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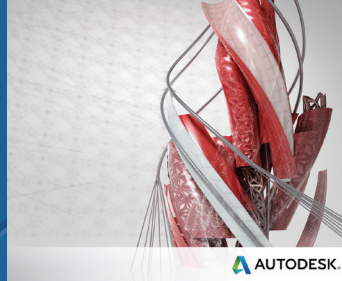
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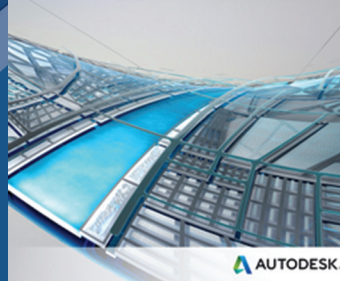
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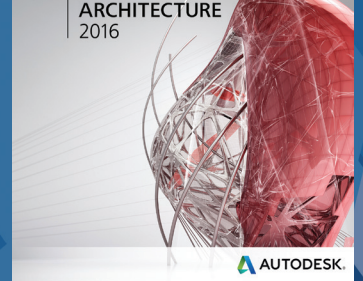
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## Also in this issue:

- Inventor's Many Enhancements
- Increasing InfraWorks Features in Civil 3D
- ACA's Update Variety Pack

HP recommends Windows.



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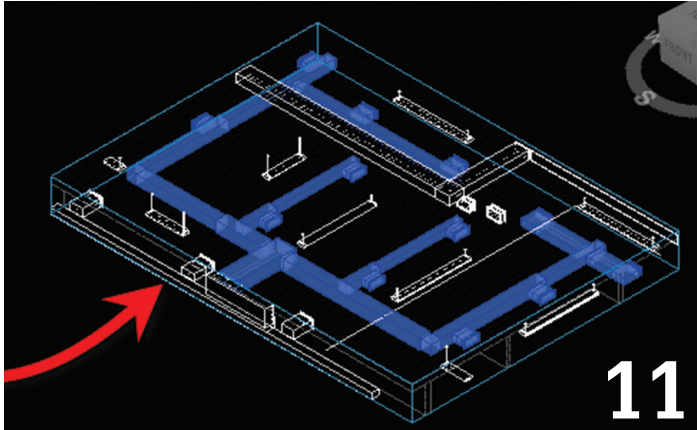
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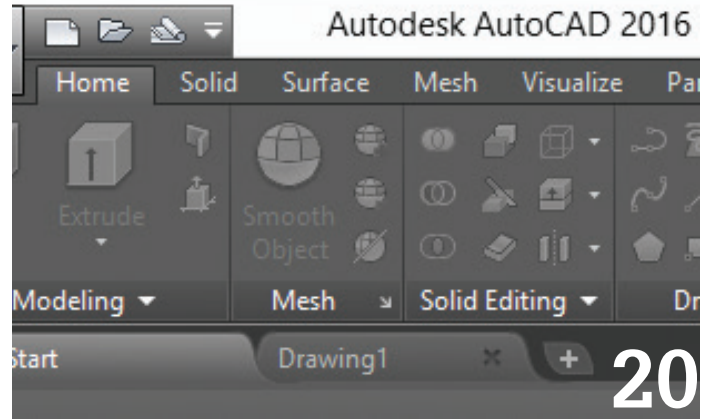
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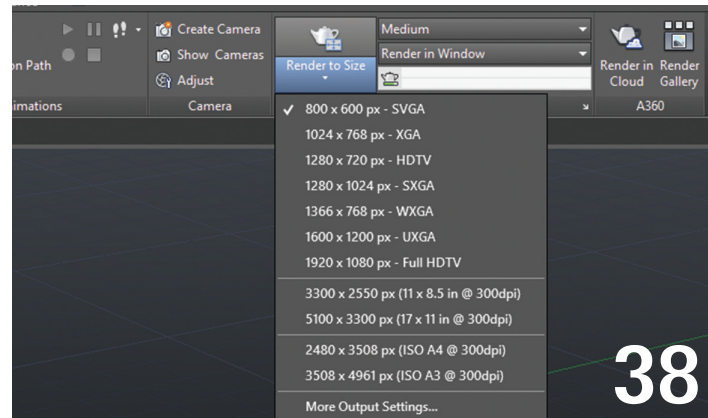
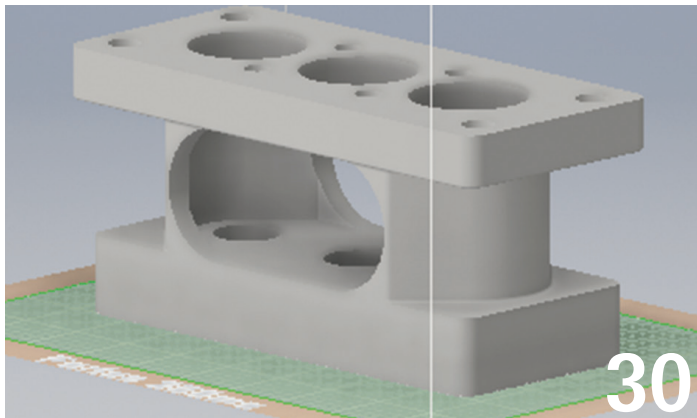
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# Letter from the President



# AUGI



## THIS IS WHY YOU SHOULD BE AN AUGI MEMBER!

AutoCAD® 2016 has been announced and by the time you read this you could already have it installed. You may have read about its features already. Did you know that AUGI's Wish List had quite the influence on this release of AutoCAD?

- Billy Wooten's wish that polygons would have a center OSnap has been granted. This is called the geometric center in AutoCAD 2016. It works on closed polylines.
- Modifying a revision cloud has been a Wish List item for a long time. Donald Boyer's wish to modify a revision cloud and add segments is now possible.
- Mark Stoner wished that text in dimensions could have a frame around the text. There is a new text frame option to do just that.
- Haven't you wished that text in dimensions could be word wrapped similar to MText? Michael Shick certainly did. Now there is a new sizing control similar to MText that allows you to wrap the text in the editor.

This is a great result for AUGI. This shows that one of the most important benefits to you as a member of AUGI is that you can influence product development via AUGI's Wish List.

Are you a member of AUGI? I'm sure there are features in the applications you use daily that you wish worked better. Perhaps you have an idea for a feature that is missing in your favorite application. The AUGI Wish List has the power of thousands of other users voting on the best wishes. This power is of great appeal to Autodesk's product development teams. Where else can Autodesk have thousands of users collectively telling them what is important to their productivity?

The answer is that there is not another mechanism for wishes with such a large group of users. And that is why, if you are not currently a member of AUGI, you should become one. Today.

The Professional membership gives you the most benefit, including a calendar year to be part of the Autodesk Developer Network (ADN). If you write code to leverage Autodesk's product APIs and are not an AUGI Professional member, you are missing out on a wonderful opportunity. As a member at this level you may also get *AUGIWorld* delivered to your doorstep.

The next level, Premier membership, offers some great benefits if you are a frequent poster on the forums and is an inexpensive way to add some more personality to your posts.

If you don't want the great benefits provided by the membership levels noted above, the Basic membership, which is free, gives you the chance to tell Autodesk what you need in your day-to-day applications.

So why aren't you a member already?

R. Robert Bell  
AUGI President

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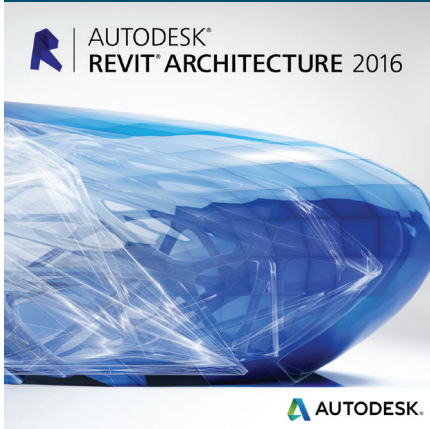
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# What's New & Noteworthy



Everyone should know that (for now) the release cycle for Autodesk® Revit® full builds/releases is a yearly endeavor and this spring sees the latest installment of that effort by Autodesk.

The development is focused this time around on many under-the-hood improvements, a majority of “platform” items—those belonging to all “flavors” of Revit—as well as some really nice additional feature(s).

In an effort to not bury the lead let’s jump into the feature added for Revit that every architect should get to know:

### Reveal Constraints

Doing exactly as it’s named, the Reveal Constraints addition is going to be as powerful as the previously released Temporary View Properties has proven to be... IMHO and in different ways of

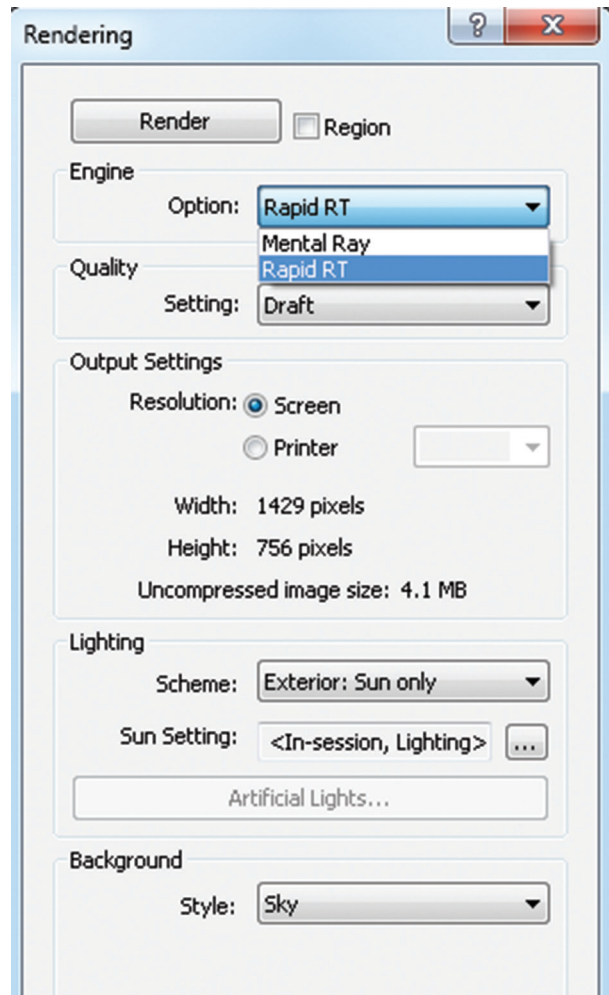
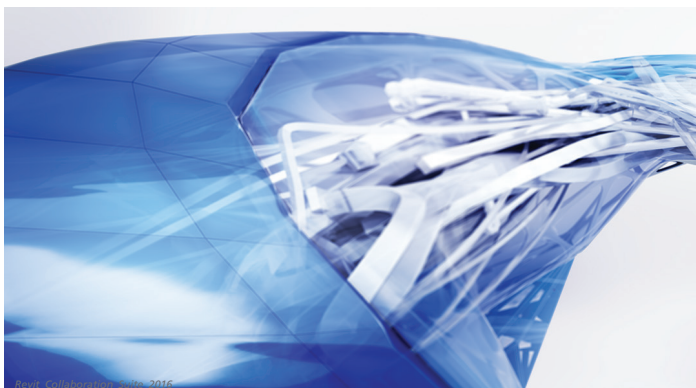


Figure 1: Reveal Constraints



Figure 2: RT Rendering

course ;) Want to know why that exterior wall moves unexpectedly when a chair, across the building, on a different level (for instance) is moved? Reveal Constraints is going to prove a good first line of defense.

Reveal Constraints is not only going to be powerful for fixing bad modeling practices...err...uhh... (yeah, bad... there's no way to sugar-coat such workflows), but this feature should also streamline the education of teams by giving more clear insight into what is truly going on in the models at a more granular level than before, by perhaps relieving the need to have "constraint" views set up.

It seems apparent that Autodesk and the Revit development teams are quite aware that the mantra "Don't over-constrain the model," while being a true and good (see: mandatory) practice, is too often not followed, if even understood by enough folks in AECO. Therefore, to have a method for more effectively visualizing what is constrained to what, as well as having a starting point to provide a path for potential solutions, this feature gets the BIM Manager three thumbs up (two was so 1900s).



*Art - Architecture - Technology - Ideas*

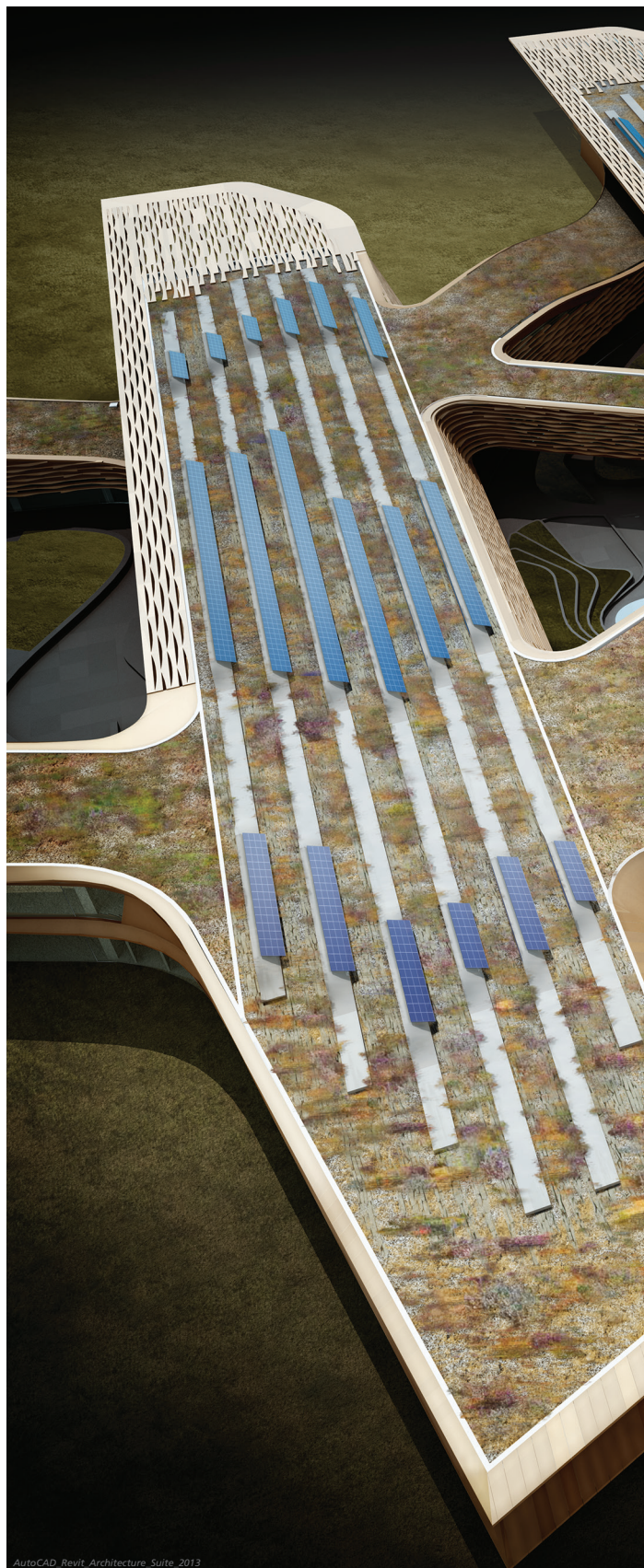
*These are Jay B. Zallan's professional passions. He is a Designer, an Artist and an AEC technologist.*

*Harley Ellis Devereaux's Los Angeles VDC's Director of BIM Jay Zallan brings unique & qualified insights into the business & creative processes of Architecture with proven strategies for production & growth.*

*Mr. Zallan has over 20 years of Architectural experience and enjoys a varied & diverse portfolio of Architecture and Art.*

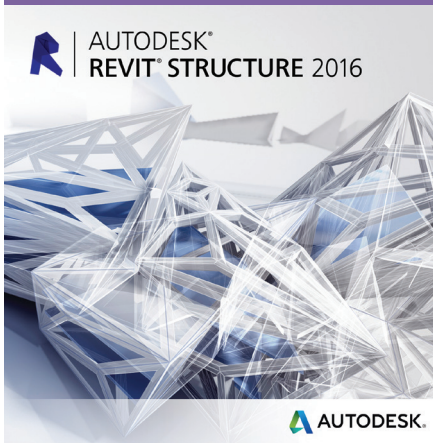
*He is currently the President of the Los Angeles Revit Users Group, AUGI-world magazine Revit Architecture Editor, BIM Advisory Board member for Graphic Standards and he is a frequent lecturer on Creativity, BIM and Virtual Design & Construction.*

*He can also be found presenting at Autodesk University, Revit Technology Conferences and as a guest lecturer at the University of Southern California, LACMA, as well as many AIA, CSI and other industry events.*



AutoCAD Revit Architecture Suite 2013

# Bring in the Reinforcements (and More)



**H**ere in the northeast U.S., the birds are returning from their southern migrations, the snow has hopefully melted (although as I am writing, we are smothered under another 12" of blessed frozen flakes), and we are excited to unpack the newest Autodesk software release. Some of the features we will examine in Autodesk® Revit® Structure 2016 include display updates, rebar and reinforcement features, and scheduling updates. (A side note: if you are on subscription, some of these features were included in the R2 update and will look familiar.)

## DISPLAY ENHANCEMENTS – LOCAL COORDINATE SYSTEM

Displaying the Local Coordinate System (LCS) on arc walls and curved beams previously was non-existent. In Revit Structure 2016, the LCS “widget” now displays on both arc walls and curved beams in the analytical model. When a hosted load is oriented to the host LCS, the LCS will display the load direction directly on the host.

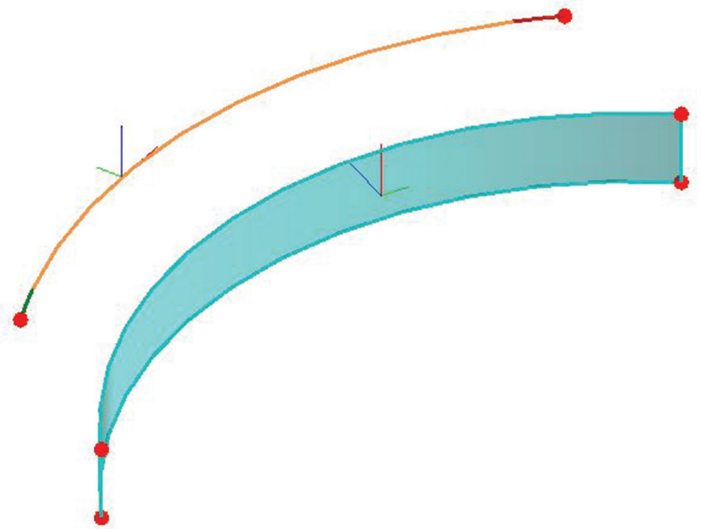


Figure 1: Local Coordinate System will display on curved beams and arc walls



## REINFORCEMENT NAVIGATION

It seems as if the most improvements have been made to reinforcement features in this release. Let's start with Rebar Display.

Users are constantly asking for improved performance, whether it be processing or graphics. Revit Structure 2016 delivers, at least in one way, by limiting reinforcement REGENs to only those elements that are visible on the screen. If the ZOOM scale is large, smaller reinforcement elements on the screen are represented by simple lines. Zooming into these elements restores them to their usual 3D visual characteristics. The detail level assigned to the view does not have an effect on the graphics display of the reinforcement at larger ZOOM scales.

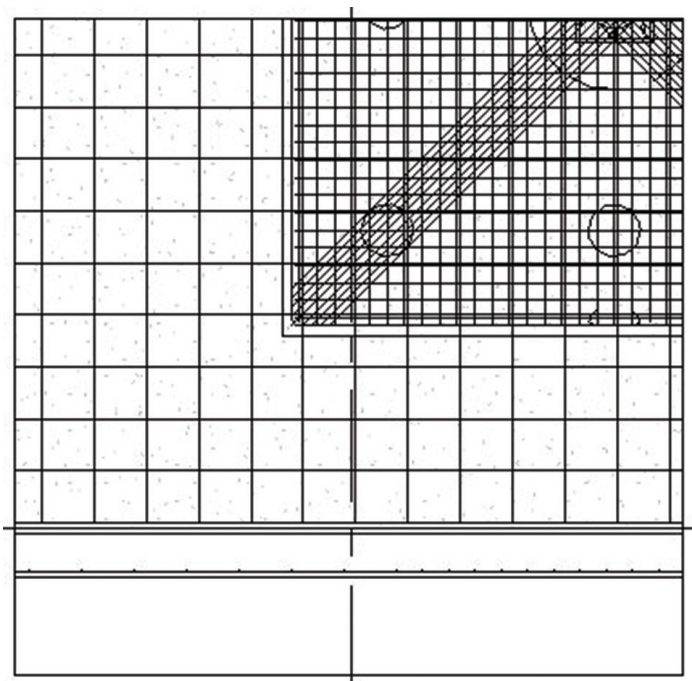


Figure 2: Simplified rebar in an enlarged plan

While we're on the topic of reinforcement display, another enhancement has been made to the Rebar Constraints dialog box. It is now possible to zoom, pan, and otherwise adjust your view

without having to close and reopen the Rebar Constraints dialog box. Seems simple enough, but a timesaver nonetheless.

By selecting one of the constraints in the Rebar Constraints dialog box and moving the mouse to the drawing window, the selected constraint is highlighted. Scrolling through the Constraint Target options highlights the targets in the drawing window, allowing the user to visualize options.

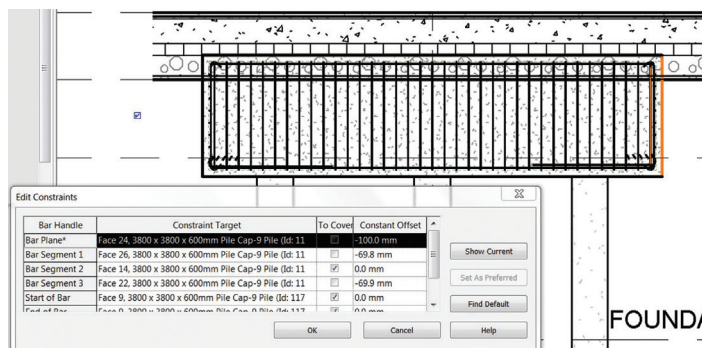


Figure 3: Rebar Constraints dialog box

## REBAR CREATION

In previous versions of Revit Structure, it was only possible to create rebar in section view of certain concrete elements. Floors were the only objects that could be reinforced while in a plan view. Revit Structure 2016 brings the ability to place rebar into various concrete elements in either plan, elevation, or section views (see Figure 4).

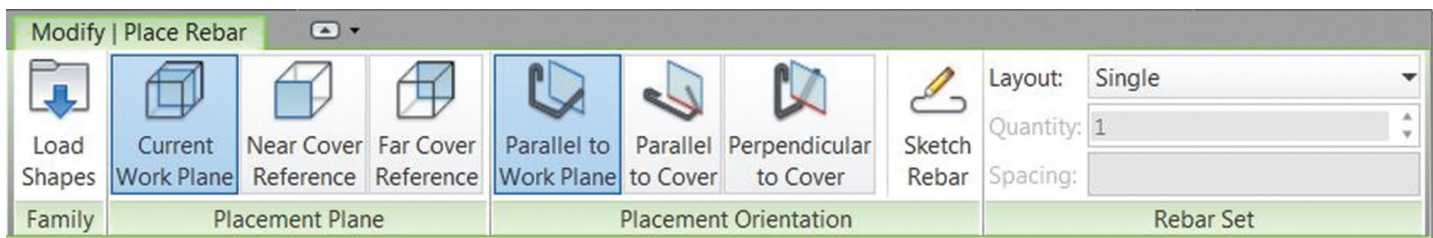
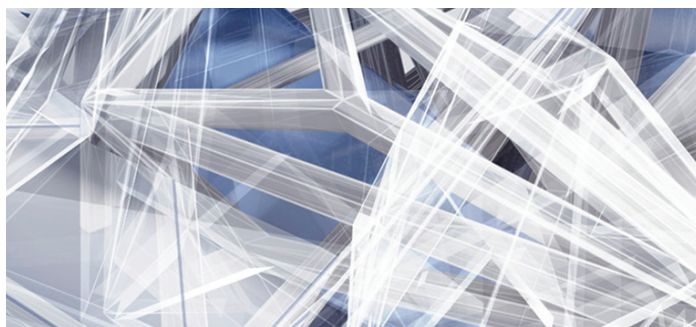


Figure 4: Rebar placement made available in plan, elevation, and section views

# Revit Structure 2016

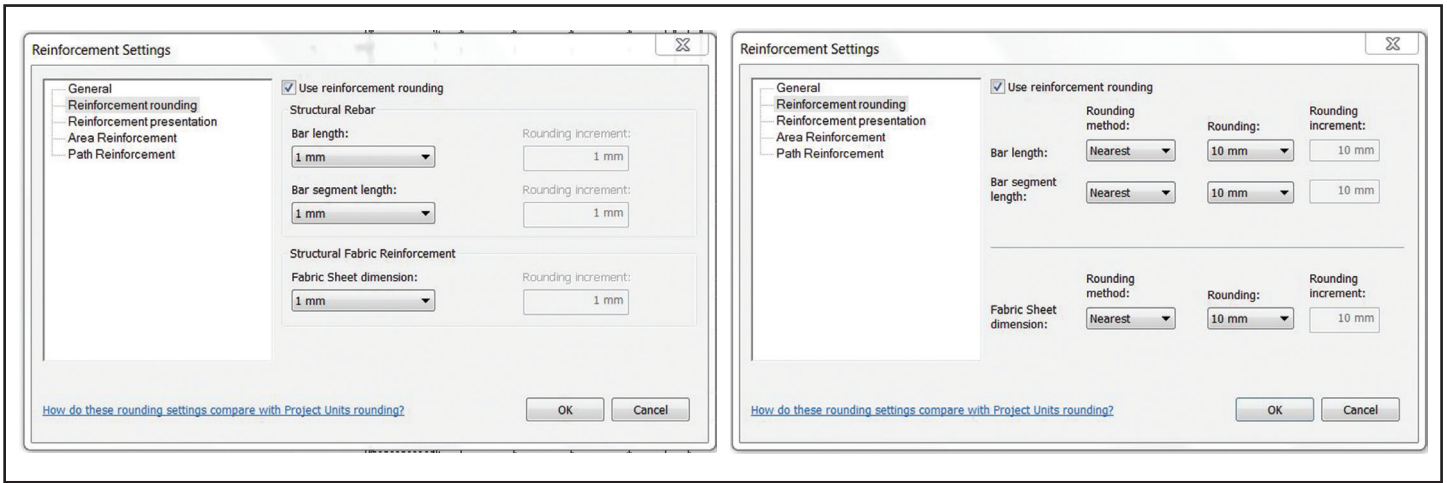


Figure 5: Rebar Rounding – Before (2015) and After (2016)

Another major enhancement has been made to Rebar Rounding. In the Reinforcement Settings on the Reinforcement panel, drop-down menus have been added for Rounding method, whether Nearest, Up, or Down. These values affect both Rebar Type and Instance Properties. In Instance Properties the rebar length will show both the exact length and the rounded length.

## STRUCTURAL FRAMING

A few features have been added to assist in structural framing layout and analysis. Probably the most obvious change is the flip control added to structural framing members. Clicking on a beam in a plan, section, or elevation view will reveal a flip control near the middle of the beam. This flip control sets the beginning and end justification parameters.

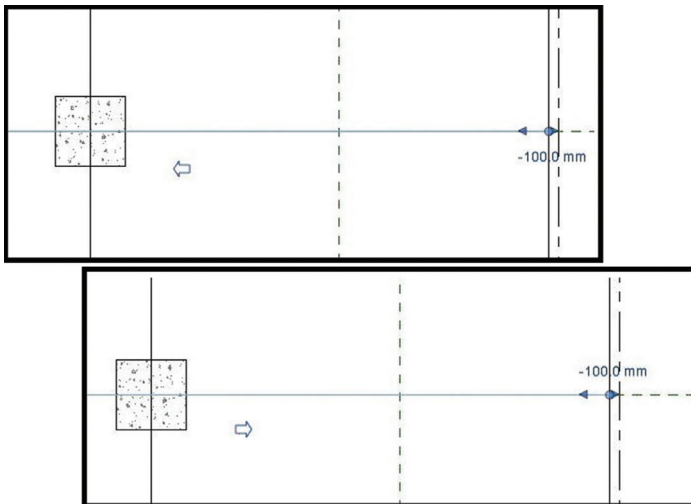


Figure 6: Structural framing flip controls

In addition, parameters have been added to structural elements that can be included in annotation and schedules. Top and Bottom parameters are included for beams, braces, and structural floors. Top and Bottom Core parameters are added to multi-layered structural floors and foundation slabs.



## ETC...

In addition to the updates that are specific to Revit Structure, be sure to check out the additions and updates to Revit in general. Some exciting features have been developed relating to text, revisions, and general interface. With each release, Revit just keeps getting better and better.



Kimberly Fuhrman, LEED AP BD+C, has more than 20 years of experience in both the civil and architectural fields using a variety of Autodesk software products. She is a Revit Architecture Certified Professional and the Revit Structure Content Manager for AUGIWorld. Kimberly is the BIM Manager for LSC Design, Inc., in York, Pennsylvania. Contact her at [kfuhrman@lscdesign.com](mailto:kfuhrman@lscdesign.com).

# Success by 1,000 Fixes



Rumor has it that Autodesk software goes through two kinds of releases: a major build then a fix and finish, which leap frog ad infinitum. This may be why “even year” releases always seem better. That being said, the last two years of Autodesk® Revit® presents a different feeling. While it’s fruitless to predict where Autodesk plans to go with any granularity, here is a personal observation. Revit seems to be stuck in a continual foundational fix mode. The grand additions and game changers have given way to a very detailed fix mode. This is evidenced by a list of more than 250 improvements, corrections, and provisions on one side and a “count on one hand” list of new functionality on the other in the 2016 release. Even with the long list of upgrades, it is hard to be excited with the subtlety of most of the improvements and the fact that many were released as updates to the 2015 release. This leads one to wonder if Revit has passed the high point of its development, or if is this a “success by 1,000

fixes” strategy. In either case, there is quite a list of improvements to review, so best to get started.

In the release notes available at the time of writing, 125 items were listed as improves, 125 as corrects or updates, 9 as provides or adds, 4 as allows or enables, and 1 each as removes or restricts. They are not all listed as they have been filtered for the concerns of MEP users in this article.

## IMPROVEMENTS

### Stability

- The Project Browser and Properties palette stop disappearing after re-opening Revit
- You can now scroll to the bottom of the Properties palette without it popping back to the top
- More stability in the contextual tab when adding electrical devices

# Revit MEP 2016

- More stable when using a panel schedule template set to hide the third phase column
- More stable when modifying the format of a panel schedule template
- More stable when deleting an electrical element that is connected to a zero length wire
- More stable when dragging cable tray or conduit
- More stable when editing a conduit temporary dimension in elevation
- More stable when generating a piping layout
- More stable when deleting a pipe fitting in an invalid state
- More stable when a family type is deleted on insertion
- More stable when changing the type of a fitting
- More stable when opening a file with corrupt dimensions
- More stable when using Tag All in a workshared model that is owned by another user
- More stable when assigning a new label to a dimension in the Family Editor
- More stable when loading layer export settings from a file
- More stable when multiple users try to load or modify the same family in a workshared model
- More stable when opening a model that contains large obsolete elements
- More stable when a user cancels an upgrade process
- More stable when zooming in a 3D view
- More stable when hardware acceleration is active

- More stable in files corrupted by cross-document copy
- More stable when editing a group from the Project Browser
- More stable when zero-length geometry is contained in an imported DWG file
- More stable when importing DWG files with warnings
- More stable when binding a link that contains a host-based family that is also identified as workplane-based
- More stable when the model is missing revision settings data
- More stable when exporting schedules
- More stable when filtering a schedule
- More stable when double-click opening a project from Windows Explorer
- More stable when family related corruption is encountered in Revit 2015
- More stable when editing a filter owned by another user
- More stable when processing geometry in section and elevation
- More stable while editing fields in the Worksets dialog
- More stable when an undo removes a view that was opened as part of a reload latest
- More stable when making edits in the Sun Settings dialog

## Corrects Issues that Caused the Following

- Deletion of ceiling hosted lights when ceiling is moved or copied
- Incorrect fitting sizing based on content settings

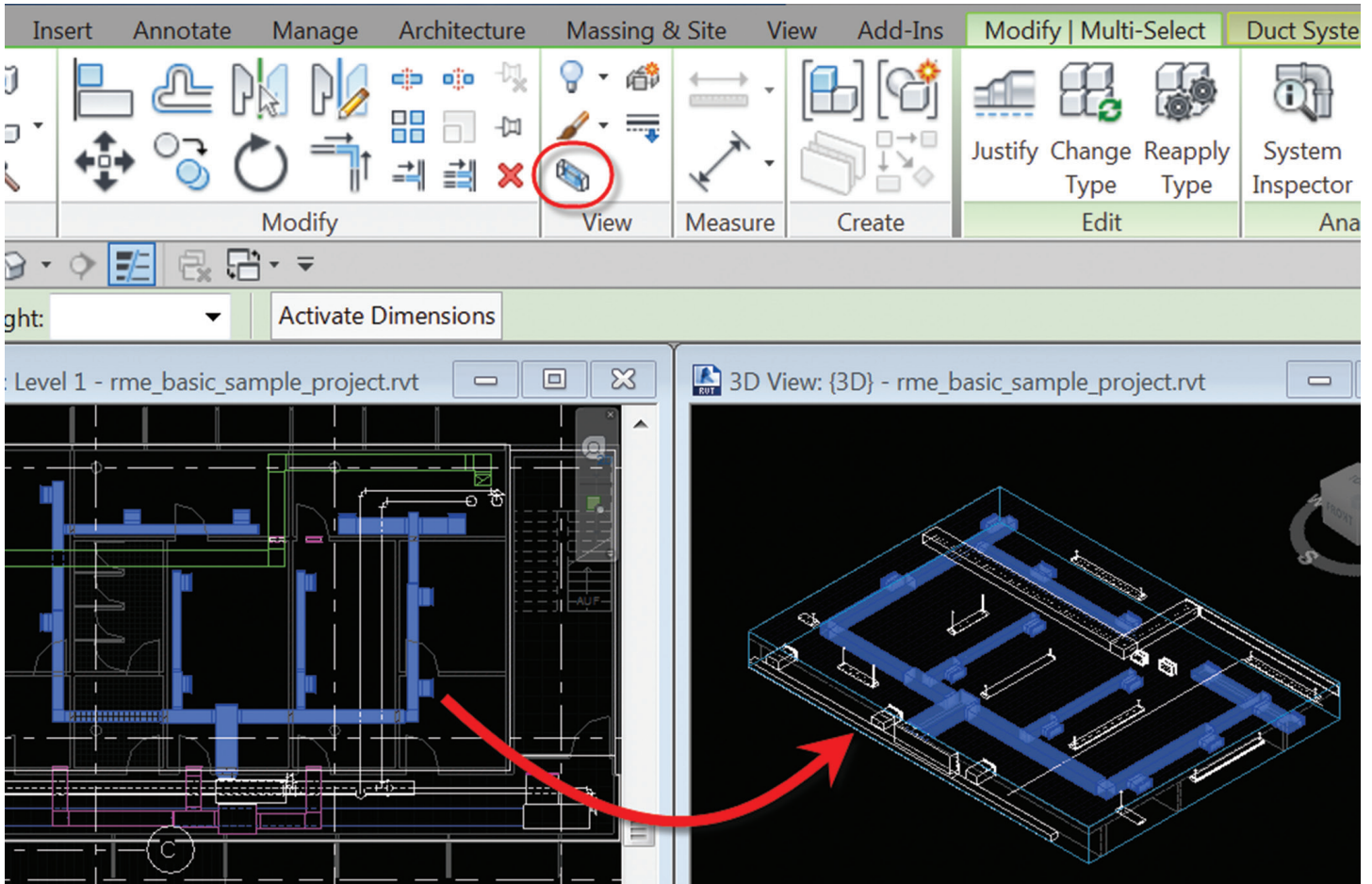


Figure 1: The Section Box

- Incorrect length of beveled tap when set by a formula
- Disconnected duct transitions when changing duct size
- Differing values in a tag and properties when using duct radius elbow/taps
- Hidden lines and gaps for duct and pipe display differently than printed
- Unavailable customizable drop-down when multi segments of cable tray or conduit is selected
- Nested objects in cable tray families don't display
- Wrong circuited item displays in plan view when selected in the Project Browser or System Browser
- Moved or edited circuit change lost after Save to Central
- Electrical families not printing or exporting when the project base point is covered
- Ducts misalign when level elevation is changed
- An error dialog when arraying pipes
- Incorrect default values when Creating Similar
- Non-displaying pipe parameters in a schedule
- Imported CAD files to not display
- Generic tags to disappear after modifying a view control parameter
- Duct color fill disappears when changing the system color scheme
- Updated family fails to create a symbol in a project
- File corruption in workshared file when saved with Revit LT
- File name missing in file upgrade dialog
- Missing preview images in Open dialog
- Graphics in some views disappear when upgrading to 2015

So what is new? Here are some of my favorite new functionalities in no particular order.

**The Section Box.** The Section Box tool is located on the View panel of the contextual ribbon when elements are selected. It opens the default 3D view with just the selected elements isolated. It's a throwback to the Object Viewer in AutoCAD MEP and is just as useful. Key in BX to get there quick—you are going to use it a lot.

**Search faster.** Search in drop-down lists and ribbon combo boxes. If you liked it in the AutoCAD command line, you will love it in Revit 2016. It will not take long to become addicted to finding just what you are looking for quickly and easily.

**Performance in calculations.** A performance setting for calculations in duct and pipe has been added. Oddly, setting the systems' calculations to Performance makes things faster than setting them to None. The None setting still maintains the logical sections in the system, and the Performance performs no system-level calculations at all.

**Allow navigation during redraw.** Pan, zoom, and orbit in a view without waiting for the software to finish drawing elements. Enabled by default—you will never go back to waiting.

**Schedule improvements.** Change cells in a schedule with the TAB and arrow keys. Using the Home and End keys inside a cell will move the cursor to the beginning and end of text. The Insert Row tool is now in the Rows panel of the ribbon and not buried in the Insert pop-out.

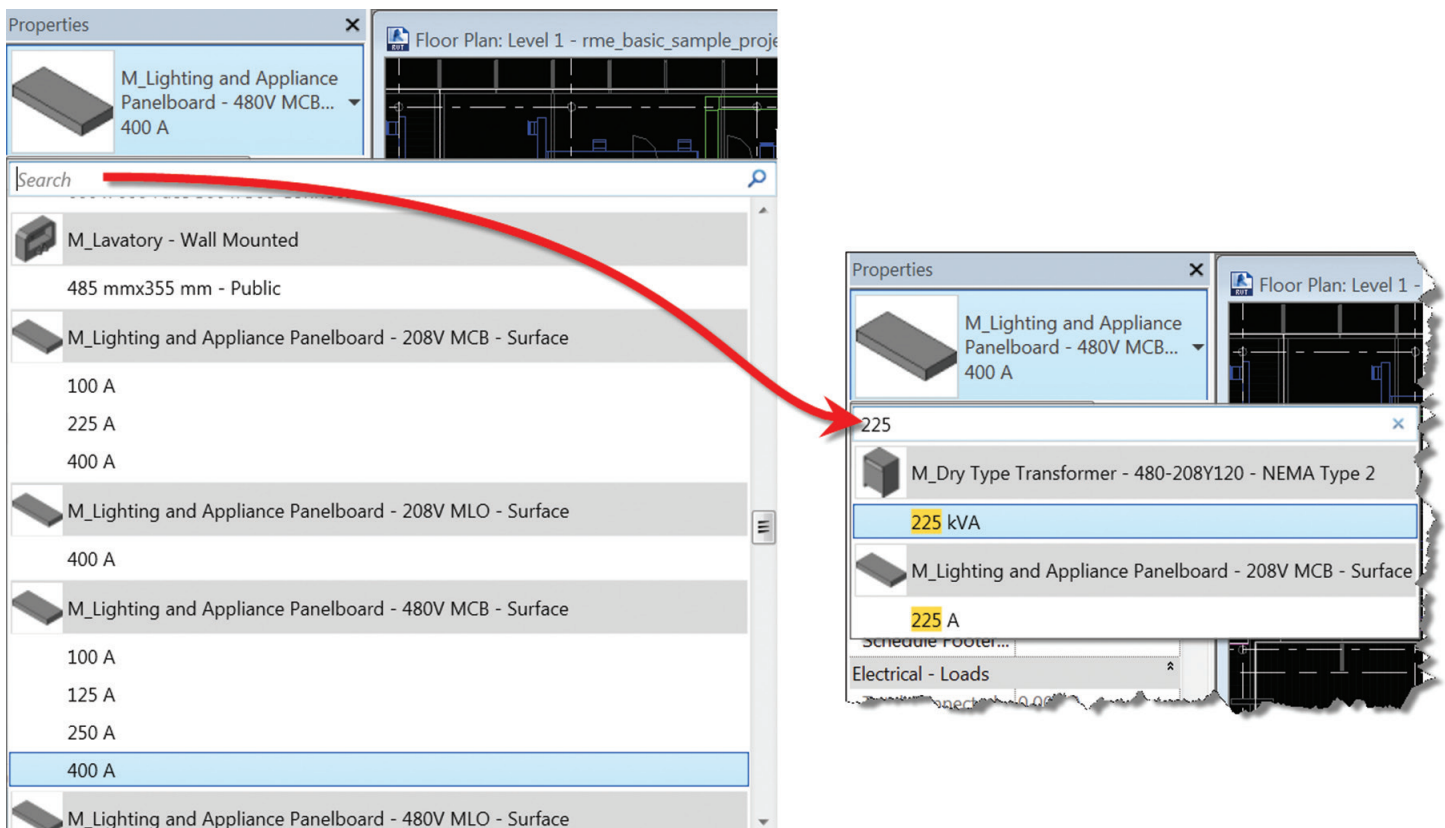


Figure 2: Search faster

# Revit MEP 2016

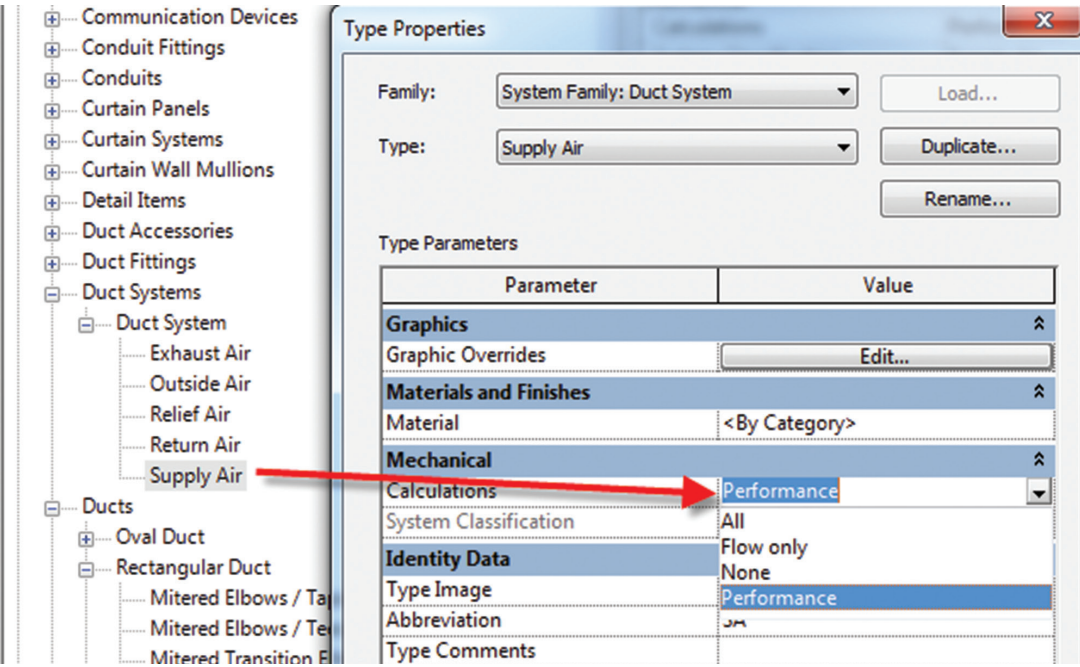


Figure 3: Performance in Calculations

**Thin Lines.** The Thin Lines tool setting is now stored in the Revit.ini file and spans sessions.

## WISHES GRANTED

How did the AUGI Revit MEP Wish List containing the top 30 wishes of MEP Revit users around the world fare? This year saw the granting of just two wishes. First is what I consider to be the very first Revit wish: defaulting to “origin to origin” when linking files. Second is the nearly as long awaited wish: the option to cancel an upgrade on open. It’s bittersweet that more wish list items were not addressed. Listed below are some of the unanswered wishes. If they look like a good

list, please login to AUGI and add your voice.

**File upgrades.** When opening a file in a previous release, users now get a dialog that allows them to cancel the open and upgrade.

**Edit/load a family.** There is now a Load into Project and Close tool in the Family Editor.

**Import/link position.** The default positioning when linking Revit files is now Auto - Origin to Origin. If changed, the selected positioning becomes the default. Revit keeps a default value for Revit models and another for CAD files.

**Revit link in a closed workset.** The status of Closed Workset now displays for a Revit link that is in a closed workset.

**Piping flow units.** Project units for piping can now be specified in liters per minute (L/min).

**Improved snapping behavior.** Remote snaps include only objects in view, rather than the view extents and snap filters related to the zoom level. Revit also remembers snaps at the application level, so set it and forget it.

**MEP fabrication detailing.** LOD 400 for detailers can be achieved with content from Autodesk Fabrication products (CADmep, ESTmep, and CAMduct).

**Revisions.** Multiple rows can now be selected in the Revisions dialog and the starting number for a numeric sequence may now be zero or any positive number. Alphabetic sequence is now “alphanumeric.” It accepts custom sequences of characters.

**Saved zoom states.** Revit now remembers the zoom states of each view after the model is closed. When reopened, each view opens to the remembered zoom state.

- \* Add a footer/notes section to schedules
- \* Text editing (make it better)
- \* Plan regions should apply to pipe, duct, conduit, etc.
- \* Tell us why a system is not well connected
- \* Multiple monitor views
- \* Any shape call out boundaries
- \* The ability to create schematic diagrams of systems from the model
- \* Making connections in linked files
- \* Freeze schedule headers
- \* Fix pipe up and down single line symbology
- \* Calculate length thru pipe, duct conduit cable tray, etc.
- \* Single/double line in the same view
- \* Use all cores of multi-core processors
- \* Highlighter clouds
- \* Spaces to cope with vertically irregular spaces better
- \* Duplicate sheets



Todd Shackelford is the BIM Manager for Alvine and Associates, the president of the BIM Board of Omaha, a University of Nebraska instructor and a frequent speaker at Autodesk University. He authors two Blogs; CAD Shack and The Lazy Drafter. A Revit 2013 Certified Expert. Todd looks for his missing socks when not otherwise committed. Tweet Todd @ ShackelfordTodd or email Todd at tshackelford@alvine.com



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# Good News and Bad News



**I** talk a lot about communication and how the CAD manager can define, refine, and proliferate knowledge so the entire firm knows, understands, and is informed. Keeping staff on top of the latest information and keeping management aware of your efforts is part of the job. There is a lot of information that goes back and forth, so this time I will confine it to the good and bad news areas of your communication.

## GOOD NEWS

The positive news that is generated by progress is always fun to share. Everyone wants to hear about it and they share it with others. As the news travels through your organization, you need to get the word out yourself. Be sure to include your participation in the success so that others see your value to the firm.

### Make Sure They Hear Good News from You

Often, CAD managers make major strides forward or tackle some really tough problems and no one hears about it. They work on short- and long-term efforts that are away from the spotlight. They produce shortcuts and workarounds for nagging troubles, with few accolades. They work in the back room and while others are focused in other directions and make small and large upgrades to proficiency.

When problems are alleviated, efforts are complete, and potholes avoided, the CAD manager needs to let others know. Managers can write newsletters and emails or just drop it into conversations and reports on their efforts. The main thing is to get the news out, while not blowing your horn over every last little tweak you do to help someone or avoid a strange failure. But you need to have a consistent way of keeping your efforts in front of staff and leadership.

### Make Sure They Know Your Contribution

When discussing efforts and the generation of ideas, you need to subtly remind them of the fixes that originated in your head. Many times team members' efforts get lost in the news. The combined efforts to make something work often come from the identification of the problem by the CAD manager. Let them know that the CAD manager (you) coordinated or managed the process of getting back on track. You should acknowledge and give credit to others and recognize their contributions, but do not fail to include yourself. I always encourage the use of "we" and "us," but a few well-placed "I" statements can remind others that you are creative, problem solving, and focused on productivity increases. Being humble and a team player does not mean that you "never" mention what you bring to the team.

### Make Sure They are Reminded about Past Good News

Good news fades fast. Just think of the news cycle on TV and other news outlets. Yesterday's news becomes useless pretty fast. So to combat the short-term memories of your company leadership you need to blend old news into new news. I do this by reminding them of past news as a preface to fresh news. Here is an example: "Remember the cost savings achieved when my team and I reworked the plotting process last year? Well we made some additional changes that increase those savings even more." This method reminds them of what was already accomplished as a baseline to launch into fresh good news.

## BAD NEWS

Good news travels fast. Bad news travels faster. I have always kept that in mind. Letting people know the positive things that happen is a good idea, but letting people know when bad things happen is critical. It always seems like a crowd appears when things go south.





Hardware failures, corrupted files, and more can derail a great project on the short term. Others can transmit these negatives quickly. You need to take control of the message when something bad is happening or has happened. Here are some reasons why.

### Make Sure They Hear from You First

When something goes wrong, it is crucial that major stakeholders and your boss hear the news as soon as it can be effectively communicated. And they need to hear directly from you first, if possible. Effective communication can be done when you have enough information to deliver. If you go in without enough information, their concern level is going to rise. You should try to get to your boss before others so you can manage the story. Others may transmit incorrect information. Get to upper management early and get them up to speed. Communicate to others as soon as you have enough info on the issue. If others are connecting before you, then go in with whatever information you have at the time. Connecting to management quickly is the goal.

### Make Sure They Know Your Level of Concern

If you tell others what is happening without defining your level of concern, then they start filling in the blanks and speculating on the damage. You need to have a calm, measured conversation that conveys the level of damage expected. Neither downplay it nor start wandering down the road of "what ifs." Keep it simple, direct, honest, and calm.

### Make Sure They Know You Are on Top of It

Let them know that you or your team members are working to define the problem and get it fixed. If you are still investigating, let them know what you might be looking for. If you are applying a fix, let them know what you are doing. Make sure they understand that you will get it fixed or define a short-term workaround and do whatever it takes to get things back on track.

### Make Sure They Know You Have a Plan

If they need more information, then just lay out your plan of attack. Let them know that you are analyzing the problem, defining options for remediation, scoping the damage, outlining repairs, and applying them quickly. Just knowing that you have a systematic approach to fixing troubles will give management comfort.

### Keep Management Informed

If the trouble is going to extend past expected impacts, circle back and let folks know what the problem is, how long it might last, and how your workaround will get things moving forward. Give them a tentative time/date for the final solution and what you have in process to get there. If you think it might take money to fix the problem, let them know early with a framework budget. If this was a recurring problem and you were limited in getting the solution in place because of money or staff, let them know. This is not "rubbing their noses in it" but is just a small reminder that you previously identified the problem, had a fix, and were prevented from putting it in place prior to a system failure.

### When It Is Fixed, Make Sure They Know

Do not forget to debrief everyone after the fix is in place. Once things are back online, check back in and let everyone know the full story of what the problem was, what it took to fix it, who helped get it back in line, and that it is working now. Let all end users know that things are back on track.

### Share Lessons Learned

When you are letting them know it is fixed, also share any lessons learned. Like budgeting for troubles so that money is around for quick fixes. Or maybe how you have adjusted the reporting process for small troubles so they do not become big ones. Or maybe it is putting in place a maintenance contract that was previously not approved.

## CONCLUSION

Sharing good news is fun. Sharing bad news is critical. Take control of both. Keep people informed and aware of your management efforts. Stay out front.



*Mark Kiker has more than 25 years of hands-on experience with technology. He is fully versed in every area of management from deployment planning, installation, and configuration to training and strategic planning. As an internationally known speaker and writer, he is a returning speaker at Autodesk University since 1996. Mark is currently serving as Director of IT for SIATech, a non-profit public charter high school focused on dropout recovery. He maintains two blog sites, [www.caddmanager.com](http://www.caddmanager.com) and [www.bimmanager.com](http://www.bimmanager.com).*

*by Robert Green*

# Configuring Workstations: Getting RAM Right

**A** When buying a new workstation – or even upgrading one you already own – one of the most common questions is, “How much RAM should I install?” The most common answer to this question seems to be, “All you can afford!” But is that really all there is to it?

Getting the best performance from your workstation requires a more thorough understanding of not just how much RAM but also the type, speed, and distribution of that RAM based on the CAD applications you intend to run. Once you know the rules it becomes easy to configure your HP workstation to get the most performance for your money.

## HOW MUCH?

The first task is to determine how much RAM is really required to achieve great performance from your workstation. Too little RAM will slow your machine down but too much will simply cost more without adding any benefit. To compute the proper amount use the following guidelines:

**Start with 4GB:** This RAM loads the operating system, email client, virus/malware programs, and other resident utilities that load at boot up.

**Add 1 GB for applications:** This RAM services word processors, spreadsheets, multi-tab browser sessions and the core software for the CAD applications used. Note: If you load several CAD or rendering applications concurrently consider adding another GB.

**Add 20 x Model Size for each CAD/rendering program:** CAD applications load a variety of files (including XREFs, Inventor sub-assemblies/parts or linked Revit files) that need to be memory resident. So a 2D AutoCAD user loading 500K files would need an extra 10 MB of RAM, while

an Inventor user opening a massive 1GB assembly would need an extra 20 GB and a Revit user opening linked building files 100 MB in size would need an extra 2 GB.

**Forecast a few years forward:** Will the user’s software packages change? Will they need to run more applications concurrently? Will their model sizes increase? If the answers to these questions are yes you may need to add several more GB to guard against slow performance when these changes take place.

**Round Up:** Total up your calculated RAM and round up to the nearest memory option for your workstation like 8, 16 or 32 GB.

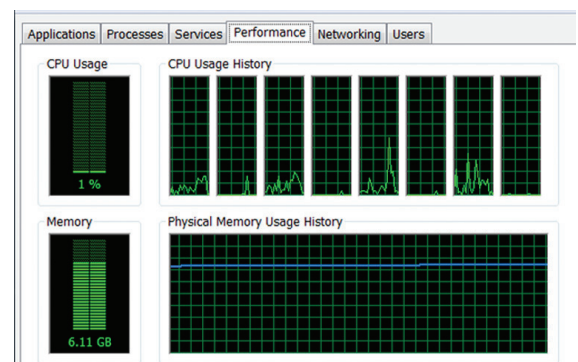


Figure 1 - Using the Performance Monitor on a machine with an 8 MB 3D AutoCAD file loaded along with eMail, a rendering session, Word, a multi-tabbed Chrome session and a PDF viewer open we see that 6GB of RAM is up to the task for this user’s needs – which validates the 8 GB forecasted using the above guidelines.

## HOW MANY MODULES?

Workstations have a certain number of available memory sockets (anywhere from 2 to 8 per processor) that can be populated with RAM modules as shown in Figure 2. So if it

has been determined that 16 GB is the appropriate amount of RAM to install for a given user's needs the question becomes should that RAM be installed as two (2) 8 GB modules or four (4) 4 GB modules? After all, if only two (2) slots are populated the other slots would be available for later upgrades.

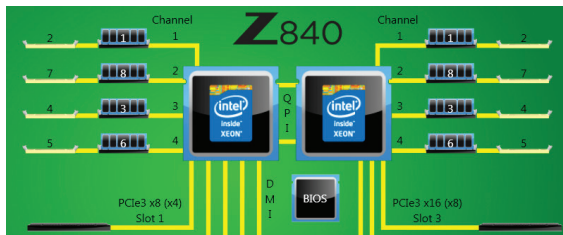


Figure 2 – The dual processor Z840 workstation diagram shows 16 available memory sockets spread over 4 channels per Intel Xeon processor. Note the optimal placement of one memory module per channel. Single processor workstations like the Z1, Z230 or Z440 have either 4 or 8 memory sockets depending on the installed processor.

In theory, the best performance will always be obtained by installing the maximum number of memory modules (4 x 4 GB in our example case) but some software programs may not require this configuration. In a [recent whitepaper](#) published by HP it turns out that single/lightly threaded CAD applications like AutoCAD, Solidworks and Siemens NX only benefit slightly (<5%) from loading all memory slots while multi-threaded analytical and media applications can benefit substantially (up to 30%) from having all memory modules loaded equally.

So depending on the software your company runs – or may plan to run – you can make an educated purchasing decision on whether to risk populating only two memory sockets rather than all four.

Note: For dual processor systems with 16 sockets - like the HP Z840 in Figure 2 - always split the memory modules equally between the two processors.

## SPEC THE SAME SPEED AND SIZE

No matter how many processors your workstation contains always purchase the fastest RAM modules supported. Buying anything slower will sacrifice performance while anything faster provides no extra benefit yet costs more. And always keep the memory module types, speeds and sizes the same so all memory channels are balanced. For example to get 16 GB of RAM use four (4) 4GB or two (2) 8 GB modules rather than two (2) 4 GB plus one (1) 8 GB module.

## SPEC ERROR CORRECTING CODE (ECC) MEMORY

Have you ever experienced CAD applications that dismiss themselves for no reason? How about corrupted data files? Blue screen of death memory dumps? All these problems can be caused by errors in non-ECC memory which is often used as a cheaper alternative to ECC workstation memory. According to

a [prominent Google study](#), one in three systems with just 4 GB of memory has at least one correctable error each year and as more memory modules are installed the risk goes up. Further, once a memory error is observed it is between 13 and 90 times more probable that another error will be experienced within a month.

When ECC memory is installed the user will not suffer the reloads, reboots and corruptions they would with non-ECC memory. While reloads and reboots simply cost user time – whose costs can be computed – it is impossible to calculate what data corruption in an assembly part or building component might cost in real project scenarios.

## ENJOY OPTIMAL PERFORMANCE

By following the guidelines laid out you can specify the right amount and type of RAM to make your HP workstation perform at its best and get the absolute best return on your RAM investment.

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## ABOUT ROBERT GREEN

Robert Green provides CAD management consulting, programming, speaking, and training services for clients throughout the United States, Canada, and Europe. A mechanical engineer by training and alpha CAD user by choice, Robert is also well known for his insightful articles and book, *Expert CAD Management: The Complete Guide*. Reach Robert at [rgreen@greenconsulting.com](mailto:rgreen@greenconsulting.com)



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# Introducing AutoCAD 2016



**A**utoCAD® 2016 is here and it has brought with it many updates to existing commands, tools, settings, and features. Surprisingly it has not followed the three-release DWG file type update. AutoCAD 2016 will continue using the 2013 DWG file type. It has also removed the ability to password protect DWG files. It can open and use password protected files, but it will not be able to create them. This update brings performance improvements, new ways to create dimensions, a few UI tweaks, a new osnap, additional point cloud tools, updated referencing options, a brand new 3D rendering engine, and a handy system variable monitoring tool.

## USER INTERFACE ENHANCEMENTS

AutoCAD 2016 has added new functionality to many user interface elements. There are some name changes, new system variables, and additional options to already existing tools. There are also new controls for older commands.

The New Tab file tab has been renamed Start. The system variables that control it have also been updated. The NEWTABMODE system variable is now STARTMODE, but it essentially works the same way. When it is set to 0, the Start tab will not be displayed. Set to 1 and it will be displayed. There are controls in the 2016 deployment creation tools that will allow this variable to be set to either on or off.

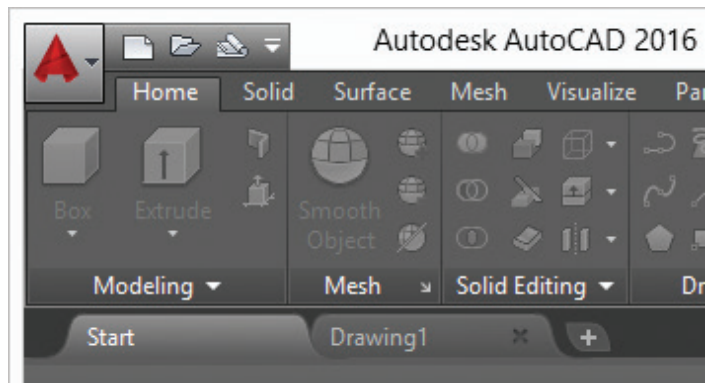


Figure 1: The Start tab will remain when creating or opening files

Pressing CTRL+Home or using the new command GOTOSTART will switch the user to the Start tab. The new command CLOSEALLOTHER will close all open files except the one that is current.

The Layout tabs (paper space tabs) have been updated so users can drag and drop them to different positions similar to Microsoft Excel tabs. The Status bar will now automatically wrap into two rows when there are more icons than screen space on your display. The model tab and at least one layout tab will always be visible on the screen regardless of space available. The Status bar has been updated to include the Isolate Objects and Lock UI switches. They can be found in the customization menu.

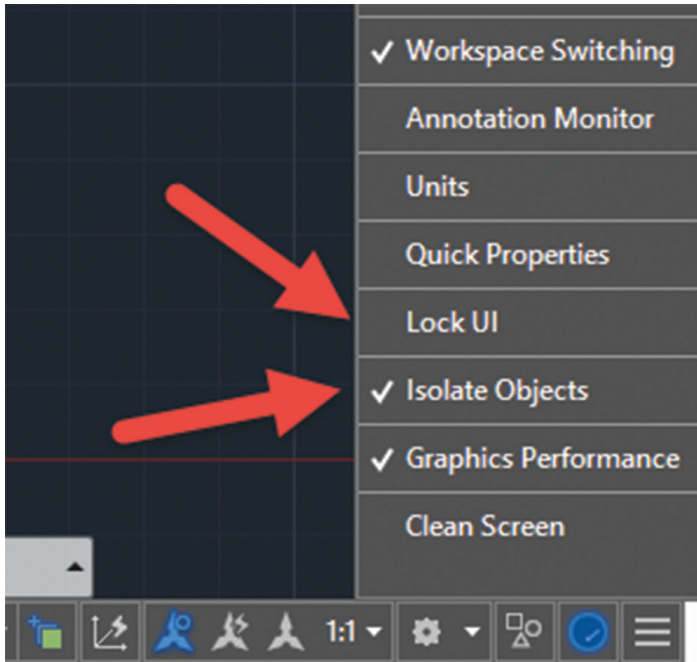


Figure 2: Access the Status bar icons through the Customization icon on the far right of the Status bar

The Lock User Interface tool allows users to toggle a lock on specific interface elements instead of having to use the old flyout option. Click the Lock UI button in the Status bar and a menu opens granting instant access to four different types of interface elements. Click the element you want to lock placing a check mark next to it.

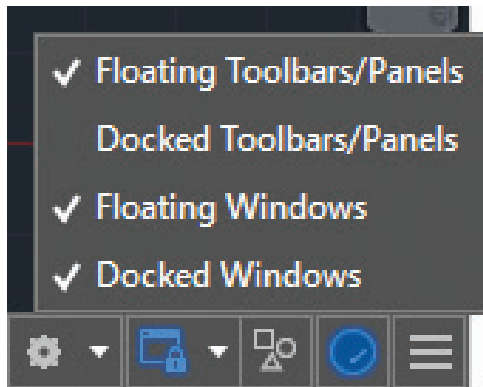


Figure 3: When you get your UI set the way you want, lock it to avoid accidental changes

The ribbon has a new system variable, GALLERYVIEW, which provides controls to display, or not to display, gallery views in ribbon panels. Setting it to 1 will provide thumbnail previews of blocks and styles in the ribbon. Setting it to 0 will turn off this functionality. The traditional Insert Menu (for blocks) or a detailed styles list (for Dimensions, Text, MLeaders, and so on) will be displayed instead.

Help now has a single sign-on functionality that will allow users to “like” a topic and save it to their A360 account, making it easier to revisit those documents in the future. The Help Find link will

now point to commands or tools that are in the Status bar. If the appropriate icon is not available, the arrow will point to the Customize icon instead.

## ANNOTATION UPDATES AND NEW FUNCTIONALITY

Revision clouds have been given a major rework and are much more than a polyline. There are three methods of revision cloud creation: Rectangular, Polygonal, and Freehand. The last method used will be the default method the next time the command is used. It can also be set using the REVCLLOUDCREATEMODE system variable. The biggest change to revision clouds is their new ease of editing. There are now multiple grips available that work similarly to editing polylines. These grips are based on the shape of the cloud as well as the method used to generate them. If a circle was used there will be a center grip. There is a new Modify option that allows users to create a new revision cloud segment and add it to the existing cloud. This was the number four item on the AUGI Wish List request sent to Autodesk.

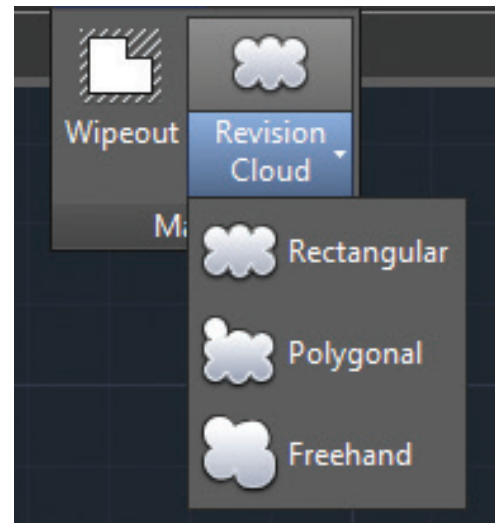
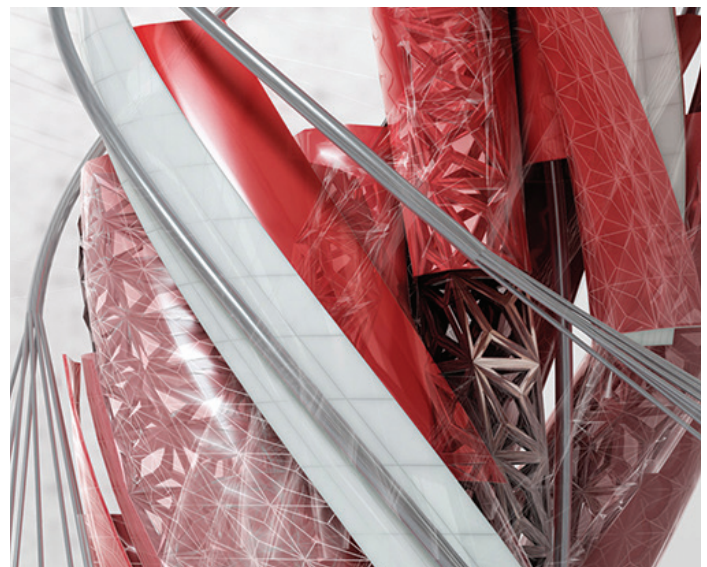


Figure 4: The Revision Cloud command is found on the Annotate ribbon panel or type on the Command line REVCLLOUD



# AutoCAD 2016

Creating Dimensions has been updated. The DIM command has combined all dimensions creation controls into one command. Simply type DIM on the command line and right-click.

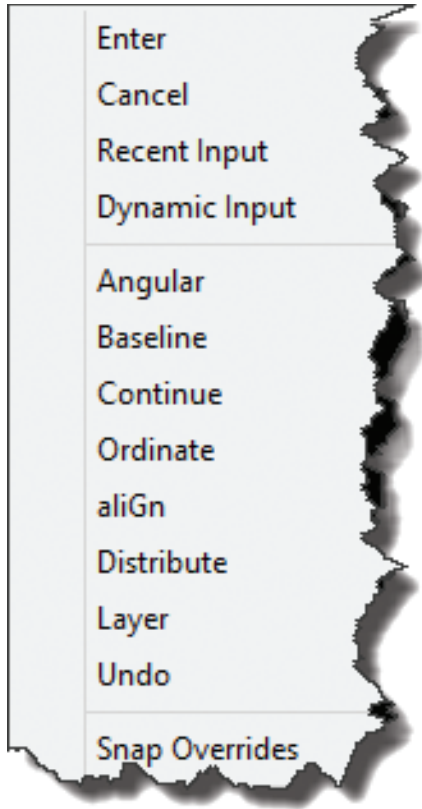


Figure 5: Users no longer have to find or remember the commands for the individual dimension types

The DIM command also allows users to select an object to automatically dimension it regardless of the type of dimension needed. Type DIM on the command line, select an arc, and the Arc dimension will be generated. Select a line and a linear dimension will be created. And so on. Hovering over an object while in the DIM command will display a preview of the dimension to be created and provide multiple options in the command line. When creating a Baseline dimension or using the Continue option, the interface automatically prompts users to select the first extension line of origin. The DIM command will remain active until the command is exited.

Autodesk has answered another AUGI Wish List item (No. 8) with the ability to wrap text with a sizing control similar to the text editor.

When dimensions are created, AutoCAD 2016 will automatically create a layer for them called Dimensions. Use the DIMLAYER system variable to control this layer. It can be set to "Use Current," which is the default setting.

Autodesk addressed AUGI Wish List item No. 5 by adding a Text Frame option to Mtext objects that will draw a frame around the text.

## EDITING TOOL ENHANCEMENTS

AutoCAD 2016 has added a new osnap addressing another AUGI Wish List item (No. 2). Users can now snap to the geometric center of a closed polygon/polyline. The tooltip pop up will display Geometric Center when hovering over the snap location.

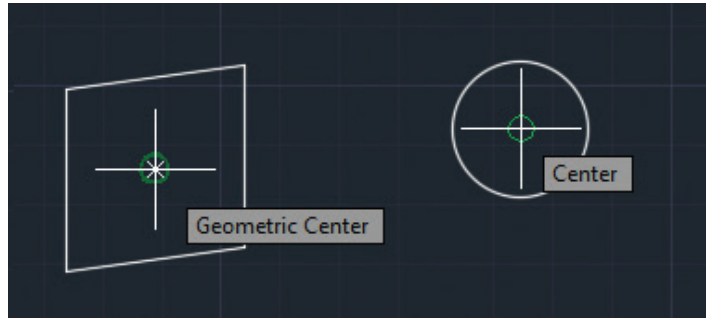


Figure 6: The osnap glyph for Geometric Center is a circle with an X in it

Several tools have had performance upgrades. The move, copy, command preview, and property preview commands/features will now perform better during operations. Users can now move their cursors freely on the Properties palette to see the changes being made. The command Preview feature now includes the Blend, Erase, Stretch, Rotate, and Scale commands. The AutoCAD 2016 selection effect color can be customized, but only with hardware acceleration turned on.

## REFERENCE CONTROLS AND OUTPUT OPTIONS

AutoCAD 2016 has seen several small new options and enhancements to many tools we use every day. Xref files are easier to work with and there are more options when creating PDFs. There are also new BIM referencing tools available.

Working with xref files has seen a significant improvement with a new system variable XREFOVERRIDE. This new sysvar will make all layers from a referenced file BYLAYER even if they are not. This might be my single most favorite new item in AutoCAD 2016. Set XREFOVERRIDE to 1 to set all referenced objects to BYLAYER. Set to 0 and they will behave as drawn. This one feature has the potential to save companies a lot of money in wasted time "fixing" the bad CAD practices of third-party vendors. Also note that xref layers will no longer be listed in the Properties palette and will be shown in grey text in ribbon layers lists.

PDF support has been given a lot of love in AutoCAD 2016. PDF output files can now search for text that includes TrueType fonts, Polygonized text, SHX text, and Unicode characters. The Output ribbon tab now displays two different boxes for exporting to DWF and PDF. PDF options now include quality, font handling, hyperlinks, and bookmarks. The hyperlink controls allow users to include links in the PDF to sheets, named views, external websites, and other files and can come from text, images, blocks, geometry, attributes, and fields. The bookmark feature will allow users to export links to sheets and named views and display them as bookmarks while viewing the PDF. Users can also create preset Plot to PDF

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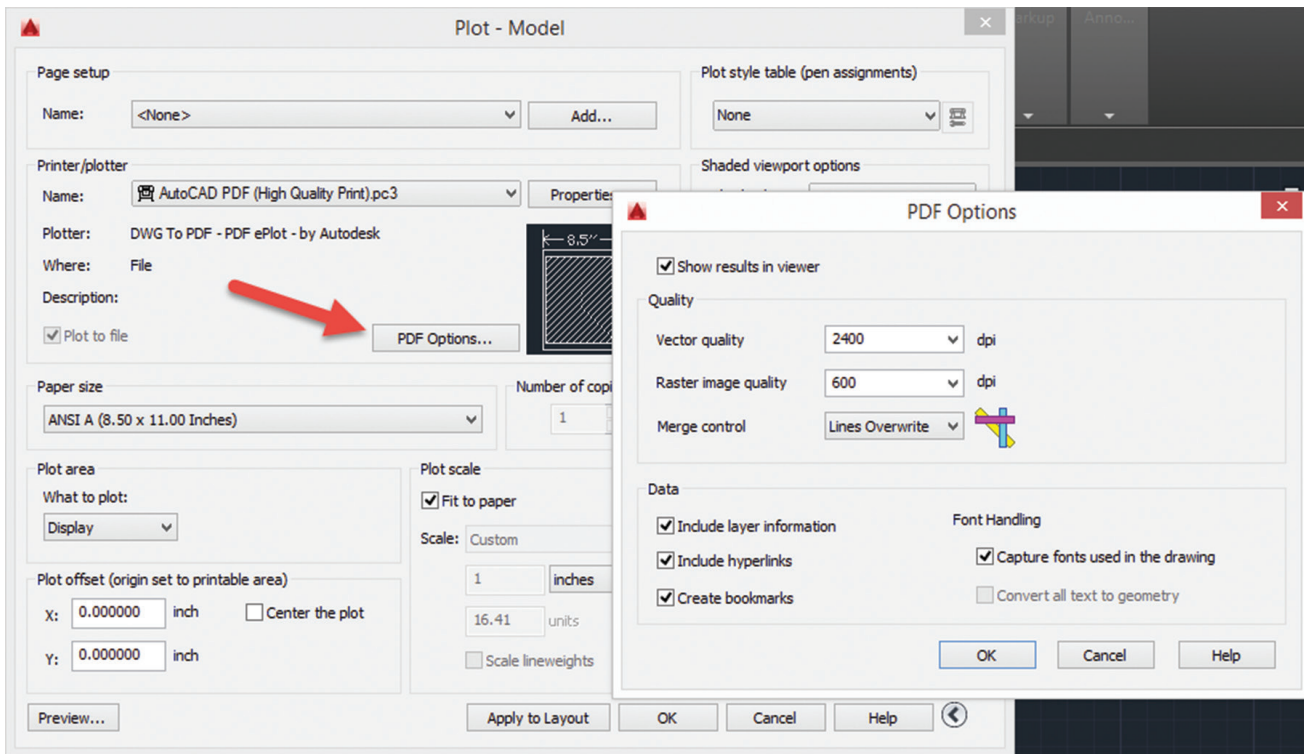


Figure 7: Print to PDF provides additional PDF creation options

controls. There are similar presets available when exporting to PDF and the Sheet Set manager will also have these options.

AutoCAD 2016 has added support for attaching coordination files from Navisworks® in either an NWD or NWC file type. Use the External Reference manager or the Attach tool to do so. You can also use the new command CMATTACH to attach Navisworks files. Users can also attach single or merged models from BIM 360 Glue via the updated BIM 360 add-in tool.

## 3D DESIGN TOOLS

3D Design tools in AutoCAD 2016 didn't see many changes except for an overhaul of the rendering engine. Mental Ray is out, and a new, easier-to-use render engine is in.

The Section Plane tool can now work on point clouds and has a new Slice type option. The Slice type creates a section that is cut on two sides like slicing a piece of cake. The other Slice types cut only one portion away from the 3D object. The Slice type creates a thin cut through the model that will always be parallel on its front and back and cannot be made with jogs. The contextual Section panel has been changed to a contextual ribbon tab and includes command for toggling Live Section on/off and other Section object controls.

Now that Section objects can generate sections for point clouds, there is a new drop-down panel button in the ribbon. This new Section Plane tool will help to create section objects of your point cloud for different orthogonal planes (front, back, top, bottom, left, right). Users can also use the new Extract Section Lines tool on point clouds. Cut a section and tell AutoCAD to generate linework from the points in the point clouds.

There are also new point cloud controls available. Users can change the new transparency setting for the points. This makes seeing behind the points easier. Point clouds now also support Dynamic UCS features. Also added are Point Cloud Object Snaps, which include Intersection, Edge, Corner, Perpendicular to Edge, and Centerline. These new osnaps will make working with point clouds easier.

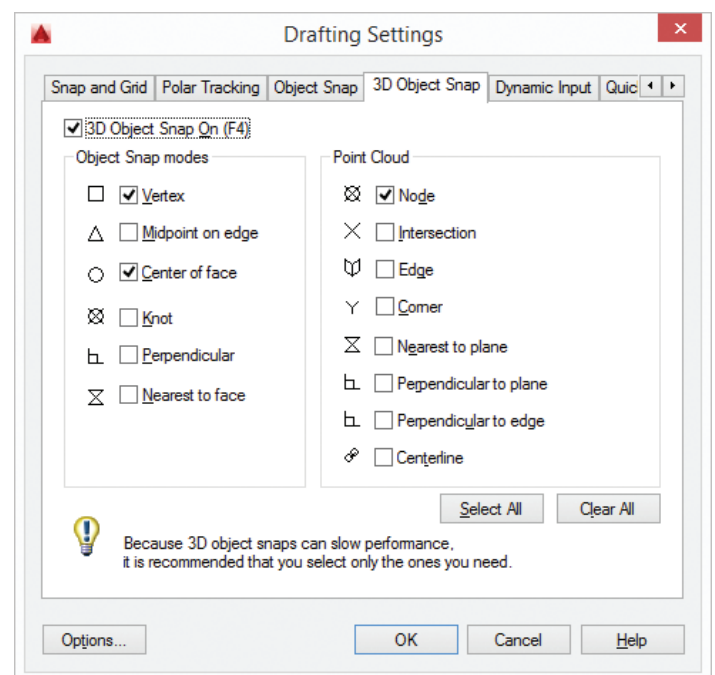


Figure 8: The new point cloud osnaps can be accessed in the drafting settings window



Working with large point cloud files is a bit easier because of the new point cloud cropping tools. They work similarly to cropping an image and users can save them as a point cloud state. This will allow for quick navigation from certain views, angles, and point states. The Point Cloud Manager can control which sets of points are displayed. If there are several different sets of scans or regions they can be turned on/off similarly to turning on/off specific layers.

Perhaps the biggest change to using 3D in AutoCAD in the last several releases is the replacement of Mental Ray for 3D rendering. This new method uses a physically based path tracing rendering engine that is much simpler to control. The new rendering UI has fewer options to choose from and is straightforward. The updated Visualize ribbon tab has the render engine controls and includes several preset drop-down rendering options. The controls now have settings for the number of levels to render or the amount of time to render. There are controls for low quality to high quality rendering, but the new time-based rendering options will give you the best rendering possible in a set amount of time. You can render as much as you can for a quick five-minute coffee break, for a full 60 minutes during lunch, or for 12 hours when you leave for the day. There are also drop-down controls for the size of the render and for file type. The changes to a simplified interface allow for a significantly easier rendering experience in AutoCAD.

## INSTALLATION, CONFIGURATION, AND OTHER IMPROVEMENTS

AutoCAD 2016 has improved graphics performance for displaying lineweights. If users are running DirectX11 and have hardware acceleration turned on, circles and arcs will be displayed perfectly in the 2D Wireframe visual style and will be smooth at any zoom level. Also, users will not have to perform a manual regen when zooming or panning as far as possible.

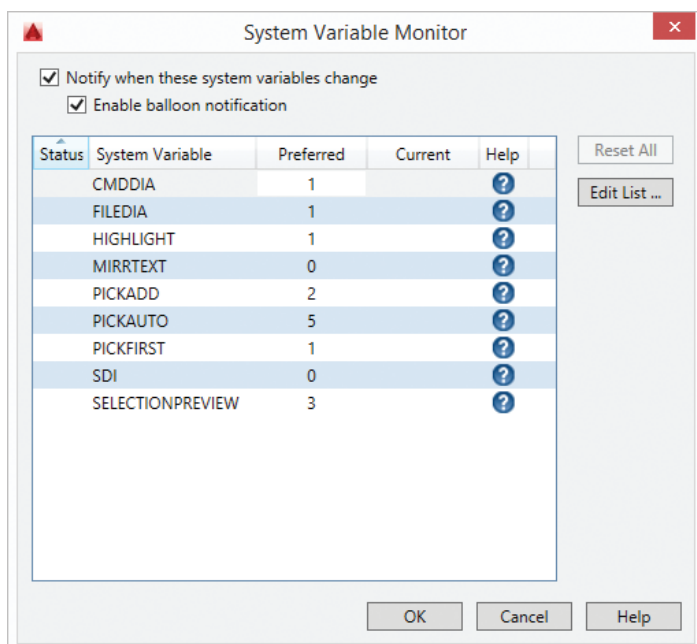


Figure 9: Click the Edit List option to change which system variables will be monitored

A new system variable, CURSORBADGE, will control the display of the badges near the cursor. Many users found this feature to be distracting and wanted it gone. Now it can be turned off when set to 2. A value of 1 keeps it on.

Remember how AutoCAD often resets the FILEDIA sysvar to off when it crashes? The new System Variable Manager tool will let you know when listed system variables are different from your defined setting. Create your list, define the setting for each one, and let it run. If something changes, the user will be made aware via bubble up. Use SYSVARMONITOR to open the control window and use SYSMON to turn the monitoring feature on/off.

AutoCAD 2016 Security controls on the Systems tab in the Options dialog box were renamed from Executable File Settings to Security Options. There are now slider controls to adjust the security level as well as more control options to define what is trusted. Users can open this dialog box with the command SECURITYOPTIONS.

AutoCAD 2016 vertical users will no longer have to wait for AutoCAD updates. They will be able to install a Single Service Pack for the AutoCAD component of their vertical product.

## CONCLUSION

AutoCAD 2016 is a very important release. Its biggest surprise might be that it is using the 2013 DWG file type and didn't introduce a new one as has been Autodesk's pattern since 2004. It lacks the inclusion of a new major tool and instead focuses on updating several existing commands. But the enhancements are great and will be very useful. It is also very nice to see so many AUGI Wish List items addressed in one release. AutoCAD 2016 is also very important because of Autodesk's announcement of the end of the ability to purchase perpetual licenses in February 2016. This end means that AutoCAD 2016 will be the last stand alone perpetual license of AutoCAD that anyone will be able to purchase after that date. New versions of AutoCAD will be available, but none of them will be perpetual. Consider that fact when you think about updating to AutoCAD 2016.



Brian Benton is a senior engineering design technician, CAD service provider, trainer, technical writer, and blogger. He has more than 20 years of experience in various design fields (Mechanical, Structural, Civil, Survey, Marine, Environmental), has a degree in Design Drafting and is well versed in many design software packages (CAD, GIS, Graphics). He has been Cadalyst Magazine's Tip Patrolter and writer, an AUGI HotNews Production Manager, is a contributing author, and an AutoCAD training video author as well as a member of the Autodesk Expert Elite Program.

# Increasing InfraWorks Features



**U**nlike some other Autodesk releases, the 2016 version of AutoCAD® Civil 3D® isn't loaded with new features and enhancements. Fortunately, users on subscription have been getting updates all along. Several things came out for 2015 in the Subscription Productivity Pack as well as other subscription add-ons. I think you will see this as a common theme from here on out. Those on subscription, whether desktop or maintenance, will get additional add-ons and benefits throughout the year. And I think this works well to get fixes/new items/"apps" immediately instead of having to wait for the big release each year.

Of course, when you have Civil 3D you also have AutoCAD and Map 3D so anything new in those should be brought over to Civil

3D as well. Below are a few findings on what to look forward to in the upcoming release.

## PROJECT MANAGEMENT

This new feature targets common data shortcut management issues, including broken data shortcuts. This addresses the following:

- Allow users to report references in a project (broken and valid so people can understand how a model is formed)
- Allow users to re-connect an object to a data shortcut if the reference is broken (e.g., source file no longer exists)
- Allow users to connect a full model object to datashortcut (downgrade the object to a different source)
- Allow the user to change the object that it is referencing (change file and object name)

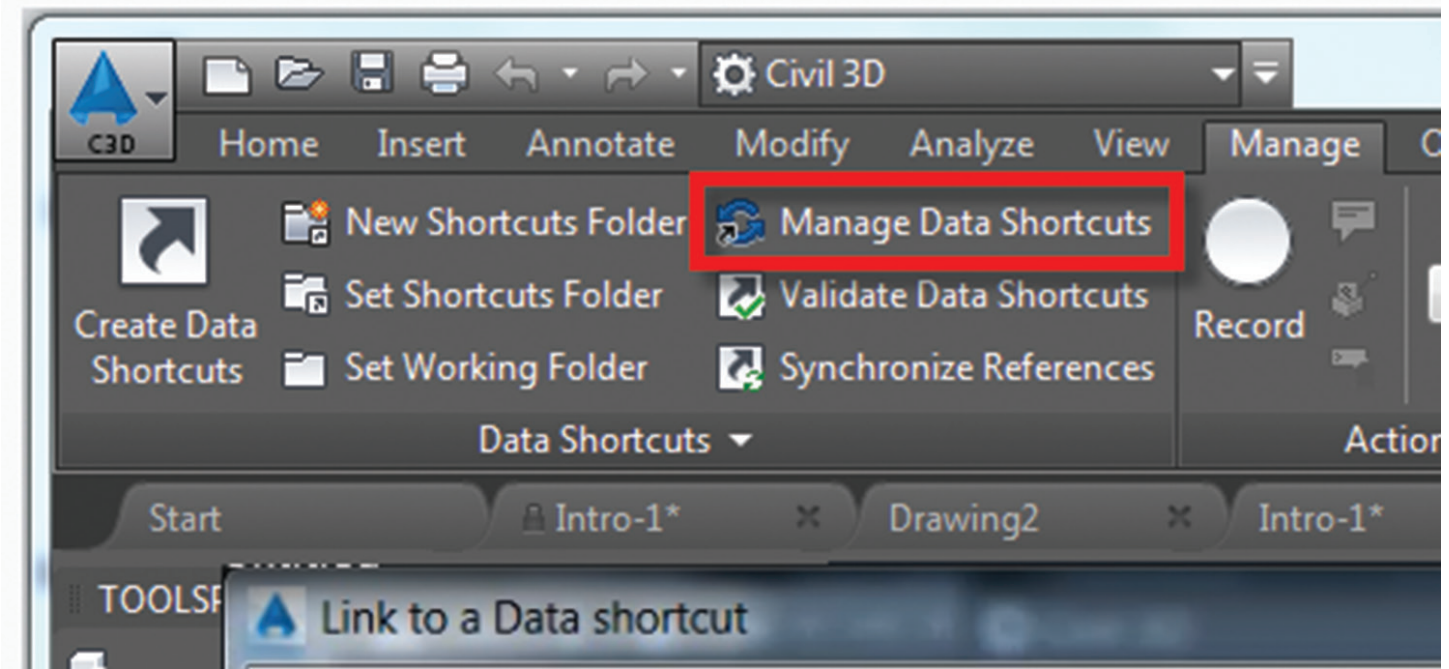


Figure 1

### COORDINATE GEOMETRY EDITOR

With the latest Subscription Productivity Pack for Civil 3D 2015, the COGO Editor tool has undergone a great makeover from past versions. The command is now launched, for the time being, from the Toolbox panel of the Toolspace, under the Subscription Extension Manager. The original method is still available for those not on subscription.

The Coordinate Geometry Editor includes features that enable you to enter, edit, and output 2D traverse data. You can create 2D traverses from existing COGO data, load it from a polyline, or manually enter known data. You can save traverses for later modification or generate traverse reports.

### BIM / IFC DATA

Under the XREF Manager, you now have the ability to attach a “Coordination Model” as it is referred to. Basically this means you can attach a Navisworks file (.nwd or .nwc).

This I think will prove very useful in the ever increasing BIM adoption within the Civil Engineering/Transportation Industry.

IFC is becoming a common model exchange environment for heavy construction. In particular, this is where Civil meets Buildings (civil structures including bridges and retaining walls, site features, etc.).

In Civil 3D 2016, we now have the ability to export to IFC. This will allow users to export basic AutoCAD objects (including C3D Corridor Solids) to IFC.

Commands:

- + IFCImport
- + IFCEXport

### CREATE SURFACE FROM POINT CLOUDS

Also for 2015 PP1. This is not the same point cloud surface creation that has been there a while. This works in a much more efficient way and utilizes the power of ReCap.

Point Cloud Surface Extraction extension consists of the following features:

- + Create a Civil 3D Surface from the new AutoCAD 2015 point cloud object (using .RCS format files generated in Autodesk ReCap)
- + Include one or more point clouds from within the drawing
- + Control surface creation boundary by graphical selection or by selection of an existing polygon
- + Control “non-ground point filtering” as part of the surface creation process

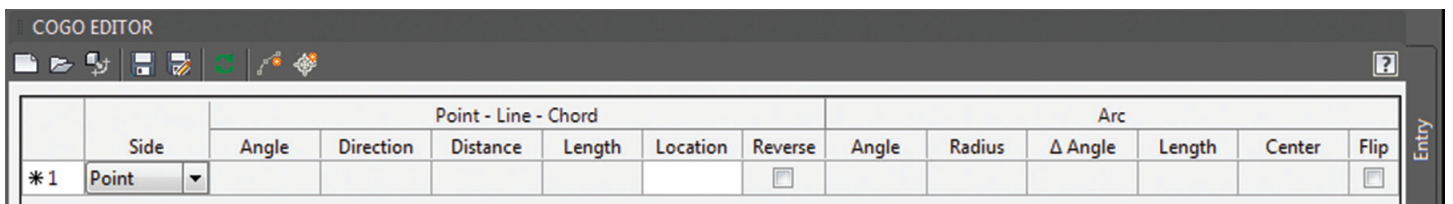


Figure 2: COGO Editor interface

# AutoCAD Civil 3D 2016

## CREATE AUTOCAD 3D SOLIDS

AutoCAD 3D solids can be used in downstream workflows including 3D printing and projection coordination. Create AutoCAD 3D solids from Civil 3D surfaces by:

- + Fixed elevation
- + Fixed depth
- + Between two Civil 3D surfaces

You can also create AutoCAD 3D solids from Civil 3D gravity or pressure pipe networks.

## DATA TRANSLATOR

The Civil Engineering Data Translator provides users with the ability to share project design data (for example, surfaces, alignments, profiles, points) between AutoCAD Civil 3D and legacy civil software environments. This will really help those firms that utilize both the Autodesk and Bentley platforms.

The Data Translator enables users to convert data between the following formats:

- + Convert the following Bentley format files into corresponding AutoCAD Civil 3D .DWG files: .DTM, .ALG, .TIN, and .GPK
- + Convert Civil 3D objects contained in a Civil 3D .DWG file into corresponding Bentley files: .DTM, .ALG, .TIN, and .GPK

## DATA EXCHANGE WITH INFRAWORKS

This I like...A LOT!! Instead of exporting to IMX from your InfraWorks model, you can now directly connect the two and transform that data much more seamlessly. This enhances the ability for AutoCAD Civil 3D users to directly read Autodesk InfraWorks models for detailed design / production tasks.

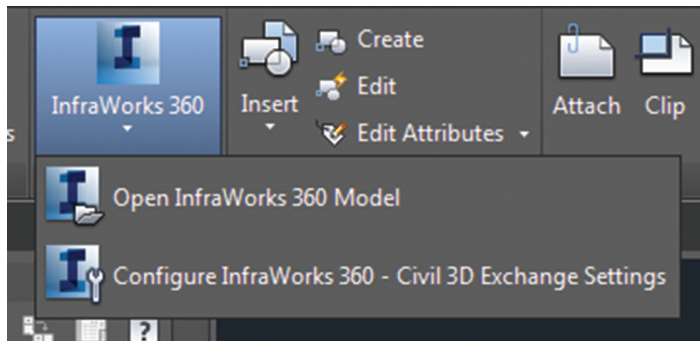


Figure 3: InfraWorks options

As you see, you have two options in the pull-down from the Insert tab of the ribbon, either Open or Configure. First you want to look at the Configure settings. This will allow you to transform the data as you want and set some standards upon import. Once that is set, go to Open and bring in the file directly from the InfraWorks SQLite database.

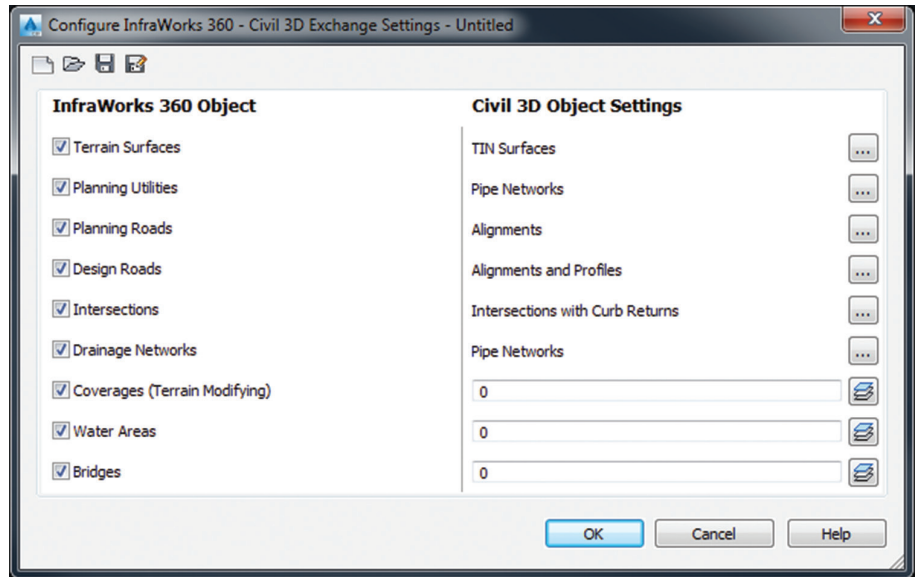


Figure 4: Configure settings

## MISCELLANEOUS ADDITIONS

**LOOP Support in Subassembly Composer** – The new Loop element enables a sequence of subassembly geometry to be repeated until a condition is met.

**Corridor Targeting** – New and improved targeting, including targeting directly from an xref.

**Production Drafting** – Items that include crossing pipe labeling, section view flip, and several other general drafting enhancements.

**Project Kameleon** – Project Kameleon is a free technology preview where you can try the new infrastructure model content authoring tools. Go to [labs.autodesk.com](http://labs.autodesk.com) and take a look. Not sure when/if this will be rolled out.

## NEW INFRAWORKS MODULES

For those looking for the MODEL BUILDER within InfraWorks, that is only available when you upgrade to InfraWorks 360. They call that the “companion” if you have the suite. As many of you know, there are several modules you can add on to InfraWorks 360.

- + Bridge module
- + Roadway module
- + Drainage module (If you haven’t yet tried it, DO IT! I like this for large data analysis.)

Coming soon there “may” be the following changes:

- + Road Components for Corridors – Gives you the ability to modify properties similar to a subassembly in Civil 3D
- + Traffic simulation
- + Energy analysis
- + Grading / land area behavior – This will be, in my opinion, the best module so far! Looking forward to testing this site design with some auto-generated grading and volume calcs

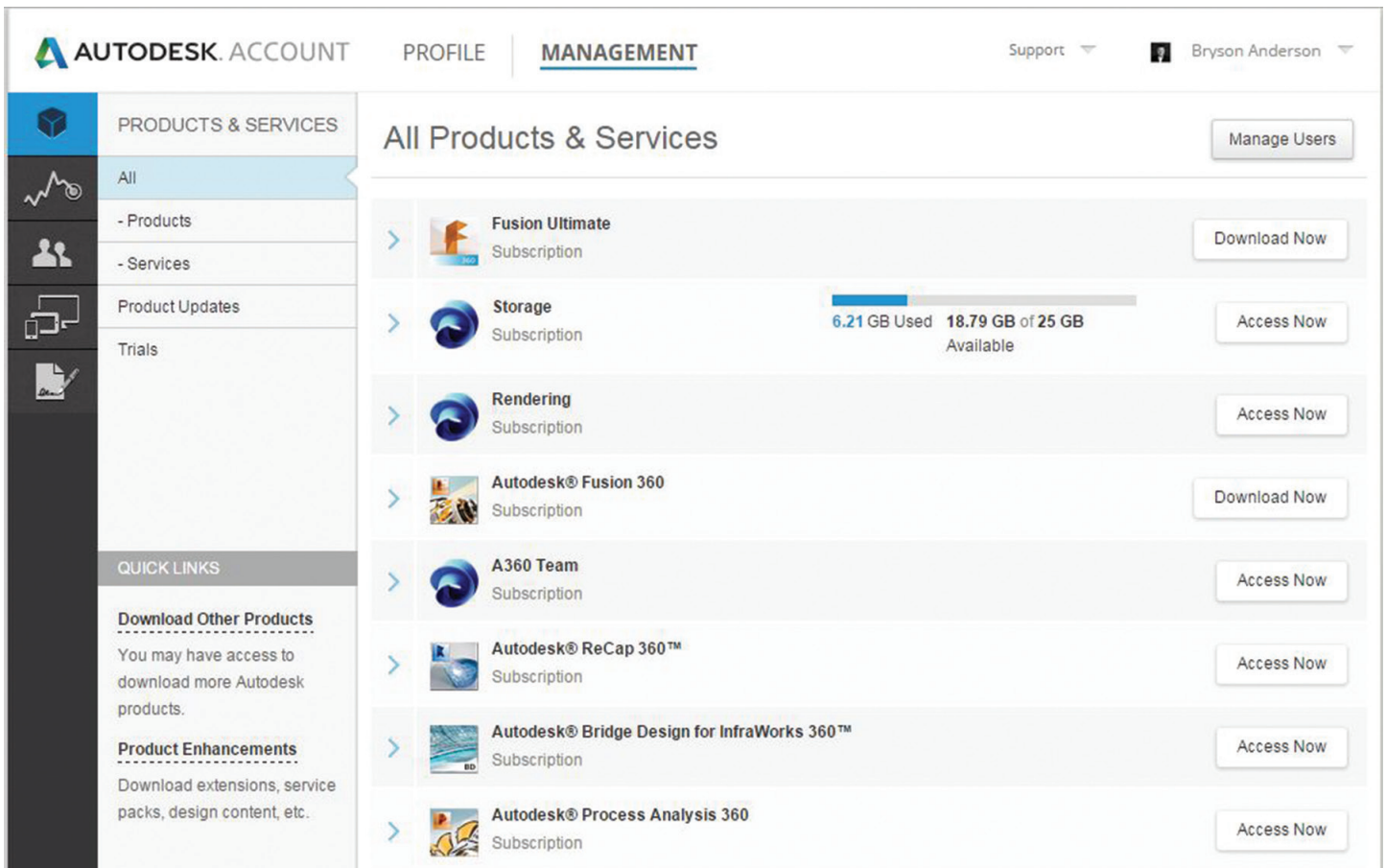


Figure 5: Autodesk Account

## WHAT IS AUTODESK ACCOUNT?

This isn't a Civil 3D thing, but it applies to all Autodesk customers, and I think this is a change people will like. As of March 13, 2015, Subscription Center, the online site where Maintenance Subscription customers have historically accessed their Subscription benefits, will be retired and all customers will be directed to Autodesk Account. This is a personalized and easy-to-use portal where customers can track and manage all of their Autodesk products, services, and benefits in one place. The newly enhanced Autodesk Account features fast and easy navigation with in-context instructions and information to help customers quickly find what they need, when they need it. You can access this portal at [www.autodesk.com/account](http://www.autodesk.com/account) and login with your existing username and password.

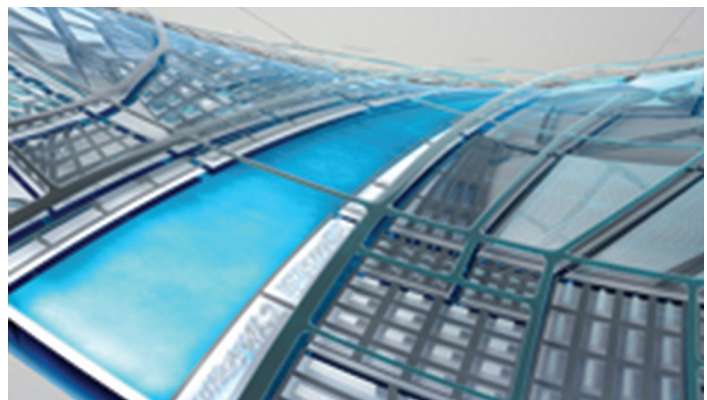
## CONCLUSION

Although there aren't a ton of new features in Civil 3D 2016 itself, I do think you will find the AutoCAD platform changes and some of the changes I mentioned to be a good addition to your workflows. There are probably several things I failed to mention, and many things within the suite, but the 2016 release of Civil 3D will be the best so far.

Thank you!



*Shawn Herring is a civil engineer based out of Utah. Shawn has been a part of the design engineering community for roughly 12 years in all aspects of design, construction, and software implementations. He has implemented and trained companies across the Country on Civil 3D and other infrastructure tools and their best practice workflows. Shawn can be reached for comments or questions at [awaitocad-civil3dcm@augi.com](mailto:awaitocad-civil3dcm@augi.com).*



# Updates, Big and Small



**T**his year, Autodesk has gone after the “No Stone Unturned” award. This may be the longest list of changes I have ever seen. If the company was scaling back on support for Autodesk® Inventor®, they forgot to tell their development team.

Numerous Inventor workflows and dialog boxes have been cleaned-up, cleaned-out, and generally reorganized to a more direct approach. Continued advancement of the surfacing capabilities, visualization, a new Additive Manufacturing Environment, and drawing enhancements are some of the big ticket items this year. I'd love to see some more simulation technologies handed down, but the multi-body Sheet Metal is a fair trade.

## CONTENTS

- User Interface
- Sketch
- Parts

- Assembly
- Drawings
- Studio Visualization
- Simulation
- Presentations
- Interoperability
- Other Enhancements

Note: In this article, we added a symbol (\*nLT) where we discovered improvements that were not handed down to Inventor LT. We endeavored to note every instance that was applicable (please forgive any oversights). Please check with your reseller about these to verify. Features appearing in bold are among the author’s favorites.

## USER INTERFACE

The User Interface (UI) throughout Inventor has been tweaked—from dialog box behavior to the workflows they contain. Visualization changes and the new 3D Printing Environment are two of the notable big items.

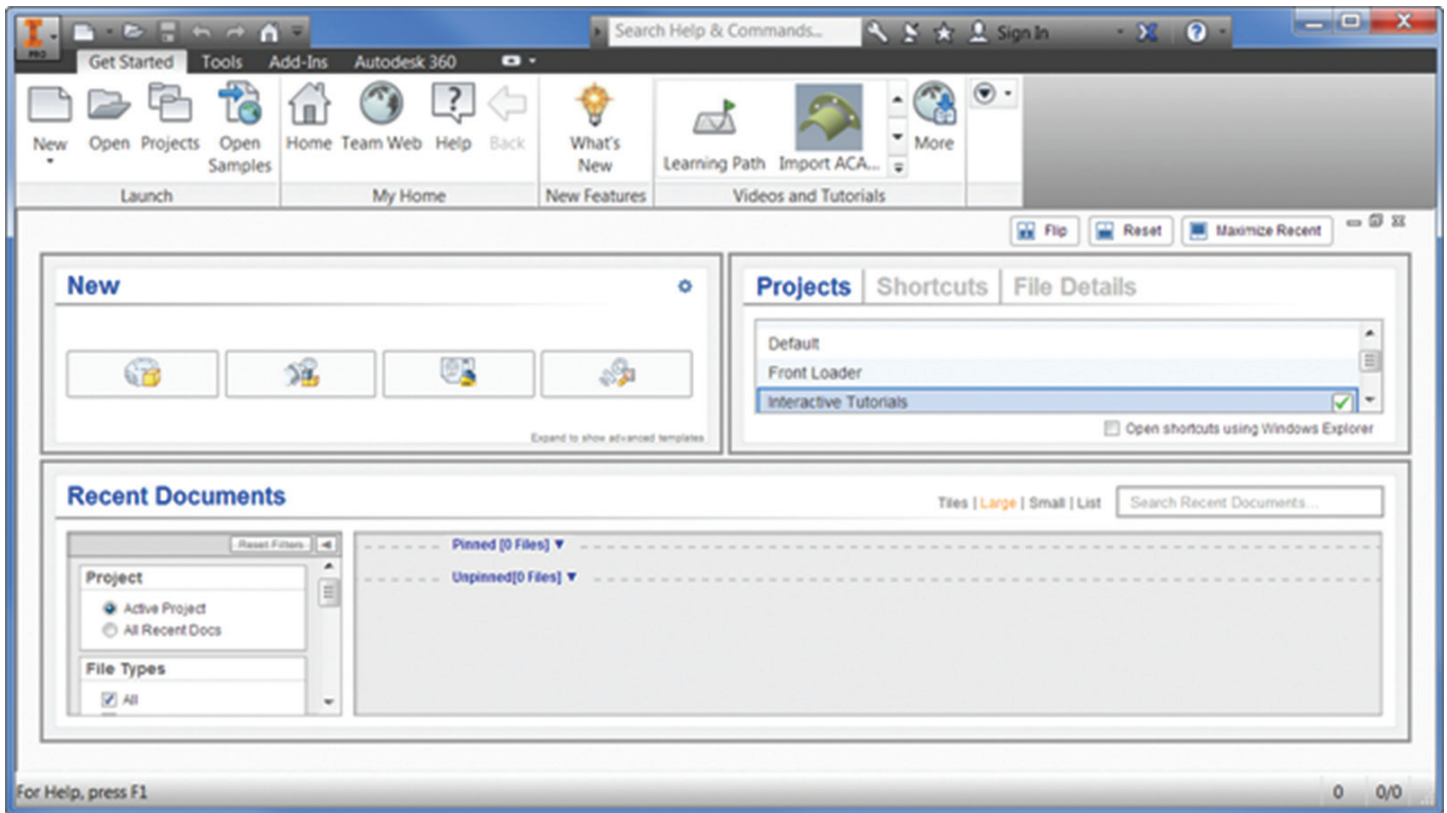


Figure 1: New Inventor Home panel

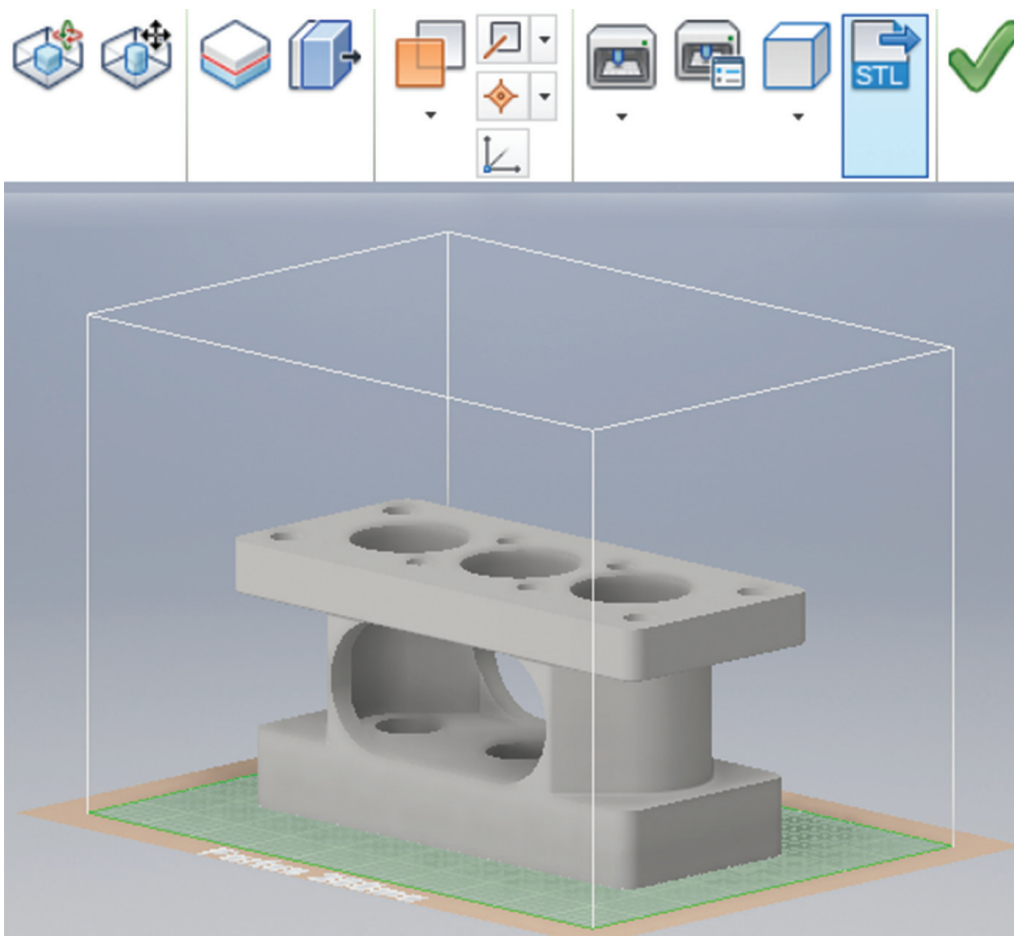


Figure 2: New Additive Manufacturing Environment

- Escape key cancellation of certain processes
- Copy model parameters to user parameters
- Drag a sketch above the parent feature in the browser to share / make visible
- Add all window tile styles to the task bar.
- Dock browser on any window edge (some \*nLT)
- **Hide all sketch dimensions**
- Import/Export iLogic external rules configuration (\*nLT)

### Countless Dialog Box Enhancements

I tried to list everything that had been enhanced or edited, but it was seemingly impossible (and honestly boring as it dragged on). I will neglect here all the little details and let you be surprised when you see them all.

### New 3D Printing Environment

Position your design within the print space of a specified 3D

# Inventor 2016

printer and transfer the print data directly.

Non-destructive “environment only” adjustments can be made to components.

- 3D Printer list
- Direct editing in environment
- Partitioning of oversized components

## Visualization

- All lighting styles now associated with Image Based Lighting (IBL)
- 11 lighting styles available in workspaces under View > Appearances panel
- Ray Tracing modes changed to Low / Draft / High

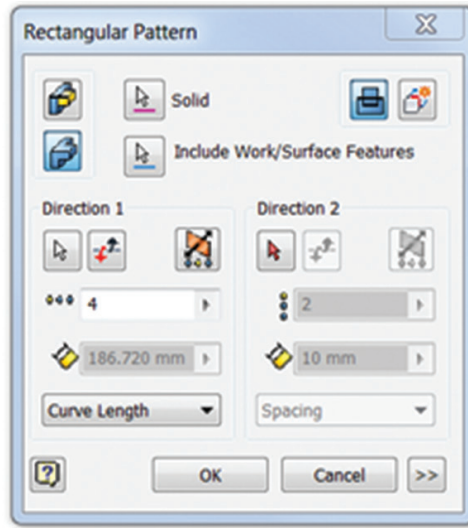


Figure 5: Non-Linear solid-body patterns

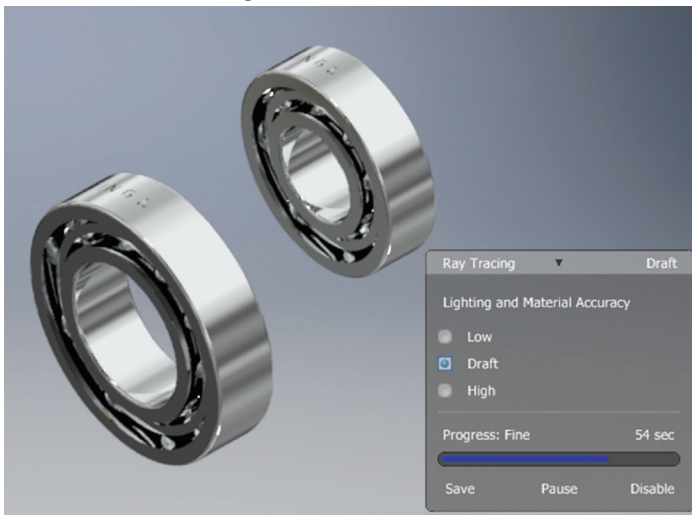
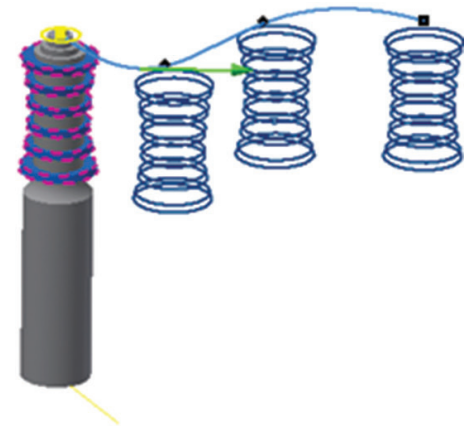


Figure 3: Ray Tracing Progress dialog box

- Ray Tracing progress bar now reflects quality, not % complete
- Save Ray Traced image at any point in the rendering process
- Enhanced visual effect for shaded visual style more consistent with realistic visual style

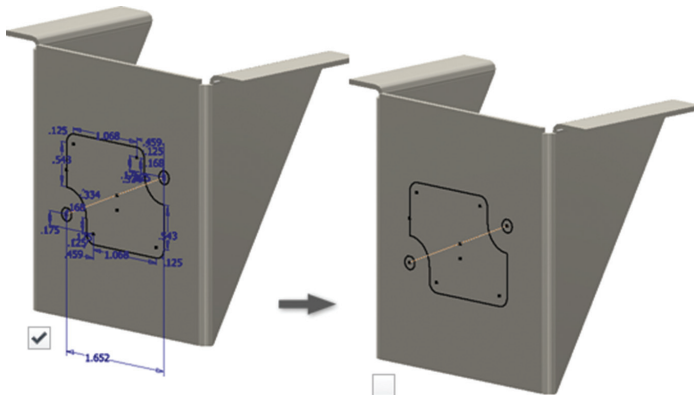


Figure 4: Hide Sketch Dimensions option

## SKETCH

Sketching enhancements encompass numerous workflows that many of us have wished for or areas that we have had to settle for a workaround.

- Identify sketch plane origin. **FINALLY!!**
- Show All or Hide All Constraints display setting remains active while editing
- Create tangent dimensions between curved geometry
- New snap points added to the context menu — Endpoint, Apparent Intersection, Quadrant, and Mid of 2 point
- Sketch Dimensions added to the Object Visibility list
- Sharing a sketch is made visible by dragging above the feature in browser
- Enhanced 3D sketch wrapping and projection

## PARTS

Numerous alterations and enhancements are scattered throughout the Part interface. Various dialog boxes and interfaces were adjusted to meet user requests.

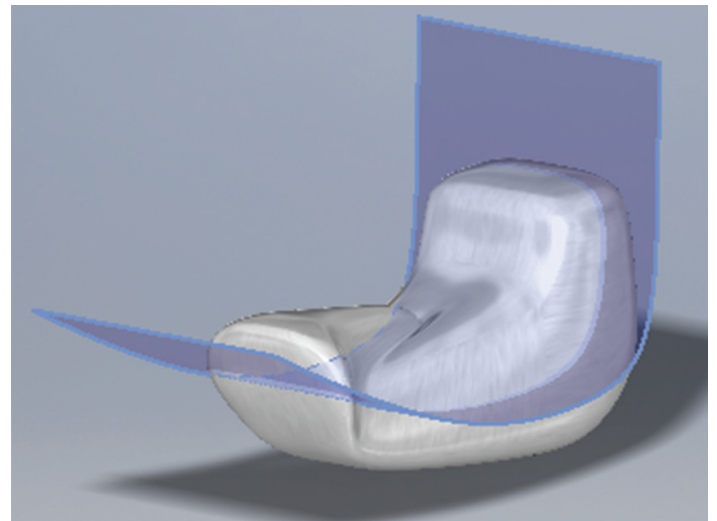


Figure 6: Surfaces used as parting lines



### General Modeling Improvements

- Face draft now contains option to Fix or Move the parting line
- Ruled Surface added to surfacing commands
- Boundary Patch no longer requires close edge selection
- Work Plane tangent / parallel respond to NURBS-based surface
- Mirror and Pattern support multiple solid body selection
- Create nonlinear patterns for solid bodies
- Measure angle to midpoint of any segment by hovering
- Copy / Paste available in Parameters context menu
- Window selection of faces during Delete Face and Thicken commands
- Surfaces used as parting lines

### Sheet Metal

- Zero bend radius support
- Material thickness detection in standard part to sheet metal part conversion
- Punch tool shows center selection count
- Dialog enhancements
- Export DWG/DXF updated with Trim Centerlines option

### Multi-body Support for Sheet Metal

Top down workflows through Make Components and Make Parts allows users to write out components and generate separate flat patterns.

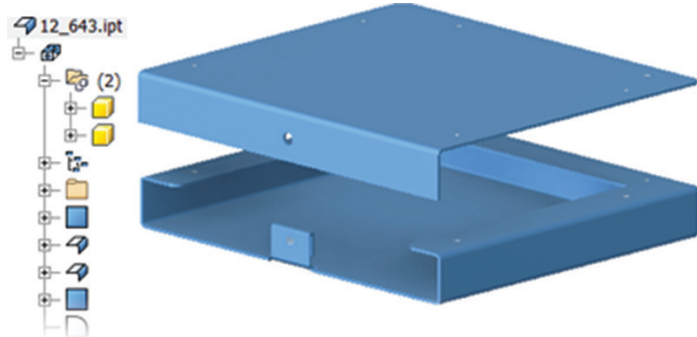


Figure 7: Sheet metal multi-body support

New Solid Body option includes Face, Contour Flange, Contour Roll, Lofted Flange, and Split, with multi-body workflows for any others.

Thicknesses are determined by detection from a selected face when prompted during the “Convert Part to Sheet Metal” option.

### Freeform Environment / Edit Form

Freeform command activates a ribbon tab providing full access to the environment; work features are now accessible from that tab. There are numerous new commands and features available, and there was just not enough room in this article to state it all. Intelligent body management is provided now, as well as Freeform Plane / Cylinder / Face objects, Mirror, Thicken, Unweld edges, and so much more.

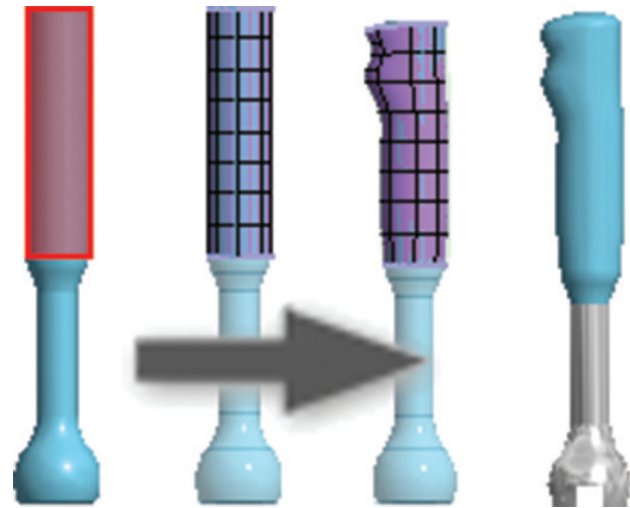


Figure 8: Convert to Freeform option

### ASSEMBLY

Color override options were the most obvious change in this environment; however, the Tube and Pipe part numbers were a good addition.

- The Midplane option in patterns (\*nLT)
- Replace All feature command for highlighted components (\*nLT)
- Design Doctor allows multiple sick constraint deletion (\*nLT)
- Content Center standards updates (\*nLT)
- Large Assembly Performance options added

### Analyze Interference Improvements

Users can select multiple components simultaneously to include in the analysis. A Zoom to Interference command is added as well.

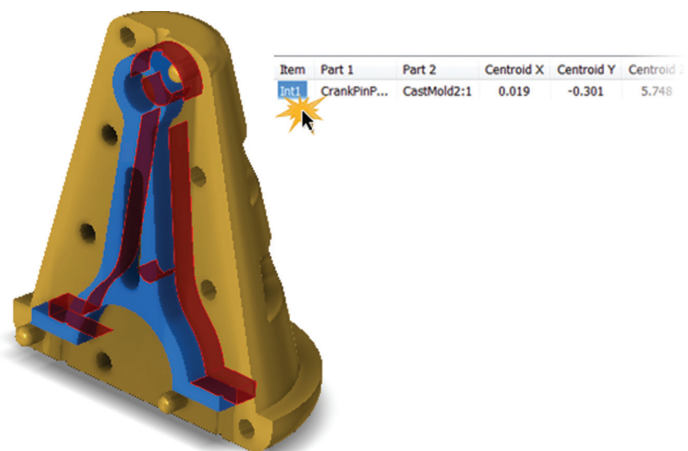


Figure 9: Assembly conflict zoom-to

### Color Override in Derived Components

“Use color override from source component” option added to Derived Assembly (\*nLT), Derived Part, Make Part, and Make Component dialog boxes. A global override is available in the Application Options.

# Inventor 2016

## Tube and Pipe (\*nLT)

File names for Fittings can be customized and part numbers can be populated in Parts Lists

## DRAWINGS

The Drawing Environment received a huge share of attention this round. Numerous view-related workflows have been cleaned up or moved to create a more direct approach of manipulation, as well as many annotation enhancements that were needed.

- Add projected geometry to view sketches
- New Reflection Environment settings in the Drawing Document Settings—apply specular effect and specify reflection map in a drawing (.idw) file
- New Hidden Line options for Content Center and Sheet Metal
- Drawing sketch creation more similar to model sketch
- Merged Format for Dual Hole notes

## Completely Overhauled Base View Creation and Editing

The In-Canvas Base View creation tools simplify workflows associated with base and projected view creation. Initial View Scale is set to a best fit and can be changed

by dragging the corner to produce the new scale. Direct editing of orientation is now available, as well as a slew of refined features throughout the interface.

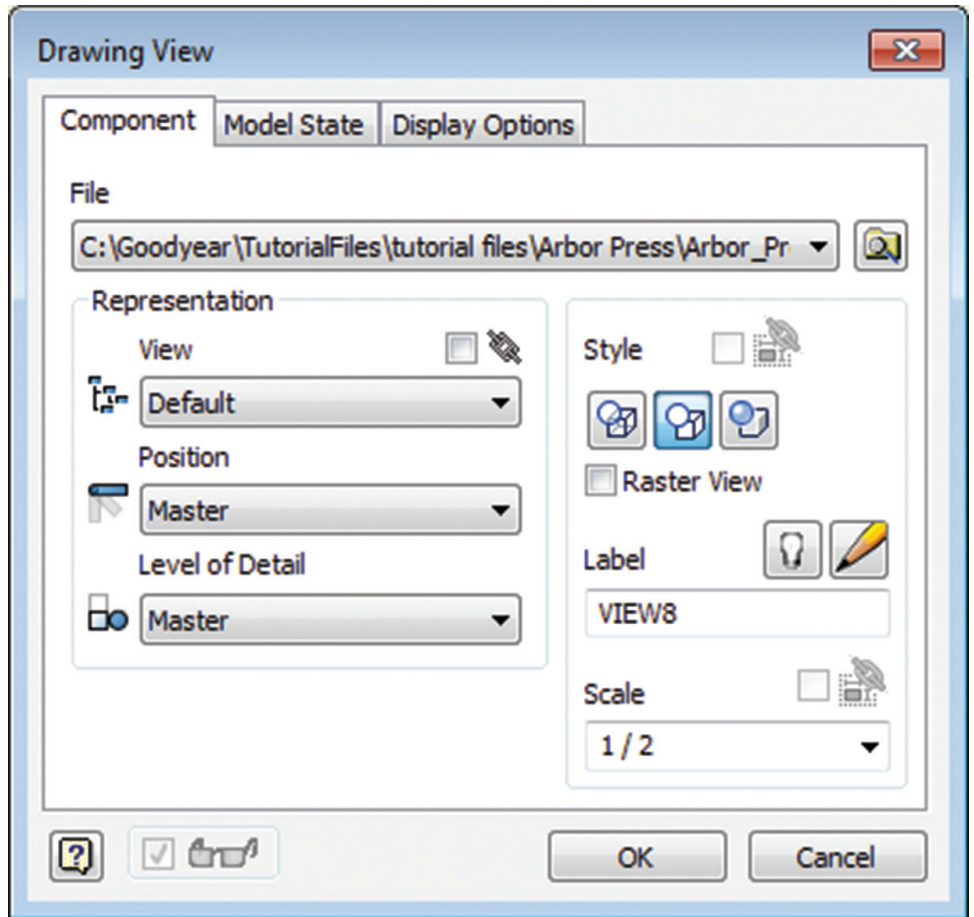
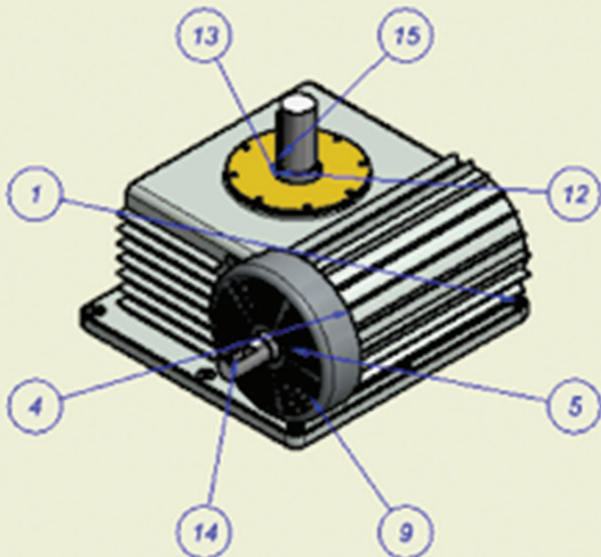


Figure 10: Big changes in Drawing View creation

2015



2016

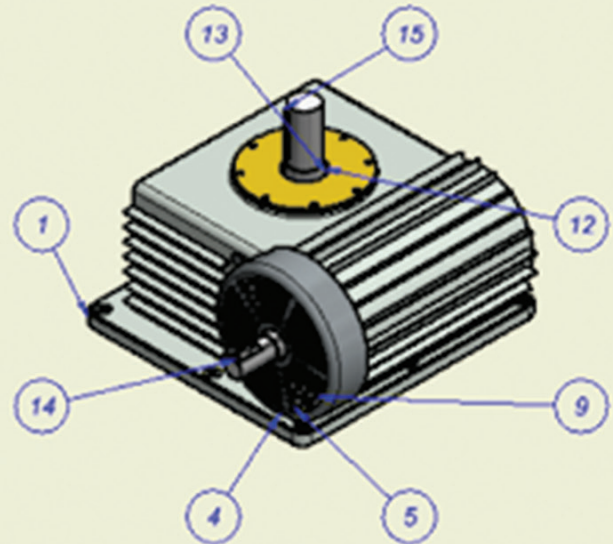


Figure 11: Drawing balloon enhancements

### Create Drawing View from Any Open Model

Drawing Views can be created rapidly through this command, which is available in most environments in Inventor. This command groups numerous steps into one simplified process. Simply arrange the components as desired in the respective space, pick the root component in the browser, and click "Create Drawing View." The current model view orientation and representation are carried over.

- Initial View Scale added to title blocks
- Transparent components in Drawing Views

### Annotation Enhancements

The Symbols list has been reorganized, and new symbols have been added. Surface texture symbols have been updated to correspond to numerous standards.

- Standardized drawing symbols have been updated throughout
- **Double-click direct editing of symbols**
- **Feature Control Frame enhancements**
- Pressed Joint Welding symbol available
- Split leader corrections
- Single segment leader option
- One-step leader alignment
- Leader angle snap is now off by default

### Drawing Balloon Enhancements

Balloon creation has been enhanced, including balloon alignment tools, split balloons, selection, and more. Custom balloon styles can be created, too.

### New Text Options

Text editing finally received some enhancements and a revamped dialog box, including:

- Text case
- Bullet / numbered lists
- Strikethrough
- Text preview in graphics window
- In-Canvas text rotation, including leadered text
- Retains original document format during copy/paste

### New External Sketch Symbols Library

Browse, share, and customize sketch symbols from Inventor drawing file designated as the library. New sketch symbol library folder option is available as well. New functionality includes:

- Search and filter dialog box
- Preview
- Both IDW and DWG formats permitted

## STUDIO VISUALIZATION

- New Technical Illustration command creates a realistic illustration effect — Studio Render Illustration settings moved to View tab > Appearance Panel > Visual Styles drop-down menu
- Ground plane and shadow settings in View tab now display in rendered model

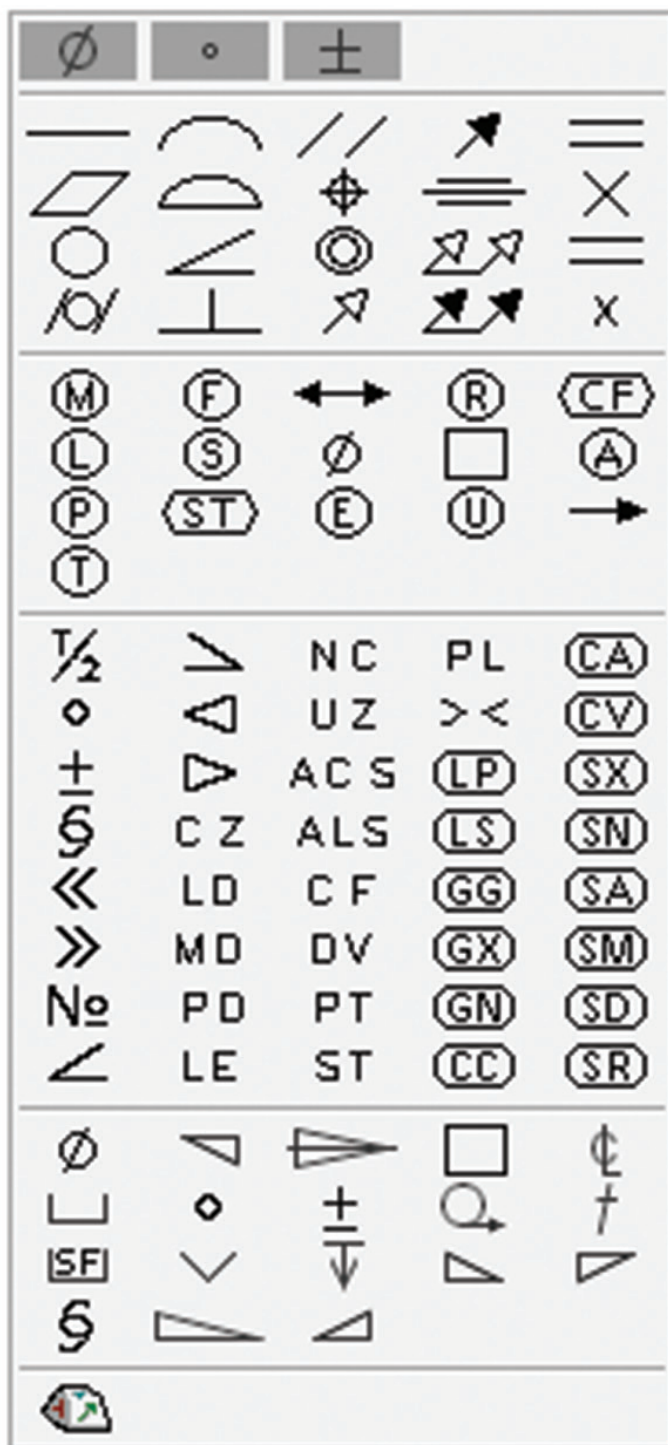


Figure 12: Enhanced annotation symbols list



# Inventor 2016

## RapidRT is new rendering engine in Inventor Studio

Enhanced render quality with additional features:

- ✦ Time duration/iterations/unlimited mode
- ✦ Lighting and Material Accuracy modes

## New IBL Lighting Styles

- ✦ All lighting styles now associated with Image Based Lighting (IBL); created styles associated automatically
- ✦ Legacy local lights are now disabled by default
- ✦ Background turn on/off

## SIMULATION

### Stress Analysis

- ✦ New safety factor calculation warning

## PRESENTATIONS

(This section is not available in Inventor LT.)

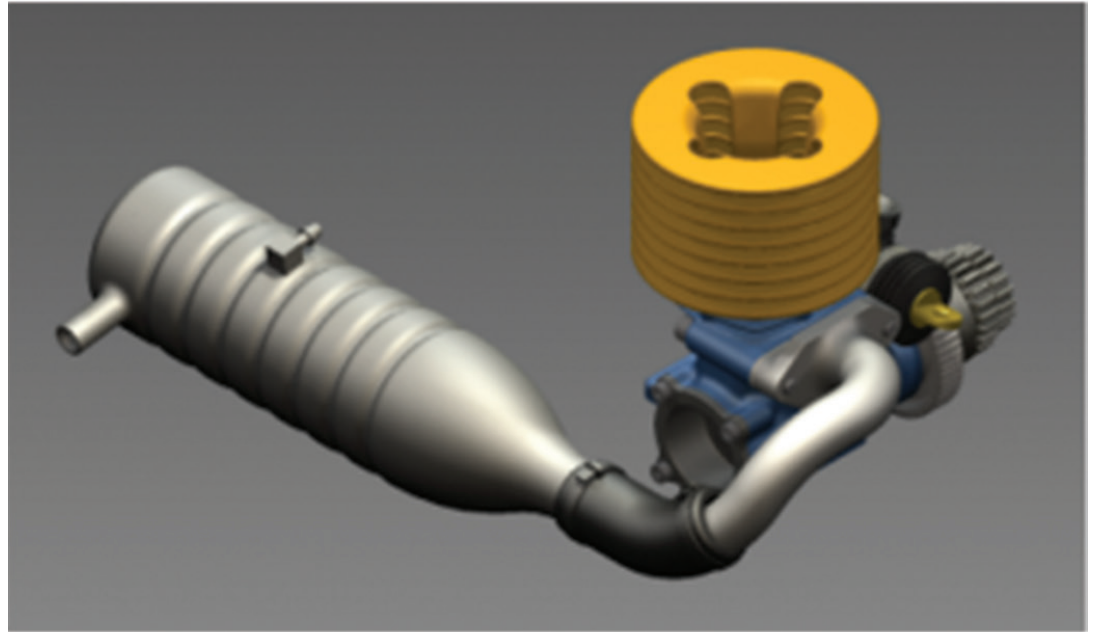
Presentations has been the red-headed stepchild of Inventor since Inventor Publisher came along (which is sadly gone). The good news is that the development team did not forget us, and has added some improvements to this rather neglected area of Inventor.

- ✦ Trail creation and editing enhanced
- ✦ Component selection simplified
- ✦ Enhanced representations support
- ✦ Triad Manipulator modernized and can be aligned to component geometry

## Auto-Explode Enhancements

Improved Auto Explode command is now on the ribbon. Auto Explode now features a dynamic preview and contains two levels and trail creation options. Tweaks created by Auto Explode can be edited individually.

R2015



R2016

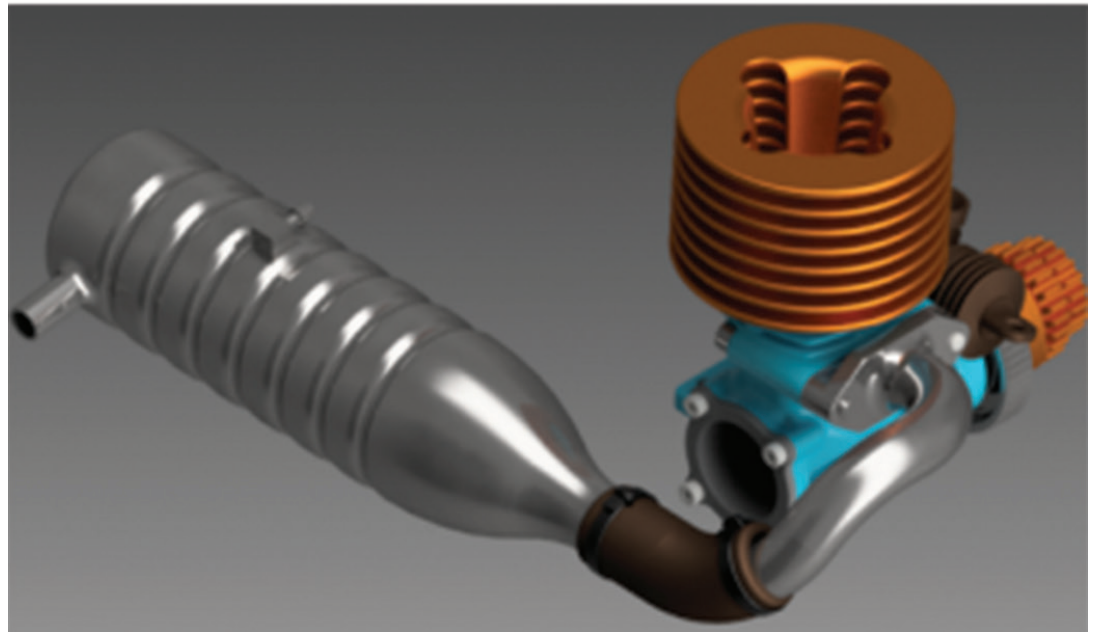


Figure 13: Improved rendering in Studio

## Tweak Command Enhancements

Tweak Components command is redesigned to include direct manipulation. A mini-toolbar is available with new commands including Undo option.

Dynamic previewing of tweaks now occurs, and components are rolled back during tweak editing to preview the changes.

- ✦ Tweaked component selection sets amended dynamically
- ✦ Enhanced trail editing and manual creation
- ✦ In-Canvas editing of distance and angle

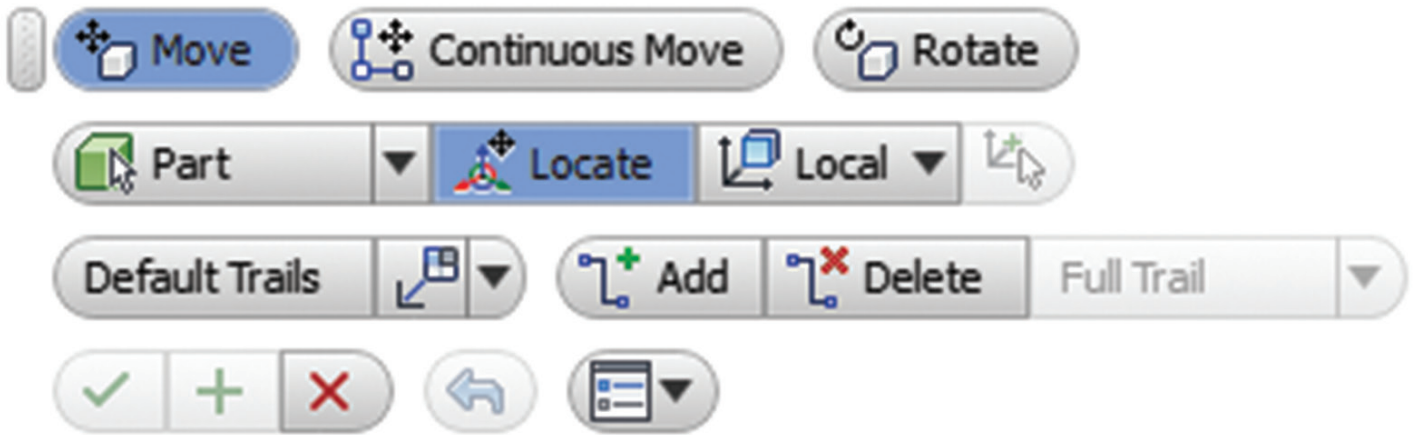


Figure 14: Tweak mini-toolbar

## INTEROPERABILITY

There were a lot of little details involved in the interoperability changes this year. Various importation and associativity enhancements in certain model formats are heavily summarized here:

- Simplified importing of non-Autodesk CAD files
- New Import/Export \*.smt file for Shape Manager files
- Updates to export formats for BOM, parts lists, and Revision Tables (\*nLT)
- Associative 2D DWG references maintained in Part and Assembly components

### Associativity

Associative CAD file import maintains and updates links with:

- SolidWorks
- CATIA
- NX
- Pro-E/Creo
- Alias

Selective import support allowing users to select only the data they need, including the above formats plus:

- STEP/IGES
- Rhino

### AutoCAD Electrical and Inventor (\*nLT)

A new Electromechanical tab has been added to the ribbon. The new Electromechanical link between Inventor and AutoCAD Electrical provides smooth data exchange and update between the two.

Location View command displays components that are common between linked AutoCAD Electrical and Inventor assemblies.

## OTHER ENHANCEMENTS

- Multi-thread support
- 64-bit-only support for Inventor 2016, including Win 7, 8, and 8.1
- Inventor LT 2016 continues to support 32-bit processors

- Security enhancement to Add-In Manager(\*nLT)
- Cleaner learning tools and search organization

### Mockup 360

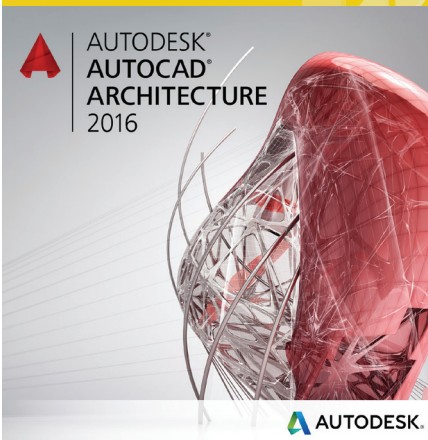
This is no longer installed with Inventor installation. It can be accessed from the Inventor App Store.

*This article was developed with the benefit of personal experience along with information and imagery provided courtesy of Autodesk, Inc.*



John Evans is the Managing Director and Technical Specialist at Design & Motion, an international R&D firm, helping customers with product design, manufacturability, and validation. He is a US Air Force veteran and has over 20 years of design, manufacturing, and fabrication experience in aerospace and industrial machinery, and holds various industry certifications including Autodesk Inventor Professional. John is a devout fan of simulation technologies, material sciences, and continues to pursue his education in aeronautical and mechanical engineering. John's role at Design & Motion includes technical research and journalism related to engineering software from around the world, with published articles in various design related journals and magazines, as well as the company website. John speaks Japanese and English, loves aircraft, loves his wife and 2 boys, and would rather be on a 1000 yard rifle range right now. You can reach him at [john@designandmotion.net](mailto:john@designandmotion.net)

# ACA's Update Variety Pack



## STYLES BROWSER

One of the first things you notice when opening a drawing in AutoCAD® Architecture 2016 is the Styles Browser (see Figure 1). The Styles Browser is a modeless palette, which is capable of importing styles, adding objects with the selected styles, and assigning the selected style to the object type selected in the drawing. It can be launched from the ribbon's Home tab, Tools flyout, or from the command line using command STYLESBROWSER. Clicking on the Browse button in the Properties palette for the selected object will access the Styles Browser as well. From the Object type drop-down, the required object type can be selected from the various categories:

Architecture Objects, Documentation Objects, and Multi-Purpose Objects. Using the Drawing Source drop-down, the source from the drawing file can be selected from Content Library, Project Standard Drawings, or Currently Open Drawings. The Drawing Files can be chosen as needed from the drawing files drop-down. The Manage Content Library button will be available in the Drawing Files drop-down only when the Drawing Source is Content Library Files. The list of drawing files will change on the basis of the Drawing Source selected.

You can search the required styles for the selected object type from the selected Drawing Source. The search is a dynamic search; thus, the results will be updated as you type the string.

Styles that users want that are not in the current drawing can be filtered using the Drawing Source, Drawing Files, and Selected in the gallery and imported using Import button or right-click Import. Multiple files can be selected using Shift key or CTRL key. These styles will immediately get added in the Properties palette Styles drop-down. Once the styles are imported into the current drawing, they show a green checkmark indicating that the style is already imported and is now in your current drawing.

Any chosen object with the selected style can be added immediately to the current drawing by starting the ObjectAdd command. This can be done in three different ways in the Styles Browser:

1. by selecting the required style and clicking the Add Object button
2. by selecting the required style, right-click, and selecting Add Object from the context menu
3. by double-clicking on the required style

Thus, the Walladd command can be directly started from the Styles Browser, and the Wall with the desired style can be placed without having to import that style or starting the walladd command from the ribbon. The Apply Style to Selection option is available only when there is an object selected in the drawing and the Styles Browser as a matching object type is selected and when only a single style is selected in the Styles Browser. So you can select multiple objects in the drawing and assign the desired style to them using this command. If the selection has a mixture of object types, the type chosen in the Styles Browser will be added to the matching objects in the selection set.

You can change the size of the preview images in the Styles Browser by choosing from four sizes: large, medium, small, and details. There are some Object Types that do not have any Preview such as Documentation Objects and some Multipurpose Objects. They will show Details view by default and for those objects the View Direction, Color Selector, and Preview Size controls will be disabled.

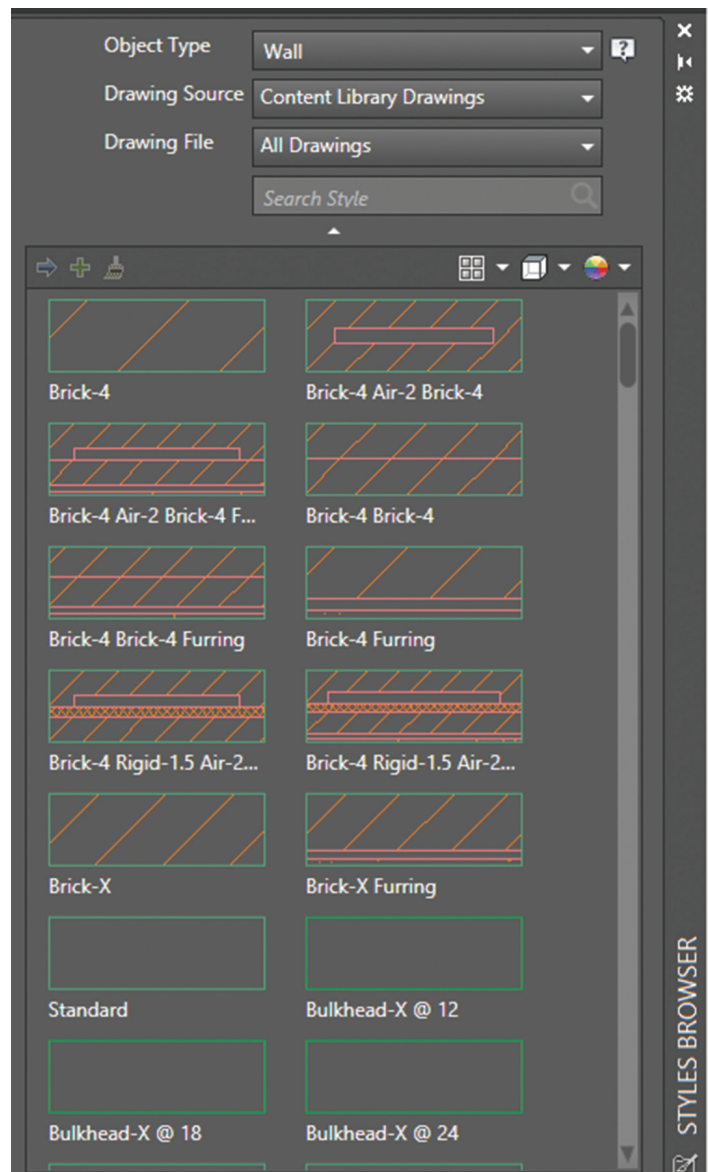
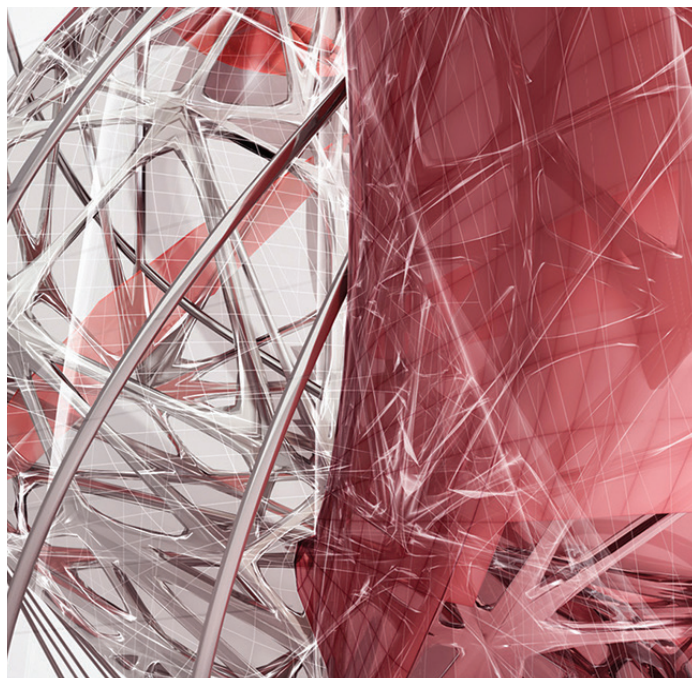


Figure 1: Styles Browser

An informative tooltip is also provided, which includes the full name of the style, full path of the drawing file to which the style belongs, and shows four views of the style. The Preview image can be viewed in 10 different view directions. This view direction is applicable per object type and is persistent across sessions. View direction can be set when the preview size is small, medium, or large. The details view will have the View Direction control disabled.

You can select a background color to be applied to the preview image for better visibility. This background color is also applicable per object type and is persistent across sessions. You can set the background color when the preview size is small, medium, or large. The details view will have the color control disabled. The background color is very useful in case of Light theme, where the background color will enhance the preview of the styles.

After setting the Drawing Source and Drawing File, you can hide these controls to make more area available for the Style Preview images in the Styles Browser gallery by clicking on the control

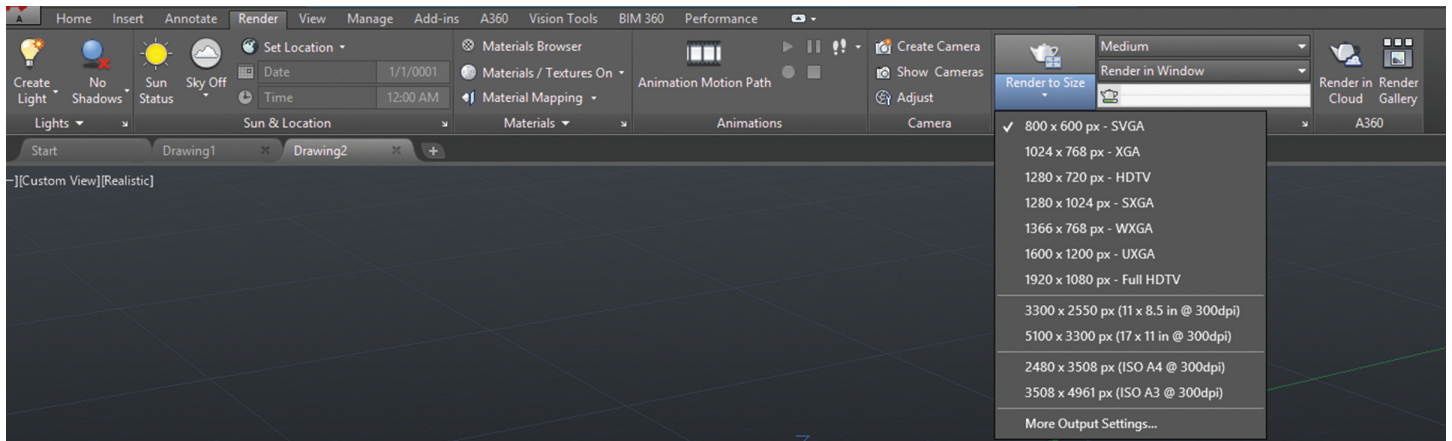


Figure 2: Render

for Expand-Collapse. You can turn off the preview image in the Properties palette to reduce the scrolling needed. Once the Preview image is turned off, a binocular button appears, which in turn will be used to access the Styles Browser. The Styles Browser is invoked by clicking on the Browse button of the Properties palette to display Styles. Once in an Objectadd command, user can still change the Object type from the Styles Browser and can start the new objectadd command for a different Object type.

## STATUS BAR

In AutoCAD Architecture 2016, the status bar can now automatically wrap onto two rows when there are more icons than can fit into a single row. At any given time, the model tab and at least one layout tab is always displayed. Isolate Objects and Lock UI have been added to the status bar customization menu. The Lock User Interface tool on the status bar enables you to check and uncheck multiple UI elements at one time instead of having to reopen the flyout each time. You can click the icon to enable or disable UI locking. Also, please note that the previous text “Cut Plane” has been replaced by an icon.

**THE RENDER PRESETS LIST INCLUDES ADDITIONAL OPTIONS ENABLING YOU TO CONTROL THE RENDER QUALITY BY SETTING EITHER THE NUMBER OF LEVELS TO RENDER OR HOW MUCH TIME TO RENDER.**

## RENDERING

A new rendering engine in this release replaces the previous rendering engine. This physically based path tracing renderer provides a simpler way to render that can produce better results. The new render UI has significantly fewer settings compared with the previous render UI. Many of the previous settings were removed as they are no longer valid with the new rendering engine. The Render ribbon panel on the Visualize ribbon tab is updated to support the new rendering engine. It includes a size drop-down where you can quickly select from standard pre-defined render sizes (see Figure 2).

The Render Presets list includes additional options enabling you to control the render quality by setting either the number of levels to render or how much time to render. The new Render Presets Manager is much simpler than the previous Render Presets Manager. You can create, modify, and delete custom Render Presets. Specify Render Preset name and description as well as the duration and accuracy. You can render directly from the Render Presets Manager choosing to render in the render window, the current viewport or a specified region in the current viewport.

When rendering in the render window, a drop-down list enables you to select from a list of standard render output sizes or choose More Output Settings to access the new Render to Output Settings dialog box. In this dialog box, you can specify the image size and resolution. You can also choose to automatically save the rendered image to a file including BMP, TGA, TIF, JPEG, and PNG formats.

A new Render Environment & Exposure palette offers powerful new Image-Based Lighting (IBL) environments. When the Environment control is turned on, you can select from pre-defined, image-based lighting environments. The image-based lighting environments automatically apply lighting effects. Some of them include 360 background images that emulate a realistic environment as you orbit around the model. The viewport must be in a perspective view and you must render to see the IBL environment.

A control in the Render Environment & Exposure palette enables you to use a custom background image. Custom images are static and do not emulate a realistic 3D environment as you rotate. Additional controls in the Render Environment & Exposure palette enable you



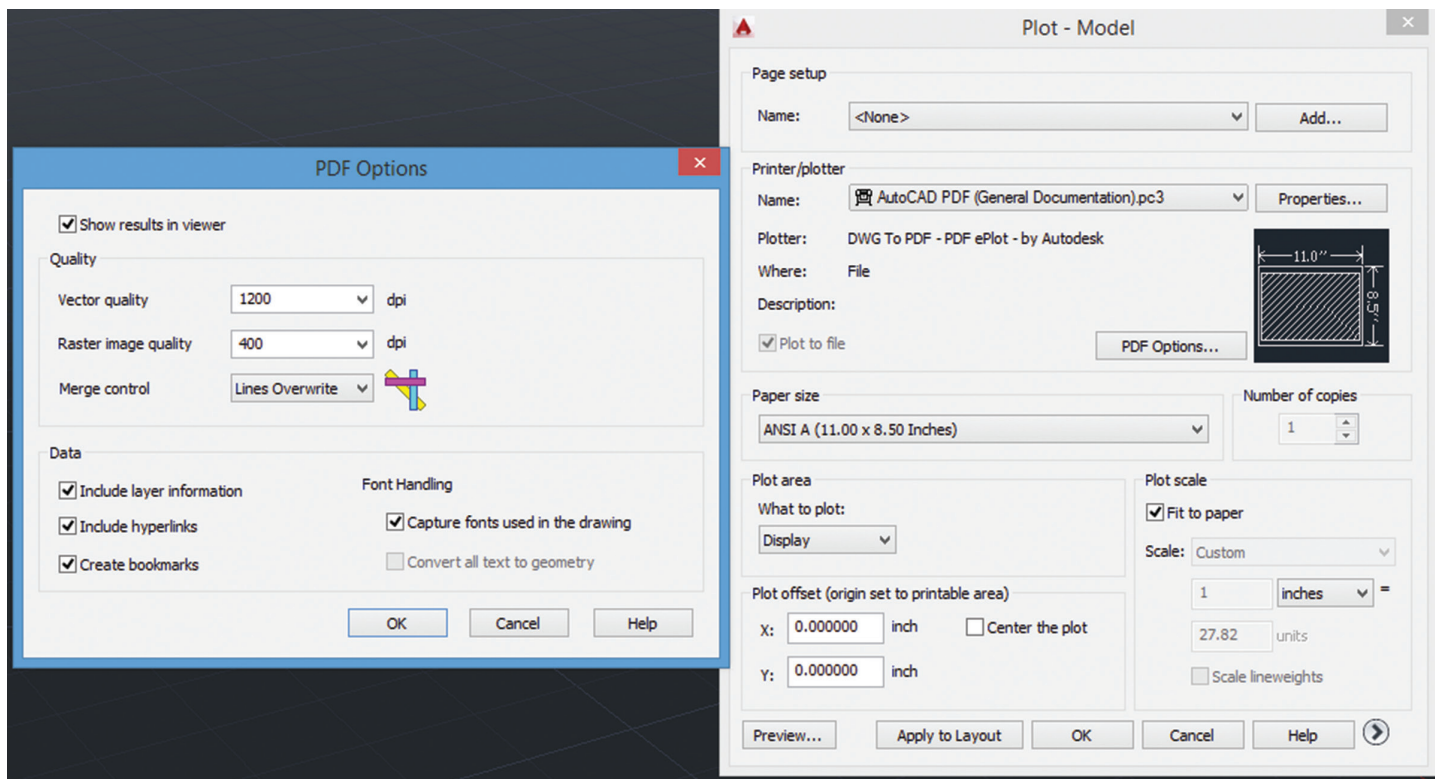


Figure 3: Plot PDF

to adjust the Exposure and White Balance. The Exposure slides between Bright and Dark. The White Balance slides between Cool and Warm. The new render window displays the current render process and allows you to save a snapshot, zoom in and out while rendering, and print the rendered image. Render history is displayed in the expanded section of the render window.

## ACA REVISION CLOUD

The Revision Cloud tool is enhanced in 2016 to provide more flexibility. It is accessible from the Annotate ribbon panel and includes three methods of creation: Rectangular, Polygonal, and Freehand in addition to the Command line option to select an object. The last used creation method is remembered the next time the command is run. You can set your own default creation method using the REVLOUDCREATEMODE system variable. Whether you create rectangular, polygonal, freehand, or object revision clouds, editing their size and shape with grips is intuitive and easy. The number of grips displayed for revision clouds has been significantly reduced. The location and behavior of grips is based on the shape of the revision cloud. If you prefer legacy display of grips you can set REVLOUDGRIPS to Off.

In addition to easier editing with grips, a new Modify option allows you to draw new revision cloud segments and erase selected portions of existing revision clouds.

## PDF ENHANCEMENTS

PDF support has been significantly enhanced in AutoCAD Architecture 2016, offering improved performance, flexibility, and quality. Truetype fonts in MText and Text with any formatting options as well as Polygonized text, SHX text, and Unicode characters are now searchable in PDF output files. PDF plotting performance for drawings that contain a large amount of text, polylines, and fill patterns is improved. The Export to DWF/PDF Options dialog box has been split into two separate dialog boxes; one for DWF and one for PDF. Both are accessible from the Output ribbon tab. PDF Options now include the PDF quality and font handling controls as well as new controls for hyperlinks and bookmarks. The hyperlinks control enables you to include hyperlinks from the drawing in the PDF file. The bookmarks control exports sheets and named views as bookmarks so you can easily navigate between them when viewing the PDF file.

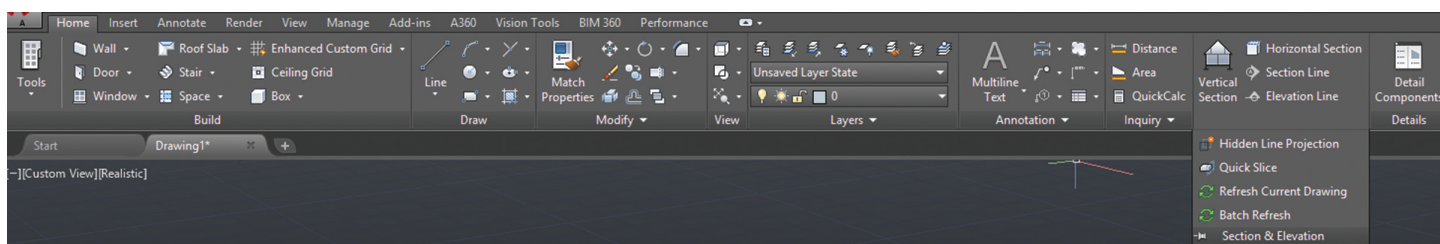


Figure 4: Section Object

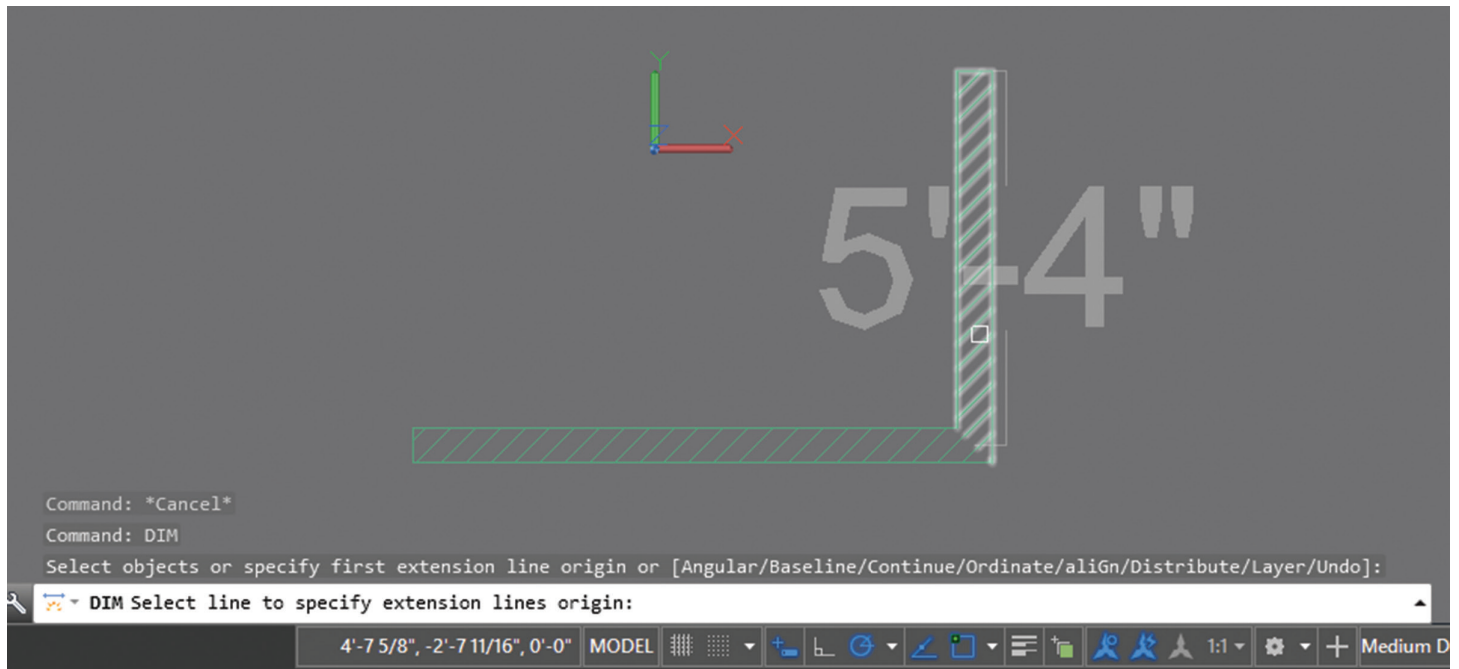


Figure 5: DIM command preview

When using the Plot tool to create PDF files, you can now choose from four predefined PDF presets, which offers a quick way to apply different PDF output options that meet various needs. If you select any PDF pc3 from the Printer/plotter drop-down list, a PDF Options button is displayed, providing convenient access to the PDF Options dialog (see Figure 3). Similar PDF presets and options controls are available when creating PDF files using the Export to PDF and Batch Plot tools.

The Sheet Set Manager has also been updated to support these PDF enhancements. Layout names are automatically displayed as page labels in the PDF file, making it easy to identify sheets when viewing the PDF.

## SECTION OBJECT

Section objects, created using the Section Plane tool, provide more flexibility in AutoCAD Architecture 2016. The Section Plane tool creates a section object that acts as a cutting plane through 3D objects including solids, surfaces, meshes, regions, and now point clouds. The section object's type can be set to represent a simple cutting plane, a bounded area, or volumetric area.

In 2016, a new Slice type has been added to the section object (see Figure 4). The Slice type generates a thin cut through the model that always contains parallel front and back section planes. The Slice type has a slice thickness property and cannot contain jogs. When switching to a slice type, any jogs in the section object are removed. Some grips have been offset or repositioned to make them easier to select and now operate more consistently regardless of the view or whether polar tracking is toggled on or off. The contextual panel for the section object has been changed to a contextual tab and has more controls. It has tools for toggling Live Sectioning on and off, changing the section type, adding jogs, and rotating the object in 90-degree increments. The tab also has edit boxes with spinner controls for adjusting the offset of the section plane and the thickness of the slice.

This is useful for changing these values when grips are not accessible from different views.

## DIM COMMAND ENHANCEMENTS

The DIM command has been significantly enhanced in AutoCAD Architecture 2016 and is now accessible from the ribbon. Options within the DIM command are now displayed at the command line and in the right-click menu, eliminating the need for you to remember which options are available and how to enter them. However, even the need to specify Dimension options is significantly reduced in 2016. Now the DIM command automatically creates appropriate dimensions based on the type of objects you select. A preview as you pass the cursor over those objects enables you to see the resulting dimension before you actually create it (see Figure 5). The DIM command further simplifies creating dimensions by eliminating prompts to modify the dimension text and angle. Instead, the default values are automatically applied. Mtext, Text, and Text Angle options are available from the command line and right-click menus if you choose to change them. When using the Baseline or Continue options, you are automatically prompted to select the first extension line origin. Regardless of which type of dimension you create, the DIM command remains active, enabling you to easily place additional dimensions until you exit the command.



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Inside  
Track



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The old leader and Mtext are deleted. The AutoLISP routine is "open source" so you can modify as you see fit, if necessary.

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