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Hong Kong Film Test Explores On-Set Virtual Production

WHEN HE READ ABOUT how On-Set Virtual Production (OSVP) was used to create "The Mandalorian" for Disney+ in 2019, Tony Ngai immediately saw that it would become a vital tool for cinematographers everywhere. He also knew that he could contribute and play an active role in education and training so as to enhance the professionalism of Hong Kong's filmmaker community regarding the latest motion imaging technology, a mission Ngai has strived for since he became chair of SMPTE-Hong Kong Section in 2002.

As the founder-director of the Society of Motion Imaging (SMI), an honorary advisor to the Hong Kong Society of Cinematographers (HKSC), associate member of the American Society of Cinematographers (ASC), and SMPTE's Asia Pacific governor, as well as a contributor to the Society's OSVP RIS (Rapid Industry Solution), Ngai has organized motion imaging technology-focused workshops, seminars, and other related educational events for decades. He proposed Hong Kong's first full OSVP film test to the chair of HKSC, Mr. Keung Kwok Man, and the project would include not only cinematographers, but also a full range of equipment vendors, engineers, and creative professionals working within the filmmaking ecosystem, from scriptwriting to postproduction.

Ngai leveraged his involvement with SMPTE's OSVP RIS initiative to seek knowledge, connections, and resources to "gap finance" those critical elements he could not find in Hong Kong and were essential to the film test. The SMPTE OSVP RIS initiative was formed in August 2021 to create a portfolio of essential tools, including the development and curation of knowledge resources, to help the media industry tackle the complexities of OSVP.

"Both the economic downturn and adverse circumstances under COVID pandemic have taken a toll on the film industry in Hong Kong and around the world," says Ngai. "I feel that if we can bring together different stakeholders to explore the potential of OSVP and to learn from hands-on testing in the studio environment, we can seize the opportunity afforded by this incredible new technology."

HKSC supported Ngai's plan, and more than 18 organizations and 100 crew members volunteered their time, expertise, facilities, and products to make the film test at Shaw Studios Stage 2 a reality in September 2021.

Putting OSVP Workflows to the Test

The HKSC's OSVP Film Test 2021 used LED walls provided by Hiller Pharma Co., Ltd. They included P2.38, a 16-metre by 5-metre curved wall as the main background; P3.91 ceiling LED wall hanging overhead; and four movable LED walls on each side. The film test team applied 6,000 reflective stickers on the studio floor to create X, Y, and Z coordinates for a Mo-Sys camera position tracking system, enabling accurate positioning, focus, and zoom points. ARRI Alexa LF series cameras and Signature lens system were employed for the shooting. Tracking data was fed to disguise VX and RX servers, which processed Unreal scenes with the game engine powered by Epic Games.

Unreal scenes of a Cybercity and a forest, both provided by ICVR.io, served as the primary environments for the test, while a living room scene supplied by TVB Publications was used, along with various foreground props, to illustrate sample set dressing in this film test. When experimenting with the Cybercity and forest scenes, the production team was able to tackle challenges and trade-offs in coordinating the LED walls and the virtual scenes. Key considerations included the processing power required for various amounts of modelling and texturing contingent upon different image resolutions.

Engineers and the creative team tested strategies for making camera panning and tracking smoother and for ensuring proper perspective in relation to actual physical conditions. Filming and projection of images on the LED wall were modified to reduce the hardware processing burden, address final pixel latency issues, and eliminate unwanted visual glitches, the first encounter of such experiences by the filmmakers on set. This was a valuable learning curve for all involved.

The team used a DMX system to adjust lighting (Pixel Mapping) according to the camera position during filming and to simulate the reflections of neon lights in the Cybercity scenes. To further

enhance a sense of authenticity of the virtual setting, the team extended the virtual scene across both the top and both sides of the main LED wall, creating reflections onto cars, people, and other objects. By manipulating LED walls, lighting, and reflections, the production team enjoyed the convenience of shooting inside a fully controlled and safe environment, and they could continue shooting in that environment as long as it was required.

The results of the test far exceeded expectations; it would inspire a larger-scale OSVP training project for the Hong Kong filmmaking community and spark collaboration and innovation between key stakeholders across the technical and creative aspects of production.

Since the HKSC Film test on OSVP in 2021, Tony continues researching and planning for HKSC OSVP Film Test number 2!

Driving Ongoing Development

A screening and experience sharing session of the film test was arranged by courtesy of Hong Kong Design Institute for stakeholders including directors, scriptwriters, cinematographers, producers, set designers, members of shooting crew, vfx producers, Unreal scene creators, post production experts, etc. It also demonstrated an integrated workflow encompassing steps from planning through shooting, as well as the simple post production process employed in this project.

This first film test aimed to inspire the filmmaking community in Hong Kong and beyond and continue collaboration between stakeholders and development of effective OSVP workflows. A subsequent screening and sharing session, which drew 150 industry professionals and 200 students in digital media, has helped HKSC raise awareness of and seek support for OSVP.

Ngai and key stakeholders anticipate that greater awareness will contribute to even stronger support — from the government and from within the filmmaking community itself — for educational resources and training programs. While further research, collaboration, and exploration will be necessary to refine OSVP workflows and best practices, stakeholders have shown significant interest in driving this project forward.

As this training takes place and the pool of talent continues to grow, OSVP will become a possibility not just for major studios, but also for other local companies and productions, in delivering richer, more engaging content to viewers. While the film industry may have the most demanding requirements of OSVP workflows, the best practices and training as a result of technological developments will no doubt benefit a much broader array of professionals working in the media sector.

SMPTE continues to work through the OSVP RIS to support the expanding virtual production ecosystem. Learn more about this work at www.smpte.org/rapid-industry-solutions/on-set-virtual-production and consider joining in the effort to make OSVP simpler and more accessible across the media industry.