Demonstration of Virtual Production at MAGIC Spell Studios

Shaun Foster[1], David Long[1], Flip Phillips[1], Mark Reisch[1], Emily Haldeman[2], Tim Stringer[2]
[1]*Rochester Institute of Technology,* [2]*Optic Sky Productions*

Virtual production represents a rapidly expanding suite of creative technologies for film, television, and media producers. During the past two academic semesters, faculty from across computer science, motion picture science, film and animation, and 3D digital design have constructed curriculum to train RIT students on the workflows and technologies supporting virtual production. At the same time, MAGIC Spell Studios has partnered with Epic Games, The Third Floor, and PRG to build a full hardware deployment of on-set virtual production. This particular workflow employs large scale emissive displays and motion capture systems to permit live in-camera visual effects, complete with proper parallax and optical visualizations.

Fig. 1. On-set staging from EVT, MAGIC's spring 2021 virtual production run as part of SOFA-262 in conjunction with Optic Sky Productions. Students and Optic Sky professionals teamed up to provide proof-of-concept for running a virtual production at RIT

Made famous by the popular series, *The Mandalorian*, on-set virtual production relies on live interactive 3D CGI and video art assets projected onto large screens behind the main performers in a scene. By presenting imagery directly into the field-of-view of the principal camera, costly and error-prone chroma key compositing can be avoided in post-production. The three enabling technologies for on-set virtual production include 1) direct-view LED walls with size, resolution, colorspace, and brightness adequate to deliver believeable photographic quality as backplates, 2) real-time video game engines capable of rendering live views of virtual art assets to the LED walls, and 3) motion tracking technologies which enable the real camera position in 3D space to be tracked for mimicked moves in the game engine. With careful orchestration of these three components, the view through the real cinema camera yields perspective, paralax, and depth in the hybrid scene consistent with what would be expected if the real foreground elements were actually present in a fully real environment.

On-set virtual production is one narrow element in a full spectrum of real-time virtual filmmaking technologies gaining popularity in mainstream applications. Other examples include 3D animated previsualizations of complex live-action and VFX shots, performance capture of human actors used to animate digital avatars in a fully CG film, live compositing of photographically captured actors in a constructed virtual 3D environment, and live matchmove visual effects inserting digital characters or props into live video photography. Further, immersive technologies, such as VR and MR are increasingly available to filmmakers for virtual location scouting, camera blocking, set construction, and collaborative previsualization. Disney's recent photorealistic release of *The Lion King* employed principal creatives directing the action of CG elements using a collaborative VR world capable of spatially accomodating multiple participants.

At MAGIC, technologies and workflows are being investigated to build teaching platforms for virtual production. These test beds further permit research into critical components of the workflow, including optics, color science, rendering, and digital tools creation. For Frameless 2021, a demonstration of the latest MAGIC on-set virtual production system will be available for attendees to experience.

Fig. 2. The virtual art department for the EVT virtual production. The finished piece can be found at https://opticskypro.com/work/evt-virtual-production/