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Industrial Light & Magic

The Avengers



Image courtesy of Industrial Light & Magic

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[Mike Sanders, Digital Supervisor at ILM](#)

Pioneering motion capture since 1984.

Industrial Light & Magic

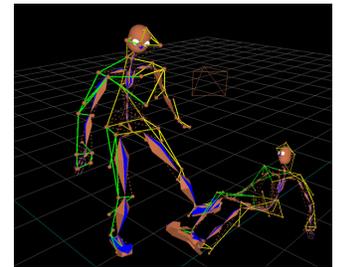
The Avengers



Vicon T-Series



Vicon Real-Time



Vicon Blade

Longtime Vicon customer, Industrial Light & Magic (ILM), evolves their use of Vicon motion capture technology beyond VFX.

Introduction

Vicon motion capture systems were used by VFX powerhouse ILM to create visual effects for box office hit, The Avengers. The superhero-themed blockbuster features digital characters driven by Vicon motion-captured performances for scenes that showcase the Hulk, Iron Man, foot soldiers and virtual crowds.

ILM is one of Vicon's longest standing customers in the entertainment market and has used its motion capture systems on films including the Academy Award-winning Rango, as well as all of the films in the Transformers, Pirates of the Caribbean, Iron Man franchises and many others.

Capture

ILM Digital Supervisor Mike Sanders has been working with Vicon systems for almost fifteen years at the company. "One of the first things we did on The Avengers was bring actor Mark Ruffalo in for a shoot on our mocap stage to do what we call 'rapid prototyping'. We applied his performance

captured by the Vicon cameras onto a 3D model of the Hulk to give him live

performance feedback in real time. This allowed Ruffalo to explore his posture, motion and timing of actions as the Hulk, and was an exciting way for the director [Joss Whedon] and actor to engage with the digital character in a very interactive way.

"Sometimes studios will hire us for pitch viz, to rapidly prototype characters and very quickly produce a cut scene of a movie that's at 80-90% render quality to help convince IP stakeholders whether or not they should move forward with developing that property. We've also used mocap to capture virtual camera moves, actors in character exploration or motion study sessions during casting, to help studios evaluate a director's ability to develop certain projects and for location scouting in digital environments using a tracked virtual camera."

ILM also uses Blade, Vicon's motion capture software, to reproduce an actor's skeletal motion from a 3D point cloud. The point cloud is created using 2D data collected from the cameras during a performance. ILM's proprietary animation system, Zeno, allows them to automatically retarget performance data from the mocap stage onto animator's character rigs in real time.

Results

Over the course of a year, ILM completed approximately 24 motion capture shoots for The Avengers, both as front-loaded

sequences for character motion libraries and fine-tuned shot-specific performances. Animation, driven by the Vicon mocap data for the Hulk, Iron Man, foot soldiers and digital crowds was used throughout the film. Full body performance of the Hulk was captured with the Vicon system both on the mocap stage and on location during principle shooting, where Ruffalo was often performing in one of ILM's Imocap suits alongside the film's other cast members.

ILM is currently evaluating the latest generation, 16 megapixel Vicon T-160 cameras. "The advanced resolution definitely helps us get cleaner data, less noise and sees markers farther and longer. It goes into occlusion a lot better, the calibrations are faster as well. Overall we've stuck with Vicon systems over the years based on the robustness and quality of the hardware, and the relationship and development service that we've always gotten from Vicon, which is critical for our industry," Sanders concluded.

Technology Profile

Vicon T-Series 40 Camera System
Vicon Blade 2 Software

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