RANDY BURNETT: All right, so here we start with our agenda. Introductions. My name is Randy Burnett. We'll get to all those things in a little bit coming up. Overview of AutoCAD electrical. That's really what we're here for. As I mentioned, very basic kind of class. We're going to explore some of the functionality including schematic creation, why you should be using AutoCAD electrical instead of AutoCAD.

That is our number one competitor by far is AutoCAD. Not all the other competitive products. Those are all great products. They work well too. But most people are still using AutoCAD. I guarantee we can save at least 20% of your time. Doesn't sound like a big number, does it? 20%. One day a week for every designer in your company. Oh, that gets pretty big after a while.

Panel layouts. Taking the information, reusing it to create our panel layouts, in this case 2D. But we can also do it using a similar kind of workflow with Inventor in 3D, giving us a lot more capabilities and things with it as well.

And doing reports. Number one time-saving piece with AutoCAD electrical. Typically if you're using AutoCAD for your designs now, it's a two-step process. First, you make the drawings. And then you go back through the drawings and create the bill of material to match what the drawing is, what your logical design is.

Right? Takes almost as much time as creating the drawings does. We're going to do that almost instantly. So think of that. If you spend three days creating your schematics. Another day creating your reports, that day is gone. And it's accurate. Accurate is what your drawings are.

And then we're going to review a couple of new things for 2017, just to give you a little bit extra flair with this. OK, starting about, our questions to get your introductions. So how many of you have attended AU, this is your first time. You're a rookie. First time? Whoa, whoa, whoa. Look at that.

Well, welcome. Are you impressed? Have you been impressed yet? I mean it's going to be phenomenal, right? Eight to 10 thousand people. Last year was a record 10,000 people here. Amazing we can get everybody fed and back here in an hour and a half, right? Pretty incredible stuff.

How many have been here three-plus years? Wow. That's a lot too. How many more than 10? How many more than 15? I'm still ahead. OK, this is my 17th or 18th year. I'm losing track of it. OK, how many currently using only AutoCAD or something very basic like that? Ah, see again. Like 40%, I said, right? That many people.

Guarantee we can do better with that. And I'll impress that on you today. How many of you have seen an electrical presentation? Demonstration? OK, so you're going to see it again. Because that's really what I'm doing basically, right?

And how many are currently using AutoCAD electrical? Not very many? Good, I'm happy to see that only in the sense that this is a basics class, so I'm hoping you'll attend some of the other classes that go in with this?

How many of you have attended a class of mine before? Wow, this has got to be one of the lowest things I've seen, and so that's pretty-- as good as well. You can see the little guy I put on there.

So about me. I'm the AutoCAD electrical specialist. I've been using AutoCAD electrical since 1996. Been using AutoCAD since 1984. That was a long time ago. That was version 262, fit on one floppy disk. How many remember that? One floppy disk? The ones that you had to swap in and out during the computers, right?

OK, that was my world where I started out from. This is my 17th year teaching here. OK, what else? I fly radio-controlled planes. That one's 35%. I like show this just to get a little thing here. I get to show off a little bit. I have five planes that are 25% or bigger, 10 horsepower in that little plane or you could almost put your kid on it and fly it. Don't think it would be legal, but could be fun, right, to do that.

Number one rule of flying with radio control or flying in general is that takeoffs are optional, right? You don't have to take off, but once you do, you will land. And here was one of the planes I started the year with. That was a smaller one, that was only 33%. And didn't end up so well. I crashed two of them within two days, doing the same maneuver, both 20 yards apart in a field. Not a good week. Not a good week.

I fix it. I replaced those. Those are the kind of planes that I have now, those two in there. So there.

I wanted to bring this up early on in the presentation, just to let you know about other AutoCAD electrical classes that are going on in the session. I want to talk a little bit about that. We tried to organize it this year that they would go in a sequence, from the beginning class now to more advanced, all the way through to the end. One I want to point out here, if you signed up early. We had a late addition to a class. This one, Getting Powered Up-- How to Implement. The instructor is [INAUDIBLE], a good friend of mine as well.

I'll also leave this up at the end of the presentation so you can copy these down, and get them as well. I just wanted to tell you that was kind of the scheme, so please, please, please, leave feedback at the end. I'd like to know how this thing fit our design people. How you thought this was laid out. We actually had them scheduled. We didn't have any overlaps this year. How about that?

Last year we had six classes, and we had two of them were overlapping, so basically you could only get to four of them. So that will be coming up later.

We don't have a lot of time, so I'm going to jump kind of right in to what AutoCAD Electrical is. We'll just start with this. It's an industry-specific version of AutoCAD. So it is AutoCAD. It's based on AutoCAD. The drawings we create will be DWG drawing files. So if you're using AutoCAD now, it's, I won't say it's an easy transition, because we have to break your old habits and get you into new ones, right?

Because you're going to be using AutoCAD now, you're using the line command and the circle command and text command. And in AutoCAD Electrical, we don't want to use those commands because those entities aren't intelligent. We can't do a lot with them. They're just on the drawing. It's like an electronic version of the drafting board.

In AutoCAD Electrical, we want you to use insert block and move component and edit component. Those kinds of tools. So it is an easy transition because it is a DWG file, but it's a hard transition because you have to break your old habits and get into using the new ones with AutoCAD Electrical.

It's very important to get the full functionality of. It's native to the AutoCAD environment. I just kind of went through all that stuff as well. It's readily configurable and has an open architecture. This can be very important as you start progressing with AutoCAD Electrical.

What I mean here is that you can make it look and act and work like you want it to. So we can

change our numbering format or tagging formats. How the reports look. We can do all that. It's configuration. I differentiate that from customization in that configuration is just say, hey, I want it to be A instead of B, I want it C instead of D. Where customization would be I'm going to make up my own E, right? My own way of doing things. And write my own custom programming with it.

So that's what I mean with that. We include the API with the software. So that's where it has an open architecture. There's no extra packages with it. If you want to customize it, go right ahead. We provide the links and the tools right into that to help you work with that. You use it, you can use LISP. That's the most easily one to get into there, but as well C++ and .Net and so on.

It's fully-- I've got to get my mouth working on this thing too. It's fully portable, meaning everything we use, all of the files you see me do in the reference files are all very generic. They're Ascii text files. Microsoft Access databases. S2L databases. All things that you have available, you can use. And you bring them around.

There's nothing that we have that's proprietary. That, oh, it's only a AutoCAD Electrical. No, we bring in stuff from everywhere to work with that. And it's tightly integrated with Inventor and Vault, the data management software. Has some really cool tools with that. We don't have a lot of classes for those two interfaces, between electrical and Inventor this year, but if you look back at last year or previous years, you'll be able to find classes at AU that have the information.

Speaking of that, you notice we don't have any handouts anymore. I don't know if some of you been from before. They all should be downloaded. They're all available online. Many of the classes, like this one, will have the data set I'm using, the PowerPoint slide I'm using, so you can see how, look at my planes again if you want.

The instructions that I have, so everything I'm going to do is typed up with instructions, so you can go back and run the same thing yourself.

All right. Let's see what's next? Ten reasons to move to Electrical. So most of you in here were using AutoCAD. I'm going to bring these up. Comprehensive Symbol Libraries. So if you were drawing your own symbols over and over, normal open switch, normal closed switch. All that.

We have 17 different Symbol Libraries, including NFP, AJIC, IAC, IEEE, hydraulic pneumatic

PNID, and Australian, Chinese, and Japanese Symbol Libraries. Sometimes in several different scales. So we have that covered, right? Don't have to make them on your own. They're all free, come with the software.

Automatic Wire Numbering Component Tagging, kind of speaks for itself. Especially if you've been using AutoCAD. I know the story, right? Put in a string of text, copy that piece of text around your drawing, and then go back and edit each one. Right? It's just a long drawn-out process.

Automatic project reports. I mentioned that earlier. You'll see me do those some today as well. Real-time error checking. This is going to be one of the things I'm going to show you that as we're designing, it will keep track of the contacts you're using, wire numbers you're using, unique component tags, all be handled automatically by AutoCAD Electrical.

Real-time coil and contact cross-referencing. Hit that one. Create smart kind of layout drawings, reusing your existing information. With AutoCAD your current workflow, I understand it because I've been there. You draw up the schematic, probably print out the drawing, and then as you start doing other things, like creating a panel layout or creating a bill of material report, you dig out the highlighter, and start highlighting components.

Yeah, I've got that one on my sheet. Highlight that. Go on to the next one, right? Am I pretty close? Same thing? I see some nodding. In fact, I've been using that workflow for 30 years. I did, before AutoCAD Electrical. In fact, I was the start of the green movement. Everybody is familiar with what green means, right?

I used to print out my schematics, and I'd go over them with yellow. I'd go back over them with blue because the lines would turn green. Groaning, by the way, is a totally acceptable response to anything I say like that, right?

Electrical specific drafting features. I'll show you those. When we insert a component, it automatically trims the line. Come one. Automatically creates circuits. I won't be showing that today. It's more of an advanced thing. Think of the circuit builder, PLC to spreadsheet I/O. There will be a class on that. The automation class, Feel the Need for Speed. We'll be talking about using the PLC I/O and automatically generating drawings and talking about that topic.

Share drawings, Right? They're DWG files, so you can share them with anybody that has AutoCAD. They can open and make changes to it. And we have lots of things for re-using

existing drawings. Copying projects, that kind of thing. Those tools as well. All things that you can't easily do with AutoCAD.

And I know many of you might be thinking, well, I can copy drawings in AutoCAD. Yes, but now you have to go back and renumber everything. Retag everything. Relabel everything. Electrical handles that all automatically for you.

All right, up to 80% productivity gains. Sounds unreasonable. 80%, meaning if five days [INAUDIBLE] now, we can get it down to one. OK, so I'll tell just a little story about that. I was at a company. We were interviewing them, and I was talking with the users. And the manager was in the room. And I said, OK, well, how do you do this? They described it to me. How long does it take? They write it down. You know, and go through that process. At the end of the process, we totalled it all up, with a manager in the room, with his people giving me the answers. And we saved 80% of the time.

I looked at him, and I said, well, that's ridiculous. You're not going to believe that number. And he said, no, I won't. Let's cut it down to 40%. Half of what your guys said it would. You believe 40? And he said yes. OK. 40%. Two days out of every work week. Pretty amazing, right? I'm not saying that every case will be like that, but the potential is there.

We have been voted the number one ECAD product in the United States for 15, the only reason we're not up on 16 is they haven't had the awards yet. So don't know if we're going to win yet. Trends say we will, but who knows.

All right, and with that, I'm off to AutoCAD Electrical. Any quick questions before we start. All right, I know in some presentations you're supposed to wait until the end for questions. I'll kind of monitor the time, so if you have questions, kind of toss them out. If there's something I can handle quick and easy, I will. If there's something that will take a lot longer, then we can meet up afterwards, and I'll let you know that. All right?

So here we go. Moving off to AutoCAD Electrical. And as I mentioned, this is a real basic piece. I am going to show you how to create this circuit. I'm basically going to re-create a circuit like this using the basic tools. Of course, we have a copy circuit command. I could just copy this, paste it down on the lower part of the drawing, and Electrical would retag all of these components and make them all unique. One of the things that you have to have is a unique statement.

But I'm going to start even more basic than that. Again this presentation is really focused on taking AutoCAD users and giving you reasons why you want to go to the rest of our AutoCAD Electrical classes.

So first of all, I'm going to add two more rungs into this schematic. To start with AutoCAD, I'd have to start the line command. Start up some kind of object snap, draw the two lines in between the spots, and add connecting dots on the end of them, right? Because that's the kind of drawing I have.

As opposed to just starting the command and picking somewhere near where I want them. You'll notice AutoCAD Electrical did all of that for me, and it found the correct locations based on the wrong number that I have in this drawing. And I want to also mention that, while I'm using a ladder with ladder references and components, we could do this sequentially. This could be a wiring diagram. Electrical doesn't care. This I've just found to be more common than most of the rest of them.

All right. Next up, I want to insert a component. So this basic workflow is what you're going to use to insert a component into your drawing. You'll see me repeating a process several times during the day. I pick on the icon menu, it presents a list of the component pieces I'm going to insert, and I'm going to select a push button. Normally open.

So this is the first place that it helps, right? Not only do I not have to go out and kind of browse through my Symbol Libraries, Electrical provides them for us. As I select the insertion point on the line, several things are happening automatically. You'll notice the line is trimmed for me, right? So if you're an AutoCAD guy, that already saves a lot of time, right? Going back now and having to do trims and breaks and all that.

Next, if we look at this dialog box, you'll see that it is labeled as PB403. Push button. It's that family code, plus the wrong number, 403. And now this dialog box that appears here, everything in Electrical is generic. In this case, our symbols are blocks with attribute information.

If you're familiar with blocks and attributes, you've got 70% to 80% of AutoCAD Electrical nailed because that's where we're putting all of our information and manipulating those blocks and that attribute information stuff. So everything you see in here, all these white boxes, are the attribute values that we're filling out with information.

The buttons you see, all the rest of this, are simply tools to help you fill out that attribute information. Very first example. I'm going to come up over here to defaults. This opens up this Ascii text file called WDD, which just stands for WD, description file. You can open this with Notepad, Word, anything you want. We even build in editors in case you don't have any of those. But, of course, everybody has something in there to work with.

This listing has several different variations. This one's going to be the system reset button. When I pick on that, you can see the information is transferred here. Also you can set this up with the first of our language tools. For example, here is a dual English and French. This is my system reset, so I can pick on that, and now the first line is system reset, and the second one is Restoration system.

Anybody speak French in here? How did I do? I was hoping there would be nobody here, and I could claim I did it well. I threw in my fake Wisconsin-French accent and tried to kind of pull it past people, and it didn't work.

OK, so I put that information in. We also have other language tools again to help fill out that stuff as well.

Catalog data. Lower left hand corner is the next spot. As I mentioned, reports are going to be one of the most important things we pull out of this. And in order to pull it out, we have to put the information in. So I'm going to do with this first one, a catalog look up. This opens our part catalog database that has over a million different part numbers.

Come on? Austin Powers? Million? Million different? OK.

We provide tools to help sort through that database. So first thing I want to say about that. We have over a million different part numbers. I stopped counting when we hit that mark because it gets crazy after that. It's already crazy. We do not have all of your part numbers in there. Safely say that, even with a million. Because new stuff is coming out all the time. It's difficult to keep up.

We have the tools like this one to edit the catalog database built right in so you can easily add your own information. This is just basically a spreadsheet looking thing where you can type in the information. This is a free style type search, just like Google. Type in anything you know about the part number. I'll show a little example of that later on. And it searches through this table for the part numbers you're looking for.

You can even save these in a favorites list, so you can create your own mini parts list inside of there as well. When I pick the part number, it adds the manufacturer and the catalog onto the component. This one even has pin list information with it coming in automatically based on the part number that I selected.

Pick OK here, and symbols inserted. Pretty slick. I did a lot of talking in there, but I'm guessing if you're doing it with AutoCAD, it would take you about as long as it did with me doing all those explanations. Just to insert that, and then you'd have to go back and add the information.

All right, let's insert the second one. So this one, I'm going to go, this is my emergency stop. So it's a mushroom head, normally closed. I'm going to place it on the line. Pick emergency stop. And by the way, at any point, I can come up into here and type in the information if I want it to be, like this is my first one, so it's number one.

For this one I'm also going to do a look up, because I want to find a very specific part number. It's going to be Alan Bradley P200 A1. That's what I remember about the part number. P200 basically. So when I do a search, it goes through the catalog database. Let me get rid of this guy in here. I must have added a little too much information on it. And do a search again.

It's not in there. What did I do with my database? Well, I'll stop for now, and we'll look up a different one. Unless I can't find the database at all. Isn't that how it always works? I practice this this morning, and everything's working fine. I get in front of 80 people, not quite 80, looks like 60 or so. Room seats 80, and this stuff happens in there.

OK, so let's take a look at this. I'm going to pick this one that has two normally open contacts, or two normally closed and one normally open. This becomes important if it has the pin list information with it. Man, I can't even find my part number I'm looking for. I know what I'll do here instead. I am going to go back to do that. This was going so smoothly, right?

And I'm going to do a project look-up for this part number, and see if I've used one in an existing project. This is actually something I usually do later on. But I know I want to find that one part number. We'll grab this guy. And pick OK. All right.

OK, so I have that push button in there now. Next thing I want to do, typical workflow, right? We're just repeating the searches. This time I'm going to grab a relay coil. So this is going to do a couple of things for me. I know why, I was putting in the wrong part number. I'm all flustered now.

Going with the relay. This one's going to be my master control relay. Same kind of workflow so far. Now I'm going to try to do my look-up and add in my right part number. And amazingly, there's the P200. I can pick on that. I get a whole big list, and I also know it's an A1. And there's the part number.

I'm picking this one because it has two normally open contacts with it. Got a little ahead of myself earlier is all I did. This one also has pin list information assigned to it. You'll notice that it says K1 and K2 for the coil pins in this case. If I'd selected a different part number like it was trying to do before, if the information is not there, they come in blank. Or you can add your own pin list information to keep it all up to date.

This is going to become important in a minute because several things are going on with this. I've inserted this coil, and it says it wants to update one. Well, I also had a CR403 contact already inserted into my drawing. AutoCAD Electrical is automatically keeping that stuff linked together. I inserted a Sierra 403, it found a contact for Sierra 403, so it automatically did the cross-referencing, showing me that there is one online 406 down here.

This child is updated to show me this guy is up here on line 403. And I have it configured to show me that there is one unused contact left. Pretty cool. Helps finding that. Let's try this again. I'm going to insert a child relay to show you how that can be set up. It was already existing, so it was automatic.

In this case, I'm asserting a child contact, so you notice the dialog box looks different because it is a child. It doesn't have that same information that the parent would have. So our job is to link it back to the parent. I'm going to click up here on Sierra 403. Notice how it copied all of the information from the parent to the child, including the cross-reference information.

If we take a look at the pin list information, here is the parent coil, K1-K2. And the other contact a A1X and A1Y. I have one pair left, this A4X and A4Y. I insert that. Everything is cross-referenced and updated. This would also help take place across other drawings as well. This is an appropriate spot for everybody to respond, ooh or aah. OK, very good. We're doing well. I know, it's early in the afternoon, but we can do well with this.

Real-time cross-referencing across drawings. So if there's coils or contacts elsewhere in the project, they'd all be updated. This works across drawing types as well. So, for example, I mentioned some Symbol Libraries early on. So I could have this parent coil or a solenoid that

runs a hydraulic valve on the hydraulic schematic, and it's going to show up in my panel drawing because it's a piece there. And maybe it shows up on my one-line drawing. And it could also show up on my three-line drawing. Four or five different places in the drawing all updated automatically. Wherever they are. So if you remember paging through and trying to find those other locations, Electrical is doing that for you automatically.

What happens if I insert a third one? So I'm going to grab the same contact down here, insert it into the rung, and I'm going to pick on this family. Remember I picked a part number that only had two normally open contacts, so there's my error message. It's telling me you've already used the two you had available, now what do you want to do?

Sometimes you may just say, look, I need to have this third one in there. And you ignore the error. It will warn you again to go back and update the parent. Or in my case, I'm just going to hit cancel. But real-time error checking as you're designing and working with the project.

Next I'm just going to insert a quick light. This is going to be just a green light that says, and it's really, I'm just putting this one in to complete the circuit. The system's enabled. I'm going to grab a part number that was used.

Oh, I want to mention this. Active project, other project, or external file, right? I can search to see if I've reused that information previously. If I pick active project, it works on the drawings that I'm working in here. And by the way, I didn't really mention this, but this is another thing AutoCAD Electrical does for us. This project manager on the side ties all of our drawings together in the project.

This particular one has 10 different drawings in it. But you can have 100 different drawings in here, and Electrical knows about all of them, peruses all of them, making sure that everything is staying unique. Tag names, wire numbers, and so on.

Or if I know I've used this light or this component in a project I worked on last week or for a different customer, I can look in that project to find the information, or even an external file. An external file. Why would you use that?

What about a retrofit that you're putting in, you're rebuilding something for somebody? And they probably have spare parts on hand. Well, wouldn't it be great for them if you reuse those same parts? So you could just request, hey, send me the list of spare parts you have on hand. I'll put the new ones into this thing from that spare parts so you don't have to get duplicates or

pieces, as much as I can, right?

So that's all available. When I pick on this, we can see I have three of these light switches. So I'll use that same part number in here. Part number information is all set up. And there we go with the piece. All inserted.

And lastly, I have to just put in these branches. This is another great example of where AutoCAD Electrical helps with even just those mundane tasks in AutoCAD. Drawing the lines again, putting in the snaps, the object snaps, pieces. Or if I want a trim out that piece of wire, takes out that section, and takes out the connecting dots for me.

Right? ooh, ahh? Thank you, thank you. I appreciate it. I hate to have to beg for stuff, but I'm not afraid to, just so you know.

All right, finally wire numbers. So I know I mentioned it earlier in the class, right? How we putting in wire numbers in if you're using AutoCAD. Typically put in a string of text, copy that piece of text around, and go back and edit each one. Trying to keep track if you've used the number before through the drawing. Wouldn't it be a lot better if we could come in and just add wire numbers drawing project wide? As easily as cooking and buttoning and letting AutoCAD Electrical take care of it for us. Like 403, 403A, 6, 6A, 6B. Right? Project wide. Drawing wide.

If you want to change your numbering sequence, we can do it through the project and have it sequence each of the drawings for us automatically. Pretty amazing. You can see where, and what happens is, the reason I go with 20% as my productivity gains. You can see it speeds up things a lot compared to plain AutoCAD. But what we're also doing is putting a lot more information into the drawings. We're adding the part numbers, the pin list, the descriptions, into the drawings themselves to be extracted later on in our reports.

So while we're speeding up the drawing processes, the drafting of the schematic, we're also slowing it down a little because we're adding this extra data, right? So that's why I go with like a conservative 20% number. I like that conservative at 20%.

So that was all I really wanted to show just for the schematic portion of the presentation today. And I've only really shown like two or three commands across the top here. You can see we have a lot more extending wires, inserting circuits, inserting PLCs, all that kind of stuff as well. Next I'm going to go to the panel drawing.

So I'm going to open up this guy right here, and open up this. And notice, all I did is expand

this out and double click on the drawing. Just another one of those little things. If you're in AutoCAD, I'd have to go open drawing, file, browse to where the project was, where you got them. Find that. This keeps them all organized in one spot for you. So in here we have this simple panel layout. In the panel environment, and really think about this, we're moving from the logical world of the schematics to the physical world of the panel.

And in this case, we're just doing it in 2D inside of AutoCAD Electrical. And as I mentioned, we also have an interface to Inventor that works similarly that can help create the 3D models and pieces with it. In this environment, in the panel, the physical world, we also have the same sets of tools like we did in the schematic.

So I can go to the icon menu, I can go look up the push buttons, and select the one I need to insert it and work that way as well. But this is a great case of showing you where AutoCAD Electrical helps you reuse your existing information. In the schematic, we've already inserted the component. We've told that it was a normally open push button. We gave it a part number.

So here in AutoCAD Electrical, we can go to a schematic list. It's going to extract the information from our project. And I'll just pick a group of drawings, my schematic drawings here. And it creates a list for us of all of the components in the project. Now it's like a bill of material. We'll get to the bill of material report later on. But this is really a tool to help us create those panel drawings.

So I just marked all of the existing ones, because we do have some existing components already in here. So we don't want to reinsert those. And as I scan through the list, I'll find PB 403 and 403A. Those are those two push buttons we inserted earlier in our drawing. All right. Assigned them part numbers and stuff with it. I'm going to set the rotation angle.

And notice down here, it says automatic footprint look up. Automatic physical look up. We're getting the matching part to that schematic from the part number from our databases that come with the software. Now since I selected more than one component, there is actually an intermediate step.

It's going to ask me if I want a prompt for each location, meaning I could pick here, pick here, pick up there. Scatter these points around inside of my drawing. Or in my case, I happen to know that my spacing is A- 2.5 inches. So I could put in rows or columns if I know what the spacing is for these.

And I want to mention this, suppress that edit dialog box. I'm going to leave that unchecked for now, but you'll see where that would come in handy in a minute. When I pick OK, Electrical prompts me where I want that to be. Notice how it found the footprint for that PB 403 part automatically, based on the part number of the component. Again, one of those tasks that in AutoCAD you'd be looking up the part number, then trying to browse through your library to find a matching piece. Electrical knows all that information already.

I pick my insertion point for it. It copies all of the information from the schematic onto the panel component. Now since it's doing that automatically, when I pick OK, the dialog box reappears. Well, it didn't just reappear. It also inserted the second component, and it brings that information as well.

So that check box I told you about earlier, suppress that? Most of the time I'm going to check that, because I don't need to see this. It's just copying that information over. It's just an automatic process for me. So I could put in a whole roll of buttons or components just by clicking it, letting it populate them all based on the spacing. And we have several other tools for doing that as well.

So when I pick OK here, brings us back to the dialog. PB403, 403A are not available. If I select on it. Notice how it says it's even disabled. It can't insert it. One-to-one relationship helping us with that design process that we're working with.

Now I mentioned that it's copying that information over. This panel drawing is tied back to the schematic parent. If I edit this footprint, and let's say we change something. I'm just going to call this system number two. I'm not going to try to pronounce it again. So I feel safe there.

But watch what happens. Because I'm making a change, Electrical knows there is a matching component somewhere on a different drawing, and it's prompting you, do you want to change that now? This is also part of what happens if we have multiple users working on a project, this little task operation.

If somebody else had that drawing open when Electrical needs to do, it'll come up with another warning and say, hey, the drawing isn't available right now. Do you want me to task this? And you can rerun all those operations later on when you do have access to the drawing that the other guy is using. I pick OK. Saves and closes this drawing. Opens the next one. Makes a change there, and brings you back here. So everything in the project stays up to date, tied together, sequenced all the time.

Ooh. Aaah. Wow, wow, tough crowd. It's just afternoon, right? I'm going to count on it just being after lunch. Too many cake pops. Or brownies.

All right, so that's how we create a panel layout. Right now I could go on and put more pieces in, and we have a few more tools to help with that as well. But that's really the basic piece. Start with one, and work in together. We can also start with the panel layout. The tools work bi-directionally. So if you had long lead time items, for example.

Motor drive. I could insert those into the panel, kind of get an idea of how big a panel I need. Stop there, and then go on to my schematic design, and as I'm designing in the schematic, I say, well, I need to know what motor drive I used. Pull out the list from the panel. Insert it into my schematic as well. Bi-directional kind of stuff.

So that's really it for the panel. Of course, we can create all kinds of things. I'm going to show an extra tool here while I'm doing this. Notice these Next and Previous buttons. Working in electrical project, if you're working in one drawing, what's your most common thing? Go to the next drawing in the project. Or the one right before it.

We provide tools that do that automatically. I can just pick on that little button. Notice over here, it went from drawing 8 to drawing 9, opened it up for me. And here's a panel layout. We have terminal strip editor tools that can help you with that as well. And so on.

So panel layouts. That was all I really wanted to show there. Again start with the schematic, build in to the panel.

From here, I want to start showing some of the reports, the real power that comes in with AutoCAD Electrical. First one, most common by far, is the bill of material report. Everybody creates one of those. We have several options for how we want to create the report, how you want it displayed. We can even filter it on installation location code. So I can just look through the drawing and find just the stuff that's in a certain drawing or assigned to a specific location.

In my case, I'm going to pick active drawing, so the drawing I'm working on. That's where I'm going to extract the bill of material from. Pick active drawing. Pick OK. And it creates the bill of material report. How legible is that? Looks pretty good up there. It's kind of small on my little screen here.

So there it is. The bill of material report. That easy. How fast could you have done that with

AutoCAD? You'd have to go back through and count the pieces. And you can see, here's the item number. The tag codes with it. Quantities. Manufacturing catalog. This is also very configurable.

So if you want your report to show different information, I'm going to hit Change Report Format. Here is all of the different categories of information we can add into this report. Extra lines of description. We even have three user columns that you can put in, and let's say I wanted to have your own custom part number, like AU number. So there, that's in here.

Actually want that before the manufacturer, and I want to put catalog up in front of the manufacturer as well. Right Very easy to move these around. What you see is what you get. There's my new report.

Now, what can I do with that. Looks great on the screen. So now I need to start doing things with it. First one is, I can save it out to an external file, Any of five different formats. Again very generic style format XML, XLS, and so on. Excel is the most common. So if I pick that, Electrical automatically gives you a name, automatically opens up your documents folder, and saves the report into the same format and category as it was before.

You even get an opportunity to run a script file against it. So maybe when you save the bill of material, you want to import it into your MRP system. You can create a little custom script routine, and just tell it to do that automatically. Same kind of things in there. I'm going to hit Close, and no script on that. So it just created that external file.

Or I can place this onto the drawing as a table. So as you can imagine, we're using AutoCAD Table Entities. Again very generic tools, very generic pieces that we're working with. That's this information over here. You can set up your own style of tables. We include several of them, including metric, inches, and so on.

Pick the location spot where you want it. And then some of these over here I find very useful. This is where AutoCAD Electrical kind of takes things a step further. I know 49 lines of information would go off of my title block, so I'm going to set this down that I only want 30 items in a row. And I'll put one-inch spacing between the two sections. And the table is automatically created on my drawing for me.

Ooh, aah. Now think about some of what's happening with some of these reports. That's one of the things that happens. People go great, we'll put this table on there. But how accurate is

this bill of material? It's 100% as accurate as your drawings are, right? Because we didn't type in anything. No typographical errors. No miscounting. If it's in the drawing, it shows up in the report.

If the report's wrong, what does that mean? The drawing is wrong, right? Fix the drawing, and then we can go back and update the report. And I have had people tell me, no, I'm just going to edit that report because it's faster and easier. OK, great, and now next week, you're going to copy this project, and run the report again. And what's the report going to be? Wrong again. So we go back and fix the drawing, reports are right, and everything is accurate. It stays downstream.

Again think about those costs. Many times they say, how long does it take to create the bill of material report? And they'll say, oh, I don't know, three or four hours. We can do it instantly. How accurate is your report? Here's the response I get all time. Oh, we're pretty good. How good is pretty good? Oh, we only have one or two mistakes in each report. How much does that cost? And that's eliminated here.

So that's important to consider when we're popping this stuff in. OK, so that's the bill of material report. Pretty impressive, right? Number one report we make. We can do it through the entire schematic, project drawings, all that kind of stuff.

The next report I want to show you is actually one of my favorite reports. I'm going to the schematic style of reports, and I'm going to create a from-to list for the entire project. So I'm going to get all of the drawings in the project, and create the report. Now, from-to, this is a wire from-to list. I'm guessing nobody in here, since most of you are AutoCAD people, create a wire from-to list for your project. An I correct?

A list of every wire in the project. Where it starts from. Where it goes to. No. Way too much work. Way too difficult. No matter how useful it would be for people in the shop, it just would take way too much time and be fraught with errors. So how about that? Again, as accurate as what it is in your project.

And let's take a look at some of this information. So if I slide down here just a little from our list. Take this guy. That says it's a 22-gauge violet wire. There is the wire number, 11-05A. Starts in the cabinet on my power supply, number 6 on pin number 4. Well, that's pretty impressive information.

But not only that, it also tells me the other end of the wire is also attached to the cabinet on receptacles six, pin number R. That's pretty detailed information, right? Now if you were writing a panel, how hard would that be? Gets pretty simple here, right? Just pull out the spool of wire, strip it off, put your wire number on. I know exactly where it goes from one end to the other.

Right? Pretty cool information. Another spot where you can go ooh or aah. Nothing? All right.

Next report I want to show you. This is where it really comes in handy. When I was doing this design work, one of my least favorite tasks was to create conduit runs. Where the wires start from one cabinet and go to the other, because it was just this process. I had to be studying on the schematic, and in my head, OK, this component's located over here. That component is located, OK.

And I can ignore that wire, and then go through the whole schematic, right? And it was tough. And invariably the people in the shop would say, add three or four extra wires. No problem, and I'd add three or four more, because I'd know I'd miss some in my counting. So we'd have six wires in instead of three.

Well, what this can do is that same process. So I have the wires starting at MCAB 5, running to operator station 3. And there's my list of every wire that's going. And once again, it's as accurate as what my drawings are. If I make a mistake, it's because I didn't do something right in the drawings.

See I got a wow over there, yes.

AUDIENCE: [INAUDIBLE]

RANDY BURNETT: Cable from 2 is there too. So a cable from 2 is just like one step up, because a cable is really a series of individual wires, right? So what we do is, you then take all these individual wires, put a cable on them, and say, all of you, your five wires are part of this cable. And we can do a cable run as well.

Or you could skip it altogether and just say, I want to run one single line between these components, say it's a cable, and not worry about all the individual pieces. Think of a CAT 5 network room, right? You don't need to know where those five wires go in that CAT 5 connector, because they're all the same everywhere.

But knowing that it starts on port 1 and goes to port 5 and these places, that's important. Because now it's just as they change it, I've just got to document. I just need to know where the cables plug in. We can do that as well.

That's one of my favorite reports right there. Ooh, I'll do it for you. All right.

And the last report I want to show, how much time have I got? Oh, I'm running out of time already. OK, the last report I want to show you is this electrical audit. Not really a report per se, but it is extracting information from inside your project. What this tool is is actually a drawing checking tool that we built into the product. A drafting checking tool maybe.

You can look here. Here are the 10 different categories that we're looking for issues inside of the project. Terminal duplication. Catalog components where you might not have put the part numbers in, the catalog information in. And it lists them out for you.

So here's an example of, I have some wires without a connection. So this tool would be helpful in itself, just to tell you where it might find these issues. But it goes beyond that. electrical knows about these pieces, so I could pick on this component, and pick Go to. Electrical knows where this stuff is in your project. It saves and closes the drawing I'm on, and zoom you in to where that wire is or where that component is in the drawing.

So notice I'm on drawing number 2 now, so now you can look at it and fix it. Right can do whatever I want to inside of here. Or maybe I look at that wire and go, hey, you're OK. This is, by the way, something that's new for those that have been using AutoCAD Electrical and you're using an older version. We have now added the ability to ignore issues.

That should be a small cheer for anybody that's used this tool before. Yay. Because before this, if it was an error or an issue, but it was OK, it was just something that Electrical flagged, it would just keep showing up and confusing the report. Now I can take that, mark that as ignored. And then it will hide that with the issues. And if I have other pieces, I can ignore them. You can see the ignored issue down here, or if I hide it, takes it completely off the list.

So after you've gone through your project, before you release it, you can go through this electrical audit and find any other errors that might be showing up in your project ahead of time. Also another great favorite of mine because I'm really not that good a drafter. And you know what they say? Those that can't do, teach. Here I am.

All right. Let's see. So that's what I want to show was a quick overview of Electrical, right. We

started with the schematic. Reuse that information. Showed you the error checking there, tools that can help with AutoCAD there. Re-used that information to create the panel layouts, then created reports and pieces with that.

With the last seven or eight minutes I have here, I'd like to hit a couple of the new features that are in AutoCAD Electrical. So if you haven't been around it, or if you have been around it before, and I know there was like 30% of the class that have seen it or used it, but you're not familiar with 2017. That's what I'm showing you, just a couple of the features there.

The first one I'm just going to talk about, and that is the SQL database. So in previous years, you could only use a Microsoft Access database for your part numbers. We can now use SQL as well. Not really a way to show you that. It acts and works and everything the same. It's just in the background it's SQL instead of MDB files.

Let's see. The other ones I want to show is, I'm going to go to my drawing number 9 here. And we're going to take a look at some of these part numbers or item numbers that are up in this area. And with the balloon and part number information, we can now configure that to be different.

There's a couple of things that help with this. So first of all, I'm going to go to my item reset piece. And here's where we sequence the item numbers for the components. So you put balloon numbers in. You have to have item numbers for them. Electrical will allow you to add those in as well. See, hear that? There was applause over there. Come on now, you guys have to step it up here somewhere. Just pointing that out.

And I can sequence this, and it's going to re-sequence the numbers. So if we take a look at the numbers in here, they'll re-number according to the new manufacturers, 40-- let's make one more change on that as well. I'm going to go back up to the re-sequence balloon numbers, and started it at 001. Make it a little more dramatic instead of just those little pieces in there.

And so that's great, right? So the numbers appear in here. But we can also change the balloon figures, and do that completely throughout the entire drawing. So maybe I want to make this a slightly different size, say call it .2 instead of . 18 because I know they'll fit in there.

And now all of the balloons in the drawing will be updated automatically with that new information. Where in previous versions, it would just be the balloons you did after that. So like

a little bug thing they fixed. Let's see, I get those two down. So the ignore issues.

And one other thing I want to show you. In here is the combined bill of material. Remember I've talked to you about how we can now do it with Inventor as well. Well, we can combine those two bill of materials, so if you have the part numbers from Electrical and the schematic drawings, and the part numbers from Inventor and the panel layout drawings, the 3D world, we can combine that into one bill of material.

So if I, and I want to show you one other thing with us as well. If you've seen that interface. This is actually the interface to an Inventor assembly. Now I don't have an Inventor assembly running right now. But if you notice, there's these little coil symbols that show us the electrical components. And here's this 3D symbol that shows us the matching Inventor symbol. And we link those two together.

There's several tools to doing that. There's one new one here that I wanted to point out. That is, I can do it right in the component tree, so I can just pick those. And now you can see there's a link symbol inside, so they're tied together. If you haven't seen this before, talk to one of your guys. And you're interested in working with 3D kind of pieces, talk to your sales people, and they'll show it to you.

It's really an awesome interface of how they tie between Electrical and Inventor pretty seamlessly and in real time. So now if I create this bill of material, I'm going to go back to my reports. And I'm going to create a bill of material for the project. And the one new piece that has been added, as soon as it generates the information from the report, is a column called A Source. Where are you, Mr. Source?

Oh, wait, this should be the panel layout drawing. Let me go grab that guy. And if I change the report format, we can find the source. Add that into my listing. Where did you pop in there? There we go. I must have missed in my click. And now it shows you whether the part was located in Electrical, or if I scan through the list, if it came from Inventor. Or if they're linked together.

So you can see a couple of the linked ones. And since I don't have my Inventor model in here, it's not showing me any of the inventor parts. It's not actually pulling it out of that information as well.

So it can tell you whether you just have it one or just the other, and so on. Any quick

questions?

AUDIENCE: [INAUDIBLE]

RANDY BURNETT: Yes, so the question was, would the Inventor be the 3D version of the same thing? And the answer is yes. Typically what people do as they start making this switch is not create the 2D schematic anymore. They would just go straight from the Electrical schematic, extract the same kind of information using this tool, and build it in Inventor instead. There isn't a lot of reason to go back and forth.

I know that was one of my first things was, why would I-- shouldn't I be able to do it in Inventor and bring it back? I was like, well, they said, to of our testing says once people move to Inventor, there's no reason to go back to a 2D world of Electrical. So that's what's happening with that part. Does that answer your question? Any others? Yes?

AUDIENCE: [INAUDIBLE]

RANDY BURNETT: Spatial business systems, yes. So here's the, I'm sure I can get into all the political speak. So don't take this as an official Autodesk said this. this is Uncle Randy up here telling you what's going on. AutoCAD Electrical and AutoCAD are generic tools. Autodesk has to make them for everybody.

Substations are various, kind of unique. Not completely unique, but kind of unique there. So it started when Automation Force saw that opening and said, well, look these guys could really take advantage of some special tools. And that's what happened. They created their own tool kit for that, and it works out great, actually.

Because AutoCAD, the big ship, think of us as the big ocean liner, we cannot turn very quickly. Because we have to keep track of everybody and keep everybody happy, even if they bought the software in 1984. There's five different ways of creating a line inside of AutoCAD and AutoCAD Electrical because the stuff we did back then we can't take out. Because soon as we take it out, somebody is going to say, oh, you can't take that out. I've been using it forever.

So by allowing it, allowing those third-party people to build applications. They can do it quicker and faster and react much faster. They come out with a new tool, you can say, hey, I don't like this tool. Or this is great, if you just tweak that. And get a tweak within a month.

Where AutoCAD would be like, OK, we got to check everything out and do it all that way.

That's really the kind of scoop of what's happening. Specific industries. Yes?

AUDIENCE: My question was just about the [INAUDIBLE]. Those are already embedded into the electronic version, into [INAUDIBLE]

RANDY BURNETT: Yes, so the question was, is the Symbol Libraries included with Electrical and R block already there? Yes, everything is set up for you. And our database has a million different part numbers in it so far. And we only have part numbers on it. It's all included at no extra cost.

AUDIENCE: For PNIDs, can you have it linked to relays, or--?

RANDY BURNETT: Absolutely. The one caution I'll say with that is we have the Symbol Libraries of hydraulic, pneumatic, and PNID, and we can link them across there. If you look, there's a class somewhere in Autodesk University about Not Just Electrical Anymore, I think is the name of the class. You can link them together, all the way across there.

The one thing I want to mention is we also have other software, we as in Autodesk, have AutoCAD PNID. It's a different software. Electrical and AutoCAD PNID do not talk with one another. There is no direct relationship between the two.

And the same thing with MEP, Autodesk MEP, mechanical electrical plumbing. It's more of an AC thing. There's a lot of overlap in our functionality, but we don't talk to one another. It's just, they grew up in different environments, different worlds.

OK, how we doing? Four minutes.

All right, finish up my class. So in summary, we did all this stuff. Real-time error checking, cross-referencing, panel reports, explored some new functionality. Cracked up, ooh, OK, that was all really cool stuff.

Questions? Right, for the answer bar. You can go there or email me. I'll be happy to ask you some of those, I'm sure you know about the, down by the food court area there, or the food area.

This is critical. Remember I talked about I'm on the AutoDeak University committee this year for setting up the Electrical classes. So not only do I want you to give me feedback on my class, how I did, how you'd want to see it different.

But I'd also like to hear about feedback about how the class set-up was doing. Maybe you

want different topics. How you want to see this work for next year, OK? I'm sure they'll be on next year unless I gave them so much hassle this year that they don't want me back. But we'll see. See how that works. But your feedback does result in better things in here.

And if you're ever wondering what the response is, just so you know, just to help you out. Again, from your Uncle Randy here. Correct answer is awesome. 5, 5 also works on those pieces. It helps me. Thanks to your strong support last year, I got one of these AU top-rated speaker yellow ribbons. Thank you very much. I appreciate it.

And I need your help to do it again, right? So it's all up to you guys. And there's the other classes. Thank you very much for your attention this afternoon, especially after the lunch.