Virtual Production in Action

A Creative Implementation of Expanded Cinematography and Narratives

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Figure 1: Selected case studies in Virtual Production

ABSTRACT

Virtual Production fulfills George Lucas's early dream of having an engulfing "space-opera in the sky" (1). Epic Games' focus on realistic interactive 3D game environments using Unreal Engine, revolutionized the field of film-making, by replacing rear film projections with large format, curved, high resolution, immersive LED video screens, allowing backdrops to adapt in real time to the narrative needs of each scene by tracking the movement of the camera. Cinematographers and Art Directors are adapting to the challenges of virtual and real lighting and props, recruiting animators and new media developers who create, usually in very little time, virtual and real props, and metahuman actors and characters, enhancing the production value, optimizing and reducing costs in unparalleled ways. This poster presents the results of the first Virtual Production class offered by the Film Animation and New Media Department at the University of Tampa. In a very short time span, students working in interdisciplinary teams have seen the possibilities of these new technologies for science fiction, fantasy and experimental films that otherwise would have been impossible to create with very limited student budgets.
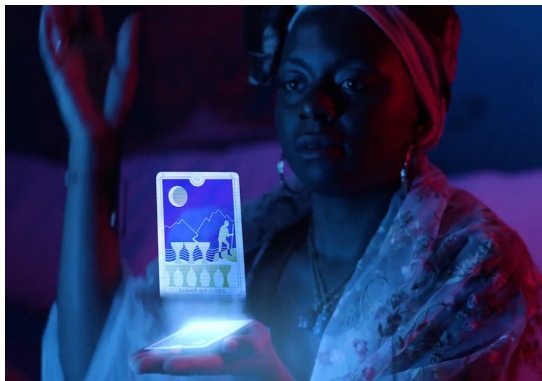
Figure 2: The Oracle, Aiyanah Esparza, 2022

KEYWORDS

1 INTRODUCTION

Virtual Production fulfills George Lucas's early dream of having an engulfing "space-opera in the sky" (1). Not to be confused with Film Compositing Techniques, available since the early days of Georges Méliès where actors are placed in foreign environments using transparency maps and green screens, Virtual Production finds its roots in the 1930's Rear Projection strategies, that became widely available in films by Alfred Hitchcock, Ray Harryhausen, and 1960's Italian directors, followed by Cave video systems. Epic Games' focus on realistic interactive 3D game environments using Unreal Engine, revolutionized the field of film-making, by replacing rear film projections with large format, curved, high resolution, immersive LED video screens, allowing backdrops to adapt in real time to the narrative needs of each scene by tracking the movement of the camera. Cinematographers and Art Directors are adapting to the challenges of virtual and real lighting and props, recruiting animators and new media developers who rapidly create virtual and real assets and characters, enhancing the production value, optimizing and reducing costs in unparalleled ways. This poster presents the results of the first Virtual Production class offered by the Film Animation and New Media Department at the University of Tampa. After receiving a generous donation of a LED Volume by Vū Technologies, and in a very short time span, students working in interdisciplinary teams have created highly successful science

fiction, fantasy and experimental films that would have not been possible on student budgets. (Figure 1)

2 IMPLEMENTATION

2.1 Technology

The LED Volume is 9x4m comprised of 72.5x1m linked cabinets, installed in a 13x7m soundstage. Each cabinet is comprised of 8 64x64px LED modules. The pixel pitch is 3.9, meaning that the center of the pixels is 3.9mm apart. Each of the 9 columns of 4 panels is offset by 5 degrees to create a concave surface that simulates a 90-degree segment of a full circle. The computer interface is a Novastar NovaPro UHD JR 4K LED Video Processor and Controller. The computer has an Asus ROG Strix TRX40-E Gaming ATX sTRX4 motherboard, with AMD Threadripper 3990X 2.9 GHz 64-Core Processor running on Windows 10. The GPU we are using is PNY VCNRTXA6000-PB PCIe 4.0 GPU NVIDIA RTX A6000 48GB GDDR6 with ECC 4x DisplayPort 1.4a with a NZXT Kraken X53 73.11 CFM Liquid CPU Cooler. We are also using Corsair Vengeance RGB Pro 128 GB (4x32GB) DDR4-3600 CL18 Memory. The tracking system is an HTC Vive Pro with four base stations positioned at the corners of the room above the soundstage. We are using an HTC Vive 3 tracker puck attached to the camera. The cameras we are using are the Blackmagic Pocket Cinema Camera 6K Pro with Zeiss CP Cine 5 lens kit. During installation, each cabinet of 8 modules is tested to match the relative color temperature. All unmatching modules are replaced to create a unified white balance across the entire array of 72 cabinets. Each cabinet emits 1000 BTU making out total output 72,000 BTU at 100% intensity. We run the volume at 35% brightness intensity which generates 25.2 BTU. Consequently, we noticed that the studio was heating up to 29-32 ℃ within the first hour of operation. We adjusted the room to a base temperature of 18℃ in order to keep actors comfortable and the equipment cool. The LED volume is projected to last 10 years if running 24 hours a day at 100% brightness. Since installation, we have had no additional issues requiring maintenance.

2.2 Wholistic Studio Approach

The goal is to train interdisciplinary teams in Virtual Production quickly. Team members are required to complete the Unreal Engine online learning track prior to beginning studio production. This approach could be applied to any group of creatives with a broad set of combined skills. Production teams are created selecting from three main sets of skills: 1. traditional filmmaking and cinematography; 2. animation; 3. new media and creative coding. To assess the relative skills of the groups, they are required to recreate a Georgio De Chirico painting in 3D. The 2nd project selects and recreates a feature film scene using Unreal Engine. All teams meet weekly in the studio to discuss issues that had arisen. Individuals that have superior talent in one area become de-facto mentors to the entire group on their topic of expertise: film directing, scriptwriting, cinematography, LED operation, worldbuilding, pre-visualization, 3D animation, post-production, editing, and costume design. Teams are then asked to create scripts and pitches for the final projects that are then selected by final full group vote. New groups are then assembled to execute the productions.
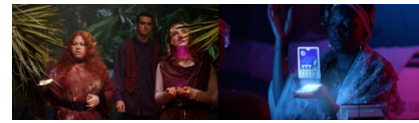

Figure 3: The Goddess' Relic Directed by Hannah Sam - The Oracle directed by Aiyanah Esparza

3 CASE STUDIES

3.1 The Goddess' Relic - Hannah Sam

The Goddess' Relic Directed by Hannah Sam shot Spring 2022. (Figure 2) Key production team members: 1st Assistant Director, Jasmine Liaw; Virtual Production Director, Hunter Dromboski; Director of Photography, Jean-Baptiste Hansali; Production Designer, Aiyanah Esparza, LED Technicians Bryan Lee and Adam Nimblett. Producer, Gregg Perkins. Created at the Virtual Production Studio, Department of Film, Animation and New Media, The University of Tampa.

3.2 The Oracle – Aiyana Esparza

The Oracle directed by Aiyanah Esparza shot Spring 2022. (Figure 2) Key production team members: 1st Assistant Director, Jasmine Liaw; Virtual Production Director, Hunter Dromboski, Bryan Lee; Director of Photography, Madison Harris; VFX Supervisor, Hannah Sam, Producer, Gregg Perkins. Created at the Virtual Production Studio, Department of Film, Animation and New Media, The University of Tampa.

4 CONCLUSIONS

PARADIGM SHIFT: Project based rather than curriculum, uses structures that fundamentally privileges flows of power in circular manners, not hierarchical academic structures. It privileges individual knowledge, and empowers team members to bring their own skills and passion to creative collaborations. Just a few years ago, any production that required non-traditional locations and sets required an extensive pre-production research and preparation. LED Volumes have enabled quicker experimentation, and recovery from mistakes, thereby removing creative constraints that were previously limited by budget restrictions. In less than a month, our interdisciplinary teams have managed to develop 8 finished projects connecting all aspects of Virtual Production, opening the door for unexpected creative possibilities.

5 LINKS

- https://www.provideocoalition.com/the-mandalorian-a-test-bed-for-virtual-production/
- Vü Studios: https://vustudio.com
- Vü Studio at UT: https://youtu.be/4AppNTEGIuc
- Sam, Hannah, "The Goddess' Relic": https://youtu.be/HObBjSQuYmQ
- Esparza, Aiyanah, "The Oracle": https://youtu.be/opK1W4ikXFE