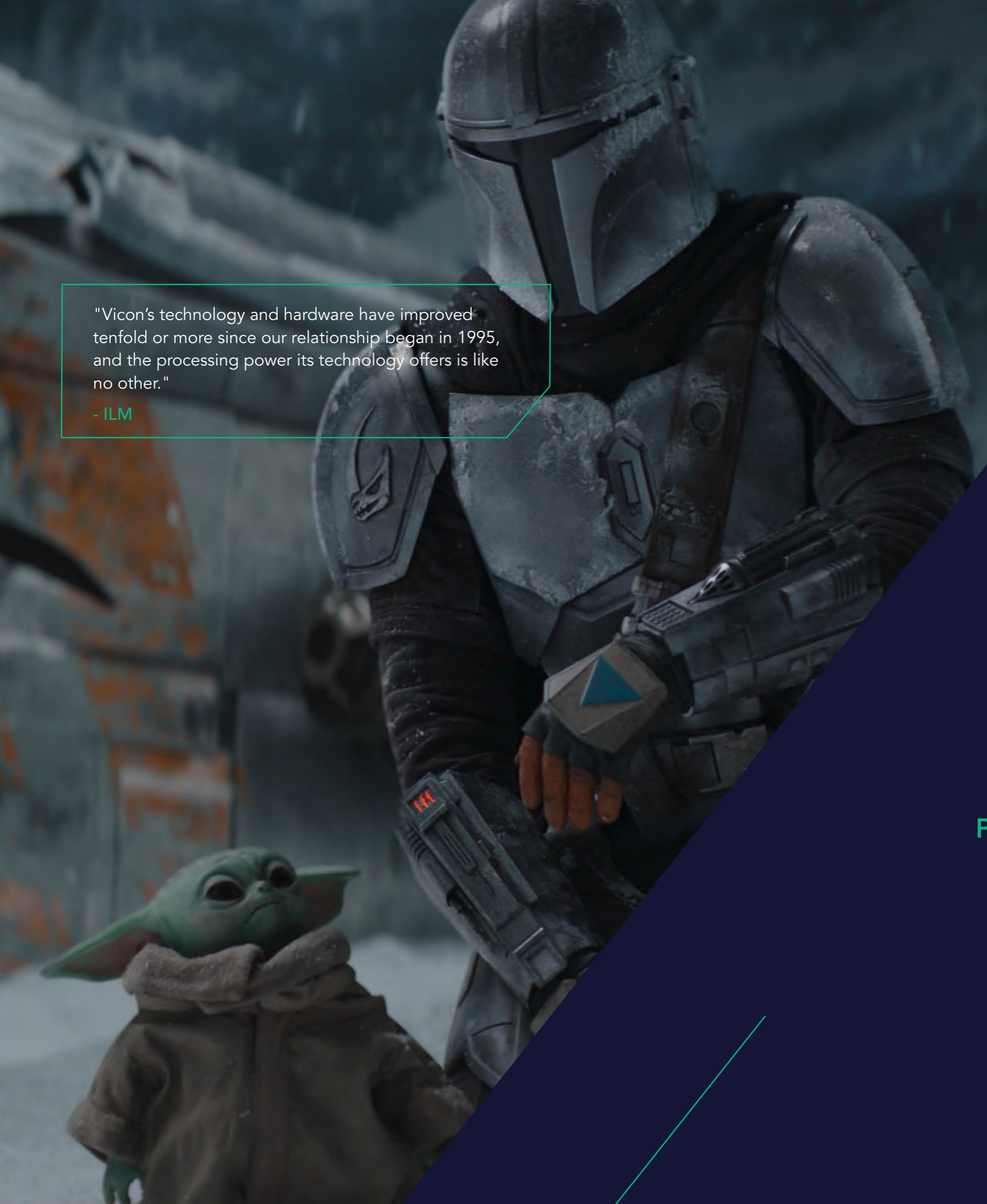




VICON

[VICON.COM/VPROD](https://www.vicon.com/vprod)



"Vicon's technology and hardware have improved tenfold or more since our relationship began in 1995, and the processing power its technology offers is like no other."

- ILM

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VIRTUAL PRODUCTION

UNMATCHED, PRODUCTION PROVEN TRACKING, USED BY THE INDUSTRY'S BRIGHTEST STARS.



WELCOME TO THE ONLY VIRTUAL PRODUCTION SOLUTION YOU'LL NEED

Bringing together Vicon's industry leading tracking of both rigid object and full body subjects, the virtual production pipeline allows users to track film and video cameras alongside highly realistic digital characters, with fingers and face, all within the Shōgun platform.

EMPOWER ON- SET CREATIVITY & COLLABORATION

By working with a trusted partner backed by decades of motion capture experience, Vicon users are able to focus on what matters - producing great work. Whether that means shooting with world-beating talent across multiple locations or making on-set changes based on real-time feedback, the flexibility of our technology allows you to get creative without worrying about the limits of your tools.

It's also why users can work with Vicon's own Simulcam and virtual camera rig or expand their setup to incorporate technology such as green screen composite and LED walls. Whatever the scope of your setup, Vicon's virtual production solution will seamlessly incorporate it into your workflow.

QUICKER & EASIER PRE-PRODUCTION CONSERVES BUDGET IN POST

Vicon's technology is designed to make virtual production effortless. That's why we're the only motion capture company that offers mixed tracking of rigid bodies such as cameras and props alongside performers in a single ecosystem.

DELIVER RELIABLY HIGH- QUALITY, REALISTIC PRODUCTION VALUES FROM THE OUTSET

With a rich history of delivering leading-edge motion capture, Vicon offers best-in-class tracking and accuracy for virtual production.

Vicon delivers a level of fidelity that other companies can't: where other providers capture from the outside in, Vicon captures from the inside out by tracking the centre of your lens; we've got HD finger solving; we offer sub-mm tracking accuracy, translating to sub-pixel accuracy in the LED wall, and our algorithms deliver unbreakable tracking, even in dark or smoky environments.



IN CAMERA VFX (ICVFX)

By enabling you to work with close-to-finished visuals on set, Vicon technology can save you time and resources in post-production whilst ensuring consistent visuals over multiple shoots.

Streamline production on set, reducing the number of people and cameras on a shoot, bringing down the number of builds and saving on travel costs.

LENS CALIBRATION

New to Shōgun is the ability to quickly re-calibrate a hero film camera, allowing users to build a lens model.

LED WALL

Supplies realistic real time background and lighting

MARKER CROWN

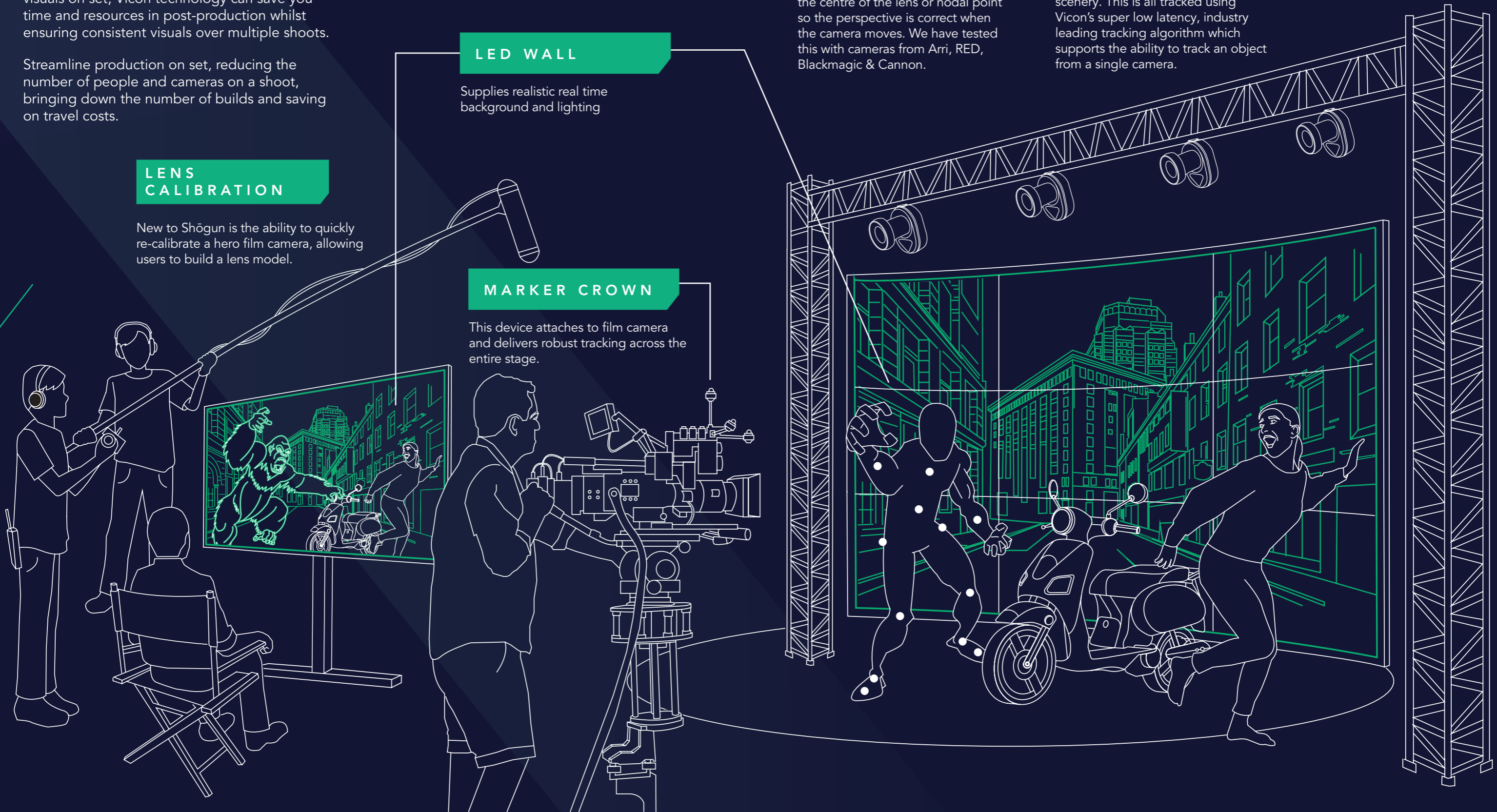
This device attaches to film camera and delivers robust tracking across the entire stage.

CALIBRATION OF FILM CAMERA

Using the normal wand calibration you can calibrate any film camera that supports SDI along with timecode and sync. This calculates the centre of the lens or nodal point so the perspective is correct when the camera moves. We have tested this with cameras from Arri, RED, Blackmagic & Cannon.

OBJECT TRACKING

Any object with markers in the volume can be tracked and streamed within the space. This could be a prop, interaction device or set scenery. This is all tracked using Vicon's super low latency, industry leading tracking algorithm which supports the ability to track an object from a single camera.



FULL BODY PERFORMANCE CAPTURE

Vicon Shōgun allows for both cameras and full body subjects to be tracked at the same time, making use of optimized tracking profiles for both. This includes high fidelity finger animation and robust occlusion fixing when capturing the most complex moves. These characters can be re-targeted within Shōgun and streamed directly into the game engine. This supports the latest technology innovations, including EPIC's new Metahuman project.

RETARGETING

Enable your performers to breathe life into incredible, diverse characters. Shōgun Post's suite of editing tools allow you to quickly setup character retargets that can be streamed to your game engine.

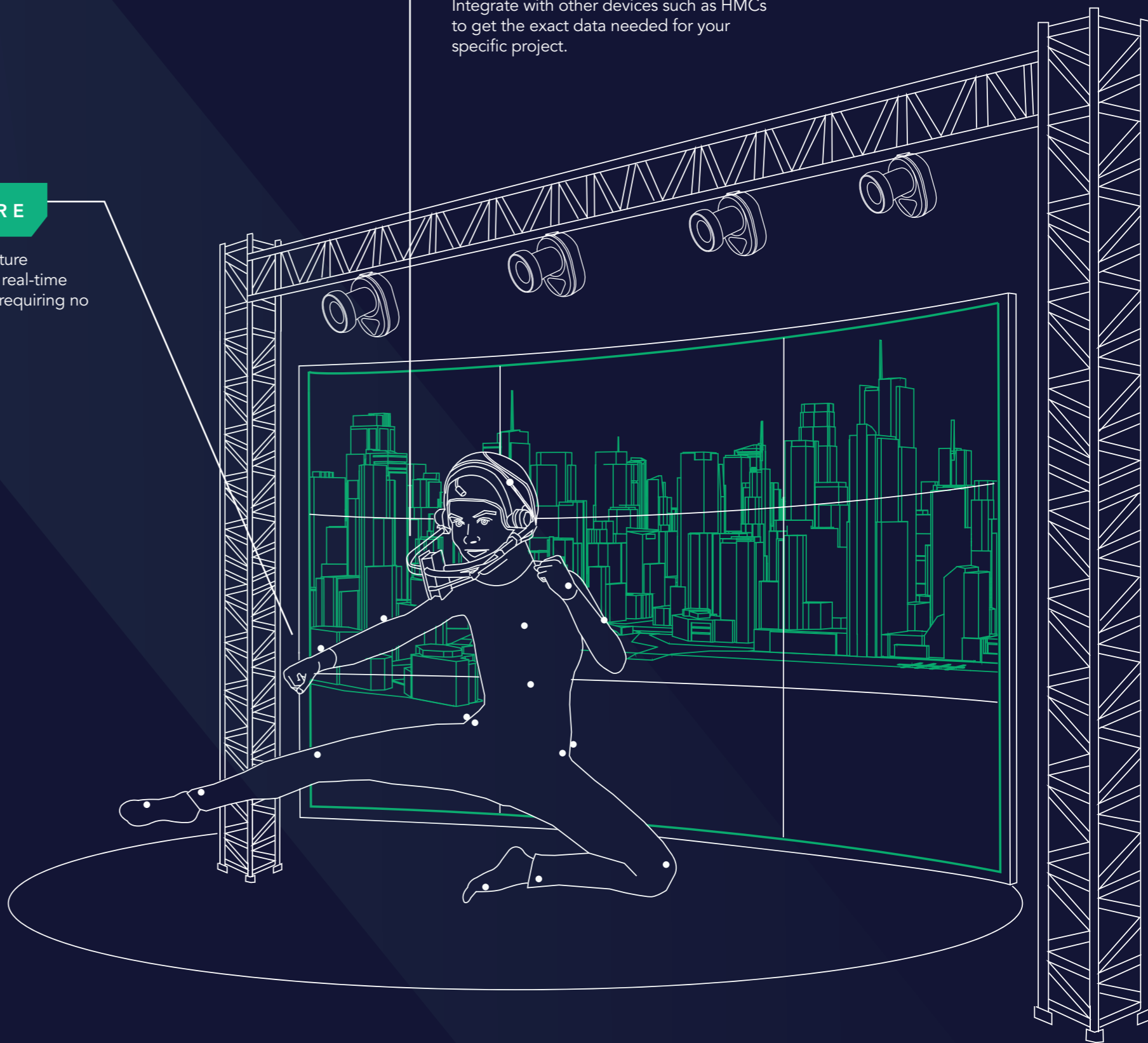


FINGER CAPTURE

Shōgun is the only motion capture software that supports optical, real-time finger tracking out of the box, requiring no additional third party products

HMC SUPPORTED

Integrate with other devices such as HMCs to get the exact data needed for your specific project.



GREEN SCREEN

GAME ENGINE

Data is streamed directly from Shōgun into the Game Engine as quickly as possible, using separate channels based on the type of data. Cameras and rigid objects are delivered first, guaranteeing the lowest latency possible. Full body characters are then sent on a different channel with SDI video being sent separately. This delivers the optimum performance for a seamless SimulCam solution.

SDI VIDEO CALIBRATION AND TRACKING

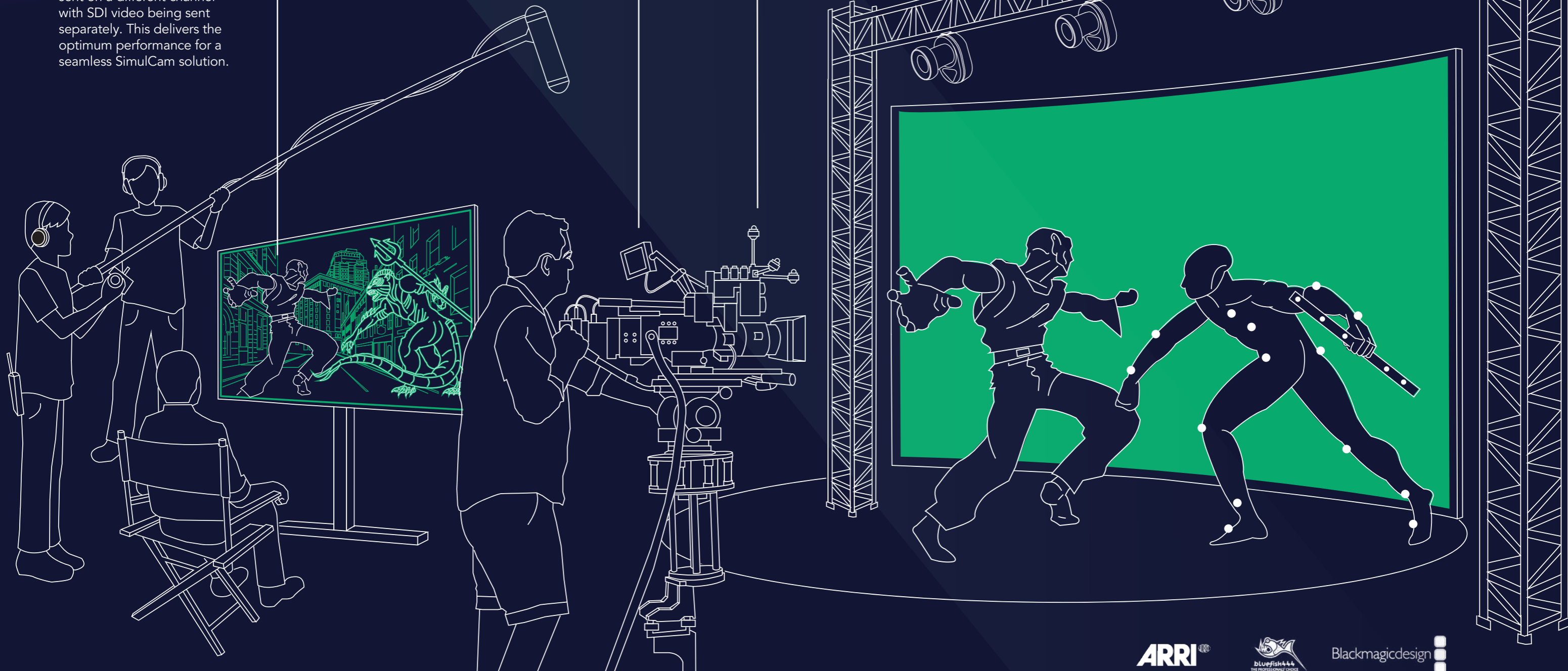
SDI video cameras can be calibrated for both Intrinsic and Extrinsic using Vicon Shōgun software. Supporting up to 4* 4K video streams, the SDI camera is calibrated as part of the main wand wave process. Once calibrated, the camera can then be moved around the volume and calibration is maintained.

PASSIVE/ACTIVE

This solution works with both our traditional passive marker system or active marker system. We have created new passive marker crowns that can be attached to the SimulCam and offer smooth, reliable tracking.

VICON CAMERAS

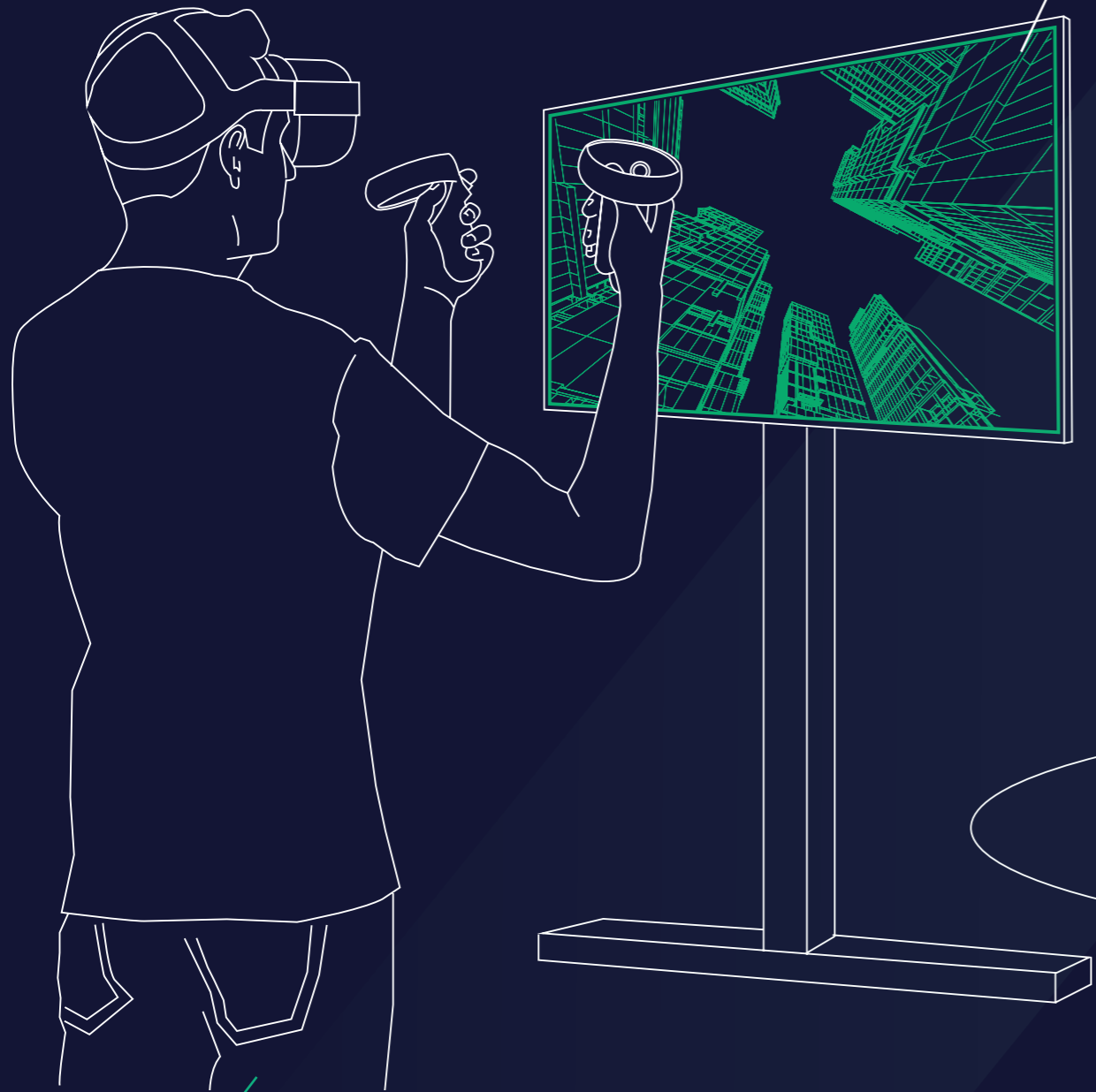
This solution works across the full range of Vicon cameras including Valkyrie, Vero and Viper. High resolution and low latency optical tracking that works both inside on set and outside on location. No matter your budget there is a camera solution that will work for you.



VR SCOUTING

VR Scouting powered by Vicon tracking allows for remote working and collaboration. Review game engine sets within VR, we can track multiple HMCs within the same space.

Scouting and pre-production in VR enables agile, non-linear production to overcome scheduling blocks, delivers consistent production values over time and different locations, reduces the number of people needed on set, the amount of build and travel costs, as well as post production cost.



CAMERA TRACKING

Camera tracking recorded by Shōgun, all aligned within the same space.



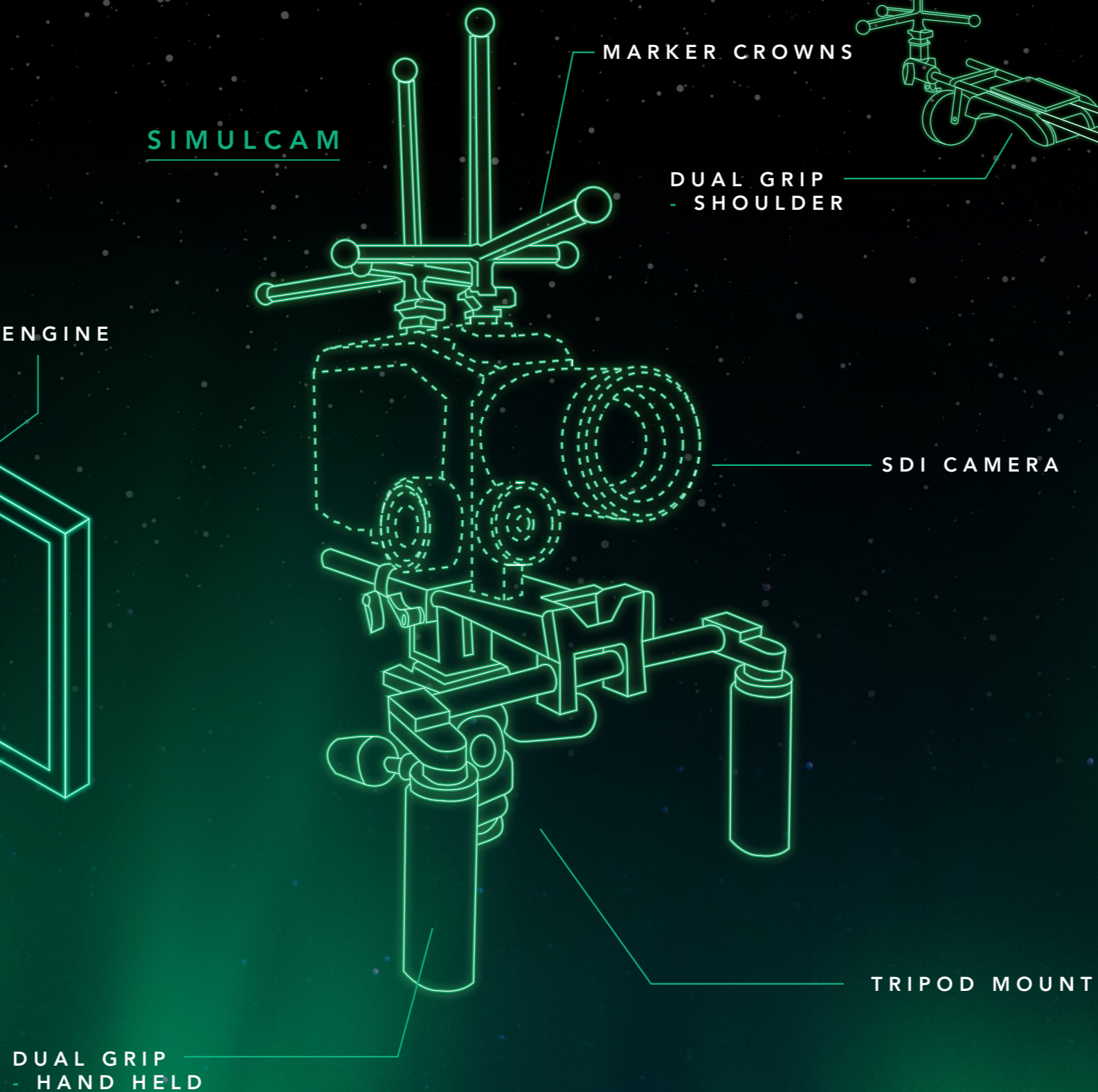
VIRTUAL CAMERA / SIMULCAM

The Virtual Camera rig is designed to support a number of different configurations and allows the user to view the game engine using a tablet device. Bespoke 3D printed stalks allow for high quality object tracking no matter where you are in the volume. It's lightweight and completely wireless allowing you to frame shots and create creative camera moves either during the shoot or as an additional camera pass once the main shoot is complete.

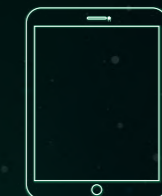
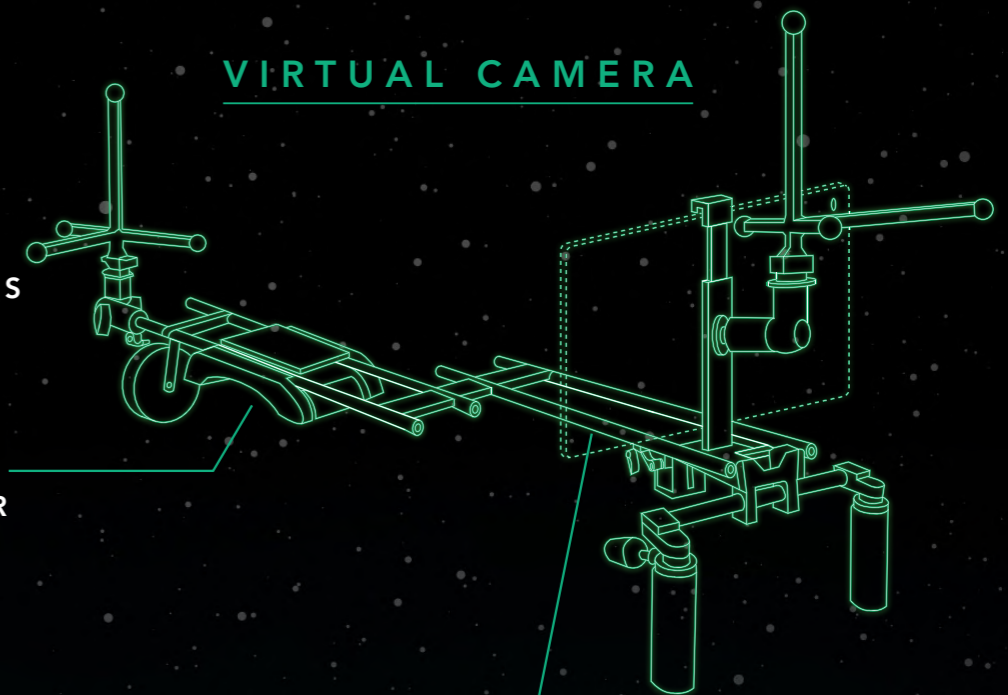
HOST PC



SIMULCAM



VIRTUAL CAMERA



- IPAD



- ANDROID



- WINDOWS

KEY MARKET USE CASES

ILM

At the heart of every project that ILM has utilized performance capture for over the last 25+ years lies a core technology that helps push the boundaries of visual effects: Vicon motion capture systems.

It is no exaggeration to say that the collaboration between ILM and Vicon has helped redefine the extent of our imagination.

The latest example of this work is one of ILM's most challenging and ambitious projects ever – The Mandalorian.

Following the Emmy Award-winning season one, the latest season of The Mandalorian pushes the thrilling ride for fans to new heights — all thanks to ILM's ground-breaking StageCraft technology that achieves a giant leap forward in filming techniques.

Working with Vicon, ILM has evolved well beyond traditional VFX motion capture to become a world leader in virtual production.



Turning vision into reality through technology

With The Mandalorian, filmmakers Jon Favreau and Dave Filoni have been explicit in their desire to “bring Star Wars to the screen in a new way.”

With the scope and ambition of the series only increasing on the second season it was crucial that the actors and viewers not only experience a huge range of new worlds — but truly believe in the reality of the worlds being created and are able to build emotional connections with the characters.

This ambition has required new filming techniques to be rapidly developed and deployed — chief among them virtual production techniques including camera tracking for in-camera VFX (ICVFX).

Virtual production in its simplest form is the merger of physical and digital worlds. Through a combination of immersive technologies like virtual reality (VR) and augmented reality (AR), as well as ILM StageCraft and real-time render engines, virtual production allows filmmakers to view their projects live on set to quickly react

and make changes as needed, rather than having to wait until post-production.

Virtual production also offers several logistical benefits as it allows for more iterations of scenes or shots to be created with fewer personnel in a shorter space of time, therefore significantly reducing production costs.

Allowing the creative team and the actors themselves to better visualize the environments on shoot day is paramount. Production teams previously had to imagine the final scene while using green screens to shoot, with visuals applied in post-production after the fact.

ILM has invested heavily in leading the way with these techniques – and projects such as The Mandalorian and George Clooney's feature, The Midnight Sky has been a tour de force of just what is possible with virtual production.

Motion capture technology in a virtual production pipeline is a crucial component in making these endeavors a reality.

Vicon's technology has allowed ILM to recreate the universe of Star Wars in compressed time with 60 different live environments, which they can use over and over again.

Everything from VR scouting, previsualization, performance capture and in-camera VFX using giant LED walls can make use of Vicon technology in some way.

One of the biggest leaps forward has been real-time capture in the volume itself, which requires high-resolution cameras and large frustums. The latest Vicon hardware has enabled ILM to accurately track cameras on set while moving about no matter if the camera is handheld, on a crane, a Steadicam, or some other support equipment. This has helped to create a 360 degrees virtual production environment at large scale such as ILM's pioneering StageCraft LED volumes, enabling them to capture a whole new category of shots while successfully blending photoreal visual effects with live action, which previously wasn't possible.



SETS EXTENDING OUT OF THE CAPTURE VOLUME



Making the impossible, possible for 25 years

For Rachel Rose, ILM R&D Supervisor who oversees the studio's developments for virtual production, the success of The Mandalorian and all ILM projects requiring motion capture owes much to the collaboration:

"Since day one Vicon has enabled us to do things that were never possible before — and that's as true today as it was in the 90s. Vicon's technology and hardware have constantly advanced throughout our relationship, and the processing power available to us with their technology is like no other. We can deploy and always count on Vicon's tech as it's such reliable, robust hardware requiring only a quick calibration."

"ILM always looks to collaborate with those who are making best-in-class software/hardware solutions for problems we're solving."

If a solution doesn't exist, we'll solve it on our own, but we're not looking to reinvent a solution that's already there.

We are incredibly lucky that we have a long-standing relationship with such an innovative company like Vicon. The absolute best thing I can say is that with Vicon I have a powerful performance capture system that just works."



Unleashing a new wave of creativity

With ILM's StageCraft virtual production technology, ILM and Vicon have realized many filmmakers' vision for creating fully digital worlds that are as close to reality as possible.

The Mandalorian is just the start of a new wave of creativity that will be unleashed as film directors explore new ways to take advantage of the virtual production techniques pioneered by ILM and Vicon.

As we have seen in recent projects, the possibilities within highly accurate virtual production pipelines are endless. Rose concludes,

"As excited as I am about what's been accomplished by our StageCraft team and the visionary filmmakers we have been fortunate to collaborate with, we've only just scratched the surface of what we believe the system is capable of. What's really exciting is where filmmakers will lead us next."

While the landscape of film and TV is constantly evolving, it is certain that whatever happens next, motion capture and virtual production will play a key role in innovation. High-quality tracking technology, offering ultimate precision, is central to enabling the advances that will allow creatives to make leaps and bounds forward and to continue to revolutionize the entertainment industry.



PIXOMONDO

In the recent commercial for Caledon Football Club in Toronto, athletes play soccer at a breakneck pace on a floodlit pitch while a 20,000-strong crowd of fans cheer them on from the stands. The fact that the crowd is computer-generated isn't novel. Nor is the fact that the commercial uses in-camera special effects. The combination of the two, however, is a technical leap forward for the nascent field of virtual production.

The crowd is the work of Pixomondo ('PXO'), produced in collaboration with Alter Ego, William F. White International and PXO's Virtual Production Academy. It answers a long-running problem for advertising. "One of the problems that we face in commercials all the time is trying to shoot large-scale crowds in a large environment," explains Eric Whipp, cinematographer on the ad. "First of all, getting into a stadium is very tricky, filling it with a crowd is very tricky."

"As any assistant director will tell you, wrangling 25 fans as extras is a pretty tall order, but wrangling 20,000 fans would be impossible and extremely costly," expands Matthew Manhire, co-director of the advert. "Pixomondo had this fantastic idea that they were testing with, and as a result we've got 20,000 unique individual fans doing various random movements to make the stadium have a sense of life and a sense of humanity."

Traditionally, that kind of crowd would be done using a couple of rows of real extras in front of a green screen, with the remainder added in post-production. It's a costly, challenging and time-consuming process that Pixomondo had gone through recently for HBO's *Winning Time: The Rise of the Lakers Dynasty*.



In the wake of *Winning Time* the studio began working on a real-time solution that would achieve the same results in a way that was more cost-effective and offered more creative flexibility. In-camera effects using LED walls usually follow the lead of *The Mandalorian*, offering epic environments that are typically deserted. PXO set about building a system for filling those environments with people.

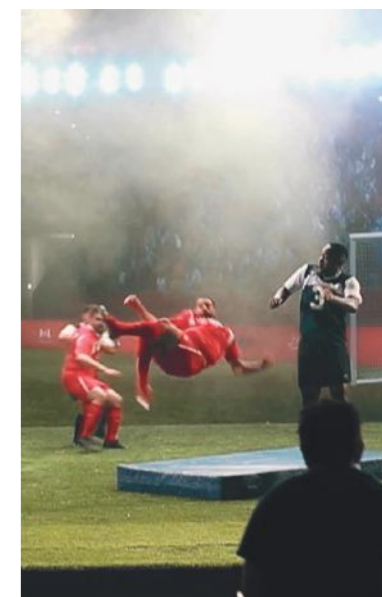
The crowd was developed using Vicon-powered motion capture combined with 3D scans of real people to create the animations. The system was then put together in Unreal Engine, with users able to trigger different crowd emotions that deploy over 100 different animations for any given subject. The crowd can be displayed on the LED wall of a virtual production volume, with Vicon technology used to track camera position in relation to the imagery being displayed.

The Caledon FC commercial was the perfect opportunity to test the new system out.

The importance of crowds

"Improving the capability of crowd assets is important to PXO and the virtual production industry, because it proves that we're not relegated to certain kinds of abstract assets; that we can accomplish any asset that requires a crowd," says Christopher Cox, virtual production producer for PXO.

The system also brings creative advantages to a shoot. "The creative decision maker gets to choose on the day what level of detail they want to adjust, therefore getting more out of the day," Cox says. "Sometimes, shutting down a set to change costumes or to change out patterns that are seen in the crowd can really reduce the efficiency of a shoot, whereas with virtual production those decisions are clicks of a button to swap out variables, and you can remain efficient."





“The crowd was developed using Vicon-powered motion capture combined with 3D scans of real people to create the animations.”

Another technical challenge – something doubly important for filming soccer, in which most of the action happens at ground level – was making the grass seamless. “Typically, up until now, virtual production has been about mid-shin up because we’ve wanted to hide the seam where the screen meets the floor. But through the discoveries that we’ve made with Pixomondo and Alter Ego we’ve found ways to properly blend the floor and the screen,” says Manhire.

“Pixomondo obviously made massive developments on their shows like Star Trek, so we brought that over into the commercial world and we really wanted to highlight that. So we’re seeing a full interaction of soccer ball, cleats and feet, and soccer players moving across the turf, blending seamlessly with the digital environment behind it,” Manhire adds.

“Pixomondo obviously made massive developments on their shows like Star Trek, so we brought that over into the commercial world and we really wanted to highlight that.”

“We bring the athlete in, we get what we need and then we’re done, rather than putting them into an unpredictable environment, whether it be unpredictable weather or the unpredictable talent in the background,” Manhire elaborates. “We have full control of everything, so it’s a matter of plunking them in and them doing what we’ve been rehearsing in our prep.”

“We have the luxury of not having to have the huge cost of renting a stadium,” adds David Whiteson, the commercial’s other co-director. “If we were renting a stadium, not only do we have the people problem, we have the cost of renting it for two days. Here, we can do more shots in a day because we’re not fighting the sun and we can be a little bit more creative.”

Shooting at high speed

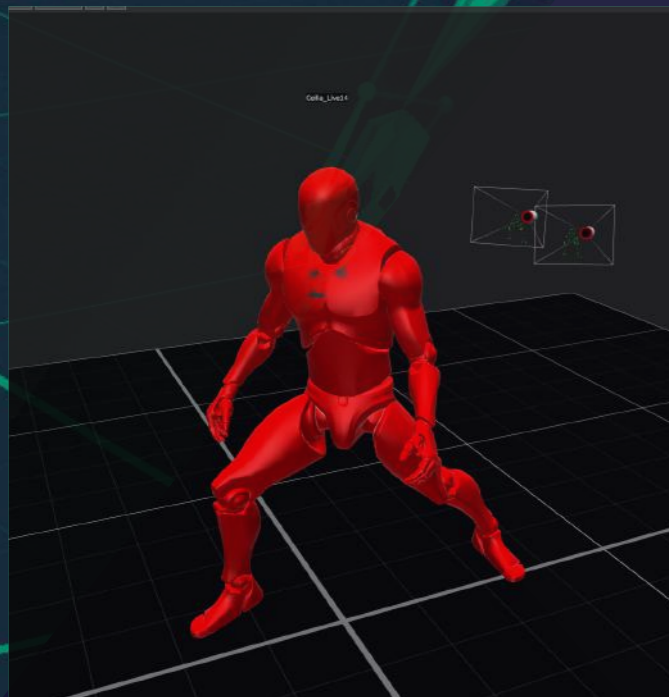
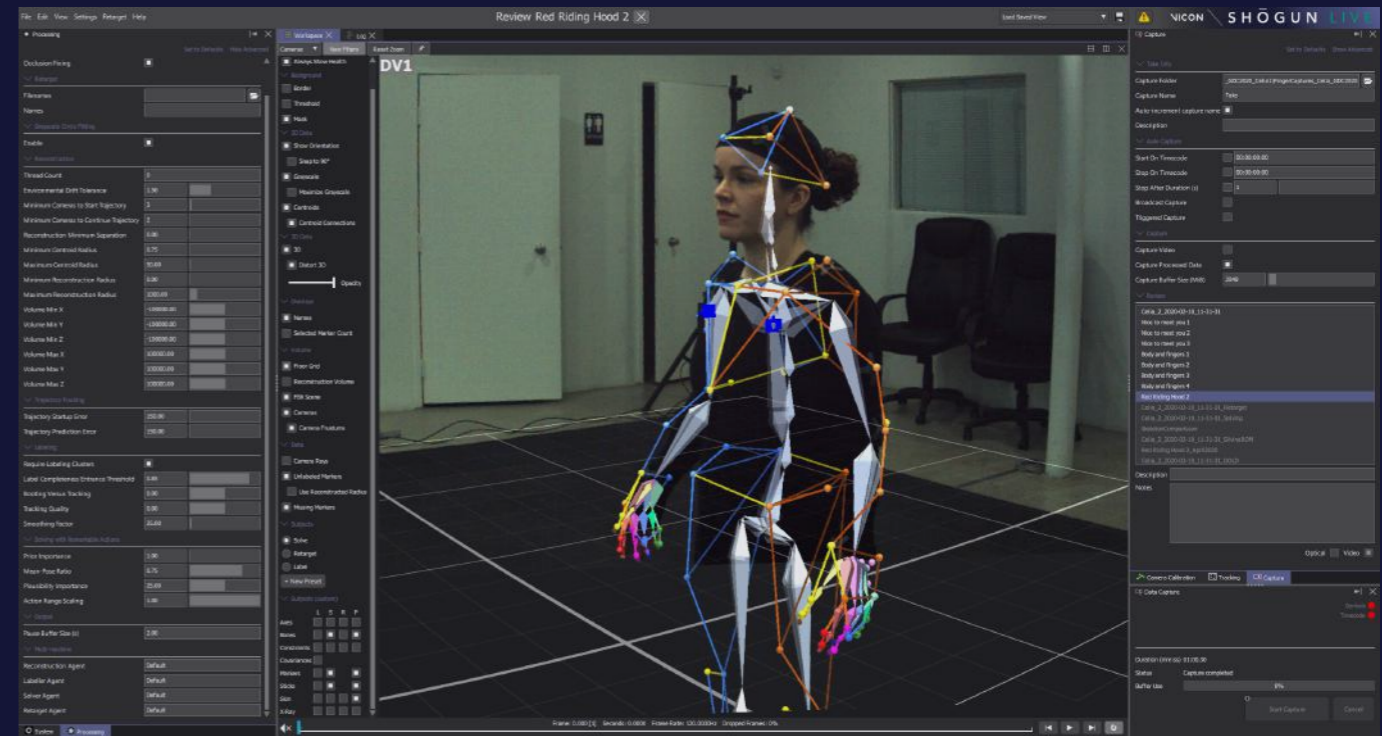
Creating a real-time, reactive crowd wasn’t the only technical achievement of the shoot.

“A very big thing is we’re shooting at 200 frames per second,” says Whiteson. “When you do that, it causes a huge amount of flicker on the LED wall because it’s not in sync with the camera or the lighting. With this project we have found ways around that to achieve a high action scissor kick in slow motion that’s never been done before. That just adds to our list of things that we’ve been able to develop and achieve to progress this medium further and further.”



The meeting point between floor and screen might not seem that important to the layperson, but for Cox it’s the point at which the entire project comes together. “Blending the virtual with the practical lighting can be really tough, but the most important part of the day is making sure that the floor is finding its way into a virtual blend so that the scale of the asset can actually be felt,” he concludes.

SHŌGUN VIRTUAL PRODUCTION



TRACK FILM CAMERAS USING MARKERS

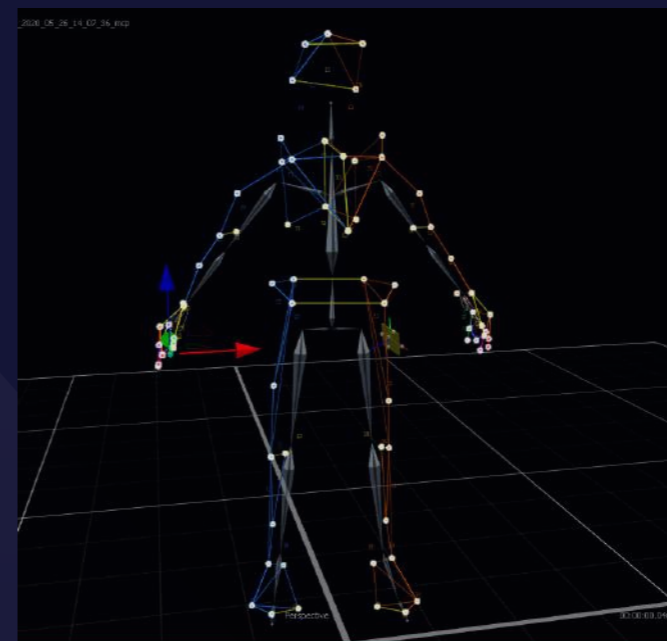
By placing tracking markers on the camera you can create a connection between the markers and the camera so that when you move the film camera the virtual camera moves with it. This allows for a sub pixel accurate overlay of the CG layer on top of the film plate. This overlay can be viewed in Shōgun or directly in the game engine.

TRACK ACTORS FOR FULL PERFORMANCE CAPTURE

Shōgun allows for both cameras and full body subjects to be tracked at the same time making use of optimized tracking profiles for both. This includes high fidelity finger animation and robust occlusion fixing when capturing the most complex moves. These characters can be re-targeted within Shōgun and streamed directly into the game engine. This supports EPIC's new Metahuman project as an example.

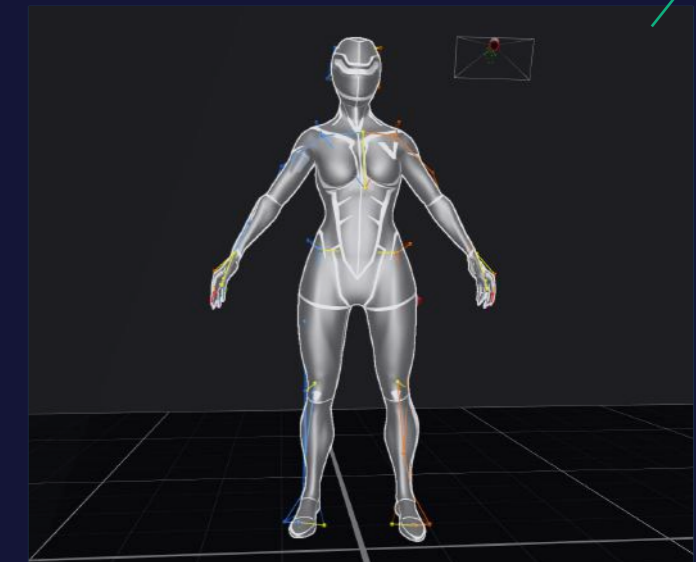
FBX ASSET SUPPORT

You can import FBX assets into Shōgun to assist with pre-visualisation and world alignment. If you have a model of the LED wall you can import this in and position is correctly using survey markers places in the volume. These objects aren't tracked but their position is sent into the game engine. They can be moved around in Shōgun and you see them update in the engine.



SUPPORT BOTH ACTIVE AND PASSIVE MARKERS

Shōgun supports all Vicon cameras including active only cameras like the Viper. You can also run Valkyrie and Vero cameras strobeless. This allows for you to capture in complex environments filled with smoke and FX and even capture outside. Alongside traditional passive markers you can also use active markers like the Vicon Nova or solutions from Technoprops or Standard Deviation.



VALKYRIE COMES TO VIRTUAL PRODUCTION

LEGENDARY PERFORMANCE

Valkyrie, the most powerful motion capture in the world, has landed in Vicon's best-in-class virtual production ecosystem.

The next generation of movement analysis hardware is here to drive the leading edge of virtual production, whether you're working in immersive LED volumes, visualizing digital effects on set or doing remote virtual scouting.

VISUALIZE STUNNING NEW WORLDS WITH HIGH FIDELITY CAPTURE

Valkyrie pushes the possibilities of virtual production with unbeatable range, speed and field of view.

Vicon's next-generation hardware allows you to capture startling levels of detail with pixel counts of up to 26MP, giving users the data they need to visualize hyper-real characters and effects on set.

The camera's unique, custom-designed varifocal lens optimizes performance, whatever your application. Its wide, center and narrow field of view options combine with the option to mix passive and active marker tracking to ensure the best possible coverage for your project.

Whether you're working in an LED volume, capturing complex scenes in a warehouse-sized space or taking advantage of the camera's IP65 rating to track subjects outdoors, Valkyrie will be the technological foundation that frees your creativity.

FREE UP YOUR TIME AND CREATIVITY

Valkyrie is built from the ground up to minimize its demands on your time so that you can focus on doing creative, agile work.

Even if you have to travel for your project, you can begin quickly. Valkyrie's 30FPS full video preview mode means that you can quickly have your setup up and running with pinpoint accuracy.

Once you're set up, the robustness of Valkyrie's tracking and calibration combines with clear display features to allow you to focus on your work.

After you've left the set, Valkyrie's incredible data quality combines with its internal camera intelligence to minimize cleanup time and processing. Partnered with Shōgun's trusted ecosystem, Valkyrie will tighten your motion capture pipeline and allow you to focus on making great work.



BESPOKE MOTION CAPTURE LENS

Valkyrie includes a new, custom-built varifocal lens to increase range and precision.



INCREDIBLE SPEEDS

Capture the fastest movements at consistently high levels of fidelity.



MARKET-LEADING RESOLUTION

With a resolution of 26MP Valkyrie offers unparalleled clarity.



INTUITIVE OPERATION

At 30fps, Valkyrie's full video preview mode is Vicon's smoothest yet for easier camera monitoring.



A CAMERA FOR ANY ENVIRONMENT

With Valkyrie, you can capture any movement in any environment, safe in the knowledge that your camera is IP65-rated.

For more information visit
our website or contact us.
www.vicon.com/vprod

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