OLIVIER BAYLE: Hello everyone. Thank you for attending our session. It will be a friend session, because they [? told ?] you there is Paris. Paris is magic. I will introduce myself. My name is Olivier Bayle. I come from France. And I am a Civil Engineer, and I work in Autodesk since nine years now.

I am a technological specialist. That means I am in front of customer to show a product [? lot ?] with our large portfolio. And, of course, we've got a blog called Village BIM where we talk about Autodesk technology, current technology and future technology. If you are not connected to our blog, I advise you to be connected.

JULIEN DROUET: Yes good morning everyone. My name is Julien Drouet. I'm part of the technical specialist in EMEA, and especially in France. So the same team as Olivier an electrical engineer. And I'm working in the construction industry. I've been working in construction industry for almost 20 years now, at Autodesk for nine years, and I'm more focused on the MEP and construction area. And I'm also one of the blog writers of [INAUDIBLE].

So in this session, we will present you a project, a real project, that happened about two years ago. It was decided to retrofit the Paris office, and not all the Paris office was retrofit, only one area, so the main entrance and some meeting rooms. And actually, at this time, we had the scanning from the existing that have been done a couple of years before.

And so, we decided to use our technology to apply this on this project. Unfortunately, some of the workflows that we will present to you, these construction workflows that we will present during this session, weren't available at the time of the works, especially the layout one.

So for this session, actually, we reproduce this workflow onsite, but after the construction, so just for you to know how it could have been done, actually. But else, you will see how we could apply these construction workflows in involving the BIM 360 solution on a retrofit project. So that's the main goal of this presentation.

OLIVIER BAYLE: What you'll learn today? I hope, a lot of things because we will show some Leica material. We will show you a lot of software, Autodesk software, of course, and we will try to show you the Optimum Workflow that you can use with Leica material, and BIM 360 cloud services.

JULIEN DROUET: Just before we start, in this session, how many people have already used this scanning or layered solution on construction sites?

OLIVIER BAYLE: Are you sure, you lie?

JULIEN DROUET: OK, thank you.

OLIVIER BAYLE: How many liars? Well, before to introduce our retrofit let me give you where the retrofit is based. We are in Paris, with the famous Eiffel Tower. OK, now we will go to the certain district of Paris. The Paris office is near to the Tolbiac bridge, so not so big bridge, but is well known by the guy who lives in Paris. It is the Paris office here. And to the sides, you've got the Francois Mitterand library. Well known also.

And here, you've got some pictures outside and inside. And this part, it was a part where we were retrofit, where we made the retrofit. Let me explain the workflow that we used. First, so the story start with scanning tree. As you see, we start with a Leica scanner, but it could be done with others, no problem.

[INAUDIBLE] after, to keep the point cloud, we built the mockup, into which software? There is nothing to win. We will see after.

Here, after build this mockup, we need to create some architectural proposition. And we use other software. I will show you after. And we obtain this final proposition. After this, we need to be this onsite. We use [? tutors ?] robotic [? tutoring ?] station from Leica. I don't remember the name. You've got the name?

JULIEN DROUET: It's the P40, P50.

OLIVIER BAYLE: And we build the retrofit. And we add another thing into our demonstration. It is to [INAUDIBLE] the accuracy of the site will be taken into the final mockup. It is for quality result to see, is what was built corresponding to our mockup? Because sometimes there is some gap between.

And we use some software, of course. First [INAUDIBLE], [INAUDIBLE] 360. We will talk about this software after. Of course, for the architectural proposition, we will use Revit and [? Format ?] 360. And anybody know [? Format ?] 360 here?

OK. And for the part of construction site, we use a BIM 360 software services, like a BIM lay out, a BIM 360. OK, first step, it is to transform the point cloud taken in the slide into one single point cloud. Starting to the Leica 3D scan, we use ReCap 360 to merge all the scan in one single scan.

By the way, this workflow, you could share your point cloud with other collaborators. And the aim of ReCap 360, it is to generate RCP, or RCS 5, to be open in Autodesk software. For instance, you've got Revit, AutoCAD, 3ds Max, Inventor, Navisworks, and others.

Yes, maybe some people are not-- never use a 3D scan. Let me show you this video. It is where the retrofit was made. You've got these scanner, it was a P40 Leica scanner.

First of all, you set up a scan until you've seen the name of project and some other setup as resolution, if you want color or not, if you want to have one one part of the area, of the 360 degrees area.

After, to set up these parameters, you click on one button-- Scan. You are aware about the Leica announcement about the newest scan? [? BL Key ?] 360? It will be amazing stuff.

First, when you start the scan, there is two steps. First step, you use a laser to keep all points in the space, and you've got x, y, z coordinates. And the second step, it will take some picture, color or black and white color, [INAUDIBLE] color, to colorize your point cloud.

And at the end, 12 minutes after, because about 12 minutes, to take this point out, you've got a nice picture, with color indicates the intensity of each point, because better intensity you have, better accuracy you will have. And it will be this picture.

It is a [? prism. ?] We'll take pictures and laser also. You see, yes? [? It's at ?] the beginning. OK.

And now is the [? state ?] to bring this pointer into ReCap 360. There is three steps.

First step, you collect all [? data ?] into ReCap 360. It is sometimes depend of the number of your scan, the color that you ask. It takes some time. Maybe one hour, maybe more. It depends.

And after collecting this scan, the second step, it is to merge all scans into one single scan. There is automatic recognition. That means it took the first scan with the second scan. It detects what are the [INAUDIBLE] common points, and it merged them, and it created some groups.

And at the end, you've got this kind of result, the number of groups, the number of scan processing, and the final report indicate the accuracy that you have about balance overlap. Of

course, the green color, we tell you it's great. And as you see, I am great in every scan.

As your last step, it's a short step, it is to render your project. This step, it is to record the point cloud into the RCP Format file to be written into Autodesk galaxy.

And the final result is this. I will take my computer to show you in life what it is. And I will show you some part of-- you see, it's not a huge point cloud, but, believe me, you can embed it into ReCap 360 a lot of [? points. ?]

As I heard, 1,000 scans you can bring into. Let's have a look-- ooh, my computer is too quick. Sorry.

As you see, you you've got the same picture as I show you before. But it is point cloud. Point cloud allows me to take some distances. For instance, I will take here, and using [? the tab ?] [? mode, ?] I can detect the vertical direction, and I've got the right dimension into the direction. I can take some angles.

[INAUDIBLE] direction.

You see? It's very accurate because the tie is taken from the point cloud. You can create some regions, regions to remove some path that you don't want. For instance, we create a region. By plane I select some point, and iterate for me a region I can give a name.

Let's say, [? Toto. ?] And you record it, and you've got your Toto. You know Toto? Toto is a French name.

And you can fix, or you can lock your point clouds. That means you can not select, and not make what you want on, but also you can switch the point cloud not to see, not to make some mistake, to avoid some trouble that you can have.

And, by the way, when your region is fixed. You can create like this some selection. And, as you see, I select only this point cloud. That means, if I create a new region, let's give a name, you can, if you want, remove. I've got to [? roll ?] behind the chair because there is no point under the chair.

But you can clean your point cloud by this way. Of course, I can go deeper in ReCap Pro 360 because there is a lot of options inside, a lot of features, but I can give you some information about cleaning because we've got automatic cleaning. That means it is an automatic process.

It detects which points are noises, and it created a special group that you can remove or [? not see. ?]

JULIEN DROUET: [INAUDIBLE]

OLIVIER BAYLE: [INAUDIBLE] yes. There is another terrific feature I hope you will use after our presentation. It is to scan to mesh. It is to create, starting to your point cloud, create a mesh. It is awesome.

Let's go return to our PowerPoint presentation. Second step, it is to bring the point cloud into the software. And the software that, to build the mockup, we use Revit. But we can also use Inventor, 3ds Max, but for IC stuff, it's better to use Revit.

Well, I will show you what is the way to bring the point cloud into Revit and show you what is the best way to create some [? wall ?] or whatever. [INAUDIBLE]. I will start with a structural template. It's my template, but you can create you template. I am in to 2D plant, but I can create a 3D view. We will see that further. I will insert the point cloud. You've got to dedicate a button in this area.

And I will select the famous [? RCP ?] file. OK. It is insert, and I will show you, in 3D view, my point cloud. OK?

So then step into Revit. It is to put the point cloud on the right position. So that means I will take an elevation or cut. I will [INAUDIBLE] the point cloud. I will take the tool displacement. I will take one point, and I will put this point on the right level. Not so complicated. I will go on the level one. I will make this modification. I will turn the point cloud.

As you see, there is some snapping, some snaps about point cloud. For guys who have never seen where snapping options, where they are, you can find them into [? manage ?] table, snapping option, and you've got point cloud here option. Be careful to switch on this option because it's not so easy to make what I've done without. And after that, I'd advise you to [? pin ?] your point cloud.

After that, you can use some Revit tool. For instance, I will put one camera here. And I have, as a result, as it was a mockup. I will show you some other features. I will use my 2D plan with my perspective view, with my camera. OK.

I will draw, for instance, I will draw something to show you what how powerful you can get using Revit [INAUDIBLE]. Because [INAUDIBLE] [? of ?] software, and sometime we make

some mistake.

I create a wall. I'm sorry, I create a wall, but under the mockup, I will select [INAUDIBLE] and [? create wall. ?] And you've got, in 3D here, the wall. Let me show you. OK.

It's not a big deal. It's very easy to create your mockup basing your mockup on the point cloud. But when you work [INAUDIBLE], when you [INAUDIBLE] Revit, you can have this kind of result. I will show you the final result. I give you some metrics at the end of my presentation, to give you, if it took me one year to create this, or 10 minutes, it's not the right-- but you [INAUDIBLE].

OK, that is a final [INAUDIBLE]. As you see, I put some walls. I put some table [INAUDIBLE], and the desk here. And based on the point cloud.

Now, the second step-- oh, I can show you in deep the model. I will switch on the point cloud. It is an option that you can find in [INAUDIBLE] graphics of Revit. And you can show cutting. I've got some cutting.

I've got, as you see, I put some lights because, at the end, I can create the 3D view, or view, with a nice nice presentation that's a nice rendering, and the more you put objects in your scene, the more pleasant it will be. But we will see later what could be done with this.

The next step, it is-- I will return to the PowerPoint. It is an architectural proposition. In front of you, you've got two engineers-- one structural and one NEP. And we tried to make another job [INAUDIBLE]. Not so easy, but it's done.

OK, starting to this initial condition, we use our brain, as I said, to use another software called-- for me, 360, there is two versions. One based on the cloud. It is [? form 8360, ?] and there is another one, [? form 8360, ?] for Windows. And I use [? form 8360, ?] for Windows, and we create some bunch of propositions and-- for instance, you've got here one proposition, more advanced with material, with [INAUDIBLE] of this final proposition.

And I don't know if you are aware, you can send your proposition directly into Revit. That is part of the workflow that you can made to not other [INAUDIBLE] between the conception and Revit stuff. And for those who never seen [? Formit, ?] here you've got Formit.

And it's very easy to use. For instance, I will create one shape. We will use [INAUDIBLE] tool.

OK? And it's not closed because I should have-- It's not closed-- So it doesn't matter, it's not imperial.

I can push/pull.

I can add some fillets. Also, it is very important to grade the fillets. At the end you can trace this kind of stuff. As I said before send into Revit. You've got this shape and you can continue to finish your work in Revit.

The final proposition was this, as you see this is the same file, but we used an option in Revit. I don't know if you are aware there is a design option, you can have several options in Revit. And It's easy to handle a lot of propositions in Revit. For instance, I will show you what it looks like in Revit. Using this option is very simple, because you start from the initial condition, that initial condition was your external world and uses this option. I've got some books where I retrofit an office.

Let's continue, an so I think the most attractive parts are for you.

JULIEN DROUET: OK, let's consider now, you you have your design option, you have to chosen what would be done on the construction site, and you want to take advantage of this model you have to put the information on the construction site. The first step would be to add points in your model, so that you will be able to get these points and use these points on the construction site through robotic stations such as the one provided here. The workflow involves, of course Revit, Autodesk Point Layout, BIM 360 Glue, and BIM 360 Layout.

Here in Revit we will use the Autodesk Point Layout application, the add-on that is provided with Autodesk Point Layout. We will be able to add points automatically, either directly on walls, or on a window, or any kind of element. Or you can also use it for faces, for instance you put points on faces every 3 inches or something like that. That's what we did for this project. We had automatic points on each face of this curved wall because we will focus on this wall, which is the most difficult to lay out on our project.

So once you have all these points we will just filter the one on the bottom. To use it on the construction site, and so we filter it, we select it, and we just change the description.

OLIVIER BAYLE: I've got 54 points.

JULIEN DROUET: This curved wall, and information, would be easier to find on the construction site. The second

step is to push your model, with the points, on the cloud. For that we will use BIM 360 Glue. That way we will glue our model where we have all these take-out points, these lay-out points in BIM 360 Glue. You can glue any kind of view, and in that case, we will just upload the 3D view and in the name of the room concerned it is Di Venci meeting room in Paris.

Now in BIM 360 Glue, you can just check that you have your model and the points. And you can of course, access the information on the points that are considered as an element of the model. And the final step, of course, is to check that in your BIM 360 Layout application on the iPad, you also have this information. Which is logical because it's using the BIM 360 Glue model, and in our case we opened the model and you see how all of our curved wall points are available in the application.

Now let's move to the construction site. The first thing to do, of course, is to localize, to position the robotic station in the model. If we want the robotic station to show where the points are, it must be geo-localized in the model. For that you need to use some reference points. It means that you should have a point on the construction site that you have identified as something [? sure ?] and that is existing also in your model. You need two points like that at least, and with these two points you will be able to know exactly where is your robot in the model. There is a process on the iPad to do so. As I explained with someone we didn't have the video for this work done during the construction site but we reproduced the workflow this summer when the office was empty. Just to show you how to proceed for this layout workflow.

Once the robot station is positioned in your model, you will be able to layout, to stake out, all the points on the construction site. That's the goal of the second video. You have two ways to layout points. The first one is to use a prism, the robot will send the information to a prism, and then the prism will be positioned exactly at the point. The second solution is to use prism-less, it's less accurate. Depending on the angle of between the laser and the ground, the position of the laser can be big and it's not so accurate, but it's easier. What you have to do is to select the point on the application and then ask the robot to show you where the point is on the construction site.

The laser will directly show you, it's here, then I mark-up, then next point, next point, next point, and so on.

OLIVIER BAYLE: There are some beeps.

JULIEN DROUET: Yeah.

OLIVIER BAYLE: Sometimes it's a little boring because of that beeping.

JULIEN DROUET: Once you mockup all your points on the ground, at the end you have exactly the way you must build your wall. In that case the skeletal I don't know if we see correctly, but we can see that this curved wall implemented, or positioned, on the site. So here are some pictures of the construction sites. On the bottom left side, you can see this curved wall in construction and on the topside once it is done.

The last, I would the last part of this global workflow is what happens when the project actually is done, and you want to check to verify if what has been done on the construction site, what has been built is correct and is corresponding to your model. So in that case, the full workflow, will involve different model and solution. So you can do this comparison two ways. The first one is to make a scan, a global scan as you did at the beginning of the project, before the retrofit. You can rescan everything and just compare with your model, with your final model. So in that case, you will use the scan in ReCap 360 and Revit.

The second way to do it is if you want to verify, to check some specific points where you have a doubt, or if you want to verify that it's OK. If it's important, you will have to redo, or if it's not so important, just modify the model to a date. So in that case, we will use a robotic station layout, Glue, point lay out, Revit. It's a reverse process that we just did for the layout part.

Here we are back in the De Vinci room.

OLIVIER BAYLE: The real room

JULIEN DROUET: The project is done, and we want to check if the little windows you can see on the curved wall are correctly positioned in my model. Now it has been done. So I just select a point in the angle, and I see it's not exactly the case. So I will manually move the position of the laser on the right position. On the existing position of the window, and we collect through the BIM 360 Layout app. I would just click and collect and it will get the new position. So the real position of the angle of my window.

I can check for different elements in our case. We just did it once, the goal was just to show you the principle. You give it a new number for your collected point, so that you will be able to find it easily. Later you can add a description. Once you you get all this information, you will reconnect your iPad to the internet, and at this moment, all the collected points you added in

your model will be uploaded on BIM 360 Glue.

OLIVIER BAYLE: Yes because we cannot use this process, you are not obliged to be online, you are offline.

JULIEN DROUET: It's working offline too. Most of our BIM 360 solution, the main advantage is that you can walk offline and you use the cache of the mobile device. Only when you are connected, everything is synchronized. So that's exactly what happened in this case. So we just re-upload all the information on BIM 360 Glue.

Now back in BIM 360 Glue, you'll notice that it's in the web browser. If you want to get this information you need to launch the web browser interface, not the application. You have a filter tool so you enter the number of the point that you collected and you can see that I have an as-built point.

Then back in Revit, you will do the reverse process as we did previously to implement the points. I will actually re-import, in Revit, from BIM 360 Glue the new point I collected on the construction site. Now the point is here as you can see, and now I have two solutions, either I destroy the wall and redo exactly the window where it should have been, or I can just update the model and move this window to its right position. On the position it is exactly on the construction site.

OLIVIER BAYLE: Now this way we can deliver a correct model to your customer. It is an issue, there is a reality and there is a mockup, and sometimes there are some gaps between. Yes? It will be a question as you pose, what is your metrics about what you have shown today? Not a big point cloud, it's only 7 scans, and this scan was made in about one hour because one scan will take me 10 or 12 minutes. Taking into account that I need to change position of my scan, one hour, it was about one hour.

Concerning registration and the indexation made it into Recap 360 Pro, it took me two hours and a half because this workflow into Recap 360, the biggest part is to import the scan and to index them. Of course it takes time, but in reality when you've got more than seven scans you launch them, the indexation and registration during the night.

About point cloud, only 45 billion points. I said only because most of the time there is more than 45 million.

Concerning manual cleanup, I'll show you a little example to clean a chair. It took me five minutes because I may scan during vacation. If there is anyone in the room, if I can give you

some advice, when you use this kind of material the less you have noises in your scene, in your scenes, I mean people, cars, the better. You save some time into your ReCap 360 Pro process. At the end, to create a mockup, the initial mock up, It took me one day. Eight hours in France, I don't know how many hours you work in the US, but in France, I do one hour or more, I got my manager here. You understand?

OK? But, of course I know very well Revit. I can inform you, I use my own [INAUDIBLE] with my mouse, but you've got some special tool, external tool, but it was-- it is plug-in, provided by [INAUDIBLE], provide by [INAUDIBLE]. You can bring this [INAUDIBLE] into Revit. And of course, it gives you-- it saves a lot of time.

I don't know if anyone use this kind of stuff? Plug in from [INAUDIBLE], it's called. Pointers for Revit. The [INAUDIBLE] is called-- oh, I missed it. Can last for but there is also too. Yeah yes yes actually at this time sure you have LHR and itchy I think it's the new one arrived and Trimble is also supported but not with the BIM 360 layer application.

So with Trimble, you are able to send only a text file with all the other position of the points. But from Autodesk point layout, you can create this kind of text file with the x, y, z information and send it in a Trimble.

AUDIENCE: [INAUDIBLE] the iPad with [INAUDIBLE].

JULIEN DROUET: Yeah. The [? work ?] for which we just present you is working with [INAUDIBLE] and Leica and soon with the [? ET ?] as well.

OLIVIER BAYLE: And take care when you say Leica It's not all the material of Leica. It is especially this--

JULIEN DROUET: There are two or three robotic station that are compatible with the solution. The connection, actually, between the robotic station and the iPad is done through Wi-Fi. But recently, it was announced that for the [? IP60, ?] the last one, it's also available through Bluetooth. The issue with Bluetooth is the distance. So in interior, it's not an issue if you want to use this process. In exterior, outside condition, Bluetooth is maybe not recommended because you can lose the connection easier. So that's the main point.

OLIVIER BAYLE: OK, using Revit, there is a lot of stuff into Revit. But you take the advantages or the benefit to [? review. ?] And I put some text behind the pictures that tell me the truth-- which is the reality, which is the virtual reality. OK, it is virtual. It is from Revit because there is no AutoDesk logo. I

don't draw it. But you see it look like the same.

JULIEN DROUET: It's really realistic, actually.

OLIVIER BAYLE: And more you put detail in your mock-up, more accurate you will have [INAUDIBLE], accuracy [INAUDIBLE]. And another point of view in the room. Of course, I can give you another advice using the 3D scan, there is some refraction when you've got some windows. And as you see, I close the windows not to have this issue. It's not an issue. But to [INAUDIBLE] your point, [? Claude, ?] it's easier not to [INAUDIBLE].

OK, conclusion-- we need to tell something before this, no?

JULIEN DROUET: Actually, our main regret was that some of the technology we presented you were not available at the time of the construction. So we couldn't provide you some pictures of using the scan on the construction site real. But I think, globally, the goal of this presentation was just to apply this construction workflows on a project and just show you the different step of what could have been done in the best world if everything would have been available at the time of the construction.

Another point-- maybe you will show shortly in ReCap, the last scan because just to notice the first scan Olivier showed you at the beginning of the presentation had been made with materials that have, actually, three or four years. So it's not the whole material. But the technology evolved. And the quality of the scanning today is much better. And you will be able to notice that through this presentation.

OLIVIER BAYLE: And as you see here, it's still loading. If you come to visit us in Paris office, we will get that in reality, not virtual reality. But we can meet together in virtual reality, if you want. And you've got this bubble. I call this in French, [? panorama ?] [? view. ?] But I don't know. They call this a [? rare ?] [? view ?] into ReCap 360 Pro.

And another trick, tips, that I can give you for Revit. When I use Revit, I use point cloud inside. But I use this scanorama [? view ?] to create the marker because sometimes you've got more detail in the pictures that you can have in the point cloud. I made a request into Revit to have this view and to put this view in different screens. You've got two screens. One screen with this, one screen with Revit.

And we show you the final mock-up into Revit here. As you see, I create some cube that you have into the point cloud and the reality. Not so complicate. But I based this creation on the

point cloud. Now, you can create a very detailed mock-up.

At the end, our conclusion-- first, we tried to show you what is the best way using our software material from Leica. As I said, it could be used by other material [INAUDIBLE] follow [INAUDIBLE] because ReCap 360 [INAUDIBLE] could embedded a lot of Formit [? or ?] [? file, ?] point cloud. And of course, we want to show you what is the best practices to bring your point cloud into the construction site. And we turn it into Revit for question of quality. It's important to deliver to the customers the right mock-up.

And basing our mock-up on top of the point cloud, we are very accurate mock-up. That means there is no differences between what is scanned and your mock-up. And of course, if your mock-up, it is very accurate, you will have a BOM bill of material-- very accurate also.

JULIEN DROUET: Important to notice, so this integrated BIM process and this new tool, such as this robotic station, accelerate the traditional layout process.

OLIVIER BAYLE: In France-- I don't know in US-- in France.

JULIEN DROUET: That's another point, interesting, that this robotic station allow you to work alone. So in a traditional layer process, you need to have someone with this station, and another guy on the other side because the process is manual. And it's two people, at least. With this robotic station, the robot is able to find the prism or to show you directly rarities. And you can work alone.

So you save money. You save time. And [INAUDIBLE] as well. So you work faster. The information are safer because through this BIM 360 process, the information are stored on the cloud and you are sure it is up-to-date. So I think you heard a lot this week about our goal with a single environment of truth for all the data. So that's also important. And finally, you get something with a better quality. And everyone is happier with that, especially the customer, to get an [INAUDIBLE] model that is on a high quality realized.

OLIVIER BAYLE: Yes, before to leave us, and before to have a Q&A session, just a reminder-- subscribe to our Village BIM blog. There is a lot of stuff. We show you just a little part. But you've got a lot of things about [? NEP ?] stuff, [INAUDIBLE] stuff based on Revit. But you've got a lot of stuff about ReCap 360 Pro. You will have some stuff about Stingray. And of course, we are focused on the visionary of AutoDesk. And you can get some good information. And of course--

JULIEN DROUET: And Google Translate can help you because we write in French.

[INTERPOSING VOICES]

OLIVIER BAYLE: But it's a way to learn French also. We speak in English. We try to speak in English. And if you're interested in geospatial and infrastructure stuff, you have two other good French blogs also. Geospatial Made in France and Civil Made in France. We are present on Facebook and Twitter. And thank you for attending. And now, we fight.

JULIEN DROUET: Do you have any questions?

OLIVIER BAYLE: We are fully prepared.

JULIEN DROUET: OK so, bu--

AUDIENCE: On your blogs, does it go into more detail about more technicalities of this? I'd like to try this. I'd like to trial it, but I'm not the most technical of people. So is it gonna be a more step-by-step process [INAUDIBLE]

JULIEN DROUET: On this topic, especially, you can find some more detailed information. We did different webinars this year around this. So you will have the link in different articles to find this information. Certainly, also, based on this presentation we, will blog it and make available more material to explain exactly what would happen so that our readers in France that couldn't be--

OLIVIER BAYLE: So in videos that we have done on our YouTube channel, but unfortunately it is French. And some time, I've got some English video. And there is a very interesting video because, as I remember, I made a series of five videos showing starting to the reality. Keeps reality into point cloud, puts the point cloud into Revit. Into Revit-- make the mock-up that you want-- bill of material. And I made another video using this mock-up, put this mock-up into CFD software. You know CFD. It's a simulation. CFD software, [INAUDIBLE] calculation.

And I bring this calculation and the mock-up into Showcase. It's another software in AutoDesk. And you've got a full analysis of your flow because you see flow of your particle of air, air particle. And it's very nice. And I encourage you to see this video. I will post it into our session to [? be ?] [? informed. ?] And it is to show you that you can start to create the virtual reality for major simulations and maybe to create your new model because you change some things after you send it to the site construction with the technology shown before. But there is a lot of

stuff.

JULIEN DROUET: You had a question.

AUDIENCE: I know that you realize that your [INAUDIBLE] scanner [INAUDIBLE]. But did you guys maybe come to the conclusion during the project that using that during construction, or taking multiple laser scanners while you're in construction to the model in the construction phase to make it [INAUDIBLE] as the real one?

JULIEN DROUET: On our example, we didn't do that, so you noticed. But you're right. That could be also something interesting to use the scanning. But during the construction phase to adapt and not to be in the situation, we just showed where you noticed, at the end, after all the finishing had been done. So through this workflow, using scanning during the construction phase, can avoid you to make some mistakes that we need then to rebuild something. So if you have a shift, for instance, on the wall, then we will involve a lot of issues with the piping stuff, with everything. So you can fix it really quickly and stay upstream in the process. So yes, you're right. That's something that could have been done. So we didn't present it here. But yes, that would have been interesting.

OLIVIER BAYLE: And we say that maybe you can also bring into your workflow, [INAUDIBLE] because a point cloud has a point that you stake out into the site. You can give this information to [? fill, ?] to correct something. I don't know [INAUDIBLE]

JULIEN DROUET: Yeah. As generally now, BIM 360 Field is working with BIM 360 Glue model. So at the moment, you get the information from a verification point that is not exactly where it should have been [INAUDIBLE] is supposed to be.

You are able to create an issue and then go on through your workflows. It's a way also to manage your quality. So you're right, BIM 360 Field can be part of a more global workflow involving this scanning and robotic station. Yes?

AUDIENCE: That was actually a similar question to what I had [INAUDIBLE] as well. And it's not so much-- [INAUDIBLE] construction phase in addition to doing it after construction. But the reason I'm thinking of [INAUDIBLE] during construction is that not just to correct the [INAUDIBLE] but also to document where you're installing your services-- your plumbing, your pipes, your [INAUDIBLE], anything that's behind the drywall, behind the [INAUDIBLE] that you can't see after it's finished. So it becomes more of a tool for documentation.

And I know our office has been heavily investing in laser scanners. We do a lot of high rise, multi-unit residential buildings. So before they board up the walls, we go inside some of the units and [INAUDIBLE] all the plumbing, all the wires, [INAUDIBLE] We do laser scanning first so you see the bare stuff. So that way, it keeps that as a reference, so you also hand that over to the client. So in the future when they're renovating or when they're modifying, [INAUDIBLE] they know, OK, here's where the pipe is. I know that I can't drill here. I have to do something special in that area or similar.

JULIEN DROUET: And maybe in that case, one of the new features in ReCap 360 could be interesting. Now you able to but in ReCap Pro a [INAUDIBLE] file. So you can imagine to have this scanning with all the wires, all the stuff, and then put the model and have both inside just to get some information that are even at the end of a project. You're right.

AUDIENCE: Do your consultants-- mechanical, electrical plumbing-- did they also use Revit?

JULIEN DROUET: On this project, no. No, actually. Unfortunately, no. Because that would have also been a [INAUDIBLE] could have scanned it, and they could adjust it there. [INAUDIBLE]

JULIEN DROUET: OK, thank you. Thank you for your participation.

OLIVIER BAYLE: Don't forget to rank us because there is something into the app, the AutoDesk [INAUDIBLE] app. For us, it will be good to have your return if it is right or not, if we need more English or not. If you want to visit us in France, you will be welcome. But anyway, put something-- good or bad-- but put some thing.