

Mar/Apr 2003

augiworld

The Official Publication of Autodesk User Group International



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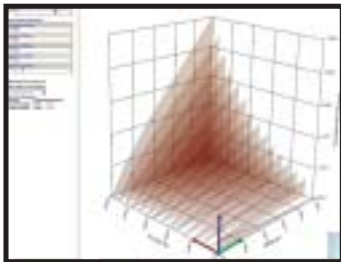


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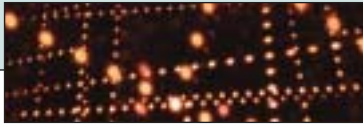
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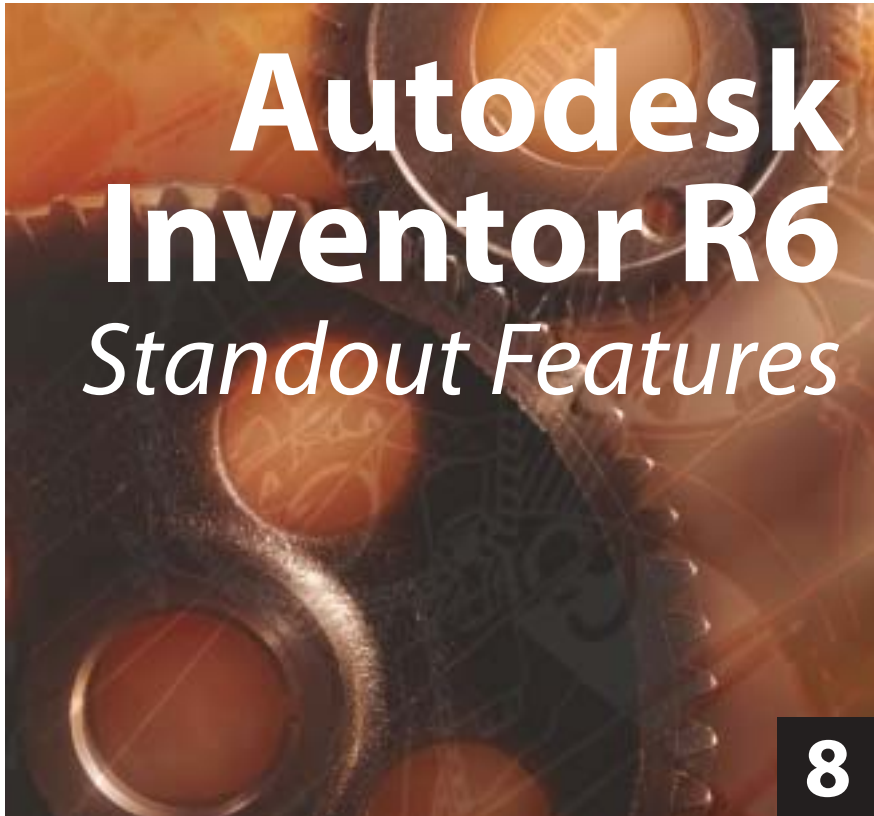
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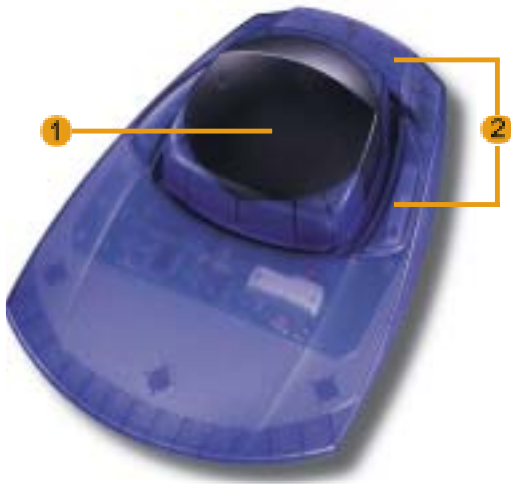
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Augiworld News



Praise for Autodesk University

With record-setting attendance and top-quality educational sessions and workshops, Autodesk University 2002 was an unqualified success. "It was the best AU ever, without question," asserts John Clauson, AUGI president. "The lineup of courses and instructors was top shelf, as were the facilities and food. The exhibit hall had the best layout and organization that I've seen, and I've participated in a huge number of them as both visitor and exhibitor.

"Those good things don't happen without careful planning by experienced and talented people who are dedicated to quality," continues Clauson. "My hat is off to the event coordinators and everyone else involved in producing AU 2002. They definitely raised the bar."

The 2002 Autodesk University marked the 10th anniversary of this event.

New Board on Board

We welcome AUGI's new board members: Michael DeGraw, Chris Lindner, and John Moran.

Michael DeGraw is director of CAD software development for The Freeman Companies, a full service trade show general contractor.

Chris Lindner, owner of onebutton cad solutions, provides consulting, training, and programming services to the AutoCAD community.

John Moran is associate technical fellow for The Boeing Company, Washington.

The 2003 AUGI Board of Directors

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Michael DeGraw

Beth Garrison

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Chris Lindner

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Elise Moss

Chris Lindner Is the Top DAUG

Chris Lindner took first place in the 2002 Top DAUG competition, held at Autodesk University.

This contest, open to all AU attendees, was created to test participant's knowledge and skills in AutoCAD. Hewlett Packard was the exclusive sponsor of the Top DAUG Competition.



Yoshi Honda from AUGI (left) and Tom Salomone from Hewlett-Packard (right), congratulate AUGI Top DAUG winner Chris Lindner. Chris won an HP digital camera and additional prizes at Autodesk University 2002.

The first stage of the competition was a multiple-choice test of AutoCAD knowledge. Questions covered areas such as Draw, Edit, and Display Commands, Plotting, Paper Space (Layout), External Reference, Customization Knowledge, and AutoLISP knowledge, as well as general AutoCAD questions.

Contestants with the top 10 scores entered the second stage of competition – an AutoCAD 2002 drawing exam.

Lindner's first-place finish won him an HP digital camera, an AUGI backpack, an AUGI mug, and NFR software of choice from Autodesk. Lindner, an AutoCAD user since 1985, is the owner of onebutton cad solutions (www.onebuttoncad.com), a consulting company providing training and programming services for the AutoCAD industry.

Second place honors went to Joseph Glick, Clark County Public Works, Nevada. Glick won an NFR copy of

AutoCAD, an AUGI Backpack, and an AUGI mug.

Greg Silva of ATS/Express LLC, Tulsa, Oklahoma, took third place, winning an NFR copy of AutoCAD LT, an AUGI Backpack, and an AUGI mug.

Congratulations to all the winners!

AUGI Membership Is Up

In December, more than 1,200 new AUGI members were welcomed into the organization.

AUGI Exchange

A new service has been introduced at AUGI.com. The AUGI Exchange is a database-driven freeware, symbol, and text file upload/download system. AMD (Advanced Micro Devices) is the exclusive sponsor of the AUGI Exchange.

The AUGI Exchange grew out of a desire to archive the wealth of knowledge generated by members of the AUGI Guild system. AUGI Exchange enables users to share useful routines, symbols, and informative papers. AUGI members can search for and download submissions from fellow AUGI members.

More information about AUGI Exchange can be obtained from www.augi.com/empower/exchange.



Yoshi Honda, AUGI and Dawn Rintala, Advanced Micro Devices (AMD) —AMD is the exclusive sponsor of AUGI Exchange

ATP Signups Begin

AUGI members have the entire month of March to sign up for classes offered in the ATP Spring semester. A Student Registration Form has been posted to the website this month. Registrations will not be accepted after March 31st. Go to www.augi.com/education/atp for more information.





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The Cad Manager



John Clauson

» ROI for Newbie CAD Managers

Bean counters don't like invisible beans. Small wonder. You might have trouble convincing one to invest in a beanstalk by describing the nutritional value of the beans instead of predicting how many beans it will actually yield in three months. After all, that person was hired to count beans.

You know this is true if you've ever tried to convince a tight-fisted boss to purchase something you're convinced will absolutely increase productivity without having hard numbers in your sales pitch. It's like asking for a raise based on your winning smile and exemplary posture. If you're new to CAD management, take my word for it: your money manager is convinced that every one of your requests is frivolous. Learn to back up purchase requisitions with ROI statements that illustrate returns on investment and you'll be delighted at how many are approved.

According to Clive Shepherd at Fastrak Consulting Ltd., one way of looking at ROI, "is to calculate how many months it will take before the benefits of the [purchased item] match the costs, and the [purchased item] pays for itself. This is called the payback period: $\text{payback period} = \text{costs} / \text{monthly benefits}$." Payback calculations, if properly done, may amaze even you when you see how dramatic the results may be.

Any savvy business person will tell you that people are the most expensive and important asset in their companies. Managers, however, may lose track of the connection between old equipment and the squandering of their employees' time. Good payback ROI calculations can help drive that point home and get approval of your requests.

To help you get a grip on this process, I've enlisted the aid of two hardware vendors to provide actual tools you can use, and will pass along some strategies from some of my wizened CAD manager friends. Together we'll give you some tips

on doing ROI presentations for auxiliary hardware and training, which are two of the more difficult "sells." For additional general information on ROI calculations, see Robert Green's article at <http://pointa.autodesk.com/local/enu/portal/Articles/article.jsp?articleId=1802>.

Knowing the actual cost of an employee can make or break your ROI calculations. In addition to the salary or hourly wage, there are many other costs that you might not otherwise consider. The most common wage of those who responded to the salary survey in the last issue of Augiworld was



about \$20 per hour. With benefits, insurances, and other factors, those people may cost their companies \$25 to \$35 per hour or more. Ask one of your accounting people for rough hourly overall costs of the people who will be using the new equipment or attending the training. Thus armed, you can begin your calculations with indisputable facts.

Here's how one CAD manager justified the cost of a 21-inch monitor for a drafter who had been using a 17-inch unit. The manager conservatively estimated that the larger monitor would reduce the amount of time spent zooming and panning by about 5 percent, or 24 minutes a day. At an overall burdened hourly cost of \$30 for the

drafter, that came to a cost saving of \$12 per day. It would then take 50 work days to break even on the cost of the \$600 monitor. More importantly, the \$12 per day savings projected over a work year of 250 days came to an additional \$3,000 savings based on a \$600 investment. That is a good return, indeed.

ROI for the Matrox Parhelia graphics card

Alain Thiffault, product manager for the Parhelia card, showed me a triple monitor setup at Autodesk University 2002. While becoming immediately hooked on the card and the possibilities of using such a setup in my Autodesk Inventor and Mechanical Desktop environment, I mused about trying to sell the concept to upper management. Alain reminded me of the lost time and concentration involved in scrolling, managing toolbars and menus, switching between application windows, and so on.

Alain was kind enough to provide a supplementary article that describes the benefits of the Parhelia card and multiple monitors, as well as some good ROI calculations that illustrate a potential cost savings of \$11,000 per year for a CAD designer using that Matrox technology. Entitled "Multi monitor ROI.doc," it is available for download at <http://www.augi.com/educate/publications/paperspace/psdownload.asp>. In it you will also find several testimonials and other pertinent information.

You can get Matrox graphics card product information at www.matrox.com/mga, and technical info by emailing cad-support@matrox.com. You can also contact Alain at athiffau@matrox.com.

ROI for motion control devices by 3Dconnexion

3Dconnexion, a Logitech company with headquarters in Silicon Valley, manufactures the well-known SpaceBall, SpaceMouse, and CadMan motion controllers and other related devices. While doing some beta testing for them on their new SpaceNavigator, I chatted with Pratisht Shah, their director of partner marketing



about this article. As a marketer of devices that some managers would consider auxiliary in nature, he is well aware of the value of solid, believable ROI calculations.

Pratish provided an Excel spreadsheet that calculates the payback of 3Dconnexion devices based on the burdened cost of a designer, the number of hours per day of use and the particular device used. Pratish explains, "The spreadsheet takes the input data and assumes a conservative 5 to 10 percent productivity gain across multiple tasks and then calculates the number of calendar months it takes to recoup the list price cost on our motion controller. This recouped cost is based on a simple calculation of how much the designer costs to perform the task and how much we are saving on the cost of the designer."

You can see a cool video of 3Dconnexion motion controllers working with Inventor at <http://www.3dconnexion.com/applications/inventor/> and contact them for information at autodesk@3dconnexion.com. The video contains great visual as well as numeric ROI information. The spreadsheet is available for download at <http://www.augi.com/educate/publications/paperspace/psdownload.asp>.

Training

Training may be the ultimate invisible bean, mainly because the results vary widely and can be so difficult to quantify. The money manager will want to know how much time will be saved by the proposed training, but how can you know? Productivity gains via training may be masked or diluted by so many other conditions. In a recent National Human Resources Development Executive Survey, 55 percent of respondents said their biggest challenge was "determining the impact of training on financial performance."

Frankly, good numerical solutions to that dilemma are beyond the scope of this article, but you may still be able to use the payback formula if you can make certain assumptions.

Let's go back to that burdened cost of \$30 per hour for a drafter. How long would it take to make a \$1,000 training class for that person pay for itself? If the class saved one hour a day for the first 30 days (not too hard to imagine), it would constitute a 90 percent payback. In my experience, I've seen untrained people floundering about for days until they began to get a grip on things, and many continued to practice very unproductive habits that wasted time and money day in and day out.

You might also be able to generate some training ROI numbers for some of the conditions that training helps avoid: errors, unnecessary repetition, and poor quality among others. How much did that pile of scrap on the shop floor cost? In my own former manufacturing business, I found that scrap-producing errors by untrained staff could, in a sense, triple my costs on a job. First, the initial time and material was lost. Then the second round of time and material costs to do the job right could not be devoted to doing profitable work, thus reducing my income potential by that amount. I was not amused.

Stick with the numbers

Hopefully you've now seen a few ways to validate your purchase requests by supporting them with ROI calculations. When dealing with money managers, you have to have numbers they understand. You'll improve your chances of getting that great hardware or software if you can make your beans visible.

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

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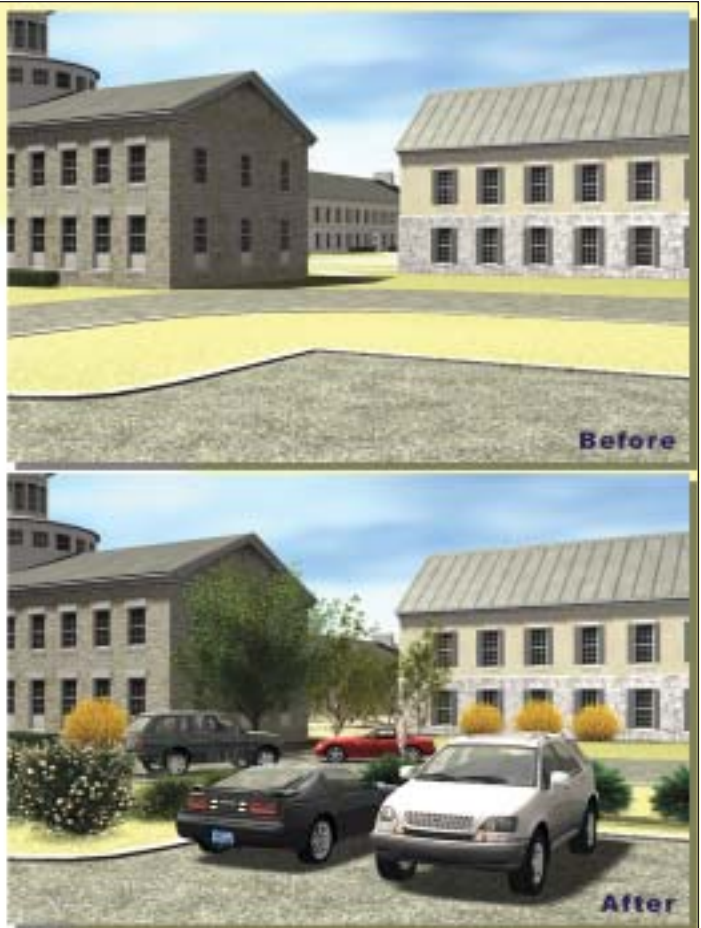
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Autodesk Inventor R6 Standout Features

» Autodesk shipped the newest release of Autodesk Inventor in October 2002. Here, author Elise Moss discusses three major new features in the latest release

Tolerancing

The Release 6 of Autodesk Inventor includes more than 200 new features and enhancements. In the interest of space, I will highlight my favorite three new features: Tolerancing, Custom Toolbars, and Thicken/Offset Surface.

Users can now apply tolerances to features of size. You can check for interference fit, clearance fit, tolerance stack-up, and positional errors. I do not recommend using this feature unless you have a good understanding of tolerancing or you will quickly get frustrated. However, if you know how to apply tolerances, you can use this tool to check your design and save your company thousands of dollars with the ability to “prove your design” on the computer, instead of in the machine shop.

You can set up a tolerance standard in your Document Settings that can be applied to all designs. A good rule of thumb is to use the same standard as you declare in the title block of your company documents. Autodesk Inventor can then automatically apply this to all dimensions.

Go to Tools → Document Settings.



The note you see here is common in industry. When you set up your default tolerance, you are applying the same tolerance specification as you would have in your drawing.



So a good rule of thumb is to look at the tolerance notes in your company documents and use those to set the default tolerances in your standard template.

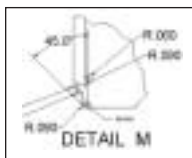
Click in the area under Linear to set up the tolerances for linear dimensions.

(These are your horizontal, vertical, aligned, diameter, and radial dimensions.) Select the Precision or decimal places you want to control. Then set the tolerance for that precision level.

The default tolerance to be applied is based on the precision of the dimension.



For example, look at the R.060 dimension. This dimension has three decimal places. That means that the tolerance for three decimal places would be applied to this dimension. In the dialog, the tolerance for three decimal places is set to 0.003. This would mean that the dimension in question would have an upper limit of 0.063 and a lower limit of 0.057.



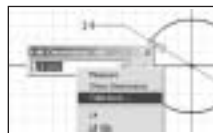
Set the default tolerance for angular dimensions in the dialog. Press ‘Apply’ and ‘OK’.

If you enable the Export Standard Tolerance Values, the tolerance values will appear on dimensions used in drawing views.

Draw a circle with the center point at the origin. Add a 14 mm diameter dimension.



Double click on the dimension.



Right click in the edit field. In the short cut menu, select ‘Tolerance’.

Set the Precision to 0. Set the Tolerance Type to Symmetric. Set the Upper value to 0.400.



Under Evaluated Size, you see three buttons.

- Indicates the model is at the maximum limit.
- Indicates the model is at the nominal dimension.
- Indicates the model is at the minimum limit.

Press ‘OK’.

The dimension now indicates the tolerance applied.



To check your tolerancing, set the Evaluated Size to Maximum on each part and then use Tools → Analyze Interference to check for interference. Likewise, set the Evaluated Size to Minimum and see how your parts fit together.

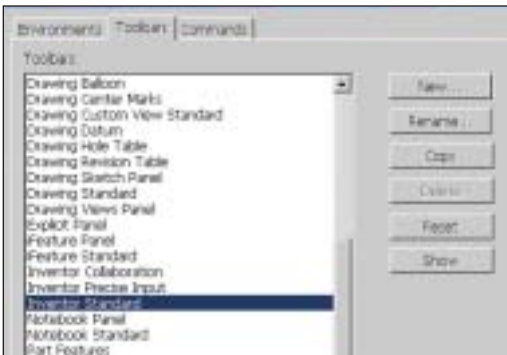
Designers can use the new tolerancing feature inside of Autodesk Inventor to gain a better understanding of how tolerances affect the fit and function of a design.

Custom Toolbars

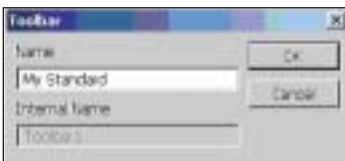
Autodesk Inventor users have been asking for this feature since Release 1. As AutoCAD users, we grew accustomed to being able to set up our own toolbars with our favorite tools. By creating our own toolbars, we can maximize our screen real estate and still have our favorite tools ready and available at all times.

Go to Tools → Customize.

Select the Toolbars tab.
Highlight Inventor Standard.
Select 'Copy'.



Name your toolbar 'My Standard'.
Press 'OK'.



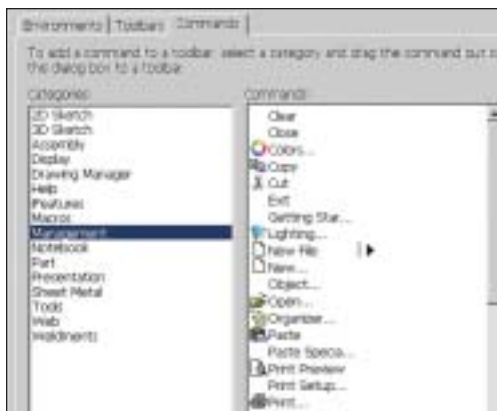
Locate the My Standard toolbar in the list.
Highlight and select 'Show'.



So far the custom toolbar has only four tools:
New file, open, undo, and redo.

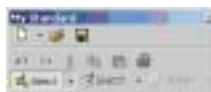


Select the Commands tab.
Highlight the Management category.

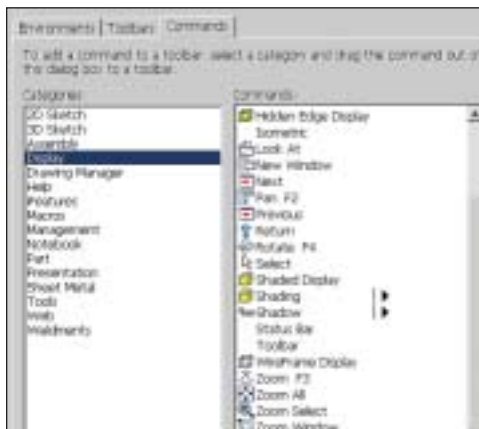


Drag and drop the following onto your custom toolbar.

- Cut
- Copy
- Paste
- Print
- Save
- Select
- Sketch
- Update



You can move icons around your toolbar to organize them by dragging and dropping, just as you can in AutoCAD.

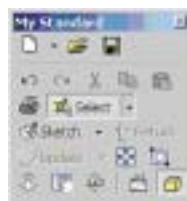


Highlight the Display Category.

Move the following icons onto your custom toolbar:

- Zoom All
- Zoom Window
- Zoom Dynamic
- Pan
- Rotate
- Look At
- Shaded Display
- Return

Your toolbar should look similar to the one shown.



Autodesk Inventor also gives you the ability to export and save your custom toolbars, so you can take them with you on a zip or floppy if you change jobs or workstations.



Offset/Thicken Surface

This tool may not have the pizzazz of the other two tools I have discussed, but I find myself relying on it heavily in my design work. It basically allows you to go from those boxy designs you were constrained to in Mechanical Desktop and really explore new levels, especially in plastic design.

An example of how I use it: Let's say I have a cylindrical part and I want to place a small circular indentation onto the cylin-

der to place a label. How do I get the Extrude to have the same depth all around? I can offset the cylinder face as a surface and then extrude to the offset surface. Or I need to shell a revolve on a complex part, but I only want to shell the revolve, not the entire part. I can create an offset surface of the revolve and then revolve or sweep a cut to the offset surface.

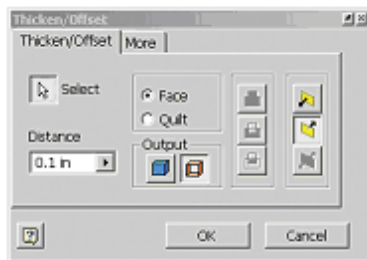
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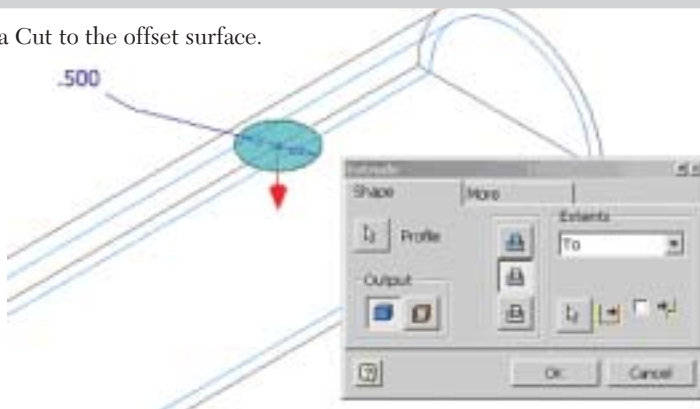
Elise Moss has worked for the past twenty years as a mechanical designer in Silicon Valley, primarily creating sheet metal designs. She has written

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.

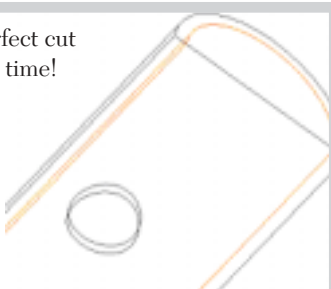
Select the outside face of the cylindrical face to offset a surface.



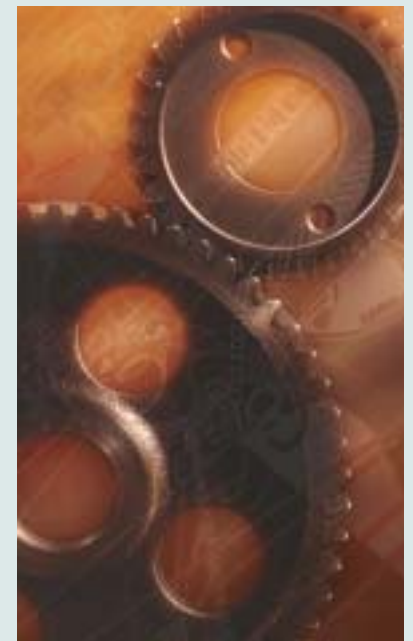
Extrude a Cut to the offset surface.



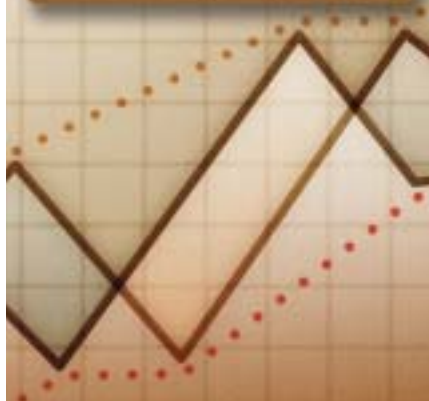
A perfect cut every time!



Other features you may want to check out are the new Decal, Text, Emboss, Loft with Rails, new spline controls, and the improved 3D Sketch tools.



A Conversation with **John Clauson** AUGI President, 2003



» Growth is good! AUGI's swelling membership is welcome news to AUGI's Board of Directors and the dedicated volunteers who make that organization work, but is also the cause of a few challenges. The new year kicks off with John Clauson at the AUGI helm. In this Q&A, John sums up AUGI's goals — which include encouraging involvement from those outside of North America — and discusses the hurdles to be cleared

AW: What are the goals you hope to achieve during your term as president?

Clauson: I think there are two sets of goals. First, there are the traditional goals of all AUGI presidents: to improve the professionalism of the organization, increase the financial stability, firm up and improve existing programs, improve and modify the infrastructure as demands change, and increase the internationalization of the organization.

One of the specific things I want to do this year, as I said in my address at Autodesk University, is to give our membership more visibility and leverage in the marketplace. We want both software and hardware vendors to recognize the AUGI membership as a prequalified group that has an unusual level of expertise and skill sets. We can aid vendors and manufacturers in improving their products because we are the people who use them.

We also want to increase involvement on the international side. Eventually, we would like to have at least one of the board members be from outside the U.S. We want to increase the involvement of those people outside the U.S. as well as increase their numbers. That's going to be a pretty challenging thing to do.

We've begun by introducing non-English AUGI Guilds and by translating some of the ATP [AUGI Training Program] classes to other languages. We would like to have ATP courses taught, natively, in other languages in the future. Maybe not this year, but possibly next year, we would like to explore having regional user group meetings outside the U.S. Some of this will occur further down the road, but these are things we've talked about. But we must increase AUGI's visibility among non-U.S. customers and users of Autodesk products so they know who we are and what services we offer.

AW: Is the fundamental problem simply that they don't know what AUGI is or what it's about, or is AUGI too "North American" to appeal to them?

Clauson: I would say it's both. Although we've had the word "International" in our name for a long time, the perception and the reality is that we've tended to be too U.S.-centric. Because most of the very active AUGI people are in the U.S. and we haven't had ways — because of the language barrier and other cultural issues — to deeply involve non-U.S. people in the process. Those are the kinds of hurdles we're trying to surmount right now.

AW: Is it possible to include everyone under a big umbrella or, because of the language and cultural issues you noted, will you need satellite user groups?

Clauson: Satellite groups within AUGI could be one of the possibilities. The core success of internationalizing will be in finding people as active as ourselves in other countries who are willing to replicate our efforts — to do the kinds of things we do here. That will be a big challenge. We know that people in other countries have at least as much skill, dedication, and enthusiasm as we have. So it's a matter of finding those people and helping them get started.

AW: Can you tell me what steps you've taken to address this goal or find these non-U.S. people?

Clauson: We have created what we on the AUGI Board call a new "bucket" — that's a project for which a board member takes responsibility — called International Development Coordinator. That person is Beth Garrison. Beth will be doing the initial legwork, developing contacts in other countries, finding out where there are strong



user groups, and discussing with them what they would like to do and how we can help them. We want to make people outside our shores aware of our existing services — the Guilds, ATP, and AUGI Exchange — and then see what we can do beyond that.

AW: Let's go back to some of your other points. You said you wanted to improve the professionalism.

Clauson: Yes. AUGI, like most of the local user groups, started with a bunch of techies getting together and doing cool things and sharing knowledge in a very informal way. Now that we've reached such large membership numbers and our growth is still continuing at such high rates, that model won't work anymore.

The past two presidents have taken great steps to transform AUGI to a more business-like model since we became a free-standing corporation. We have budgets and a board of directors and a growing pool of volunteers and we're learning how to spread the workload out amongst more people, and those things call for management skills. The core of AUGI is the Board of Directors, and together with our volunteers we must act more as managers than we ever have before.

A person may have gotten involved in AUGI because they liked to customize AutoCAD, but as that person rises through the volunteer ranks, he or she has to do more and more of other kinds of things and less and less of their initial activity, which is typical of anyone who formalizes a business around a skill that they have. You wind up running the business and finding other people to do the thing you enjoyed.

AW: You mentioned AUGI's programs in your group of goals. Is your goal to enhance existing programs, to create new programs, or both?

Clauson: We have to do both. For example, we recently had somewhat of a crisis in the Guild system, where we were the victims of our own success. The numbers of members and the traffic in the Guild system had increased to the point where our current service provider couldn't handle it. Unfortunately, Guild messages were taking a very long time to get disseminated to the various Guilds. While that's a good problem to have in a way, we had to find a provider that could handle the volume.

We found a new provider, tested them, and we're now in the process of moving

various Guilds under the new service provider. The access time has improved dramatically and it looks as though this new provider will work out well for the time being.

AW: Any other existing programs you'd like to improve?

Clauson: The AUGI Wish List is another area we'd like to expand. Autodesk would like for us to have wish lists for all of its products. There are also some internal things Autodesk would like to do with the Wish List, so that's going to be an evolving project for some time.

AW: Do you think that there's a perception that AUGI is just an AutoCAD group?

Clauson: Sure, but that shouldn't be the perception of anyone who has ever looked at us closely. Every Autodesk product is represented to some extent in our user base. The Inventor and Revit portions of our membership are among the most vibrant — that's where the excitement is right now.

AW: The last goal you mentioned, to modify infrastructure. What do you have planned there?

Clauson: We have to keep changing the infrastructure to meet demands. For the last two years, we've had one part-time staff member working on the web. We have to get more staff members on our web team because there will be more for them to do. We will continue to have to expand the volunteer team that does translating to other languages. There will be more demands on those kinds of things. We need to continue to improve or make some modification in the Guild system to make it more attractive to members. So we can't rest on our laurels in any one area for very long because the dramatic increases in our membership, as well as technology, put pressure on us.

AW: What are some of the new AUGI programs or services you would like to mention?

Clauson: First, we'd like everyone to check out the AUGI Exchange, a new service we unveiled at Autodesk University 2002. It's a repository of productivity tools that are created and shared by AUGI members. It contains program routines, menu snippets, symbols, papers, and a variety of other items that our members use to make their work easier. I believe the Exchange will become a resource that all members would want to use regularly.

We like to have some fun, too. At Autodesk University 2002, attendees had the opportunity to participate in our first Top DAUG contest. It is a test of AutoCAD skills and knowledge that we plan to offer annually. Chris Lindner won it this year, so he has the bragging rights until AU 2003.

It's a bit early for discussing other new programs, but we've kicked around a few ideas. For instance, there has been discussion for some time about putting the AUGI Guilds on the Internet, where they would function as private discussion groups. As such, the traffic would be archived and would be searchable, thus becoming a gold mine of support information. Before taking such a step, we'd have to find out from our members whether they think it would be a good idea, since we know that at least some portion of our membership has e-mail but not Internet access.

We want to be deliberate about starting new programs, being sure that they have value for a large number of our members and can be developed and maintained properly.

AW: What, in your opinion, are the major strengths and weaknesses of AUGI?

Clauson: Well, some of our strengths are also our weaknesses. We talked about the knowledge and expertise of our members and the qualifications they have as experts in this particular field. However, we are a free-standing organization made up of incredibly dedicated volunteers already. And we know we will have more. But there's only so much we can ask of our volunteers. Our Board of Directors is unpaid. We have two part-time staff positions in our entire organization. We are asking a lot of our volunteers. Two years ago, we had 5,000 members and 10 board members. Today we have 40,000 members and 10 board members. As those numbers increase, there's going to be more and more work to do. The new programs that we have instituted, as well as future ones, will take more effort on someone's part. So finding the people to conduct these programs and activities will be one of our biggest challenges.

But the volunteer aspect is also our strength because we are not beholden to anyone. People are here because they want to be; they're not just putting in their time, like some employees do. Volunteerism is a major factor in our credibility, too. It's a strength and weakness at the same time — and the very nature of the organization.



About John Clauson

John Clauson is CAD support manager for Indak Manufacturing, a Northbrook, Illinois-based manufacturer of switches, resistors, and HVAC control units for the automotive industry.

Clauson began using AutoCAD in 1985 and spent a decade in the dealer channel, using and training others on numerous other CAD systems. In addition, Clauson has years of experience with Autodesk Mechanical Desktop and Autodesk Inventor, two products in use today at Indak.

A member since 1990, and former vice president of the Greater Chicago AutoCAD User Group, Clauson today focuses on AUGI, which he joined in 1996.

Clauson has been a member of AUGI's Board of Directors since 2000, holding positions such as Junior Vice President and Secretary. He was elected president of AUGI in December 2002.

AW: Do you find that you act as a cheerleader, of sorts, at your own company? Do you recruit from among the employees?

Clauson: Yes, I do to some extent. I don't want to do it to where it brings attention to me as an AUGI board member, but I try to tell people about the services available to them and let them make their own decision. It wouldn't be right to try to force membership on them. All of us at AUGI are cheerleaders in that sense. You'll find many of us, in our regular business activities, will be mentioning AUGI from time to time and pointing people in that direction, both within our organizations and among the people we talk to.

AW: How understanding is your employer, Indak Manufacturing Corp., of your involvement in AUGI?

Clauson: Incredibly understanding. I'm very fortunate to have the kind of internal support I have at Indak. They realize too that my involvement at AUGI has benefited the company as well.

AW: Hypothetically speaking, what are the benefits to the company whose employee wants to get more involved with AUGI? Does the fact that an employee might give input to the Wish List, for example, which results in an improved Autodesk product, ultimately benefit the user's company?

Clauson: That's certainly one of the benefits. The fact that board members and product chairs — the two highest levels of volunteer we have — deal with Autodesk directly. We have a very direct voice with Autodesk and they do listen to us. They value our input on their products because we are the people who use them every day. People who are heavily involved in AUGI would have personal contacts that do indirectly help their employers. The recognition of the com-

pany at a place like Autodesk certainly doesn't hurt anybody and it enables a company to make its case a little clearer at Autodesk.

For example, my company has a niche function — we make a specialized product in a specialized market. We use Mechanical Desktop and Autodesk Inventor in ways that are somewhat different than the majority of Mechanical Desktop and Autodesk Inventor users do. So we've been able to impart that info to the Autodesk people we speak to and they are very interested in hearing our input. Even in casual conversations, they like to hear how we use the product.

AW: What do you say to people who don't see a benefit to being part of a local user group or AUGI?

Clauson: I ask them, "What are you waiting for?" Membership in both of these organizations expands one's horizons dramatically. You get to talk to people like yourself, who have the same problems, issues, and interests. You learn more, you build wonderful relationships and friendships. And the professional networking aspect is very important. It's a great way to enhance your career — to meet other people in your field.

One of the most shining examples of this is Christopher Fox. He became a volunteer author for PaperSpace and now he's a regular *Augiworld* author. He's also author and co-author of a number of books. He's become a very visible example of how involvement with other users can improve one's career. Another one of our authors is Alireza Parsai, who started out writing for PaperSpace. He has taught three very popular ATP classes and has published a number of articles. He's become quite noteworthy and popular.

AW: What would you say to people who are active at the local level, but don't

see a benefit to being part of the larger international group?

Clauson: Well, it's hard to reach those people. We have to get to them through the local user group and show them that instead of being competition, we complement their offerings. This year we're going to try to promote 100 percent AUGI membership within the local user groups. We'll do that partially through the local user groups and through events such as Autodesk University. We'll also be exhibiting at NDES [National Design Engineering Show] in Chicago later in March.


AW: How well was AU attended, by the way?

Clauson: Record attendance. A very interesting thing to me is that while so far AUGI represents a relatively small percentage of the total Autodesk user base worldwide, 25 percent of all AU attendees were AUGI members. I think it's noteworthy. It shows a high percentage of the people who were interested enough in training and their companies were interested enough in training to send them to AU are AUGI members.

AW: Did anything surprising come out of Autodesk University, 2002?

Clauson: The standing ovation at the end of our annual meeting at AU was a pleasant surprise. We haven't had that kind of reaction before and it was a real terrific moment. I think it gave us a sense that we've accomplished something, that we're getting the message across and that people are starting to see the value of the organization. It was neat to see that our efforts had been appreciated. The traffic at the exhibit booth and the interest that people showed in *Augiworld* were also extremely encouraging.

AW: How do you feel about this year? Are you excited, nervous... or do you wish someone else had been elected president of AUGI?

Clauson: I'm very excited. I'm humbled, too, that the organization would have the confidence in me to let me lead them for a year. I'm also humbled in the enormity of our mission. I would hope that 12 months from now we'll see that we've made progress in the areas we've talked about here. I would really like to see people, particularly those in other countries, look back at 2003 as a significant advancement in their lives because of their involvement with AUGI. 



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Leveling the Field

» The Autodesk Inventor Certified Applications Program assures users that certain third-party developer solutions “play nicely” with Autodesk Inventor. It also levels the playing field for developers. Here’s a look at the program and the players

Since June 2002, when Autodesk launched the Autodesk Inventor Certified Applications Program (AICAP), third-party developers have jumped on the certification bandwagon. A replacement of sorts for Autodesk’s defunct Mechanical Applications Initiative (MAI) program, which was largely a program for developers of Mechanical Desktop-complementary products, AICAP is considered by developers to be superior to MAI in a number of areas.

The requirements necessary to achieve MAI standards were rigid; the number of developers accepted relatively few. “MAI was very, very strict, constrained, and selective,” says John Callen, vice president of marketing for Gibbs and Associates, Moorpark, California. “Essentially, it offered an Autodesk customer a fairly integral solution to their problem. But it turns out that at the same time, there were a number of good and capable alternatives out there that weren’t getting the same exposure or recognition.” Gibbs and Associates, a former MAI partner, develops GibbsCAM, which is now certified under AICAP.

There’s no doubt that AICAP makes certification possible for developers of third-party applications that might not have made the grade in the MAI program. Autodesk’s own Barrett Kamille, solutions development



Barrett Kamille

manager, says that his team works with all developers to steer them toward certification. “We don’t turn anyone away,” he comments. “But we work with these partners to make sure they are meeting the criteria, that their products work, and so on. We make suggestions on how they can improve their products. Most often these suggestions are taken, and that’s a benefit to everybody.”

Even with this everyone-can-play philosophy, Autodesk covets certain types of third-

party applications. “We’re always looking for products that extend the value of Autodesk Inventor, or products that are completely integrated with Autodesk Inventor and actually add functionality to it,” Kamille says.

When Autodesk Inventor was first released, Autodesk actively courted developers. “When Autodesk Inventor was in its infancy, we had to do a lot of ‘selecting,’” says Kamille. “We approached AutoCAD developers and told them about Autodesk Inventor. Many of them were excited, but were hesitant because it was a new product, no one was using it yet, and those developers needed to focus their attention on where their revenue was. In the beginning, we had to do a lot of push.”

That was then. Now, with Autodesk Inventor firmly established as the company’s premier mechanical design solution, third-party developers are willing partners and the number seeking — and achieving — certification for their products continues to grow (see Certified Products chart).

What’s in it for Users?

The million-dollar question is: how do end users benefit from a developer’s involvement in AICAP?

Admitting that “every end user is different,” Autodesk’s Kamille believes that product certification assures users that a given third-party product meets Autodesk standards. “Certification means, to the majority of users, that Autodesk has taken the time to look at a partner’s product, because that’s what this program does — we look at the product, we test it, and we certify it and make sure it does what we think it should be doing. It lends a much higher level of comfort when selecting a product,” Kamille says.

Callen of Gibbs and Associates believes



that product certification through AICAP enables users to remove one important worry when they are searching for a technology solution — that of potential incompatibility between Autodesk Inventor and a particular third-party offering. “Autodesk’s certification ensures that the products are good partners...that the products don’t go in and corrupt your space, that they install and deinstall and do it cleanly,” he says. “In effect, what this program has done is protect an aspect that a lot of users would be concerned about, and that is: does this product cohabitate with Inventor? It removes that from users’ ‘concern lists’ so they can focus on selecting the appropriate application for what they’re trying to accomplish.”

Users with close ties to Autodesk also benefit from Autodesk’s skill at putting people and products together for a good-fit solution. Naturally, products that are certified through AICAP are the ones that will be brought forth for user consideration. That alone is enough to make certification a must-have for serious third-party developers.

CAD Gems, North Bend, Washington, developer of assembly modeling products, is a relative newcomer to the scene. Its iPCB and iViews products have achieved certification through AICAP. Erich Nielsen, president, believes that certification has helped his company’s products get noticed. “There are customers that would not have been aware of our products if they had not been certified,” he asserts.



Autodesk's certification of third-party solutions may save end users time in the software selection process. John Ferens, spokesperson for ANSYS, Canonsburg, Pennsylvania, notes, "I think the program is a validation on Autodesk's part as to the quality and usability of the [third-party] software. Without that, a developer probably wouldn't even be considered out of a list of possibilities." ANSYS's certified products are DesignSpace and DesignXplorer.

While Ferens believes that non-certified developer products could still be discovered by users, those products would have to undergo a period of testing and certification by the users themselves — steps that certification within AICAP automatically does for them. Would users bother with this, or would they opt for the "sure thing" offered by AICAP? The latter is more likely in the majority of cases.

"If a product is not certified, you can be sure that [certified] competitors will use that fact to their advantage. It levels the playing field while ensuring that the user has more than one option to choose from in terms of the solution they're trying to build," says Todd Cummings, director of product development for Synergis Technologies. Synergis,



Todd Cummings

is the developer of Synergis Adept, a document management solution. Ultimately, though, the biggest benefit of the Autodesk Inventor certification program to end users is, potentially, better software solutions. While it is true that AICAP doesn't impose MAI-like restrictions on the developers, there remain strict requirements that developers' products must meet. Autodesk's Kamille names two of the most important: "We want them to use our API we want them to distribute our libraries appropriately."

Often, developers find that their existing products already meet the certification criteria required by Autodesk, or perhaps require only a bit of tweaking. Gaining certification for these products is a relative breeze. Some developers also approach Autodesk early — in the product design phase — to ensure that certification requirements will be met in the end product. "Some come to us when their product is still on a whiteboard," says Autodesk's Kamille. "They haven't even written a line of

code and they tell us they want it to be a certified product and ask us what to do. We work with them during their development. These have actually been very successful."

He adds that this team approach benefits both parties. "It works out well because the developer points out problems in our API that we can fix, and we are able to give the developer suggestions for how to make their product better using our API."

Certified and Proud of it

Users will be hard-pressed to find a developer that doesn't display the AICAP logo on its website and in its marketing literature. And, while most developers admit that they don't know to what extent users are even aware of the Autodesk Inventor certification program, product certification is nonetheless talked up in sales presentations as a definite plus.

"We use [our certification] extensively; we certainly display the logo prominently on our website. It's part of all of the presentations we make to prospects throughout the decision cycle," says Synergis's Cummings, adding, "I think it's important for users to feel comfortable that our efforts are aligned with Autodesk."

Marilyn Law is managing editor of Augiworld.

Certified Products

The following third-party products have achieved certification through the Autodesk Inventor Certified Applications Program as of January 2003. For more information about these products, contact the developers' websites.



Assembly Modeling Products

ACAD-Stahl Inventor
Schäfer Computer GmbH
www.schaefercomputer.com
IDF Interface for Inventor
Latimer-CAD
www.latimer-cad.com
iPCB and iViews
CAD Gems, Inc.
www.cadgems.com
PartsNow! Autodesk Inventor
Cadalog, Inc.
www.cadalog.com

CAD Utilities

Concept
Configure One
www.configureone.com
<http://www.cad-symbols.de>
Modularis Software AG
www.modularis.de

Document Management

AutoManager Meridian and
AutoManager Teamwork
Cyco Software BV
www.cyco.com

COMPASS 2000 easy and
COMPASS 2000 pro
AIM Systems GmbH
www.aimsystems.de

DBInventor
Mechworks SRL
www.mechworks.com

Design Manager
Curve Design Solutions
www.curve-design.co.uk

eChange Solutions
Entrada Software, Inc.
www.entradasoftware.com

eMatrix Integration for
Autodesk Inventor
The Van Der Roest Group, Inc.
www.vdr.com

GAIN EDM System
GAIN Software GmbH
www.gain.de

IDECS
AproTec International Limited
www.aprotec.co.uk

Synergis Adept
Synergis Technologies, Inc.
www.synergis-adept.com

truElso.View and truEVault
truEInnovations, Inc.
www.trueinnovations.com

Web@PDM
Logotec Engineering S.A.
www.logotec.com.pl

WTC ProductCenter
Workgroup Technology
Corporation (WTC)
www.workgroup.com

Drafting

Genius Inventor
web2CAD AG
www.genius.de

Electrical

Inventor/IDF PCB Modeler
Desktop EDA
www.desktop-eda.com.au

Engineering Analysis

ALGOR Finite Element Analysis,
ALGOR InCAD Designer, and
ALGOR Mechanical Event
Simulation

ALGOR, Inc.
www.algor.com

CFdesign
Blue Ridge Numerics, Inc.
www.cfdesign.com

COSMOS/DesignSTAR for
Autodesk Inventor
Structural Research &
Analysis Corp.
www.cosmosm.com

DesignSpace and Design Xplorer
ANSYS, Inc.
www.designspace.com

MSC.visualNASTRAN 4D
MSC Software Corporation
www.mssoftware.com

Proof Positive
Avatech Solutions, Inc.
www.avatechsolutions.com

Resinate Materials Analysis
Resinate Corporation
www.resinatecorp.com

ToleranceCalc
Geomate Corporation
(408) 371-6095

Graphic Translators

CADporter
Elysium Inc.
www.elysiuminc.com

VRLM Translator for Inventor
Xanadu s.r.o. division CAD Studio
www.cadstudio.cz

Mechanical Design Visualization

IPA Professional
Immersive Design, Inc.
www.immersivedesign.com

PARTsolutions
CADENAS GmbH
www.cadenas.de

Presenter
Digital Immersion Software Corp.
www.presenter3D.com

Motion Analysis

Dynamic Designer Motion
Professional
MSC Software Corporation
www.mssoftware.com

MotionInventor
Solid Dynamics
www.solid-dynamics.com

NC Manufacturing

EdgeCAM Solid Machinist
for Inventor
Pathtrace plc.
www.edgecam.com

ESPRIT
DP Technology Corp.
www.dptechnology.com

FeatureCAM
FeatureCAM – Engineering
Geometry Systems
www.featurecam.com

GibbsCAM
Gibbs and Associates
www.gibbscam.com

Production Engineering

TailorMade Configurator
IMAGINIT Technologies –
Rand Worldwide
www.imaginit-tech.com

Project and Data Management Tools

SMARTTEAM – IN Integration
SmartTeam Corporation Ltd.
www.smartteam.com

Sheet Metal Layout

AutoPQL Unfolder for Windows
FCC Software AB
www.fccsoftware.com

COPRA MetalBinder for Inventor Analyser i and COPRA MetalBinder for Inventor TD i

data M Software GmbH
www.data-m.com
radan2002
Radan Computational Limited
www.radan.com

SPI – Ducting Inventor and
SPI – Sheetmetal Inventor
SPI GmbH
www.spi.de

Tool and Die

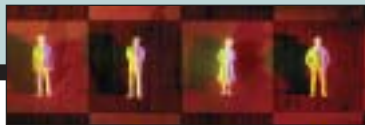
InventorPlot
65° nord ab
www.65nord.se

Other Manufacturing

JetStream EA
StormMaker Software
www.stormmaker.com

Source: Autodesk, Inc.

The Best of the Guilds



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

From AUGI's LDDT Guild

Submitted by Harry Ward, Land Development Desktop Guild Manager

About Blocks

Q: I received a drawing, which was converted from *Microstation* to *LDD*. The drawing contains Point Blocks with attributes (i.e., point number, elevation, description, with node location similar to the old SDSK points but are not actual point blocks per se — just the info is there).

Is there a program that can read and/or replace these blocks with SDSK point blocks or Active description keys?

A: If they are just blocks but have attributes, you might try using attribute extraction. The command is *eattext*. The command brings you into a wizard that extracts attributes from blocks. It is simple to use. You could build an *ascii* point file to insert with the information extracted. I have done this and it is fairly easy.

Another thought is if the blocks have an actual elevation and you only need to build a surface with them, use Terrain model Explorer under Point Files: Add points from AutoCAD objects> blocks.

Menu Editing

Q: All of a sudden, I have lost my right-click edit context menus. Now, when I select an object and right-click, all I get is the standard context menu showing the Design, Desktop, Documentation, etc. selections. I no longer get the edit listing such as Edit Entity Display, Modify Door (Window, Wall, etc.), Properties, etc.

What could have caused this?

A: It sounds like the *PICKFIRST* variable is set to 0 instead of 1 like it should be.

Since variables get changed easily, I added a button to our company's custom toolbar that resets a bunch of variables. I tell people that when things start acting different than they are accustomed to, that they should click on this button and see if that corrects the issue. I have found that this helps with most minor issues. The syntax for that menu button is below.

These are the variables that we use and your office might have some different settings, especially for EXPERT and PSLTSCALE.

```
C^C^PHighlight;1;Pickfirst;1;Grips;1;A  
ttreq;1;cmddia;1;filedia;1;dragmod  
e;Auto;hideprecision;1;expert;0;pick-  
add;1;pickauto;1;shademode;2d;psltsc  
ale;1;Textfill;1;
```

Seeking AIA Layers

Q: I wonder if I can get a listing of what AIA layers ADT uses. Is there a file that I can print with all the property assignments? Has anybody compiled this list? Is it available somewhere in the web?

A: Go into Desktop menu, select Layer Management, then Layer Key Styles. This opens up the Style Manager to the Layer Key Styles. In the right pane, double-click on the desired Layer Key (Standard, AIA-256, etc.). This opens up another dialog box that has a General tab and a Keys tab. In the Keys tab, highlight any of the layer keys listed on the left. Right-click and select Copy All. Start Microsoft Excel (or other spreadsheet) and pick Paste in a new Excel spreadsheet. You can then cancel out of the layer key dialog boxes.

This gives you a listing of all the layer keys and the properties for the layers like you are requesting.

Linking a Word Doc

Q: Has anybody ever linked a Word document into a CAD file? I want to have my room finishes on my floor plan sheet, but I also want to keep them as a Word document. I guess this would be sort of like an xreference.

A: We use the process for the General Notes that we put on our cover sheet (in a Layout - paperspace). The process that we use is as follows:

- Create a Word document with a page size of 22"x22", using columns in the document.
- In AutoCAD or ADT, go to the Insert menu and choose OLE Object.
- In the OLE Object dialog box, choose "Create from File" then pick the Browse button.

- Browse to the Word document and pick the Open button.
- In the OLE Object dialog box, place a checkmark next to "Link".
- The document will probably be very large in size when it comes into AutoCAD.
- Highlight the document, right-click, and pick Properties from the pop-up menu. In the OLE Properties dialog box, go to the Size area. Change the Height and Width to the same size as you specified in the Page Setup of the Word document. Having the same size allows you to specify the text font, height, etc. in the Word document and have it appear the same way on the final plot. (For the "OLE Plot Quality", we have it set to "Text".)
- Pick the OK button of the OLE Properties dialog box.
- Move the OLE Object to the location that you desire. If you highlight the OLE Object and right-click, we have "Selectable" and "Bring to Front" check marked.

You can now double-click on the OLE Object to automatically open it in Word to modify it. You can also have anyone with Microsoft Word open the document and modify it. (They don't have to have AutoCAD, so an office assistant can do this.) If you have the "Link" option turned on as noted above, any changes that are made to the Word document will be seen the next time the AutoCAD drawing is opened—similar to xreferences.

You can only display one page of a document as an OLE Object in AutoCAD, which is the reason we have the Word page size as 22"x22". I believe 22"x22" is the maximum size in Word. You have to create a new "Custom" paper size in Word for this.

You will need to make sure that the plotter is capable of handling OLE Objects. Some old laser printers and old plotters (like the HP 6xx series) aren't capable of this. Also, note that you cannot choose "Plot Upside-Down" in the Plot dialog box. OLE Objects will NOT be rotated.

There is a problem that exists if you use Microsoft Office XP. Using Office 2000



we can use the 22"x22" size and link it into ADT3.3 just fine, but with Office XP on the computer that same 22"x22" document will be truncated to 15"x15" in ADT3.3 and chop off the other information.

This problem will not have a resolution until the next release of AutoCAD/ADT.

Non-working Osnaps

Q: I have a user who tells me that her *Osnaps* don't work, and have never worked on this new computer. As best I can tell, the *Osnap* itself works, but won't let her reset it — for instance, it's on "intersection" but won't change to "center" no matter what she does.

A: Check the *Snapunit* variable setting. It might have gotten changed to 0,0. This is also shown in the Drafting Settings dialog box under the Snap and Grid tab. The Snap X Spacing and Snap Y Spacing values must be greater than 0. (Values shown here are the SNAPUNIT setting.) It is weird, but having zero settings will cause the *Osnap* settings to not work.

Deleting Multiple Layers

Q: Does anyone know how to delete multiple layers from a drawing that has 2-3 x-refs with the same layers in each drawing? For instance, if I have a layer called "Blue," it appears at least twice in the final drawing because of x-refs. Is there an easy way to get rid of layer "Blue" quickly so I only have one layer called "Blue" instead of two?

A: If I understand what you are asking, the answer is yes. Draw all those BLUE things in only ONE drawing. Or use MAP to query in only the BLUE things and place them on a single BLUE layer. If the data isn't on a single blue layer, in a single XRE, then no, you can't have only one blue xref layer or only one blue layer.

From AUGI's CAD Manager Guild

Submitted by Richard Binning, CAD Manager Guild Manager

Modifying Radio Buttons

Q: On the "select file" dialog box in A2Ki, there is a list of "radio" buttons for "history," "desktop," "buzzsaw," "redspark," etc. (BTW, redspark is out of business.) Is there a way to modify the "radio" buttons to be what the user wants them to be?

A: Manusoft offers freeware that will make the Buzzsaw, Redspark (out of busi-

ness) and Point A icons removable as well. You're able to restore them later if you wish. Works for A2K, A2Ki and 3.3.

From AUGI's VBA Guild

Submitted by Robert Bell, VBA Guild Manager

Getting to IE from VBA

Q: Can you access Internet Explorer using VBA?

A: Download EX001183 from <http://www.augi.com/empower/exchange/searchdownloads.asp>. It's a function that opens a URL in IE. You can specify the window style. There are also API functions and scripting in that download.

From AUGI's AutoCAD Guild

Submitted by Mike Perry, AutoCAD Guild Manager

Double-Click Dilemma

Q: HELP! Suddenly I cannot change between floating model space and paper-space by double-clicking.

A: This behavior indicates that the SPACESWITCH variable is set to off, or 0.

To resolve this issue, change the SPACESWITCH system variable value to 1. Now you will be able to enter into the model space by double-clicking the viewport boundary in a layout.

From AUGI's ADT Guild

Submitted by Bobby J. Jones, ADT Guild Manager

Anchor a Room Tag

Q: I had a room tag anchored to a space. I released the room tag, deleted the space, and converted a polyline into a space. I would like to anchor the tag to the space. Is this the wrong procedure?

A: To anchor a room tag to a space:

Autocad menu

—>Documentation

—>Schedule Tags

—>Anchor Tag to Object

Or from the Command line type:

_AecTagAnchorAdd

The Best of the Guilds is compiled by Beth Garrison, AUGI Board Member and newly appointed International Development Coordinator.

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VBA Foundations

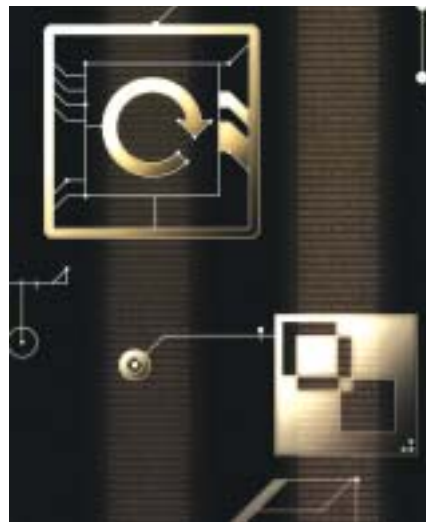
All right, I see that you are back for more — just like a kid in a candy store who can't get enough. Okay, reach in with both hands and let's see what we have now. In this issue we will take a look at an old friend, the Object Model. "Wait!" you say. "We haven't worked with the Object Model yet!" I just smile and shake my head. Actually, we have been working with object models all along! Every time we type in the editor window and we see the "Intellisense" helper displayed, it is because the editor was reading ahead and using the Object model to assist you in writing your code.

In previous issues I mentioned the "dot operator" or the period symbol, which is also used to access the object model properties or methods of the object in question. The object might be asking, "What about me?" Get it? "Me" as in "me.width" or "me.textbox1.text." In the "Me" examples we used an alias, "Me," to represent the current object and accessing the object model through the alias with the assistance of the dot operator. It's all rushing back in now, isn't it? Now let's start unwrapping that candy. In this issue we will discuss some new terms and concepts. In the longer version, available for download at <http://www.augi.com/educate/publications/paperspace/psdownload.asp>, we will also watch the Object Browser in action, and look at special control structures for use with object models.

The object model is what makes VBA customization possible. A good object model is a keystone because it is the means by which we will interact with AutoCAD. Therefore, the object model must be extendable, easy to use, and a solid representation of the application. Applications expose themselves to VBA through this mechanism known as an Object Model. This is actually part of COM — Component Object Model. Internet.com defines COM as the technology that "enables programmers to develop objects that can be accessed by any COM-compliant application." Let's

explore this a little deeper by discussing exactly what an "object" is.

We have already used objects in our previous explorations. The form was an object and the controls were also objects. If we had to define an object then we might describe it with two parts: an object is something that is able to save information or data. An object also offers more than a single behavior or activity that can either examine or affect the information mentioned previously. Can you figure out what information the form had? What activity or behavior did it have?



Let's think about objects as real world entities. The next time you drive to work, think about what makes your car an object. What information or properties might your "object" possess? Typical properties of your car "object" might include the color, the number of wheels, the number of doors, the speed it travels, etc. If you had to describe the typical activities or behaviors, you might include driving, turning, starting, stopping, and so on. Cars and trucks are quite similar when simplified and broken down into the parts, pieces, and activities that make an object an object. Although you might prefer to practice before driving a vehicle you are unfamiliar with, if push came to shove you could most likely jump behind the wheel

and drive it successfully, just by using what you know and applying it to this "somewhat different" object. What about even more common objects? Wall switches come to mind. Do you need to know how a wall switch works? Nope, you just need to flip the switch to the opposite side to either turn something on or off. What if the switch were mounted sideways? This results in the same type of activity, just in a different direction.

Hopefully we are now starting to understand the cryptic term "object" a little better. This brings us back to COM. The Component Object Model is a collection of objects and groups of objects that allow VBA to interact with applications. As in the car example, once you begin to work with an object model and start to understand it, you will find that you also understand other object models as a result. Although each car is unique in some way, once you find out where the switches are, you can operate the vehicle in much the same manner as your own car. Trust me when I say that the COM concept is the same. Once you learn what switches to look for, you'll be driving virtually any object model almost as soon as you sit in the driver's seat.

Microsoft describes using an object model as exploring the content and functionality of the object model. The content of the object model is the objects or properties it exposes to you. The functionality of the object model is how you interact with the objects or properties. Let's see how this is represented in AutoCAD's object model.

What might the content of the object model be? Thankfully, we don't have to look very far or hard to fully understand this based on our in-depth knowledge of AutoCAD itself. Let's list a few of these and see where it takes us. Probably the most basic content would be the application itself. Think about what you can do in simple terms with AutoCAD. You can open and close it. What does the application work with? "Drawings," you say? Good answer! What can you do with a



drawing? You can open and close it, plot it, save it, save it as some other name, and purge it. Those functions that we are so familiar with are also activities or methods of the object model. What might the content or information associated with our object model consist of? Perhaps the caption you see at the top of the AutoCAD window, the drawing's name itself or the version. Yes, these and more are the properties or information states available to us when we begin exploring the object model.

Now that we have a better understanding of what an object is and how objects are tied into the VBA environment, we can learn about how it is organized and how to make use of it. Objects in the object model are provided in a hierarchical fashion. If we think of an object model in the shape of a triangle, we might place the most basic (also the most powerful) object at the top and start working our way down. In our example we would place the application object, representing AutoCAD itself, at the top of the triangle. In order to work with anything inside of AutoCAD, it must exist first. So what does the application contain? It contains the drawings that can be opened inside of AutoCAD. Okay, two objects taken care of, but what is next?

If we continue down the triangle, you may notice that the triangle is getting wider the farther down we go. Looking inside the drawing itself, we realize that we will find other objects, such as layers, blocks, dictionaries, etc. It seems as if any item or function we can think of in AutoCAD is an object itself, a group of objects, or an activity to be performed on an object, or finally a property of an object or group of objects. This is where we want to be in our understanding. And with a mature object model we should be able to find a method (activity), a property (content or information state), or an object or group of objects to accomplish anything we could accomplish manually inside of AutoCAD.

There is one aspect of object models that we haven't explored yet: the concept of events. An event is anything that can be said to have happened. Objects can react to things that have happened. This is the heart of automation and what differentiates VBA from some other programming languages. Events are at the heart of VBA and the object model, and AutoCAD has enabled many objects with the ability to react to events. In fact, with a beginner's

understanding of events one can create new events to which objects can react. The application object has events, so do the documents (drawings), and many more sub-objects found in AutoCAD.

In summary, the objects, groups of objects, properties, and activities available in an application are divided among the objects in the object model. Basically, the objects in the object model's hierarchy represent all the properties or functionality provided by the application that is exposed to Visual Basic for Applications. Individually, these objects provide access to very specific properties and/or functionality. To discover or change a property or state of an object, you get or set one of the object's characteristics. To perform an action on or with an object, you use one of the object's methods. Some objects also provide events that are triggered by a reaction to some discrete happening or action, so we can write code that will run in response.

As always, use the online help to further explore these concepts as necessary. Download the longer version of this article, the tenth in the twelve-part VBA

series, to get more in-depth treatment and "hands-on" examples of these concepts. The "full length" versions of the articles in this series are available for downloading at <http://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 Guilds or in the next issue of *Augiworld*.



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, offsite 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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AutoLISP: Not an 'All Or Nothing' Choice

Do you use AutoLISP at command line in your day-to-day work? Many AutoCAD users feel that using AutoLISP is an all or nothing choice. They tend to think that to use AutoLISP (or programming in general), you need a very big task — such as generating the whole drawing — that requires days of programming by an expert. This need not necessarily be the case. In this article, we will examine a practical example of how you can use AutoLISP at command line to simplify a complex task that results in improved productivity. Note that AutoLISP has an advantage here over VBA. You cannot do it with VBA.

The Problem: One of my clients creates drawings of gauge panels for large plants. A panel normally has more than 50 gauges of various types and sizes. A frequent problem he faces is that the hole (circle) sizes change at least a couple of times before the design is finalized. How does he ensure that changes are done globally, positively, and repeatedly without the need to individually reselect the circles?

The problem, thus, can be split into two parts:

- 1) How to select the objects, using multiple criteria, more easily?
- 2) How to make this selection reusable for the future?

Consider the simple case of two types of gauges: Pressure gauges in two sizes requiring 50 mm and 25 mm radius holes on the gauge panel (see figure 1), and tem-

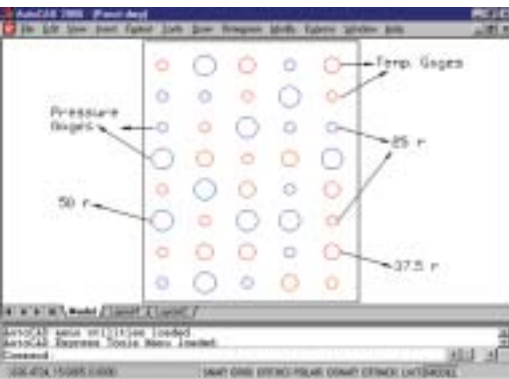


Figure 1

perature gauges requiring 25 mm and 37.5 mm radius holes. Also assume that there are ten each of these. Let's try the task of selecting the circles with 25 mm radius used for only temperature gauges

and saving this selection for possible reuse in future.

Part 1: Creating A Complex Selection Set

The solution to the first part of the problem is to create a complex selection set, one that needs to satisfy more than one criterion (two in this case).

The Manual Solution. The straightforward solution would be to manually select all the required circles by clicking on each of them after ensuring that:

- its radius is 25 and
- it is used for a temperature gauge.

You will quickly realize the impracticality of this solution, especially if the number of objects to be selected is large and you have other similar objects from which to choose. For example, you need to differentiate the two types of circles — for Temperature and Pressure gauges — of same size.

Of course, using different layers does help in simplifying the task of selection. The layer for temperature gauges ("LRTG"), however, will still contain two sizes of circles. You will need to differentiate them visually during the selection process — in the worst case by verifying properties if the sizes are within a close range. The task of choosing the circles of correct size and type thus remains time consuming and taxing to the user's eye.

The 'Filter' Solution. Using the 'filter' command, you can create "reusable filters to select objects based on properties." To create a selection filter list, you need to add 'select filter' — one for each property — to the filter list using the 'Object Selection Filters' dialog displayed by the 'filter' command.

In our case, the required filter list will include the following three filters:

- Object = Circle
- Circle Radius = 25
- Layer = LRTG

You can create the selection set using the filter command either at the command prompt or transparently inside an editing command. You can name and save the filter permanently. It is saved in the applica-

tion and can be applied in any drawing opened subsequently. However, you need to set the filter current and then apply every time from inside the filter dialog.

The 'qselect' Solution. AutoCAD provides another tool — "qselect" — that you can use for creating a complex selection set. You can also use it either at command line or from within the Properties dialog box, which displays a button for this tool. It can't be used transparently inside an editing command, though.

In this case, you can create the required selection set using the qselect command twice. The first qselect creates a selection set of all 25 radius holes in the drawing. The second time, qselect removes from this selection set all those circles not lying on the 'LRTG' layer. (See UsingQselectForComplexSsets.doc on the PaperSpace download page at <http://www.augi.com/educate/publications/paperspace/psdownload.asp>.)

This may not seem simple, but is certainly easier than selecting each circle individually. The selection set, then, can be subsequently used in an editing command using the 'Previous' selection option.

The AutoLISP Solution. The task of creating a complex selection set can further be simplified using selection set filter lists in an AutoLISP command. A single command, like the one below, will create the required selection set.

Command: (ssget "_X" '((0 . "CIRCLE") (40 . 25) (8 . "LRTG")))

Part 2: Making a Selection Set Reusable — The 'Group' Solution

You can create a selection set using any one of the above methods. This selection set, however, is volatile. It can be subsequently selected with the 'Previous' option only as long as another one is not created. One of the methods you can use to permanently store a selection set, and select it directly as a command option, is to save it in a group. (See UsingGroupToSaveSelectionSet.doc on the PaperSpace download page.) A group is saved in a drawing and is available over sessions.

You can save a selection set in a group using two different ways:



- Create the selection set transparently inside 'Group' command using 'filter' command, or
- Create the selection set independently and save it in a group using the 'Previous' selection option.

AutoLISP again provides a single line solution:

Command: (command "-group" "c" "TG" "" (ssget "_X" '((0 . "CIRCLE")) (40 . 25) (8 . "LRTG"))) ""

You can now respond to a 'Select Object:' prompt with 'g' (for group) and then 'TG' to select all the objects in the complex selection set (see figure 2).



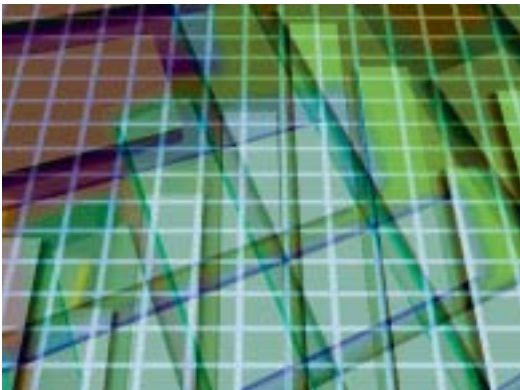
Figure 2

As we have seen, using AutoLISP need not require a big task. We can accomplish small but complex routine tasks, like creating a multiple selection set, using AutoLISP interactively (at the command prompt). This can save us a lot of hassle and time, resulting in increased productivity.

AutoLISP, after all, does not need to be an "all or nothing" choice!

Sanjay Kulkarni is an AutoLISP programmer and AutoCAD trainer from India. Sanjay can be reached at SanganakSakha@freelance-worker.com.

Manipulating AutoCAD Objects With AutoLISP



Manipulating AutoCAD objects with AutoLISP can be very interesting. It offers you many capabilities to access and manage AutoCAD objects. Let's use it to solve a practical problem. A few days ago I received an e-mail from an AutoCAD instructor as follows:

I teach an AutoCAD class at a local technical school and am preparing to grade some final drawing projects. Several students seem to have a problem with drawing [orthographic] lines or maybe they are snapping to the wrong Osnap or something. What I am looking for, and have not been successful in creating myself, is a lisp routine that finds all lines that are not drawn at 0, 90, 180, or 270. That way I could easily see which lines were not [orthographic]. I have tried using DXF dotted pairs, but lines do not seem to have a dotted pair for angle (only x, y, z) changes. Any help or direction you could provide would be greatly appreciated.

Basic Information

Every AutoCAD object is defined with a series of DXF codes. Based on AutoCAD help, the DXF format is a tagged data representation of all the information contained in an AutoCAD drawing file. *Tagged data* means that each data element in the file is preceded by an integer number that is called a *group code*. A group code's value indicates what type of data element follows. This value also indicates the meaning of a data element for a given object (or record) type. Virtually all user-specified information in a drawing file can be represented in DXF format.

The DXF codes associated to an object are kept within a list. Such lists are called associated lists. Here is a sample associated list for a line that starts from the origin and ends to 3,2.

```
((-1 . <Entity name: 4007dd58>) (0 . LINE) (330 . <Entity name: 4007dcf8>) (5 . 2B) (100 . AcDbEntity) (67 . 0) (410 . Model) (8 . 0) (100 . AcDbLine) (10 0.0 0.0 0.0) (11 3.0 2.0 0.0) (210 0.0 0.0 1.0))
```

Don't panic! Although the list is complicated, there are some AutoLISP functions to handle it. Let me explain some of the elements.

(0 . LINE) indicates the type of object. DXF code 0 is always used for this purpose. DXF codes 10 and 11 are used to

specify the start point and end point of the line. Back to the problem: notice that we have the start and end point of the line, not its angle and length.

Building A Solution

Here we want to make a selection set. Selection sets are created with *ssget* function. You can combine *ssget* with DXF codes to filter the selected objects. For example, the following code selects all the lines within current space: (ssget "X" '((0 . "LINE")))

Since we are looking for oblique lines, we should filter the current selection set.

To filter the selection set, we need a series of functions: *ssadd* to build a new selection set or add an object to an existing one, *sslength* to retrieve the number of elements in a selection set, and *ssname* to get the name of the objects within the selection set. For instance, (setq ename (ssname ss 0)) extracts the name of the first entity in the ss selection set and assigns the name to ename variable.

Later we can use *entget* function to retrieve the list of DXF codes belonging to the object. The *assoc* function will help us to extract data associated to DXF codes. For example, (setq elist (entget ename)) assigns the list of DXF codes to elist variable. Thus (setq pt1 (cdr (assoc 10 ss))) assigns the coordinates of the start point of the line to pt1 variable.

(continued on page 22)

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(continued from page 23)

Final Solution

The following steps can solve the problem:
 Build a selection set that contains all lines within the current space of the drawing.

Build a new and empty selection set.

Revise every single member of the old selection set. Calculate the angle of the line by extracting the start and end point.

If the angle of the line is not equal to 0, 90, 180, or 270 degrees, add it to the new selection set.

I have prepared a program named “Oblique Lines.LSP” that manages oblique lines. You can download it from the AUGI web site at <http://www.augi.com/educate/publications/paperspace/psdownload.asp> or http://www.geocities.com/cad_tips/down-

loads.htm. It defines two commands: MOL and TOL. MOL can be used to select and/or modify oblique lines. TOL is useful to verify whether the selected line is oblique or straight.



Alireza Parsai (alireza@khawarizmi.com) is a mechanical engineer and AutoCAD instructor. His major interest is AutoCAD customization techniques and has used and customized every version of AutoCAD software since 1991. He has written several books and articles about AutoCAD in both Farsi and English. His English-language articles are published in PaperSpace, where he is a contributing editor.

Command Spotlight

Viewports can be great — I am just not sure I am a real fan of having too much information on my model and having to manage two or more different dimension layers on top of each other. I also do not always have the drawing xref'd when I need to have another view for a detail, for example. So clipping out some things may not be something I can do to get the section of the drawing I need in view. With these types of things confronting me I discovered a chance for a little creativity with viewports.

To demonstrate one technique that I have used to manipulate drawing information in viewports, I will show you a section of a house with a stair coming down from a deck. The piers for the deck and the piers for the stairs were so close that the dimensions were overlapping. To make things more readable I separated the piers for the stairs out to another place in model space and dimensioned them there. I then needed to overlap

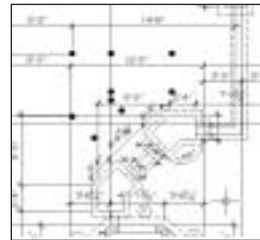


Figure 1

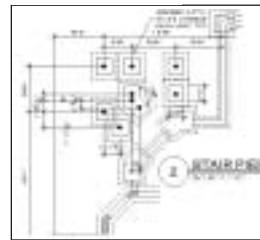


Figure 2

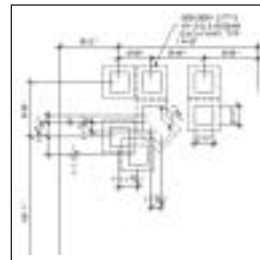


Figure 3

them with the post from the stairs and also the area of the deck to show relationship. If this had been xref'd I could have just made a copy and done an xclip on it. In Figure #1 you can see the original, congested area for this example. Figure #2 shows the desired dimensions and details for the footings and piers for the stair post. The trick is getting there.

By creating another dimension layer — Dim2 for example — I allow myself a chance for turning off dimension around the post and dimensioning them as I need it. I can also add the other information related to their foundations. I then move this information along with the dimension off to another part of my model space. Just make sure to move it a distance that you can remember and use — say 50'. Figure #3 shows the information that I will eventually want to show with the post. This is the information that I have moved over 50'.

(continued on page 26)



**Quick. Before defragmenting,
you may wish to consider one additional accessory.**



PerfectDisk “is blindingly fast”

Microsoft® Certified Professional Magazine, November 2002



PerfectDisk® 2000 Version 5. (Shades not included.)

Microsoft® Certified Professional Magazine also said stuff like, “In all cases, the results were superb” and “...installing and using PerfectDisk is simple.”

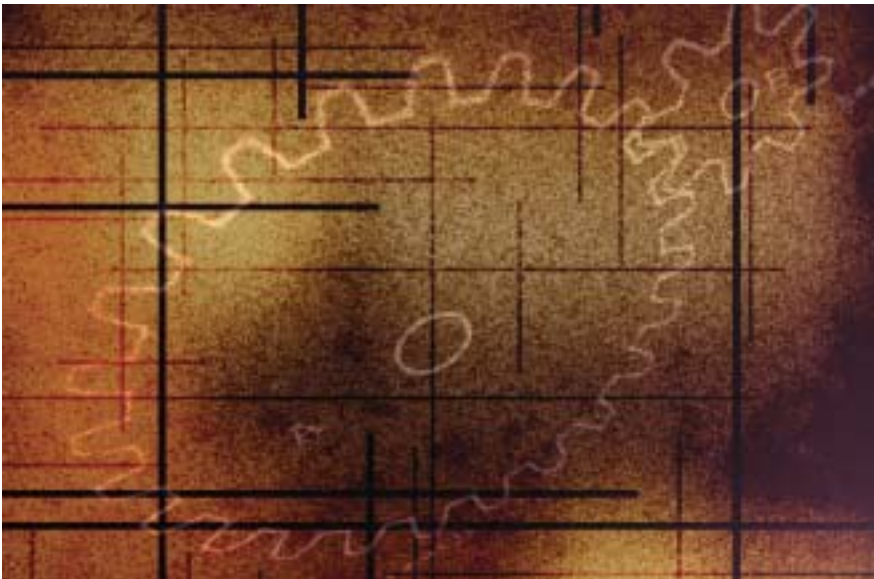
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(continued from page 24)

To get these two sections of drawing merged in paperspace took a little creative viewport action. To start with I had to make a “viewport” shape of just what I wanted to see from the original drawing with the post and deck pier section. This shape needed to fit around the original viewport in a corner of the paperspace area.

Starting in modelspace, I used a polyline to outline the area of the drawing needed. I copied this polyline over 50' to make sure that it would also encompass the dimensioned area I want. I then went to paperspace. I made sure the new polyline was showing in the original viewport. Clicking into the viewport I used the Express Tool — Layout Tools — Change Space to bring the polyline into paperspace in the original position of around the desired area.

Now that I have the shape in paperspace it can be transformed into a viewport. Using the VPORT command or the button off the Viewports toolbar that will allow converting polylines into viewports does this. (See Figure #4) The next step would



Figure 4

be to freeze all layers related to the original dimensions and any others not desired in this viewport. Move it to the corner of the paperspace where it is to remain. (When you convert a polyline to a viewport it keeps the polyline in paperspace. Be aware of this when selecting the viewport to move, change layer, etc.)

Now the other polyline will have to be sent to paperspace so that it can be changed into a viewport. You have to be in paperspace to change space on an object. You may have to go into another viewport and pan it around to where you can see the polyline so that it can be changed to paperspace.

Once the polyline has been changed to paperspace you just have to line the two viewports on top of each other. This allows you to view both viewports with your drawing and dimensions aligned. In Figure #5 I have taken the polylines that

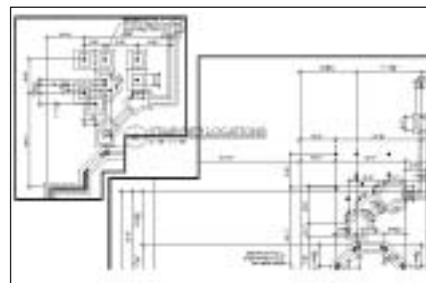


Figure 5

were around the viewports and given them a thickness so that they can be seen here. Here you can see the post in the original viewport and the post in the second viewport. The third viewport with the post dimensions overlays the second viewport and can be seen as well.

Command Spotlight and Hint are submitted by Donnia Tabor-Hanson, AUGI Board Member.

Hint

Stacking text in MTEXT has several options that can be very useful once you find what they are. You can create fractions with a horizontal or a diagonal line. You can also create superscript or subscript text using MTEXT. All you have to know is the character used to create the option you wish, where to place the character in the text, how to change to stacked text, and how to manage the stacked text properties.

To make a fraction using a horizontal line, place the character “/” between the two numbers. An example would be “1/2” for this. Making a fraction using a diagonal line would use the character “#” between the two numbers. So “1#4” could be converted to a stacked diagonal fraction.

The superscript and subscript use the same character. It depends where you place it as to where your text will go. The character “^” is used for this. If placed behind the character and then stacked you will get superscript. Placing this character in front of the desired text will allow you to

create a subscript.



Figure 6

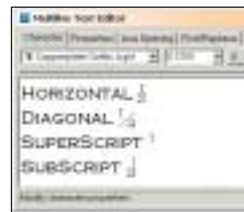



Figure 7

Figure #6 shows you the prepped text for each example. By highlighting the text to change and using the right-click menu, you should be able to stack each to see the desired options. Figure #7 shows each option of the stacked text.



Figure 8

Figure #8 shows how you can manipulate the properties of the text you have created.

To bring up this dialog box just highlight the text use the right-click menu to get to “Properties.” This is great for increasing the size, changing position, or the style. 



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Back In The Day



David Kingsley

The CADzoec Era

Some of you may not realize this, but Autodesk did not invent CAD. Before Autodesk was a viable company, there were several major players in the CAD market. In the late '70s and early '80s, CAD encompassed a variety of acronyms, CAD-CAM, CADD, CADDs, but it was all extreme technology. Only major corporations could afford it. When I started using Computervision CADDs-4X, the system we worked on had a CPU that was roughly equivalent to today's Pentium 3, but there was no Intel Corporation. It had 64 megabytes of RAM.

The amazing part is that 12 users were hitting that one CPU, not in a server/client arrangement mind you, but an actual CPU sharing design. Nobody in the CAD business talks about "mainframes" anymore, but this was a mainframe. It was all they knew how to do back then, "AND WE LIKED IT" (there, I finally said it...).

A Billion Here, a Billion There...

The CAD Center was stand-alone accounting entity within the company. It was called a "zero cost center", a laughable term considering the hardware alone was valued at almost \$4 mil, and our technical support contract alone (training not included) for those 12 seats was almost \$300k annually, and that's in 1985 dollars. The accounting process was that our internal projects were billed between \$50 and \$75 per hour to use the CAD system. The projects then billed their external clients, which were usually large government agencies, universities, or big aerospace companies. Theoretically this would result in the CAD Center being "zero cost" to the company. Somehow it never really turned out that way.

One sunny day on the way to the CAD center, I noticed three palettes just outside the door. A box on the palette had been opened and a more familiar package had been exposed. I soon realized that there was probably a ton of plotting paper sitting on the back steps. I had never seen it in this form or quantity before. There were always a few rolls stacked in the plotting room.

Our only hardcopy device was a 36-inch electrostatic plotter, capable of 200 dpi, mono-

chrome of course, with a dot size just a tad smaller than a .05mm Pentel pencil. When you ran a plot, there were about 12 inches of blank space before and after each image. The paper cutoff device was a very crude manually operated wire thingy that no one ever really mastered. You always stood a good chance of trashing your plot when you tried to use that thing. The 12 inches of dead paper often came in handy. It took two to three minutes from hitting Enter to cutting off the plot.

Our document management department had always purchased high-quality rag vellum for the drafting department. They had not yet come to understand the nature of a CAD plot. They continued to insist on buying only top-quality vellum, thinking that every plot was an original that had to survive 50 years in a file drawer. When I asked our CAD manager how much we spent on plotting paper annually, his answer was \$91k, in 1985 dollars.

For a D size plot, five linear feet came off the three-foot-wide roll (three for the image and one each for the blank leader and trailer), equaling 15 square feet of paper. When we cut out the two by three foot image we threw the remaining 9 sq. ft. (60 percent) into the trash. Multiply \$91k by 60 percent and you get \$54,600 worth of paper every year that spun off the roll, across the room, and directly into the trash.

Presentations were made with viewgraphs, letter-size transparencies that the presenter (or his assistant) manually placed on an overhead projector one at a time. We did not have a letter-size output device. Power Point was not even a concept because Bill Gates was still in high school. Laser printers were just entering the market, but CV had no stated plans to support them.

Design reviews, which occurred almost daily for one project or another, created a flurry of plotter output. Many times the plotter was backed up for hours at a time. You would issue your plot command, then check with the CAD technician to see where you were in the plotting queue. We would often use three or four 100-foot rolls a day. It was not uncommon to see a few dozen letter-size images with a foot of blank space between them along the edge of a

three-foot roll about 100 feet long. Many times we worked into the evening with the Exacto knife, trashing five square feet of paper for every letter size viewgraph.

Tech Support, Pastries, and Beer

The reason CAD has moved to a distributed computing model over the years is partly because when a software patch was required or a circuit board burned up on a mainframe, everybody had to stop working.

Our tech support person was a tall slender gentleman named Tim. He always smiled and was quiet but personable. He was the CV employee responsible for keeping our CAD hardware and software operational. Whenever you saw Tim, you knew there was some downtime in the very near future, especially if he was carrying a big cardboard box. When I learned what Tim's services cost the company, I suggested that when he came to visit us, depending upon the time of day, he should bring us pastries for our coffee break, or beer to wrap up the day's work. This suggestion was well received by my colleagues, but it never came to be.

A few minutes after Tim arrived (from where he came we never knew) a message would appear on the screen, always in caps. "FILE YOUR PARTS!!! THE SYSTEM WILL BE DOWN FOR APPROXIMATELY TWO HOURS STARTING IN FIVE MINUTES." It was kind of like when your plane finally stops at the gate and the seat-belt light goes off. Everybody piled out of their cubicles and headed for the door.

Calling All CADosaurs

Augiworld is a user-to-user magazine. I invite any and all of you CAD dinosaurs out there to send me a paragraph or two about your favorite CAD memories (or nightmares). Don't worry about your style, we'll pretty it up if need be. I'll keep your name confidential or give you credit if you like. Thanks for your e-mails.

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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