CRAIG DIEZIGER: Good morning everybody. Hopefully you survived last night and are ready for your last day at AU. My name is Craig Dieziger. This will be my seventh time presenting at AU. I've had a little over 16 classes in that time that I've done. This will be the second year that I've done this class, and the fourth year in a row they've stuck me with this hour, or this session, this time slot. I'm not sure who I pissed off, but I must have pissed someone off.

A few housekeeping things that I want to go through before we get going, and I promise you there will be very few PowerPoint slides here. We're going to do this live. It's a small class, so I'll stop you. If I feel like I'm ahead of schedule, I'll ask for questions. Otherwise, I'll make time afterwards. Plus, I'll make sure you have my email address and everything. I have business cards up here, and feel free to shoot me an email. Cell phones, be courteous.

So what this class is-- Basically, I'm not going to read this whole thing to you. But basically I want you to understand this is a very basic class, showing you some of the concepts that I use for AGIS, for airspace analysis, and on down the line in the airport world. I'm going to show you the tools. But just because I show you it for one application doesn't mean it doesn't work for another application. The big thing I see in my 27 years of working in this field is, people tend to say, ah that's offset command, I can only use it to offset. Well no, there's other things you can do with that command. Always think outside that box. That's the key there. Think outside the box, and you'll be surprised what the tools will allow you to do. I'm basically going to show you the favorite tools that I use, day in, day out type thing.

The reason I'm telling you that is, because you're not going to hurt my feelings if you say oh, this isn't for me. Feel free to go find another session. I want to give you that heads up, so that when it comes time for those surveys, you're not saying oh, I thought this was going to be a little more advanced. You shouldn't see any of those complaints about it being basic.

Class summary, that's on your handout. Everybody found the handout in time, I'm assuming. I had it up there, I think, in plenty of time. Our key learning, as I talked about, we're going to work on showing you some of the tools I use for aerospace analysis, AGIS tools. Basically, GIS tools. We'll bring some points in and stuff, show some obstructions, and things like that, planning tools and data incorporation. All the way through this, we will be dealing with data incorporation. I don't have a specific section for that.

Basically, what we're going to do is build a Part 77 airspace, and bring it in to InfraWorks. Then

bring in some survey points, a few trees, and a couple things that we know might be obstructions. We want to compare it to that, and give you the chance to use InfraWorks for the analysis. How many of you have used it, InfraWorks? So not quite half. If you haven't, that's definitely something you want to look into. It's a quick, really powerful tool for using large datasets.

What I'm showing you, I've been doing this type of stuff for years in Civil 3D, LDD and DCA. But I would have to go get a pot of coffee a lot of times, waiting for the drawing to open, or [? regen ?] or something like that. You'll see here, it's almost instantaneous. So, using basically the same data that I was using in Civil 3D or any of the predecessors. Is it survey grade? No. But what are you using most of the time for Part 77? You're using DEM from USGS. Well, that's what InfraWorks will be using for you.

The other thing that we're doing a lot now, and I was unable to get permission from the airport that has contracted me to do this, but we're building an actual 3D model of the complete airport in there with assets, everything right in there, and using it for the bin model, or the AGIS model, right in InfraWorks. To where we've got the Terminal and Revit. We've got all the lights, storm, water, sewer, all the pavement, everything right there, even the crack [? end ?] [INAUDIBLE]. To where they can lively picked on it on their own time, and see what's there, and know what date it was put in, and history. And then it becomes a great planning tool for us when we sit down with the airport and say, OK, what's next year's projects look like?

It's really nice and easy to plan through. And as we get new projects, we just update that model, so that we have that master model for them, and away we go. Like I said, unfortunately they didn't give me permission to show you. The airport we're going to use is a little GA out of Stevensville, Montana. I'm from Missoula. Stevensville is about 30 miles south of Missoula. I've been working on this airport for 20 years, so it's one I know pretty well, and it's small.

So we'll get right into it. Any questions up to that point? I mean, are you thinking you're in the right place? Everything's good? OK. Uh-oh. Hey, how's that color background? Good? You OK with black, or do you want me to change that real quick? We'll go with that.

OK, so basically starting there on page four, that's what we're going to build, as far as the Part 77 goes on figure 1. I'm going to put this dataset up there either today or tomorrow. I've labeled everything with numbers and letters, so that within the handout, I'm not going to spend the time telling you this point, to this point in the class. But just so you know, it's there so that I

can communicate with you afterwards through the steps in the handout. Figure 2 explains the dimensions of that Part 77 for you.

So the first thing, since this is a basic class, I want you to build a surface for each one of these parts. Now you could do this all as one. I like to do each one of them as an individual surface, so the 21 conical has its own surface, the 7:1 transitions, the primary surface, the horizontal surface, all as separate surfaces. That allows me to give them different colors and different shading, and once I go in to InfraWorks. If I do them all as one, then I'm kind of stuck.

Everybody know how to build a surface? Anybody? OK. I'm not gonna walk through that. I do step through it there in the handout. I always build those first, and then-- First thing I'm going to do is start with just drawing a simple 3D polyline. Now, I'm only going from point A to B, even though I know I have 200 feet on each end of the runway for the primary surface. The reason I'm doing that is because I do have my existing ground surface in here, just not shown. And I want to take this line that I just drew, this 3D polyline I just drew, and I want to change it and add elevations to it.

So I'm going to go up to the Grading, edit Featured Line Elevations. I drew a 3D polyline-- well, this works for 3D polylines, and that's why I'm doing that, and I want to go elevations from surface. So if I select that, and pick my EG surface, insert intermediate grade breaks. You leave that on, and then what it's going to do, every place that crosses the triangle in your surface, it's going to add a vertices to, or not a vertices, but an elevation point to your line. I'm going to uncheck it, because I just want the two ends. So now if I look at the properties of that, now I've got elevations for that. OK?

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Huh?

AUDIENCE: Why [INAUDIBLE]?

CRAIG DIEZIGER: Old habits.

AUDIENCE: Fair enough.

CRAIG DIEZIGER: Yeah, I mean a feature line-- We'll use a feature line here in a minute. But really, it's an old habit. It's just as easy to create a feature line. The difference is even now today-- one of the things I should get used to using the feature line again. But the biggest reason I used to not

use it was because I always had to define a site, and I had to have that in the site. Now you don't have to have it in the site anymore. It's, like I said, it's habit, and-- It's hard to break those habits sometimes. But as I'm showing you right now, we're going to draw those two primary surface ends. You don't have to have that site anymore. So it's not going to accidentally interact with something I don't want it to interact with.

I'm just going to give it a zero elevation for right now, and then snap to the other end point. Because I snapped it in to that 3D polyline, I have my elevation. That line should be the same elevation on both ends. So just copy, paste, and do the same thing on this end. And I'm going to use 3D polyline on this end. Just a few less clicks too, is the other thing. I always end up with feature lines.

So now I have all three of those lines, represent that centerline of the runway, and add elevation and horizontal. So now that I have that as a feature line, I can come in here. When I select the feature line, contextual ribbon comes up. So now I have the option of joining. And just because those are 3D polylines, doesn't matter. You can join those to a feature line. So you can see why-- I use them pretty seamlessly. So now I have a centerline with elevations. OK. So that's tool number one there on page 6, for creating the breaklines for the surface. That's one of the tools. Now you'll see- Obviously, you can use that tool. That's probably the most common tool I'll use right there. I use 3D polyline and feature lines all day long.

Tool number two was the joining of the two. And then tool number three, on page 8, is our next spot. And what that is, is the offset command for a feature line. I can't just type offset, and give it a distance here, and select that feature line, and offset it. Whoa, it did. Since when has that happened? And it's still a feature line. How long has that been there, Dave?

DAVE: [INAUDIBLE]

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Huh?

AUDIENCE: Way to go Dave.

DAVE: [INAUDIBLE]

CRAIG DIEZIGER: Yep. And that's what I was going to point out. That must be new to 17, because I don't remember it ever--

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Because it usually will say-- You know, it's something I haven't tried in years, but usually it'll say unable to offset, because it's a feature line. So they want you using the offset command. So when I select that feature line, bringing up the contextual ribbon, here's the stepped offset command. I recommend that's what you use still today, probably. Without me doing a little thinking and testing of that offset. But this is going to give you some other options that you're not going to have otherwise.

We're going to go select it, this little button right there. And we want it to be 250 feet from the centerline. So that primary surface is going to be 500 feet wide. I'm going to pick that side. Here's the options you'll get with stepped offset. I can type in a grade, and it'll change that line at that grade. I can put in a slope, so at 3:1 or 4:1, and it'll change that elevation. So elevations are going to be a fixed elevation. So I can tell it I want it to go to 3,200, or some fixed elevation. And then a variable will allow me to pick up a transition in it. And then the default one is difference, so it's going to take and add whatever I tell it to the elevation at each vertices.

For this one, its primary surface, which is flat, so I want it to just be 0. So I'm just going to accept 0, select that line again, pick that side, and 0 again. So now I've got my breaklines on both sides of the primary surface. OK? We good up to there? Everybody following those? Pretty simple, like I said.

The next step is, what I like to call, building a temporary surface. I use temporary surfaces for grading, all kinds of things. OK? In this case, we'll probably end up-- I'm saying this is a temporary surface, but really I'm going to end up using this as the horizontal surface in the end. But I'm building it so that I have something to target to, to calculate my 7:1 transition surface. OK? So that I know where I'm going. So I'm just going to start by drawing two circles at the end, at that 10,000 foot radius. And then I want to draw a line that's tangent to both circles on both sides. Whoops. That's not at the same elevation on everything. That horizontal surfaces at elevation [? 37:63 ?] so-- I should have made sure that that was that before I did anything. Hm.

So basically, you're going to build that surface that way. I'm going to go ahead and skip ahead to a drawing that it's already got that in there. So I've got that line in there now at that elevation. Notice, I've just got this as a polyline now. OK? At that elevation. I can turn around

now and add that as a breakline to my horizontal surface. Which I've already done, but-- The one thing you want to do, is make sure your mid-ordinance is set to something a little smaller, so that it follows the curve a little tighter. And if we look now at that surface, we'll see at the triangle, since it's a flat surface. You can see we've got triangles through that.

The next step is using the grading tool in Civil 3D here, to build that transition, that 7:1 surface that matches the horizontal surface. Now normally I'd have my RPZ zones in here and everything. We're gonna just go with the primary surface for right now. You've got to create a grading group. Tell it what surface to target. So, which surface do I want that transition to go to? Got to make sure your feature lines here are in. They do have to be in a site to use a grading group. Something I wish wasn't true, but you do. So I've added them to a site. You can always remove them later. So now, I'm selecting a set of rules that I have set up that slope to target surface. OK?

I'm going to select that feature line, tell it what side I want it to go up, and I want to do the whole length. And I want it to be a 7:1, so I'm hitting 7:1. Now it's giving me where it catches that horizontal surface. So now what I do, I'm not a big fan of grading groups, for one, for grading objects. They tend to be a little touchy with the drawing. I use them. They're a very useful tool. Don't get me wrong. But I'll take and copy about 00, hit exit. Now I've got a feature line there of that, and then I select the green diamond, which is your grading group, and delete grading. So now I'm left with that catchline, and no longer the grading group.

Where the grading group comes in handy though, is if the elevations are going to change, that line will automatically change. By me getting rid of it, now this is not dynamically linked. But I know this is where my final line is going to be anyhow, so I'm not too worried about keeping it. So we'll do that one more time, just so that you all follow along. I can use the same grading group, same target. Let's just select, tell it which side. Yes to the full length, quick copy.

So where this is handy, not just in building this airspace, but in working with-- say you're grading a pad or a a concrete pad, or something like that, and you want it to be generally, a 2% slope across. But you know you have an existing ditch at the end of it that you need. I'll take and just offset a line past the ditch at 2%, build the temporary surface. Take that ditch line that I have elevation at, take it up at whatever slope I want it to be to catch that 2%. Now I've got my catch limits.

Just one example of how you can use it in a temporary surface and grading objects. One of

those think outside the box type things. So those are the tools that I use to generate my breaklines for the surface. So obviously, we haven't built the entire surface, or all the breaklines, but you'd have the 20:1 conical surface on the outside of that. That's a simple-- We'll convert that to featured on here real quick.

OK so, how that works is use that stepped offset command. Select it, tell it the distance, and then decide. This time I'd use slope. So just pick my S for slope, and this time I'll tell it a 20:1. So it offset that line, the 200 feet at 20:1. I think it's probably closer to 5,000 feet, is what it's supposed to be. But it goes at a 20:1, and the elevation changes that much. So if I look at-- Select one. We are at a [? 37:63. ?] So 21, we should be up 10 feet, right? Or, yeah. So it went up 10 feet for me. So just another way to use that stepped offset command. OK? I wanna see how we're doing on time here.

OK, so the next step. I'm going to just skip ahead here. So once you have each of those individual surfaces built, one of the things that-- You're not able to really have multiples. You can have multiple surfaces in InfraWorks, but it's hard to display multiple surfaces. So what I've been doing is, I use a 3D solid. And that's really easy to create. If you're following along, we're on page 14 there. If you select a surface, so there's my 20:1 surface, you'll see extract from surface. And then right here is extract solids from surface. So I can make a solid, a 3D solid of this surface. I can tell it a depth. I always give it like a 0.1, something thin if you want. And I can also add it to a new drawing, or I can just have it insert here into this drawing. I usually just do it here in this drawing. But it does work real well. So I'm going to turn that surface off now. And you'll see I've got a 3D surface now, solid of that surface.

So from there you can put it on a different layer, you put it on whatever color you want, everything like that. The one thing that I would recommend is, you build a material for it that has transparency built into it. If you have transparency built into it, then when you suck it in to InfraWorks, which we'll be doing here in a minute, you're able to see through it then, and it's not opaque. I haven't found a way in InfraWorks to add that transparency after the fact. So I'm not saying there isn't a way, but that's something that I haven't personally been able to figure out. But using a material style to apply to it works really good.

So now we have-- So now I have a drawing here with the 3D solids in there. And like I said, I'll give you this drawing, and actually the material is in here with the transparency on it already. So you can just copy it, and pirate it from this drawing if you want. But if you're interested in seeing how I did that, feel free to shoot me an email. So there's that airspace surface, all the

solids ready to go. OK? Any questions on that? We're going to get out of Civil 3D here for a minute.

So this is what we're shooting for. OK? So first thing we want to do now that we're in InfraWorks is we want to build a model. So we're going to go to Model Builder. How many have used Model Builder? Not many. Right? Because it wasn't many of you that had even used InfraWorks yet. And I'm going to-- It works similar to Google Earth or Bing Maps. It basically, it is Bing Maps. I go to Stevensville, Montana. There's my airstrip right there, that I'm working with. You can have up to 1,000 square kilometers. I'm just gonna guess about right there's probably far enough . Give it a name. This is where you can share with your group, and create model.

OK now, we're not going to sit and wait. It usually doesn't take very long. I'm not sure with the bandwidth that we have, how long it will take. But I've already got this one built, so we're going to go ahead and use it. But it will come up and populate here, and it will send you an email here shortly saying, hey, it's built. Usually, a couple minutes. This is what you'll end up with, maybe a few more things. There may be buildings. There may be some bridges. Depending on what's available for data, but generally very good GIS. Great data from us USGS or Open City. So [? DM. ?] And see, there's my airport. So you can see, that's a fairly large piece of land right there that I'm dealing with, and I can navigate real nice through it. So something like that, I hate to say, in Civil 3D would-- I've had several of these that it takes forever to do what I just did right there.

The next step is to start bringing in what I've built. OK? Basically, I've got this blank, so I'm going to take and go to my data sources. Just in case you didn't see where that was, under the big guy, the square here. We'll bring up data sources. I want to add AutoCAD drawing 3D objects, and then I'll browse to that drawing where I have the airspace 3D solids in it. Hit open. Now one thing I didn't show there was, I do have it set to Montana State, plane NAD83 in my Civil 3D drawing. And I have this set to Montana State plane NAD83. So they're on the same zone. It will transfer it if I, say I was in metric here, and in feet in the other one, it will convert it. Really, InfraWorks is always working in Lat/Long 84, so LL 84. But you're telling it.

So it's in there, but nothing happened. Well you always have to configure it. It doesn't know what to do with that. It comes up with XY international feet. I want it to be Montana 83. What type? I always use buildings for this, or city furniture. You know, like I said, thinking outside the box. Is it really city furniture, a light pole or something? Probably not, but I can't add it as a

surface, so I have to pick something and this gives me the most functionality. And then, how do I want it to show up? I can simplify it. I can adjust the level of display, invert it, flip, override all materials. So we're just going to say leave it with the default, close and refresh. What did I forget? I forgot-- City furniture, solid, geolocation. Should be close. I have a feeling, because I already have it in here. [? Undo ?] here. I broke it. Let's try that again here.

So what it's doing, why it's processing that, is it has to take it through Navisworks to convert it to something that InfraWorks will recognize. So that's why it's processing. I think I had the wrong zone selected. There we are. So you can see, now that I have that in there, there's my 20:1 surface, horizontal surface. You can see I have some ground penetrations through there. So you can see where this-- What we just did there in basically 45 minutes to an hour, would have taken me three, four days to do before in Civil 3D.

The nice thing is, is this is really easy to share to the web. Take for meetings. Show the airport authority, the board. This is what we're dealing with, this is what we've got. FAA understands it well. The public understands it well. So the other nice thing is, is if someone comes in and says hey, I'm going to build a hangar right here, you can plop that hangar in just a simple square box real quick. You're not sitting there with the map trying to figure out, am I going to penetrate or not.

AUDIENCE: Why aren't the trapezoidal surfaces on the runway [INAUDIBLE]? Do they only approach from one end?

CRAIG DIEZIGER: Yes.

AUDIENCE: Because of the ground penetration?

CRAIG DIEZIGER: Because of the ground penetration, yep. You can only approach from this end, but they can take off from this end, or vice versa. They can land on this end, but-- Depending on the size of the plane too. We're actually in the process of shifting this about 1,000 feet this way to take care of a lot of that ground penetration right now, so that they can have a little larger plane. Like I said, it's just a small GA, but it's probably 50, 60 little planes a day. OK? Valuable up to that point?

You can see the planning capabilities, the analysis capabilities there. You can even see, if we zoom in here towards the runway, we had a little ground penetration there. And honestly, I didn't bring this up, but if you do have a surveyed TIN surface, you can suck that in too, to

have that accurate surface in here. And I do have that in this model. And there really is ground penetrations right there that-- They're not bad, but it's stuff that we are aware of now, and we're working on. But it's pretty easy to show the client.

So the AGIS planning tools. Basically all AGIS is, is asset management and showing penetrations, GIS for airports. Right? So what we're going to do is come over here to Civil 3D again. I'm not sure whether you can see that well or not, but there's a-- I've got a few points right here that were surveyed in, a tree, a few trees, and I think, a power pole that we think might be penetrating. So I had surveyors go out, shoot them, get me the XYZ, and height of them. So I sucked those into here, and from here I can go to the export panel. By the way, my model is back. We'll look at that before we leave today.

So we want to go to that output, export Civil objects to SDF. OK? I'm going to tell it where I want to store that. Make sure the zones are set right. Hit OK. And you'll see it told me four points. Now, I can do my alignments, parcels, pipes, all of that through here too, but we'll just do those four points. So imagine you had all your lights, everything. And before we go in and import those, I'm going to-- We'll wait on that because of time. We want to go back to our data source and import, and we want to select that SDF file. There's that export Cogo Points, the SDF file we just generated. Select it, hit open. It's going to show up here as not configured. And we want to pick city furniture here. Check the geolocation, make sure that's right.

Now if you really want to get fancy, you can take and define the description of each of those points in here, and it'll assign a style to that for you. So you can set one up to go to trees, one to go to the lights, and automatically do that. A little advanced, but you can script that. I've got it defaulting to trees. So there's three of the trees that I brought in, in styles. If you're not sure if it's got the right height or not, you can select it. Select here, type in whatever height the surveyor gave you. You can also, in, the script, have it read a column, and have it scale it to that height for you. So as you can see, we've got three trees there that are penetrating. Easy to show the client. Nice visual. OK.

AUDIENCE: [INAUDIBLE] model?

CRAIG DIEZIGER: You can actually share the model through the web, for one. So they can have access to it anytime they want at that point. You can also--

AUDIENCE: You can make [INAUDIBLE]

CRAIG DIEZIGER: You can make exhibits from that. So say hey, I want to see this view right here, showing this view. I can come over here to the display thing. I can do a storyboard, which is basically zooming from point to point for me. So kind of a quick video demonstration, and then I can run a scenario, I can create a snapshot. So I have a JPEG image. I can add sky, time of day. You can look through cloud analysis, which honestly, we've done a lot of in Montana. You're worried about ice, you're worried about snow, and stuff like that. So when we're trying to figure out what's the best orientation for hangars, we'll look at time of day, clouds, and stuff, to make sure they're oriented the right way, so that we're not having shade at the hot part of the day. We want to maximize that heat onto the concrete pad out in front of the hangar, so the ice isn't there as much.

So there's all kinds of little things like that, that this will allow you to do. Is it exact? No. Is it becoming closer and closer to a true design tool? Yes.

But right now you still need Civil 3D. You can't print from this, you can't produce. Actually, there's a real good YouTube video out there on how to animate a plane landing and taking off. And I've done that several times. That's a class in itself, but you can have a plane fly through, and also do your noise. You can do a noise contour analysis with this too, which they haven't pushed that much, which I've always found interesting. It's not up my alley. I have guys that do that. But they do have noise analysis in InfraWorks, to where I can tell it at this end of the runway, I've got 80 decibels or 200 decibels, and it'll go look to see how far. It takes in the earth, and terrain, and everything, and tell me how far that contour will go out.

So it's a really powerful tool for planning and analysis. You can see, you throw those buildings in there. I just, with SketchUp, threw a bunch of buildings in. That's another tool, FormIt or SketchUp. You can sketch things up real quick and use them. The other thing that I'm doing a lot of now is 3D scanning of the actual signs. And I'll just clip it down to a point cloud of that actual sign, and that's what I used for that asset in import. So I'll suck that little point cloud in. I don't add it to the surface in any way, but I have the actual sign then. It amazes me how many times it'll say well, was that a double faced sign, or what was the exact wording on that taxiway? What type of sign was it? Was it glass, was it plastic, red, white, whatever? Nothing better than a 3D scan.

And what's interesting is, there's-- If you're interested, one, in that the airplane YouTube video, just email me, and I'll be happy to send that to you. Two, there's another one out, YouTube video out there, and I use this method a lot, and it's free software. There's free software that

you can use. But you can also do it in ReCap. Where you can take just your phone camera, take pictures of the signs. Take, I don't know, probably I usually take 20 to 30 photos. Convert that to a point cloud. So now I have the actual 3D model. Yes, I have to move and rotate it to the location, but it works really good and gives me a really good representation of that sign to show them, this is what it's going to look like.

Anything? We're at exactly an hour here. I knew that-- Last year the class was about 150 people, so it took the full 90 minutes. And I was worried about this, so we're going to do a little freestyle in here. So any issue or problem that you were hoping to get solved here? Yeah?

AUDIENCE: Is there a way to generate reports? I mean, all your-- all your [INAUDIBLE]?

CRAIG DIEZIGER: You know, personally I haven't done that yet, but I would venture to guess through scripting you could do that. Scripting is something I haven't-- It's a tool that I'm just now finding. It was one of the things here at AU that I wanted to get into a little more, and find a little more out. We're always learning and improving. But if not scripting, I don't know of another way. But I would bet-- You know, I don't know that that would even work, because this isn't a surface, so it doesn't recognize that.

One of the big things that I've been really trying to get Autodesk to do is, I want multiple surfaces, separate surfaces. And you can't, you just plain can't. If I was to bring this in it would merge it into my existing ground surface. So I have to bring it in in solids

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: You probably could do that. You'd have to have it as a surface, so that it'd have something to compare to. And then I think you probably could do a script that would say, if objects elevation subtracted from the existing, or from the surface elevation, it should come back and tell you then.

AUDIENCE: There is a recording tool then, in InfraWorks?

CRAIG DIEZIGER: Yes. Yes. That's your storyboards. So all the storyboard is, is creating interest points. Now, you can bring in an alignment within this, or not scenario browser but, within the-- You can bring in an alignment here to follow. So you can create a flight path, have it follow that. You can set speeds and everything, and it will record that. So here's your add camera path for animation. You can import and use a road. So I added that frame and I can go-- We'll just do a couple of points. So then you can play and record that from that point. That's real simple, but

you can see it. And then you can record that and export it as an MPEG, a Quicktime, just about--

AUDIENCE: I was asking for reporting.

CRAIG DIEZIGER: Oh, reporting.

AUDIENCE: So is there a report tool like in Civil 3D, generating point report?

CRAIG DIEZIGER: There is. Tommy, do you remember one? I don't remember one.

AUDIENCE: Not really. [INAUDIBLE]

CRAIG DIEZIGER: Yeah, you get a thematic. So like, what you were talking about, who ever asked the question about the penetrations. All you'd be doing is thematic theming it, is what you'd be doing. So it would turn those trees-- You could have it turn those trees red or something like that, the objects that-- So that you can see it. I know that's something that I've heard, but I can't remember whether that got-- I've seen in beta version, but I'm not sure whether I've seen it in Release 2 or 2017.2

AUDIENCE: [INAUDIBLE] it was [? ideal ?] [INAUDIBLE] place to actually put [INAUDIBLE] they'll show you some stuff [INAUDIBLE] they look [INAUDIBLE] the more [INAUDIBLE] you get, [INAUDIBLE] the better chance of getting [INAUDIBLE]

CRAIG DIEZIGER: Oh I--

AUDIENCE: We post it Twitter, Facebook, send an email to your friend for you to log on. Ask if you [INAUDIBLE] my wish-list.

CRAIG DIEZIGER: Yep. And they do a very good job of listening to those things. The other great tool, if you haven't looked at it, is going up to the Rolling Sandbox. So that's the beta version of this. And great opportunity to just be able to play with this without having to purchase it, for one. But they do a lot of listening to the client, the consumer.

AUDIENCE: If you want to talk directly to the developer, and know that you're being listened to, sign up for the beta. Beta.Autodesk.com. Sign up for the beta. get on the Civil 3D one, get on the Rolling Sandbox. They want people on those beta versions [INAUDIBLE].

CRAIG DIEZIGER: I've never heard--

AUDIENCE: [INAUDIBLE] feedback to them. [INAUDIBLE] Work with issues [INAUDIBLE].

CRAIG DIEZIGER: I know Tom's been doing it for a long time. I've been doing it for a long time, and I've never heard of them turning someone down. If they ask you to be-- You have to be invited, but you can go to it and request an invitation. And like I said--

AUDIENCE: [? AutodeskUsers.com ?]

CRAIG DIEZIGER: Yeah

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: There's a Civil 3D one, and the InfraWorks one. I think they're combining the two here in the next couple of days. Is what I understood the other night, but I might be wrong. But I know they're trying to link them a little closer together.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Yeah. But the InfraWorks one is Rolling Sandbox. Which is why, if you haven't stopped by the booth out there in the exhibit hall and saw Eric Chapelle. He's got a box set up with sand in it. Rolling Sandbox was what it was named before, but it's essentially, that's what drove them to do that tool . UC Davis did that for them, and it's pretty cool if you haven't seen it. You move the sand, it updates in the model. So really powerful stuff. So any other solutions you were looking for? No?

Well, trying to think what else I could show. I know it's an early morning, so we could--

AUDIENCE: [INAUDIBLE] site?

CRAIG DIEZIGER: Huh?

AUDIENCE: [? Website ?]

CRAIG DIEZIGER: What site?

AUDIENCE: Airport.

CRAIG DIEZIGER: Which air--

AUDIENCE: Flood it.

CRAIG DIEZIGER: Huh?

AUDIENCE: Flood it.

CRAIG DIEZIGER: Flood it? I don't know that--

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: This is pretty flat.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Actually, no. It's on top of a hill, so it would--

AUDIENCE: How do you get [INAUDIBLE]

CRAIG DIEZIGER: You publish it to the web. Actually, why don't-- Before I do that, why don't I go ahead and show you what the Model Builder gave us first.

AUDIENCE: Are there ways the public can share this information without publishing it to the cloud?

CRAIG DIEZIGER: You can just copy the-- it's a SQLite database. So if you do it that way, you can take and copy it from your desktop to whatever desktop you want. You'll see when I put this up on the web, or up on the AU site for you guys and the dataset, I'll have the SQLite file included in it. It's not small, but it's not terribly big. So they can copy that, but then you have to have InfraWorks to read it.

AUDIENCE: Yeah. Commercial service, airports, and especially military are very sensitive about that.

CRAIG DIEZIGER: But you can-- When you put it to the web, not everybody has access to it.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: And I know the FAA in Montana still hasn't had an issue. Washington, they were a little, Oregon, they were a little leery at first, but they came around. And actually, Wyoming didn't have any issues either. Phoenix is the only one that wouldn't allow me to. I do Sky Harbor. So I do Sky Harbor. And Yuma, I'll be down there next week working on Yuma.

But it's just a right click on the Model and say share and with what group. You can publish just panoramas of it. That's another thing that I'm starting to get into a little bit, is that the VR side

of it. You can create the VRs from InfraWorks to use with Google Cardboards or VR goggles. Really easy. There's a couple of good YouTube videos on that out there. But VHB, or yeah, VHB. Right? I think it's VHB. Tommy, Ryan is VHB. Right? Something like, it's VH-- I think it's VHB. They do a lot of that. And they sell little $5 cardboard goggles that work great, that you can just throw your phone in and hold them up to your eyes, and you're virtually at the site then. And I know he's got a couple of YouTube videos up there on that. But you can generate those images right from this. Actually, videos, not just images, but even videos.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Yeah, you can take the view points. I can take like, if I picked, say this view right here, I can share just that view out to the web, and that's all they see. They don't really have just the model.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: But the key is that they can see it from-- It's HTML at that point.

AUDIENCE: Right, and it's kind of silly that people are concerned about sharing openly available data.

CRAIG DIEZIGER: No, I totally understand what you're saying, but any more with AGIS, it's out there. You know, any pilot can get to that information. So that's why I had to-- It surprised me that some of them would have trouble with it. Especially when you're really not telling them, not making it accessible to anybody but them. I had the same problem with 3D scans. Cause with 3D scanning, with the FARO scanner that I use, I can export out basically Google Earth Street View of the scanned site, that they can pull dimensions, whatever off of that. And it's a web browse item, and they had a time with that.

So there's what you get from Model Builder. Right. That's a little bigger I think, than when I had. You got your streams, your roads, some buildings. This is a wildlife refuge. You can bring in either imagery if you want, if you have better imagery. You know this imagery is, I don't know, it's probably 2014, 2013, somewhere in there. I've got newer stuff that I can bring in, but-- Any--

AUDIENCE: [INAUDIBLE] survey, you can supplement that.

CRAIG DIEZIGER: Yeah, it's--

AUDIENCE: It completely just modifies everything.

CRAIG DIEZIGER: It merges it into this one. It keeps them similar to the layers in there. So just like in Civil 3D, when you take a surface and merge another surface into it. You can turn one off and it won't build into it. You can do the same thing here. So it's under that same spot. So you're just bringing in terrain instead. So you just tell it terrain and it sucks it in.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Yep. You've got to think about the order that you're bringing him in. You can change it, but the newest should be the last. Yep. Newest will always trump. In airports, it's pretty common to have just this area surveyed this year, just so you're piecing those together.

AUDIENCE: [INAUDIBLE] advise the airport that maybe you'd get better survey on this area, in terms of [INAUDIBLE]

CRAIG DIEZIGER: And we've done that on a lot of them. But you think about it, over the years. I don't know how-- God, when I first started working in airports on this type stuff, we were just overlaying that Part 77 on a quad. So you're plus or minus 50 feet.

AUDIENCE: Yeah. [INAUDIBLE] highest level of surveys. [INAUDIBLE] I haven't done it in a while.

CRAIG DIEZIGER: I'm talking, this is 20 years ago though. There wasn't there. I mean it is getting better and better. And actually, the steeper the ground, the more accurate a quad is. And same thing with the [? DEN, ?] the steeper the ground, the more accurate it'll be, flat. So that's why we're pretty comfortable. That penetration that you saw, the big one that you saw, we'd never go out and resurvey that. We just-- It's believable. Now if it's a couple feet? Oh yeah, I'd want to verify it. You know, if it's going to cause heartache. I'd probably want to verify it before I even showed the FAA that it's there.

One spot that I've used that type of analysis for is on approach surfaces, which are different. We've use that to determine whether or not that approach surface would work. There is a contract in Wyoming that we were-- An airport we were going after that we traditionally hadn't had much luck getting. And the firm that we were going against kept saying there's a penetration, or there is no penetration, no problem. But the FAA kept thinking, God, this has to be an issue. So the firm that we were going up against hired a professional to come in. Some analytical guy that that's all he does, is kind of the court type thing, professional type, witness type thing. And he came in and said, "Oh yeah, there's a penetration, and there's no solution."

So I whipped this up in about four or five hours, and found two different solutions that were acceptable. Yes there was a penetration, You know, so one, they had an expert saying there was a penetration, yet the client, the normal engineer was saying no, there isn't. So we now have a five year contract with that airport. And it didn't cost us but five, six hours of my time to prove him wrong. I wouldn't have ever been able to do that with Civil 3D. Hear can guarantee you that.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Huh?

AUDIENCE: [INAUDIBLE] Civil 3D [INAUDIBLE].

CRAIG DIEZIGER: OK.

AUDIENCE: When you did your grading group, [INAUDIBLE]

CRAIG DIEZIGER: Oh, copy to another site.

AUDIENCE: Also, if you put that daylight line, and explode it, it only explodes out that daylight line [INAUDIBLE]

CRAIG DIEZIGER: Except the grading group is still in that drawing then. That grading object is still defined in the object, and you will end up with having some issues, eventually. That's what I used to do, and it was a problem. I understand that. No, you definitely want to use that green diamond to delete it, and not just the erase command too, because it will not remove it. If you go look, it'll still be defined under the tree, the grading object will.

AUDIENCE: [INAUDIBLE] targeting the horizontal surface [INAUDIBLE] determine the elevation of the horizontal?

CRAIG DIEZIGER: Through the circulars, through the FAA circulars. For that airport it was 150 feet above the highest point on the runway.

AUDIENCE: Highest point on the runway, or the highest end of the runway?

CRAIG DIEZIGER: Runway. Yep.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Yep. And fly, so in some spots-- Normally, you know I didn't add all the vertices. Part of the reason I didn't do that was just time. If you add all the vertices to the centerline, it should, the 7:1 should mimic. Or the primary service should mimic the centerline elevation. So if it's got a sag or a crest in it, it should have a sag or a crest in it all the way out. I left it, basically at that plane from end to end, Just for that. But in most cases-- And that's why there's a penetration there right now. Because that's my high point. You know, that penetration of the runway?

AUDIENCE: So if you track the profile of the runway, there isn't the penetration there?

CRAIG DIEZIGER: No, there wouldn't be.

AUDIENCE: OK.

CRAIG DIEZIGER: There should never be. At centerline anyhow, because you should be mimicking.

AUDIENCE: Well, yeah. But you're infiltrating [INAUDIBLE]

CRAIG DIEZIGER: Right but not on the runway. It should be-- Well, if you do have questions, my email's under the class, for one. Two, I've got business cards here that you can grab one of those. Feel free to shoot me an email. Tommy, over here has known me for years, and we'll shoot each other emails all the time. I may not answer right away, but I'm more than happy to answer questions whenever.

AUDIENCE: I don't always know the right answer, but I usually know somebody who might.

CRAIG DIEZIGER: Yep. We've got a pretty big network of guys that we lean on.

AUDIENCE: Would you-- I'd ask, instead of just having [INAUDIBLE] email, [INAUDIBLE] like a [? blackpath ?] thing, the YouTube video that you've done. If you would just post that in the comments.

CRAIG DIEZIGER: Yeah, I can do that.

AUDIENCE: [INAUDIBLE]

CRAIG DIEZIGER: Yeah, I can put that there, and I'll put the 3D scanning one too. Put the camera-- It's really cool. The guy, he's doing a rock, but he's using software that's free to do it all, and he does a great job. So beats having to buy a $50,000 scanner just for something little like that. OK? Thank you. Enjoy the rest of AU.