

July 2023 - BIP REPORT

WAKE UP BEFORE IT WAKES YOU UP

July 2023 - BIP REPORT	1
Project presentation.....	2
Pre-production.....	2
Screenplay	3
Physical art	4
Production.....	4
Virtual art	5
Lighting	6
Camera crew	7
Result.....	9
Analysis	15



INSTITUT NATIONAL SUPÉRIEUR
DES ARTS DU SPECTACLE ET
DES TECHNIQUES DE DIFFUSION

Project presentation

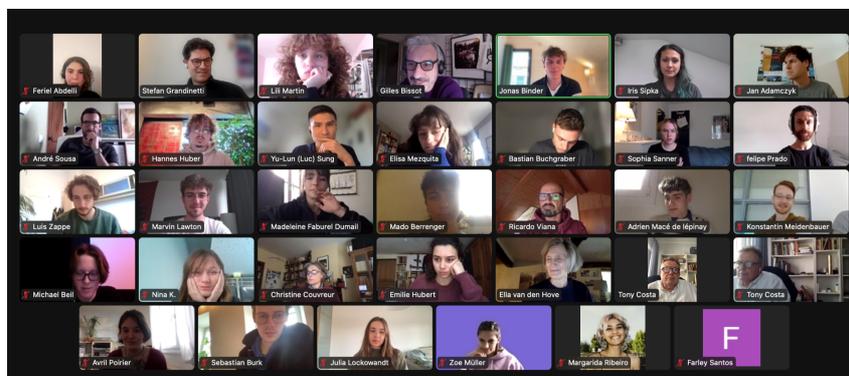
During one week in July 2023, 37 students and teachers of Herchschule der Medien from Stuttgart, Lusófona from Lisbon and INSAS from Brussels got together in Stuttgart to shoot a short awareness type ad warning on climate change. This international project was made possible by the EU as a Blended Intensive Program (BIP).

A BIP is a short ERASMUS project gathering together students of multiple European schools not only interested in the pedagogical acuirements allowed by the program but also having the desire to meet foreign students and staff, develop their transversal skills such as communication and research, and get exposed to other views, knowledges and teaching methods.

The goal of this international crew shooting was for everyone to acquire experience from a new technology called virtual production. HdM owns a 3x3 meters LED wall and a set of tracking cameras fit to show in studio a 3D environment moving accordingly to the camera. Use of this type of technology is increasing across film studios today. It was showcased in large audience series such as *Mandalorian* (2019) and *1899* (2022). It's meant to allow a lot of on-set special effects: create any type of easily customizable environments, match harmoniously background and foreground in terms of lighting reflections, colors, perspective, and help the actors' immersion in set-decoration.

Pre-production

Online pre-production was one of the main challenges of this project. We all communicated via a discord server. We had zoom meetings each 2 weeks from march to may, and one per week during june. At the beginning, we split into 5 teams of around 5 students mixed between schools to write down first ideas on a script we'd like to adapt that would make good use of the led wall and its virtual environment. Subject was very broad, we could reflect on any kind of theme at that time. Everyone voted for their favorite after a pitch



One our many zoom calls

presentation meeting and the chosen one was called *Wake Up*, a prevention spot warning about the brutal consequences of climate change today.

Everyone then decided which role they would play within a number of film production departments: screenplay, directing, camera, lights, grip, sound, set decoration, virtual art, studio technicians. From there, we all had our department chats available to move forward into pre-production.

Screenplay

American Suburban Area

INT - BEDROOM - NIGHT

A woman lies in bed consuming mindlessly social media, TV, Fast Food and in the background, we hear a news show on the radio. She falls asleep.

MORNING

We see her again lying in bed, waking up. Everything looks nice and tidy. She gets up slowly, goes to the window and closes her eyes enjoying the sun.

Through the window we see a beautiful suburban landscape.

Suddenly the world glitches and the scenery switches to burning and messy for split seconds. She opens her eyes but doesn't get a hang on what was happening. She closes her eyes one more time but there are more and more glitches.

She flinches and tips over in her bed.

NIGHT

She wakes up soaked in sweat. Stands up and goes towards a mirror and looks at herself.

Focus shifts to the window, where the outside burns.

Claim "wake up before it wakes you up" appears

END

Physical art

During our meetings, we talked about constraints we could meet. Students from Stuttgart shared to the internationals informations about what was going on their side : 3D environment shaping, on set physical art's state of advancement, lighting plot... INSAS students brought some clothes and curtains to help with physical art, every piece of furniture came from the HdM students' apartments.



Set decoration

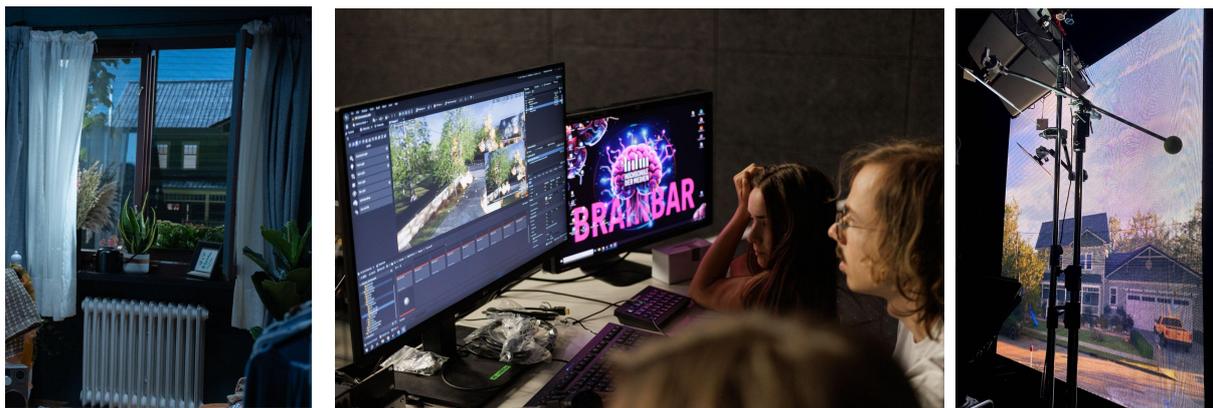
Production



We met on the 9th of July, visited HdM the 10th and began shooting the 12th after one day of testing. We had daily meetings to help us understand the work of everyone. A day would start at 9am, ready to shoot at 10. One shot in the morning, one hour break at lunch and 2 shots during the afternoon. Having a small amount of shots per day helped us focus on the teamwork and on the new technology which sometimes needed time to look well.

Virtual art

The led wall was standing behind the window of the on-set physical room. It showed one landscape through different lighting conditions (morning, night, on fire). Having just one perspective to the outside world was helpful to reduce the time needed to shape this 3D environment. We had to go to the essential, which was trying out the led wall's ability to integrate on a set in terms of colors, reflections, realism and movement. Building the outside in different perspectives would have been very long and not necessary to us. The landscape consisted of a suburban area typically American with clean mowed lawn, open space and some trees around.



3D environment on the led wall behind the window

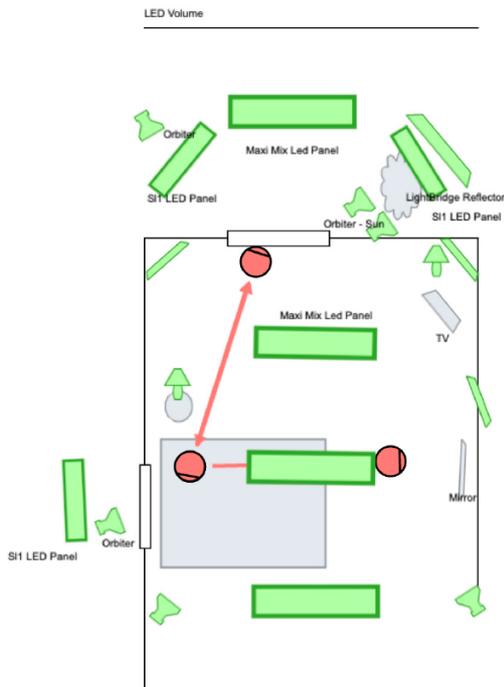
Bastian from the virtual art team explains how they proceeded:

“When designing the virtual landscape, our main concern was to create credibility. This is especially important to create a good symbiosis between the physical set and the virtual set. After all, it is not least about blending these two realities with each other.

For the lighting of the virtual scene, we wanted to use very realistic light at first. That means a realistic atmosphere, sunlight and a photorealistic sky. Since Unreal Engine allows you to implement photorealistic textures from megascans via the Quixel Bridge, you can achieve credible results very quickly. In addition, there are ready-made landscapes in the Epic Store that you can purchase and redesign according to your needs.”

And indeed the virtual team made a landscape quite credible and photorealistic quickly. However, one must admit that it was sometimes a long process matching it to the real set.

Lighting



Our lighting plot

On set lighting's biggest concern was being able to match multiple atmospheres from the virtual outside with the 3D environment shown on the wall, and doing it quite fast. In 2 days, we shot this room under night, morning and fire. The lighting crew had to know how to achieve these ambiances in order not to lose any time on set. They were then able to focus on the light levels and contrasts.

The idea was then to hang every fixture before the shoot began, address them on a GrandMA lighting console and achieve testings before shooting. The fire effect was ready before first day of shooting. As everything was set on a console, they could easily switch from one ambience to another, hence making the fire glitches with the right rhythm.

All the fixtures were RGB LED. Many Orbiters were used especially with Lightbridge lighting reflectors which helped give distance between sources and subject. Everything was programmed. Today there are even new lights (Kino Mimik) coming out which are able to project light accordingly to a video signal they receive, like the screen video output.



Different lighting moods



Co education among students about DMX and LED lighting

Camera crew



Camera crew's main concern was filming the led wall in a manner that allows it to be realistic. Indeed, with its pixel pitch of 3.6mm and resolution of 768x768 pixels, we

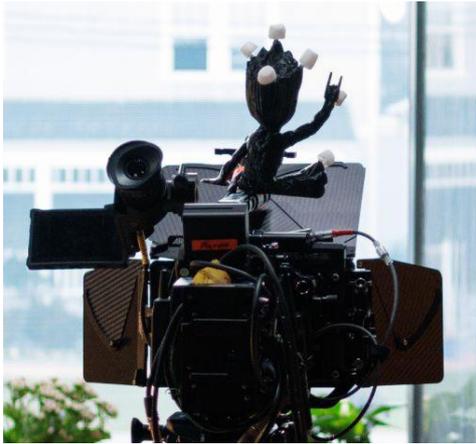
couldn't really film it either frontally or too close. Farley, our DoP, student at Lusófona, was always communicating with both lighting and virtual art crews to help with matching inner and outer worlds. The virtual art crew then managed with their tools :

“Adjustments to the scene could be made all the time and, thanks to the game engine, even in real time. These include technical adjustments, so that the blacks of the foreground and background were identical, as well as creative adjustments such as different lighting moods and colour adjustments. The DoP was able to express his wishes on the set, which the Virtual Art department was able to realize accordingly.



Monitoring the camera clean feed helped the virtual art department to match background and foreground

It was always important in this step not to judge the LED wall alone by itself, but to make appropriate adjustments based on the final image seen through the camera. For this purpose, colours can be changed globally but also individually for certain assets and lights within Unreal.



Camera "crown" atop the handle

To make the symbiosis between the two worlds even more credible, the effect of parallax should also be taken into account. For this purpose, the camera movement of the real camera on the set is picked up via a tracking system (such as Optitrack in our case) and transferred to a virtual camera in the Unreal scene via LiveLink. The camera has a so-called camera crown with a certain asymmetrical shape known to the tracking system. If the offset of this tracker is matched to the nodal point of the camera, the result is an exact representation of the camera movements. Within Unreal, one should then set the exact focal length and aperture and that's it.

In order to finally get the setup working, nDisplay is also installed. On the one hand, this plugin allows us to save resources and, on the other hand, it helps us display the so-called inner-frustum of the camera on the physical LED wall. The advantage here is that the computer only has to render the area visible to the camera (inner-frustum) on the LED wall in real time. The outer-frustum can then display a frozen image of the environment in order to still get meaningful reflections within the physical set.

Last but not least, it should be mentioned that all devices must run in the same clock. And that is really accurate to the frame. The Brainstorm DXD16 and the eSync2 of the tracking system take care of this. In addition, the LED wall is played with 50Hz using frame-doubling of the graphics card, even though the camera only records 25FPS. The reason for this is better synchronization of the camera and the LED wall.”

Result

After image and sound editing, grading and mix, the result's duration is 2 minutes with 5 shots. Here are some pics:













Analysis

To begin with, we have to say that online collaboration in pre production wasn't as easy as in real life. For example, we international students couldn't help HdM students build a 3D environment because it requires better computers than our self ones and time that we didn't have before this project. At the end we only brought some clothes and curtains and a video we filmed to be put inside the TV on set. In every aspect we lacked some time and maybe some motivation because we didn't really know where we were embarking with this technological shooting. It was at the same time exciting and a bit overwhelming when the preparation was added to our schedules when we had exams in June or other projects at the beginning of summer.

Fortunately, everything went well. The reception HdM offered us was really great. They worked more in preparation as they had all the tools in their hands and it helped the project getting on foot a lot. We screened the result on friday, 14th of july and analyzed our week of work all together. Here are the learnings we got.

Everyone was glad to get in touch with Virtual Production constraints. We managed to match the led background with the inner lighting ambience quite well. The most difficult shot was the one in front of the window, from outside. We were close to giving up but communicating about framing, dolly moves etc felt good and fluid even though it was often hard to fully express what we meant. That's both coming from speaking technical English and not knowing what other student's experiences were at the beginning.

We sometimes felt like it was a bit rushed. We started working on set very quickly, with almost no preparation. It was hard to get to work properly as a team within only 2 days of shooting. Getting to know each other's different way of working because we come from different schools and countries took some time, we were better the 2nd day than the first. But communicating differently was also one of the most interesting things we learned. Creating our own LUT was not possible either because we first had to get in touch with the DIT setup when we got there, which quite screwed up research for colors and contrast we'd like. We also didn't take the time to think about workflow, we tested it with the teachers during shooting. There missed one day of preparation to really feel like we handled what we did.

We felt that more interactions between the virtual art department and other crews would have been necessary. We felt too far from their department and missed some info that we should have asked them before.

For the virtual art department, the main point was the short time they had. It's amazing that anything worked. Put anything live on set, on the fly, build out the environment almost anywhen like adding a car to give more life to an exterior is a huge advantage with the virtual production technology. Virtual production can be a great gain of time for such difficult VFX shots like reflections in a shaking mirror in a handheld shot, you can't do that easily with green screen.

However this technology brings on set a considerable amount of small things. Very complex little pieces to manage all around and if one stops working it stops the whole set. That can become quite dangerous, it's really important to think of plan B. Furthermore, it takes much more time on set to build up shots. Our blocking times were underestimated as we always had micro adjustments to achieve on the screen.

Virtual production brings a really new mindset about set decoration. If enough time is scheduled before to prepare different virtual 3D props, then we can adjust a lot of virtual things on set. With that possibility also comes responsibility to keep continuity and 3D pieces can move quickly with a simple click.

Maybe on *Wake Up* we've been a bit too shy on parallax in the environment, which is a shame because that's almost the biggest advantage of having a tracking system. Indeed the outer world, everything was quite far, the house, trees, road and all.

Finally, having a virtual production crew member on set next to the DoP would have been nice, acting kind of like a VFX supervisor. For example, at once set decoration team lost a lot of time trying to adjust a reflection in a mirror because they didn't know the 3x3 meters led wall could be moved. We were actually working in a very classic way here. We have to understand which jobs now need to be created with this technology.

Students of each departments learned a lot during this week.

As for the DITs, using QTake monitoring solution to pre-edit really helped for one of the last transitions, when she falls on her bed. After letting the directors see something was wrong, DITs suggested adding a transition to the actor's playing and they did it. As DITs we learned a lot about equipment and softwares thanks to HdM students. There really was co-education.

The lighting crew thinks they could have paid more attention in preparation to the different environments that had to be matched. Designing the light in the virtual scene has to be done in prep so that the gaffer knows where to place the fixtures before shooting.

One of the biggest difficulties was the inside black level matching with the wall's luminance. The gaffer had to lift the whole scene.

One thing that has to be tested is the capacity of interference between tungsten lights which always emit a lot of IR rays and tracking cameras which work with IR. By the way, skirting on toplights sometimes covered tracking cameras. These 12 tracking cameras were a real pain for all the light sources hung above the set.

Post-production now, it was nice and easy with really few shots, but quite rushed. There was only one morning to edit, grade, mix and render the master. Luckily, we had time with the teachers to test the workflow during shooting days but one morning is still not enough to get a nice final result.

Physical art can really help better integrate the 3d environment, like we did with the outside leaves in the morning shot. Maybe it would be best with more people in physical art department. Having the set ready earlier could be interesting to exchange inspiration with virtual art and the same goes in the other way.

About set organization: people need to be more on time or communicate about that. On every front, communicate more, about our tasks and how advanced we are. Then the assistant director doesn't always need to ask if we're done. Being two directors was a good thing to split up the big amount of work brought by the virtual production technology.

Both directors agree that the LED wall gives a lot of opportunities but also restrictions. Some shots were adapted because the wall imposed limitations. We could not show frontally and on focus what was outside. However, the glitch effect was amazing. It really worked and that's something which cannot be reproduced easily at all without Virtual Production. Adding the camping-car passing by prop during shooting was also a great opportunity allowed by the virtual environment.

Even though we come from different cultures, schools, and speak different languages, we managed to find a way to work all together and it was after all a really good experiment.

Another BIP will probably be organized!

Here's the link to the final result : <https://vimeo.com/845956393>

And here's one to Tony Costa's report on our conclusions during the analyzing meeting:

PART 1 - <https://vimeo.com/848340136>

PART 2 - <https://vimeo.com/848342457>