INTRO TO VR FILMMAKING

edited by Nadine Soraya
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td>The Why, Where, How, What And Who Of Virtual Reality Filmmaking</td>
<td>3</td>
</tr>
<tr>
<td>The Difference Between 360° and Virtual Reality</td>
<td>12</td>
</tr>
<tr>
<td>5 Things To Keep In Mind When You’re Making a VR Film</td>
<td>14</td>
</tr>
<tr>
<td>What Kind Of Virtual Reality Film Should You Make</td>
<td>17</td>
</tr>
<tr>
<td>What Does Virtual Reality Mean For Film?</td>
<td>24</td>
</tr>
<tr>
<td>5 Ways That Virtual Reality Is Changing the World</td>
<td>26</td>
</tr>
</tbody>
</table>
Introduction

Congratulations. You’re interested in the biggest technological advance to hit the film industry since the advent of sound matched with pictures a hundred year ago.

Suddenly filmmakers have the technology to create movies covering all aspects – in-front-of-and-behind the camera.

360/VR is not a fad. It’s here to stay.

**Fact:** All the large tech, software and web companies are pouring tens of millions into developing the technology.

**Fact:** The technology is continuously being updated.

**Fact:** No one has figured out how to use 360/VR for narrative story.

This is where you come in. If you want to establish a career as a filmmaker using this new opportunity read this eBook and follow these three simple steps:

1. Learn the basics of the technology.
2. Use entry-level kit to create narrative and proof of concept.
3. And finally, market yourself and your talent.

So few people do this at the moment. Everyone’s screaming for content. If you get the word or your content out they’ll send limos.

Raindance has two classes that might assist you:
- **Saturday 360/VR School** – one day class explaining and demonstrating the basics of 360/VR
- **Hands-on 360/VR Filmmaking Workshop** – weekend masterclass: you’ll make at least two short films with a qualified tech team.

Elliot Grove, founder Raindance Film Festival | British Independent Film Awards
The Why, Where, How, What And Who Of Virtual Reality Filmmaking
- By Charlotte Raymen

Why waste your time with something that was made up by bored science fiction and Simpsons writers?
Never before have we had access to the stuff dreams are made of, and given its current trajectory, a shared Virtual Dreamscape on the scene wouldn’t be all that surprising.
Virtual reality as it stands has excellent gimmick factor – it’s the most immersive platform of entertainment available today. It’s easily accessed through our smartphones, our Facebook and origami goggles Google have dubbed ‘Google Cardboard’ for that total Virtual Reality experience that is both cheap and cheerful.

It’s an excellent marketing tool and in the filmmakers line of work and everyone knows that is where the money is. Facebook have even created heat maps for their videos - tracking where their users most look during a session. If you master this art and accept that Big Brother is watching you - you can make a pile of cash.

Where can Virtual Reality go?

Literally everywhere you can shove a VR camera! (Or 16 GoPro’s attached to a 360x180 degree rig - giving you complete freedom to create an equi-rectilinear 360 video and no nadir blind spot)
Virtual Reality promises real life experiences that your life might not allow you to access. It's the perfect premise for a generation of millennials who can’t afford to buy a house but they have more power in their phones than the last shuttle sent into space - which incidentally would be a perfect idea for a VR Video!

Live streaming VR will allow you to sit in the front row of a Beyoncé concert! Or if you were so inclined - Coldplay (the only obvious downside being that your booing would go unheard - but that’s what twitter is for).
Although a lot of the equipment such as rigs, light stands and higher quality cameras have been developed you will face a lot of trial and error. With this micro industry, “fix it in post” will inevitably become something of a mantra, but hold on to your fierce filmmaker’s optimism and you could become a pioneer with experience in something only a handful of people in the industry have today. The only limits lie in the adaptability of your technical and engineering prowess or your threshold for general squeamishness.

How to make your own Virtual Reality

I know what you’re thinking - how can I, a filmmaker, tell a story through the medium of song/Virtual Reality (song optional). Well here’s some top tips to make your musical virtual reality dreams come true!

1) Blocking and Direction

**SCHOOL OF ROCK: The Musical – “You’re in the Band” (360 Video)**
The most important thing to remember when writing is that you won’t be able to control where your viewer is looking - unfortunate sides affect of the total immersive experience. There’s a temptation to fill the frame with exciting props and light and interesting things, and in a VR piece without story that would be possible to explore like a virtual Easter egg hunt. However too much can be distracting and in some cases nauseating. This includes movement; slow and steady is the best way to avoid causing motion sickness.

What works best is having an interesting setting - but keeping action concentrated in one or two quarters of your 360° circle of fun. Splitting your storyboards and scripts into quarters allow for every part of the VR experience to be planned out in as much detail as possible. For example...

Think of it like dumping your audience in the middle of a play or a musical; the whole stage is filled but there is always a place to focus.
2) Cuts

In traditional filmmaking the cuts can be the make or break of a piece - however it can create the sensation of teleporting. Visual and audio queues however can both train where you want people to look and build up to a potentially disorientating cut. The MINI 360 advert “Real Memories” uses audio queues effectively.

“Real Memories” | A Cinematic 360° Virtual Reality Experience

3) Camera positions

Camera position in VR determines how tall your audience member will be. On top of that - VR offers an interactivity that traditional film often doesn't (aside from Hardcore Henry but that's like the only one). Like gaming you become the silent character that everyone ignores, or everyone talks to; creating either a passive or empathetic experience. Gaming VR is of course very successful; boasting interactive VR that allows you to interact between headsets.
Like gaming, successful narrative VR suspends disbelief through world building and transporting you into new bodies of different ability, gender, age or none of the above - depending on whether or not you decide to give your audience a body. At this stage, being experimental and wild with your camera positions can only help hone your craft. The same applies with post. VR is more stimulating the more weird and wonderful the world you're creating is. Put music behind it and you've got one hell of a gimmick to promote that band.

FOALS - Mountain At My Gates [Official Music Video] (GoPro Spherical)

FOALS' “Mountain At My Gates” is an excellent example of VR world building that is both simple and exciting to look at. You’re standing stationary in the middle of a courtyard, being serenaded by four FOALS, knitted together with a hell of a lot of compositing, that includes birds, leaves and several of Yannis Philippakis in one pretty far out video.
What do you need to start Virtual Reality filmmaking?

First you’re going to need a GoPro. Then you’re going to need 15 more. It’s easy! Just use that limitless supply of cash you independent filmmakers seem to have. Forgo eating for a month or so. Have sleep for dinner!

Okay here’s the deal with cameras. Products on the market right now (even rental - which is preferable) are subject to two debilitating factors - “Stitch” lines and Resolution. Imaging your frame of 360° as a world map - this can be viewed as either a sphere from within (or Globe if you will) or one long flat rectangle (or Atlas), the latter of which you would deal with in post.

The above shows one ‘Atlas’ (right) and a ‘Globe’ split in two, this is owing to the fact that this was shot on a Ricoh Theta S; which utilizes 2 x 180° cameras to create a 360° image which is then 'stitched' together.

On desktop VR at first you can only see an aspect (ratio) of the atlas. This severely reduces the quality - for example if you record in a long 4k atlas frame, when the video is viewed after being stitched together and seen through YouTube you’ll more or less be zooming in on a quarter of that 4k. This lowers the resolution and makes the videos look soft. The answer of course is to film in higher quality, and higher quality cameras will do that at the expense of your wallet.
However having more cameras, like the 16 GoPro rigs, can improve the quality, but again you are at the mercy of "stitch" lines.

Imagine each camera is filming a certain size of box; those boxes have edges and with enough of them wrapped around a rig, and the edges of those boxes will overlap. To turn this into your 'atlas' -
which is required to do any kind of finished VR post work - you must stitch these boxes together. You can make use of markers such as corners of rooms or props to align stitch lines. Where they meet however is not always perfectly lined up at the right angle, so like a punch in the face - these fractions of difference can cut off a mans leg as he cycles past.

Dealing with these is where your production becomes post heavy. People who can stitch are in short supply - learn to do it well and you will have VR productions queuing to work with you. There are things you can do during filming to ease the post production pains; its important to let your actors know where the stitch lines are, and if they cross them they can’t get too close to the camera. The use of a digital flash, enveloping a room or scene in a bright white light that will take up the same frame can replace a clapperboard and help sync the timelines of recordings. Clapping also can create an audio reference. VR is the perfect partner for binaural audio; recording sound in 3D that will allow sound (with the right headphones) to pan and replicate how living ears work, and is recorded by this freaky thing.

There are others but this one makes me feel pretty.
Like any edit there is no set way to get the job done. Nuke is the industry standard software for this kind of work utilising a plugin called CARA VR, although there are plugins available for Adobe After Effects by the name of ‘Metal Skybox’, which is familiar as well as more cost effective. Less cost effective but still another way to go is ‘360VR Toolbox’ which is compatible with AE, Premiere Pro and Final Cut Pro, this software allows headset monitoring while editing in full 360°.

Who’s who of Virtual Reality

If you like this article, tell your friends, if you’ve truly let it inspire you - you’ll find these people and hound each and every one of them until they give you your first job in Virtual Reality.

eleVR - Like anything; practice makes perfect - but there are those out there who have done some legwork already. EleVR is a website dedicated to the science of VR, playing with different VR
filmmaking methods and improving them any way they can. Remember the only difference between goofing off and science is writing down what happens!

“You can build any building you want if you know how to lay bricks!” - Elliot Grove whoever that is.

**Felix and Paul** - Félix Lajeunesse and Paul Raphaël are responsible for a Jurassic park Virtual Reality documentary that is off the chain. Their content is available on the oculus store.

**The Foundry** - has cornered the market of VR in post houses in London. (If they’re not in London - I don’t want to hear about it!) They have a research team “dedicated to solving the big challenges that our industry faces with new technologies” (Andy Whitmore CPO). If you’re looking to learn VR post, going through this posthouse might just be right up your alley.

**Chris Milk** of Samsung MilkVR has a studio vrse.works, his portfolio offers a range of live and composited VR experiences, as well as pioneering Virtual Reality sound for Samsung VR. MilkVR specifically is an upload site for the US that is worth pitching to.

**Kaleido VR** - a community for Virtual Reality creators is funding projects and content. Many other festivals, not just Raindance are taking up the VR mantle and hosting competitions; South by Southwest; Tribeca and Sundance to name a few. If you can find a localised event - it’s a good idea to go to them and pitch, you never know what may come of it.

Other good names to know are [wevr.com](http://wevr.com) who are curators of content and [honeyvr.com](http://honeyvr.com), who are investing in CGI VR content.

**Lytro** are looking for worthy candidates to use their LightField Camera; this is a camera that can focus on literally everything in range and can measure light even around corners!
The Difference Between 360° And Virtual Reality
- By Baptiste Charles-Aubert

Virtual reality is not the next big thing. It's the current big thing - at least for independent filmmakers who are always on the prowl for exciting new ways to tell stories. Here at Raindance, we champion cutting-edge techniques that will be tomorrow's mainstream. That's why we've opened a VR strand at this year's Raindance festival.

However, there is a confusion regarding the definition of terms; sometimes you'll hear about virtual reality (from Facebook's investment in Oculus, mostly) or 360° video (from Google's Cardboard app, mostly). So how about we clarify?

Environment

Many exciting things have been happening in virtual reality. You can roam the corridors of the Overlook Hotel or explore the infinite depth of a surrealist Salvador Dali painting. However these are computer generated. Virtual Reality experiences (from Samsung or Facebook's Oculus) are all video game-based.

360° video is, no surprise, video content. They're shot with 360° cameras - the simplest camera setup are two 220° cameras back to back together, which is the same width as the human eyes have. That makes a difference in terms of perception, but also for what comes next.

Mobility

Corollary to the previous point, virtual reality is inspired from video game experiences. Therefore you can do whatever you like in your VR environment. Go anywhere you like that has been designed.
360° will put you in the place of the camera, therefore you'll be at the mercy of the filmmaker as a viewer. (Filmmakers, rejoice.) There's the challenge for you filmmakers: what catches your attention when you're in a room? How do you do light something differently or make a noise happen with the trickery escaping the omniscient 360° camera?

Timeline

The distinction between 360° and VR is that the latter is interactive while the former is immersive. Regarding VR, the timeline will be in the hands of the viewer - therefore giving them an escape from the tension you're building in the story.

Story

Story is the most important part. This is where it all starts. In a Virtual Reality setting, the viewer/player leads. With 360° filmmakers need to control the narrative and push it forward. That's what happens with 360°. The viewer experiences a story happening around him and not to him. The physical location then matters even more in 360°.

Now get cracking on your 360° films!
5 Things To Keep In Mind When You’re Making A VR Film
- By Isabelle Mecattaf

Virtual Reality is becoming more and more popular. Companies like Google, Samsung are investing in it and coming up with cheap ways to make it accessible for everybody (of course you can also find the more advanced gear). YouTube even announced that their videos are available in VR. So if you’re curious about this new medium and want to try your hand at it, here are five tips to keep in mind.

1) The introduction

VR is more than a 3D experience; you are transposed into this new world, and it is both fascinating and unsettling. One moment you are at home in your familiar living room and all of a sudden you’re in a forest or another country, or even a cartoon.

There is always going to be some element of surprise, but as the creator, you have the ability to control your audience's first reaction. Do you want them to feel safe, scared, amazed? No matter what you choose you don't want them to remove the headset, so if the first image they see is a monster lunging at them they might be too scared and take it off. That’s not good. Your audience should forget where their body is and be immersed in the VR.

So VR might take some easing into because it is nothing like what we’ve experienced so far in other story telling mediums, and when you’re creating your storyboard, take into account your audience. How are you going to introduce them to your world?

2) Directing

VR is more than just story telling. The audience is not sitting in a dark room and passively watching a screen, they are in the screen. Therefore, unlike traditional films, you don't have the ability
to control every image. In VR, the viewer can look around and is not restricted by the camera angle or position. You can’t stop your viewer from exploring but it’s your job to make sure that they don’t miss what’s going on in the story. VR is an immersive experience but it’s also a story telling medium and you have to find different ways to capture the viewer’s attention, without however restricting the freedom that VR gives them.

So don’t get too distracted by all the cool features of VR. It is still a movie after all and you are still the director. So even if your viewer has more freedom and a different approach to the film, it doesn’t mean that all the rules of filmmaking are thrown out the window. Things like mise-en-scene, lighting, sound etc. should help you convey your story and capture your audience’s attention.

3) The story

The story you are going to tell can’t be separate from the environment you create. Since your audience is immersed in the story, and can explore the surroundings, there has to be some sort of connection between what is going on and where they are. What is the best way to tell your story in virtual reality? The medium goes hand in hand with the plot, and they feed off each other.

4) Emotions

VR gives you a lot of control over your audience’s emotions, even more so than a film on screen. Your viewer might be in the world you created, but he’s still an observer. So although he sees everything, nobody sees him, and he can’t physically touch things (I’m excluding VR games that have remote controls). But because he’s immersed in this world, and is under the illusion that he is part of it, he’s going to want to be involved. The viewer becomes a character in the story, and therefore feels the need to interact with people there. Your audience is going to want to comfort your character that is in distress, or slap the annoying virtual person. They’re emotions are heightened, because they feel involved, and you can use that to your advantage.
5) Let loose!

VR opens up a whole new set of possibilities. You have the ability to transport your viewer into the world you created, and there are no rules. This is still a relatively new medium and people are still figuring it out, there are no set techniques or restrictions. So experiment, test your work and see what works, what doesn’t. Be bold!
What Kind Of Virtual Reality Film Should You Make?
- By Isabelle Mecattaf

VR makes the viewing experience so much more palpable and real. Where do you want your audience to be when they put on their headset? Maybe you want to learn how to write and create your own VR film?

Here are a few types of VR films that will inspire you to make your own.

**Documentary**

*Walking New York | 360 VR Video | The New York Times*

French artist JR teams up with the New York Times Magazine to create the "Walking New York" cover. An artist, an immigrant, and a group of volunteers stay up all night to paste an enormous picture on the pavement so that people can walk all over it. This works as a VR Film because it makes you feel like you are part of the process, every step of the way.
This film delves into the lives of three kids from different parts of the world, who have had to leave their homes because of war. VR transports you from Ukraine, to South Sudan, to Lebanon, and let's you see it all for yourself.

**Educational Video**

**MythBusters: Shark Shipwreck (360 Video)**
You get to dive into the depth of the sea without needing a gas tank, getting wet, or you know, being surrounded by deadly sharks. What's not to love?

**Travel Guide**

**360 Barcelona City Guide**

It might not beat the real thing, but Jasmine Down takes you on a tour of all the must-see places in the city, and you get a glimpse of what she’s experiencing.
Life Experiences
The three following videos don’t really have a narrative or a plot, their only aim is to transport you into another world and allow you to experience things as if you were really there.

Get Barreled in Tahiti with Samsung Gear VR, C.J. Hobgood
The Fight to Save Threatened Species (360 Video)

[Extreme] 360° RollerCoaster at Seoul Grand Park
Reliving Historical Events

Apollo 11 VR video trailer

Music Video
Avicii - Waiting For Love (Jump VR Video)
Avicii's music video puts you at the centre of a wacky dance floor where dancers emerge from doors. It's creative and it is built around VR. What I mean is they didn't just want to make the music video in VR, they had an idea that could only work if done in VR.

**Horror Film**

*360° Horror: Lock Your Doors*

Horror works particularly well in VR because your audience experiences it first hand, and if it's done well, you can scare the sh*t out of them.
What Does Virtual Reality Mean For Film?
- By Raindance

Search around a little bit for biggest expected trends in technology for 2016, and you’re almost certain to stumble on a few headlines about virtual reality. Indeed, a number of major tech companies are on the verge of rolling out virtual reality headsets in a big way, and the result could be a pretty significant shift in how we go about home entertainment. Most of the early implications, however, involve the gaming industry.

Some even equate the very term “virtual reality” with video games, given that the expectation of a VR environment is to immerse yourself in a fiction, and thus take part in it. This implies taking an active role in the fiction, and so we think first of video games. And this is where much of the early excitement regarding in-home virtual reality lies, particularly given that there have been numerous exciting games announced and, in some cases, publicly demonstrated. Wareable compiled a list last year of different VR games “set to blow your mind” in the next 12 months, and it included some exciting looks at various adventures, puzzles, and even adaptations of older titles (such as Minecraft) coming to VR consoles.

Additionally, there are existing types of video games that would seem primed for quick and effortless adaptation to VR formats. The first games that come to mind are those in the racing genre, where the first-person point of view is already offered in a number of the top games. Sure enough, the aforementioned article about upcoming games points out a title called “Assetto Corsa” being made for Oculus Rift. On a simpler level, the casino genre, which caters to tens of millions of players online, has also made strides toward approximating VR environments. According to Gala Casino, they have adopted the use of live casino options to allow players to react to and interact with human dealers via video feed to provide a more personal touch. And when this concept is considered in VR terms, it’s easy to see how it could seamlessly create a simulation of sitting at a real casino table.
But even with all of these headlines for VR gaming — some confirmed and some rumoured — a lot of the excitement related to virtual reality also has to do with the film industry, where the whole concept has equally disruptive potential. As VR Circle describes it, watching a film in VR allows you to watch a cinema size screen in your living room, and “if the movie is 360 degree, you can literally step into the movie and be part of it.” That still feels like a pretty sensational concept, but the technology is there and it will be fascinating to see what film studios decide to do about it.

Just recently, we’ve gotten the first major indication that mainstream film in VR could actually be explored in the near future. An article at Paste notes that hit 2015 film The Martian has been adapted into a 20- to 30-minute VR experience that will debut at CES 2016. Rather than simply a film that can be enjoyed via VR, this sounds more like a game spinoff. Users will be in a position to complete tasks the way Mark Watney (Matt Damon) does in the actual movie. Still, it’s a pretty significant milestone in cinematic involvement with virtual reality.

Looking a little further, The Wrap recently discussed the fact that film studios of all sizes are well into exploring the potential of VR and figuring out where to invest and how to craft films for the new form of entertainment. The article theorises that it will likely be indie filmmakers who first master the format, but that this would likely open the floodgates to larger studios roping in the indie capabilities with big Hollywood budgets.

Realistically, it will probably be a while before VR film becomes a sizable means of watching movies. But with the headsets emerging in 2016 and gaming development well underway, we’d all do well to remember that VR isn’t limited only to gaming. The film industry will hop on board as well.
5 Ways That Virtual Reality Is Changing The World
- By Baptiste Charles-Aubert

If there's one thing that gets the film industry buzzing as much as a profitable blockbuster, it's a new toy that will help make the next blockbuster. For a while 3D had been the next big thing, until something else took over: virtual reality. It's currently sweeping the gaming and film industries and much more: it's changing the world. Let us count the ways...

Alter the senses

The immersive quality of virtual reality, overtaking your viewing and hearing abilities, is so powerful that, when it comes to telling stories or setting you in a different environment, you completely immerse yourself in another world.

This eerie sensation that affects the body is about the gap between where you really are (and you actually know where you are) and the information that is received by your eyes and ears. The two latter senses are so primal and overpowering that they take over.

[WATCH] Vertigo: Kinect body-tracking and Oculus Rift DK2

Shift daily life

Virtual reality is not just about the Oculus Rift and Google Cardboard, or transporting you into entirely different places. At the heart of the technology is that the world that has been programmed into the VR experience can be entirely fictional or replicate reality. That is in part how Pokémon Go draws its success. That 'mixed reality' or 'augmented reality' has applications for gaming, but it also has applications to help with the most mundane tasks, and devices could show you the name of that neighbour who's passing by.
Playing Pokémon GO in New York

Improve your health

Of course, VR offers applications for all kinds of people: VR that we can incorporate in our daily lives. Also, VR could unfold quite impressively: think of a doctor who has a skill that no other doctor has, and only they can operate - but they’re on holiday on the other side of the world. Never mind, they can put their headset on and control a robot in the operating room that is going to replicate their movement.
"SURGEON SIMULATOR IN VIRTUAL REALITY!!!" HTC Vive Virtual Reality (VR) Surgeon Simulator!

Transform reality

By mapping out digital environments, whether they're real or fictional, VR will take the training of pilots to entirely new levels. It will also prepare soldiers well by enabling them to scope out the terrain before they are actually going on the battlefield, and help automated cars.

Tell more stories

Of course, virtual reality lends itself perfectly to creating fictional universes and finding new ways of telling immersive stories. There have been incredible shorts and VR experiences created by Pixar and many others, and 360° is having its moment as a promotional device.
‘Wild’ was promoted with a tie-in 360° experience, but that indie is soon to be surpassed by Steven Spielberg’s highly anticipated ‘Ready Player One’, which will have a promotional tie-in VR experience. It’s spookily fitting, as the original novel was a dystopian exploration of a world in which people live in poverty, but can access a dream world to escape their reality through virtual reality. When reality catches up with anticipation...