FMP Creative Report

Marcus Ayrton

Contents

INTRODUCTION:

My practice is as a 3D Pre-vis and Layout artist. This role involves extensive knowledge of industry-standard 3D software such as **Maya**, to be able to **model and source assets** as well as **animate using character rigs**, to show how scenery for films or animations will look. Pre-vis involves **planning camera angles, shot sizes, and camera moves** all in 3D space and then **editing them together** to show the director and film crew how film sequences can look. This role is very new and has become necessary for **live-action film production** as shots and sequences become more advanced and more expensive. Even more recently, **companies are now using Unreal Engine** to render out these sequences, as its faster real-time rendering capabilities are favoured with traditional rendering taking so long.

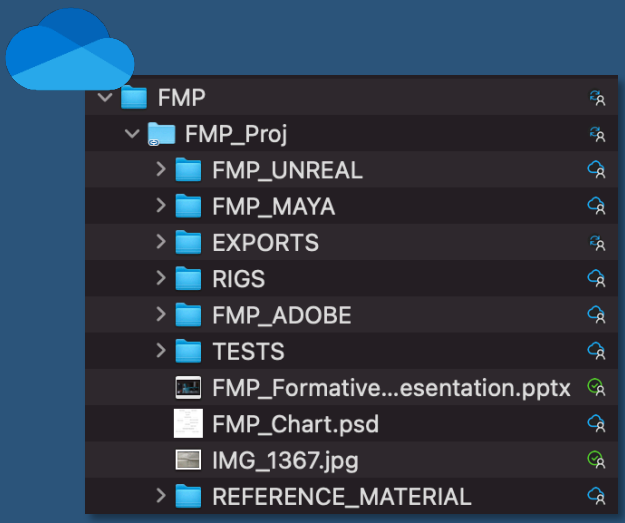
In this project, I intend to use as many of these necessary skills as possible, challenge my practical knowledge and technical ability, and apply this to a collaborative workflow to prepare myself for an industry environment. The idea for the project came from my partner Mason, to whom I originally pitched my pre-vis abilities, and he would lead all the character animation aspects and use motion capture.

I hope by the end of this unit, that I and my team have **produced a rendered and edited animated piece using Unreal Engine,** consisting of realistic camera movements, semi-realistic layout design, and solid animation, which replicates the style of pitch vis quality pieces from companies such as The Third Floor, DNEG, and MPC, to show companies that I am very technically capable, would fit well into the existing industry previs/VFX/feature film workflow, and that I am very skilled in visually telling stories.

Due to the scale of this project, it will be challenging. Lots of planning and organisation will be required, but I am confident that it will be carried out effectively. Having not had the skills of two people behind a single animation project before, I am hoping that successful collaboration and our previous combined knowledge and understanding, will make this project very possible.

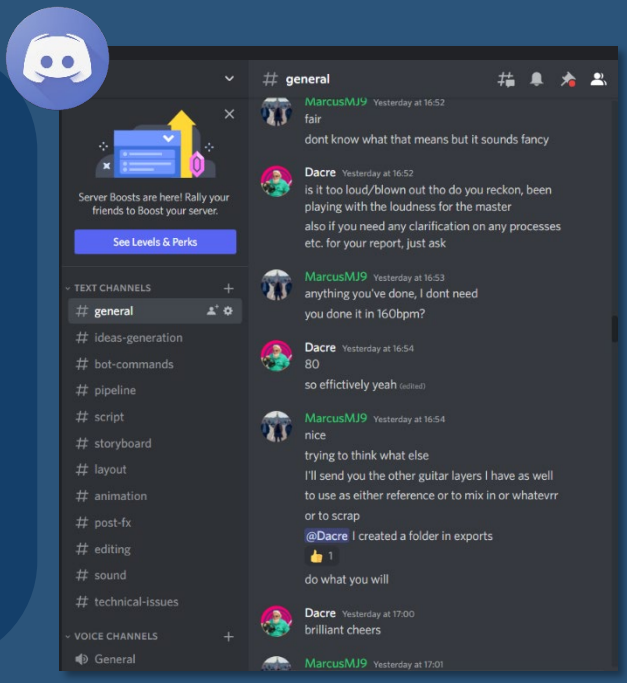
Collaboration

As collaboration was the main aim of this project, the collaboration had to be successful for the project's success.



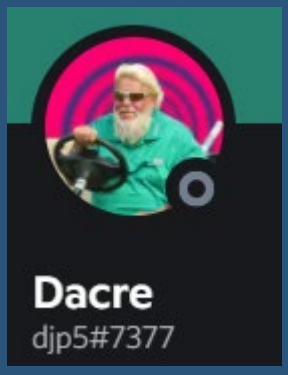
Utilizing a shared OneDrive proved to be mostly successful. Sharing everything was a no brainer with the scale of the project, and it was easy to use the same project and be able to keep everything together. We used it very effectively and its organisation contributed to the success of the project. The only negative that came from it was having to share the use of Unreal Engine. We had an issue where files got duplicated because we both had the project open. So we decided to let each other know when were using it, which proved to improve reliability.

Throughout the project, we had our very extensive discord channel, which provided to be a very effective and easy communication platform. The fact that I could ping any of the team for updates, or very easily just ask for a meeting really assisted with the project's success. In the last month, we had meetings at least twice a week, whether just me and Mason or with the sound designers. This really helped to establish updates, changes, and collaboration-based questions, especially when me and Dacre were collaborating towards the end on the music composition.



Incorporating the sound designers on the project was an excellent idea, and the fact that they solely focussed on the sound effects and atmosphere, made it sound extremely professional and brought the project to life.

Dacre was extremely professional and great to work with. He regularly produced bodies of work which Mason and I could review, and every time we praised his great work. Very competent and very professional member of our team.



Hammad on the other hand was less cooperative. He regularly had excuses or reasons for not producing work and did not actually produce anything until 10 days before hand-in. Dacre ended up taking on his workload and offered to complete his tasks for him, which helped my stress levels massively, and Dacre said he didn't have any problems.

Will, the music consultant, was a great addition to the team, and his contributions were brilliant. He produced many ideas for how the music should sound and was overall a great communicator. As he was only consulting, he had no intentions of finalising any composition elements, as I said I would take that on board. I had a lot of notes on the work he sent, mainly regarding timing, but I offered to take it off his hands and he was fine with it.

Another important collaborative member was David. David really helped in the creation of the live-action pre-vis, and his surprisingly good acting skills, his movements, and his ability to be easily directed meant that the live-action pre-vis was a very effective pre-production document. (See more details in blog)

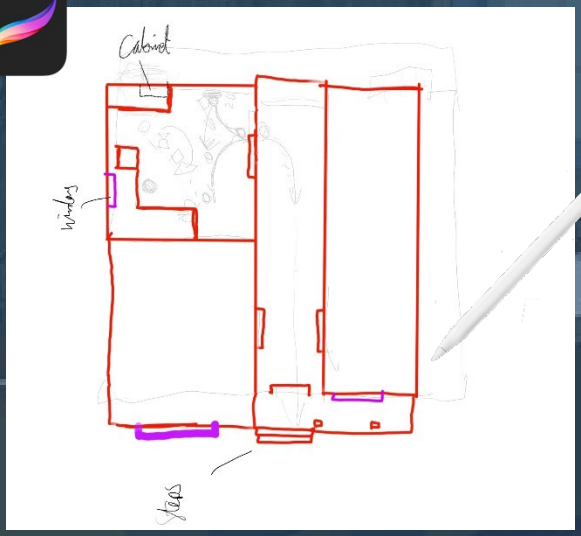
There were few problems with our workflow, which led to a very stress-free working environment. Although Hammad lacked, the sound designers produced excellent work.

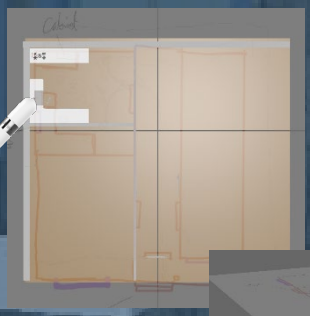
Mine and Mason's collaboration was executed brilliantly. We communicated very frequently, and our project is very successful because of it. We also both offered to assist with each other's roles to help with the workload, for example, me offering to take on some animations, and Mason offering to assist with some camera moves. Working with him, and everyone else on this huge project was achieved brilliantly.

Layout / World build– Maya

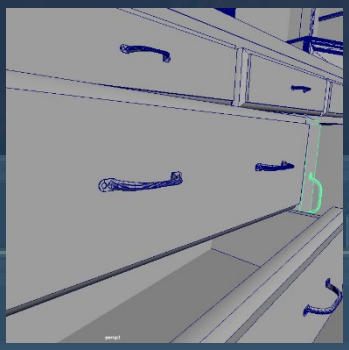
Worldbuilding in Maya was a relatively easy task, as I have had a lot of experience with the role previously, and luckily from the very start I had an idea of the exact layout I wanted for the Kitchen, and where the characters were going to be.

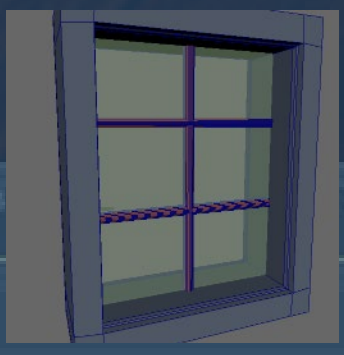
Using the floorplan that I created during pre-production in procreate was a brilliant tool, and a technique I have used very frequently, since the first year's modelling to the camera unit. Establishing the scale was simple too, as I imported the door model into maya, and sent the scale of the floor plan around that. It did not completely line up, but it communicated the layout of the room effectively

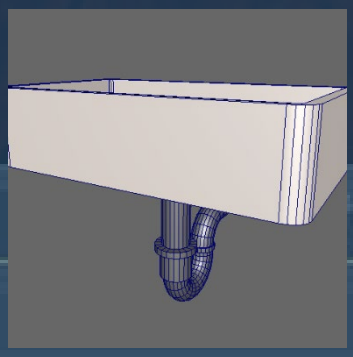




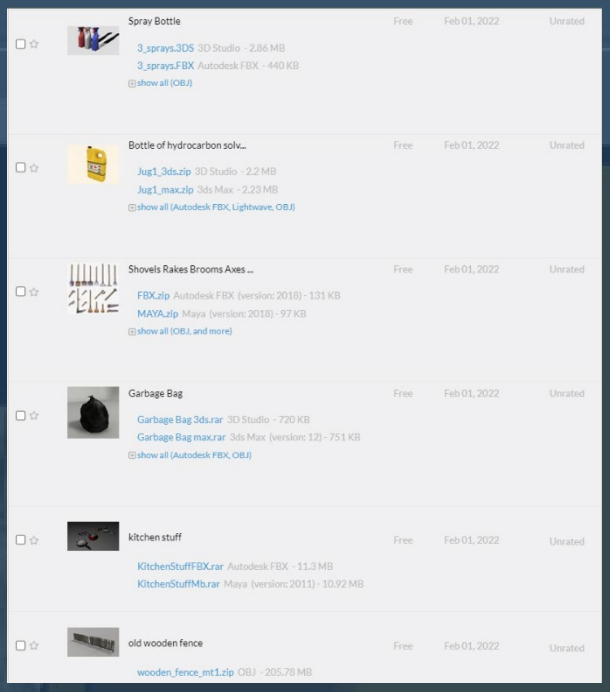
The modelling I completed for this project was not too difficult, as I have developed my modelling skills to a high standard already. The modelling I took on was only for very specific aspects of the story and I am glad I didn't try to model every asset, as this would've taken far too much time. I completed everything related to the layout of the scenery, like the counters, cupboards, and I also modelled assets that I wanted something more specific, like the drawers, sink, windows, and tap. During my modelling process, I used techniques including heavy vertex manipulation, Boolean differences, sculpting, extruding, and extruding along a curve. Although the models aren't super detailed, they communicate what they are and I feel they effectively contribute to the visual look of the kitchen, and therefore the film.

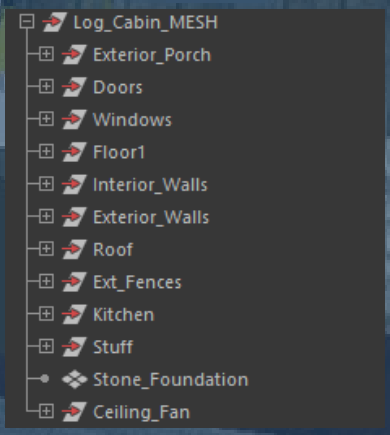






Finding free assets to fill the scene is quite hard. There were times when I was tempted to pay for some, but I resisted the temptation after discovering using a combination of CG trader and Turbosquid to find assets.
Turbosquid would only produce a few free assets, and then show paid adverts for lots of paid ones, whereas CG trader had more free ones available, Therefore, I used CG trader a lot more, and the quality of some of the free assets provided is exceptional, for example the kitchen hob, pots, pans etc. When they are pre textured it was also much better and easier for me to work with, it also sped up the workflow. There were points when I spent too much time on trying to fix textures, but I solved that by either realising models had a separate texture file, or by just using proxy textures which still looked ok.





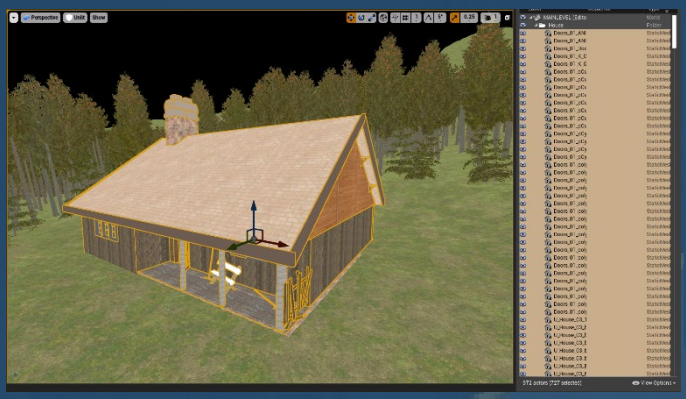
My organisation inside Maya was kept nice as well, and proved effective when Mason needed to reference it in. It was all organised, and any objects that were going to be animated were also organised as such. Very glad I spent a few minutes to overcome my naturally messy nature to ensure organisation and tidiness.

I kept the design of the exterior simple but indicative for time saving reasons, and to reflect the layout workflow for pre-vis. All the elements of the house are very communicative in that it is a wooden log cabin without too much detail, and I'm very proud of the turnout. I used simple shapes like prisms and rectangles to communicate the elements, and other aspects such as the chimney, fences and support beams were all sourced.

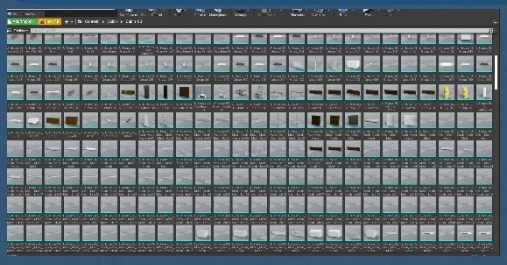
Overall, I am quite satisfied with the quality of the layout in Maya. If I didn't have lots of other roles to carry out, I may have spent some more time perfecting a few details, such as making some cupboards look more destroyed, broken lamps, more little assets etc. Regardless, it communicates that it is a ransacked kitchen, inside a log cabin, which was always its intention, and is reflective of a layout for pre-vis role.

Layout - Unreal

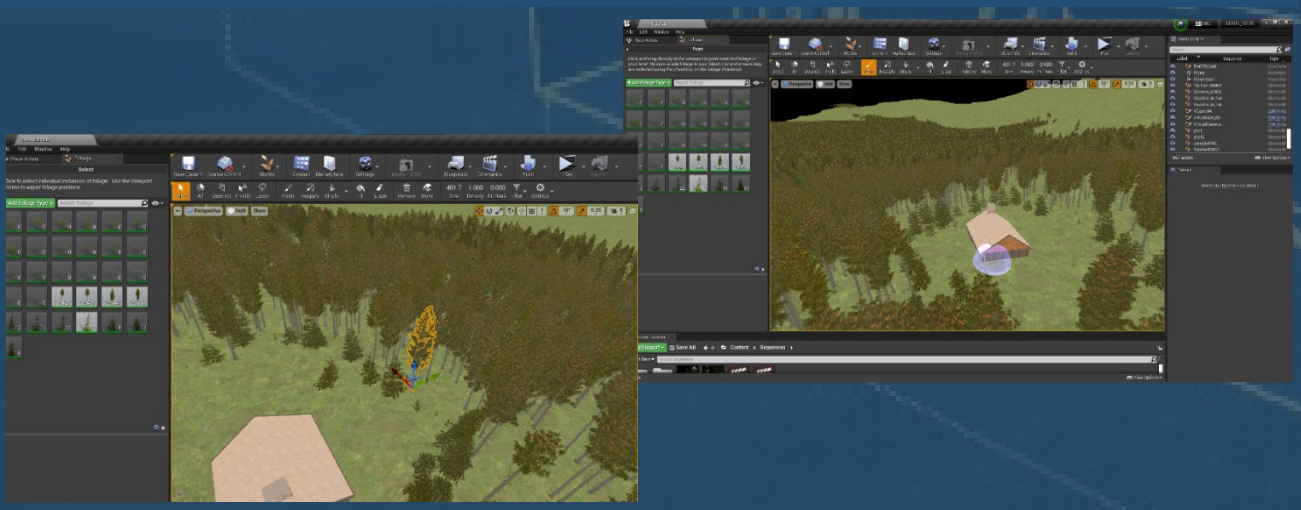
A lot of the tools for doing layout inside Unreal are new to me, so I did not want to go overboard. I feel like I effectively used the tools provided in Unreal to communicate an exterior environment, however, some tools proved to be temperamental.



The house assets imported relatively easily and were all in the right place. After I created a folder for every single object to go in, the outliner was much more organised. I was very pleased with this outcome despite my troubles with assets in the portfolio unit, but what I learned there informed how I did this here.

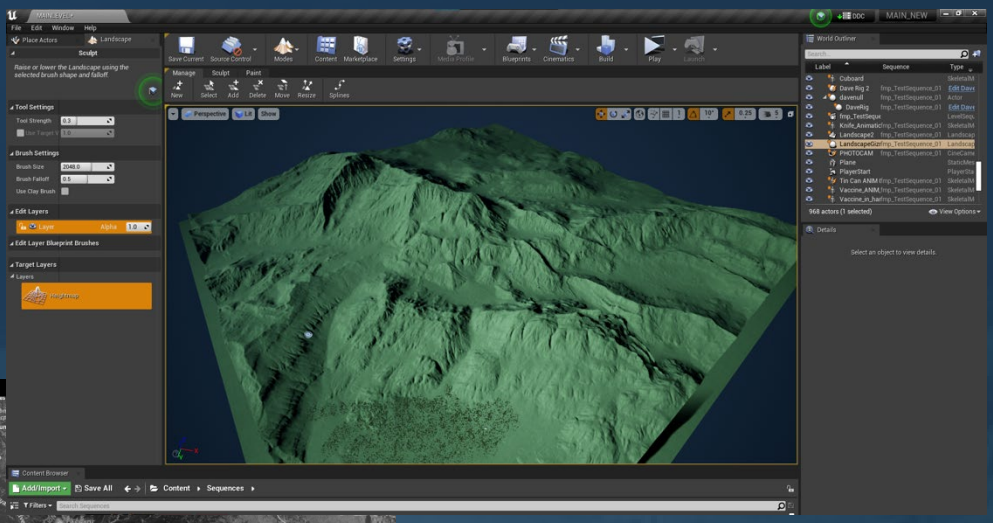


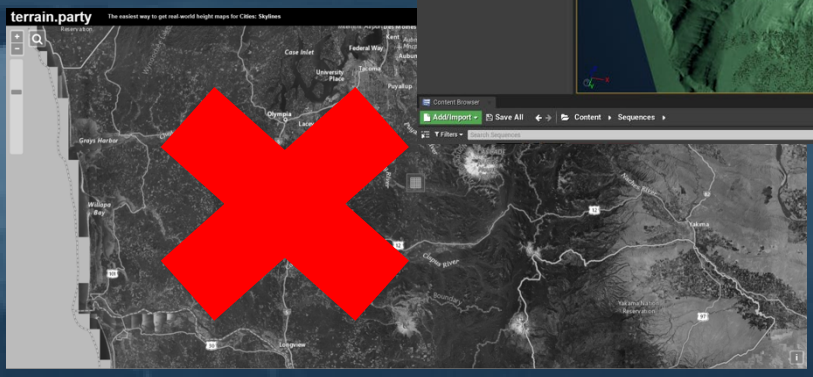
The spruce trees from mega scans were an excellent addition to the scene. I always planned on having a forest filled with thousands of trees surrounding the house, and these ones looked brilliant. Not only did they have LOD's built-in for optimisation, which helped massively when working with the project, but also they had actual wind animations. These looked natural, and I'm happy with what they added to the film. They also complimented the gritty dark and moody lighting in the scenery when lighting is applied.



Spawning the trees however was more difficult. Using the foliage painter tool to paint the trees only worked once or twice to paint over the entire environment and showed signs of being temperamental. After some time and saving the project a few times, I could no longer paint anywhere outside the boundaries of the house. There was also an issue where trees would be angled, but I'm glad I understood the parameters inside each asset and was able to fix it. Either way I successfully used this tool to fill the scenery with around 25,000 trees with variations.

For the mountainous terrain, I found that you could use heightmaps to create a realistic landscape shape, instead of my original plan which was to manually sculpt one. I really wanted to create a custom heightmap using Terrain party, based off a tutorial I watched, but this tool has gone offline and no longer works. Either way I'm mostly happy with the turnout, and now understand the process. I wish I could have more time figuring out how variable heigh textures work for more realistic grass but figuring this process out would've added a lot more time to the project, which we did not have, considering my other roles. The speed of this workflow is an excellent way of time saving, and perfect for the role of pre-vis on projects.

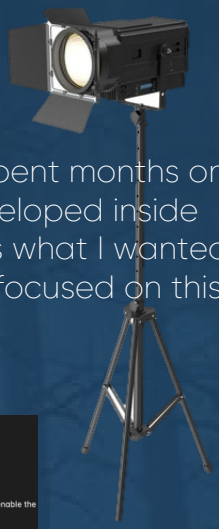




The process to create realism inside Unreal engine seemed like a very long process according to research, and something I may have had to dedicate more time to, had I not had to work on all the other aspects. I wish I had more time to add more details to the exterior ground, such as rivers, real grass etc, however time did not permit, and I rather spent time focussing more on framing the animations and camera work. I did initially attempt to add grass

Overall, I understood how to create a good exterior environment inside Unreal, and effectively did so to a certain degree. With more time, and had this have been my primary role, I would've spent more time on making it look more realistic.

Lighting & Rendering



Lighting inside Unreal was another process that I could have spent months on learning how to make it look perfect, but the lighting skills I developed inside Unreal still lead to a really nice visual look which communicates what I wanted it to. This was one of main bracketing roles, as I had never really focused on this in Unreal, or to such scale on previous projects.

To understand the main principles of the main lighting systems, I spent a few sessions with technical tutor Reke. He helped me navigate the primary lighting systems, as well as the settings to change to get the look I need, as the number of settings to change is quite overwhelming. The main ones to use for exterior lighting were **a directional light, sky light, atmosphere, fog, and clouds**. All with their own settings. Unreal engine also has a post-process volume, which is live real-time 3D colour correction.

UNREAL NOTES
Market place stuff already has LODs, but to optimise.

Rendering - LOD, you can force the LOD model with each.

You can set the minimum LOD in each model, which will then update.

With the sky, find an HDRI, and then you can use a skylight to set that as image-based lighting or enable the backdrop plugin.

YOUTUBE how to hide texture repetition, gives you a free master material as well
look for something that can give you forest-based off slopes, procedural forest.

Look up unreal recommended landscape size when generating landscape.

FOG: exponential height fog, change a load of settings there

LIGHTING, cascaded shadow maps, to reduce shadow depth.

World creator - Landscape

days are gone, look at the environment.

look at decals to break up repeated textures.
(use quite bridge to link everything)
import file"
Add "Decal" to the scene, the arrow indicates where the decale goes.
You can set meshes to not have decals.

Create a new material, import all the images, set the material domain to "deferred decal"
set opacity to translucent

WHEN importing, you can do, File - Import to Level to bring scenery in where it was in Maya.

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LUT (lookup table)
Screenshot scene
import screenshot, then import LUT table as a separate thing
Colour grade in photoshop using adjustment layers
copy adjustment layers to the LUT table file.
Export the LUT table,
Reimport new LUT table into Unreal
Apply that to post-process.

Change LUT Table in Level of detail:
MIP gen: NoMipmaps

Texture group: colour lookup table

Raytracing:

Platform, windows, directX12

Rendering
Ray Tracing
Enable
Restart

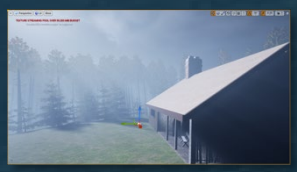
Turn off when coming off the Uni computer.

Light Preview - Path Tracking
For proper realistic rendering, like Arnold

Overcast simulation.

Go into the sky atmosphere and tweak the Atmosphere MIE and absorption settings.

After a session, and a few tests using each of the parameters, I was quite satisfied with look I had, but knew that changes could be made. I made subtle changes throughout using mostly the post process volume. I had found working with the project was consistently very dark, so I was always torn between bringing the lighting up or down. I really like the high contrast dark gritty look, with the natural night-time look, but equally, it's very hard to watch as an audience member, or working with such dark displays when playing.

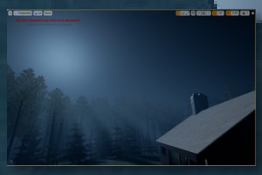


Without post processing

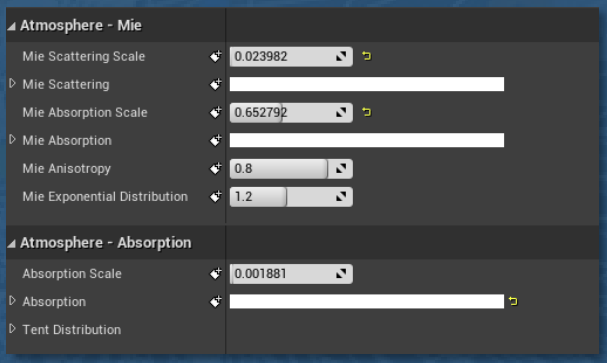
Without fog

Without atmosphere

Without Clouds

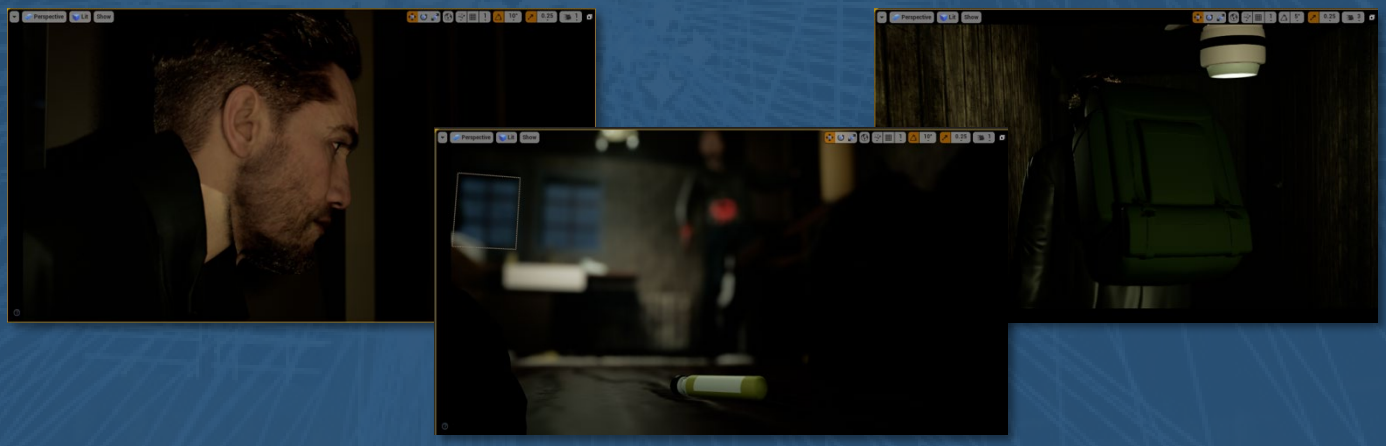


The hardest setting to play with was the Atmosphere MIE. I didn't really have any ideas of what this setting did, all I knew was that it helped create the dark colour of the **sky**, which I took notes of after my session with Reke.



I did spend time on filling some shots up with fill lights, using area lights, or as unreal calls them 'rect lights', which proved very effective, but it was quite difficult to keep the realistic look of the light, whilst also lighting up certain elements. As some of the shots are so quick, you don't really think about if the lights look artificial or not, which means I have done it right to some degree. Again this can only be improved by more time dedicated to the lighting. I am still very proud of how the lighting has turned out overall.

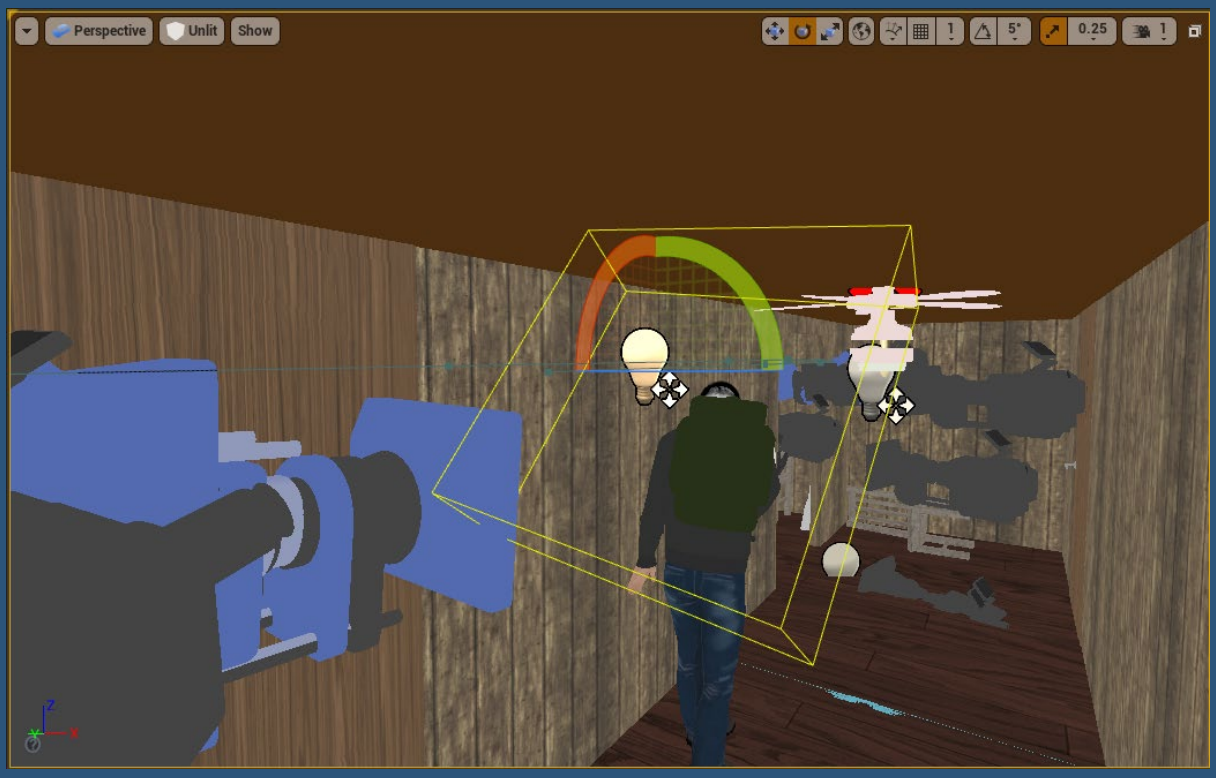
For more detail / dev, see blog



Interior lighting, I really am proud of. I experimented a lot with figuring out which lights would work coming from the chandeliers. I originally just had point lights, but far too much light was reflecting off the ceiling. Therefore I used spotlights instead which reflected how lights should work, facing down. This then didn't look realistic enough, so I added back the point lights at a low intensity to fill the dark space.

Spotlights only

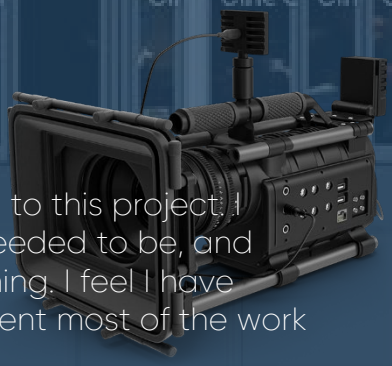
Point lights only



Here you can see visually what a 'Rect light' looks like in the scenery with the cameras. It is a really brilliant way of filling the room with extra lights, as it's so flexible with the size, position, and barn door angles. I enjoyed using these lights the most, I think.

I enjoyed lighting, but I don't consider myself an absolute master at lighting, I used it here to convey a message, and to make the room look quite eery, which I did so successfully. I am fully aware that lighting is a huge part of any production, and takes years to properly master, but here I know it looks good and conveys the message, which as a pre-vis artist is all that's necessary. That's not to say I feel like I've done a bad job, because I know I haven't, and I know it still looks brilliant. Lighting was fun, but it was hard not to go down the rabbit hole of spending hours perfecting lighting.

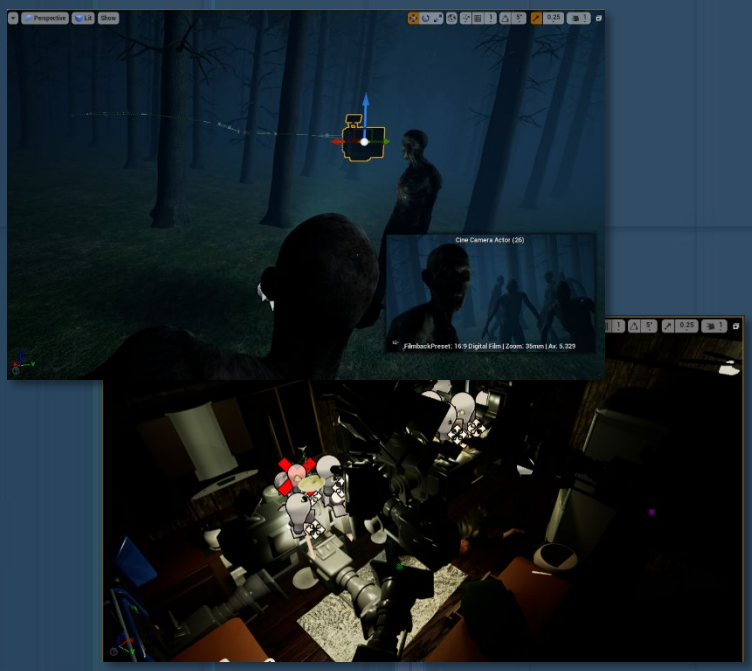
Cameras and Editing



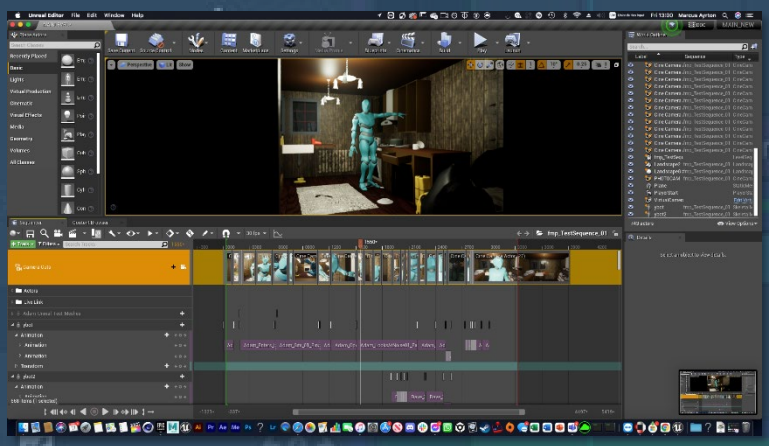
The cinematography and editing were my key contributions to this project. I planned out all the camera moves, where the characters needed to be, and how all the shots would be edited together from the beginning. I feel I have effectively carried out these roles in these projects, and I spent most of the work perfecting the look of the shots.

I really enjoyed working with cameras inside of Unreal, as the cinematic view is so realistic, and extremely flexible with camera settings. Real cameras tend to have limitations with focal length, and aperture, but the fact you can have no limitations really lets you get creative with shots.

Despite this, I found myself using typical lens sizes and specifications, primarily things like 35mm, 50mm, 18, and 10mm, never anything specific or niche. If doing pre-vis for live-action films in the future, I am aware that sticking to actual camera lens specifications is essential, so this was good practice in doing so.



When initially starting to create shots and edit them together, after importing Mason's first instances of motion capture, I felt a sense of euphoria, as it felt the story was starting to come together in its most basic form. Seeing the layout all together with the animations and camera work in the first pass was an amazing sight to behold, and evidence to prove our successful collaboration workflow.



The first shots were quick and easy to create, as I based them on our live action pre-vis that we created 2 days into pre-production. I also based the timings of the cuts and edits based off the live action pre-vis that I edited together. Editing cameras together uses the camera cuts track, and dragging to determine the lengths of shots. As I had developed a vision for how the project was going to look so early on, a lot of these initial shots remained in the final edit.

Having the live-action footage was a great assistance tool to create shots, and was almost like having a storyboard, which is typical industry practice for shot creators. However, we knew that the live-action pre-vis would be more beneficial to us and communicate more about the shots than 2D storyboards could. When creating shots, I never used the live-action as direct reference, but I had it next to me as a rough guide. Because of my skill I could replicate the shots with ease, picking lens sizes, and with good framing.

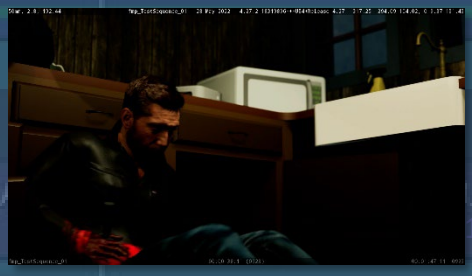






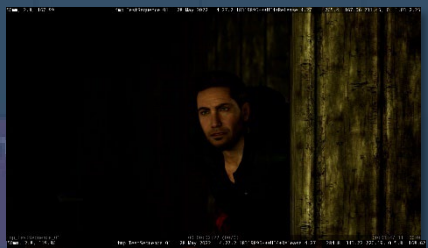

Although *these* shots are close to the live action counterparts, development was always inevitable. As I had complete freedom in Unreal to create whatever shots I wanted, I added in some extra shots in which they weren't even considered in the early planning stages.



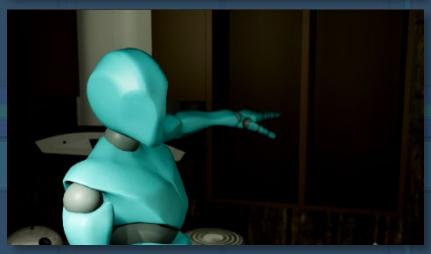

In total there are 55 cameras inside the sequence, including 3 virtual cameras. 42 shots were used in the final film. During this process, there are shots that were reframed, or massively changed to an extent, purely based off testing new shot sizes out, or if shots just overall gave me a better feeling. When changing the shot, I genuinely know I'm happy with it if I feel something when observing it. That's what it took to get these shots in particular right.

Longer focal length (50mm)
Tighter framing and lower aperture
For a better reveal impact



Tighter framing, pan upwards.
Indicates struggle better and
Shows need for cupboard support

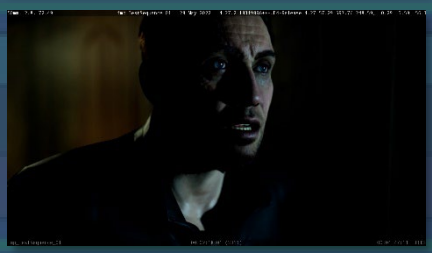
Offset framing, further emphasis
On something behind the wall.



Tighter framing to provide
Further emphasis on the reaction

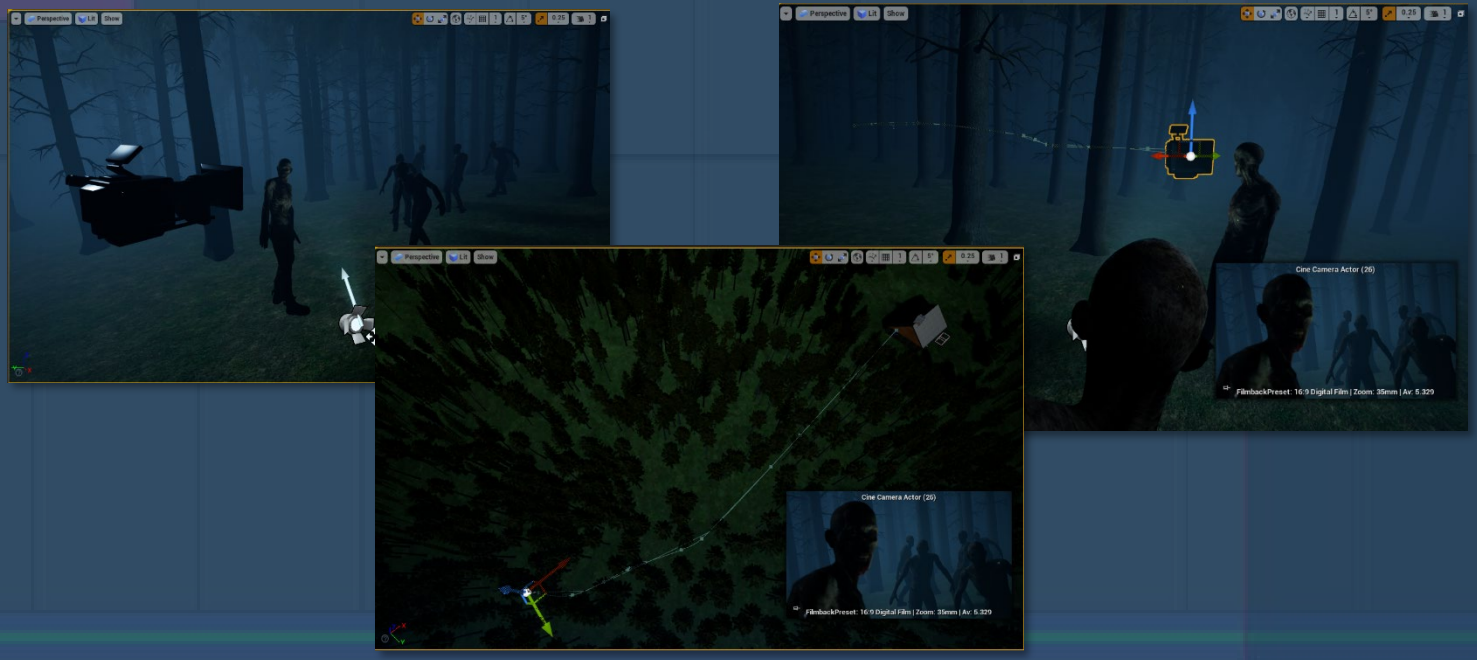
One take move. Tighter framing
overall, kept camera to just
rotating, handheld move feels more
natural and unstable

Change of angle entirely, felt more
Intense. Looking out more onto
the horde.



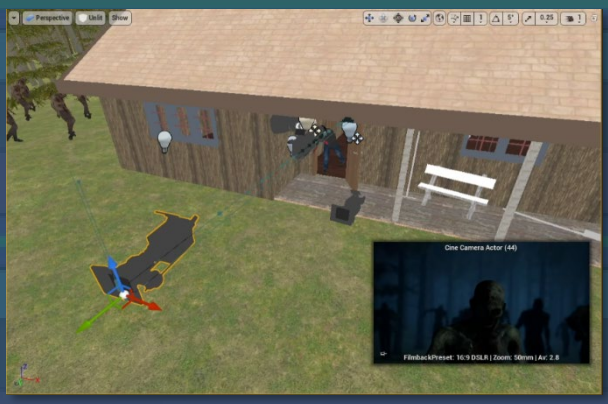
When originally planning the shots, I knew there were particularly advanced shots that could have only really been officially planned and executed inside Unreal. These were the shots that required a bit of extra work, but the turnout was magnificent, and really make the film.

The prime shot was the drone shot. I always wanted the camera to fly from the zombie scream in the house, through the window, and to the clearing in the forest with a horde of zombies, to visually represent sound travelling. To do this I had to plan the movement of the camera through the forest and make a space with the trees that could fit these zombies. It took me a few tries to get it right (see blog) but eventually I got there, and instantly it became my favourite shot. The pull focus from the horde to the individual zombie was an accidental find with Mason's animations that one looked up slower, so I tried it out, added the pull focus, added a fill light and it looked magnificent.



This shot involved a crash zoom (or crash truck) where the camera flies from being behind Adam to the zombies. I framed both the start and end and used the graph editor to make the movement sharp, and then also did a rack focus. A very complicated but extremely rewarding shot.

This helicopter shot was always planned. I kept it high in the air at a low angle, like a car chase copter view and framed it so the horde was prominently in framed. For the effect I wanted, I know helicopters don't actually move, they zoom in, so I animated the focal length, ensured the animation was quick but smooth. I also moved the camera along a path, and added handheld keyframes for realism. This took multiple attempts to get spot on, but again it's very rewarding.



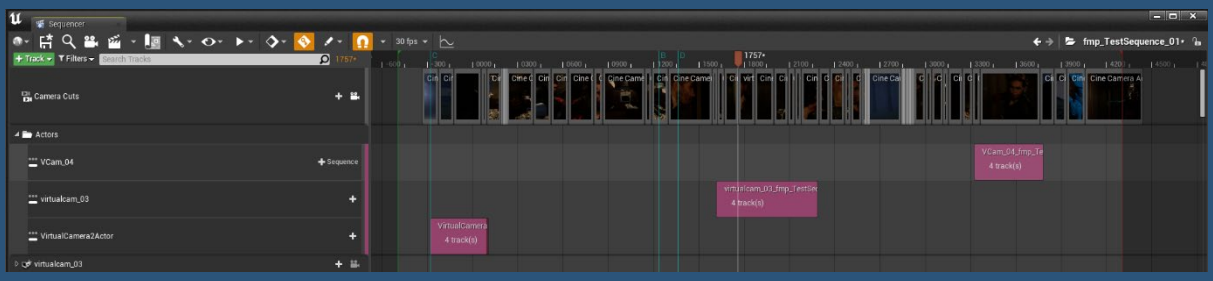
Editing these shots all together came down to having a good sense of timing. I never spent too long perfecting the timing of certain shots. The only one I knew I was massively out on the opening establishing shot. In one of the drafts, it was far too long, so I had to cut it in half.

An editing technique I used was cutting on action. This means that the edit matched the movement of the action. This was done with the shot of the knife being removed to when the knife stabbed Dave. I made the cut as the knife was in the air, so the transition looked natural.

I also liked to cut just as characters entered the frame. For the shot when Adam sits down, at the start his head is just out of frame, but he drops into the frame when the edit is made. I used this quite frequently, on shots such as his face entering the secluded cabinet, his hand entering the cupboard shot, and Dave entering the frame out of focus when he walks in.

Another notable technique I used was frame matching. The best example of the use of this technique was when I cut the zombie looking towards camera, with Adam looking towards camera. They aren't framed the exact same, but their heads are of very similar size, and alignment, meaning the cut was very natural.

I am quite proud that with my previous editing experience, I could execute these techniques quite naturally without extra assistance, as I had judged all of my shots and edits based on how they made me feel, and trusting my gut instinct.



Very close to the final outcome of what the edit looked like. It got some complex, I had to use the graph editor on m second monitor

Overall. I'm extremely proud of how all the edits and camera work came out in the final film. My choices were all based on instinct because of my natural creative eye for composition and timing. Sometimes it is hard to realise that the shots and edits I would do naturally, are named techniques used commonly in the film industry, as I make changes to shot sizes and edits purely based on feeling, and only occasionally on how good a technique is (for example the dolly zoom, and helicopter shots)

One creative and technical tool I really wanted to get right for this project, was **virtual camera**. I had many problems with setting virtual camera up initially. Connecting a device to Unreal Engine's 'live link' tool was standard enough, but recording camera moves into the sequence was very tricky. Setting up the camera, I followed a lengthy tutorial from 'WINBUSH', but recording into the sequence I had to figure that out myself.

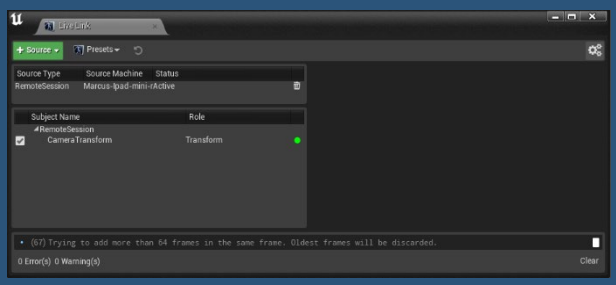
After months of trial and error, and instances where Unreal completely crashed after trying to record, I eventually developed a successful pipeline in which I used to record virtual camera movements:

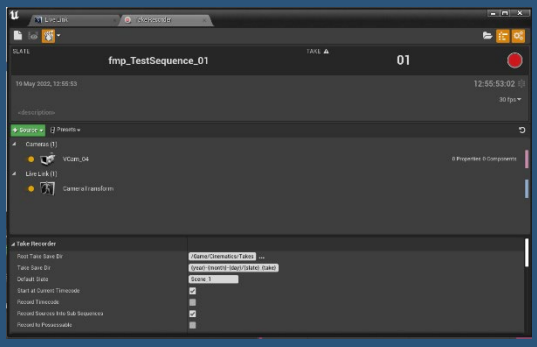
- Use live link to connect to device (Ip4 addresses)
- Take recorder window – Set main sequence as recording location.
- Ensure that your cameras are being controlled by live link device
- Change preview settings to 'unlit' so lag didn't occur.
- Change initial camera starting point using translation, ensure there are no keyframes.
- Lock the viewport to the virtual camera view, and turn off sequence override.
- Once you've recorded the sequence, it'll create a subsequence. In the camera cuts track, add the new camera created in the subsequence to edit your move in.

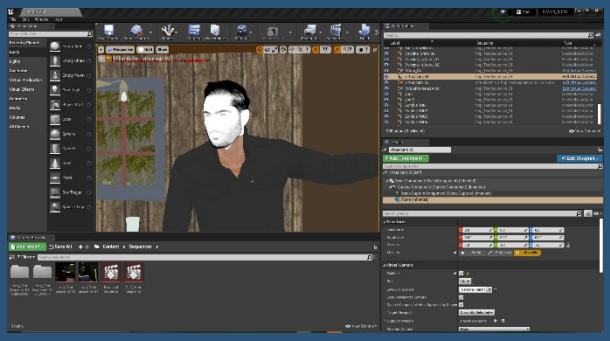
The steps are very specific and elaborate, as not doing these results in catastrophic failure.

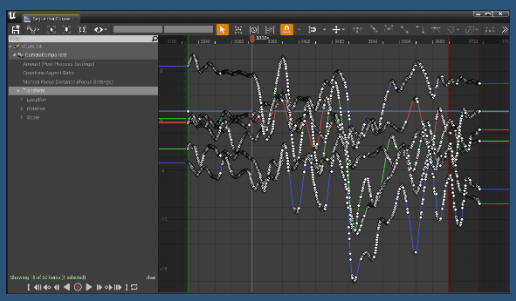
In the end, it was still very temperamental. My device never actually had live preview of the scenery like the tutorial showcased, the movements recorded had elements of choppy movement which I needed to cleanup (see blog), and if you didn't press the stop button after recording, it immediately crashed.

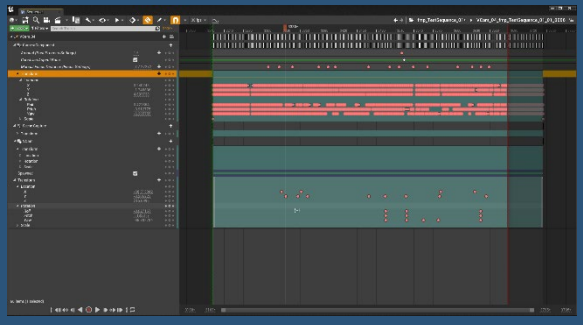
I wasn't happy with the workflow and hope in the future to find a better alternative. I ended up not using it across all shots, and instead developed











Conclusion:

In my introduction, I stated that I wanted to use all the necessary skills of a pre-vis artist (layout, cinematography, editing etc) as well as technical skills, in a collaborative workflow to produce an edited sequence rendered in Unreal Engine.

The final output of the film certainly reflects these initial aims and is a magnificent technical storytelling piece, which visually shows all the hard work that has gone into it. I am very proud to step back and say that I have worked on this piece. It's also amazing that other than a few assets and the zombie rig, everything in this project is original, which is absolutely fantastic achievement to have.

The collaboration of this project was overall very successful, and without it working, the project wouldn't have gotten anywhere near to the stage it did. Having this experience working collaboratively is essential for studio environments, and the way it was executed, although not perfect, has got me excited about using similar workflows on a larger scale. The collaboration worked because the people involved were hardworking and as passionate about the project as I am. Those that weren't as involved only suffered themselves, and it did not affect the output of our work, mainly because of the way I ensured to the best ability that each member relied on each other as little as possible.

I completed all my primary roles to a very high standard and spent time practising my camera work and developing shots. Had the project been purely a piece to test out these skills, I may have had more opportunity to try some cool experimental stuff inside Unreal, although I have my portfolio project to try these things out. I measured the success of the project by how well each shot communicates an aspect of the story. Although to some degree I wish I had more chance to add extra detail, it was never a condition for success.

Maya behaved very well in this project, as I have had many years of troubleshooting and problem solving to know what to do. I completed the layout/worldbuilding role, as well as exporting models and animations without issues.

Unreal Engine is a very difficult piece of software to use, but after spending time understanding its tools, I'm glad I am now confident in every aspect of importing animations, scenery and using cameras to tell stories. Compared to the Portfolio unit, much more time was spent on the creativity of shots rather than technical problem-solving. There were still many new problems that came with this project, including virtual camera issues, offsetting animations, and the sheer power-hungry nature of Unreal itself. Needless to say with time and dedication, I overcame these issues, and have now figured out what works, and to do it next time to save time, for example for the virtual camera, I now know to

use the take recorder to set the sequence location, remove the sequence playback override, and select the camera via the created subsequence when editing.
Right now, I'm a student in animation experimenting on a smaller scale with new technologies being used in the industry today. 5 years ago, I had the interest to enter the film industry, most likely in editing or postproduction, and I am glad that although I changed paths to do an animation degree, I have kept using my camera and editing skills to develop projects in an animation environment.
In the future, I want to have a cemented position in a studio, hopefully at somewhere like The Third Floor, DNEG, Pixomondo or another studio with a dedicated pre-vis department, and have had the opportunity to create and edit pre-vis shots on at least a few productions.

I also measured the success of this project by the feedback I received. Peers who have watched the film including classmates, technical tutor Reke, teachers Dev, Allan and course leader Dan all really enjoyed the film, as well as Stewart Ash and Maya Greaves from The Third Floor, and Liam Morris from Pixomondo.

Hopefully, now the project is fully complete, it will fully showcase my skills to the industry, online and at the degree show, and hopefully land me that all-important pre-vis shot creator role in a studio that I want.

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