

# Next Generation Design Tools:

## 360 Imaging, VR, and Video Game Tech

Live Webinar Transcript



### Introductions

**Adam Fisk - Director of IT Services:** Hi everyone, so we can get started today. I want to officially welcome everyone to the TSP Smart Spaces, [Boston Design Week](#) webinar, covering what we see is really the next generation of design tools, our time today will feature Michael Oh, President and Founder of TSP, as well as Aaron Stallings, TSP's Director of Smart Spaces. My name is Adam Fisk, I am the Director of IT Services here at TSP and will be acting kind of as your host/ringleader and everything else of sorts.

I will also be joined in later today by Ken and Patrick from [Modus VR](#), and really throughout our time today we're going to hit on a number of really really fascinating topics and even some real time demos of some of the systems were wanting to show off, and we invite you to really open as many questions as you wish, via the Q&A section in your Zoom window.

At the end of our time today will be answering as many of these questions as we have time for.

But at the end we'll be sending everyone who registered a copy of the recording, as well as a transcript of the questions we didn't have time to answer included in that recording will also be the more full resolution versions of what we're showing as we are doing this over Zoom.

So some of the content may be a little bit more choppy than we intend. So with all that said, I'm going to pass it over to Michael oh and we can get this webinar started.

**Michael Oh - President:** Thank you, Adam, and it's good for everyone to join us for this Boston Design Week, events, about next gen design tools, just a quick little blurb about who TSP is, we were founded about 29 years ago.

And we started in the IT space but actually now work in lots of different areas where technology and design intersect so we do Smart Home design for projects, both in Boston, as well as all over the country and even in Iceland, we do commercial AV work. We've done work once again in the US and then across the seas in the UK for clients like Accel Partners. That's a photo from them and we also have a design consultancy that works in larger projects, not just implementation but really helping advise designers, architects in technology. So we do smart building consulting. That's the [10 World Trade](#) project in The Seaport that we working with the [Sasaki](#) and [BGI](#) on that project, and also working in the empty space so helping with technology for condominiums, and multi-dwelling units all over. So, we have a lot of different hands and a lot of different areas around technology around design.

We've come across a lot of things a lot of technologies and we've sort of put this together in today's presentation now, we're not architectural workflow experts we're not here to tell you how to change or run your firm and how you know how to do things differently what we wanted to do is really just introduced and hopefully open your eyes to some of the new trends that are happening in this space because it's moving so so quickly. And so, you know, you know, hopefully you'll find this this time, you know, very useful, and we'll dive right in and talk about three different tools. But first, I just wanted to set the stage a little bit.

## **Set the stage: the Metaverse Generation**

And, you know, I can sort of describe what's going on today, in the world of visualization, real-time rendering as almost a product of what I'd call the metaverse generation. So the metaverse is just another word for alternate universes and alternate realities. But in the world today, that's all video gaming. I mean every, a lot of the video games that are out there, you know from Minecraft, Fortnite or in worlds that are being rendered on all you know in real time.

And, you know, there's a lot of technology that's gone into that, of course, maybe that is or isn't sort of useful to architecture and design but we're finding that it is becoming more and more relevant.

And it's relevant in a couple different ways. I mean, first off, Minecraft, you know, is probably one of the first kind of "blank slate" and "build your own world."

Very popular, it has 131 million active users. It was first released in 2009. And what that means is that you know you have people and kids. Maybe they're six years old and picked up you know their first mobile device. I mean this is also the time that the mobile device boom, the gaming mobile gaming boom, also happened. And, you know, over that course of 12 years they were immersed in these different alternate universes and those kids are now 18. They're starting to learn about the real world, starting to find professions. And the reality is quite a few people, their introduction to architecture was through gaming. They're able to go into a world blank slate create find, find some materials, create buildings, create environments all on their own and without the constraints of the real world, right, without the constraints of physics, without the constraints of project management, you know they're able to create all of these worlds in hours if not minutes, and there's something about that creativity that that sort of comes with the, you know, having a blank slate having this metaverse that you can play and, and it has started to bleed over I mean even [Bjarke Ingels](#), you know, of course, part of a very prominent architecture firm in Denmark has been quoted to say that architecture should be more like Minecraft. Not that it should look like it we certainly all agree on that point but more than it should have that creativity and interactivity.

That Minecraft allows and you know all of these other video games. And I think that attitude of, you know, a whole generation of people coming into these different professions, with a whole different set of tools and technologies and that's really you know what we want to talk about today.

And really, you know, all three of these play in this idea around virtual worlds, and the real world, but of course it's all about the real world, in terms of architecture and design.

But how can we communicate things that maybe don't exist, maybe exist in our minds and we as designers are trying to get out there, you know, to the clients or, you know, in other ways.

## **Matterport and working in 4D**

So we'll start with a very straightforward tool called [Matterport](#). You may have seen this especially if you've done any buying of home recently it's a very popular platform in real estate. It's also very popular, there's another platform called [Listing 3D](#), but what it does is very much the same thing and of course Matterport captures spaces, virtually.

So you know you're looking for a home. You can walk through that home, different versions of this technology have been around for a long time but they really seem to have gotten a lot of traction in the real estate space. And part of the reason is the development of consumer cameras like the one that's how that I have here and that's on screen. That's the [Ricoh Theta Z1](#). There's a version of it that's a little bit lower resolution, that's \$500 this camera's \$1,000.

And, you know, it may sound expensive for what it is but as a professional tool it's really nothing, especially for the value that we got out of it that people get out of it.

And it means that you can capture a space of room in minutes. A 7,000 square foot house maybe in an hour or two, going through the space and and basically just using your phone and using this camera to capture the space.

It really captures everything like a snapshot in time, I mean, I think we've all been in a situation where we go on site we take photos of things that we think that matters but we walk away and we realize a two or three days later, we have the wrong photos, we need a detail on the ceiling or on the floor something we didn't anticipate and doing these characters with Matterport just, you know, makes that problem go away, everything's captured.

But for us, the way that we've changed and flipped the script on Matterport is that we've gone from three dimensions into the fourth dimension which is time, where we're capturing this as part of the build process. So I'm going to hand it over to Aaron and I'm going to bring up a couple Matterports, and he's going to walk you through how we use this at TSP.

**Aaron Stallings - Director of Smart Spaces:** Awesome, thanks Mike and hello everyone! So, as Michael mentioned this is probably the most simple, it's certainly the least novel of the technology we're going to be looking at today, but because I'm the least technical person on the panel I'm going to be presenting the least technically complex software we're going to use, and we're still excited about it because it's become a huge resource to TSP and the partners that we work with.

So this first project that Michael is going to walk us through is a super fun one for us. It's a bowling alley in a residential addition that we're showing here and the rough stage and underneath all of this, as I'm sure you can imagine, is a lot of tech to focus on elements like low voltage cabling lighting, anything to do with audio visuals.

This captures, you know, other work as well such as plumbing. Other wiring details like blocking and anything, essentially that's visible to the camera, and as Michael spins around you may notice these call tags throughout that we use liberally to, you know, indicate what wall control is going to be, where that's at

automatic shades in the case of this particular project from Lutron invisible speakers. These are all elements that we have on paper and some other format and drawings in 2D, but there's really nothing better than this type of file to look for placement of things within framing for instance, or again blocking that type of thing.

And while we use this before, pre-pandemic I would say, you can imagine how much more useful that's becoming. We can effectively walk through with homeowners or other, you know, team members to review placements of different elements, such as invisible speakers, temperature sensors, those types of things, and even talk about new system features or scope changes with a really good backing context, you get from this.

We're going to go on to another project as well. And just to reiterate what Michael said about the cameras, you don't need to invest \$8,000 or more into a camera really to get the value out of 3D image capture. We got by with a much more economical camera and you could get something you know and do a great job with something as low as \$60 so it really, it really is open in terms of what you can what you can pull off this next project is another fun one that we are super excited about and we're still in the in the middle of very grateful to be a part of. It's a very historic home in Boston, turn of the century addition to a Victorian era mansion in this particular space, and we were brought in to drastically improve the lighting in the in the in the home and the space in particular, while paying some sort of reverence to its historic, you know, preservation and heritage. Because the architect or the team that was actually brought in to help design lighting. We outsourced some of the lighting design and expertise in this in this particular project. Some of that team is UK-based, and because of that and the fact that we began design concepts for this project and the height of the pandemic, 3d image capture is really the only way that we were able to assemble the team that we did.

Of course, Matterport doesn't truly replace what it means to be live and in person, but it does allow for a more realistic perspective than you would get from static photos, so we can really get a better sense of the space and a better perspective of the space. It also allows team members throughout to access this file and call out tags or even take measurements. Rough measurements we wouldn't necessarily order, you know, our product from these measurements or wallpaper. As you know, measurements are super important to the lighting design process, but we have call out tags here for items like architectural lighting which is the bulk of what we're doing in this particular space.

Invisible ceiling speakers, even a custom commission gas fireplace pan that we've worked on for this particular project. So there's a lot that we can have access to and in items that we need quite valuable for us to get our jobs done,

We can move on from this space into the main floor of the house just to show you a little bit more, how we use this, again more call out tags in this particular case, we're focusing a lot in this home on a retrofit improvement to update lighting and wall control.

We have lots of good intentions and can always do what we want, but we can really talk that out via, you know, this type of means and the homeowners really appreciate what we're able to do. In terms of practical uses, I mean I've shown you a lot of what we do and how this really affects our work but something as simple as a stain on the carpet. This particular file picked up that a stain had been around for a year before, some contractors were doing work on the property and they really were grateful to TSP to be able to pull up an old file and say yes that stain was not put there by you, at least not this time.

So it's super it's super practical and I, and I hope that you get to use it if you haven't already.

**MO:** Great, thanks Aaron thanks for that little tour of matter port and how we're using it, not just the one time capture, but like with the bowling alley we were really able to capture it multiple times.

You know what one of the challenges with a pandemic is that we really couldn't go on site as often as we would normally in a project where we're managing the build. And what this allowed us to do is maybe take a much smaller team, or one person at a time. We can go in and take that capture and then share that amongst the team and discuss things without, not everyone having to be there, which was really key. So, you know, a lot of these technologies have come to the forefront, particularly around Covid. And I think that's, you know, a silver lining on the pandemic.

## **Twinmotion - Real-time demo**

Let's move on to something that's a little bit different. So of course, as we talked about with Matterport, it's great with capturing physical spaces that exist, and then making them virtual. You may have heard the concept of the digital twin. Well, Matterport is making a digital twin have an existing space but what about spaces that don't exist? How do you, how can you take the vision of a space that you're creating as an architect or designer and really be able to kind of get that in front of the client in a way that works. Now of course, renderings are the traditional way of doing that in today's world. But what we found is that there's a use for another set of tools called real time rendering, some leaders in that field are Twinmotion, Lumion and Enscape as well, who are able to bring rendering to new parts of the design process.

Now, I'm not here to say that these tools are going to replace the existing rendering workflows. I mean of course as many of you who might work within architectural firms know there are three primary ways that renderings are done.

If it's a small firm, you're sort of doing it yourself, you're kind of having to learn those rendering tools. If it's a larger firm you might have people within the firm that specializes in rendering, or the alternate is to farm that out to a third-party that specializes in high quality renderings. And those things take hours if not days, for all the details to be rendered and as an end-product, you know where you're really demonstrating to the client.

This is really what their property is going to look like, their home or commercial building. That isn't going to go away, necessarily, but what we found is real time rendering opens up new parts of the design process where you can use rendering to help communicate certain things. Communicate choices, give people a real sense of what choices can be made in the design process and guide them through that.

Twinmotion is based on the Unreal gaming engine, so once again this concept of the metaverse. The sort of alternate universe universes that are created for entertainment. Well, they're just applying that same technology to the real world so at some point they ask themselves, "Can we apply this to actually doing renderings of what's really out there?" And once again, you know, we found within the pandemic and with these virtual tools really coming to the forefront they have become much more prominent.

So Twinmotion can import 3D files from [SketchUp](#), [Revit](#) other standard sort of CAD and BIM products. We bring them in, and within those files, we create context you can even, you can even open up interactivity.

You can put on a VR headset and have somebody walk through a space with these things, but I think it's all best demonstrated so what we're going to do is we're going to play a video which has been pre recorded in real time. So no tricks, no compression, no cuts. It's me doing this Twinmotion project and I'm going to narrate, it's just impossible for me to do it and narrate at the same time.

So we're going to start with the basic Twinmotion interface and I'm importing in a SketchUp file now this is a project that we're working on in Scottsdale, Arizona. So here's the SketchUp file, obviously it's not been particularly optimized for real, for any, any sort of rendering. All the basics are there, but SketchUp you know does its job with vegetation, very static and very unrealistic. And so we are simply just going to make some adjustments to remove the elements which really kind of add that sense of unrealism to a rendering.

You know it's sometimes called the uncanny valley where the human mind is so good at picking up these details that anything that throws it off from what really looks real. It makes it sort of not really register it as something to engage with. And that's really where Twinmotion excels is taking a basic file like this, and then starting to apply layer after layer of these details.

So I've selected a few textures, sort of favorite materials that I've used for this project on the left, that's pretty much the only sort of Julia Child thing I've done with this pre-positioning. Everything else is being done in real time.

And this whole video is going to take maybe another 15 minutes and we'll show you the basics of Twinmotion. As you start taking that file, you take out the unrealistic elements, and then you start applying your texture. So I'm taking various textures that I like to use, and I'm applying them to all the different elements of the house, and you'll see as I'm applying them there's not a radical difference.

You know, simply adding, you know, a steel beam to that particular architectural detail in itself doesn't radically change but when you add all these things together, then you start to get a lot of really interesting effect so I'm applying slate roof and I'm rescaling that so along the bottom you have the ability to change the color reflectivity the scale of the materials. I'm going to also apply stone pavements to the outdoor flooring, once again, adjusting the scale accordingly. You can still see that there's a lot that's unrealistic about this right, you've got this sort of default city in the background you have kind of what looks like a little bit of brick is kind of the surrounds I'm going to take, take that and put it in a desert sand, redo the gravel. The focus here is not to recreate the universe, I mean this is just one house. What I'm trying to do is just take elements around the rendering areas, let me the places that I'm going to show off some assets to the client.

So I'm going to create a video or I'm going to create a few photos. I need everything in that photo to kind of have some sort of contextual completeness, so that it engages with the user, but I don't have to recreate the universe here. But what I do want to do is recreate some of the vegetation and some of the planting so you can see the plants that I'm putting in from the Twinmotion library.

They're not just cutting and pasting the exact same versions of the same plant, as I'm creating them. It's creating slightly different size rotations and slightly different leaf patterns, and that's one of the powers of Twinmotion, the vegetation that it has. So I'm going to add a couple palm trees.

The other thing that Twinmotion is aware of, how trees and bushes and things grow. It's not just simply taking a simple model of the tree and just scaling it up or down which of course doesn't really lend itself a palm tree doesn't look like that when it's a baby palm tree. And so it knows that and you can adapt that.

So I'm going to change the background as well make it something more mountainous. you can see as we're going through this now we've added these trees, the shadows are being rendered in real time, very much like a video game, but if you compare this against sort of traditional rendering workflows it's completely different, very interactive being able to just basically see what you're doing as you go along.

So next I'm going to do what's called vegetation painting, and that's simply just taking a few pieces of like let's say dry grass and dry wild grass, and I'm going to mix them together and essentially use a paintbrush to take, get rid of some of these hard edges and once again as I choose my rendering angles and locations. It's going to show some of that stuff in the background so I just want it not to have the sort of fake and kind of artificial hard edges.

I'm going to add a little bit of grass with just some color here for the back garden. Clearly I could spend a little bit more time and trim that out to be exactly the location that I want.



Next up we're going to go and look at this pool of water. So, you know, like you would imagine in many landscapes you have sort of a rust rusty metal container and it's going to have some water in it.

This looks very flat, very fake right now with it coming from SketchUp. I've added a water element to it. So that allows me to define the water depth. I'm going to change the colors just to make it a little bit more visible. And you can already see that there's a lot more of a rendering of something that's that's more lifelike there. So I'm going to change the angle a little bit to zoom in on it and you're going to see something very similar to the render you know image that we have, you know, for our promotional stuff for this talk.

And this is all happening in real time so you see that water the reflections it's reflecting all of those textures, the light of accidentally dip the camera in the water there. Luckily this is all virtual.

And it's all rendering that you know as you go in real time. and I mean and that power of being able to kind of put these different contextual elements in there that create realism is really where Twinmotion excels.

I'm going to just create a little bit of patio furniture and or replace what is very static, you know, stuff that came from a SketchUp.

I'm just adding some things from the standard Twinmotion libraries. There's tons of third party libraries that you can pull from as well you can even pull in your own models if you want to apply textures to them. These are just some basic outdoor chairs.

But one fun thing I'll do is just add a mindset so once again this sort of interactivity. I'm going to take those wine glasses which actually are made up of three different elements, and let's zoom in a little bit. And I'm going to look at let's say this wine glass. I want to make some extra wine glasses so I can do that and add a bit of life to this scene so it looks a little bit more lived in.

It looks like there have been people hanging out drinking some wine and all of those little contextual elements help to take you away from that uncanny valley where you're no longer believing you're sort of disbelieving what you're seeing in front of you. It allows the clients into the metaverse right and you're creating a universe that is in your imagination as a designer architect and you're drawing them into that.

We moved inside and for the purposes of this demonstration, we're not going to spend a lot of time on the inside. I'm basically just going to adjust some of the materials here just to make them a little bit more realistic and my focus for these renderings is to do some renderings from the outside. But as we are going to do a video that's panning around the outside of the house I do want some of the inside elements to look a bit more realistic so I'm taking a TV. So I removed once again a very flat and static item from SketchUp, I'm putting in a TV from the Twinmotion library. I'm going to resize that you can see there's already better

reflectivity on that screen, it recognizes that it's glass. I basically sort of position, I think what the right TV size is for that area, and you can use that to sort of interact with people you know with.

Here's a little trick that Twinmotion is really good at is mapping, a video file to a texture so I can map that video to the TV, and I'm actually even adding a little bit of glow to that video to simulate an LED backlight. And you'll see that that video plays in real time as I'm interacting with the space and you can make that video whatever you want. So, whatever is going to engage the client, you know, and really as we just use it to show when when you have a video that there's action, there's a movement, this isn't just static.

Next up, I'm putting on the lights right and so what we're using is standard sort of light patterns which are built into Twinmotion to simulate recessed lights. And I'm not a lighting designer, but I'm simply just putting in a few lights, where it's already been positioned for this particular project. And you can see that once again, as I'm adding the lights to emotions rendering that in real time, it's showing how that light is interacting with all those all of those materials and the other lights in the space. It's calculating all that stuff as, as it goes. And really shows you the power of that rendering engine that comes from unreal.

And then I'm going to do the same for these wall washers where you know clearly they're going to have slightly different effects. So I'm going to angle the lights you know a bit more appropriately to what the intent is there, and then I'm going to duplicate that across as well.

So I mean what are we like 7, 8, 9 minutes into this and we've already created you know a much better more compelling space in terms of being able to communicate things within the lights you if you look across the bottom you have the ability to adjust things like the intensity of light so now I've grabbed all the lights and I'm just toning them all down, you can change the color temperature which for those of you that are doing lighting design or working in architecture where you interact with lighting design, color temperature is hugely important for communicating and conveying the right look for a space and and there's so much you can do with Twinmotion to communicate that. You can even do RGB lighting and all that stuff as well.

Moving to the outside of the space and just going to add some lights here once again I'm not a lighting designer but just to sort of demonstrate the potential of Twinmotion. So we're going to add a couple, you know, presumably waterproof, waterproof resets you know into the outside here, toned down the intensity, and I'm basically just going to take that and duplicate it suit to give it a sort of a nice look.

Next I take what's called an area light, which basically gives you a rectangle of light. But if you adjust the dimensions on this so make the length really small and the width very large, you know, equivalent to that steel beam, I'm able to simulate an LED, a linear LED. And I'm just going to adjust the angle of that light so it's appropriately sent out now gives you that same look as a linear led in a recess waterproof recess once

again, obviously for outside. This would be something like a closer an acolyte, you know that type of fixture that you put in a scenario like that.

And I'm going to take that and basically simply copy and paste that across so whatever is whatever is in your imagination however you want to play with lights within these spaces planting, furniture, you know you're able to do that very very quickly in a way that is much more difficult to do in more traditional terms and tools. I'm even going to put in and apply here just to sort of experiment with well how does that really kind of look on the wall of course I'm doing all of this in a representation of daylight so you're going to have a completely different effect in the nighttime, but just simply you know adjust that light and rotate it hundred 80 degrees. And then what I'll do is just simply go through and turn those lights off, because we don't want those, you know, during the day so that's kind of my scene that I've created there's there's not much else that that I want to do with the actual objects. But what I can do now is change the environment.

So within Twinmotion, I can adjust so many elements of the world around me and this is really the power of that unreal gaming engine, I can change the time of day. So you can see that the sun moves and the shadows move. It gives me a North orientation. I could take the entire house and oriented the correct way for the actual plot. I've gone into nighttime here and I'm going to adjust it once again, back to that angle that we've used before. You see the reflecting water. So well why don't I turn on the outside illumination now, so I put in those extra lights I turn those off for daytime. I'm going to select them all. And I'm just going to turn them on right and then suddenly you can see the lights don't really get much of that, so we'll have to sort of play around with that to see what reposition and see how we want to play with it.

But now what I'm going to do is I'm going to take these captures and basically kind of look at, you know, taking snapshots of this angle during two or three different environmental scenarios. So one night time with illumination we clearly did that. Well, let's do another one that's daytime and in a different month of the year. So the light is going to be different, the sun position is going to be different. You can choose that you can just change that. And then I'm going to turn off the lights and save those conditions for another image, another rendering I'm gonna create a third one. And let's say that we want a different weather pattern. And so, Twinmotion says okay, we want it to be different, we want it to be raining right. It can even simulate snow in Arizona if you want. We're going to say, okay, we want overcast in totally different light, totally different conditions, you can even see the raindrops falling.

And we want to take a sort of a photo of that to really give a sense to somebody of how property is going to look not just in one ideal state, but in multiple, multiple times of the year. Multiple you know weather patterns and whatnot and, and you can even take that entire vegetation of the landscape I didn't show it, but you can also elevate, or you can grow the plants bigger, smaller make them baby palms adolescent palms and and change that and the rendering as well.

So the last step I'm doing is just going into the make a video section of Twinmotion and you essentially just work with keyframes so you take snapshots of the video and this allows you to essentially work as a kind of like a drone right so if you reposition your camera you can move anywhere and the x y z axis and position of the camera exactly where you want them.

You can change those conditions and what emotion does is it evolves between the key frames, it changes things so it makes it kind of more continuous. You know movement but also if you're changing the time of day, you'll see the sun move you'll see the shadows move you'll see the weather evolve. All of these factors, you can do. And I think the point that's been mentioned before, I'm not an architectural visualization specialist by any means, I mean I started out in the IT world. So the fact that I can do this is really more, you know it's more reflection of the video game technology of that simple interaction, making the interface very straightforward, very simple, yet very powerful.

And there's really a tremendous amount that can be done with a tool like Twinmotion in a very short period of time. So I'm just making a few final adjustments on those key frames, and I'm trying to capture those I think it took me on this video a couple of times to get this particular part of the video right. But that's what you get for recording in real time. And then I think we're almost done so I'm going to evolve it so that the time of day is a little bit different. And then I'm also going to turn on or off the lights inside to sort of show you know that it's the end of the day and everything's turning off. So I've captured all those different key frames, as part of my rendering.

## **Twinmotion - See the output**

And I think we're pretty much ready to export next. So Adam is going to show the video. So essentially after that, there's about a five minute rendering process and you will see there's a little bit of jittery-ness here and that's due to Zoom, not due to Twinmotion and we'll give you these files as part of the package of stuff that we send off to all the attendees so you can open it up and look at it in real-time.

But you can see how it is, how it makes all those transitions makes it very smooth. It's like a drone is flying, not just in three dimensions but across time, across months, across weather, and it's very compelling to be able to sort of bring in a client into that journey, and you can use all of those elements you can demonstrate with these photos like for instance what it's like to have outdoor lighting whether or not they should add it, what type of lighting, and those types of things.

So Aaron from your perspective as somebody who has done renderings in the past with more traditional tools. You know how, how, how it felt the first time that you saw Twinmotion.

**AS:** Yeah I'm super excited. It's just cool generally but also just super, super practical. Anyone familiar with 3D rendering is well aware of how long the process used to take in years past, how many hours or even days with multiple dedicated rendering machines are working on static rendering. And then if you were you often were unfortunate enough to have forgotten to turn on a texture or light or something else that wasn't in there, and you had to you know go through the whole process again, and hope for better results in a day or two. And then, and then cloud rendering and outsourcing really helped to improve the situation by saving a ton of time and oftentimes you know providing better renderings and more more immediately.

But the type of value that Twinmotion offers takes rendering to a whole other level, providing immediate results that allow for extremely efficient collaboration, which is always a big deal for us. Whether you're discussing TV sizes differences in lighting such as an awesome effect that we got to see here, lightings which increasingly vital element and building design, or even, you know, which vegetation which maturity of vegetation to use for landscaping.

Imagine you know the value of real time kinetic fine tuning with stakeholders homeowners developers, whatever we're often only afforded. What's an economy of time and decision makers and this type of technology can save time and efficiently and accurately relay what our design intent is and that's that's always we're looking for so on.

## **Modus VR - Live demo**

**AF:** Thank you for that Mike, thank you for showing us so we've now really seen the culmination of a few hours of work, and then a few minutes of rendering. But what we really want to be moving on to next is what we at TSP are seeing as the next frontier of collaborative design. And with that will hand it over to Ken and Patrick from Modus VR.

**Patrick Higaki - Modus VR:** Thanks Adam. Thanks guys for having us. Everything you guys have covered so far has done a great job of demonstrating the power of being able to see something, especially before that space exists, and from a client perspective once they can see what the end product is going to be like. That's often the first time they're really in a position to ask informed questions. And so because of that the earlier in the process in the design and sales process you can bring these visualizations in the better because they become a powerful discussion platform. And that's really where Modus VR comes into play. It is a real time design presentation and collaboration tool.

And so really you can think of it more like a high fidelity whiteboard, where you're able to quickly sketch out and try ideas but you're not at the mercy of your own drawing skills. Everything is dimensionally accurate, has a high fidelity look to it, but it also has more of an audio video focus; it incorporates a lot of real world

products, so that all of the stakeholders can participate very early in the process to see how that project is going to come together.

And so today, we thought it would be fun to do a live demo of a conference room so Modus is both a residential and commercial product, but given the state of the world right now we thought it'd be fun to start off with an existing conference room that has kind of a pre-pandemic setup to it. And we're going to use Modus to educate the stakeholders on perhaps some things that should be updated. And then in real time, we'll swap out products and swap out a few things to refresh the room to make it more of a post pandemic type of approach so I'm going to go ahead and put on my headset and what you'll see here in a minute is this process.

So the screen share you're seeing a zoom call and I'll hand back here and you'll see the entire room, and we'll have Ken, and I believe Michael is also in the room with us right I'm in the room there's Ken in green.

**Ken Brueck- Modus VR:** Yep. Can you guys hear me okay?

**PH:** Yes sir, and Michael is in red.

**MO:** Hello.

**KB:** Wonderful, and quick time check here Michael it's 15 after So how much do we have about five maybe 10 minutes, five minutes be great. Yeah, okay. So we'll move through this pretty quickly. The main thing here is there's multiple ways for the stakeholders to be involved in this. So for example, we've got Michael wearing a VR headset.

So in this case, he'll be one of our stakeholders, but also the other stakeholders could be participating over screen share like all of the participants in the webinar right now they're able to watch this and in a normal environment they'd be able to communicate.

What we'd like to show is just a couple of issues here so this room we call it pre-pandemic in that it is laid out with the intent of people to be meeting in person. They're all gonna be looking across the table from each other, and then a type of video conferencing is more of an afterthought right there is a screen there is a camera here, but it's really not optimized for it. And so the very first thing we're going to do to help illustrate that point is show our field of view indicator for this camera, and so understanding exactly what people on the far end of a call will see is critical to understanding their experience,

So very, very quickly here we can demonstrate what those cameras are going to see. In fact, Patrick How about you fly up here and show everybody that foreign view? And I'm going to turn on some fake heads from

the Blue Man Group just so everyone can really see what that's like. And right away there's a few problems with this first we've, we've got a seat here that's an issue I'm going to go ahead and get rid of that. But on top of that we see all of these chairs Here, let me help you out there, Michael.

All of these chairs here are arranged in such a way, the really only getting a view of these front two people and the view itself isn't even very flattering we're kind of looking up their noses. So there's a few problems, there's the placement of the camera, the type of camera, it's got a very wide field of view. We're getting a lot of wasted space off to the side here, but then even the table itself encourages a poor placement of every seat.

So I'm going to remove this camera So Patrick, thank you, I'm also going to delete this table in just a moment. After I show one last problem and that's this microphone so we can visualize the pickup pattern the range that this microphone can pick up. And so from a specs standpoint, it is a perfect microphone for this size table, but the problem is this microphone is designed to go with the center of the table when everybody's looking in at each other across the table, but once we're doing a video conference and keeping in mind this new hybrid workforce where, as many as half of the workforce might still be at home.

Many of these calls are now going to shift from looking across the table to now looking at the screen which means these front four chairs here are all going to be facing away from the microphone so we got to get rid of that microphone and come up with something a little bit better.

So I'm going to get rid of that table. I'm going to swap in a different one and these are again often real world products so this table we're putting in right now is a table from salamander designs they offer many different shapes and sizes, and this is a trapezoid table. And you can see Michaels already rearranging these chairs a little bit so that we can naturally follow that table and what happens here is it automatically fans these participants out a little bit.

So when we toss it a new camera will see that they're not going to be blocking the view of each other. And so in fact I'll go ahead and do that right now I'm going to toss in a camera and do one from Logitech. So Logitech has some really great products and they have one called the Rally Bar, and the Rally Bar is an all in one device, it's got a camera, microphone, and speakers, built into one. And previously we had the camera below the screen, which is not so great because it gives you that unflattering view.

But instead with the rally bar, it also supports pan and tilt, which we can also demonstrate in Modus. And so I'm going to go ahead and turn on that field of view indicator again and this time we're going to aim it down just a little bit and Patrick, jump up and show just the difference in the view already. We've got a much much better view for those remote participants, and especially right now in the world today, where we have 50% of the workforce participating this way, it is so important that they have a good experience otherwise

productivity is going to drop, and just with a few small changes, we can help encourage that. So I'm going to do one other thing really quick here, we have addressed the camera. We've addressed the layout of the table here. We also need to make sure the audio is good. We've all been victims of a bad conference call audio experience.

And so we're going to turn on the microphone pickup pattern for this rally bar to see how we're doing. And if we look, the first six seats, so about the first two thirds of this table are within that pickup pattern. But these back three participants are likely not going to be picked up as well so we need to augment that microphone just a little bit. So we'll add in a second product this is another product from Logitech. This is the rally bar, or the, I'm sorry, the rally mic pod. And just like we did with the other microphones we can demonstrate the pickup pattern for this one. And we'll see very quickly. All right, great. We've now picked up everybody else in the room.

But perhaps now somebody, one of the stakeholders says yes that's great but we've got such a clean design now do we really want this on the table, do we have any other options. And this is again where Modus is a wonderful type of Whiteboard tool. So we can very quickly try putting this up on the ceiling to see if that pickup pattern works, and as we can tell, it sure does. It ranges enough to grab people, even when it's mounted up on the ceiling. And I'll even change it to its graphite color to help it blend in a little bit better. And just through a quick demonstration there were able to show how, just a few minor changes to this room can update it to become more post pandemic where we have a hybrid workforce, we want to make sure that people in the room and people on the call remotely are all having a good high quality experience so we can keep that productivity, nice and high.

And so again as we talked about our at once we can see things we need to be able to encourage discussion and collaboration. When you can bring this type of tool in early on in the process and get those stakeholders together, We can save everybody's time because we can work through these problems in one meeting, instead of presenting a possible solution, getting feedback and questions, and then going back to the drawing board for a week trying to reconvene and align all those schedules.

Instead, you can just do it all at once and that's the power of these newer tools that are coming out, Michael, do you have any comments or questions you'd like us to cover here?

**MO:** Well, you know, just wanted to point out in terms of the collaboration side of things you know I'm in this VR and I'm, you know, basically, working, working as an observer but also as somebody that can ask those questions like say well look, can we have that microphone on the ceiling instead of the floor and you can show that in real time.



And the other piece is like we're very physically distant right. I mean Patrick's in Washington state you're in Utah, and I'm in Boston, and basically we're in the same immersive space together, interacting. And I will say, while the people on the webinar can't necessarily see it, and if you've had this experience with the gaming in VR, you do really immerse yourself in it you get a sense of what the space is like you get a sense of what it, what it's going to be like to move around the table how much space there is between the TV and the table.

**KB:** If I'm moving around if I'm presenting all of these elements become really obvious, I mean like, you know, intuitive, in the sense that I really can put myself in any seat, you know on the table and see what the view is going to be like, you know, from that location is the TV big enough, maybe we need a bigger TV right maybe we need to TV so all of that is stuff that let's, let's add a second. And here's, here's a fun one. You know, a lot of touchscreens are becoming a pretty common thing in these conference rooms and so when you're sort of physically in the space you know we're not really but it feels like we are, then we can start to get a feel for okay is this an appropriate height for me to do a touch screen is this cabinet going to be in the way is it too deep, do we need to get rid of it.

Once I'm here I am blocking the view of the camera, all those types of things are such powerful things that you just intuitively understand by nature of being there in space.

Alright so, to leave some time for Q&A, I'll turn it back to you guys.

**AF:** Yeah, Mike is still on mute from his eyes. There we go. migration from a VR, almost all the way through this without, without the, you know, you're muted.

**MO:** So thanks thanks Kevin Patrick for that that demo I mean, you know, and I think that it's somewhat hard to convey and and one of the things that that most, you guys are really good at is can is doing this over zoom so people really can get a feel of what it's like but there's nothing like the experience of doing it in VR and VR hardware so the platform like this where you are, rendering in real time you're interacting in real time.

It isn't just the headset we're working with a gaming PC but it's not a particularly high end one is the \$1500 dollar gaming PC basically just purchased on Amazon, and you know got it hooked up an Oculus quest to which the \$300 consumer VR headset.

The kids love it because they can play games on it without the computer but you can use it for work too. And it's it's a fantastic to see this technology, and it's evolving so quickly so you know the wrap up for today I know we only have a few minutes so we'll give some time for Q&A is really you know this is all food for thought, you know, we've already said we're not experts in architectural visualization workflows, but we think that there's something here which every design firm.

Every architecture firm is going to, you know, be involved in at some point in the near future because this hardware, whatever is in that gaming PC will be in the headset within the next 18 or 24 months, you're going to start to be able to have these experiences, and we recommend that as designers if you're an interior designer as an architect or or whatever to to investigate and look into these things you don't have to learn the software, just learn about what it's doing how it's interacting, there'll be a new generation of people entering into the workforce that have a lot more knowledge and and sort of sappiness with this technology and leverage.

You know those people, is I think it's it's going to be a really interesting you know kind of world in the next year or two, particularly as a lot of these activities have gone virtual and will continue to be very hybrid so hopefully people have learned stuff and Adam, we can just dive into the Q&A.

## **Q&A**

**AF:** Yeah. So thank you again to Ken and Patrick. That was awesome. And I'm going to give them a quick plug.

This was a snapshot of how interesting and great this technology is but please go to motors VR calm To find out more about their technology including, in this case a much more Modus focused webinar on May, 20. And then as well if you were someone who did join a little bit a little bit later and you missed any parts of our presentation, or have any colleagues or friends who would be interested in the event.

Stay tuned. We'll be emailing you the event video and the full transcript as well as any and all of the questions we touched on today. So, the first question that comes from the audience.

I know Ken was able to touch on it a bit with how Modus but I'll turn it over to Mike and Aaron, but how do you involve the customer in the process of space creation or space design and then how are you validating with your customers of their specific needs and making sure that the space serves their needs, their wishes?

**MO:** I mean, I'll get my sort of two cents on in there and you can jump in, I mean I think that's how you're involving the customer into this process is very much up to you I mean we've been investigating this in terms of lighting control for instance, and how can we give people a sense of what's the value of paying money for good lighting control or even good lighting so we're a catcher dealer, that's a much more expensive fixture than an everyday recessed.

What's the value? What's the benefit? And if we have showrooms we can show that, and even pre-pandemic It was a struggle to get people to go to those places so being able to show these things

virtually either over a Zoom call, or, you know, in VR and that's that's a little bit, it's a, it's one step a little bit further removed I can't just ship a VR headset to somebody, and then jump into motorists but there is, you know, it's very much on the cusp that, you know, will be able to be doing, doing that type of a design process.

Aaron, anything else to add there?

**AS:** Yeah, I think, you know, we start from a place of collaboration as early as possible and getting to know our clients so whenever we're brought in that early and we have that type of connection. It's always easier for us to figure out how best to approach the designs that we work on for our smart systems or smartphones or even commercial spaces. So technology aside, that type of, you know, constant and direct communication is key. It's much easier to do when we're not working through a third party.

And then from there, it's really just a matter of what the particular specifics of the project or the challenge require it changes from project to project, in many cases, especially since the pandemic began. We've had no choice but to do a lot of this work virtually. So, whether we want to or not, virtual you know solutions, or sometimes there are only options.

**AF:** Well then, I'll hand it over to Ken as well I mean in the last part of that question is like, you know, how do you validate with your customers I mean it seems like Modus as a platform is basically the whole thing is validating with customers right I mean the whole point is that you're able to demonstrate and validate very quickly on the spot in this sort of environment that they've got the right hardware or not.

**KB:** Yeah well and it's interesting because validation itself kind of implies a slightly different flow where it's like, All right, I'm going to put together this idea and then I'm going to validate it against what you're asking for, but in many cases it's not that cut and dry, right the clients like well I've got this open space What do I do with it? And so if you are in more of a legacy model where it's like okay I've got to put together options, A, B and C, and you're kind of stabbing in the dark a little bit.

That's a challenge, but if it is more of that whiteboard experience and you can say well hey what if we tossed in a partial wall here to divide the space. Or what if we used a piece of furniture here to encourage flow. I'll use a personal anecdote we use at Modus, when we went to finish my basement, as you might imagine, and we had this big open space, and my wife and I, ironically were completely unable to visualize how we wanted to do it.

But once we started kind of just dorking around in Modus we stumbled on the perfect solution for us, and there's no way someone who could have just said hey we think you should do this and we would have said yep, that's it. It was a completely different way of solving the problem.

**AF:** That's great. Another question for you Ken actually. In this case, when demonstrating you were highlighting being able to show the range microphones that can be picked up on or other, like the table. Can this be used with any products or is there a set list of products that are already created?

**KB:** Yeah, a little bit of both. So, the Modus library is populated by our team. Whatever products are in there are driven by customer requests, so if there's a particular product or manufacturer we haven't worked with yet. Our customers say hey can you do that and we go make it happen. And we also rely quite a bit on generic products. So when we showed the camera field of view, for example, we also have a generic camera that lets you enter your own specs for that camera so that way if you've got a particular product that we don't have in the library. Oftentimes you can just enter the information you care about and it'll work just as well in the motor system.

**AF:** Awesome. Thank you. And this one really goes to Mike as the kind of driver behind a lot of these technologies. What kind of computing hardware is required for your work with Twinmotion or, I know you were able to speak on the modus work but how about Twinmotion?

**MO:** So actually, it's remarkably pretty straightforward hardware so the Twinmotion video that I recorded was done on the same PCI, we used for the motors demo, as well. It's using an AMD RYZEN 5, not a particularly high end process or there's plenty more expensive stuff out there that uses it's G-force RTX 3060 graphics card which is the new relatively new car that was released last year but it's the one of the lowest then versions of that. So the PC though, was playing with 1500 dollars and Twinmotion actually runs on Mac as well.

And, you know, which I know some designers and architects will be using on a day to day basis, and it runs fine. You know, sometimes you're not getting the frame rates if you don't have a dedicated graphics card but when I first started to learn Twinmotion. I was doing it on, on a MacBook Pro 15 inch, you know with pretty standard specs and when it comes to rendering the output it renders the exact same output it meant just not be as fluid as you're walking through, and particularly if you're doing things like wanting to walk through on VR, you know you want higher end hardware but like I said, you know, the combination of hardware talking about using today is about \$2,000 and compared to two or three years ago, when people were doing custom VR rigs 4 or 5, \$6,000 just to get the hardware, it's radically different. And that's, extrapolate forward a couple years, and it will be literally in the headset itself and that will be, you know, a completely different experience as well.

**AF:** Awesome. Thank you. So our last two questions for today. The first one, Matterport actually has an app where you can use your phone to record spaces. How does this really differ from the Reiko camera that we mentioned earlier?

**MO:** Um, I'll take that one just because I've done a lot of matter port captures with this camera it's about speed, in the sense that an iPhone is only going to have a very sort of small field of view and you essentially rotate the camera to capture the 360 and it will do the similar to like a panorama where it sort of stitches it all together with the right goes you're able to put it in one spot capture, put it to the next button capture and you don't have to tell it were in the room, it is matter for us uses a system called cortex AI, where it basically will figure out where the next camera frame is as long as it's close enough that a lot of the same elements are in it, then it figures out the physical dimensions, so you can actually take a camera like this and create a floor plan, without actually having to do a single measurement and of course it's not going to be dimensionally accurate to be able to order things but to order a rug or to order a sofa.

I mean, those types of things that can absolutely do you know off of the metaphor process so great and really just to tie up our entire time together.

**AF:** How would Twinmotion and Modus VR work in cohesion, with each other? Do you find that using two or more of these programs with clients is more effective than just one.

**MO:** Well I can, I can talk a little bit about the Twinmotion side and our perception of motors and then maybe hand it to you Ken. I mean I know they're both in some ways based on the same engine but sort of in different parts of it and I, one of the places where we are currently in the technology is that the tools are optimized for what they're doing. So Modus is optimized for the collaborative experience when Twinmotion is optimized for the real time rendering experience and really focus more on materials and details and you know things even things like vegetation which you know the library is an extensive but they're adding more I mean one of the things that unreal has done is really they bought up companies like there's this company called Quick soul that does mega scan so they call their scans of textures of rocks and and a physical objects that you can literally sort of throw in there, vegetation is a little bit more complicated because it grows and all that stuff we were talking about. So that's kind of when Twinmotion focus and Modus's focus is a little bit different but you know I think there is a point where these tools do start to converge. Ken, what's your view on it?

**KB:** Yeah, I mean from a technical standpoint, they've, they've got a lot of the same DNA from a workflow standpoint and the problems are hoping to solve I think that's where they diverged more, and there's definitely room for them to work together, right so when when you were showing Twinmotion, a lot of it was more of a macro perspective. Right, let's show this entire space let's see what it's like at night or under weather.

Whereas Modus says hey let's let's dig in deep into this room and figure out some nitty gritty problems that the clients going to want to be very hands on with right let's let's see if there's enough space between this entry way and we're the biggest chair is, you know, that type of thing. And so I think there's a lot of room for

them to work together where you have these deeper dive sessions and Modus, and then perhaps when it's time to present to a larger audience wants a lot of the decisions have been made, that's when you can bring in that higher fidelity render that someone like Twinmotion can provide.

**AF:** Awesome. Well, again, I want to thank both Ken and Patrick from Modus VR for joining us today and thank you for everybody who was able to take time out of their weeks.

I'm sure that you are all just as busy as we have been during this pandemic. So thank you again for attending. As we mentioned previously, keep an eye out will be following up soon with a digital version of this that you can be able to download, share, be able to see those more high resolution versions of the various vendors that we were doing, without the zoom effect or anything like that. But if you do have any other questions or have any other comments feel free to reach out to us.

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