



2018
CASE STUDY

A Cinematic Revolution In Human Movement

A Chilean-born cinematographer uses Phantom high-speed cameras to capture and articulate body movement in new, visually striking ways.

If you were to walk through the doors of Brazil's Espaço Energia museum, you might be surprised by what you see: a large, three-screen platform displaying slow-motion footage of a woman dancing on a beach, ocean waves breaking behind her. Then suddenly, the film cuts to a close-up of the woman's hair as it billows around her head – then to her feet as she kicks up sand with each step.

The film might not seem like it belongs in a museum about energy, but for Llano, nothing could be further from the truth. The Chilean-born cinematographer has dedicated his life to capturing the poetry of human energy and movement – an artistic endeavor that involves slowing things down with the help of Vision Research high-speed cameras.



When it's too fast to see and too important not to.®

A STUDENT OF MOVEMENT

Llano, cinematographer, director and visual artist, is based in São Paulo, Brazil. He has worked in the film industry since 2002 and spent the last three years directing or co-directing short films. Llano has worked with high-speed cinematography since 2012 after partnering with DVPRO, a distributor of audiovisual equipment. Over the years, the company has allowed Llano to test several Vision Research high-speed cameras for the Brazilian market, including the v642, Miro 320 and 310, Phantom HD Gold, Phantom VEO 640s and Phantom Flex4K. “Only a few people have been given the opportunity to use these cameras,” Llano said. “Being in this position, I’ve had a lot of freedom to experiment.”

Llano uses the cameras to capture body movement. For example, many of his short films depict slow-motion footage of dancers mid-step or skateboarders mid-flight. “Before shooting, I always ask myself: how can I present this world in a new way using high-speed cinematography?” Llano said. “It isn’t simply about ‘capturing’ an action. It’s about finding moments that are intense, yet very specific.” For instance, in his short film, *Just A Board*, Llano slows down the movement of a skateboarder as he rolls across pavement, grinds on rails and hops off half-pipes. “But I wasn’t necessarily interested in the rider,” Llano said. “I wanted to highlight the board itself as an extension of the physical body of this character.”

While Llano does have a vision whenever he approaches a subject, he enjoys surrendering a part of the storytelling process to the cameras. “I surprise myself,” he said. “The cameras always bring something new to the table I could’ve never predicted.”



The powerful, lightweight Phantom Miro 310 is a 1-megapixel camera with 3.2 Gigapixels/second throughput – translating to over 3,200 fps at full 1280 x 800 resolution.

SHOOTING FOR THREE SCREENS

Because of his artistic focus, Llano received a proposal from Brazil's Espaço Energia, an interactive museum where visitors learn about energy, to create an audiovisual piece that would be displayed on a large, three-screen platform in the museum's welcome hall. The project needed to articulate the theme of energy in nature, including human energy – Llano's artistic focus.

While exciting, figuring out how to shoot the film would be challenging. "Because of the configuration of the space, you can never watch all three screens at the same time," Llano said. "There are no chairs in the room, and the screens bend slightly inward. You face one screen and focus on it, while the other two remain in your peripherals. This setup added an interesting level of complexity to the assignment."



Llano had to figure out a way to create an audiovisual piece that would be displayed on a large, three-screen platform in the museum's welcome hall.



Initially, Llano thought about displaying a single image across the three screens using the high-resolution capabilities of the Phantom Flex4K. This camera, which was designed specifically for cinematography, has a flexible frame rate and can be adapted to various shooting styles. It is capable of shooting up to 1,000 frames per second (fps) at 4K and almost 2,000 fps at 2K/1080p, while its super-35mm 4K sensor provides sharp, detailed images with low noise and high dynamic range. These features would address the requirements of the museum's three-screen configuration – specifically, the angles of the bending screens, as well as its large size. “But because of the project's tight budget, I had to come up with something different,” Llano said.

Instead, the cinematographer opted to use the smaller, more lightweight Phantom Miro 310 – a 1-megapixel camera with 3.2 Gigapixels/second throughput, translating to over 3,200 fps at full 1280 x 800 resolution and frame rates up to 650,000 fps at reduced resolutions. Because the Miro 310 has a smaller resolution compared to the Phantom Flex4K, Llano would use it to shoot images that would be displayed separately on each of the three screens. “By doing it this way, I wouldn't have to divide the same image into three screens,” Llano said. “This approach also gave me the chance to use a camera with lower resolution without losing image quality.”

FROM MUYBRIDGE TO *do.C.orpo*

Llano describes one of his upcoming projects, titled *do.C.orpo*, as a “poetic and revolutionary visual document” linking body movement with camera movement. Using the Phantom v642, he created a few short test clips, highlighting the poise and grace of barefoot dancers as they step, their hair and clothes rippling slowly around them. Llano says *do.C.orpo* will be a longer, 20-minute piece, portraying a “revolution in not just body movement, but shooting speed.”

Like *M.U.Y.*, this project is inspired by the works of Eadweard Muybridge – specifically, *The Attitudes of Animals in Motion and Animal Locomotion*. The former is a sequence of images depicting a galloping horse. In 1872, Leland Stanford, former governor of California and president of the Central Pacific Railroad, asked Muybridge to photograph the horse to confirm his theory that all of the horse's feet are off the ground at some point during its stride – something that couldn't be seen with the naked eye. To accomplish this, Muybridge developed a method of stop-action photography that involved 24 cameras triggered either at timed intervals or as the horse tripped a suspended wire.

In addition to animals, Muybridge applied his stop-action photography and motion studies to humans – from construction workers to baseball players. In 1887, over 20,000 photographs were published in the collection, *Animal Locomotion*, which is still used today by artists, animators and students of biomechanics.

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M.U.Y.

According to Llano, the resulting film, titled *M.U.Y.*, is a metaphor for how energy is represented by the human body. The piece is named after Edward Muybridge, an English photographer best known for using multiple cameras and stop-motion photographs to capture animal locomotion. *M.U.Y.*, which incorporates frame rates between 300 and 2,750 fps, depicts nature’s four elements as a series of couplets: fire/earth and water/air. Sometimes, the elements are represented literally – shots of ocean waves breaking over rocks – while at other times, their presence is more abstract – shots of a woman’s fiery, red hair, for example.

“Museum management had given us total freedom for the project,” Llano said. “They didn’t know what we were doing until we showed them the final piece. At first, they were astonished. Visually, *M.U.Y.* is abstract. They understood that this was more than just a video, and they’re really happy with it.”



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