



ROBOTS, ROCKETS & NASA! THE NEW FRONTIER OF VR & AR – FIELD OF VIEW WITH MARCO TEMPEST – S1E1

VIDEO TRANSCRIPT

SPEAKER: Brought to you by Accenture Extended Reality. This is Field of View.

DANIEL COLAIANNI: Yeah, welcome everyone to Field of View. This is the first in a series of podcasts that the Academy of International Extended Reality are doing. I am very privileged to be doing this in partnership with Accenture and the wonderful co-host of mine, Nicola Rosa.

NICK ROSA: Hi, Daniel. How you doing? Thanks everyone for connecting, downloading and tuning in to Field of View. We are going to explore all the different use cases and parts of this amazing business and amazing world that is extended reality. In the next few episodes, we're going to see all the different technologies and the people that are behind the most innovative use cases for consumers, for enterprise. And today, I think that we have a very special guest that is going to talk about some of the work that has been doing in Accenture with me. I had the privilege of working with our guest for the last couple of years, but also the stuff that has been doing for NASA at the Jet Propulsion Laboratory in Pasadena.

So we have today with us, Marco Tempest. Hi, Marco.

MARCO TEMPEST: Hey, how are you doing? Thanks for having me on the show. I'm delighted.

NICK ROSA: Absolutely, pleasure, pleasure. Would you like to introduce yourself a little bit?

MARCO TEMPEST: Sure. So my name – and you already heard. My name is Marco Tempest. I work with augmented and virtual reality, gestural sensing, robotics, augmented intelligence, to create experiences that are clear, memorable and seemingly impossible. And the impossibility is a really important part of this. So before I moved into technology, I actually worked as a professional magician. And in magic, inventing the impossible is actually the starting point or a position of hope. It's where we all start every day creating new things. So these days, as Nick already mentioned, I'm a Directors Fellow at the MIT Media Lab and I work as a Creative Technologist at NASA's Jet Propulsion Laboratory. And most importantly, I'm running a studio for extended reality in Zurich Switzerland for Accenture, where we do incubation and innovation in this exciting new field.

NICK ROSA: And, Marco, you've been doing some amazing stuff recently related to communication and the networking. Daniel, do you know what Marco's been doing in terms of our virtual communication?

DANIEL COLAIANNI: I have seen some snippets of this and it's not just me or you guys talking about this. I've had multiple people come up to me recently and actually asking me about this kind of stuff. So it's really exciting, Marco, and I'm really excited to actually see you guys be kind of pushing this kind of stuff out as well.



MARCO TEMPEST: ICP is a tool which we are using internally at Accenture where we are hit by the crisis like everybody else and we can no longer use our physical location. So we created these virtual pieces of infrastructure, which are actually digital twins of our real world that we call them best-in-class locations where we do innovation and incubation. So it's labs and studios all around the world and we use these virtual spaces to bring our clients to virtual workshops. We do our orals, our pitches right now in virtual reality and we use Synapse also to onboard people, to bring people onboard and show them around. We call this the Innovation Traveler Architecture. And some of the unique features are that you can join like you would join a Zoom call or a Webex or a Teams call. And you can, as a group, teleport from location to location. So you could start in our Zurich studio and look around and look at some PowerPoints, then you can zap out into the Swiss Alps into a design thinking workshop while the birds are above you and you see a beautiful mountain lake. Then you can go to the South of France to Sofia Antipolis where you'll learn about the latest in extended reality, haptics and all the wonderful new technologies which are coming online as these kind of different pieces of technology start to converge.

And so this has been super successful for our internal tool and now, we're getting a lot of attention from our clients who want to use this as a kind of starting point, as an accelerator for their own bespoke solutions. And there we have this whole plethora of new things which companies need to do from virtual showrooming for showing their products, creating virtual fairs, virtual events.

These are kind of the usual suspects. But then it goes into the control room of the future. How would it be if you can be in virtual reality and receive telemetry or from inside VR influence the real world or bring the real world into VR. So there are some of these advanced concepts which are now piloted in large scale pilots by some of our clients.

NICK ROSA: And the true differentiator for this tool that you created and I've seen a lot of collaboration platforms all around. It's basically a framework that defines the best-in-class user experience for VR. I think that this is the true differentiator of what you're doing. How important is to design with the user in mind while you're doing this kind of experience? Can you take us through a little bit of a process, the creative process and the design process behind the Synapse?

MARCO TEMPEST: So you touched on user experience and that really is kind of the guiding principle. Talking from my background in magic, we talk about the effect an illusion has on the audience. In technology, we talk about user experience. But essentially, it's the same thing. It's that delightful experience you can give to a user where he's equally guided maybe down a narrow path, with narrow options which are pre-selected for mostly light. And so, in virtual reality, where you have to imagine a lot of the users they are first-time users and their very first touch point with this new tech is going define if they love it or hate it for the rest of their life. So having very simple controls which are super intuitive, having a very fluid frictionless experience is one of the guiding principles I would say when creating these kind of experiences.

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And that's something which in the end looks simple and elegant, but that's where also a lot of work goes into. I would say that probably and while XR is a kind of engineering heavy field, I think a lot of the problems we currently have with extended reality are not engineering problems. They are literally liberal arts or design problems. They're all about user experience and design and delight.

DANIEL COLAIANNI: I think you've touched on some really good points there and I think – Marco, you got to tell me if this is true or not because I heard this really crazy story that I think it was like in 1988, I think I heard that you wrote a letter to Steve Jobs. What is this story? Tell me this story? I need to know about this.

MARCO TEMPEST: This is one of the most amazing things which happened to me when I was young and kind of set me on that trajectory which led me to where I am right now. So when Steve left Apple, he founded this company, was called NeXT Computers. And they made this incredibly beautiful computer like a magnesium cube, a black cube, and the premise of that computer was that it would be the next wave of computing. It had like a dictionary in it like Google built in. This was way before we all had internet access. And I wrote a letter to NeXT Computer saying, if I had this computer, I could do the next wave of magic. I could do what you guys are doing in computing and maybe we could collaborate or I could help you with your product launch events.

And sure enough, about six weeks after I wrote the letter, some really big boxes arrived at my house and with a with a letter, which said this is what you asked for and we would love to have you at our European launch event in Lucerne Switzerland in two months from now. And that kind of put me on that trajectory of working with interactive technology. And I must say when I got the computer, it didn't do anything I imagined it would do. I sort of play video and do all the things we expect from computers these days but, as a matter of fact, it was a magical machine. It had like object-oriented programming on it and like a beautiful user interface, but it did not exactly do what I wanted it to do. But I very quickly found out that you can use technology and you can augment it with a little bit of magic or a little bit of showmanship or what we would call user experience and make it do something which is unexpected and which an audience will not believe the technology can do yet.

So I was like fingerpainting on the screen pretending to have a touchscreen. I stuck my hand into the screen and it would appear on the screen. I pulled things out. Of course, this was all pre-recorded video playing from a VCR backstage, not really done by the NeXT Computer, but it gave this simulation of a future, which I think sometimes is really important to have this this touch point with the technology before you go further to see if this is something you truly want, if this is something that people would accept and interact with it in a way which is useful for them.

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So I find myself now like 30 plus years later at Accenture doing essentially the same work, taking existing technology and making it do something which might be unexpected at the very moment, but that unexpected test or what we call like an incubation or a pilot or a prototype, will inform our clients if that is something they truly want and if it's truly useful. And so, the quicker you have these cycles, the further you can go, right. So that magician field tests a new trick every day in front of a new audience and there's these very quick iteration cycles. And I think that's a very good model to think about when you're creating these kind of prototypes or these new user experiences which sometimes only exists in our head before we do these prototypes.

NICK ROSA: And you have one of the most successful Ted Talks in history. I mean how many viewers your Ted Talk had to date?

MARCO TEMPEST: Well, thank you.

NICK ROSA: So it's time to show off a little bit. Come on.

MARCO TEMPEST: Okay, so, again, I was just really super fortunate to have kind of found my audience. You could say like 10 years ago, it was kind of odd to have somebody using video screen and projection mapping and AR and VR gear on stage. And at this point, I have like 7 Ted Talks online and some of them are using projection mapping, some use swarms of drones flying around. And I don't know, like there's probably tens of millions of viewers. But I would say like I don't see this as an accomplishment so much as an amazing opportunity, which just came to me, that there was this platform which fit so well what I was doing and that I found my place in that.

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DANIEL COLAIANNI: Yeah, I was like –

NICK ROSA: Sorry, I'm go on.

DANIEL COLAIANNI: You go first, Nick, it's fine. No, no, no, I was just saying that I had the privilege to see your studio in Zurich and it's such a toy shop you have no idea, Daniel. I mean every little corner has a drone or has a full body haptic suit for VR, you can find small robots on two wheels going around and greeting you when you get into the studio. It's incredible the way that Marco is able to mix and match this technology together to create something completely new and different.

Sorry, Daniel, you wanted –

DANIEL COLAIANNI: No way, now you've got me in my mind is spinning. I'm like I'm just imagining like Batman's cave with like all of these fantastic toys in there like - I don't know, Marco, now we know the reason why you got involved in this, right. It wasn't to further the immersive industry and all the crazy stuff. It's just so you could play with some toys.

MARCO TEMPEST: Absolutely. And I think a lot of these things and when you say like that it's a rich like array of different things in the studio. A lot of these things do not naturally overlap or converge, but they will and if you put them close enough together and you have a team and you run a team or run is maybe a wrong word, but there's a culture in your team where everybody can contribute ideas, where you have some sort of an open door policy where every voice can be heard and everybody can play to their desires and their curiosity with these things, then new things will emerge. Like there will be things which we might have not seen as belonging together a little while ago, but very soon they will be totally together like what some examples will be, what we've been doing with chatbots. They will manifest themselves in augmented and virtual reality. We will have these digital humans which interact with us in a way which might be creepy, it might be super delightful and in some parts will be extremely useful.



So I find myself now like 30 plus years later at Accenture doing essentially the same work, taking existing technology and making it do something which might be unexpected at the very moment, but that unexpected test or what we call like an incubation or a pilot or a prototype, will inform our clients if that is something they truly want and if it's truly useful. And so, the quicker you have these cycles, the further you can go, right. So that magician field tests a new trick every day in front of a new audience and there's these very quick iteration cycles. And I think that's a very good model to think about when you're creating these kind of prototypes or these new user experiences which sometimes only exists in our head before we do these prototypes.

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And when we think about robotics and augmented or virtual reality like augmented reality can make us understand how robots talk to each other, it might provide a way for us to talk to robots. If we think about VR, we can build robots and simulate them in virtual reality. There's a project at the Jet Propulsion Laboratory where the Mars Rover is sending pictures from Mars into a cloud process. And these pictures, thousands of pictures get stitched together into a topological map. And now, literally every day before breakfast, the team of scientists can meet on Mars wearing a HoloLens, an unimaginable solution which would not be possible without virtual reality or augmented reality, but would also not be possible without thinking about some of these things which can be put together in new and unexpected ways.

DANIEL COLAIANNI: So, Marco, how does somebody get involved in something like this? I mean we were talking about the Mars Rover here and kind of the Jet Propulsion Lab and using all this technology. I mean I'm sure there's people watching this and then listening to this right now wondering, wow, I want to be just like this guy.

MARCO TEMPEST: So if we talk about - if this is a question about careers, then I would say you know kind of my philosophy there is find what you're good at and do it with passion and be open to what comes from it. So I don't believe that people should plan exactly where they want to go. Like at the Media Lab, there's this idea of compass versus destination that you might not need to know exactly where you want to go, but you need to know kind of the basic direction and then you need to be open for serendipity and good things.

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So I was super fortunate that I was invited to do a talk at JPL and that led to some of the groups that wanted to meet with me and kind of you could say we hit it off really well, kind of some of the stuff I did for simulating kind of future technologies overlaps or converges really well with what NASA needs to do when they think about future mission concepts or kind of future concepts of operations. How will we interact if we have 100 robots on the moon looking for water, right, kind of like how will that dashboard look like? Like is that going to be a delightful experience? Is that going to be a very technical experience?

So I was super lucky and I have to say it's like I'm three years in there and I have impostor syndrome every day. We're kind of meeting the people which work there which are some of the most brilliant people in their fields. And so, I guess it's a lot of luck and kind of I don't know, maybe believing in yourself a little bit, but not too much and being nice, right. So that would be kind of my career advice.

NICK ROSA: And what you say is super important especially in an environment that is dominated by technology and innovation. I mean being able to be fluid in the way that you're planning your career and in the way that you're applying your talent to what you're doing is extremely important because otherwise you can get too narrow and in the end, go to a dead end or you can be too broad and at the end of the day, not be relevant for what you're doing. And as you said, I mean the passion is infectious and can be the true differentiator for what you're doing in your career.

MARCO TEMPEST: Absolutely and that also speaks to the culture we have at Accenture, right, where to be able to have a passionate team and to have a team or everyone - repeating myself a little bit - where everybody has a voice, where we have experts in their fields, but we can switch roles and be a little bit anti-disciplinary or interdisciplinary, so to speak, and if you have too many people in your team which have a clear goal, then you cannot have this innovation happening.



You need a good balance of unguided research and then true pragmatism to identify the solutions and decide where do we take the next step or where is it worth to take another step. And so, I think Accenture within their innovation architecture or what's happening within Accenture in that regards is absolutely amazing. I'm in a company of like about 500,900 people and there's like probably like a billion dollars or so a year which goes into R&D and ventures. And that really shows like the level of expertise is super high, but also the level of innovation and combined with that pragmatism of picking the right solutions for our clients.

DANIEL COLAIANNI: Well, you know, I mean part of this kind of touches, I think, on I think as part of the academy, we did some projects where we actually went into schools and we went in with universities and colleges and we interacted with students aged between 16 to 18, who, to be honest with you, hadn't really had much experience with immersive technology or the technology in itself. And I found it particularly fascinating because we worked with students who were fashion students. So we're not talking about computer science students or tech students, they're fashion students. And we told them at the start of this thing when they came in and we were like, okay, so how do you see your future, your career, your thing with immersive technology, like virtual reality and augmented reality? And not a single one of them could really think about that or they not understand how that could interact with them. And then, by the end of that particular day that we'd spent with these students, every single one of them came back to us and was like, oh, I can see I'm using it for this now. I want to do with this and I think that's an interesting subject when we talk about not having a fixed kind of particular path or to encourage innovation.

I think if young people and people like want to get involved in this industry and technology can understand that we're still kind of writing the rule books a little bit and we're testing what's working, what's going to be exciting and stuff and I think that opens doors for many people as well.

MARCO TEMPEST: That really speaks to like – like you build a team with people with different backgrounds, different skills, it's as much as diverse as possible and then you end up with something which doesn't resemble group sync. You come up with something which is to use way too much use the terms like outside of the box. It's like something new and that comes from like a culture where people can bring themselves in and be themselves and be super diverse in skill sets and opinions and everything that comes with that.

NICK ROSA: I have a million dollar question now for you. What do you see as the biggest hurdle that immersive technology has as to overcoming or that you become mainstream right now? What needs to happen to this industry to become mainstream for real?

MARCO TEMPEST: There are different things which kind of like, oddly enough, in this very hard and difficult time kind of start to fall in place. And we have a little higher adoption right now because companies are struggling with not having physical spaces they can bring their customers in or where they can collaborate with each other. So there is a quicker adoption into VR than anybody had expected. It's also that the hardware is catching up. There's some beautiful devices out, like the HoloLens 2 or the Oculus Quest and like there's some smaller companies which have amazing devices as well. There's a lot of platforms which are coming online, which are kind of are about to reach maturity.



So if you want to deploy VR or AR at scale, that's more and more possible and doesn't need so much glue to put all these things together. So I think a lot of these kind of hurdles are put out of the way, so to speak. I also think that we have not quite yet reached the killer app. Kind of when I described onsite that system where people walk around on Mars, that's a killer app, right, that's we cannot do that with anything else. So I think we need a handful of those to kind of - and I think they will come out as at least in enterprise we have some of those. They're clearly identified like connected worker is an amazing topic where you can have kind of a rookie out in the field and in these classes like an experienced person who is semi-retired helps him out or you have like self-guided learning, immersive learning, which is like Nicola's field of expertise like where you can - like you can learn something in such a condensed way like it's almost your - it's like a time machine which condenses time and transports you wherever you need and you have much higher knowledge retention, virtual merchandising, like pre-sales and post-sales, like there's some interesting things. I think these control rooms of the future, they start coming up like you can just like create a control room around yourself and interact with physical infrastructure.

On the consumer side, it's slowly emerging. We have like close quest like if you play Beat Saber, you get it, right. It's like this is cool. This is going - it's here to stay.

So I don't think there's so many - so the million dollar question is like I think it's happening. We thought that 2020 would be the year of extended reality. I think 2021 will be the big year, the really big year and it will be also the year of convergence. So for me that specifically for me, I'm super enthusiastic about robots. So I think there's going to be a really big thing with robots and XR, where there's going to be amazing applications. So I'm super optimistic.

DANIEL COLAIANNI: Marco, do you still live with your Robot EDI.

MARCO TEMPEST: Oh, EDI, yeah so, I mean the company who made it kind of went out of business, so to speak, so it's no longer supported. I'm super interested in drones, like because they pose different problems like - so you have it's kind of this multi-agent, like how do robots work together, like how would a swarm of drones do an inspection of a disaster site or like do power line inspection and then how do you put the human in the loop, these kind of future concepts of operation. They're super interesting. How do we make sense of robots? It's like a robot if he runs out of batteries, is he going slowly fall over kind of or look tired or like kind of what are the modalities there? Like what do we think is acceptable or cool or like what makes us interact with robots and how do we have robots which are not looking like we do enter our spaces and still feel comfortable with that? And so, I think like some of these mixed reality or blended reality applications, like using projection or they have projection and they show where they go or what their range is or whether they think it's safe or not. Like super interesting topic. So robotics is very close to my heart.

NICK ROSA: One of the things that I was exploring and you remember that we talked about this from famous Project Ghost was to use lidars connected to a swarm or robot dogs to create mapping inside indoor environments and being able to doing remote inspection in these 3D scanned environments. And another project, very exciting one, that we've been doing for a very famous movie production company, which is called Scout in a Box, that's basically it's a project that we deployed in U.S. to take aerial pictures of shooting locations and create digital twin of the shooting locations. So that the directors could inspect the movie location even before - even without going there physically and start placing the cameras, the lights, start imagining and pre-visualizing the scene how it's going be - I mean there are so many use cases that can be applied to utilizing robotics, utilizing drones, is fascinating. And, of course, convergence between VR, robotics and machine learning all together will enable even more use cases in the future.



MARCO TEMPEST: Yeah, I think there's going to be a real need for machine learning and AI talent in the XR field. I kind of like so much goes into that direction when you're talking about robot dogs walking around and mapping environments and creating useful maps. That's all in that in that corner. I think there's going to be kind of a democratization of the quadruped pet field. I would imagine the same thing is going to happen like happened to drones, where like they just going get cheaper and cheaper and the companies which will win that, will be the companies who have the best software which can do autonomy or clever teach and repeat behaviors where humans are properly avoided and not heard and be compliant when they interact in our spaces. And then, the whole map creation kind of like could a robot go out, do a survey and then, we can use this map and immediately go in there and make sense of it and see if something is broken and it needs to be fixed and so on.

These are super interesting topics. They're incredible engineering challenges and they're also incredible user experience challenge.

NICK ROSA: You're working at JPL and I'm pretty sure that you're very familiar with all the robots that are used on Mars, but also the robots that they're designing right now to do the mapping of the Mars surface for future colonies or potentially to build, construct structure on the surface of Mars and the moon because, of course, building it with the robots is way easier than doing it with humans. Are you interacting in anyway with those kind of projects? Can you tell us a little bit what you're doing there at JPL related to Mars colonies and lunar colonies and so?

DANIEL COLAIANNI: I mean I know you already touched on, I guess, the HoloLens stuff as well and things like that, but it's exciting to see, I guess, the difference that they have between utilizing virtual reality and augmented reality as well.

MARCO TEMPEST: Some of the ongoing efforts are like so there's a tool at JPL, which is used for spacecraft assembly. It's incredibly useful. So some of these parts of these spacecrafts arrive very late in the process on a very tight timeline and putting the part in the right way and making sure it fits in the assembly process is incredibly useful.

So there's a HoloLens application where people collaboratively can look at spacecraft parts and kind of put them together and see how they fit and, again, another like incredible application. There's also applications in what I touched on like future concepts of operation kind of. So where is the human in the loop in some of these autonomous spacecraft? In Mars 2020, which is flying this year, is going to have a little helicopter under it's –

DANIEL COLAIANNI: Oh, wow. I find it fascinating because throughout history and especially it's so evident in the stuff that we do with immersive tech because when we look at all of this stuff. All the things that NASA is doing for all of this kind of vision mapping and economic vision learning and kind of stuff for all of this stuff gets reapplied straight back into these consumer headsets and these consumer devices and things that people are buying. And I guess if we look back at some of the earliest hardware when it comes to VR and that stuff's being used by the military, by NASA and now, I guess, all of this stuff that we're talking about here being applied in JPL is being applied to consumers at a kind of a later date as well.

MARCO TEMPEST: I mean if we think about kind of the type of computer vision or machine learning, which is in a in a \$400 headset like the Oculus Quest. That this is mind-boggling like kind of like as an upgrade, they gave us hand tracking. It's like an Androids –

NICK ROSA: It feels like a device from the future.



MARCO TEMPEST: Somewhat like in there and like in like a compute budget which is like this and they give us hand tracking which is useful. It's like it's unbelievable. I think some of the companies who do these, especially in the hardware field, they have attracted like the most incredible talent in the world, like the teams at Facebook or Microsoft doing these kind of gadgets for us. They're remarkable.

NICK ROSA: Marco, I know that you have some very interesting insider view in all of those companies and lucky you probably seen all the devices that are going to come out through NASA and through all the other companies in the next three four years. Can you give us, without spoiling too much and without getting in trouble, what is from your point of view, the technology that is really going to change the way that we're experiencing immersive? Is it going to be 5G? Is it going to be a full world of spatial mapping, like a sort of an AR cloud? What is it going to be from your point of view, a better user experience and interaction with ions?

MARCO TEMPEST: So for me, probably the hit list is kind of like and I'm not sure what the order is of these things appearing, but I think 5G will be super interesting for teleoperation of things, like you can fly a drone in the real world from a virtual environment or you can do remote rendering like Google is doing with Studio if you can have that on a headset. Like can you imagine how that's going to be if you have like super graphics computer power on a mobile device because it's just streaming it through the cloud. So 5G is a really big thing, I think. I think also see-through headsets, like there's a handful of them now which have super high quality RGB cameras. So you see the outside and things. And so, it's kind of local transparency on the pixel, so to speak. So it's no longer holograms. It's like real rendered content which looks like it's situated in the real world. That's fantastic.

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I think eye-tracking like eye-tracking will make a big leap. You're going to have devices which don't use optical cameras to track your eyes. So we think there's some startups which work with things which can track your micro circade, so you can do predictive eye-tracking. You know where your eye is going to go next and it's super precise and super high frame rate. And that will enable devices which can do much deeper introspection about their user, kind of like are you tired or you're awake, did you overlook something, all those super magical things as well.

And then, I think devices will just get less expensive. So that's going to be great too. There's going to be more people. There's going to be more in education, more in the consumer space. So all good stuff.

DANIEL COLAIANNI: So, you know, I find it really interesting because I think the topic of 5G always comes up, I guess, and when it comes to immersive. And sometimes, I guess, we're all a bit guilty of using lots of buzzwords and things like that. I mean I know you touched it a little bit though of the ways that you think that 5G will impact this, but what is it about 5G that gets people so excited with immersive at the moment?

MARCO TEMPEST: I think the low latency and then the premise of ubiquity kind of like, so wherever you are, you're going to have low latency access at high bandwidth. And so, the low latency is really, really important because then you can do a lot of the compute you need in the cloud and you can just push that into your headset, right.

So if you can push the pixels fast enough from somewhere else and you're just sending the high level position to the user. Basically, you send a user input, there's some sort of deterministic, super clever step logic thing in the cloud which sends the pixels back to you in milliseconds, then you can have any level of fidelity you like on pretty much any device. And that's what we saw in the movies, right. That's what we were promised. So then we're going to get that.



NICK ROSA: One of the things that's also I'm very interested about in the space of XR, it's the input methods methods that are used to interact with XR experiences. In many early XR experiences, there was an overflow of virtual keyboards and simulation of normal 2D computer interfaces or even tablets in XR. While more and more designers and the creative technologies like you, Marco, are defining these new guidelines of interaction with physical space like having digital buttons or eventually doing audio cues or eventually using the natural language processing to have a normal dialogue that flows from the user to the VR experience and vice versa or having real hand tracking in the in the VR headsets. What from your point of view are the, I don't know, three major design rules that anyone should follow when creating an immersive experience? I mean I know there are hundreds probably, but for you, what are your top three right now?

MARCO TEMPEST: So for me, the user delight is like the top kind of - that's on top of the pyramid for every decision, right, kind of like if you cannot - like if there's friction, if there's some - you know, you have to strap on something weird or it takes too long to start it up or like anything which provides friction has to be eliminated. I think that's really, really important like in all of these experiences. And I'm not sure if I have any other design rules. I mean it's like kind of like rules have two sides to them kind of like say no friction, but then haptics typically have friction. There's something you have to put on or something you have to sanitize or kind of like so - yeah, I'm not sure I have a proper answer for you, but like certainly, like removing friction is really, really important and having like kind of clarity in your experience. And hopefully, if it's something which is not just for play, like a real reason for it to be in XR, I kind of like. So it makes very little sense to me if you have a screen with a screen and a screen, right, kind of like you play a video. You go into VR to watch a video, like that's a challenging thing to make, to have a good reason to do that kind of so, but there might be a use case. You want to be isolated from the world and watch your movie experience with friends and then it works again. So, yeah, there are no rules, I guess.

But I have one thing maybe like to add to this is like some of these things you cannot just sandbox in your mind, right, you have to get in there. So it's like what we do with our clients a lot is we're actually, we're creating these environments with them, like these virtual twins of their showrooms or whatnot and then we try to get them in there as quickly as possible, before the whole use case is mapped out. Because what happens when people go into VR is they start understanding it, like the all the stuff which sounds abstract when we talk about it, kind of like performance and field of view and this and that. And once you're in there, like the ideas come. So this co-creation process ends of virtual reality inside virtual reality is super meta, is really, really important. Like to get in there as quickly as you can with as many team members as you can, to see how it feels to everybody and to kind of start gathering by collecting these ideas, which only come when you're immersed.

NICK ROSA: And also, because it's important to make everyone understand the possibilities of the technology. I think that virtual reality is suffering a little bit of the Nintendo 3DS syndrome. When Nintendo launched the 3DS, was very difficult for them to market the feature of this new device that was doing 3D images for video games because you cannot advertise a 3D image on a flat screen of like a TV or a magazine when you do the advertising. So how important is seeing in VR to believe, Marco, for you?

DANIEL COLAIANNI: And as a magician, this would be a good one to answer.

MARCO TEMPEST: Well, yeah. I think it's really important to have an experience. But it's also important to have a good experience. You see a crappy industrial demo somewhere, you know, that can ruin it for you. But a lot of the pre-conceptions about the medium, kind of like - so we have some clients that are like, yeah, I wouldn't want to spend more than five minutes inside. It's just going to make me dizzy and we send them a headset to join us in a meeting the next day and then they played Beat Saber all night long, kind of the device that their battery is empty by the time the demo starts and it's like - they were longer than five minutes in there.



So kind of – yeah, so the preconceptions tend to crumble and also the kind of the use case tends to change like where maybe a design thinking session in the real world is like a 90-minute thing or two times 90 minutes or you spent the whole day together. Now you're in VR. You have these ideation boards. You can order your ideas and notes magically appear because we have described some desktops which add the notes for you while you're in virtual reality. And you get this compression of time and the design thinking session now is 10 minutes long and then four teams presenting 90 seconds each and then, you do the second round and then you're done after 20 minutes.

So it's like things just start changing once you explore the new medium.

DANIEL COLAIANNI: I think that's a really interesting comment.

NICK ROSA: So, seeing believing, but also enjoying. Sorry, seeing is believing, but also enjoying is believing. Sorry, Daniel.

DANIEL COLAIANNI: Well, I was just going to say because part of what we do is whenever we get on a phone call with anyone, like particularly anyone, we go through what are their challenges when it comes to the immersive industry because we're very interested as an academy to know what are these areas that people are finding difficult. But particularly, when we speak to content creators and creative agencies and people in the enterprise and marketing sectors, they tell us quite a lot of the time that, okay, so we will be pitching to a client or we will be looking at this these kind of experiences and the client will just be like, yeah, yeah, yeah, okay, yeah. And then the moment they get them into the headset with some of these ideas, that's when the client starts realizing, wow, okay, there's this we can do, there's this. Okay, let's spend some money on this. So I think it's just to echo, I guess, what you are saying, Marco, and I think, Nick, what you're hinting at, I think you know you've got that. Seeing is believing, but give them a good experience, then they're going to believe even harder.

MARCO TEMPEST: Absolutely, but to tip this all over now is kind of like so - in the example, yes, it's a beautiful experience on the Oculus Quest and we send these devices out to our clients and like the client teams with their representatives, they meet and they do all these great things, but then we have whole geographies where like 10,000 people use a laptop to access the platform. And so, the challenge there is to make it equally delightful and it is actually quite delightful. It's fun to move around using just your arrow keys and having these little gestures you can trigger. So people in headsets have full body representation, but we have this little emote menu you just click on it and then, you can wave to somebody and you see yourself waving. And so, yes, full immersion is fantastic, but sometimes to have more than one way to access a platform is also is it's golden.

We have an iPad app where you can pop the whole meeting space into your living room in AR and it's like a little puppet house and you see everybody in there moving around. It's like super fun to use as well. So presence is super magical, but sometimes the pragmatic solution is to have to support more than one platform for sure.

NICK ROSA: Even the accessibility in some way probably because there are some people that maybe are unable, so not only to buy a headset, but also to use a headset. There are some interesting articles about accessibility in VR and how you can make immersive accessible for everybody, even people that have disabilities. So having multiple points of entry to this can help these people also to get a glimpse or an idea of what immersive could be. Sorry, Daniel.



DANIEL COLAIANNI: No, I'm interested to hear that kind of stuff. I mean I was just going to say, Marco, one of the things that I get asked a lot and I'm interested to hear your take on it is this idea of the convergence of VR and AR. This idea is thrown around a lot in terms of the fact that these people speak about the fact that we're only going to have one headset or one device that does it all. I'm interested to hear what your thoughts are. Do you think that there's ever going to be one definitive area of immersive or do you think it's going to converge or do you think that they're going to remain separate in different ways?

MARCO TEMPEST: I think it's extremely use case dependent, right. So like we have immersive - we put like devices with a tiny little screen next to your eye into the immersive field and it's not really all that immersive, but it's super useful and it's appropriate in a work environment where you don't want to have this cognitive overload where you can just put too much onto somebody and then they don't know what's happening around them anymore. But I mean I love these experiences personally, kind of I can deal with a little bit of a larger headset as a trade-off when I can have see-through and not see-through and I can sit on the couch or I can walk around with it.

I think there's not going to be a definitive device, so to speak. I think there's going to be always kind of - and they might get a little closer together. I think people ultimately for AR want something which looks like this, right, or is invisible and there's some startups who work on that like put something in your eye. And for I think we are - like when you're fully immersed, we're probably going to be - there's also going to be conversions with robotics, where robots come a lot closer like things we see in sci-fi where we have like haptics, just in time haptics. You touch something and in the real world there's a robot arm kind of helping you out with touch surfaces and so on.

DANIEL COLAIANNI: So I mean, Marco, I mean looking back at some of the things that you have been doing, I'm really interested. What is some of the - what was your first immersive technology piece of hardware that you tried and, I guess, how is that different from today's technology?

MARCO TEMPEST: Well, I went to a conference in the early 90s, a virtual reality conference on the West Coast in the U.S. And after that, I was hooked for quite a few years. I worked with these like first generation virtual reality headsets. They were like 320 by 240 pixels in each eye, a big magnetic tracker like a polymer sensor on the headset. And we ran on like Pentium 5 computers. We ran a software piece called - I think it was called VRT, a UK company which had a virtual reality software like an engine where you could attach scripts to flat shaded objects. An amazing adventure which mostly took place back in the days in our heads. So the technology was not ready, but we had all these incredible ideas of the things you could do with virtual reality. And now, it's like 20 years or 30 years later, we have all these opportunities. And, literally, sometimes the opportunities kind of outpace the ideas.

We're literally looking for problems we could solve with this technology. Like we're still looking for the killer apps, which I find fascinating.

NICK ROSA: Thank you, Marco. This has been a very enlightening and delightful conversation. It's been a delightful experience. Thank you so much.

MARCO TEMPEST: Well, thank you very much for having me on the show.

DANIEL COLAIANNI: I mean, Marco, just so I know, I mean you've had such an incredible career, you know, spanning over multiple decades, doing fantastic things from magic, JPL, to sign-ups, to all these different areas and what is next for you. I mean it seems like you're not a person to stop here.



MARCO TEMPEST: I'm super excited about my work at Accenture. I think it gives a little bit of meaning to what I do, the same way you could say, you know, working for an organization which does space exploration does. But this other side is kind of like where you're outside of academia and you work in an organization which potentially truly can change the world. Like a company which scales things up which work for everybody and has an internal culture which is so rich and so - there's just so many things right with this company. So I'm very excited about my work there and then, I don't know what's next after that.

DANIEL COLAIANNI: Well, thank you, thank you very much.

NICK ROSA: All right, thank you everybody. Thanks for tuning in. This is Field of View. We remind you that the next episode will be released very, very soon. We're going to have a very special guest. We're going to have the CEO of ILMxLAB that is going to take us through all the latest and greatest related to everything that they're producing in VR for Star Wars and all the Lucasfilm and potentially other properties that are around.

Thank you, Daniel, for hosting this call. And thank you, Marco, for being with us today.

MARCO TEMPEST: Thank you.

DANIEL COLAIANNI: Thank you, Nick, as well. I think the one thing I want to remind everybody watching this and kind of listening to this as well, is the fact that we are really shaping this around the feedback that we get from the community. I think this isn't a news podcast. This isn't a kind of - this is an opportunity for to really get in deep and to delve into some of these innovations that are happening into our really exciting industry. And whether or not you're a student or you are a seasoned professional in this area, I think this is a podcast that we want to be accessible for everyone, that really allows you to understand how you can get more into the technology, how you can make the most out of the technology. And I hope speaking to fantastic people like Marco here and we're able to give you a glimpse into that. So stay tuned for some fantastic episodes coming soon. And, yeah, we look forward to see how that goes.

SPEAKER: Through accessible insights, a solid network of support and recognizing truly outstanding achievements near or far, big or small, we're in this together. AIXR.