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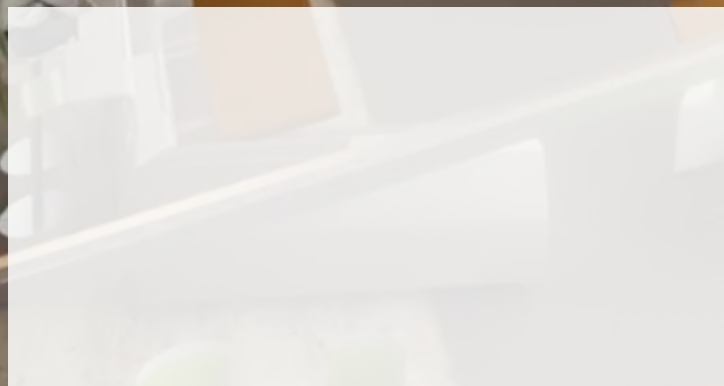
The Official Publication of Autodesk User Group International

October 2013

## Personalized Products: Customizing Autodesk Software

### Also in this issue:

- Transition Roadmap for Revit MEP
- 10 Inventor App Exchange Reviews
- The AutoCAD Rainbow



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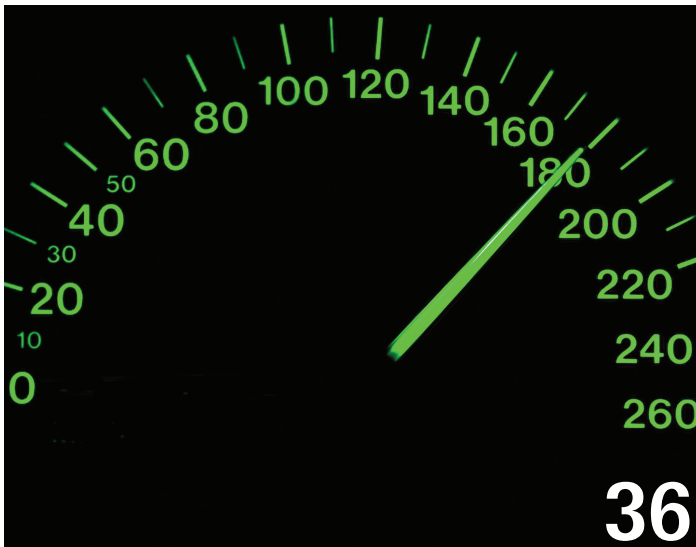
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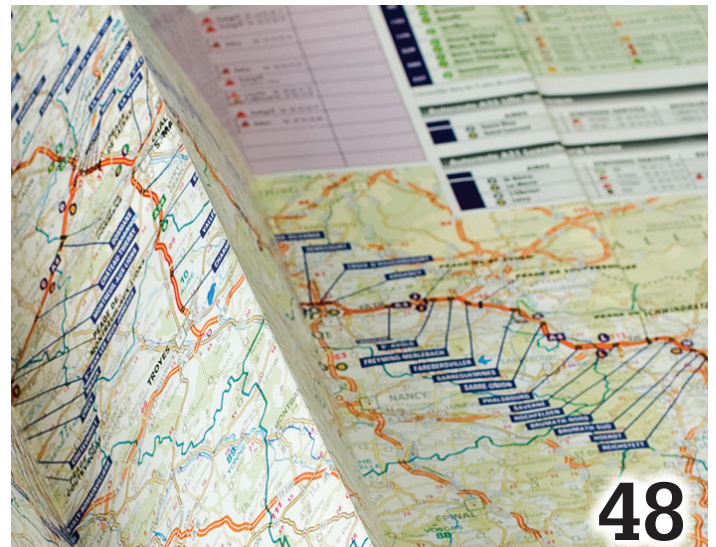


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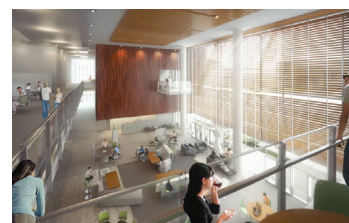
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**Cover image:**  
Project: West Valley-Mission College  
CCD Mission College Main Building  
Replacement Phase II

Software used: Revit (BIM), 3ds Max  
Design (rendering), Photoshop (post-  
production)  
Lionakis, 2012



# Editor's Note



# AUGI



Hello, AUGIWorld Reader!

Welcome to the October 2013 issue, which is generally focused on customization of Autodesk software. This is a nebulous subject, as one person's simple customization is another's advanced, highly enhanced software add-on.

But before we run down who and what is in this awesome issue, a quick mention of our wonderful cover graphic. This was created by the team at Lionakis and is the 2nd place winner for Best Presentation at the recent 2013 Revit Technology Conference North America. It is always very interesting how people use Autodesk software, along with other products, to create some really wonderful work.

We begin this month with an article by Curt Moreno, who is discussing the rainbow of AutoCAD flavors available in today's workplace. We follow this with a piece by Michael Beall sharing how to find settings for variables. And then we have the venerable Melinda Heavrin covering AutoCAD Architecture and Renovation mode.

Next up is a review by Mark Flayler of 10 Exchange Apps for Inventor. You simply don't know what you don't know—you really need to check this out! Melanie Perry returns this month with her new column, String Theory, which highlights some of the most interesting AUGI Forum threads of the month. And then Martijn de Riet brings us part 3 of Revit and IFC, busting myths for the final time!

We then have Chris Murray, who brings us customizing essentials for the user interface in 3ds Max. He shows us how to create a custom UI scheme for Max 2014. Next we have Vladimir Triantafillidis discussing AutoCAD MEP and helping to explain what is driving the MEP industry. And then Jonathan Albert shows how to streamline using AutoCAD sheet sets with Revit Structure.

Switching to the AutoCAD Civil 3D world, Tench Tilghman explains how to customize correctly (always a great goal to have). Then Todd Shackelford breaks down the transitional roadmap when using Revit MEP. It is much more than just software, guys! Lastly, Lee Ambrosius brings us the monthly Inside Track column with new releases from CSC, SofiSTiK, and Autodesk.

And with that, this issue is a wrap! Turn the page and get to customizing Autodesk software!

Take care,  
*David Harrington*

## AUGIWorld

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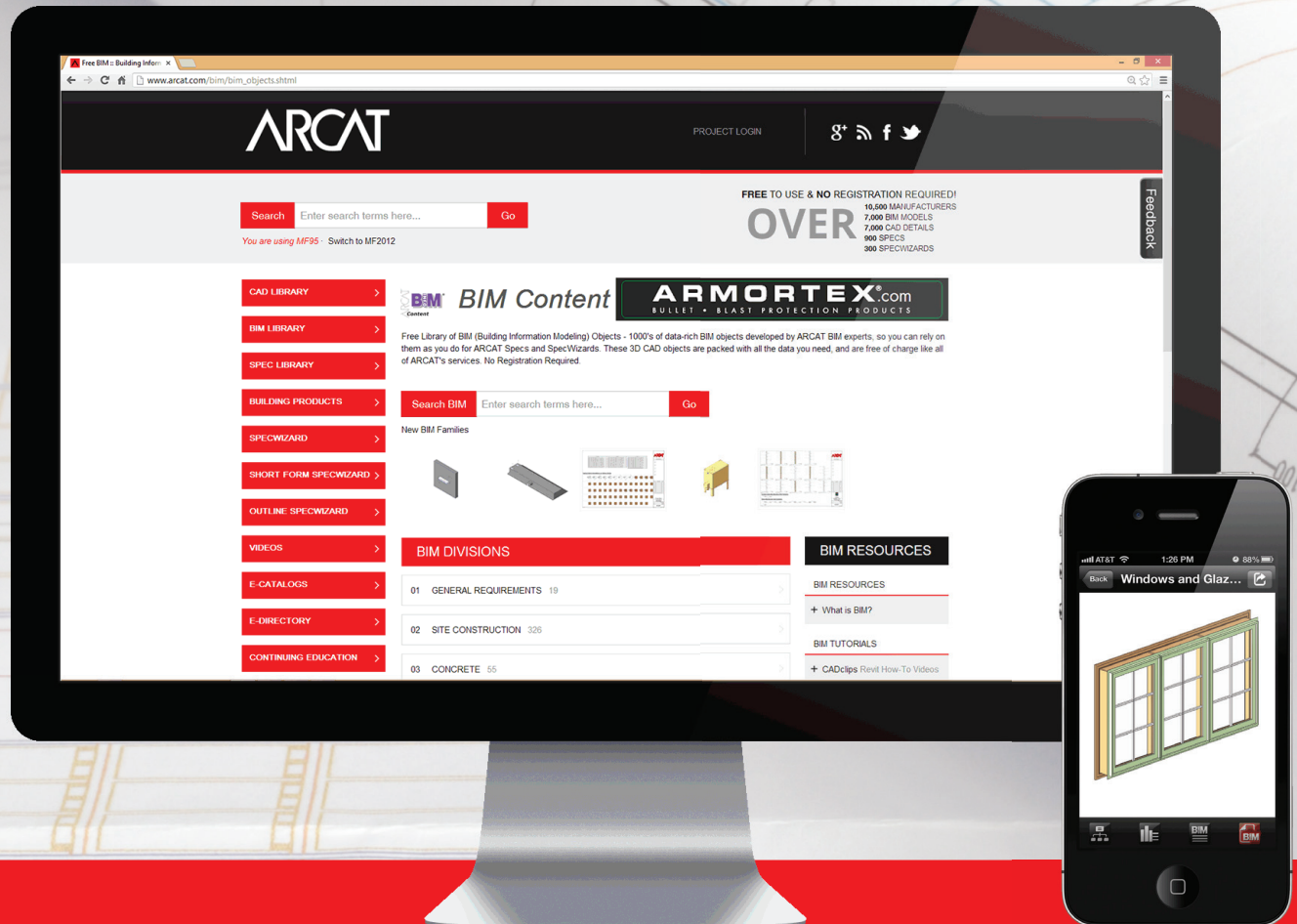






# BIM Library

ARCAT has the most comprehensive collection of BIM objects you will find, available free of charge and without registration.



The ARCAT BIM Library is also accessible in the ARCAT app, with editing capabilities in the AutoCAD 360 app.



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# The AutoCAD Rainbow

 When you are a long-time CAD professional and AutoCAD® user in a position where you provide support to others, every phone call can bring something new to you. Maybe the phone will ring and someone will need help using AutoCAD to create a design for a life-saving medical device. Or maybe the phone will ring and someone will need help with the next great design for front-end suspension on a luxury car. Or maybe it is a first-time user calling with a question that you've never even heard before. Unfortunately, it is most likely going to be someone asking you the same question that you have been asked 10,000 times before.

That call is the one that came today: *Ring... ring...* "Hi. I've been using AutoCAD for a few years and now I have to do this job and I want to customize my AutoCAD. What would you do?" That's right, it was the dreaded "how do I customize AutoCAD" call. Over the years I have gotten this call more times than I care to count.

There was a time when I would have taken more time to discuss workflows and industry specifics with the caller. I would have gotten my little yellow sticky notes and made scribbles about other scribbles. Inevitably I would have had to do some research and check some prices and then report back to this caller.

In 1991 the world was very different. If you worked in a certain industry and wanted your AutoCAD installation to have libraries and scripts specific to your industry, things were not easy. You had to delve deep into the dark arts of variables and plug-ins. You had to purchase libraries and install side applications. Maybe you even wrote your own LISP routines and made your own custom menus. Times are different now, and like the Monkees said: "That was then, this is now." In 2013 I sort of wonder why people who want industry specific customizations even want to go through the process of customization.

Today Autodesk offers so many flavors of AutoCAD that choosing a certain version is more akin to choosing a new flavor of ice cream at Baskin Robbins than buying software. If you are working in the



civil engineering field, then AutoCAD® Civil 3D® is the AutoCAD for you. For those in the utility market, AutoCAD® Utility Design is your choice. The list goes on, but more on that later. Truly, today's modern AutoCAD has fulfilled the promise of a "platform" rather than a single product.

Rather than spending this "Customization" issue of *AUGIWorld* discussing the endless ways in which you are able to outfit AutoCAD, we are going to discuss the variety of AutoCAD packages on the market. All the software packages we will look at share not only the AutoCAD engine, but also the interface. Soon it will become obvious why I feel that patching, plugging, and twisting standard, vanilla AutoCAD is not as necessary as it once was.

## AUTOCAD CIVIL 3D

The first AutoCAD variant we will look at is the one that I use just about every single day, AutoCAD Civil 3D. Although Civil 3D is a very close cousin to AutoCAD, it is packed with tools and routines germane to civil engineering projects made for design and documentation. Whether your infrastructure project is a retention pond, a neighborhood subdivision, or a major highway, Civil 3D has the tools for you.

With features such as survey data collection and advanced grading, Civil 3D is stuffed full of just the types of tools civil designers need. Major features include advanced surface modeling functions, corridor design and modeling, parcel design, and advanced style management. There are even newly enhanced tools for pipe networks that include both pressure and gravity systems.

As a long-time AutoCAD Civil 3D user, I cannot imagine taking the standard version of AutoCAD and customizing it to better suit the needs of a civil engineering office.

## AUTOCAD ARCHITECTURE

One of Autodesk's flagship products is the Autodesk® Revit® collection of programs. Over the past few years Revit has become the *de facto* standard in nearly every architecture office in the country. With the increasing popularity of the Building Information Modeling (BIM) concept, Revit has spread even further into adjacent disciplines. As wonderful as Revit is, in the eyes of many CAD users it lacks one major feature: the AutoCAD interface.

Because Revit is a completely separate product from AutoCAD, it does not share the AutoCAD engine or interface. That can be a stumbling block and cause a steep learning curve for transitioning CAD professionals. Never fear, Autodesk has just the solution for the CAD professional seeking to customize the tried-and-true AutoCAD installation for a more architecturally oriented task: AutoCAD® Architecture.

From the simplest sections and elevations to the most complex materials schedules and renovations, AutoCAD Architecture brings all the tools the AutoCAD professional needs to tackle the project. And all of it is powered by the familiar AutoCAD engine and features the familiar interface.

**TODAY AUTODESK  
OFFERS SO MANY  
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THAT CHOOSING A  
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ICE CREAM AT BASKIN  
ROBBINS THAN BUYING  
SOFTWARE.**

Users moving from standard AutoCAD to AutoCAD Architecture will begin making short work of just about any architecture task. With enhanced tools for placing walls, doors, and windows, layouts will happen faster than ever. Room documentation and advanced tagging and annotation features along with the industry-standard buildingSMART system, Industry Foundation Class, will make sharing work with others quick and easy.

Going from AutoCAD to AutoCAD Architecture will help experienced users move from standard drafting to complete architecture plan sets and rendering quickly and easily. Check this program out before digging around the Internet looking for a set of pre-made door blocks to use.

## AUTOCAD MECHANICAL

Another important product for Autodesk is Autodesk Inventor®. You have no doubt heard of this powerful program, but may have thought, "I'm too far into my career to move from AutoCAD to something new." To that I would first say, "You're never too old!" Secondly I would take a moment to understand that feeling (we've all been there) and tell you to check out AutoCAD® Mechanical.

Designers working on a wide variety of mechanical projects will welcome the features AutoCAD Mechanical has to offer. Whether you are tired of drawing tension springs or you need some help determining the perfect design for rotation pattern of your cam, you are going to find a tool to help you here.

Why would you take the time to find blocks, even dynamic blocks, or bolts or threads or any of that? AutoCAD Mechanical comes with a multitude of tools that are perfectly suited for this sort of work. Sporting a robust library of more than 700,000 discipline-specific parts and shapes, support for multiple standards and intelligent, dynamic geometry, this is a package ready to do some work. Of course, all of this sits atop the familiar AutoCAD interface.

# AutoCAD 2014

## AUTOCAD ELECTRICAL

It seems that one of the largest groups of users I meet looking to customize their AutoCAD installations work in the Electrical fields. Whether it is a small contractor trying to find an economical route or a large outfit looking to retool, I pose this question: "Why don't you check out AutoCAD® Electrical?"

Like all AutoCAD-based products, AutoCAD Electrical is a product intended for both design and documentation. That means electrical designers are going to find the tools they need, all in one package that has the familiar AutoCAD interface and commands in addition to many industry-specific functions. Whether you are laying out panels or bringing together your bill of materials, there is something here for you.

One of the common (but unloved) tasks I hear electrical designers and CAD professionals discuss is creating Programmable Logic Controls. AutoCAD Electrical offers the automation and dynamic logic that makes this sort of job much easier. Not only will electrical designers be able to choose from a prepared library of more than 3,000 PLC IO modules, they can create their own PLC IO modules with the Module Builder tool. That one feature alone is enough to save any electrical designer or CAD professional from a head full of gray hair!

Documentation tools are just as robust in AutoCAD Electrical as the design tools. Out of the box, your designer or CAD professional is going to be armed with automated report generation features to create bills of material, terminal plans, wire labels, and much more. Probably just as fantastic is the fact that you can run reports on a sheet, a panel, a section of design, or just about any other selection you can need.

Sure you could piece together all this sort of functionality yourself. You could go out and download modules and blocks from manufacturer sites or purchase plug-ins with similar routines. Then you could do the installation and compatibility dance, but why? AutoCAD Electrical is ready for the electrical designer or CAD professional now, requiring no more effort than to install it.

## THE REST OF THE RAINBOW

We have taken a look at three of the AutoCAD-based products that I point people to most often. The wonderful part is that there is still a whole slew of products out there built on the AutoCAD platform. Users seeking to customize their AutoCAD installation with model-based GIS tools, P&ID libraries, or structural detailing documentation reports just need to check out the rest of the impressive collection of AutoCAD-based products:

- AutoCAD Architecture – for architectural layouts, elevations, and other projects
- AutoCAD Civil 3D – for all manner of civil engineering projects from roads to water systems
- AutoCAD Electrical – for electrical distribution projects
- AutoCAD Map 3D – for adding mapping and GIS data to support planning projects

- AutoCAD Mechanical – for a wide variety of mechanical and manufacturing projects
- AutoCAD MEP – for adding mechanical, electrical, and plumbing documentation to building projects
- AutoCAD P&ID – for design and documentation in piping design projects
- AutoCAD Plant 3D – for the 3D layout and design of process and manufacturing facilities
- AutoCAD Structural Detailing – for creating shop drawings for steel and concrete structures
- AutoCAD Utility Design – for the rules-based design and layout of electrical distribution systems

## THE END OF THE RAINBOW

As you can see, there is wide variety of predesigned, industry-specific flavors of AutoCAD. From laying out processing facilities to bringing electrical, water, or sewer services to that facility, there is an AutoCAD out there for you. If you are like me and many other CAD professionals I know, you will probably find that selecting one of these versions of AutoCAD is much quicker, easier, and often cheaper than taking the time to search out, purchase, and install various plug-ins for a standard AutoCAD installation.

While there are certainly other Autodesk products that perform many of these functions, they are not AutoCAD-based and will have different interfaces. This change in user interface and product design can often bring a steep and unwanted learning curve to a firm or project. By choosing an AutoCAD-based product, you will not only be adding specific functionality, you will also be able to benefit from the familiar AutoCAD design and user interface.

So the next time you are considering taking the time to customize your standard AutoCAD installation with various libraries, scripts, or plug-ins, think about the alternatives. Take a moment to investigate the world of AutoCAD products that are ready and available to serve your industry-specific needs. You may be surprised at how much benefit the rainbow of AutoCAD versions can bring to your company.



*Based in Houston, Texas, Curt is a CAD Coordinator for a civil engineering firm and the owner and editor of the Kung Fu Drafter blog. He began using AutoCAD with Release 10 and has spent the past 20+ years working with various Autodesk products including AutoCAD, Civil 3D, Map 3D and SketchBook Designer. Curt is also a freelance content creator, featured Autodesk University speaker, and training content developer. In his spare time Curt writes, games and spends time with his dog and horses.*



# And Here's the Express Tool... to Find the Settings for Variables

Variables come in two flavors (if you don't count those that are 'Read Only'): Those that are saved in the Drawing, and those that are saved in the Registry. For example, the variable CURSORSIZE is saved in the Registry. The variable TEXTSIZE is saved by Drawing.

But what about the less obvious ones? Did you know the OSMODE variable—a Registry setting—stores a bitcode that represents the combination of Osnaps you have set? We'll actually be covering that tidbit in my 90-minute Lab at Autodesk University this year: "Click My Ride: Customizing Autodesk® AutoCAD® for How You Work."

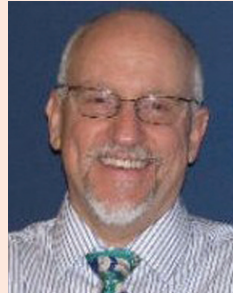
## SYSTEM VARIABLES EDITOR

On the Express Tools tab > Tools panel, click System Variables.

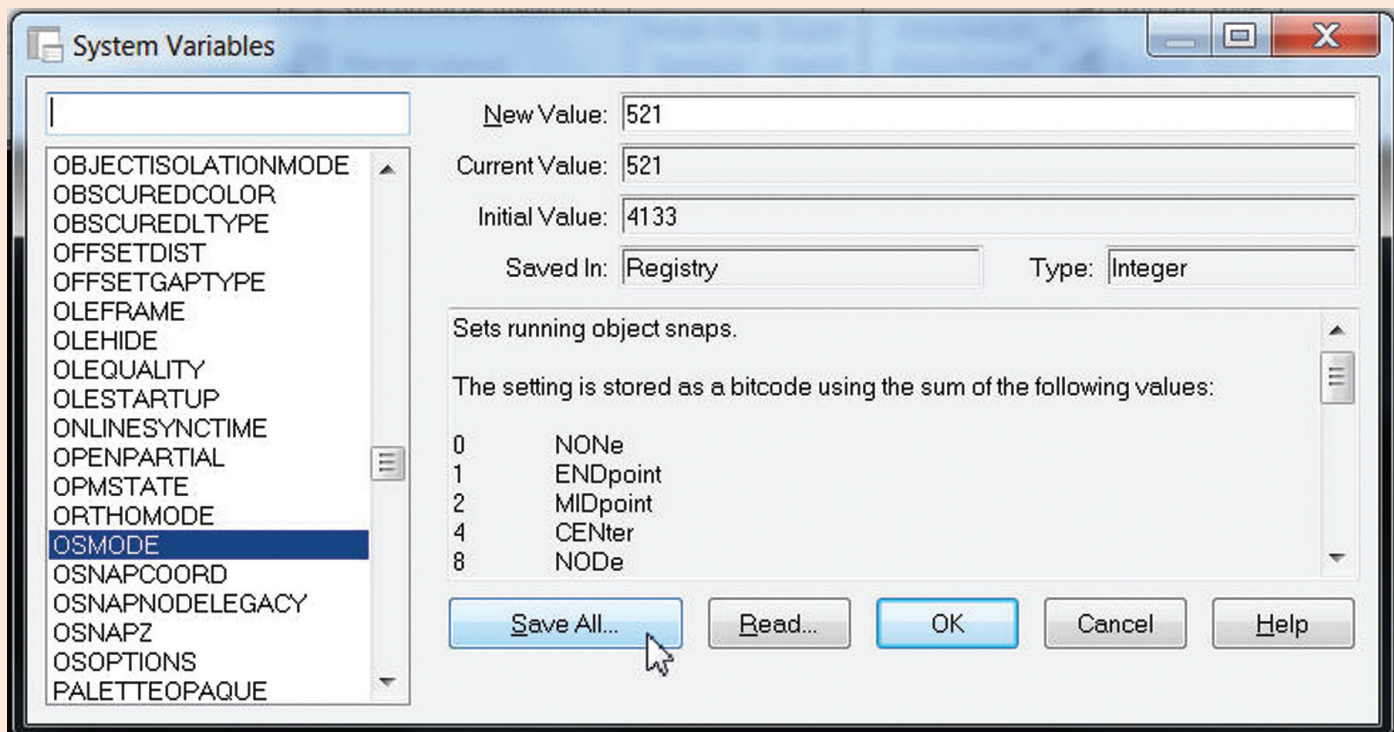
There's a field at the top that acts as a search feature and that accepts wildcard characters of ? for a single character and \*

for everything before and after. Enter \*MODE\* to find every variable with the word 'MODE' in it.

A bonus feature is the ability to Save All the variables to a .SVF file that you can then read into another system. Love this thing.



*Michael E. Beall (B. Arch.) is an Autodesk Authorized Author and the owner of CAD Trainer Guy, LLC. He has been presenting onsite CAD training around the planet for more than 30 years. Contact him at michael.beall@cadtrainerguy.com or give him a call at 502.500.2267.*



# Efficiency with Renovation Mode

**R**enovation Mode in AutoCAD® Architecture 2014 easily identifies objects and associates them with different phases of a renovation project, allowing for clear construction drawings each and every time. You now have the ability to display existing, demolished, and new construction all in one drawing. Working within one drawing and having the ability to switch between renovation plan types allows you to avoid errors that are typically caused by editing multiple drawings.

## ACTIVATING RENOVATION MODE

The first time Renovation mode is activated, a specific Renovation display configuration is created. Once activated, you will notice that this specific configuration is a copy of the existing display configuration with “Renovation” added as a prefix (see Figure 1).

To begin Renovation Mode, click the Manage tab of the ribbon, Style & Display panel, Renovation Mode. This brings up the First Activation of Renovation Mode dialog box that allows you to give a name to the new display configuration. Please note that it is best to maintain the default prefixes for display configurations to eliminate confusion later. Next, select the Options button to

change settings using the Display, Layers, and Styles, Blocks and Materials tabs. Click OK and you are now working in Renovation mode.

## WORKING IN RENOVATION MODE

When you begin Renovation mode, the existing category is assigned to existing objects. Objects that are added to the drawing while you are working in Renovation Mode are automatically categorized as New. If objects are deleted, they are assigned to the demo category; however, they are not actually deleted. For example, moving a door

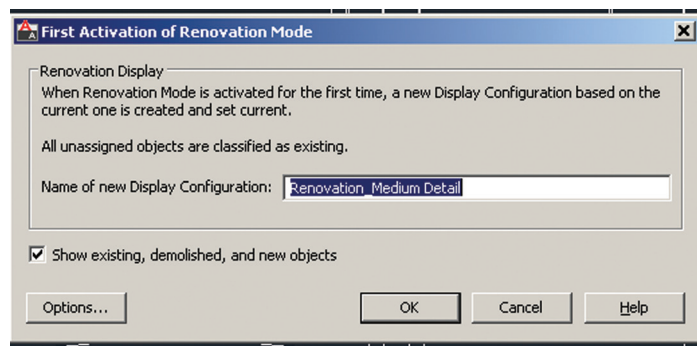


Figure 1: First activation of Renovation Mode dialog box



will create a new door as well as a demo door along with the corresponding wall openings. It is important to note that existing and new walls will automatically clean up after each other while in Renovation Mode; however, demolition and new objects do not interact. This will be discussed more later in the article.

In the display configuration for Renovation, objects are displayed according to their display representation. Within this display configuration, Existing, New, and Demolished categories are specified. They can be viewed in plan, elevation, and section displays. Both 2D and 3D objects will display according to the categories they are assigned in plan, elevation and section views. Dimensions are important to mention here, as well. When you use AEC dimensions, you cannot automatically ignore objects by Renovation category. All existing, demolished, and new objects are dimensioned. Any undesirable dimensions must be manually removed.

Objects can be manually assigned to a Renovation category, if needed. The display properties will change according to the category specified. This option may be necessary for 2D, multi-view block, or block objects because these objects are automatically assigned to the Existing category when you begin a Renovation session. To do this, click the Assign Existing, Assign New, or Assign Demo buttons, according to your needs. Next, select the objects to be assigned to the specified category and hit Enter.

To make things easier, you can click the Select Existing, Select New, or Select Demo buttons on the Renovation panel of the ribbon if you have several items to work with at once. Once selected, you can complete a command, such as Delete.

## RENOVATION MODE SETTINGS FOR OBJECTS

Design rules for New, Demolished, and Existing categories by object type are controlled by Renovation styles. You can import Renovation Styles from external catalogs or export to external catalogs in the Renovation Options dialog box. For maximum flexibility, Renovation styles for display and layer assignment can be specified independently from each other and are saved to the current drawing.

In the Renovation options dialog box, the Display tab allows you to specify the Renovation Display Style as well as to set specific design rules for objects such as walls and doors (see Figure 2). The layer tab allows you to set the Layer Assignment Style and to specify a prefix or suffix to layers in lieu of changing the layer name (see Figure 3). The Styles, Blocks and Materials tab allows you to add a prefix or suffix to style/block

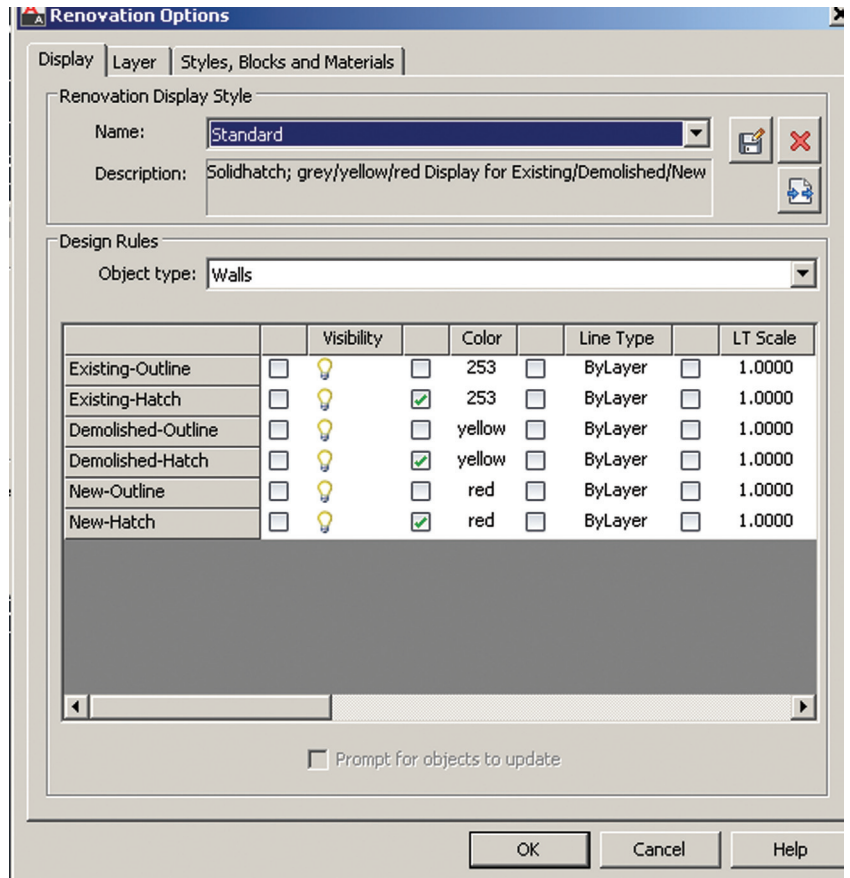


Figure 2: Display options

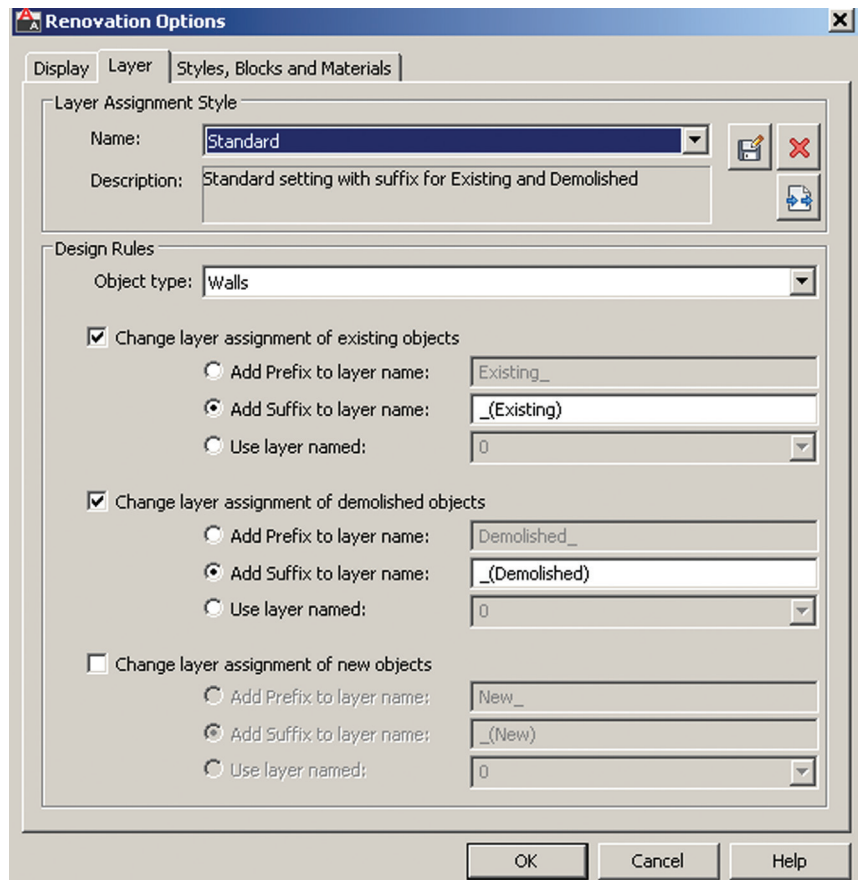


Figure 3: Layer options

# AutoCAD Architecture 2014

names to avoid naming conflicts between objects in different Renovation categories (see Figure 4). This is much quicker than having to manually rename each object! When the Duplicate Material Definitions box is checked, a copy of the material is automatically generated and assigned to the building object. The corresponding color settings will automatically display.

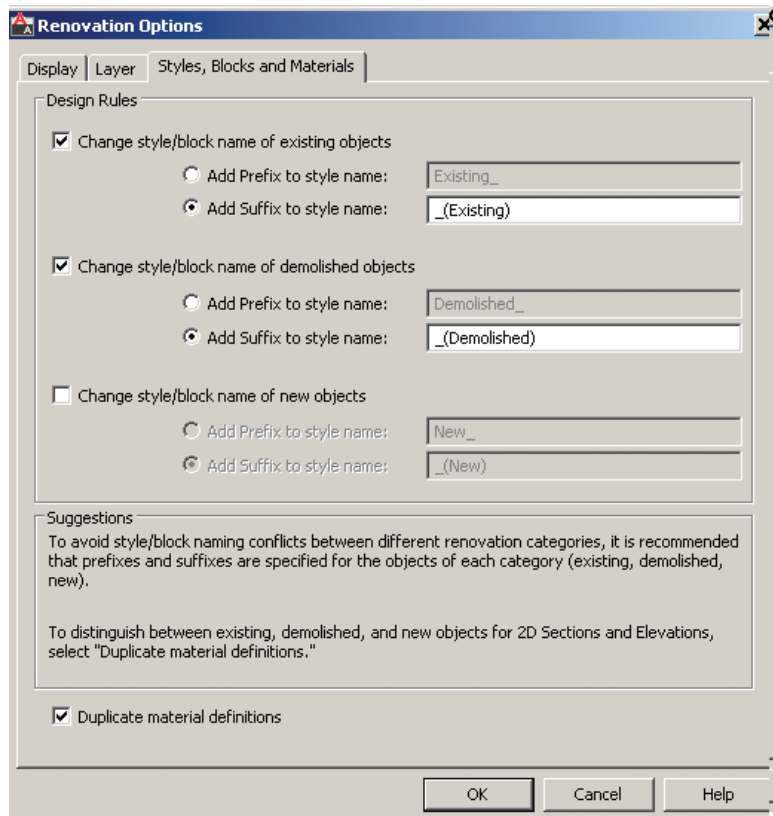


Figure 4: Styles, Blocks and Materials options

## ENDING A SESSION IN RENOVATION MODE

Once you are finished working in Renovation Mode, ending the session is simple. On the Renovation panel, click the Close Renovation Mode tool. It is important to note that if changes are made to the drawing after Renovation Mode has ended, the uncategorized objects are automatically assigned to the Existing category when you reactivate Renovation mode.

## MODIFYING THE RENOVATION DISPLAY

You can change how properties of objects within specific categories are displayed in the drawing by unlocking them, changing them individually per object type, and saving them as the Renovation display style. Modifications made are saved to the current drawing. The lock icon to the left of the property signals whether this property can be changed. If the property is unlocked, any changes made to the display are reflected in the drawing.

With the Renovation drawing open in an active Renovation mode, click Options on the Renovation panel. The Renovation Options dialog box displays. On the Display tab, select the display style to apply to the current drawing and enter a description. Renovation

styles can be modified and saved, deleted, and imported from/exported to an external catalog. Now, select the object type for the design rules and then select the checkbox to the left of each property value for the category you want to change. Modify the properties as desired and select Prompt for objects to update. Select the objects to modify or press Enter to select all objects.

Changes to the selected properties for the specified object type are applied in the current drawing.

## CONTINUING TO WORK IN RENOVATION MODE

When Renovation Mode is reactivated in your drawing, the existing Renovation display configuration can still be used or you can create a new one. The objects that were previously categorized in an earlier Renovation phase will retain their representation and category. Any objects that do not yet have a Renovation category will be automatically categorized and displayed as Existing objects. The “Show existing, new and demolished objects” option is automatically selected by default. It is recommended that this option remain selected, as it ensures that categorized objects in your Renovation plan remain visible while switching between the Demolition, Renovation, and Revision displays.

To continue working in Renovation Mode, select the Manage tab on the ribbon, then click the Style & Display panel and finally click Renovation Mode. This will display the Repeated Activation of Renovation Mode dialog box (see Figure 5). Next you will need to specify the settings in the dialog, depending on what you want to do. To begin with an existing Renovation display configuration, click the drop-down arrow next to Activate an Existing Renovation Display Configuration, select the display you wish to use, and click OK. To begin with a new display configuration, select the Create a New Renovation Display Configuration Named button, enter a name for the new configuration, and click OK. Next you can change the display style or design rules of objects by clicking the Options button at the bottom left of the dialog box. Click OK when finished. Then click OK again to exit the dialog box. You are now working in Renovation Mode again.

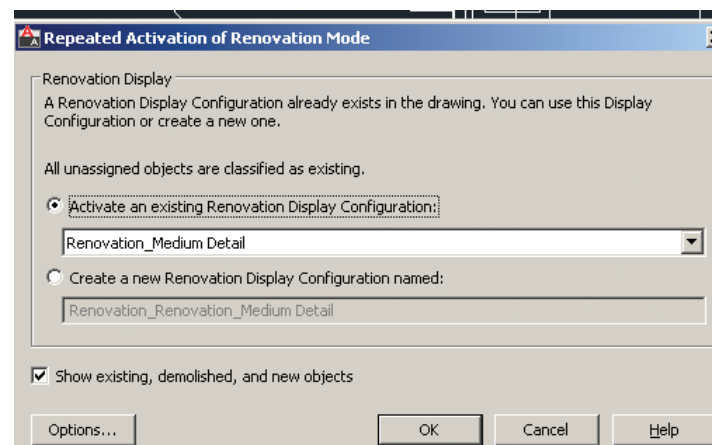


Figure 5: Repeated activation of Renovation Mode





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- Come visit the Community Pavilion on the Exhibit Floor to meet your fellow professionals from the International Communities.

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# AutoCAD Architecture 2013

## ACTIVATING A DEMOLITION PLAN

The display of a demolition plan shows existing construction and those objects categorized as demolished. All new objects, however, are hidden. Display settings for the demolition plan type are located in the options dialog box for Renovation Mode.

To create a demolition plan, activate Renovation Mode as previously discussed and then select the button for Demolition Plan on the Renovation panel of the ribbon. You can now select a Renovation Display Configuration to activate. The box next to Hide All New Objects is automatically checked. If you want New objects to show while you are working in the drawing, click in the box to deselect the item and then click OK. You can also click the New Show/Hide button on the Renovation panel. You are now ready to begin creating a demolition plan.

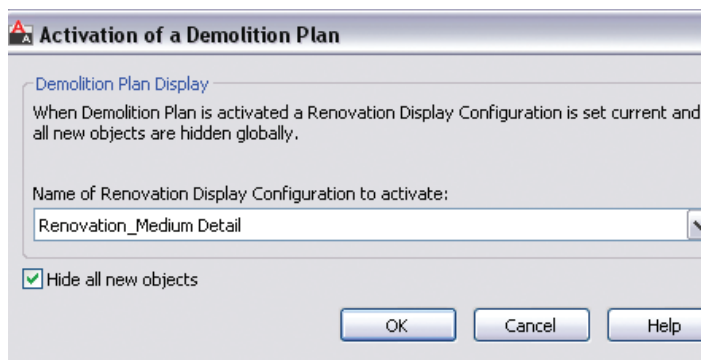


Figure 6: Demolition dialog box

Please note that yellow is automatically assigned by default to demolition objects. This can be changed in the options dialog box for Renovation mode under the Layer tab.

## ACTIVATING A REVISION PLAN

A revision plan displays new and existing construction objects, but all demolition objects are hidden automatically. Display settings for the revision plan type are located in the options dialog box for Renovation mode.

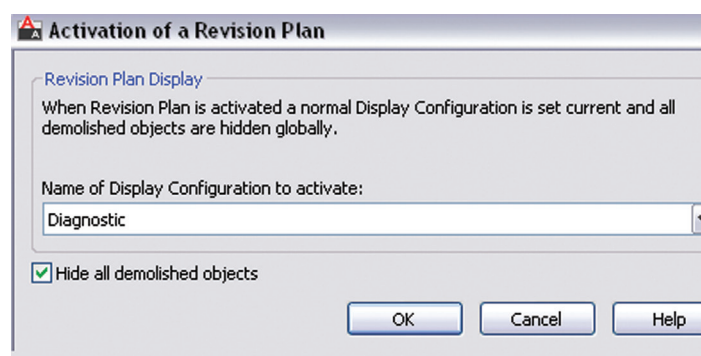


Figure 7: Revision dialog box

To create a renovation plan, activate Renovation Mode as previously discussed and then select the button for Revision Plan on the Renovation panel of the ribbon. You can now select a Revision

Plan Display configuration to activate. The box next to Hide All Demolished Objects is automatically checked. If you want Demolition objects to show while you are working in the drawing, click the box next to deselect the item and then click OK. You can also click the Demo Show/Hide button on the Renovation panel. You are now ready to begin creating a revision plan.

## MANUAL MODIFICATIONS

Sometimes walls of different renovation categories do not intersect correctly, so manual modifications become necessary. This can be done by temporarily suspending Renovation mode. For example, you may have a plan that includes walls categorized as demolition and walls categorized as existing with wall edges that need to be corrected. Remember, objects categorized as New do not interact with objects categorized as Demolition. When you need to make a manual correction, you temporarily interrupt Renovation mode by freezing the walls you want to modify and then correcting the edges. These changes are not considered part of Renovation. The option to freeze or thaw walls is only available when Renovation mode is active.

Let's make this a little clearer. To do a manual modification, click the Freeze Walls button on the Renovation panel of the ribbon. Next, select the walls in question and hit Enter. Renovation mode is now temporarily suspended. Proceed with correcting the wall edges and then click Thaw Walls when finished. Renovation mode resumes.

## RENOVATION STYLES CATALOG

The Renovation styles catalog contains display and layer assignment styles. AutoCAD Architecture-based styles for objects are managed with Style Manager. By default, the Renovation styles catalog is installed in ProgramData\Autodesk\ACA <version>\enu\Styles. If the Renovation styles catalog is renamed or moved, the styles are disabled and cannot be accessed. Use the Renovation Styles Catalog Settings dialog box to specify a valid catalog.

With the Renovation drawing open in an active Renovation mode, click Styles Catalog from the Options drop-down menu on the Renovation panel. The Renovation Styles Catalog Settings dialog box displays. Select the Import renovation styles from catalog checkbox for drawings to be populated with all Renovation styles in the specified catalog. Clear the Import renovation styles from catalog checkbox for new drawings to include standard styles only. Browse to the location of the Renovation styles catalog you want to use. Click OK.



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# 10 App Exchange Reviews

Free Autodesk Inventor® apps? You mean like a Bloomin' Onion at Outback? Count me in! Wait, you mean Inventor apps as in applications that change how Inventor works for me and makes me more productive? Okay, I'm still in, but I also still want some fried food.

In this article we will take a look at several of the free apps available in the Autodesk Inventor Exchange store for trial, purchase, and Subscription customer benefits.

## DESIGN CHECKER

The first one we will take a look at is the Design Checker that was previously called Validus and sold through DMSI. Autodesk purchased this software in a manner similar to its purchase of the iLogic code from Logimetrix a couple years ago. Luckily, I was a user back before this acquisition so I know the tool pretty well. The fact that the software went from costing around \$3,000 to being a free tool delivered exclusively to Subscription customers is a really nice benefit for having an Autodesk subscription right now.

The Inventor Design Checker is a productivity solution that gives the designer insight into the adherence of company or customer standards for

the product being designed. Live Checking gives instant feedback to the user and ensures a high level of quality for the entire design process.

Users can use pre-defined checks or define custom checks with iLogic scripts to perform design checking. Executing the on-

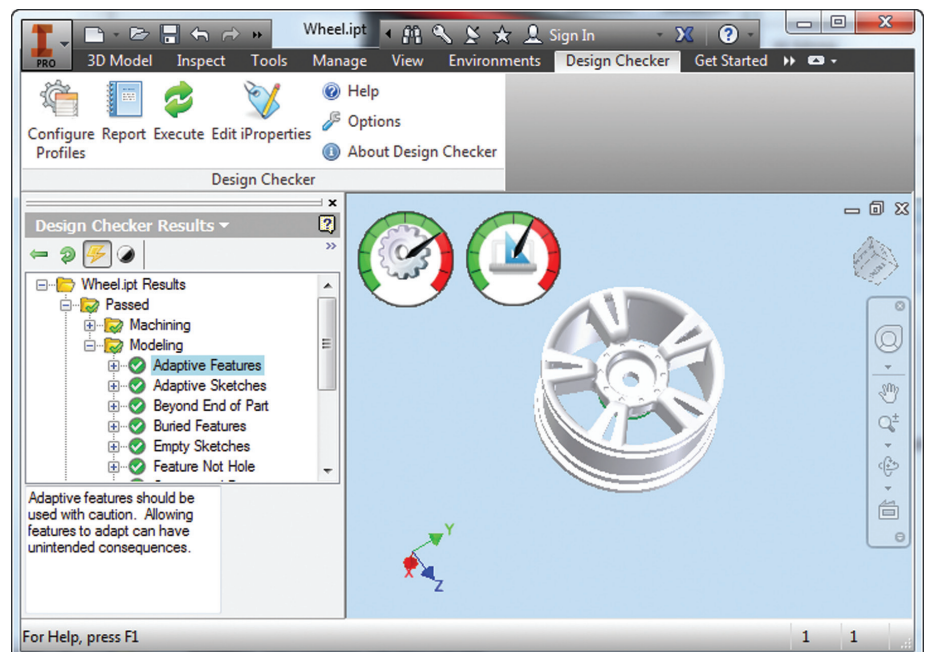


Figure 1

# Inventor 2014

demand checking updates the design checker results, and enabling the live-checking allows users to get the real-time feedback from the design checker during design process. The Design Checker Results Tree Browser allows users to interactively edit the objects with failed checks, and a Design Checker Results Report shows all the passed and failed check results and allows users to export the report to Excel, Word, or pdf, or print the report.

Now what I really enjoy about this tool is the iProperty checks and some of the modeling checks. The machining checks I could live without, mostly due to the fact that most companies try not to hire users who make such drastic mistakes in machining operations. My favorite thus far is the unconstrained sketches check that validates my design before adding it to Vault. I have also used this as a measuring stick before hiring new engineers or bringing vendor Inventor models into my design.

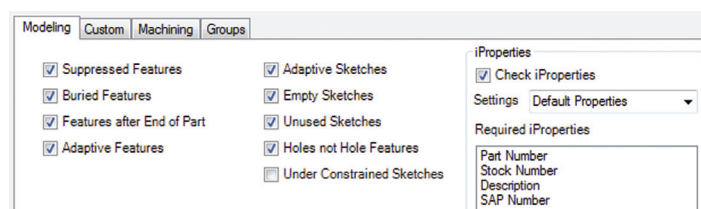


Figure 2

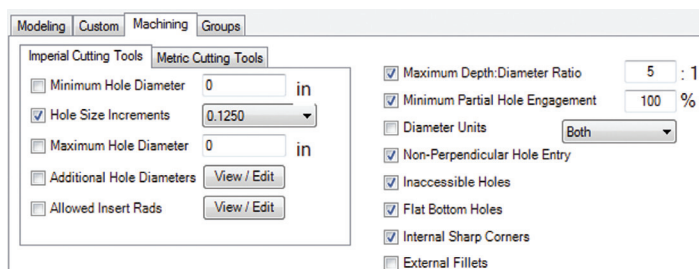


Figure 3

## AUTODESK REMOTE

This next app allows some really nice RDP use for Autodesk Inventor. Autodesk Remote is a standalone application for Microsoft Windows 7 and 8 and is compatible with all Autodesk products. It lets you drive Autodesk software installed on your primary computer from a remote computer or iPad for fast access to native design data over standard networks. To use it, simply install Autodesk Remote on the PC you want to share. Install it again on the machine you want to connect from and start your connection. Note: Autodesk Remote currently works only in North America.

Autodesk Remote also has a companion application for the iPad that allows you to access your host PC from an iPad. The iPad app is optimized for Autodesk Inventor so you can work from anywhere, improving collaboration and increasing flexibility. Download the iPad app from the Apple Store.

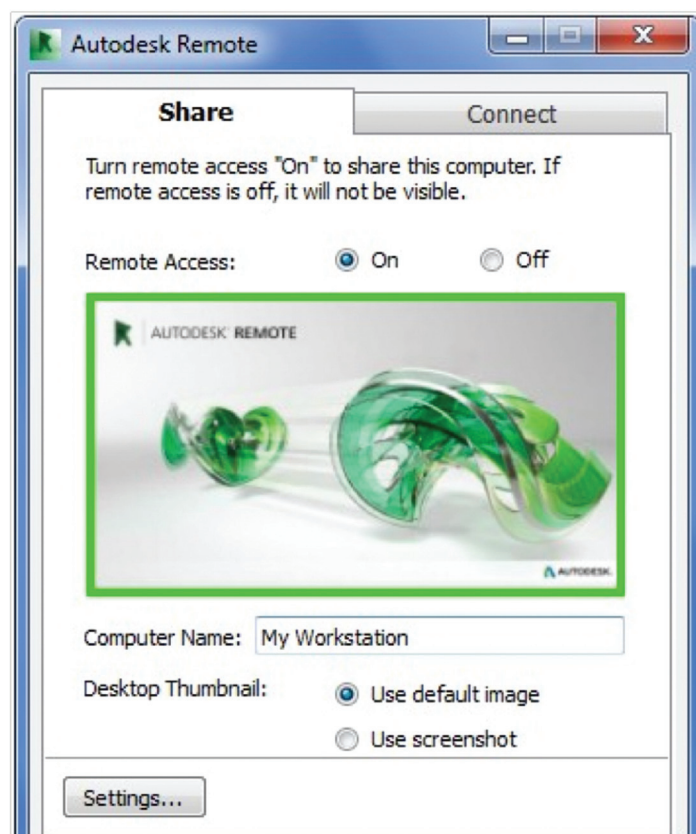


Figure 4

The controls in the iPad app are pretty easy to understand, but that doesn't make a high-end CAD product made for the PC instantly translatable to a touch interface. You can see where interface elements of Inventor have started to lean more toward this inevitable progression, though.

From my usage of the iPad app on my iPad 3, I found the usage a little sluggish and gesturing a bit picky. I found the use the ESC

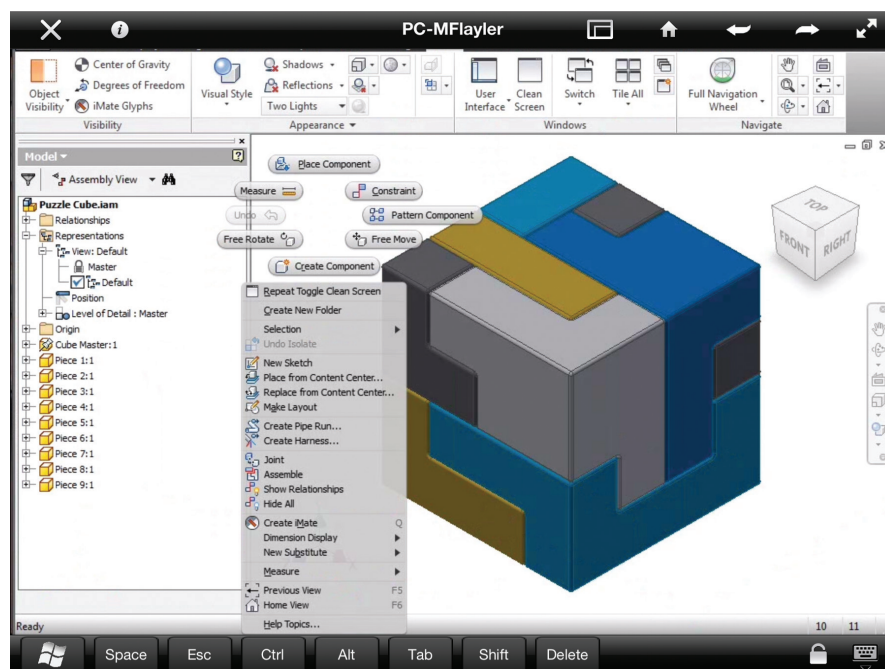


Figure 5



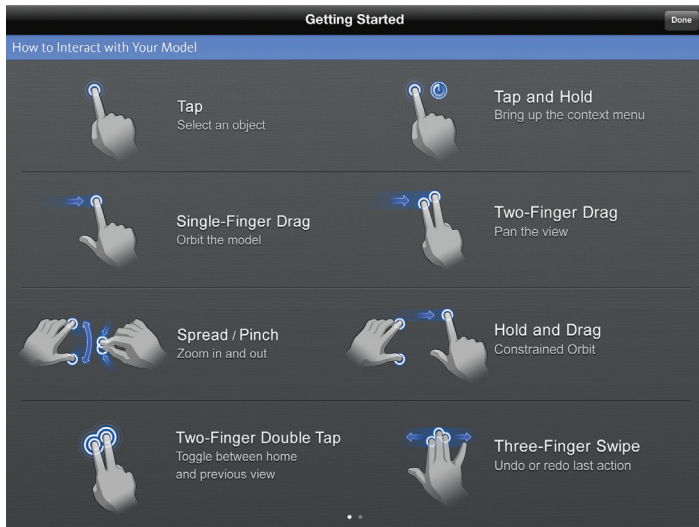


Figure 6

key a mandatory function as I often initiated one navigation tool and found myself trying to start something else before finishing the tool I was in. In the end, I see some fantastic usage on the horizon for this app, but right now it is pretty gimmicky for my taste. I do picture myself at some point on my front porch with my tablet instead of my computer. I would look cooler to the neighborhood kids, too.

Be aware you will probably have to troubleshoot the setup of this app a bit; I had to lock and unlock my computer and restart the app several times before I got it just right.

## FEATURE RECOGNITION

The Feature Recognition application converts neutral 3D CAD models, such as STEP, SAT, or IGES solids, into full-featured Autodesk Inventor models. Feature mapping could be executed automatically or interactively as needed to maintain design intent. Currently there is one Automatic Feature Recognition command and eight feature recognition commands you can use.

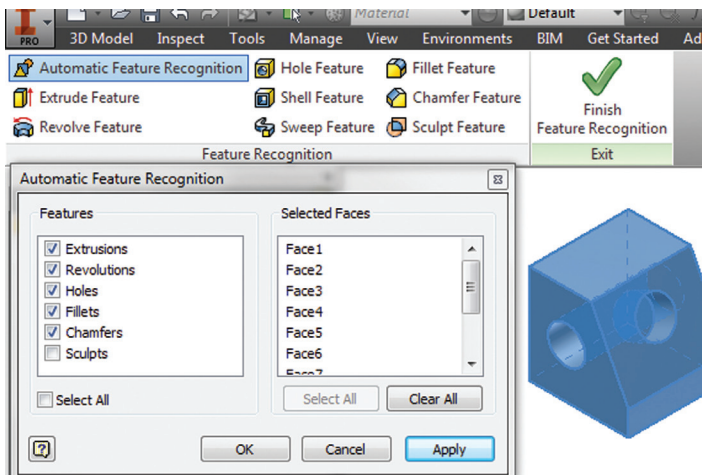


Figure 7

Automatic Feature Recognition attempts to recognize specific feature types and populate the browser tree with the recognized features. A dialog box displays the feature types you can recognize in the Features section with the defaults checked. You can select features you want to recognize and deselect features you do not want to recognize.

When you import a file it will offer to start feature recognition. If you decide to do it later, you will have to find your Base1 solid in your tree and right click on it to start it again.

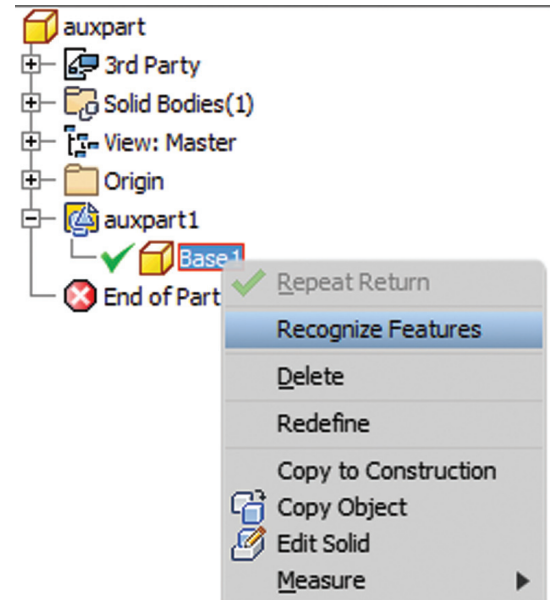


Figure 8

This tool has been around for a long time, previously only on Autodesk Labs. Personally, I don't like it, mainly because I have to constrain and dimension the sketches when they get recognized by the tool. If your goal is to bring in a solid and then do some minor modifications to it, then you are better off using the Edit Solid tools also shown in the image above. If you want Work Plane tools also, remember to turn off the Import into Repair Environment as well before opening the file.

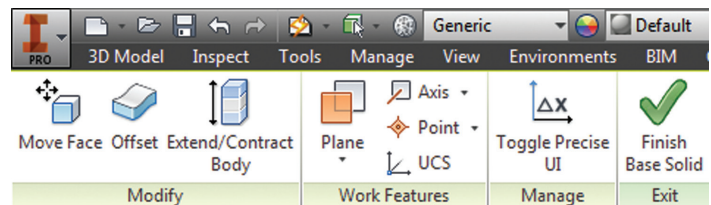


Figure 9

If you really had to go the distance and recognize features, it is actually a lot quicker and generally creates a more intelligent modeling history if you just redo it yourself in Inventor. The recognition tools only lend themselves to simple parts in most cases.

# Inventor 2014

## WORK FEATURE VISIBILITY

This product allows Inventor users to manage all work feature visibility in a fast and easy way keeping full awareness of the involved entities. This app consists of six buttons on part environment and another six on assembly environment. Inside of part environment a user can choose to enable or disable the visibility property of planes, axes, or points. Inside of assembly environment a user can also choose on which components to enable or disable the visibility property of planes, axes, or points.

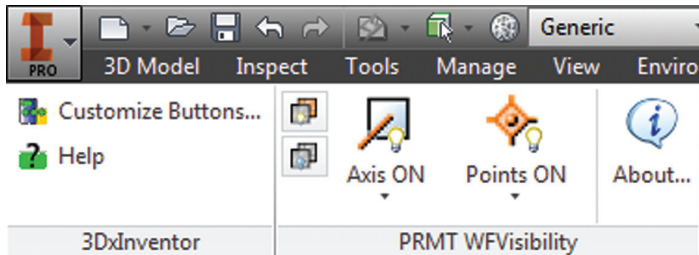


Figure 10

I had a little trouble with this app in the assembly environment, but that was due to some bad installation files. This is one app really worth the \$0.99. How often have you been in an assembly and not wanted to go back to the part files to turn on and off work features? I recommend ungrouping them so you access both commands faster.

## SHEET METAL FLAT EXPORT

There seems to be a plethora of these apps on the Exchange with each of them varying in price and options. In general the idea behind these apps is to help automate the process of getting a DXF to a machine that reads them for manufacturing in a more efficient manner. These programs will scan an assembly file and find the sheet metal files on which to perform their routines.

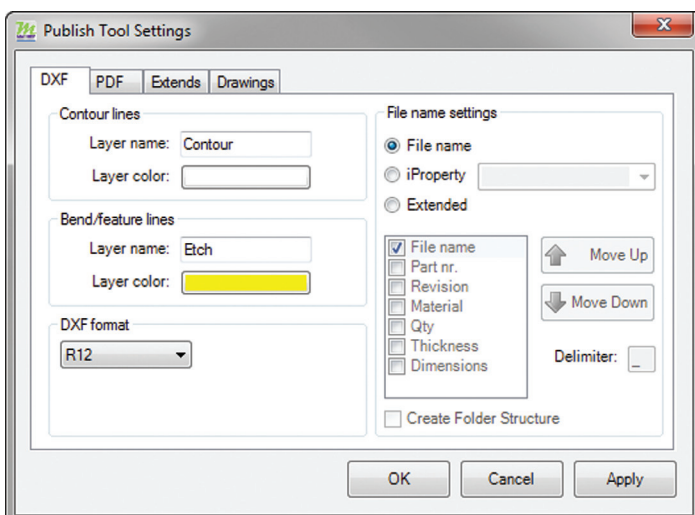
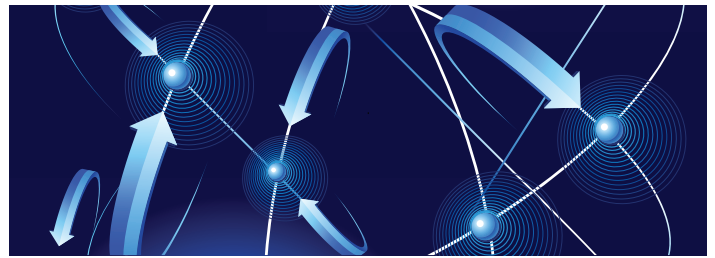


Figure 11

The different variations of this program range from free trials upwards of \$100 for the paid apps. I started with one that gave me



a "lite" version that would do 20 sheet metal files and I liked it so much I started using the full version.

## FEATURE MIGRATOR

The Feature Migrator tool allows Inventor users to more easily create part features from assembly features. User can migrate assembly features either by selecting them in the Feature Migrator browser or by right-clicking on one or several of them and then using the "Send to Parts" commands. Features can also be directly migrated from the regular Inventor model browser using the context menu item added by the add-in.

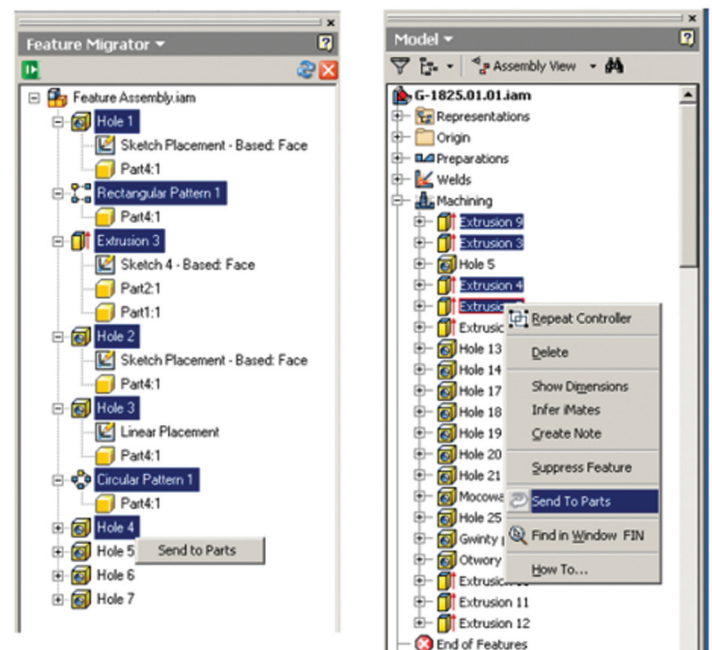


Figure 12

Once the operation of migrating features is completed, the Feature Migrator displays a dialog that provides information about the results. This first dialog is a "high-level" report of the migration. It provides the opportunity for the user to select the action to take for all the assembly features migrated {Suppress if Succeeded, Suppress always, Delete if Succeeded, Delete always or Nothing}; also for the part features that haven't been migrated correctly {Suppress, Delete or Nothing} Features created by the add-in can be in an invalid state in the parts for a number of reasons.

The user can also see when a feature is out of date from the assembly and perform updates from the part side.



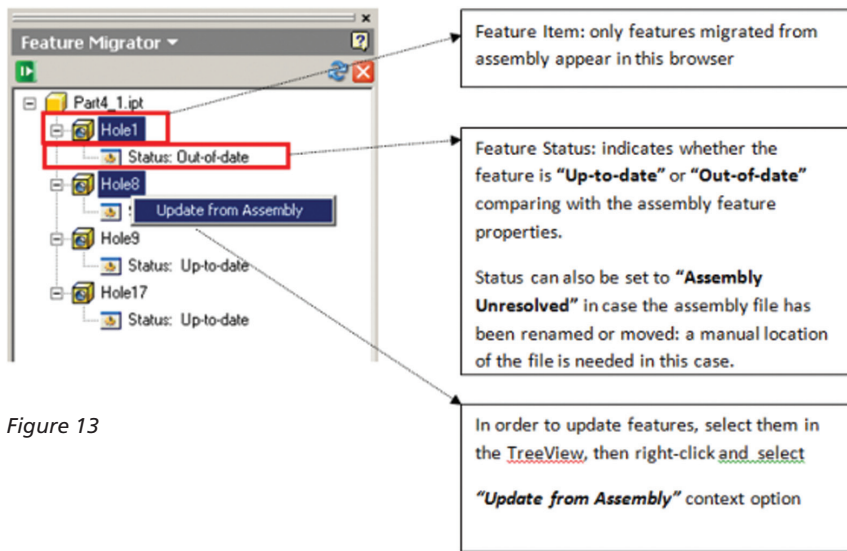


Figure 13

Now this tool presents a bit of a quandary for me. I have always stood by the default mentality of Inventor that you design as you would manufacture. With that being said, sometimes it is just easier to do it in the assembly as a feature there and migrate it down. Other programs do this with relative ease, but I like the fact this add-in makes you think about what you are doing. Some added dialog boxes force you through the process instead of easily making the mistake and then something doesn't line up right during the actual assembly because it a machining operation occurred at the wrong time in production.

## COLLISIONS4INVENTOR

I really like this one. This is what interference analysis should be in Inventor right now. Collisions4Inventor technically only works

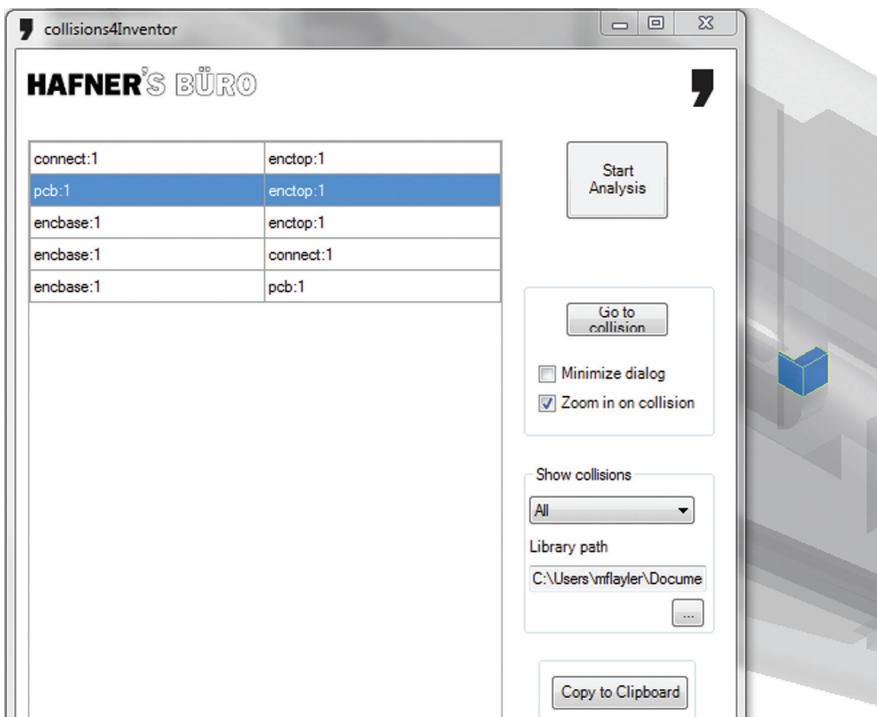


Figure 14

on Inventor 2013, but it installed fine for me in 2014. That little caveat aside, it works extremely slowly, even on small assemblies. The results, however, almost make it worth the wait.

The app will actually isolate interferences between two parts and highlight that area only and ignore the rest of the overlaps. With the current Inventor you have to precisely pre-click which parts or assemblies you would like to analyze.

Now why does it take so long to run the collision detections? Well, this app takes a different approach to finding interferences. It actually uses intersecting surfaces between the two parts and when you go to another collision in the tree, it starts all over again. For this five-piece assembly I had to wait about 20 seconds between collision checks.

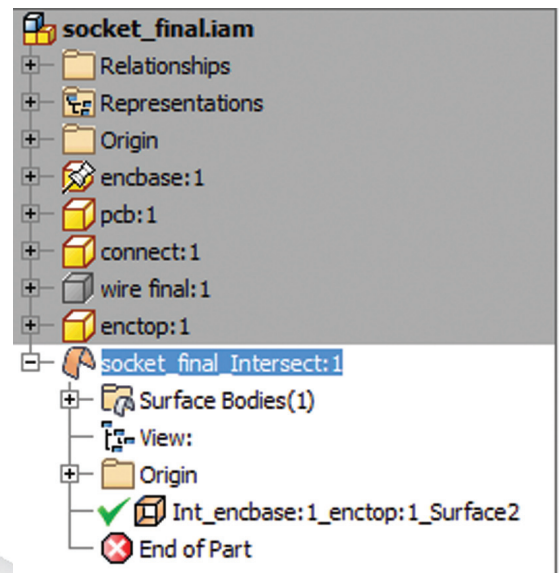


Figure 15

The ability to save it to the Clipboard for quick pasting in emails or documents was a nice touch, too. A big downside for me is that you cannot actually find the price for it until you contact the people who made the app. This is not very marketplace-efficient and perhaps a little telling of what will hit your wallet if you actually want the program.



# Inventor 2014

## TIME STAMP

Time Stamp is an Autodesk Inventor add-in that provides:

- A low-cost, simple-to-use tool that adds plot time information to your prints.
- A plot stamp that does not dirty the Inventor drawing document.
- A simple, dockable user interface that keeps out of the way.

The Time Stamp editor lets you size, position, and orient the stamp relative to the adjacent sheet edges. You can include date, time, and current user information in the stamp. The time stamp only appears on the plot; it does not alter the Inventor drawing.

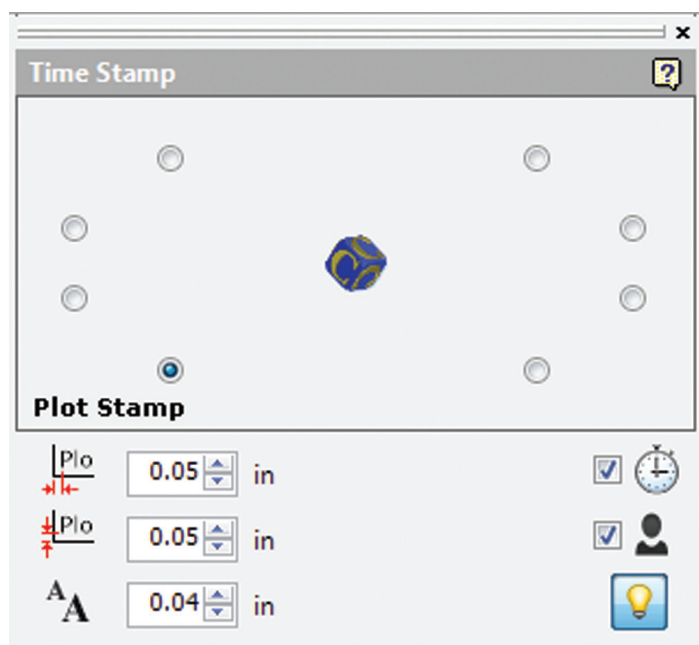


Figure 16

What I really like about this app, even though it costs \$5.00 per license, is that you can find the price yourself and buy it. It does everything it says it does and it provides an easy-to-use interface with an icon that changes based on whether the tool is on or off. If you want even more control over your plot stamping, there is a more professional version offered by this company on their website for about \$40.00 a license, which will allow more reporting fields and more control on the look and location of the stamp.

## SIMPLE SHEET SETTINGS

Simple Sheet Settings combines the existing sheet settings with some new tools such as changing the title block and also the ability to make changes to all sheets in a document at once.

Instead of first deleting the existing title block from a sheet, expanding the title block folder, and inserting the desired title block, then opening another window to change the sheet size and orientation, just click the "Settings" button located on the Sheets panel in the Placed Views tab (right next to "New Sheet"), and have access to all those options in one location.

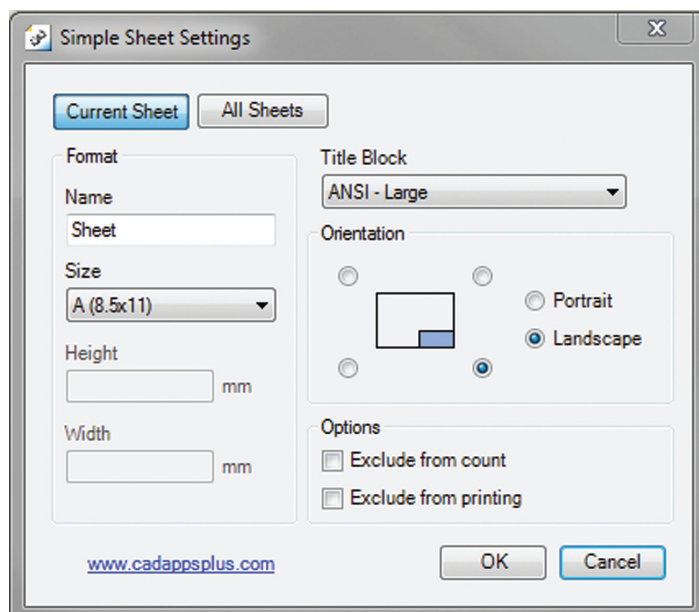


Figure 17

When the Simple Sheet Settings window is loaded, it gathers all of the existing title block names and puts them into one drop-down menu. To change the title block on the current sheet, simply select the desired title block from the drop-down menu and click OK. There is also the ability to change the title block, sheet size, and sheet orientation to all sheets at one time.

This is a great little app that saves clicks and only costs a dollar. Quite useful and no real setup involved.

## INTERACTIVE TUTORIAL

The Create an Interactive Tutorial app provides instructions for creating your own interactive Inventor tutorial. The Guide also includes how to customize the Welcome Screen to display your interactive tutorial and add to the ribbon.

This one definitely falls under the "too much time on your hands" user or CAD admin. After reading through the guide on how to create the interactive tutorials, you find yourself asking the question, "Why don't I just save videos of the process we use in a company server location?" And that is when you uninstall this app as you have realized that while it sounded good to you at first, there are better ways to accomplish the goal of company-specific tutorials and process documentation.





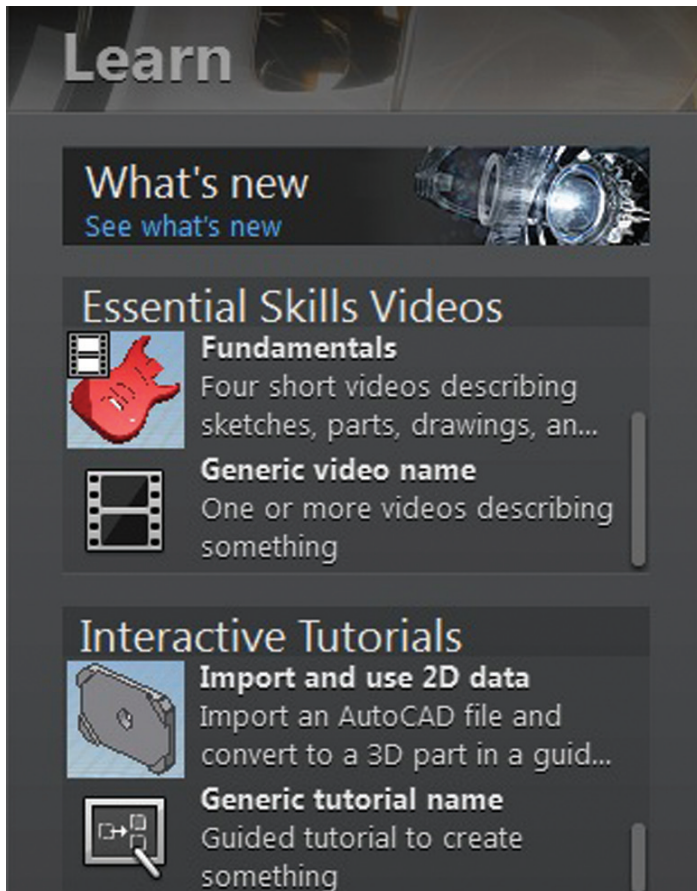


Figure 18

The tools actually rely on too much externally controlled software such as Camtasia and other plug-ins and third-party apps to make it work correctly. Save your time and just use Camtasia from TechSmith to do your bidding.

## KEEPING UP TO DATE

With all these apps, it is easy to understand how a user could get behind on the updates to so many tools. With that in mind, the Exchange Manager found on the Tools tab in Inventor will keep track of that for you and offer assistance not only in updating, but also uninstalling and specialized help for each app.

As a reminder with regard to third-party apps, if you start experiencing undesired effects in Inventor, start turning add-ins

off one by one until you isolate which one is giving you fits. Proper reporting back on the app to the developers makes everyone happier when the issue gets resolved. Thus far, I haven't had near as many issues as I thought I would have.

## ANY MANY MORE!

With 80+ apps currently in the store and about 60 of them ready for 2014 at the time of this article, you should take some time and look through what is available. There are apps which are very niche to the user base as well as those that have you scratching your head over why they are not already part of the core software. Below are some I would write about if I had more room in the article and/or a fatter PayPal wallet.

- + BOM Tools
- + EDM Express
- + Sketch Symbol Library
- + SolidWorks iProperty Import
- + Quick Views
- + 3D Pipe
- + Point Linker
- + KwikTools



Mark Flayler is an application engineer with IMAGINiT Technologies, specializing in manufacturing environments. He has implemented Autodesk manufacturing products within several industries including the blow/injection molding, automotive, and custom machinery markets. When not providing training, support, and implementation, he writes the IMAGINiT Manufacturing Blog and takes an active role in the manufacturing community. Mark is an ATC certified instructor, and is PSE and ATC certified in AutoCAD, AutoCAD Mechanical, AutoCAD Electrical, Autodesk Data Management, and Autodesk Inventor.

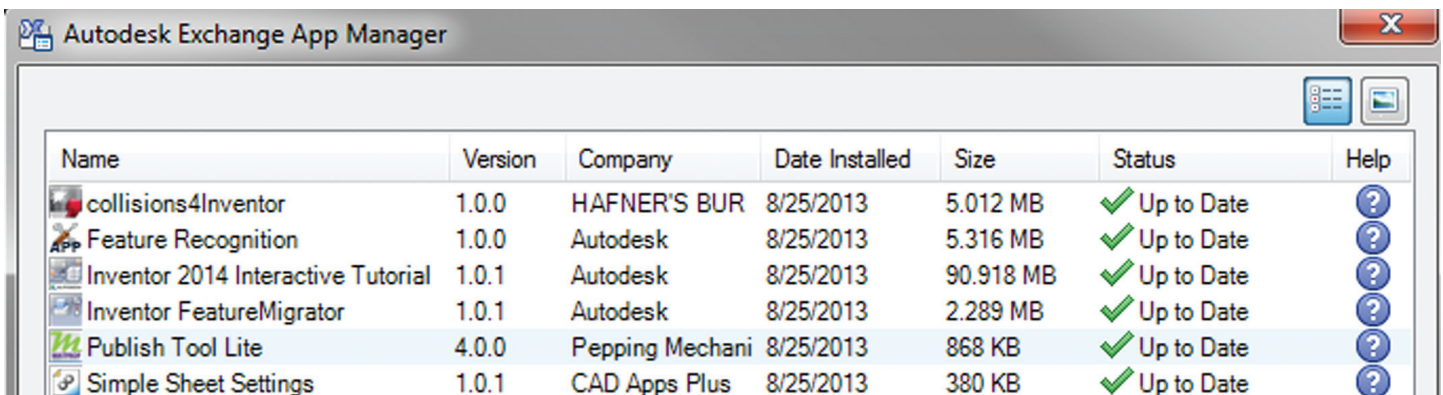


Figure 19



➡ **T**he AUGI Forums are, as always, a busy place. Ask a question, and you might see half a dozen varied methods and workarounds posted in a single thread. If you have not had any questions yourself, I would still like to encourage you to pop into the Forums and see if there are any problems you could solve, especially if you use one of the less adopted products. There will always be many helping hands in the AutoCAD and Revit Forums, but what about the mechanical products or design visualization or structural detailing Forums? Peek in and see if you can share your experiences and wisdom with the community.

I confess that I only scoured the English-speaking Forums for content for this article, but please keep in mind that there are AUGI Forums available in 12 other languages, so users have the option of asking for support in their native tongue.

## AUTOCAD – SYSTEM VARIABLE DISCUSSION

<http://bit.ly/15M1hB9>

This topic started out when a user couldn't delete. The solution was ultimately the PICKFIRST variable, but the discussion evolved to safeguarding other variables automatically, just to protect against a loss of settings in the event of a crash. User **Coloradomrg** offered the safeguard shown in figure 1.

**Norton\_cad** also suggests DIMLFAC, EXPERT and BLIPMODE be added to the list.

## REVIT – UNDERLAY BEHAVIOR EXPLAINED

<http://bit.ly/15M1iFd>

**Mschroeder** opened the discussion with: If you have ever wondered why some walls don't show up in underlays or

show up inconsistently from floor to floor, or why roofs and view ranges affect their behavior, then read on.

*First rule of underlays:* Underlay view extent properties (cut, range, depth) are not user modifiable and not coupled to any other view's properties.

It's also been mentioned "If objects are visible in the view range of your current view, AND in the view range of your Underlay, they are automatically hidden in your underlay, so there isn't a double instance."

Users **twiceroadsfool** and **dbaldacchino** helped clarify the effects by posting sample models and pertinent data from the Autodesk Knowledgebase and Autodesk Support. Visibility, View Range, Detail Level, and Cut Planes are all touched on in this discussion. Need clarity on how to make the most of Underlays? Check into this thread on the Forums.

## LISP – MAKING A DIALOG BOX RETAIN ITS SELECTIONS

<http://bit.ly/15JzMCc>

The LISP Forum always has such fascinating topics it is hard to decide which to highlight. From locking OSNAP options to setting Explode options, along with troubleshooting of existing code. But the discussion surrounding the tutorials and methods

to retain selections in a dialog box was varied and lively, so I had to check it out. **Treaves04413213** even posted a sample .dcl file when he was finished.

**Coloradomrg** 100 Club

Join Date: 2008-07

Location: Colorado Springs, CO

Posts: 116

**Re: My delete key doesn't work in Autocad**

Zach,

If your autocad lost pickfirst during a crash, in my experience it likely lost other variables. I use my acaddoc.lsp to set all pertinent variables due to this happening a few times over the years.

Not all of these have been reset by crashes, but this is what I include in our company acaddoc.lsp.

Code:

```
(setvar "FRAME" 2)
(setvar "IMAGEFRAME" 2)
(setvar "PLINEWID" 0)
(setvar "PLINEGEN" 1)
(setvar "PICKFIRST" 1)
(setvar "ATTREQ" 1)
(setvar "ATTDIA" 1)
(setvar "PEDITACCEPT" 1)
(setvar "ATTIPE" 1)
(setvar "SAVETIME" 10)
```



## AUTOCAD ELECTRICAL – LINES BEING LABELED AS WIRES

<http://bit.ly/1ew9p9D>

**Dinochrome** says that one of his coworkers has reported a problem with regular AutoCAD lines being labeled as wires.

**Crosswire35** advises: Try checking your wire type edit dialog box, and make sure the “make all lines valid wires” check box is unchecked.

And **IMCO** goes on to say: Using the vanilla line command in ACADE will still place that line on a wire layer. Change your lines to layer 0 and ACADE will not give them a wire number.

## AUTOCAD STRUCTURAL DETAILING – TUTORIALS

<http://bit.ly/17kW7cc>

The consensus is that this product is a little confusing to figure out, and that most of the tutorials out there are older. Most products have a few videos floating around on YouTube, but this one does not seem to have too many yet.

**Jpo82** chimes in with: I guess only tutorials for this software are those found at Autodesk website. They are for versions 2010 and 2011 but still valid. <http://usa.autodesk.com/adsk/servlet...12&id=13111928> I’m not sure, but sometimes I feel that the only new feature in ASD 2013 is that it’s more stable than previous releases.

**Lucis29** goes on to say: Also you might check some movies: <http://www.robotoffice.com/asd/> but they are very old.

**Spenner** then linked to his reporting of the Service Pack and issues it addressed, hoping that it addressed some of the issues that came up in this discussion.

## NAVISWORKS – IMPROVE ANIMATION EXPORT QUALITY

<http://bit.ly/1fQLoIv>

Different methods are discussed, from exporting individual image frames to exporting a video (and how long), but I will leave you with the following list from **Revit For Breakfast**.

Here are the secrets to movies in Navisworks:

1. Don’t use materials – you make your render time much longer.
2. Use the PNG export option 15fps.
3. Make your video export twice as long as you need. Then speed it up for a faux 30fps. This is faster.
4. Look up the Navisworks blog by Lee Mullin and Paul Walker about gooch and phong. There is your faux render setting.
5. If you have NW 2012, you won’t have gooch or phong, but you will have better export options. 2013 has gooch and Phong but fewer export options.
6. The flickering occurs when multiple shapes overlap. If you care, delete them in your export model. Sometimes flickering occurs

October 2013

in the generation of your frames on the PNG export. You may have a frame that is “off.”

7. Set your anti-aliasing to 4x or better on the png export.
8. Check out my old post: <http://forums.augi.com/showthread.php?p=132209-Animation-Resolution&p=1138298&viewfull=1#post1138298>.

## CAD MANAGEMENT – NETWORK DRIVE CHANGED BY IT WITHOUT WARNING

<http://bit.ly/18J4k9c>

**Blackbox** advises edinsmore595165 straight off to utilize the Reference Manager program that comes with AutoCAD in order to reconnect all of the external reference paths that were broken when the IT department upgraded their archaic servers. He further points out that moving from hard pathing to relative pathing would make things easier in the future.

**Feargt** offers another twist: Another option which would work on a need only basis when you open the specific drawing. Change XREF and Image paths in drawing to Network path through script on a need only basis. Basically this will only change paths Place this line in a acadoc.lsp file

(command “script” “\\yourserver and path\XREFREDIRECT.scr”)

and the following in a script file

REDIR

B: ;enter name of path to be replaced

P: ;enter new path

There was also a debate in this thread about obstacles and benefits of user-managed and IT-managed drive mapping.



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## OTHER HOT TOPICS?

Have you found a Forum solution so mind-bogglingly useful that you leapt out of your chair with a whooping cheer (or were at least tempted to)? Please, let me know. A single person cannot read every post in our bustling AUGI Forums, so if you would like to see a thread highlighted in a future edition of String Theory, feel free to let me know. Send me, **Wanderer**, a PM in the Forums, or send an email to [Melanie.Perry@augi.com](mailto:Melanie.Perry@augi.com).

See you on the Forums!

# MYTH BUSTER: REVIT & IFC, PART 3

I've given a lot of thought as to how this trilogy of articles should end. At first I thought I'd use the Coordination View 2.0 EXPRESS-G WallPaper for IFC2x3 ([http://www.mdr-advies.nl/wp-content/uploads/CoordinationView\\_V2-0\\_WallPaper\\_IFC2X3\\_Version-1.pdf](http://www.mdr-advies.nl/wp-content/uploads/CoordinationView_V2-0_WallPaper_IFC2X3_Version-1.pdf)) as a stepping stone, to give an "IFC for Dummies" type of solution. But that turned out to be quite lengthy and rather boring. But the link is included above for obvious reasons—it's useful!

So I went back a little and asked myself, "Why IFC?" And with that question, the inevitable follow-up immediately appeared: "Why *not* IFC?" I realized that in the previous articles I failed to explain why, in my humble opinion, we should care about this somewhat crooked, badly implemented, severe headache-inducing format. Therefore, instead of explaining the fundamental technicalities of IFC that can be explored in other places, this final installment will explore the Why versus Why Not IFC discussion and begin with the latter.

## WHY NOT IFC?

*When everybody uses Autodesk® Revit®*

Well, in this case it's a no-brainer. Share your Revit files. Period.

### *Loss of data*

This is an easier way to share data, instead of hacking your way through IFC and praying your stuff doesn't get lost in the process. Even when you manage to export your geometry through IFC, there's always loss of data.

### *Loss of intelligence during import*

Even if you only need to send over geometry, not data, importing that into Revit makes it utterly useless. All constraints are lost, component parametrics are gone, and so on.

### *Availability of bidirectional links*

When not everyone uses Revit on a given project (which is quite often when you're not located in the U.S.), why not simply use a bidirectional linking between proprietary software standards? This can be easier and better to control.



## WHY IFC?

Which may be asked as: why would you want to use IFC? Or more accurately, why would you want that option available?

Consider what Sir Arthur Conan Doyle wrote: “Once you eliminate the impossible, whatever remains, no matter how improbable, must be the truth.”

Let’s put that to the test, shall we?

### *When everybody uses Revit*

Okay, simple math: Autodesk has around 7,000 employees. The world has about 7.2 billion people. What are the chances someone not working for Autodesk has a brilliant idea and creates the software you need tomorrow? There will always be better solutions. They might not be viable for you overall, but there’s no reason to shut down access to them. Revit is a wonderful generic tool for which I see a brilliant future with all kinds of additions for specific niche-markets like AutoCAD has.

What about today? DDS is MEP-engineering software that can do energy calculations (not simulations!) inside your model. Rhino lets you model things on the fly that could (arguably) take ages in Revit—if you ever get them done. Tekla lays waste to the Revit structural rebar functionality any day of the week, without breaking a sweat. Solibri is a wonderful solution for clash detection and, most importantly, rule-based model checking and reporting—something Revit (or Navisworks) doesn’t do.

Should I go on?

Only problem for all this magnificent software: It’s either based on the IFC format or requires model exchange through IFC.

The fact of the matter is there will always be better software. Any one may be the software for you, but that doesn’t mean your partners, associates, etc. need to have the choice to use it forced upon them.

### *Loss of data*

On July 1, 2013, there was an extra release for Autodesk software. The Sourceforge Open Source IFC Exporter released a new version that incorporated the option to map custom Revit parameters (shared or non-shared, family or project, even calculated values) to their IFC counterparts.

On September 28, 2013, I had the honor of showing the second step in a complete and controllable data export from Revit.

During my RTC Europe class, I showed the new option to create a custom IFC Property Set and map any given Revit parameter into IFC, fully customizable.

IFC does not automatically lead to loss of data. That idea is simply not true. Incomplete implementation in Revit does lead to loss of data. As of now, you are able to put any piece of data into an IFC, even calculated values. And we didn’t change the IFC format. We just improved implementation in Revit.

October 2013

### *Loss of intelligence during import*

“Just because something hasn’t happened yet doesn’t mean it’s impossible.”

I don’t know who originally had this insight and I doubt it to be the movie line I remember, but it is true.

In the same RTC Europe class I showed a native Revit family being exported to IFC, altered, and re-imported—while keeping all parametric constraints and even adjusting to the alterations made directly in the IFC file. It is possible, but not with the current importer.

### *Availability of bidirectional links*

I’ve been using Revit for almost 10 years now. For 4-5 years I didn’t know about IFC at all. Before a year ago this was my strongest argument against IFC: Why would you need a generic “language,” with all its limitations (of which there are), weaker implementation and use of parametric capabilities (because it has) and lag-times in development (by nature)?

IFC will never be able to do what native software does, simply because it’s responsive in nature. Development budgets are a fraction of what Autodesk, Trimble, or Nemetschek get to spend on their software.

So why not keep it simple and use a bidirectional link? Revit has it with a lot of other Autodesk software and third-party applications.

But how long have we waited for them? And are they even truly bidirectional? Do they exactly do what you want them to do? In my humble opinion the answer to these questions is not very inspiring. Even bidirectional links tend to have major limitations and severe constraints in flexibility. And most important: The link itself is also propriety software. No way of adjusting it to your needs.

## WHAT IF MORE PEOPLE STOPPED TALKING ABOUT IT AND JUST GOT INVOLVED?

### *The improbable*

First off, it’s a matter of simple logic. As Sir Arthur suggested, if we can successfully check off all likely options to NOT want to use IFC, doesn’t that mean the improbable is true? That IFC is in fact a valuable tool in our toolkit and we should be able to use it when necessary?

Mind you, I’m not saying you should use IFC. If you’re on a Revit-only project, it would be insane. Just send and receive RVTs. The fact is this will only be viable for limited parts of the building lifecycle. If you’re lucky, the entire design team is on Revit. But manufacturers have other software; facility managers, too.

As for the design team, what if the best structural engineer is not [on Revit], or the MEP guy that has loads of experience in similar projects? Would you settle for second-best just because someone uses the same brand of tools you do? I wouldn’t.

**IT'S THE "I" THAT MATTERS. IF WE'RE COLLABORATING, THE INFORMATION IS MOST ALL I CARE ABOUT. I JUST WANT YOUR DATA—IN THE LEANEST, SMARTEST, AND MOST EFFECTIVE WAY POSSIBLE.**

### *Open Access*

Which brings us to the biggest advantage of IFC (or any open format): it's open! Which means it's adjustable to your needs. Now don't go "that's too difficult / expensive." That's bullocks.

The first external enhancement to the Open Source Exporter was created by Tom Pesman, a self-employed API specialist.

### *Parametric IFC?*

Implemented by Jon Mirtschin, also self-employed, IFC parametrics is available. Agreed, Jon is a well-known IFC guru but still, the point holds.

### *Custom property sets and parameters?*

Wim Tas, owner of a small MEP engineering firm, has added functionalities toward this end and he's not even a true API specialist.

All these developments were done for free by altruistic, volunteer efforts as part of the creation of the Dutch Revit Standards. And, of course, with the invaluable help of the Autodesk Open Source IFC Exporter team, Angel Velez in particular.

But what if these guys actually got paid? What if this project wasn't a Saturday night side-job? What if more people stopped talking about it and just got involved—either by themselves or by leveraging experts to get what is needed? The entire IFC format is Open Source, the source code is out there, which basically means you can do whatever you want and create whatever you need—even on a project-by-project basis.

## **BIM: IT'S THE "I" THAT MATTERS**

In my humble opinion the entire debate on BIM is focusing on the wrong part of the acronym. I don't care if "Building" is a noun or a verb. Nor do I care whether it's "Model" or "Modeling," nor am I commenting on whether one should say "BIM Model."

It's the "I" that matters. If we're collaborating, the Information is most all I care about. I just want your data—in the leanest, smartest, and most effective way possible.

A Revit model will do, conversely a lot of times. A Revit model will give me heaps of data I don't want, geometry I don't care about, and a file format I can't use. Now we can all keep on being really anal about it or we can simply use the tools available to us, one of them being IFC.

## **A FINAL NOTE**

As stated at the beginning of the article, I really enjoyed writing this series and for now, this is the last of the series. But if you're interested in more tips and tricks on IFC, let me know. I might be able to persuade the guys at AUGI to let me write about it again. Lord knows there is still a lot to talk about regarding IFC.



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# 3ds Max Essentials: Customizing the UI



## SUMMARY: WHAT'S CUSTOMIZABLE IN MAX (HIGH LEVEL)

When it comes to the customizability of Autodesk 3ds Max®, it's no secret that it can morph itself into whatever you want the program to become.

Whether you're a modeler, animator, lighter, rigger, generalist, or technical artist, 3ds Max can become your own personalized tool box that is an extension of your own hand in your daily work. You can now combine different command types (such as creating objects and object modifiers) into a single menu, reducing the mouse travel and improving efficiency.

In this article, we're going to take a closer look at one specific aspect of customization with 3ds Max, the new enhanced UI. As part of this article, besides taking a deep dive into the operation of this feature, I will also be showing how I created the "Mograph"

tools UI that includes custom buttons and icons. At the end of this article I will also provide a link to this UI so you can use it, customize it yourself, or share it with others.

## ENHANCED UI SUMMARY

### What is the Enhanced UI?

The Enhanced UI is a new graphical user interface system that does two main things.

- 1) It provides a refreshed 3ds Max user interface with updated tool categories and new clusters of pre-existing tools in groupings that are more akin to their intended purpose as opposed to some technical requirement for menu placement.
- 2) It provides a way to allow you, the end user, to customize the menu system in almost any way you choose. The drop-down menus are "tear-able" (not to be confused with "terrible"... but I digress) and the resulting configurations are savable either by scene or as



a preset. They are also distributable and deployable so they can be shared with others.

### Where is the Enhanced UI?

The Enhanced UI can be found in the upper left hand corner of the main UI at the very top of the screen. There is a drop-down menu that says “Workspace: Default” This default is the same baseline UI that ships with all 3ds Max installs (Figure 1).

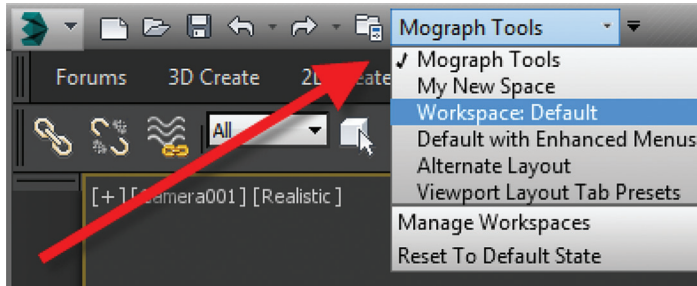


Figure 1: Workspaces are in the Workspace drop-down menu

Within the drop-down, you can find the “Default with Enhanced Menus.” This is the alternative default menu system that you can use on its own or use as a starting point to create your own customized menus.

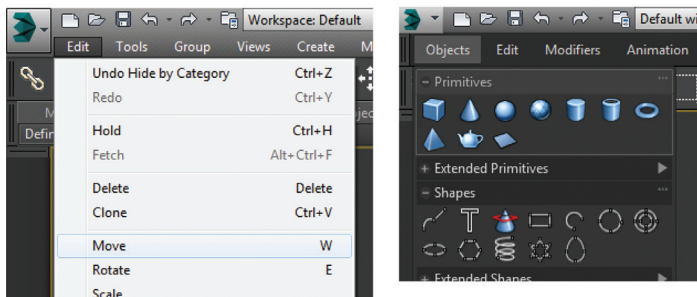


Figure 2: Default UI (left) and the Default Enhanced UI (right)

## BASIC DEFAULT CUSTOMIZATION

### Enhanced UI Customization Basics

Now that we’ve enabled the Enhanced UI, how can we change it?

*STOP! Before you begin mucking around with the UI, It’s important to understand what I call the “save-logic” as it pertains to custom UIs.*

### The UI Save Logic

If you plan on saving this UI for future use, there is a specific method you must follow to properly save the UI you want and not wreck the default Enhanced UI.

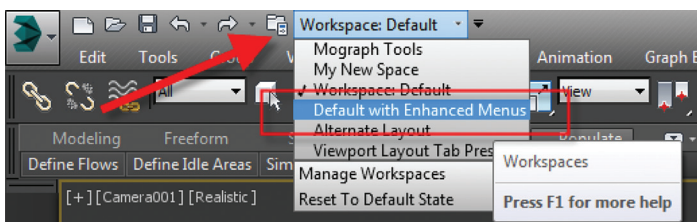


Figure 3: Turning on the Enhanced Default UI

The Save Logic is as follows. It’s simple but important.

Step 1: Turn on Enhanced Default UI (Figure 3).

Step 2: Click “Save as New Workspace” FIRST. At this point you will be prompted for a new name (Figure 4).

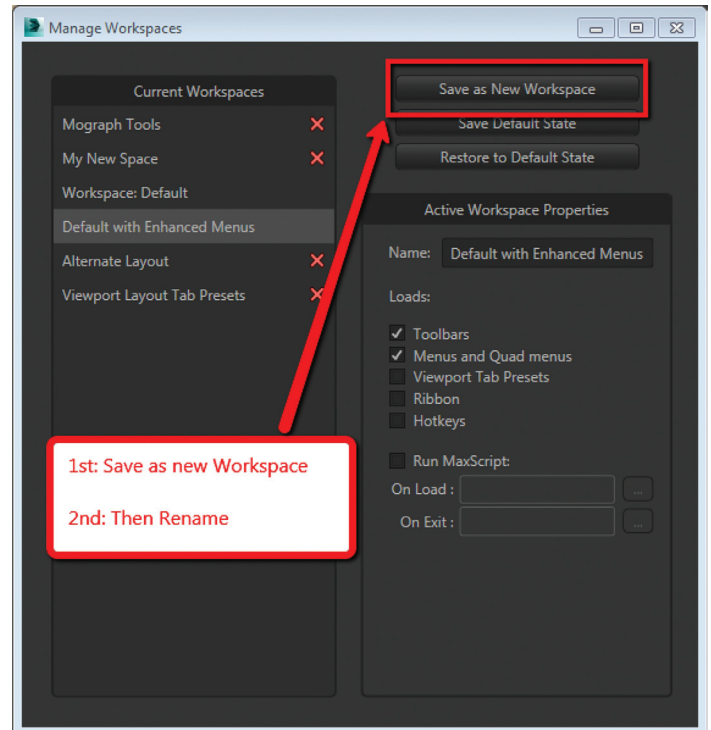


Figure 4: Saving the New UI Workspace

Step 3: Edit and change the UI at will.

*NOTE: All future edits are “automatically remembered” as you go. (I intentionally did not use the word “save.”)*

Step 4: The “save as default state” button is important. When we have completed the customization process, we then choose this button to “lock” in the changes. This is different than Saving a UI with a custom name.

*HOT TIP: “But this methodology seems backward.”*

*I can see how you’d say that, but remember that any changes you make to any enhanced UI are automatically “remembered.” If you create a custom UI, then while working you make some temporary changes when doing something specific, those little changes are automatically remembered. If you want to return to the default state [of your customized UI], you select “Reset to default state.” This does NOT bring back the default Max UI; rather, it brings back the customized UI you created in “locked” in Step 4.*

Okay, now that you have the save logic down, let’s begin customizing.

- 1) If you haven’t done so already, turn on the Default Enhanced UI.
- 2) Go to “Manage workspaces” from the drop-down and in the

# 3ds Max 2014

Manage workspaces dialog choose “Save as new Workspace.” Give it a specific name.

3) Begin making your desired changes.

Since a custom UI is specific to any one individual, let’s take a look at what types of customizations can be made.

## Simple Changes

One of the simplest things to do is peel off any command group (see Figure 5). Just click the group title bar and drag. The command group becomes a floating dialog box. Now just because you’ve peeled it off does not mean that you’ve removed it from the drop-down menu. The “original” command group remains in the drop-down. You can just close the floating dialog when you’re done with it.

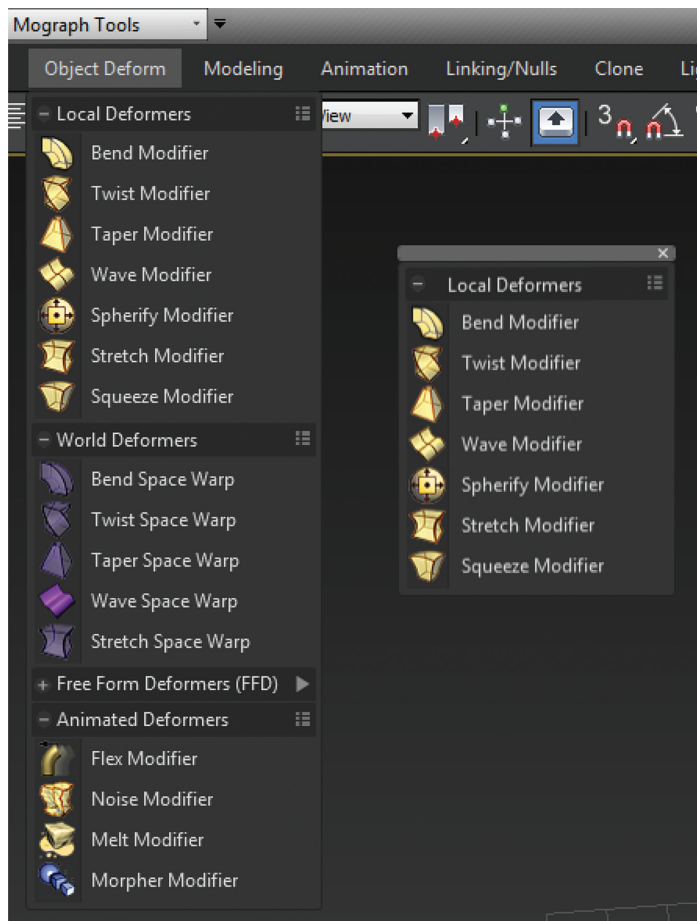


Figure 5: A floating menu that has been torn off the drop-down menu

Probably the simplest thing you can do is reorganize the menus. In each drop-down menu appears a group of commands. You may notice that some command groups are icons and some are words (Figure 6). To change the appearance of the commands there is a small icon in the upper right corner of each group of commands (Figure 7).



Figure 6: The different display states of the menus

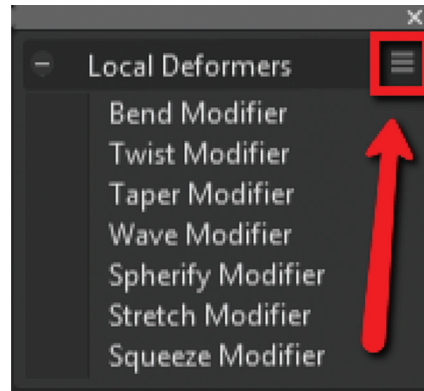


Figure 7: Changing menu layouts

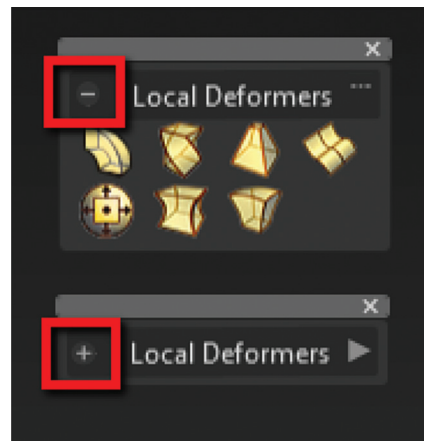


Figure 8: Rollouts

The next change is also really simple: Is the command group open (expanded) or closed (rolled up)? Just click on the plus or minus sign in the upper left corner to set this state for the next time you launch 3ds Max (Figure 8). Remember, these settings are saved as you go, so whether it is open or closed is your choice, but the state the menu is in when you close Max is the one that is remembered the next time Max opens.

What about Saving the Default state? More on this later.

Once you have a floating menu, you can combine different command groups by dragging any other command group to any other floating dialog

that you’ve created. This makes for easy creation of custom dialogs based on specific tasks. Figure 9 shows a command group for character animation.





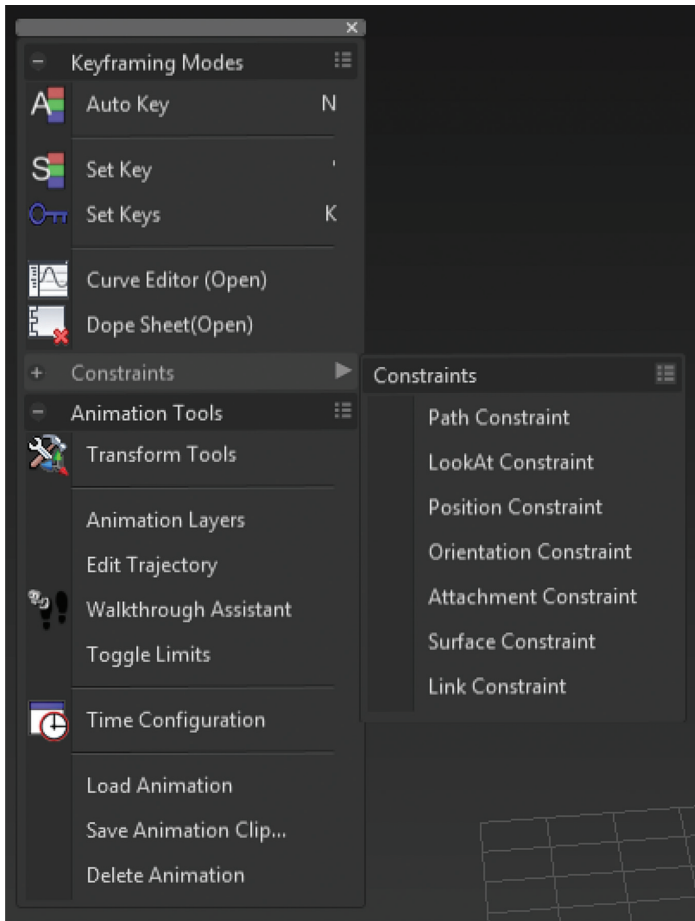


Figure 9: Multiple command groups in one menu

## ADVANCED CUSTOMIZATION

What about completely custom interfaces? Here's how we do that with the Enhanced UI menu system.

The following is the high-level overview of the process. We'll then unpack each step in more detail.

If you haven't read the section on Basic default customization, please do so before continuing. Before starting this phase of creating your new UI, you should have saved your new UI state. That process is explained in the previous section.

- 1) Create a main drop-down menu (like "My Tools").
- 2) Create a tools category menu into which you will place your tools (a submenu such as "Modeling Tools" or "Animation Tools"). Drop-downs can have more than one subcategory.
- 3) Add commands to various submenus.
- 4) Clean up the UI by creating custom names, adding separators, or creating custom icons.

First let's create a new menu for the menu bar. This is done easily from the Customize>Customize [Rollout]>Customize User Interface dialog box.

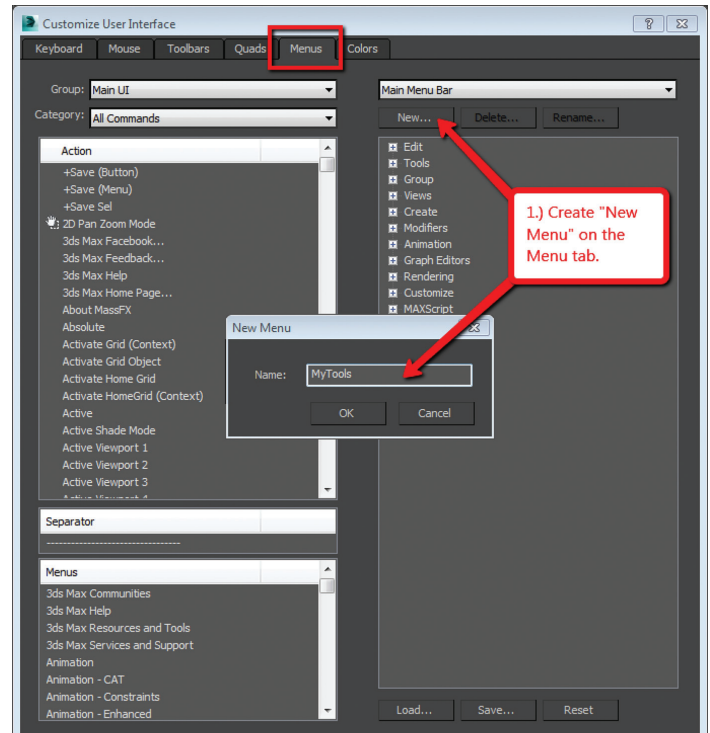


Figure 10 – Creating a new drop down menu

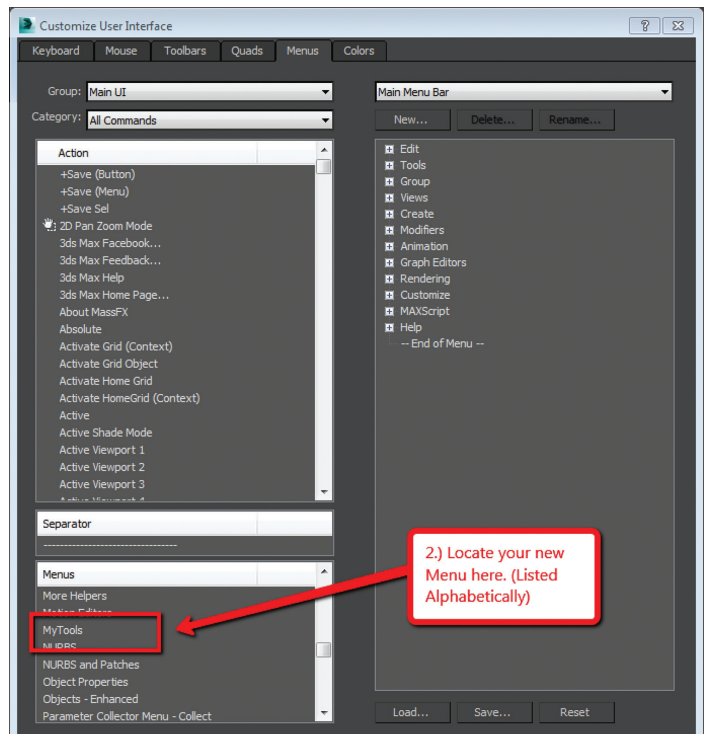


Figure 11: Location of new menu

Steps for Creating a Drop-Down Menu:

- 1) Create a New Menu and give it a name (see Figure 10).
- 2) Locate your new menu in the Menu window. It will be listed alphabetically (Figure 11).

# 3ds Max 2014

3) Drag your newly created menu category over to the column on the right. This will add your new drop-down menu to the interface immediately and you can begin populating it with menu items (see Figure 12).

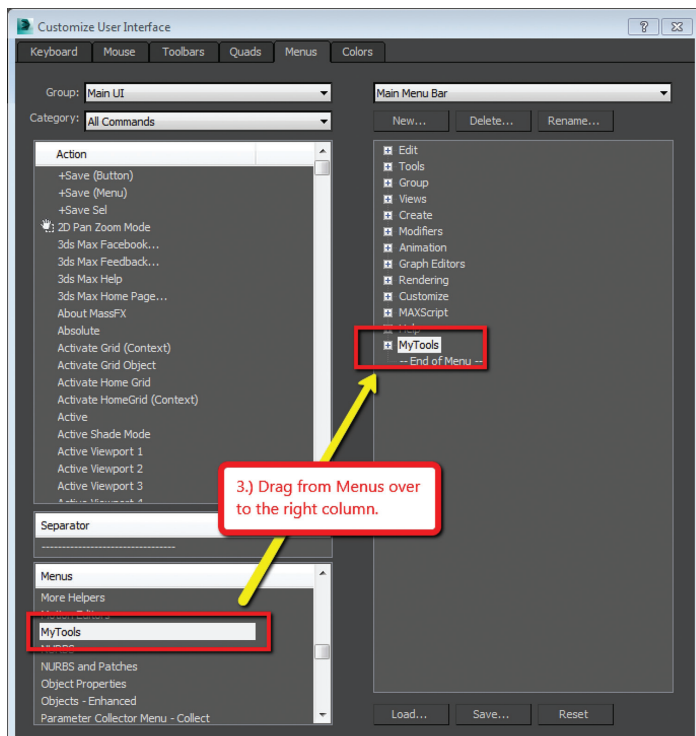


Figure 12: Adding the new menu to the UI

**UI DESIGN TIP:** The actual menu name and display name can be different. I used a custom menu name behind the scenes so I could easily differentiate my menus from the ones created by default or other tool companies. After you create a menu and add it to the right column, you can right-click on it and change its display name (see Figure 13).

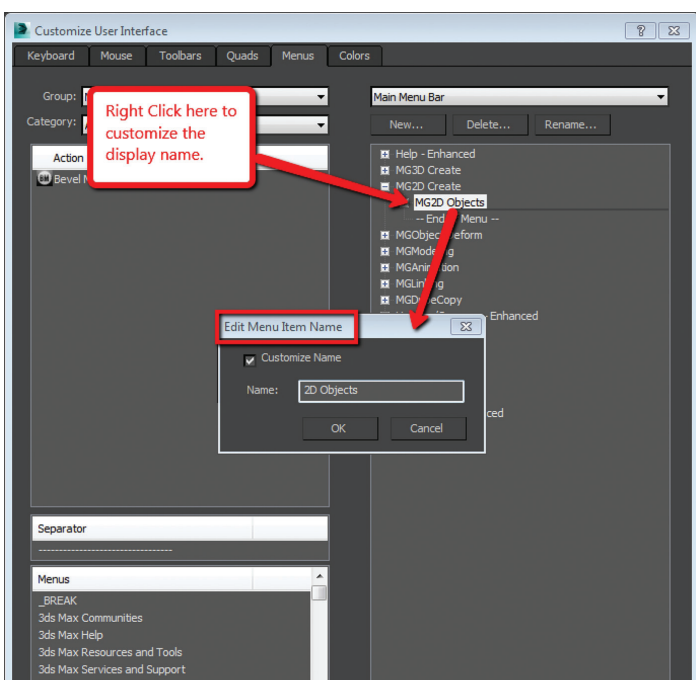


Figure 13: Custom menu names

Next, let's create a command group.

- 1) Just like in Step 1 from the previous section, create a new menu.
- 2) This time, before you drag it to the right column, click the plus sign next to your drop-down menu item to expand it. Then drag the new item to the right column dropping it "under" the menu name.

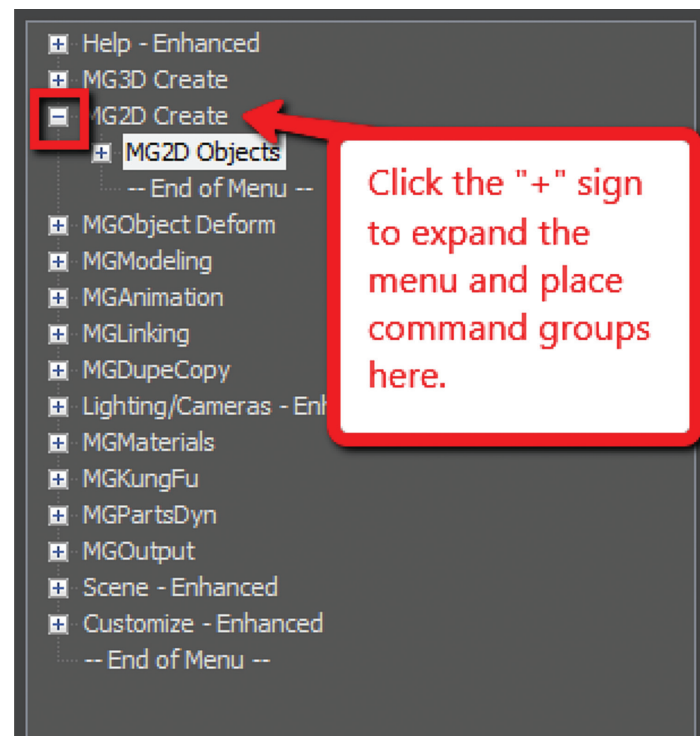


Figure 14: Creating a command group

- 3) Drag any commands from the Commands window on the left to the submenu on the right (see Figure 15).

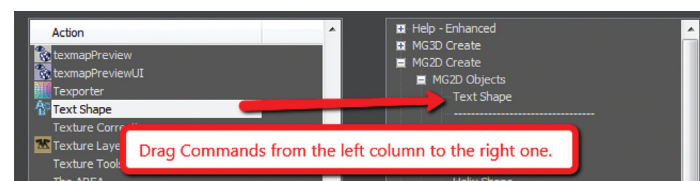


Figure 15: Dragging commands onto the menu

Here's an example from my Mograph Tools workspace that shows how a completed menu looks once it is created (Figure 16). In the following figure, you see both the menu as it appears in the Customize UI dialog and the actual menu (which has been peeled off).

Notice that some of the commands on the menu are greyed out. That's because this new menu combines both "Object create" commands and "Object Modify Commands" in one menu! They will remain grey until you create an object on which they will be used.



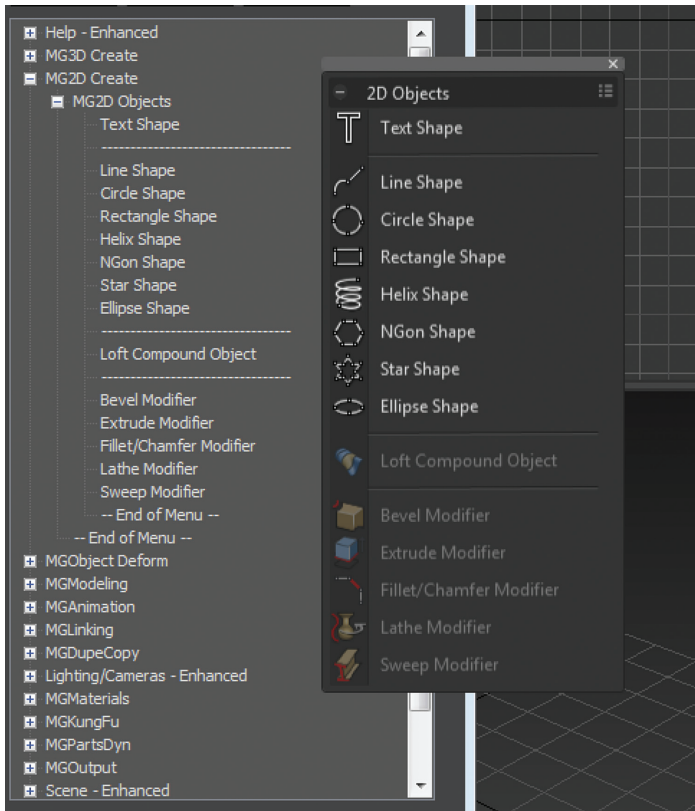


Figure 16: The completed menu

### Adding Separators

Separating commands is easy and is recommended to help you or your intended user make sense of how the tools are arranged in the menu. Creating a separator is as easy as dragging one over the right column, just like a menu or command.

**HOT TIP:** “Why do I need to create another menu? Why can’t I add tools right to my menu?”

The main reason is that adding a submenu gives you the ability to tear off the submenu. If it weren’t in a submenu, it wouldn’t be tear-able. So it’s really a “best practices” kind of thing. But even if you try to not add the submenu, it will happen automatically. It’s important to do it

explicitly so you are aware of what submenus are in the menu and that you are the one in control of what command is going where.

### CUSTOM ICONS

No custom UI is complete without a custom set of icons. Additionally, not all commands in 3ds Max have their own icon yet. But it’s important to realize that regardless of how you set up your UI, you’re still working within the framework of an existing application and there are boundaries to what you can edit and create. Icons have specific requirements both in their creation (size), location, and file name that must be adhered to in order for them to work properly.

#### Size/format

The size of icon is pretty simple. It must be 32x32 pixels and .PNG format.

#### Location

The location is very specific. New icons must be added to this location:

C:\Program Files\Autodesk\3ds Max 2014\UI\_In\Resources\Dark\Icons\Main

The new icons I created for the Mograph UI are shown in Figure 17).

#### Icon File Name

If you’re still with me at this point, we are now getting into the nether regions of customizing a UI. This is where things get a little tricky, but it’s really not too bad. File names are specific and are generated by the application (3ds Max).

So let’s begin. First, identify the command for which you want an icon—usually it’s one that doesn’t already have an icon. But if it does, and you’re changing it, MAKE A BACK UP of the original icon .PNG file. This is because, as previously stated, you don’t have control over the file name. That means if you’re creating your own icon, you need to overwrite the existing one and use its name for your new icon. So back up any original icons.

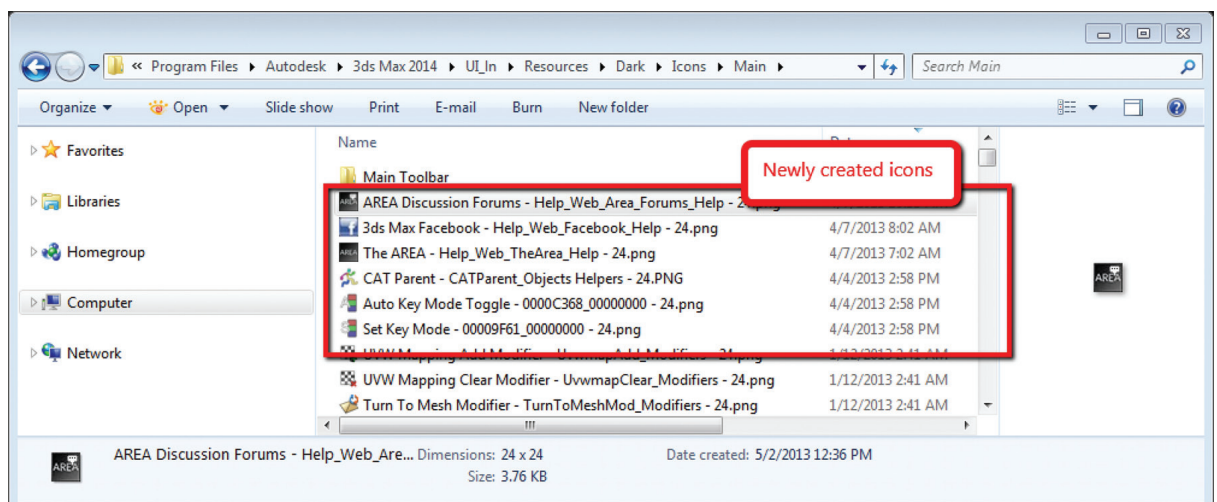


Figure 17 – The created icons

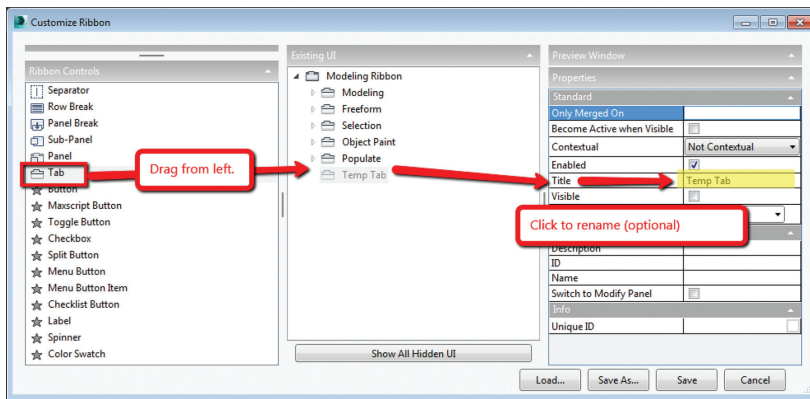


Figure 18: Creating a tab on the ribbon

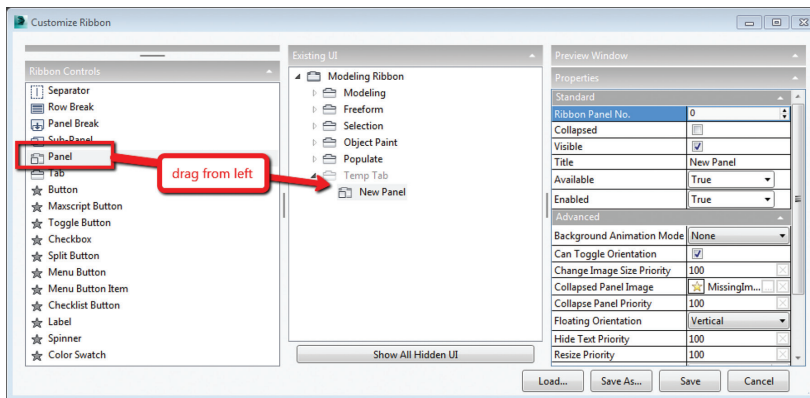


Figure 19: Adding a panel to the tab

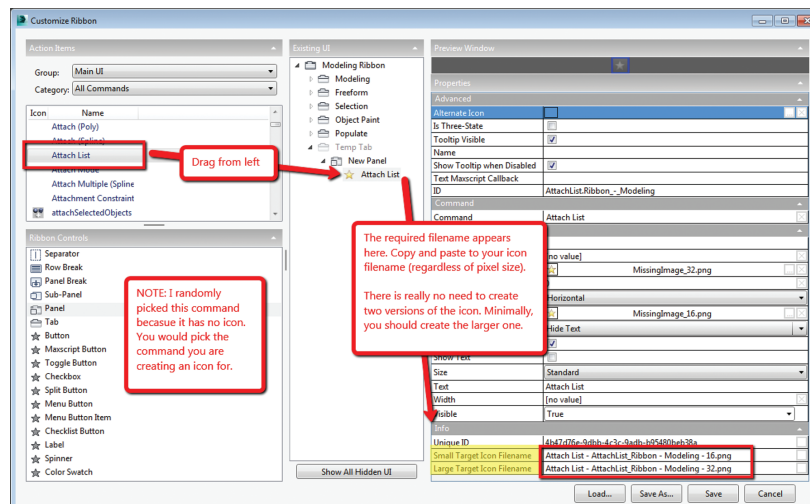


Figure 20: Finding the required file name

It really doesn't matter whether you make the icon first or not. To find the name you need to use you need to navigate as follows.

**NOTE:** You're about to edit the ribbon. There is no need to save these changes as we are merely extracting information from it. But if you're doing a lot of custom icon work, you may want to save this change to the ribbon so you can come back and continue your work in later sessions without have to recreate this every time just to get the proper file name. Saving this ribbon is not related to saving your default state of your UI. When you're done creating all your UI icons, you can just delete



whatever changes you make to the ribbon.

- 1) Open the "Customize Ribbon" dialog box.
- 2) Create a new "tab" by dragging it onto the "Existing UI" column in the middle (see Figure 18).
- 3) Using the same drag method, add a new "panel" to the temp tab (Figure 19).
- 4) Now you can get the information you need. Find the command for which you are creating an icon and drag it to the panel.
- 5) Locate the "info" portion of the "Preview Window" column. At the bottom of the column is the file name needed to have the icon used properly by the application (Figure 20).

## CONCLUSION

So now you know how to create a custom UI scheme for 3ds Max 2014 and up. By using the Enhanced UI menu system, it's really easy to generate a multitude of workspaces that allow Max to work the way you want to work.

The example used in this article was the "Mograph" UI that I created for NAB 2013. If you would like to download and install it, you can get it from my "Pinning the Stack" blog on the Area here:

<http://area.autodesk.com/blogs/chrismurray>

Enjoy!



Chris Murray works for Autodesk Media & Entertainment. He is trained as an animator (3D variety) but considers himself a creative technologist. His daily role is a technical "evangelist" for Autodesk creating marketing deliverables for 3ds Max. He is the author of Mastering 3D Studio Max. He has a Masters in Fine Arts (MFA) in Computer Animation from Miami International University of Art and Design. Follow him on Twitter: @chrismurray





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# BIM Is What's Driving the Industry

For the past decade, many would argue that building information modeling (BIM) has metastasized aggressively throughout the AEC industry, but what does BIM really mean? More importantly, what does it do for us and for our industry? Ask someone who has been in this industry for more than 25 years or those nearing retirement and you'll find that less than half see its value, much less care to make the effort with its implementation. These questions mean something different for those who have been in the industry the past 10-15 years. Recent college graduates,

however, with their tech-savvy capacity and high expectations, are eager to implement anything that resembles cutting-edge, flashy technology. Typically, they are the ones most receptive, if not adamant about, putting their talents to use through BIM.

I recently gave a BIM presentation, with an emphasis on mechanical systems, to the summer interns and new hires at our company—all were non-BIM users except for one—but my presentation did little justice to BIM. Half of my audience had found a cure for their insomnia when they realized this wasn't the latest edition of "Call of Duty." That was no



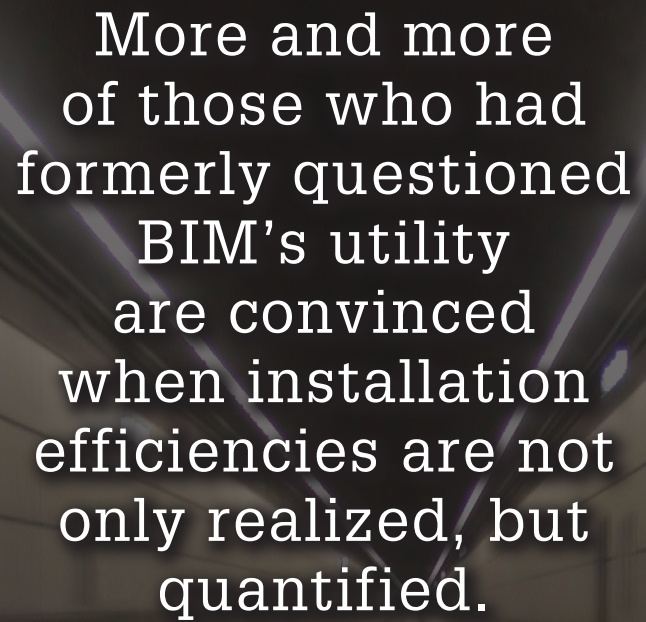
reflection on BIM by any measure. Simply put, I fell short of connecting with a potentially captive audience, eager to know what really makes BIM intriguing or how it would give them an edge in the industry. I didn't think to look past presenting the facts of its processes and benefits. To simply have stated that proficiency in any of its many facets will promote a lucrative career, would give those still awake the impetus to jump ship. In hindsight, the first step I should have taken to begin this presentation was to ask what they wanted to get out of BIM.

If you think it's hard conveying the value and splendor of BIM to receptive and impressionable young minds, try to convince the weathered veterans, dead-set in their "old tricks." For every experienced veteran who has converted to BIM, there are two "old dogs" that can't shake "the good ol' days when we used vellum and light tables." Guess what—an increasing amount of naysayers are starting to come around, including those who say they've been burned by BIM in the past. They are seeing the simple solutions BIM presents and how these solutions translate into cost savings. More and more of those who had formerly questioned BIM's utility are convinced when installation efficiencies are not only realized, but quantified.

Another factor in the evolution of BIM is its tendency to expand faster than the pace of its general population of users. Those of us proud to be catching up to what we think is cutting edge quickly realize it was just another false sense of accomplishment as BIM's web continues to grow exponentially. The solution is rather simple: Focus on what you can handle and always have the presence of mind, and sense of caution, to avoid being overwhelmed by the wake of BIM's progress. There's plenty of money to be made and countless facets to explore as long we have the following mentality: We live in the information age and those willing to share knowledge will reap the rewards of communal synergy.

On the opposite end of the spectrum you might find our industry's opportunists. In a hurried frenzy to claim their spot in the intellectual property queue, these opportunists get carried away with pioneering what they assume is the latest improvements to BIM. Instead of stopping to absorb and develop the benefits of 4D, 5D, 6D, and so on, the pioneers are spreading these "Ds" thin with abandon, further expanding the gap between quality and quantity. None of this is to say that we're heading in the wrong direction. On the contrary, let's call it more of a positive economic problem—the demand for BIM expertise and development outweighs the supply of available users.

Fortunately, as collegiate curricula catch on to this industry trend, the point of equilibrium will soon follow. For as long as I can remember, respective companies' 2D CAD departments have been a significant source as the breeding ground for potential BIM users. While this route hasn't changed, regarding the career path of a draftsman, the source pool has expanded to include architects, engineers, and construc-



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tion managers, just to name a few. It's even hard not to notice its stark demand when BIM and Revit courses are being increasingly offered at local community colleges. I knew then that you didn't necessarily need an undergraduate degree, back when I got my foot in the door of this industry. This probably won't hold true in the coming years. Still, the privileged few who are already a part of this industry subset can rely on their experience in this fast-paced market to continue to propel their careers forward ever faster. All these few need to do is grab onto a small piece of BIM's wing and hang on tight for the ride. The fresh-out-of-college entrants might have a harder time grabbing onto this wing that's already in motion.

To those who are only vaguely familiar with BIM, it is typically perceived as the equivalent of a 3D role-playing video game. In this case, it's not difficult to capture a "snapshot" image of a 3D model, shadows cast across random metal objects taking up space in an orderly fashion between ceiling spaces and walls. What is difficult is conveying the abundance of value behind the pretty picture to a client who's only interested in the pretty picture. Who isn't familiar with the adage "a picture is worth a thousand words"? Why not change that saying to "a BIM model is worth five thousand hyperlinks"? Now we're talking lifecycles and facilities man-



agement. This supposed video game has suddenly become an encyclopedia of usable information. But wait, it's not just static information that's stuck on a DVD on a shelf in some owner's random storage closet. It has now become a living, dynamic source of real-time data. Maintenance technicians will know exactly where to go when the active 3D model loaded on their laptop highlights a hot water pump needing service while concurrently bringing up the cut sheets and operation and maintenance manuals specific to that pump or system. Better still, the source of information has shifted from multiple stacks of large drawing sets collecting dust to several hundred gigabytes on a hard drive. Yes, Mrs. Client, your 3D BIM model will be usable for the next 20+ years.

Even though you might not necessarily think about it, some of you probably realize that BIM has become the "middle-man" for so many key components in the construction cycle, well beyond its intermediary role between design and construction phases. You want to do some significant tenant improvement in an existing building? Laser-scan the existing conditions. That's BIM. Is the general contractor racking their brain trying to figure out where to station the crane for the project or pave the pathways for delivery trucks? Now they're looking to BIM to answer these questions and optimize their decisions. To take it a step further, at which end of the building do we want to load thousands and thousands of pounds of sheet metal and pipe? And then, which trades should be installing their systems first in any given area of the building? That's right; we're deriving sequencing and timelines from the BIM model to establish the best routes to take while addressing any constructability issues. BIM has become the consultant that wears most of the hats. It's our one-stop shop.

I know that I've personified BIM as if it's the brains behind all of its success. Let's take a moment to focus instead on its collaborators or the sum of its integral parts to show that, in reality, we are Dr. Frankenstein and BIM is our monster.

Except in our case, we're beginning to tame our monster and those who were previously frightened by it are starting to see that it indeed is no monster. In fact, while evolving to do—and become—greater things, BIM is transforming into an industry hero. The point of convergence is approaching because we're saving money, time, and even trees. Soon enough BIM will be the industry standard even on the smaller projects. Let's keep the pedal to the metal.

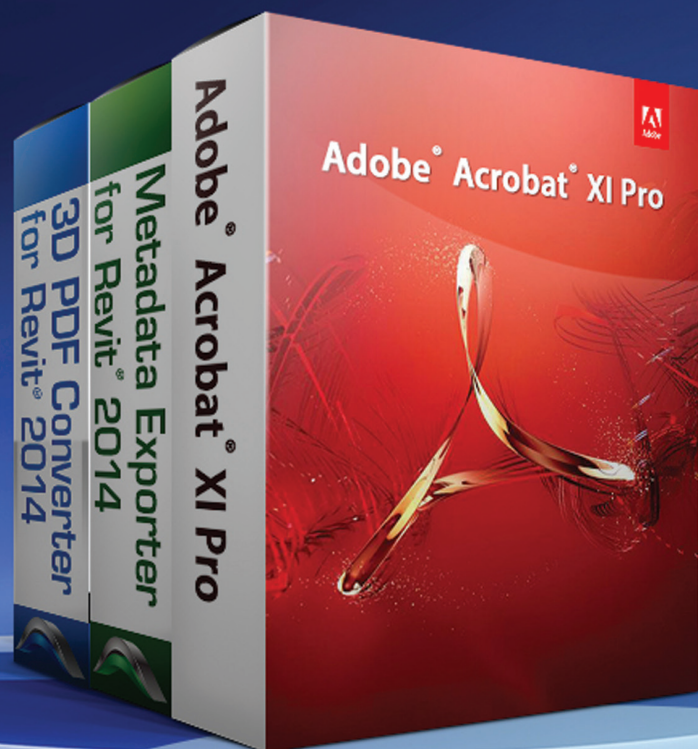
You want to know the best news? Most of us haven't even begun to scratch the surface of BIM, but we're in strategic positions to reap the rewards. Taking the possibility of its vast potential into account, isn't it reassuring knowing that in these tough economic times, we're engaged in an industry that has a shortage of well-qualified BIM experts? Our exposure alone sets us up for success. Now ask yourselves this question: Is BIM driving our industry or is it the BIM user?



*Vladimir Triantafyllidis works for a leading mechanical contractor in the San Francisco Bay Area with more than 10 years of experience in the industry. Although he has a bachelor's degree in biology, his unique career choices have firmly rooted him in a substantial BIM role, awarding him the opportunity of progressing alongside the relentless evolution of BIM. Outside of his career, he's always open to new adventures whether trying a new cuisine, exotic travels, or extreme sports. The latter adventures have recently subsided as the balance of life has shifted his focus on spending time with his growing family.*



# Adobe® Acrobat® XI Pro Solution for 2D & 3D BIM

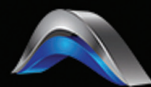


- ✓ Anyone can interact with the 3D model
- ✓ Industry templates for powerful 3D PDFs
- ✓ Only export the parts of the project you want
- ✓ No lost comments, keep them within the 3D PDF
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# Streamlining Sheet Lists with a Custom Application

**I**n this article we take a brief look at a simple add-in for Autodesk® Revit® named X-Sheets, which provides tools for incorporating sheets from an AutoCAD® sheet set in a Revit sheet list. Typically this is handled by manually adding placeholder sheets to the Revit sheet list. This can be problematic because the sheet list becomes disconnected from the source and must be updated manually. With X-Sheets, sheet set data is exported directly from AutoCAD, linked to a Revit project,

and included in the sheet list by automatically adding/updating placeholder sheets. For this example, all structural schedules, plans, elevations, and section sheets are in Revit Structure. All detail sheets will be pulled from an external AutoCAD sheet set.

## X-SHEETS RIBBON PANEL

The first command on our ribbon panel is Discipline. This command is used to establish the Revit project parameter to which the AutoCAD sheet subsets will be mapped. For this

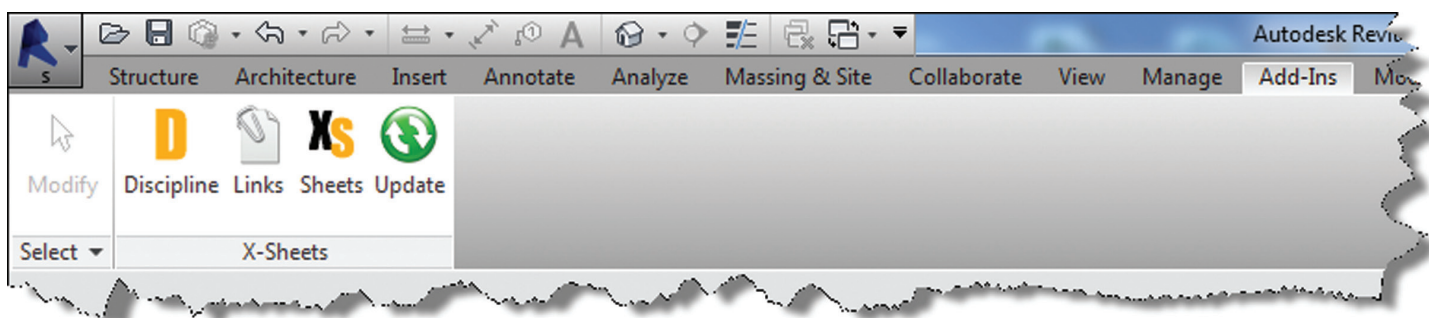


Figure 1: Revit X-Sheets ribbon panel



example we have created a project parameter named My Discipline Parameter. Each Revit Structural sheet has been assigned a value of STRUCTURAL—the same as the subset name for the AutoCAD detail sheets. The sheet list is grouped and sorted by this parameter.

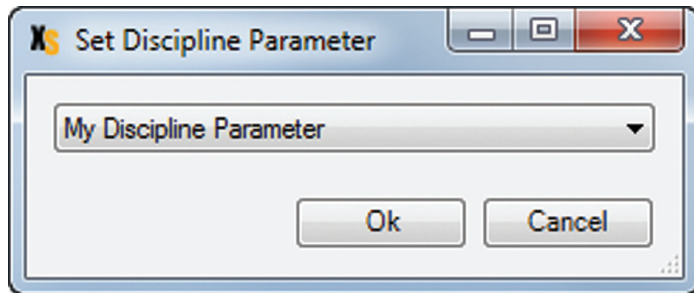


Figure 2: Discipline command dialog

The next command on the ribbon panel is Links. This command is used to establish a link between the Revit project and XML file(s) containing sheet information exported from AutoCAD. You can create as many links as needed, and use relative paths if required.

The next two commands, Sheets and Update, do the work of adding/updating placeholder sheets to the sheet list. While the Sheets command allows you to select individual sheets from links to include in the sheet list, the Update command includes all sheets from all links.

## EXPORT SHEETS FROM AUTOCAD

Figure 3 shows the AutoCAD X-Sheets ribbon panel and a sample sheet set containing structural detail sheets. Notice the detail sheets are grouped under a subset named STRUCTURAL. This subset name can be exported with each sheet and mapped to

the My Discipline Parameter in Revit. Figure 3 shows the Export Sheets dialog with an option to include subset information and the ability to exclude individual sheets. Selecting the Export button prompts us with a dialog to save an XML file to be linked into our Revit project.

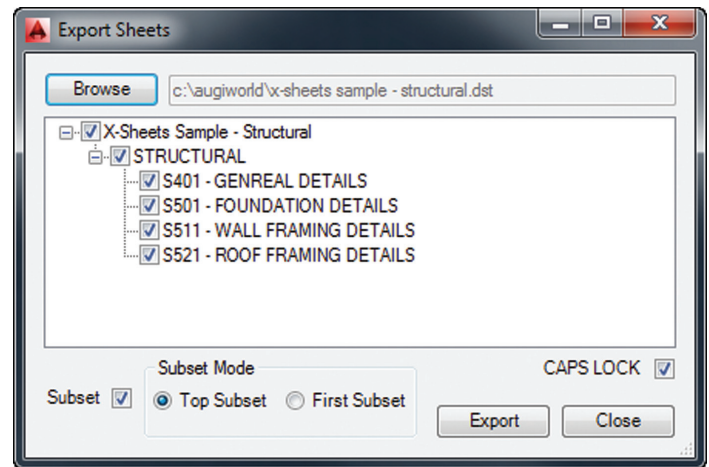


Figure 4: Export sheets dialog

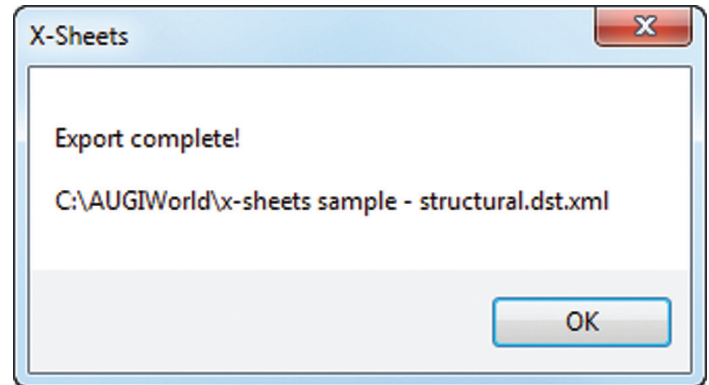


Figure 5: Export complete!

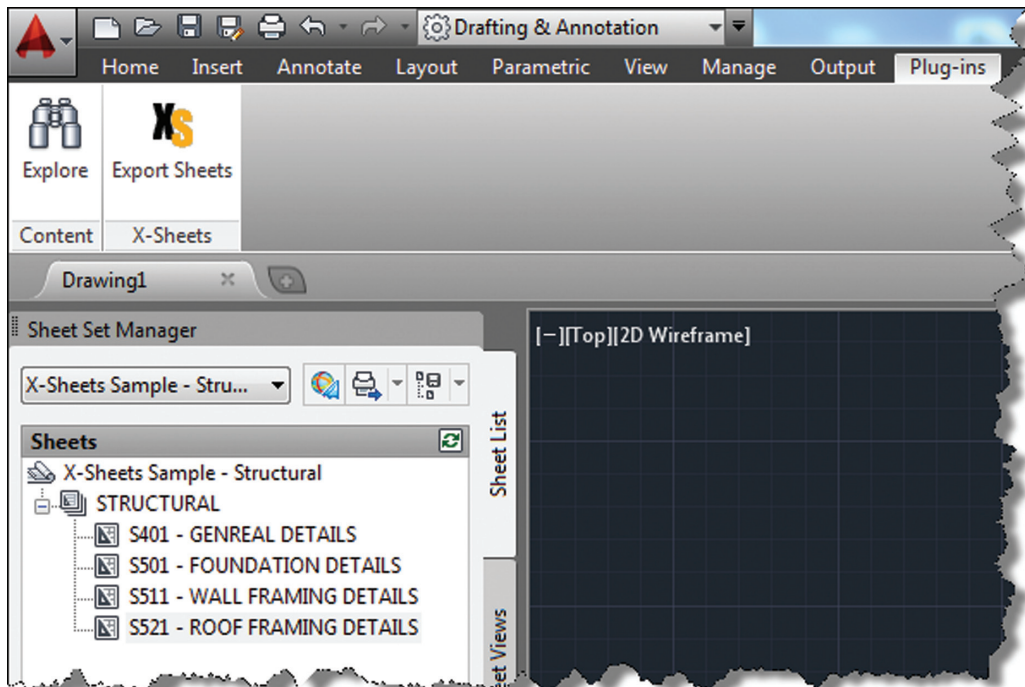


Figure 3: AutoCAD X-Sheets ribbon panel and sample sheet set

# Revit Structure 2014

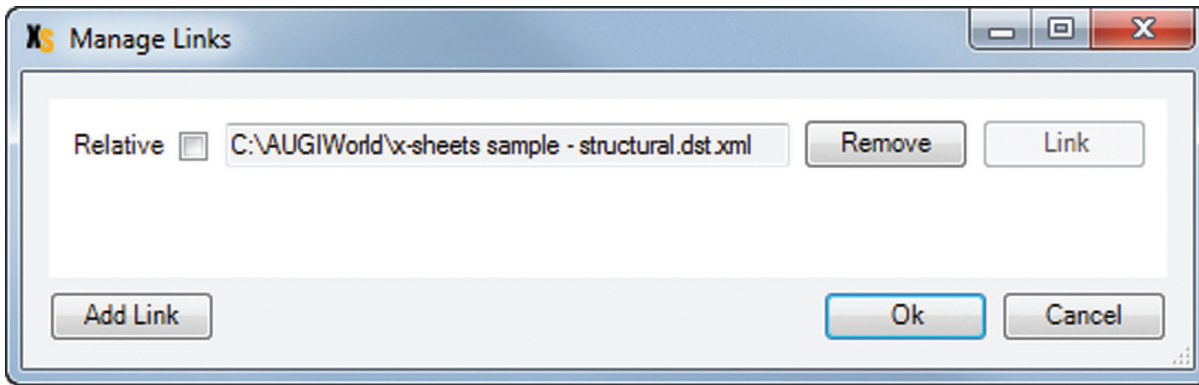


Figure 6: Manage Links dialog

## ESTABLISH LINK TO XML FILE IN REVIT PROJECT

Figure 6 shows the Manage Links dialog. A link has been added to the XML file we generated when exporting sheets from AutoCAD. Notice there is an option to make the link path relative to our Revit Project location.

## IMPORT SHEETS FROM XML LINK

Figure 7 shows the Revit Structure sheet list before any sheets have been imported from AutoCAD. After selecting the Sheets command we are prompted with a Manage Sheets dialog.

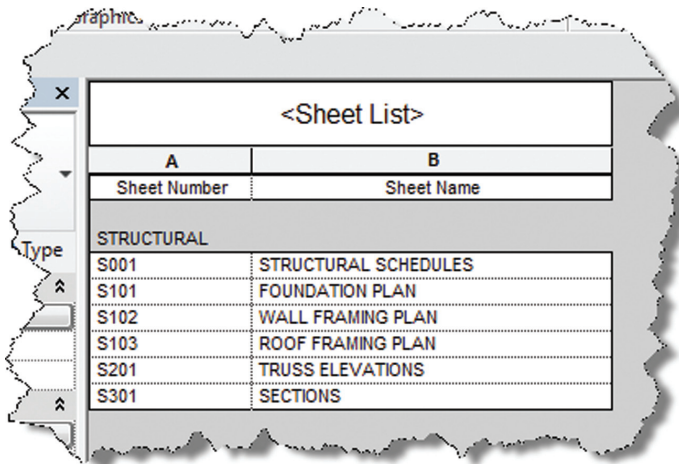


Figure 7: Sheet list before import

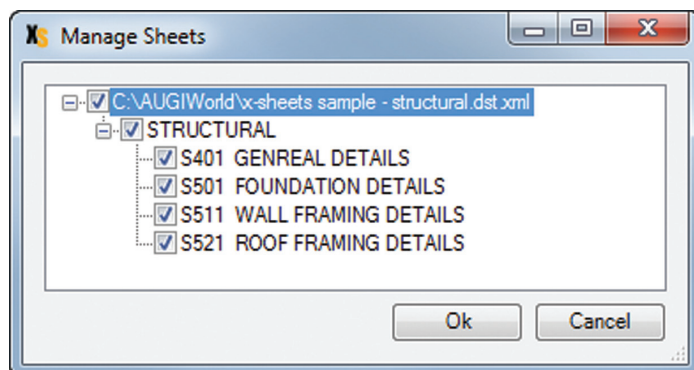


Figure 8: Manage Sheets dialog

For this example we have selected all sheets from the XML link to include in our sheet list. After confirming the dialog, new placeholder sheets are immediately added to the sheet list and grouped according to the Subset/Discipline mapping. The new placeholder sheets are identified behind the scenes as being related to the X-Sheets XML link for later updating.

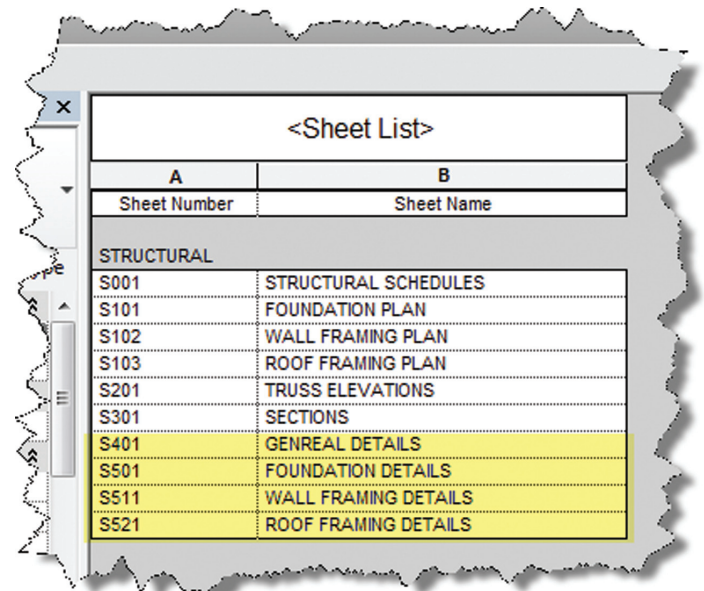


Figure 9: Sheet list after import

**The X-Sheets  
add-in is a great tool  
for incorporating  
AutoCAD sheets into  
a Revit sheet list.**



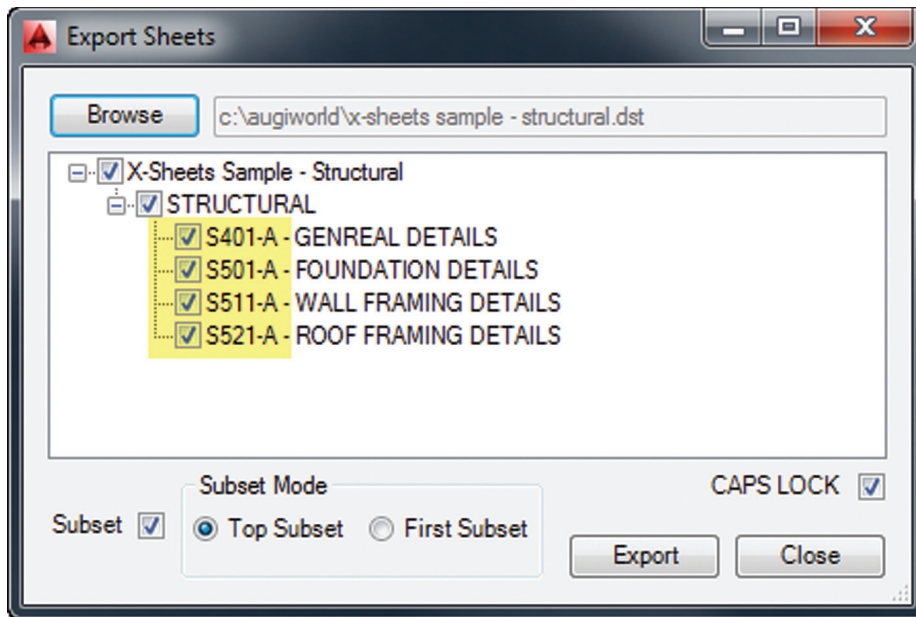


Figure 10: Export Sheets dialog after sheet renumber

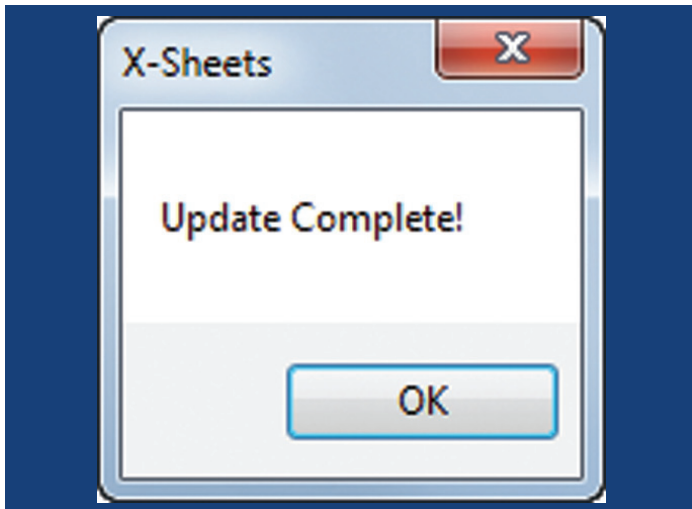


Figure 11: Update complete!

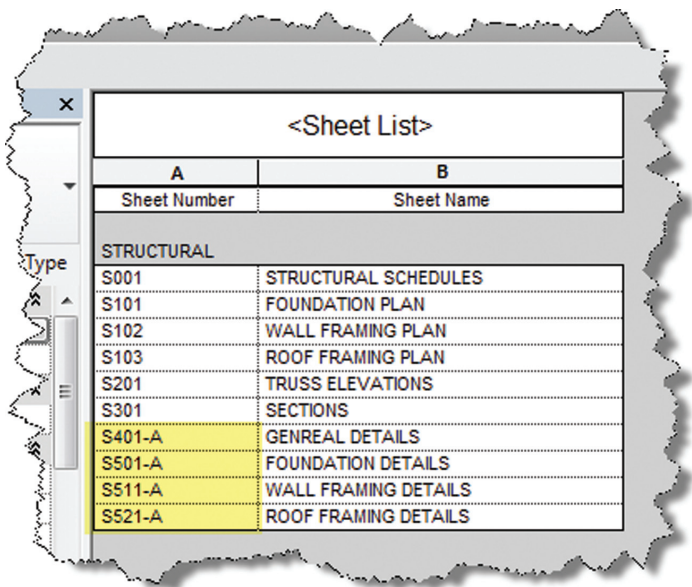


Figure 12: Sheet list after update

**The X-Sheets add-in is a great tool for incorporating AutoCAD sheets into a Revit sheet list**

## UPDATE SHEETS

Figure 10 shows the Export Sheets dialog in AutoCAD after detail sheets have been renumbered to include "-A." When changes are made to AutoCAD sheets, the original export steps must be followed to replace the XML file linked to our Revit project. Once the XML has been replaced, simply run the Update command in Revit to update the sheet list.

## SUMMARY

The X-Sheets add-in is a great tool for incorporating AutoCAD sheets into a Revit sheet list. The add-in saves time by automatically adding placeholder sheets, eliminates room for error in manual translation, and helps to keep your sheet list up to date with minimal effort.



Jonathan Albert is co-founder of BIMpulse Technologies, LLC & Senior Applications Developer at Lindeman Bentzon Bojack Engineering in Clermont, Florida. He has worked more than 15 years implementing and using BIM Technology for some of the nation's leading production home builders. Most recently he has developed BIMpulse, an Options Management and Material Takeoff Add-In for AutoCAD Architecture, Revit, and Autodesk Design Review. Jonathan can be reached at [jona@lbbe.com](mailto:jona@lbbe.com)

# Customize Correctly

It's a fact, Jack. You invested money in the world's most popular civil engineering and design software. You (or someone else) will have work hard to make the software run productively and publish the engineering design or survey work acceptably.

Every AutoCAD® Civil 3D® user will tell you: "You need a Civil 3D template."

They're right, sort of. You need more than one. The supplied example Autodesk template files (.dwt) are just that—examples to show you that things are possible. A great many "things" are possible in Civil 3D. It is data-centric, model-based software. As a dedicated content developer and continuous customizer of Civil 3D, I hope the following perspectives and tips help shorten the cycles and reduce the pain of customizing the software.

AutoCAD Civil 3D was constructed from the ground up to disconnect the survey and engineering data from how that mission critical data is represented.

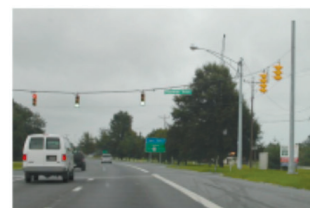
## WITH LIBERTY COMES RESPONSIBILITY

As far as Autodesk is concerned, what you want the many Civil 3D "things" to look like and how the Civil 3D data is to be annotated is totally up to you. That's not really true, is it? Plan sets are published in arcane symbolic graphic languages designed to faithfully convey the design intent to someone who must build it with a plan checker or two (or three or four) stuck in between.

As a professional, I prefer to call them "Plan Set Languages." This helps focus the development to the publishing of Civil 3D data. Most people throw a fuzzy word around this complex mix of human perceptive agendas and call that "CAD Standards."

*"The wonderful thing about standards is there are so many of them."*  
— Grace Hopper, et al

**Jump Platform  
Products  
for  
AutoCAD Civil 3D**



**Standards Documentation  
for Release 5 for 2014**

Figure 1: Standards documentation is required

## PICK A STANDARD AND MANAGE BY IT

"We already have a CAD standard." This may be the first and worst Civil 3D customization mistake any skilled AutoCAD user or organization can make. The odds are the CAD standards you employed before do not take into account the data centric and model-based methods that Civil 3D employs. Simply put, Civil 3D manages how things look and behave by Style. Primitive-based AutoCAD® standards may get in the way.

Older "CAD" standards by definition must be focused on CAD primitive publishing specifics: layer, textstyle (height), block



graphics standards, and so on. In raw AutoCAD and AutoCAD-based drafting and design software the only way to manage all the CAD primitive stuff was to be SPECIFIC about all the details all the time. The drawing we create and check things in is the drawing we publish.

If you publish work out of quality control or design drawings in Civil 3D, this is a sign you may be missing some of its time saving advantages.

While the old CADD process works, it requires a lot of man-hours dedicated to maintaining and checking the details. Clearly one of Civil 3D's critical design development goals is to rid organizations and Civil 3D users of this expensive man-hour burden and cost. The idea here is to put the man-hours into the iterative engineering process instead. Civil 3D Feature data and Style make this possible.

Civil 3D styles and label styles do employ the AutoCAD layer, textstyle, block references AutoCAD customizers are used to. The software is still called "AutoCAD" Civil 3D, after all. Our AutoCAD customization skills still apply. But we must apply them differently and much more systematically. Here's why...

## YOU NAME IT—THE MOST CRITICAL STANDARD

Civil 3D Styles and label styles employ (reference) the AutoCAD "named" parts to "express" themselves. Style tools just look for and match the "right" names. Change the "meaning" and/or definition of the names and you can change anything.

We call this fundamental property and benefit of object-oriented programming the Power of Names. In programming speak, this concept and practical reality is called a "namespace."

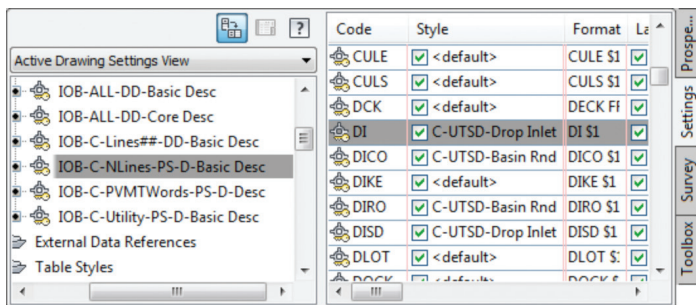


Figure 2: Are description keys a namespace?

Such a namespace in engineering speak answers the question: "In this context, does 'DI' mean a 'drop inlet'?" In a minute, we'll get to the structure of a customization "namespace" for Civil 3D AutoCAD references.

## THE POWER OF NAMES

Go ahead and make a drawing from your current Civil 3D template. Toss in some Civil 3D data by data reference from any project. Use the RENAME command on any of the old AutoCAD style collections—try layers.

Rename like crazy. Your existing Civil 3D styles and label styles will happily work exactly the same. The components in the Civil3D Feature and Label Styles will go to your renamed layers. Because you didn't change the properties of the layers either, nothing changes. It's not too exciting until you think about what it means.

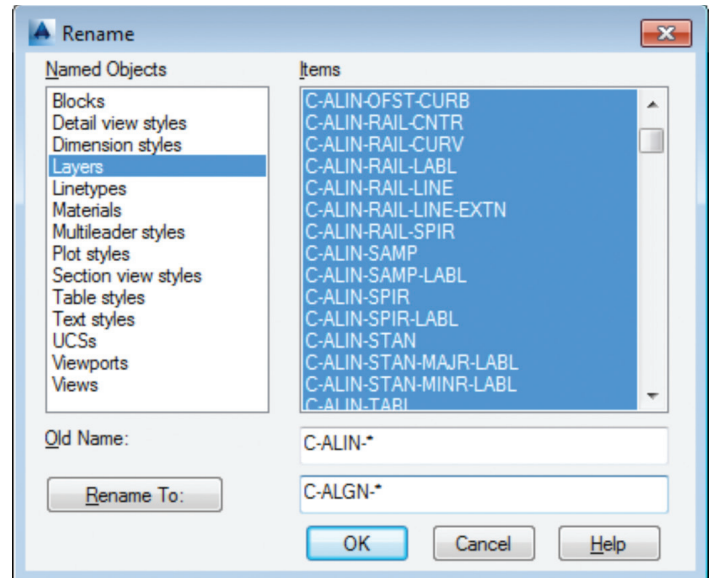


Figure 3: Rename the AutoCAD reference names

## FOLLOW A SCRIPT

Obviously, as customizers we never want to do this sort of work manually. Computers are faster, better, and more exact typists than we are. We commonly rely on AutoCAD scripts generated from Microsoft Excel spreadsheets. (See the end of the article.)

There are a couple of key collections in the object model that Civil 3D walls off from this form of potentially destructive user madness—Object Properties in Drawing Settings and a few things like Figure Prefix Dbs values that are not ever in the drawing, per se.

## WHAT REALLY MATTERS

AutoCAD Civil 3D style is mind-boggling abstraction. Everything is designed and built to point at references. We can employ style abstraction for our benefit.

In one sense, AutoCAD Civil 3D style doesn't care about AutoCAD layer standards, block libraries, textstyles, colors, plotstyles, or really anything else AutoCAD. From our perspective, all the Civil 3D styles care about are the arbitrary and exact names they currently reference.

The Civil 3D customizer's dilemma: Keep book on the exact names. There are a lot of names to keep track of. You must have a plan. You must have rules. You must employ the same processes consistently in the same order to get quality assured results.

# AutoCAD Civil 3D 2014

That Current word is a wonderfully relative term for the customizer.

Build a set of styles; extract them to another drawing; rename and/or redefine the references; and quickly produce a different result. The Current method makes it easy to propagate success and mistake. It makes it repetitively tedious to make fixes.

## NO CAN STOP

As innovative content developers for Civil 3D we chose to employ the National CAD Standard (NCS) as our fundamental Name standard. Not because we like the NCS, but because of all the hard-won experience expressed in these tested standards. In many respects, we employ the NCS, UDS (Uniform Drawing Standards), etc. in our Production Solution products because of the underlying How and Why for those standards and their practical published Rules.

We want to build faster, high-performance vehicles. Why reinvent the wheel when we can improve on it?

## STANDARD KEYS TO NAMES

The NCS employs a hierarchical concept of Keys. There are Major Keys, Minor Keys, etc. that have order, precedence, and an interpreted meaning. The NCS Layer standard employs the Key-based rules to produce defined meanings to Layers.

You can, in practice, employ the same Layer Keys to be generic or granularly specific about where the published results go. All the annotation can go to one layer or many different layers, for example. Styles and/or sets do the work.

This KEY CODE structure produces a flexible and structured “namespace” we referred to earlier. It’s a namespace that both the software can employ and is relatively easy for us dumb-bunny humans to learn to decode when we must. Most of the time, the users don’t and shouldn’t care anyway.

Figure 4 shows a few of the NCS “like” Keys we employ in our products. We employ them for both layer and block collections and even the structure of libraries. They may even be employed in Civil 3D style names when that’s appropriate. (See the end of the article.)

The customizing key point is that the meanings of these specific Keys can be translated into any other set (or sets) of different

BKWR	Breakwater	DASH	Distressed Asphalt	EOWD	Edge of Wood	GRAV	Gravel
BLCK	Block	DASP		EOWK	Edge of Walk	GRID	Grid
BLDG	Building	DECK	Deck	EOWR	Edge of Water	GRND	Ground
BLIN	Baseline	DIAG	Diagnostic	EPAV	Edge of Pavement	GRTE	Grate
BMRK	Benchmark	DIKE	Dike	EROS	Erosion	GUTT	Gutter
BNDY	Boundary	DIMS	Dimensions	ERRO	Error	GUYW	Guy Wire
BOLL	Bollard	DIRC	Direction	ESDR	Edge of Shoulder	HCAP	Handicap
BORE	Boring	DIRV	Diversion	ESHB	Edge of Shrub Line	HCPT	Horizontal
BORR	Borrow	DIST	District	ESMT	Easement	HDPT	Hydrologic Point
BOTB	Bottom of Bank	DIVR	Diversion	ESTM	Edge of Stream	HEGE	Hedge
BOTM	Bottom	DMRK	Rock Dam	EWAT	Edge of Water	HEGL	Hedge Line
BOTS	Bottom of Slope	DMST	Straw Dam	EWET	Edge of Wetland	HGLN	Hydrologic Grade Line

Figure 4: Some standard keys

Keys. The Key changes can be systematically applied to whatever AutoCAD reference tables and resources we require.

The results of any changes will float uphill to the named Civil 3D Styles we choose to employ. Think of all the AutoCAD references in a template as a Set.

## BEYOND AUTOCAD

Now we’ve looped back to Civil 3D style tools and substantively their names and what their parts refer to. Welcome to the circular and iterative world that is customizing and employing Civil 3D.

Aside from the requisite customization skills and experience to build style tools, our practical biggest customization issues are frankly Civil 3D human interface issues.

No matter how you cut it, you have a very limited amount of text space to help users decide on the “right” style tool to use. The text of the style tool’s name is all you get to deliver to the user. Typically it’s a pick box list.

You might get lucky and have the Style Viewer, but that Viewer cannot represent everything a style can do.

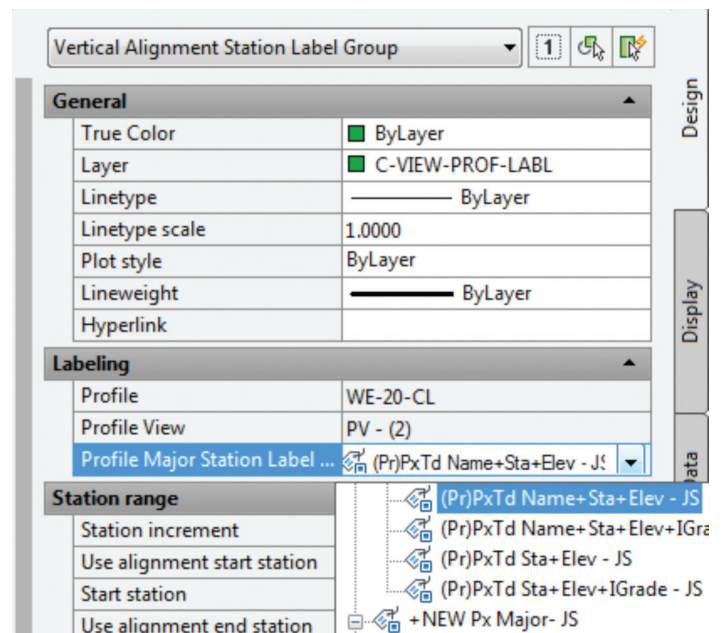


Figure 5: The limitations of user style choice

## FEATURE STYLES NAMES

What we call the “Feature Styles” (the Civil 3D Feature’s graphics) require that our style names explain in simple readable human terms what the tool does. For example a surface style like: “Contours 1-5 Proposed.”



For the common and most understood features this makes some sense. ASCII order rules how named Styles organize. Names must sort that out.

Complex graphic features such as Views have a lot more going on. “My Standard Profile View” doesn’t cut it except in a publishing template. The style names must be more informative and specific. Does the Profile View include grid lines or not? We must recognize that the engineering data behind what we want to visualize is variable and the user will have specific needs to get work done. When you check a surface you need to see the data in different ways than when the result is published.

Choice of style is productive. Choice is not contrary to publishing standards unless you mix the two.

## LABEL STYLE NAME FACTORS

When we open the Alignment Label Style collection and/or start to assemble Sets of Label Styles, we see any hope of name simplicity for label styles disappears in a flash.

The majority of styles are annotative. There are a lot of forms and specific types of them. Label Style Type matters. The smart customizer employs the Label Style Default (LSD) hierarchy expressed in the Toolspace>>Settings tab or ignores it and misses the benefits.

Label styles often must have a geometric framework to them. It’s about “readability” and meaning. Whether this label goes up or down or attaches here and not there is critical to annotative clarity. The graphic structure of many data-rich label styles also fundamentally matters to the style’s upgrade stability. There’s a maintenance cost to pay if you refuse to employ consistent geometric structures in label styles.

## CUSTOM USAGE

Can users see the right data and at the right time? Will the user employ a general, alignment, parcel, or figure line and curve label? How do they see the difference in a simple list? It is easy to miss how “on-the-fly” annotative information negatively or positively effects design time decision making and quality control. People will make things to get the job done. Do you fight it or enable it? The Simple Style Rules anyone can learn.

## THE CIVIL 3D NAMESPACES

A Civil 3D style naming convention must be: human readable, create order in the interface, and therefore include a rule-based, easy-to-learn code system that expresses quickly the critical details. To customize we need two namespaces: One for the top-end styles and one for the back-end AutoCAD references. In production projects, we need a third namespace for how we name the features, but that’s another story.

This client and this project demand these CAD standards specifics. Another client and project demand something different. Even if you don’t believe you regularly face that common problem, you

still have to improve the internal production templates themselves. The method and process aren’t different.

In our project-based, production world, Civil 3D users and supervisory staff can always work with the familiar and publish what is demanded in a customized publishing template. The two-pronged project template approach has the added benefit of potentially quantifying the costs and real return on investment for the customization itself.

## CUSTOMIZE TO PUBLISH ON DEMAND

In practical terms we can change the expressed graphics—the Plan Set Language (CAD standards) with managed intern level staff. Even non-CAD people can see and identify graphic difference. Only basic AutoCAD and basic spreadsheets skills are required for much of the work if you have a naming plan. “Change that manhole block to look like this manhole block.” Your “that” must be specific.

“Publish on demand” capability is a productivity and competitive advantage, but it takes repetitions to develop and practice the skills. We must endlessly customize Civil 3D—reap the benefits.

## CIVIL 3D NAME RESOURCES

The Standard Keys: the NCS-like AutoCAD reference namespace. The Jump Standards: includes the detailed and documented style namespace. Find them at: [www.cadpilot.com/resources.aspx](http://www.cadpilot.com/resources.aspx)

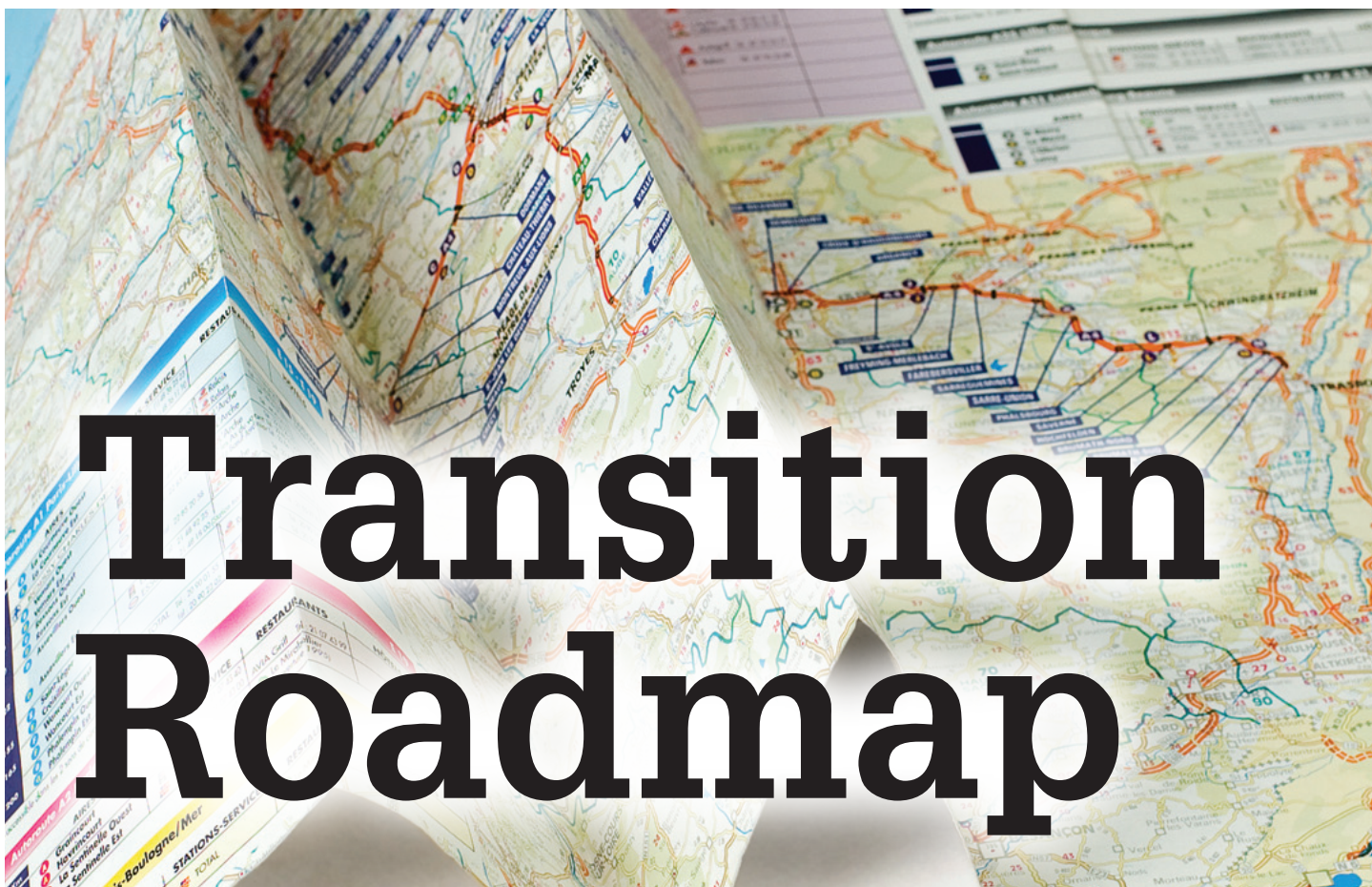
### Excel Cell Formula Script Example

Here’s the pseudo code for a typical formula-based layer script that makes a layer table with all the details filled in from a cell. It creates a series of quote wrapped strings when a column of such cells is copied and pasted to an ASCII text file.

```
<LayerCommand>&CHAR(13)&"S"&CHAR(13)&<OldLayer>&CHAR(13)&"R"&CHAR(13)&<NewLayer>&CHAR(13)&<NewLayer>&CHAR(13)&"C"&CHAR(13)&<Color>&CHAR(13)&CHAR(13)&"LW"&CHAR(13)&<Lineweight>&CHAR(13)&CHAR(13)&"PS"&CHAR(13)&<Plotstyle>&CHAR(13)&CHAR(13)&"D"&CHAR(13)&<Description>&CHAR(13)&<NewLayer>&CHAR(13)
```



*Tench Tilghman is President of MoreCompetency, Inc., an Autodesk Developer Partner specializing in innovative Civil 3D Production Solution products and consulting services for AutoCAD Civil 3D. Tench is a regular speaker at Autodesk University and AEC industry events on the topics of technology adoption, innovation, and (his personal favorite) people skills. He posts on the Get the Jump on Civil 3D blog.*



**W**hen any new technology hits the ground, there are plenty of false starts and backtracking. In time, shortcuts are found, tricks of the trade are discovered, and best practices are defined. So is the case with Autodesk® Revit®, even for MEP users. This article will outline a logical roadmap of technical and non-technical must do's, and don't do's for transitioning to Revit MEP. From setting expectations, defining goals, and plotting in Revit, to addressing BIM, IPD, and VDC, the checklist of elements required to help Revit really work in an office will be covered. Every implementation will come with resistance, workflow issues, and plenty of headaches, but staying on course and hitting the important milestones along the way will help reduce stress of something akin to the craziest family trip ever.

## FIRST CONSIDERATIONS – SOFTWARE

One might think it is all about Revit. The truth is that Revit really wants to act as a central location for data that is constantly on the move. Much like a smartphone leverages the power of thousands of applications, Revit plugs into workflows with more than a few Autodesk programs as well as a host of third-party programs. The simple fact that the Building Design Suite comes with so many varied applications is a pretty big hint that Revit wants to play on a team. Firms need to look at their processes from a high level and look for the best workflows and programs for the team.



## FIRST CONSIDERATIONS – HARDWARE

Evaluate the PCs and know what their capabilities are and know what Revit requires. Search Autodesk's website for system requirements for Revit products. Requirements for three tiers of deployment are listed for systems covering an entry-level configuration, a balanced performance configuration, and a performance configuration. Certified and supported graphics hardware is also accessible from this page. The non-hardware savvy should seek input from an IT professional. Revit cannot and will not perform on outdated or entry-level PCs, and the person leading the implementation usually takes the blame when expectations fall short. Best advice is overkill it on hardware. What seems over the top today is inadequate in a year.

## FIRST CONSIDERATIONS – TRAINING

There is no way to get around the fact that training will need to be done. Even if every person in the firm has already used Revit, training on using Revit company standards must still take place. There are many ways to deliver training. An in-house expert



## Autodesk Revit Services &amp; Support

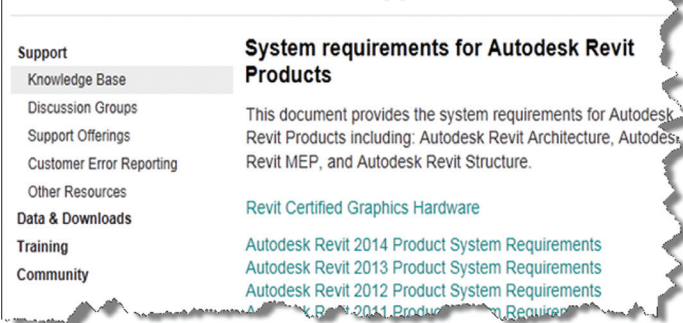


Figure 1

can provide just-in-time, all the time. Autodesk resellers and consultants typically provide three- to five-day immersion training and short- to long-term consulting. There are countless web-based training options—free and paid. Community colleges that offer Revit training usually require a final project that will put students through the paces and better entrench the knowledge and skills.

On the down side, Revit MEP-specific classes are all but impossible to find. Lastly, the extreme go-getter can buy a book and learn on the job. In reality, everyone learns differently and being prepared to leverage all these types of training is the best solution. People will gravitate to the solution that works best for them when it is provided.

## FIRST CONSIDERATIONS – LINE UP YOUR DUCTS (UGH... DUCKS)

Set appropriate goals based on the size of the firm. Small, medium, and large firms will have drastically different goals and timelines. It might seem odd, but small firms have the upper hand in adopting new technologies and processes. Think about it: What is easier—getting 3 people to agree, or 300? Recognize that an AE firm will have completely different goals and processes than a solely MEP firm. During any shift in process be prepared to support the old and new at the same time, and sometimes in the same project. This will mean keeping symbols in Revit as close as possible to symbols in AutoCAD®. Consider how quality reviews are done and client expectations. When things look different, it is an impediment to change. Minimizing the impediments will help tremendously.

All that being said, communication is the real key to most every project's success. It is important keep information flowing up and down the chain and set the expectations early. Some critical expectations for this type of implementation are that things will go wrong, things will take longer, things will look different, things will have to change, and things will continue to evolve. Remind users and management of the progress they have been made by tracking and documenting incremental goals.

With a general direction and expectations set, it's time to get more specific about the journey. This trip is a long one, and a phased approach is best. Firms can tailor the following phasing to suit individual needs. This example has four phases—each with its own goals building off the previous phases.

### Phase #1 - Goals

1. Create construction documents
2. Improved collaboration
3. Interference mitigation

To obtain these goals, the following Revit items need to be addressed. The first group addresses the goal of good construction documents. The second group deals with process and keeping things standard. The space available in this article doesn't allow for "How to's" for each item, but each is well documented in the Revit help page and all over the Internet. Get a couple points of view and marry the possibilities to the culture and needs of the firm in question.

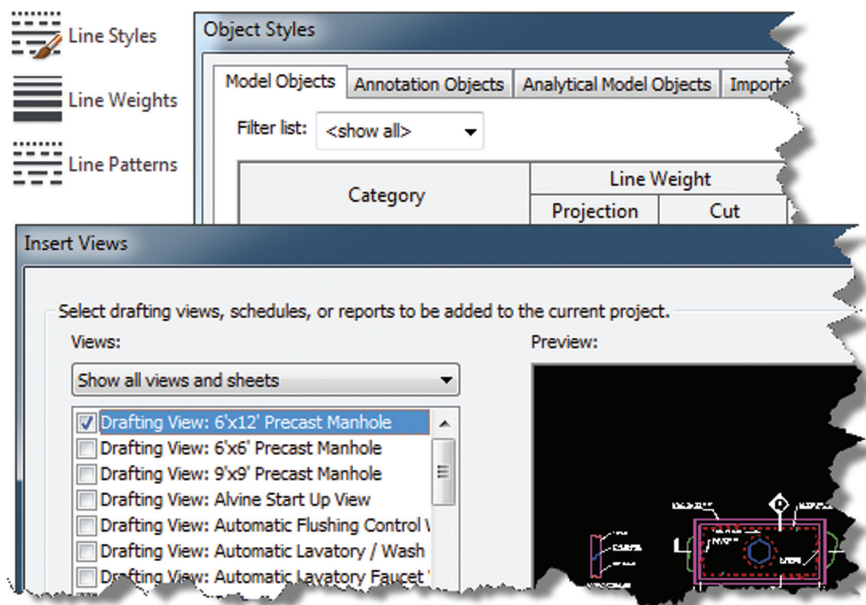


Figure 2

- Line styles created
- Fonts set for plan text, titles, title blocks, tags, and everything else
- Object styles – Define the weight, color, tone, and transparency of everything
- Incorporation of standard details
- Browser organization – Decide how you want to see views organized
- Filters – Know if you need standard filters and create them ahead of time
- Phases
- View templates
- Project template
- Duct Styles
- Pipe styles
- Family creation

# Revit MEP 2014

## Phase #2 - Goals

1. Data mining/data reporting
2. Calculations
3. Coordination

At this point the low hanging fruit has been harvested, so to attain the goals above, a deeper understanding of the topics below are required. There has to be an intentional meeting of Revit experts and progressive engineers that can influence the status quo to change long-entrenched processes. Think high level and have goals in mind to refine and streamline the everyday workflows in the office. Again, the personality of the firm will dictate the way the tools are used, but the tools are the same for every firm.

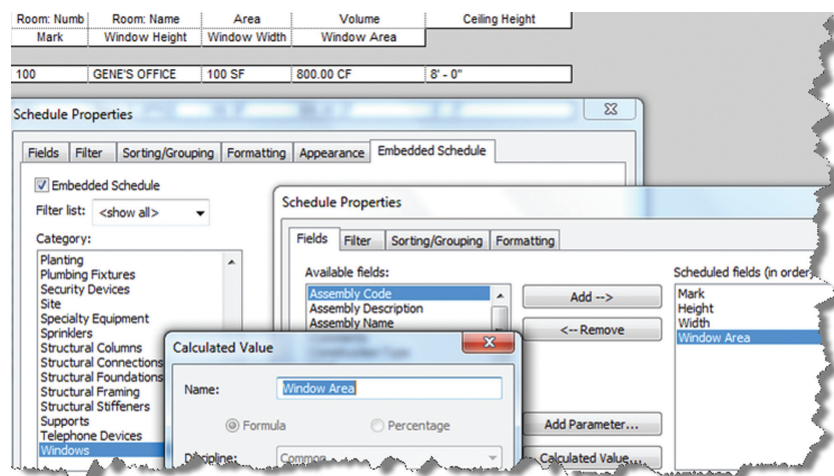


Figure 3

- Schedules
- Shared parameters
- Project parameters
- Electrical circuiting
- Electrical panel templates
- MEP settings
- Calculations

## Phase #3 - Goals

1. BIM / IPD
2. Virtual calculations
3. Virtual design with rendered reporting

Once the first two phases have been achieved, people get crazy ideas. This is good. Know that Revit likes things to be perfect before it produces perfect results. This is a big reason to have a proven track record of attaining the first two phases before launching into phase 3. Prove the concept on a small scale before attempting things on the biggest project ever. Well-picked pilot projects can very much influence the acceptance of new tools and processes in future projects. There are more possibilities than those shown below. At this point, the firm's imagination is all that restricts the possibilities.

## Heating and Cooling Loads

- Solar studies
- Lighting calculations

- Family creation
- Standard subcategories
- Width-Length-Depth-Height
- Materials
- Formulas

## Phase #4 - Goals

1. Upgrade and maintain

This is not really a phase as much as a constant issue. There are many facades to maintaining Revit. It is not uncommon to have to support four version of Revit at a consulting MEP firm. So be prepared to maintain differing family versions and templates.

Know that Revit is new every year and upgrades mean small changes and sometimes big changes.

- Updates and service packs
- Maintaining multiple family versions
- Upgrading families
- Third-party tools for shared parameter manipulation
- Documenting standards as the software evolves

## FINAL THOUGHTS

The point here is to take well thought out incremental steps. The old adage "failing to plan is planning to fail" applies. Do the homework up front and get buy-in from above. A well-run implementation will earn the respect from the floor.

Over-communicate all the way through the process. Surprises tend to be unpleasant when making big process changes, so let people know what to expect and when to expect. Follow up often and remind everyone of the progress that has been made as a firm and the progress people are making individually. People's receptiveness to communication changes with their proximity to the issue. So training and communication is most meaningful when a project is going on.

Be relentless. This isn't accomplished with a short burst of energy. It takes time, and it takes a leader who is consistent and persistent. Be the unwavering North Star that the firm will follow. Pick and stick, and people will follow.

Get a doughnut. That is, reward yourself. This isn't easy, and nothing says "job well done" like a doughnut.



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**CSC's Integrator**<http://www.cscworld.com/>

Integrator is a tool that allows you to synchronize structural designs created in CSC's Fastrak Building Designer (steel building design software) and Orion (structural concrete building design software) with Autodesk® Revit® 2014.

"Leading structural software provider, CSC, has released a new version of Integrator, its market leading Structural BIM integration software for synchronizing code-compliant models produced in CSC's building design software, Fastrak and Orion, with Autodesk® Revit®. Now fully compatible with Autodesk Revit 2014, structural engineers and technicians have even greater control during the integration process.

Using Integrator, full and part models can be synchronized between Fastrak or Orion and Autodesk Revit, with the ability to manage added, deleted, and modified members and their associated design data."

**BiMTOOLS**<http://www.sofistik.com/>

BiMTOOLS is a set of productivity tools that are designed for Autodesk® Revit® 2014. The plug-in can be installed from the Autodesk Exchange Apps store.

"The first international version of the SOFiSTiK BiMTOOLS is now available. SOFiSTiK BiMTOOLS is a collection of free tools for Autodesk® Revit® Structure to enhance the productivity up to 50%. The features range from easy font type substitution and automatic generation of dimensional lines over the automatic positioning of structural elements to the comprehensive Family Creator to generate families of e.g. beams, braces and columns for optimal communication with FE analysis tools like the SOFiSTiK software."

Find further information and download links for Revit 2012 and 2013 on the dedicated BiMTOOLS website.

**Autodesk AutoCAD 360 2.1**<https://www.autocad360.com/>

Autodesk® AutoCAD® 360 is a mobile and web-based application that allows you to view, edit, and share drawing files created with AutoCAD and AutoCAD-based products. The mobile app is available from the Apple iTunes App Store and Google Play Store.

"AutoCAD 360 is a free, easy-to-use drawing and drafting mobile app that allows you to view, edit, and share AutoCAD drawings—anytime, anywhere. Simplify site visits and fieldwork with powerful design review and markup tools—available online and offline.

Seamlessly share drawings with others across desktop, web, and mobile devices. Easily access drawings from web browsers using the free companion AutoCAD 360 web app. AutoCAD 360

Pro subscription plans further expand the functionality of the app, bringing additional capabilities to the field."

The updates that are in this latest release are:

- Stunning high-resolution drawings display via full retina support
- Better display through improved PDF support
- Easy switching between metric and imperial units
- Saves time with faster app loading
- Improved collaboration through in-app notifications and streamlined sharing
- New properties for Properties Palette (Pro version)

Until next issue!

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