

## Michel Reilhac

### Presence Design and Spatial Writing in Virtual Reality

FilmCamp, Målselv/Norway, 11<sup>th</sup> June 2016

MICHEL REILHAC I just want to start by saying that I come from the same world as you. I used to be Head of Cinema at ARTE in France for ten years, commissioning films and co-producing films, so my passion is the same as yours. It just so happened that in the course of what I was doing, I started meeting filmmakers who were exploring new ways of telling stories using all the interactive options that are on offer. I decided to resign from this job about three and a half years ago to go back to doing my own work as a director, and to specifically explore virtual reality, which is what I do now full-time. My presentation is not about convincing you that you have to drop everything and do VR. Let's be clear that it's not about that. It's about looking at it in a very quick overview of why there's a buzz about VR. Why are people talking about VR? What is it, and does it represent a valid option for you to maybe consider in the future to tell some of your stories? You will make that choice. The more I work with VR, the more excited I am about its creative potential. Forgive me if I get a little over enthusiastic, but don't take it as a mission to convince you to drop everything else.

First I want to go over a few facts about where we stand today with VR. It's new, and it really picked up two years ago when Facebook bought Oculus Rift, a start-up begun by Palmer Luckey when he was sixteen. They bought his company for over two billion dollars when he was twenty. That's what started the rage about VR. But before we talk about virtual reality, I want to talk about realities because at the core of considering VR is this notion that the concept of reality is being challenged. When we use the word 'reality', we tend to think that it means the physical world – what we can touch, what we can see. That's one level of reality. Today, we talk about different levels of reality. The second level is 'augmented reality'. I'd like to share with you a short film that was just done in Colombia. It's a fiction film that illustrates, in a nightmarish way, what could be our world in three to five years with augmented reality.

[Clip is played <https://www.youtube.com/watch?v=YJg02ivYzSs> ] Augmented reality means adding a layer of information over the real world through glasses. Notice the advertising everywhere – total nightmare. In restarting the device, we can see the world as it is in 'real' reality. There's no more augmented reality and then it restarts. I wanted to show you the whole length of this film because it shows the nightmarish possibility of augmented reality. But one thing to notice is that, in this film, there are no keyboards in use. We are living in the last years of keyboards. All of the interfaces we'll be using in dealing with reality are going to be with voice and gesture.

There's something else called 'mixed reality' that we used to call holograms. In a couple of years, we will start having devices that will help us use 3D digital objects in our full real environment. This is another little film that shows how it works. [Clip is played <https://www.youtube.com/watch?v=qym11JnFQBM> ]

Now virtual reality is something else again. This is when you cancel your perception of the physical world and replace it with a virtually generated world. All three digital realities will be mixed in the devices we'll be wearing in about five years. I'd like to show you a bit of a definition of what virtual reality is. [Clip is played] The idea of VR is experiential. When we talk about VR, we are talking about having one of those funny headsets to give you 360-degree vision. You don't have any visual or aural information coming from the real world. People often mistake virtual reality and 360-degree

video for the same thing. The video allows you to decide how you want to look at it on your flat screen that has been recorded with a set of cameras that allows 360-degree vision. When you are watching this on your flat screen, you're not breaking any of the rules or the paradigm of watching content on a rectangular screen. The reason why VR is considered to be such a revolution and such a disruptive medium is the fact that it is experiential. In VR, you are in the middle of the world that is represented. This is why VR is a changing paradigm.

We talk about the 2D representation – films, movies, TV, phones – as 'flatties' because they're just a flat rectangular representation of the world. VR is 360 all around you. It is a spherical representation of the world. The reason why VR is so powerful is because by being at the heart of the sphere that represents the world, you are immersed. You're no longer a spectator standing by being protected by the fourth wall, watching the content on a flat screen, distanced from it. In films, the imagination does the work, building the bridge into the world that is being represented on this window. But physically and on a neuro-scientific level, you're not immersed; you're protected. The immersive experience is what makes the difference. The direct consequence of being immersed in that world is that you are present. You have a feeling of presence, which is completely different from watching the difficulties, for instance, of an immigrant, of someone going through traumatic experiences. In VR, you are *with* that person, next to them experiencing what that person is going through. It creates an incredibly strong sense of empathy. A lot of people call VR an empathy machine. When you are presented with anything in VR, it is something you can feel and sense alongside the characters that you are present with.

We have to bear in mind that we are now at the very, very beginning of the technology. But this also goes for the language. We're at the same point as cinema was at the end of the 19<sup>th</sup> century with the Lumière brothers. It's still clumsy. Wearing this headgear on your face really makes you look a bit stupid. All the imperfections of the medium are due to its very young age. It's been only about two years since we've seen VR come up as an available medium. The market, and by market I mean the audience, doesn't exist yet. None of you has a VR headset at home. It still is very much a niche thing that developers are using. But it is predicted that the market is going to start growing very, very quickly. There have been different studies that have been made by major financial groups such as Goldman Sachs to predict the future of the market to see how fast it will grow and how soon we can expect people to have access to content. By 2020-2021, four to five years from now, the market of VR will surpass the current market of the PC and laptop industry and the TV industry. [Referencing a graphic] This shows how VR content will be spread in different industries. You can see here that video games have the biggest share. Gaming, in general, is the industry where VR will be the quickest to be adopted by players. Live events are also something that is very big and movies and other cultural content will be here. Entertainment and culture will be roughly about fifty-eight percent of total VR use.

You can also see that the health industry takes a big part. VR is already being used very successfully in the treatment of phobias and in anaesthesia in surgeries and also to eradicate pain. This has been used on soldiers who have heavy burns. They are given headgears through which they can see ice and a place like this in winter giving a sort of hypnotic effect that allows them relief from pain.

I will skip these other graphs so as not to bore you, but this is another bank group that has been quoted in confirming that they will advise their customers, their clients, their investors to invest in VR. I was just reading something before I came here that the main market or the main audience is China. By far, China has become the early adopter main market and it's pulling the market now.

Five years from now, we may no longer be using our smart phones. We'll all have glasses. Those glasses will do three things: they will correct our vision for those of us who need it; give us access

to augmented reality and mixed reality like we saw in the first movie, allowing us to overlay digital information over the real world; and, by becoming opaque, they will give us access to virtual reality content. Instead of keyboards we may have rings that will allow us to start using gestures, movement language that is similar to sign language that will take the place of everything we now do on a keyboard. Keyboards are inherited from the time of typewriters. They're not adaptive to the digital age. Voice interaction and a new form of sign language will be the key way we'll be interacting with content.

These are the first prototypes of glasses that are designed to replace this. This is something we will all have in our pockets. This is a new prototype design that has just been revealed by Apple. It is the one big company that is waiting. They have not done anything as far as VR is concerned yet. They're waiting for the time to come onto the market with a disruptive product that may look like this. The glasses are shaped so that they touch our faces on the edges so that when it becomes opaque, it will cut us off from the perception of the outside world.

So Apple is waiting, but Amazon, Facebook and Google are all jumping into it. All the studios in Hollywood and the content companies such as Netflix now have huge VR departments. Gaming, as I said, is the one industry in which VR is going to be the most prominent in the near future and will be the first test for the market. This headset was called Morpheus and it's now called PlayStation VR designed by Sony. They're launching it in October of this year 2016. They made a sort of survey of the almost fifty million PlayStation 4 owners to see if they would be ready to spend an additional \$700 to equip themselves with the PlayStation VR and eighty-five percent of them are ready to do that. A lot of people said they're ready to buy the PlayStation 4 because it will have VR headsets with about sixty games that are already developed for VR. This is a video of what the games will be like. [Clip is played]

It's hard to render the immersive nature of the experience when you're just watching it on a flat screen, but this is something that makes a huge jump in the experience for the gamer. We're already starting to see some apps that are available in VR that make people want to get a headset. I did the Tilt Brush experience not very long ago, and since I've done it, I'm dying to do it again. It's something that comes free with the HTC Vive, which is one of the most sophisticated headsets you can get in virtual reality. I have friends who want to buy it just to get that app. I'll show you a bit. [Clip is played]

What's revolutionary about this is the interface. He has this object in his hand and in the other hand the same object. When he turns it like this, it's like a box with four faces on which he chooses the color, thickness, and quality with his paintbrush. He can paint with water, with fire, with stardust, with anything. If I want to do a vortex, I would paint a circle here, move in space, make another one, another one here, another one here, and so on. Once that is done, my experience in the gear is such that I can go through the circles and build the whole thing in 3-D. Art galleries have started inviting artists to create work using Tilt Brush. In these Tilt Brush shows, you can enter the work of each artist.

One of the things that will make VR a much more sophisticated tool is interactivity and spatial tracking. When I move in the physical world, I move the same way in the virtual world creating a mirroring effect. This is The Void, a theme park that is about to open this summer in Salt Lake City, Utah. It's a bit like Disneyland but in virtual reality. [Clip is played]

A lot of what I'm showing you is very Hollywood and very commercial. I'm very much aware of that. It's where the money is being invested. Billions are currently being invested in this new medium. This is why it's too late for VR to fail. Whether we like it or want it or not, it's going to happen on a

huge scale. This is very much Hollywood extended. So what does this mean for us as independent film makers?

One of the things that will make VR impact all of our lives is virtual presence. Very recently, Facebook held its conference two or three weeks ago and did its very first presentation of its prototype for virtual presence. It's about how what we do with Facebook now will be done in VR. That's going to change all of our lives. It's going to impact what we do in terms of stories. I'll show this to you. [Clip is played] This guy is on stage and he's going to connect himself with someone else represented here. He's represented with a head and hands. At the moment, the prototype allows for five people at the same time in a single space. Or a person is represented by an avatar of his or her choosing, and together they can watch content at the same time.

Microsoft uses a HoloLens, which is the same device we saw with the girl who was building the store. They are starting to test Holoportation, a way of being present simultaneously in the same place. [Clip is played] This technology will allow us not only to share content but will allow us to interact with each other mixing physical and digital presence. We can play together; we can tell stories together; we can act in stories together. We talked about applications for this in health. Education is going to be a huge field of development. For tourism, you're going to be able to pre-live your trip before you decide whether you want to buy the trip or not. Real estate is a field where money is already being made with VR. You can visit ten different flats before you decide which one you want to buy. Fashion is getting ready to change its model by making it possible to buy a virtual ticket to the fashion shows, which will save on trips to New York, Paris, London, Milan for the fashion weeks. The porn industry, as usual, is leading in VR in terms of making money.

Why am I talking about this? I'm sure a lot of you are thinking about what I'm showing you and saying to yourself: "okay, this all may happen, but it's not for me. My job is to make films, tell stories. How is this relevant to telling stories?..."

But VR is not just a gimmick or marketing tool. It's going to change the way we relate to content, the way we relate to each other and the way we relate to representations of the world. In VR there are a lot of the same basic principles we have learned over the past 125 years making movies. The language of cinema totally applies to VR, except that it needs to be adapted to spheres instead of rectangles. Independent filmmakers are already exploring it. If you have a chance to see this 20-minute piece called *Allumette*, you should. It's an animated film and is adapted from Hans Christian Andersen's story "The Little Match Girl". It shows off the new frontier of VR.

It uses roomscale rendering. You are in the sky and there's a village planted in the clouds. This little girl comes in a boat floating through the clouds with her mother and lands on a bridge. You feel like a giant in the clouds watching this little girl. She's about that big and I'm standing about this distance from her and I can lean and look out from her eyes. I can walk under the bridge and see what's around the corner. I can poke my head through the shell of a boat and see what's happening inside the boat and pull my head back out again. There's a sense of realism in terms of distance connected with one's actual movements, which is very new in VR technology.

VR theatres are going to start to accelerate. They have opened in Amsterdam, Berlin and Paris. Over the next months, VR theatres will be opening in the multiplexes where you live, becoming more and more an option. There is a possibility to have a collective experience. Even though when you're in the gear, it's a very isolated experience obviously, you can still watch the same content at the same time. Last May 2016 in Cannes, I collaborated on the VR program for the first time at the market where we had a 30-seat theatre with a screening every hour. People sat and put on the gear and the content was beamed to the gears simultaneously. Each one of them had a different experience and the spectator could decide, of course, where they would want to watch so technically they didn't see the exact same thing but they were inside the same content spheres at

the same time. When the screening was over, they could meet with the director and the producer and have a chat and a Q&A just like in a regular screening.

The first VR feature-length movie is going to be released at the end of this year. We've been experimenting with short content so far, but the next step is going to be full-length. It's a Los Angeles-based production company and the film was shot in Italy. A new trend in VR is that we're starting to see apps and companies that are offering the idea of watching a movie in the old-style way, in the old flatties way, inside VR. This is an example that has been developed recently and launched. You can go to the moon and watch a movie on the moon. You can watch *La Dolce Vita* on a screen and when you look around, you will be on the moon. But you could also be in the Castro Theater in San Francisco. The nice thing about this is the flexible size of the screen. You can choose where you want to sit in relation to the screen so it's like having a huge screen in front of you. This can be reproduced in VR even if you have a flat screen. If you are a filmmaker and you decide to start showing a flattie in the old way, you can decide when it can evolve and start surrounding you. The experience becomes a 360-degree experience if you want. You can now download films in VR even if they're traditionally made for the flat screen.

One of the reasons why I think VR is an amazing opportunity for filmmakers is that if you decide to embrace the experiential nature of VR, it opens incredible horizons in terms of new ways of telling stories. The principles of the hero's journey, the narrative principles of storytelling in cinema apply to VR, but what is radically different is the experiential nature of VR. You can't reason in frames anymore because everything's around you. What is the job of the director then? It's the same as in traditional cinema because you need to decide where your cameras will be. What is the point of view in this 360-degree world? The switch is from thinking of the frame to thinking of the sphere. The transition is from telling a story to offering an opportunity to the audience to live a story. That's the main shift for scriptwriters and directors.

I'll talk now about presence design. As a viewer, I am always at the centre of this 360-degree world. I can no longer project myself through a rectangle or flat representation. As a director, I need to find ways to offer viewers an opportunity to engage fully, spatially, including the option of the viewer being able to decide where he or she is going to look. I'm not going to explain this sketch because it's quite complex, but what are the different tools that you need to control in order to design the experience of being at the centre of the world you are showing? In this graph, you have sight, sound and touch, being the interactive response in the VR world. There is the environment directional, meaning which way you move. And where it says user-initiated, this means that the viewer or spectator makes that decision. The modelling of behaviour in 360-degrees is quite complex and is being researched as we speak.

Where to start if you want to be aware of the challenges of presence design, if you want to tell stories in VR? What really needs to be taken into account at the beginning is the fact that each of us is the centre of our world. For instance, we're all together now in the same room and living the same moment but each of us is experiencing this moment from where we are. I am seeing you. You are part of my world. I am the centre of my world. Wherever I turn, whatever I see is always around ME. In VR, it's exactly the same. When I am filming, I am giving the opportunity to the viewer to be at the heart of the sphere, the centre of the world, the same as it is in real reality. The question that needs to be addressed by the director or the writer is, if that is the case, then who am I? I need to decide who that is going to be. A key question is, do I have a body or not? If I have a body, the technology does not allow me, for the moment, to have MY body. I am going to have someone else's body, which means I am going to be someone who is not me. Does that someone then need to be characterised? Do I need to see who I am so that I understand what I look like so I can identify? Or can I be someone else without knowing who I am?

This is an example of a Danish VR installation that has been done by Makropol in Copenhagen : Doghouse. I want to show you the beginning. [Clip is played]

So you see here that I am this woman. My vision is subjective. When I look down, I have her body. I am her. Each member of the audience is in the shoes or the head of a different character among the 5 that are present at this dinner party. So I'm seeing the other guests at this dinner but I never see what I look like and I have to accept the character I'm portraying. I will experience the dinner from that point of view. If I don't have a body – when I look down and see nothing – if I don't have a physical presence, who am I? Am I God, in the sense that I can do whatever I want and go wherever I want as in the diegetic presence in cinema? Can I be the spectator who is watching? Can I be felt as a presence as a spectator? All of those options are for the scriptwriter and for the director to decide. The big thing in writing for VR is that of the notion that the audience is present, the spectator is a part of what's unfolding in that story. This is new for all of us and we don't know yet how to completely process it or how to handle it. It's a fascinating challenge in writing stories for VR.

So what about editing then? Yes, we can still edit. We can do flashbacks and flash forwards, all the tricks of editing can work in VR.

AUDIENCE Are we talking about linear storytelling in this case, or is there something interactive?

REILHAC Yes, you can do interactive. You can manipulate objects. You can decide where you go through a door or another one.

AUDIENCE It's rather a game then?

REILHAC Then it becomes more of the logic of a game. That's the next step of full interaction if you decide you want to give that much space. It's a creative choice where the boundaries between game and story are really merging. But they are already. A lot of people in film are not interested in what happens in games, but there are more and more scriptwriters being hired by major game companies because the games being developed today are becoming more psychologically complex. They have the hero's journey, transformation arcs, all the dynamics that a story has. The characters in games are starting to evolve like film characters. This is to the benefit of games, this convergence. They are the ones exploring this. We, in film, are really not doing anything related to games. We don't need to make any clear categories anymore between film and gaming because there are already stories using game dynamics, particularly in animation and the films that use CGI. In live action, it's still very complex to integrate these kinds of interactive options.

AUDIENCE So, in essence, cinema spaces or the movie theatres will accommodate all the ways in which a spectator can have choices and the way we will move through a film? Will there be different ways of experiencing the same film, in different spaces, or in the same space – virtual stories with all kinds of options?

REILHAC The options you are describing you saw in The Void, the theme park.

AUDIENCE Then you would have to consider the physical limitations to your story, otherwise you can't produce it.

REILHAC Yes and that's the work of the writer. The creative freedom of the writer and director are re-designed, but there's nothing taken away.

AUDIENCE But I'm talking about the fact that if I want someone to move back, there needs to be a wall built there so that you can control the action.

REILHAC That already exists in the HTC Vive. If I am in this room, there would be four movement trackers in each corner. They define my game area. When I have the gear on and I walk over here, I can see I'm coming close to the wall. When I'm one metre away from the wall, in the game, there's a grid that comes up that tells me I can't go beyond.

AUDIENCE I played with the *Parallel Diver* at Cannes this year and the grid was built as part of the game as a physical marker. Storytelling is about time and rhythm. If you've got to interact – act or not act as the case may be – then that's part of the story. I've taken part in experiential theatre but that's different. With a film, it just goes and goes without pause. What I don't understand is what we're doing as storytellers. Is it just to allow the spectator to open a door and do what they want?

REILHAC No, this is only one option. Most of the films made in VR are linear. You don't have interaction with the unfolding of the story. It goes on. It's the director's decision to take you from one place to the next. Within the development of the action, I cannot change anything in the timing of the story. It just unfolds. I'm present and I'm watching. In that particular technology, as the story is unfolding, I can decide to move my point of view. I can move closer or change my position. But the course of the action is predetermined.

AUDIENCE How do you take a viewer along if they decide not to? Does the story wait?

REILHAC No, it continues. I just continue to watch the film unfold.

AUDIENCE But if you're the action and I'm watching you give this talk but then turn away, it would carry on?

REILHAC Yes, it continues. If you're bored to tears with what I'm saying, you could start looking outside. There's nothing I can do to prevent you from looking outside. It's the same in VR.

So now is a good time to introduce the notion of spatial writing for VR and that is exactly that challenge. When I started showing VR, I chose a film by Chris Milk, one of the pioneers of VR. It's called *Evolution of Verse*, which you can download on the Within Platform. In this 3-minute film, the beginning pays homage to the entrance of a train into La Ciotat station from the Lumière Brothers' film. You're standing in the middle of a lake. You can't change that. That's where the point of view is since it's a CGI film. The landscape around you is beautiful with the sun rising and birds chirping. In the distance, you start hearing a train, an old steam train that is coming. The sound becomes bigger and bigger. If the sound is behind you, you turn around and you see the train coming on the edge of the lake. Then suddenly it turns and starts running on the water towards you as if it's going to run you over. It's a very powerful effect and when the train runs over you, it transforms into thousands of birds and then magical things start to happen.

The sound of the train is very powerful and was designed so that people who were not seeing it would turn around. When I started showing it, I would point out to people to be sure not to miss the train: "When you hear the sound of it, turn around because the effect is the train running over you". Then I wondered what would happen if I didn't say anything. I was really shocked to find that only half the people saw the train. Afterwards, someone would ask if others had seen the train and wasn't it a scary and powerful effect? And others would say, "What train?" As powerful as the sound was, it was still missed by some spectators. They chose to look at the beautiful sunlight and listen to the birds instead.

You can never be sure someone is going to watch what you have carefully designed for them, which is a very interesting, almost psychoanalytical dimension of how we, as directors, are relating to our work. There are two kinds of people in VR: those that are going crazy to find ways to make sure that their audience is seeing what they have designed for them. Sometimes they will turn a whole scene black with only one source of light and the only sound is coming from that spot because that's where they want people to look. The other school, which I'm starting to belong to, is letting go. You design several things around the sphere with things happening in several places simultaneously. You're carefully crafting it so that it makes sense and it's well done, but then you accept the fact that all this nice work may be completely missed.

Two different watching behaviours seem to emerge:

Either a spectator will be focused on one particular thing to try to understand more about it or he/she will fall victim to the FOMO effect, the fear of missing out, (and that's very big in VR) and they will start looking everywhere all the time focusing on nothing.

There are two ways of watching VR. There are some that are looking everywhere all the time to make sure they're not missing out on anything. But they end up seeing nothing because they're constantly looking all around trying to make sure they get everything there is to see. Others choose one thing that they like and they enjoy it. Occasionally, they'll look around but they're much more at ease with selecting.

AUDIENCE Have studies been done to determine if it was just the novelty factor that was distracting people? I would imagine at the first 2D screening of the Lumière Brothers some were looking at the screen but then maybe some were running to look to see if they could see anything behind the screen.

REILHAC [laughing] Yes, yes, most probably.

AUDIENCE There was a game from years ago called *Myst*. And this was exactly this effect. You would come across this absolutely beautiful environment, absolutely riveting. And then you could go someplace and see a dinosaur emerging out of a lake. But you could also completely miss it and never come across it unless you played it again and saw it by chance. It was the only game I ever played. It was so real precisely because I could never predict what would happen, if I would be able to see the important things, or if I would completely miss out.

REILHAC I completely agree. I'm spending a lot of time in the gear watching stuff and find that I've completely accepted that I'm not going to see maybe everything, but then the best ones I want to see again and again. And I know that each time I will not be seeing the same thing.

AUDIENCE It's a great medium for detective stories where the viewer is the detective. It's up to you to try to find out what's happened. It could be very exciting.

REILHAC It's great for horror stories, as well, zombies and things like that particularly when it's doubled with real life actions. There was a presentation of a new rig in Cannes. They had a teaser with a game with zombies where you were seated in a wheelchair and someone was pushing you. You had to escape from a warehouse filled with zombies that were attacking you, nothing very creative. The three friends and the guy who is pushing you get bitten and they lie on the floor and turn into zombies themselves. So you end up being all alone seated on your chair. At some point, someone gives you a gun just before they die. In real life, they give you a gun. You have a physical gun and you start shooting all the zombies in front of you. Of course, you have to shoot for their heads because it's well known that you cannot kill a zombie unless you destroy its head. Little by little, you run out of ammunition and they start creeping towards you. It ends with this really awful

zombie girl creeping towards you and she puts her hand on your thigh. There's someone in the room putting their hand on your thigh at the same time. It's horrible! It's really scary.

The idea of spatial writing is that when you write for VR, you need to take into account that you need to describe what's happening in many different places at the same time...

AUDIENCE I'm sorry. I have to come back to this question of being a spectator who makes choices and maybe that choice is that I don't move around but just sit in a chair. It's a bit different when I choose to get up and walk to a certain door because I'm interested in what's happening in the next room. In a detective story, for instance, this would create a larger dimension. Nevertheless, as a writer, you would need to create a physical space that has an end to it.

REILHAC: It's in the design and the basis of VR. My only freedom as a spectator is to look around and decide where I want to look. If you go through that door, there has to be a sign that tells you that something is there, just like in a game. Most headsets now have this new technology that identifies where you are looking and tracks your vision so it can download the content that is behind a door, for instance, if that's where you're looking. You don't move but you virtually go through the door, unless you have a tracking device like HTC Vive that does allow you to move, but within a limited environment. This is where the game and story merge because you have all the variations of combining the story and the game territory within which you can move.

The 'front' is where I face when I put on my gear. If I take my gear and stand in a certain place that will be the place where I'm starting the film. The front of the first scene is going to be here. If I put it here, it's going to be here. The front is where I face when I start. In editing, when I'm going to move to the next scene, I have to figure out where the front is going to be for my next scene. It's a bit complicated to explain when you're not actually making it. In my last film, the action all takes place in one room. So when I start, this is the front. My decision for the editing was that in all the different sequences of the film, no matter where I look, I wanted the front to always be in the same place because it all takes place in the same room. Once it starts, I look around. The next scene starts and I happen to be looking here. So the front of the space where I'm looking is there. When the next scene starts, I want the front of this next scene to still be there, at the same place as in all previous scenes. Even though I'm looking here, I'm going to be looking in the same spatial direction in that second scene so I don't get lost. I still feel like I'm in one coherent space.

In another story, I am walking through the woods. I start with the front here and when I'm going to the second scene, I'm watching here. Because I'm in a movable environment, I can decide that my front is going to be here. A moose is going to jump out of the woods in front of me and I want to be sure I see it.

AUDIENCE Is it continuous or is there some kind of black out when the scenes change and you go somewhere else?

REILHAC Yes, it's just like in cinema. That's a very interesting question because, as you know, when cinema started, it took years before we could accept that if someone enters a room through this door and walks up to here and walks back out through that door, I had to film and watch the person go through the room and go out. Our ancestors figured out that there is no need to see the person do this. There could be a time cut so that we don't necessarily have to watch them crossing the room. It's exactly the same in VR. I can cross-fade.

AUDIENCE Only if you have the ability to move?

REILHAC It doesn't matter, just like in film. What's different is that the rule, at least for the moment, is that you cannot do a scene shorter than ten seconds. The viewer needs the time to explore and watch. It's also because of motion sickness, which is one of the big problems of VR right now. If you're moving, the vestibular system in your head knows that you're not moving. You're sitting in a chair. The brain is getting conflicting information. It's getting visual information from the VR world that says you're moving through a corridor but physically you're not moving.

There are some dangers with VR, one of which is that there is now research going on in how to manipulate the inner ear to trick it through very tiny electrical shocks, to make the liquid inside the inner ear move as if the body was actually moving. This goes back to this split between the philosophy of trying to control the viewer or let go. Most people coming from the traditional film world want to control the viewer. Most coming from the non-film world are totally okay with letting the viewer make choices.

These are just a few items on the plate when you want to start to explore telling stories in VR. There are dozens of other aspects obviously. I want to show you the Gartner Hype Curve Model – do you know this? Once again, it's a bit scary [laughing], but it's very interesting. It's a curve that had been modelled in 2000 by the Gartner Institute, a marketing institute. When the Internet bubble burst in 2001, the industry that was forecast to occur did not happen and things collapsed. This model was made for every kind of innovation. The curve shows that when something new happens here – a new technology, a new idea, a new service, a new product – it starts from zero because it didn't exist. And then all of a sudden, lots of expectations are built upon this and it reaches a peak of inflated expectation. The vertical axis is expectation, and the horizontal axis is time. In a very short time, lots of expectations are built and there is bound to be disappointment because they're excessive. The promise can't be sustained. The expectations can just drop as drastically as they arose.

This is true of absolutely all innovation, including all basic human phenomena, such as love. You meet the person of your dreams. It's amazing and crazy. But after a while you begin to feel that it's not the right person after all. Disappointment sets in because you expected him or her to be the perfectly right person. You then fall into what is called the 'trough of disillusion'. Once you're there, that's where it all happens. Either the man or the woman of your life, or the innovation that was started here, has enough in its belly as potential to start re-building slowly and progressively. That's when the whole couple relationship mythology starts building and developing. That's where most innovations have to find their strength, in the hardcore people who believe in it and will build this potential to reach the plateau of productivity and integrate the new service, the new idea, into the landscape, along with everything else.

Virtual reality is here on the curve, on its way back up from the trough of disillusionment towards the plateau of productivity, meaning it has already gone the route of inflated expectations and is rebuilding. VR has been fifty years in the making already. The re-birth is very, very new. When you are starting something new – a new film, a new idea – it follows the exact same process. There's a phase of excitement and then a phase of difficulties when you almost lose hope and faith and that's when you reach the real strength to recover and make it happen. The market, in terms of value, does not care at all about the excitement phase and the disillusionment phase. The market value of an innovation only starts taking off after the trough of disillusionment. This is true for everything. When you start something new and you know it's bound to go through these phases from the beginning, while you are at the heart of the most exciting phase and you know you are going to fall, you can get ready for that moment where you will start really building. If you're ready psychologically for all of that, you are so much stronger. If you're madly in love with someone, you know there's going to be a disappointment phase and you expect it. When it comes, you're ready. Then you're also ready to build the relationship.

AUDIENCE So the market value of the wife goes?

REILHAC Exactly. [laughter] As I said earlier, I'm not trying to convince you of anything but if I have one piece of advice to give you I will say that it's too late for VR to fail. It's going to happen. It's going to disrupt our lives and it's going to disrupt what we do and the way we do it. It does not mean that cinema is going to disappear. It's going to be changed because of this. You can explore it. You can ignore it as a filmmaker. But it's going to be part of your landscape. That's why Marion invited me here this evening. I apologise if I've upset you and you feel this is not related to what you are doing. But I will still say, it may not be what you are doing or it may not be what you want to do or are interested in exploring, but at least don't blame Marion and Sources 2 for not having warned you that something big is about to happen in your lives and in your professional work. [laughter]

We have already realized that the digital dimension of our lives is really key. Look at our relationships with our smart phones. Three years ago, if we had been told how dependent we would become on them, we would have been horrified. Today, we live with them as if they were fifth limbs. When they break, we go crazy because we're not connected. The first thing we ask when we get somewhere is if there's wifi. Social networks have become an essential part of our lives and our social fabric. At the same time, we're learning how much we need to have disconnected moments and how much we need to live experiences that have nothing to do with the digital world.

An example of this would be food. Cooking and gastronomy has never been so big because it's a way of reminding us that we are physical beings. Everything that is vintage is so cool and appreciated and sought after today. We need to feel that we belong to a physical world but also that we continue to live within the flow of history and time. Why are books made of paper still around? Publishers are still doing okay – we're still buying books and newspapers. There is reassurance from those objects. It places us in the flow of time. My intuition tells me that cinema is slowly becoming vintage. This is why it's going to stay around for a very long time. It allows us to keep a relationship with time.

AUDIENCE But it still gets me in trouble when I don't download the latest version on my iPhone. The industry supplies capabilities and other things that I won't be able to live without.

REILHAC Yes, it's two-fold. We'll need the glasses in the same way we need our phones now. We're going to be learning a new language, a physical language with our hands. There's an amazing new independent film called *Creative Control* by Benjamin Dickinson. It's his first feature film. It's a black and white film about augmented reality. Have any of you seen *Her* by Spike Jonze? He gets his character running with just his fingers. You can already buy those rings that track your finger movements.

AUDIENCE We are so isolated in a certain way already. Isn't it potentially problematic that augmented reality will make it even more difficult for us to have collective experiences? My second question is a bit more technical and that has to do with the rumours of Magic Leap.

REILHAC Magic Leap is not located in Los Angeles or Silicon Valley but in Fort Lauderdale, Florida. It's a mixed reality company that has raised almost one billion dollars without showing anything of what they do, just a promise. There was recently a very long article in *Wired*. For the first time, they published a picture of their lens, which is their secret. It's a piece of glass that is electronically and digitally activated in many different ways that allows one to see three dimensional objects and interact with them in augmented reality. We don't know much about it. But HoloLens and Magic Leap are leading the way for augmented and mixed reality. I've never tried

HoloLens. I'm going to try it next week. You have to fly to Fort Lauderdale and be invited by Magic Leap in order to be able to test their lens. It's supposed to be amazing.

About isolation: what I showed about Holoportation and Facebook VR is going to develop. We're going to be sitting in real life isolated in our gears but we will be together in a communal space, just as all of us here could be wearing gears in our respective homes but meeting together virtually in one space.

AUDIENCE But you're still physically isolated. I understand there's interaction, but...

REILHAC The very concept of reality is becoming multi-layered. There is real reality but that's just one layer. Augmented reality, mixed reality and virtual reality will all combine for multiple experiences. The fact that we may be isolated for a while physically in the real reality layer but together in the virtual reality dimension will not be seen as something crazy. Once again, if you saw yourself now from ten years ago with your smart phone, it would be unbelievable that you would behave this way. That is going to accelerate. We're going to see a lot of problems. Teenagers will suffer from addiction, isolation and for sure it will be a major issue.

AUDIENCE The human being is not made to do this. I mean, there's also going to be social exclusion, never mind the isolation. There are going to be whole countries that can't adopt it because they don't have the GDP so they will be excluded.

REILHAC They will be very sought after because they will be non-digital havens. The luxury vacation you want to have nowadays is to go to a place where you can just disconnect, right? These places will be able to sell and commodify the fact that they are digitally clean.

AUDIENCE Real estate with no wifi will be really expensive.

REILHAC Perhaps. The reason why Facebook bought Oculus Rift is not so much for the games and films, etcetera. It's to create what is now starting to be called *The Oasis*, the name for the new meta-verse. This was sort of tested in Second Life. The next generation of this is *The Oasis*, where we will meet and live the same way some people lived in Second Life. We'll develop stories and play games and will have businesses in *The Oasis*. There will be places where *The Oasis* will not be accessible – in the mountains, the north of Norway. Maybe you [Marion] should make sure this place is completely disconnected. It will have an incredible value. There will be moments when we're hyper-connected and then not, the same way we go to work and then vacation. We behave differently. Our lives are going to be organised around moments that are hyper-connected and totally disconnected moments.

AUDIENCE I think about what could happen during health checks if there aren't continuous signals. All alarm clocks will be interconnected. I wonder if there will be a system in place that won't let us off this connection?

REILHAC It will be our choice.

AUDIENCE I hope so. That was my question. Do you think we will still be able to have choices? I'm not so sure.

REILHAC Privacy issues are huge in the digital realm. The challenges are huge. We're being threatened very directly.

AUDIENCE In the future, it's said that poor people will be able to make a living selling their personal data, as something valuable to trade.

REILHAC I think we're going to see worse things. I think we're going to start to see people making a living by being mules, fronts for people who want to have the luxury to not be identified digitally. I think we're going to start to see a new form of slavery, in a way, where rich people will be able to buy people to act as their digital double.

AUDIENCE I perfectly understand, but that's scary, isn't it?

REILHAC It's very scary. There are huge shady areas that come with all this.

AUDIENCE This is a different issue. I have a friend who is slightly autistic. He doesn't respond at all when he goes into virtual reality like we do. His brain isn't processing the same way. He knows what the real world is and so he's unable to be 'tricked'. He said it's really tough for him and he has to take it off.

REILHAC It's the same with motion sickness. There are some people who just cannot stand it. It makes them sick. They are overly sensitive like some people are to seasickness. There are some people that give motion sickness prevention pills to certain individuals before they do a VR experience. It works the same way.

AUDIENCE What's the latest stance on interactive stories concerning various dilemmas? I have an open world that is non-linear but certain content elements are not available to me. Or something is linear but gives me the illusion that I can actually choose to have an impact on the story, but it doesn't always work and then I feel cheated. Which direction is storytelling going towards? Or will there be diversity in the different options?

REILHAC I think it's already very diverse. There's a new game story called *Sens* that just premiered at Tribeca. It's a very simple game in an empty world. You're a character walking through an empty world. Arrows appear and you follow them but then you realise that you can interact with the arrows. You start to understand that you decide where you're going. There are ones that we saw with the PlayStation VR headset that are very basic. I think it's going in all those directions. Everything is being explored. What's accelerating is the merging of game dynamics. Platforms like Unity or Unreal, which are used for games, are also used for VR a lot. So the interactive dimension is very much connected to the same dynamics as games with the whole range of possibilities.

AUDIENCE I think one of the biggest challenges as a scriptwriter is the decision about where do I keep my story linear and where do I cheat? There are these examples in games where we know that the 'choice' to go through a door is pre-scripted but there is an attempt to create the illusion that it's not. Sometimes it works and sometimes it doesn't.

REILHAC If you're doing a project that does have those interactive dynamics, one thing for sure is that you can't write it alone. You have to collaborate with either a game designer or a creative technologist. I worked recently on a project with a game designer. My thinking was very linear in terms of time, on a horizontal level and I was only preoccupied with the information that sat on that level. He was planting trees on my horizontal line. The whole transformation of the characters was something he had a very hard time with, but he would choose moments where we could create a multi-level experience related to one moment in time. When we started doing the graph of the story, it was like he was planting trees on the soil of the story. His thinking was multilayer, branching, vertical. It was interesting that he was using a moment and then seeing how that

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moment could be a multilayered experience. A creative technologist would work completely differently by suggesting interactions within the story thanks to the technical possibilities that are available and that I might not think of.

In my last film, I wanted to play with space but I didn't know what was possible. Through talking with the creative technologist I was working with, I found out I could go much further than I thought. I could play with space in a completely free way because the post-production tools he knew how to use allowed me to play. In *Allumette*, you can poke through the shell of the boat and look inside and this comes from a defect in the game engine. When you go on the edge of something and there's no more world, you go through and there's nothing. But the further you can go through a surface, you can then go inside something that appears to be closed and peek and see what's happening in there. And even though there's action happening in there, if you had stayed outside, you wouldn't know that. In terms of the collective experience, people who have seen it start telling others that they found out they could go through the boat and tell the others that they should look through the boat. Some people will not try it because it's not an obvious action, just like in a game.

**AUDIENCE** Does the amount of interactivity have to do with age or time, or both? For myself, I preferred an open world when I was younger and I'm not sure it was because I was young or that I had more time at hand.

**REILHAC** I find that the management of time is really intriguing because time is so precious. Learning to manage it is really essential because we have so many things we can do. I find people that consider gaming a top priority and who spend an amazing amount of time gaming. Some of them are my age. I think it's more a question of priority. I'm not a gamer because I want to do other things with my time. I play a little bit so I know the games but it's really an individual choice.

Well, thank you very much.

APPLAUSE