was having a hard time letting all of that go. I mean…Autodesk has finally, after years of end users begging, come out with a user interface designed for the average user. On the other hand, I was looking forward to using this new CUI and training on it as well.

"It's extremely easy to navigate… and intuitive," I said one late spring morning at the end of a long boardroom table. With my little projector beamed on the wall, I proceeded with dragging things around, deleting things I thought I didn't need, and basically having my way with the CUI. Sure, I had never actually looked at it before, but I was pretty confident. What could possibly go wrong?

The following occurrence has haunted my dreams (and presentations) ever since. Once I clicked that Apply button, ALL of my toolbars, dropdowns…COMMAND PROMPT!!!—all of it, gone. That long boardroom table seemed to get much longer. Man, was it hot in there!

Okay, long story short: The CUI is very nice, but if you go "willy-nilly" poking around in there, things will happen that you may not like.

How it's structured

The CUI is designed basically for "one-stop-shopping." Unlike the old 2005 customize dialog, the new interface allows the creation (and modification) of toolbars, buttons, menu items, and even double-click actions without having to tab through a dialog and without having to reload menus
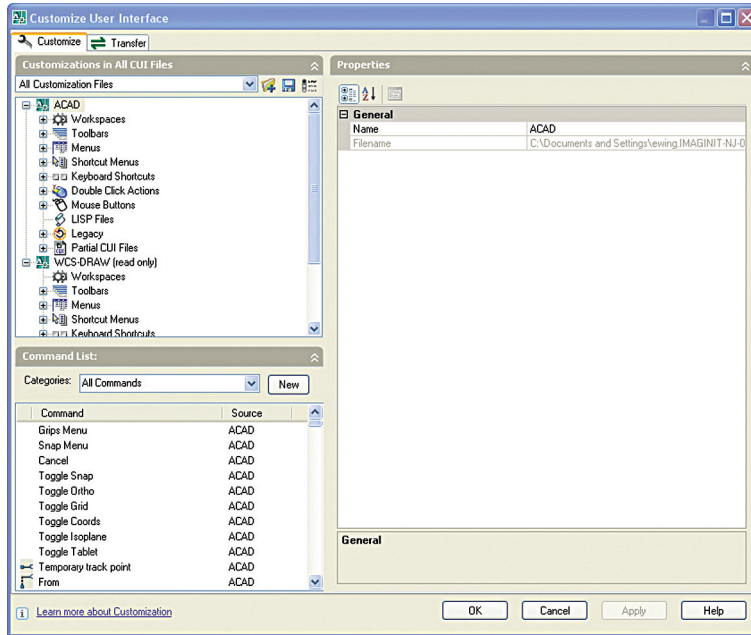
Figure 1

or forever keep closing and re-opening the application.

- Type CUI to bring up the editor.
- You will see three windows.
- The first window (Customizations in All CUI Files) shows you the actual menus that are loaded into your system. It also shows the list of items contained within those menus. As you can see, the
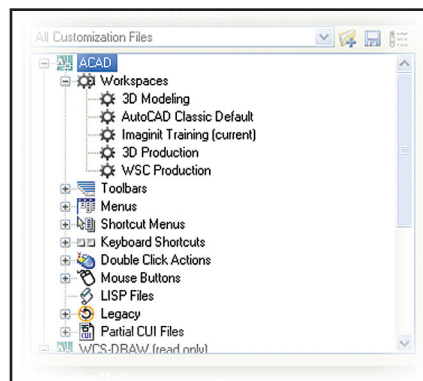
Figure 2

ACAD menu is loaded. For this article, we will be making modifications to this menu. In the next article, "CUI for CAD Managers," we will discuss enterprise and user CUIs.

- The second window (Command list:) is just that: all of the Architectural Desktop commands. What's nice about this is that custom commands are now included. You can either search through the entire directory or break it down into categories using the categories dropdown. When we want to add a command to a menu item such as a toolbar, we simply drag it from this window up into the menu item we want it in.
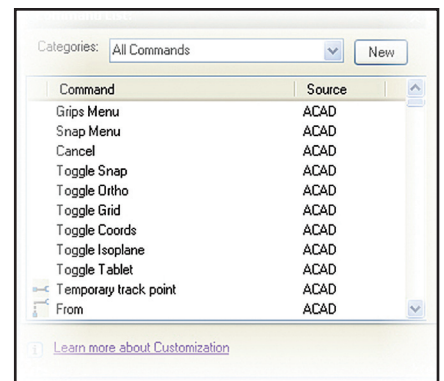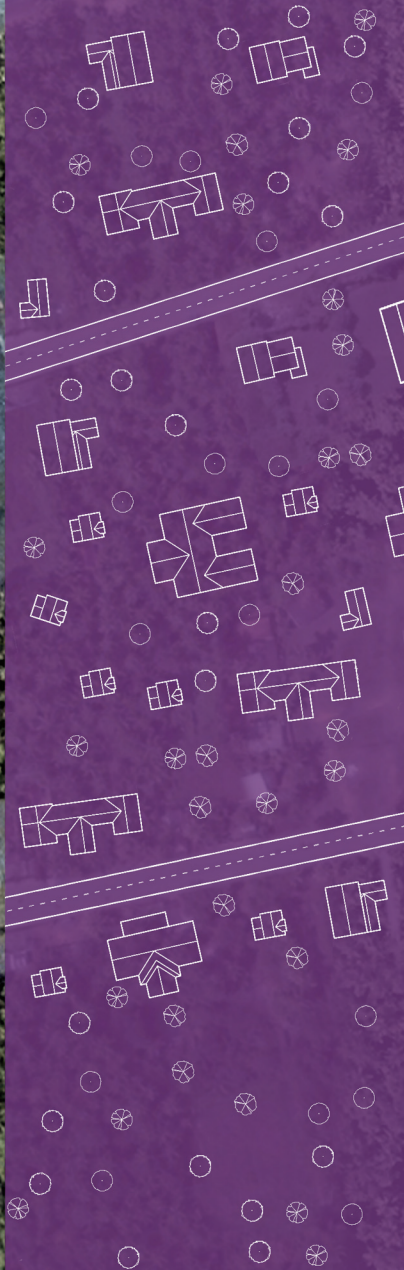

Figure 3

- Click the New button.
- Notice the third window populates with the properties of the new button. This is a very simple procedure in creating a new button.
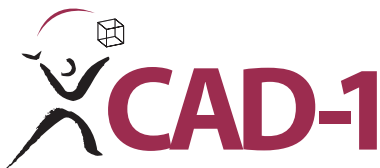
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- For the name, call it Options.
- For the description, type "invokes the options dialog".
- For the macro, type ^c^c_Options.
- For the button, check out all of the choices now! Pick one or make a new one. *See Figure 4*
- Click apply in the lower right corner.
- Notice also that a new command is added to the list.

Adding this new command to a new tool bar is easy.

- In the Customizations in All New CUI files window, find the Toolbars icon.
- Click the plus sign next to it. This will show you all of the toolbars in this specific menu.
- Right click on the Toolbars icon.
- Select new…
- Call it My AUGI Toolbar.
- In the commands list, find the options command you made.
- Drag it up to the new toolbar you just made in the customizations window. *See Figure 5*
- Once you drop it, it's part of the menu.
- Just below toolbars, you will see the same exact icon tree. This time it is for menu pull-down items.
- Right click the Menus icon. *See Figure 6*
- Select new menu.
- Call it My AUGI Menu
- Drag a command up to the new menu.
- Click Apply.
- Close the CUI. You now have a new drop-down menu complete with an icon. *See Figure 7*
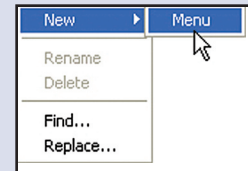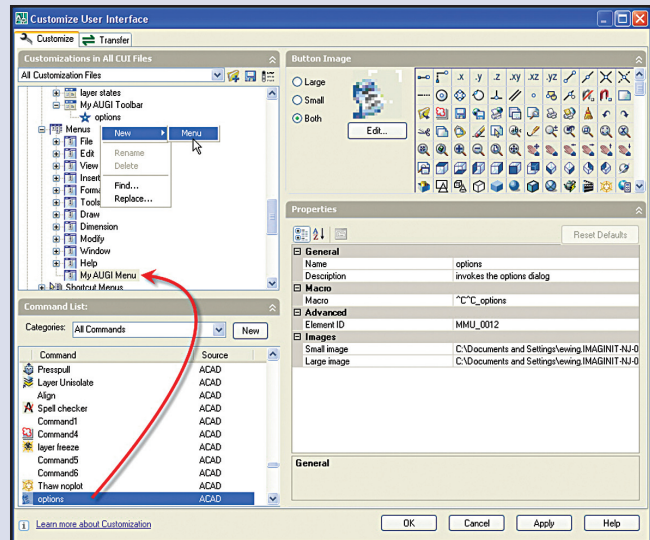
Shortcut menus

Or, if you are a nerd like me, you can create Context menus. Either way, when you right-click on an object, Architectural Desktop knows what it is and provides choices in a list to perform an action on that object. We can now weasel our way into those menus. YES!

- Open the CUI
- Find the Shortcut menus category. *See Figure 8*
- Click the plus sign to drill into the category.
- Click on the Default Menu to expand it.
- In the Commands list, drag Osnap Settings… onto the Default Menu.
- Apply and exit.
- In ADT, right-click, but hold down the right button.
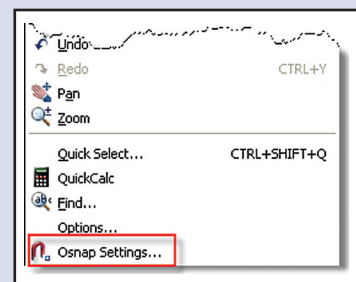- The Osnap choice is now there. *See Figure 9*

Figure 4

Figure 5
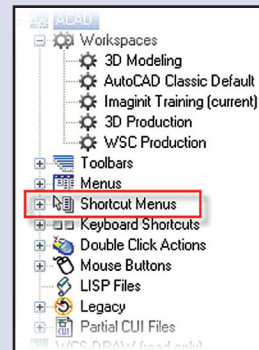
Figure 6

Figure 7

Figure 8

Figure 9

A **2**WOSOME THAT REALLY **C**ONNECTS…

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Shortcut keys

This one's not as straightforward. A couple of things need to take place.

- Open the CUI and drill into the keyboard short-cuts, then Shortcut keys.
- From the commands area, find Options… and drag it into the Shortcut Keys list.
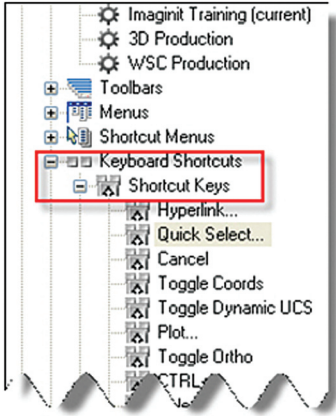
Figure 10

- Select the new Options…shortcut key.
- To the right, there is an area where you can specify the actual key combination.
- Click the button with three dots…
- Press and hold the Ctrl key. As you are holding the ctrl key, press the T key. (O and P are taken. This is the next available key.) *See Figure 12*
- Click apply, then OK.
- Test the combo.

Double click overrides

- Open the CUI.
- Drill into the area where the mouse icon is. It says "double click actions".
- Find Dimensions.
- Drill into the dimensions and you will see properties. Now, I don't know about you, but when I double-click on a dimension I'd rather edit the text, not look at the 200 property items associated with it.
- Select the properties and delete it.
- In the commands window, sort the commands by Modify.
- Find the Edit… command with the text icon.
- Drag it up to the Dimension icon. *See Figure 13*
- Apply.
- Double click on a dimension and enjoy.

In a future *AUGIWorld* issue, we will focus on issues involving setting the CUI up in a network environment, CAD management headaches that can occur, and how to avoid those headaches. If you have any questions or comments regarding this article please feel free to contact me at ewing@rand.com
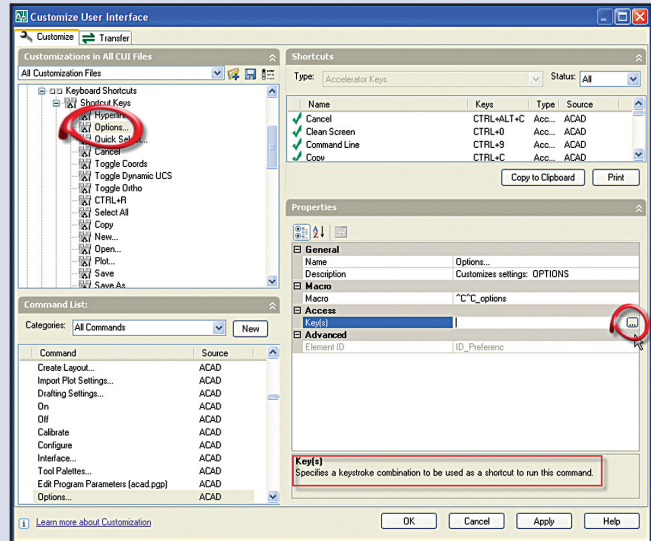
Figure 11

Figure 12
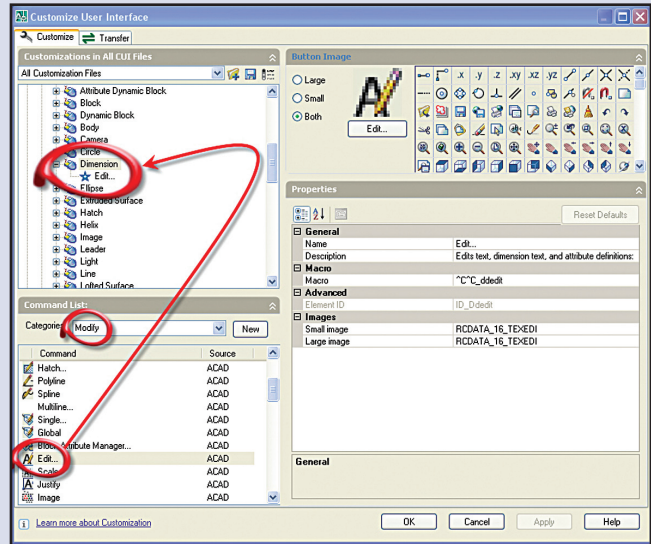
Figure 13

Eric Wing has been in the building, architectural design, and structural engineering field for 15 years and has been managing, teaching, and presenting Autodesk applications for 10 of them. Eric's activities within AUGI include: ATP Director, Survey Manager, ATP instructor, AUGI HotNews columnist, and AUGIWorld columnist. He serves as an Application Engineer for IMAGINiT, a large Autodesk reseller. He can be reached at atpmanager@augi.com or ewing@rand.com.

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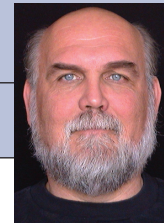
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On The Back Page

David Kingsley

During most of the 1980s, I taught AutoCAD® in the evenings at a university Continuing Education program. We're talking AutoCAD 11 DOS, Win12, and the infamous Win13. In one class I would have: local high school students who couldn't get AutoCAD classes; 60-year-old architects who couldn't get work because for too long they had avoided AutoCAD hoping it would go away; foreign students in engineering programs which didn't offer AutoCAD in the curriculum; and people who just wanted to learn a skill to get a better job.

There are many memorable moments from those years. It was one of the pleasures of my life to see a classful of faces (well, usually more than half of them) light up when I delivered the "punch line" of the lesson. After several evenings they would start to gain some control over the beast known as AutoCAD and become obsessed. We would always have supporting exercises immediately after getting a concept through to them, but they would often get so deep into the screen that I couldn't get their attention back. When it was time for me to resume lecturing, sometimes I had to cup my hands like a megaphone and call out "Please step away from the keyboard!"

Over the years AutoCAD has improved immensely. It is far less arcane and more attuned to the way people really work. It is far easier to teach because it makes more sense. What amazes me is how long people in the workplace will hang on to their antiquated ways. As I see it, there were four paradigms shifts in the history of AutoCAD.

Which one fits you?

The first I call "Old School AutoCAD." This was established by the pre-11 user base (R11 was introduced in March 1990). Prior to R11 there was no Paper Space. Everything was in Model Space. These drawings are usually accompanied by non-associative dimensions. For the younger crowd, I describe non-associative dimensions as "a picture of a dimension." Each line, arrowhead, and number is a separate object. Compared to today's powerhouse AutoCAD, it really was one step away from paper drafting.

The next wave I call "I Hate Paper Space!" Paper Space was introduced in R11, October 1990, and survived almost nine years, through R14's reign, which ended in March 1999. The introduction of the model/drawing paradigm was probably the single most controversial feature to ever hit the community. People either loved it or hated it. It was well executed by Autodesk, but it was difficult to teach. Some people would get it immediately and some just

never grasped it. We often ended up in a divided class where some people were anxious to learn all they could about it while others were totally befuddled.

AutoCAD 14 was a real workhorse and is one of my favorite releases. To me it now represents AutoCAD's attainment of young adulthood. I have fond memories and many physical remnants as a result of the thousands of hours I spent with it.

The third wave of AutoCAD was "Layouts for the New Millennium." Release 2000 in March 1999 was a significant leap from R14. AutoCAD was now far more Windows-compliant. Knowledge of Windows apps was readily transportable to AutoCAD. Having already learned how to use tabs and worksheets in Excel, the new "Layout Tabs" were easily understood as "multiple Paper Spaces."

In one of my classes, a "student" taught me an alternative way to enter commands in AutoCAD. (She was a math professor, and her husband flew a U2 for NCAR. FYI, the U2 was a famous spy plane before Bono was born, and is still in service. Go to Wikipedia and search for Lockheed U-2.) Back to the class… she almost exclusively used Windows keyboard shortcuts to run AutoCAD. As an alternative in AutoCAD, look at the pull-down menu and tap the Alt key. Notice the underlined letter that appears. Type that letter and the pulldown will open (some versions may require you to hold the Alt key, *i.e.,* Alt+N). Notice the underlined letters on each menu choice and type those. Watch the command line responses. With a little practice you can issue most AutoCAD commands with two or three keystrokes. Who knows when that may help you out of a jam?

The current paradigm is "Sheets Happen!" In March 2004, release 2005 introduced Sheet Sets. I have been more involved with Inventor in the last three years and haven't mastered them, but Sheet Sets and Inventor drawings share the same technology and are similar in practice. In short, with layout tabs you can create multiple documents based on one model. With sheet sets, you can have a different model linked to each sheet. This is very powerful, but in the manufacturing world you need to be careful. It is bad practice, and probably not ISO9000 compliant, to have several part numbers nested within in one file name.

Tip of the month

Optical mice don't work on glass tables! Being fond of trendy WiFi-enabled coffee houses (where I am right now), I do a lot of work under the influence of Fair Trade Coffee (Google that). You can use a piece of paper as a mouse pad if necessary. I've used an optical mouse for years, but I didn't know this until an hour ago.

David Kingsley served from 1999-2004 on the AUGI Board of Directors and is the Director of Electrons at CADPlayer Web Courseware. He can be reached at djkingsley@cad-tv.com

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