VICON ENGINEERING

CAPABILITY OVERVIEW

# MOTION CAPTURE FOR ROBOTICS & AUTONOMY

## THE REFERENCE THE FIELD IS MEASURED AGAINST



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GROUND TRUTH FOR ROBOTICS & AUTONOMY

# WHEN THE WORLD'S MOST ADVANCED ROBOTS NEED TO KNOW THE TRUTH, THEY MEASURE IT ON VICON.

The measurement standard for humanoid robots, drones and autonomous systems, trusted by the labs and manufacturers building what comes next.



*Motion Capture for Robotics & Autonomy*

THE PROBLEM WITH "GOOD ENOUGH"

## EMBODIED AI IS ONLY AS GOOD AS THE DATA BEHIND IT.

**Robots learn from motion. They're trained on it, validated against it, and trusted because of it. But a policy that looks right in simulation can fail in the real world. Without an independent source of truth, teams can't tell the difference between a model that works and one that got lucky. Every humanoid gait, every drone maneuver, every autonomous decision has to be measured against reality.**

That reference is what Vicon provides: sub-millimeter, real-time ground truth that tells you exactly where everything is, so you can trust what your robot learned. And increasingly, the deliverable isn't the capture at all. It's the dataset: cleaned, retargeted to your robot's skeleton, ready to train. You're not buying a set of cameras.

**You're buying the data your robot is built on.**

**Truth you can trust.** 0.105 mm dynamic RMS tracking accuracy makes Vicon the reference the whole field is validated against: the benchmark, not a competing estimate.

**Real-time, in the loop**. Stream 6DoF pose at up to 1,000 Hz straight into teleoperation, training and control loops via the Vicon DataStream SDK.

**Built into your stack.** Native ROS 2, MATLAB and Python workflows drop Vicon into the tools your team already uses.

**0.105 mm**

DYNAMIC RMS TRACKING ACCURACY*

**UP TO 1,000 Hz****

REAL-TIME STREAMING INTO THE CONTROL LOOP

**400+**

ROBOTICS & AUTONOMY SYSTEMS DELIVERED WORLDWIDE

*One reference. Every result measured against it.*

*RMS error in measured distance between two independently tracked marker clusters, compared with externally measured ground truth, during a dynamic trial. 24 Valkyrie VK26 cameras, 10 × 5 m volume, Vicon Tracker.

**With Valkyrie VK6 cameras. Maximum frame rate varies by camera model and resolution.

ARENA 1 · HUMANOID & GROUND ROBOTICS

# FOUR JOBS. ONE MEASUREMENT STANDARD.

Humanoid robotics isn't a single use case. It's four, each with its own demands. Vicon is the one system that meets all of them, from the training lab to the working floor.

### TELEOPERATION & CONTROL

Stream an operator's full-body pose to drive a robot live, with low latency and Vicon's data mapped straight into the robot's own coordinates.

### TRAINING DATASETS

Turn human and animal demonstrations, including hand and finger motion, into clean, retargeted datasets your robot can learn from. Today's largest commercial use case.

### REAL-ROBOT GROUND TRUTH

Characterize the robot's motion against its intended motion, to solve the problems simulation can't.

### SCENE INTERACTION

Track the robot and fast-moving objects with 3.3 ms latency.*** Enforce safety boundaries in real-world deployment.

Chosen by the fastest-moving humanoid teams across the world, for live teleoperation and training-dataset capture.

***Measured with Valkyrie cameras at 1,000 Hz, from shutter opening to receipt via the DataStream SDK.

*Motion Capture for Robotics & Autonomy*

ARENA 2 · DRONE, UAV & AUTONOMOUS SYSTEMS

# THE REFERENCE FOR EVERYTHING THAT FLIES, DRIVES AND DECIDES FOR ITSELF.

Indoor and large-volume flight arenas, defense test ranges and autonomy labs use Vicon as the independent ground truth for position, attitude and trajectory.

### FLIGHT ARENAS & UAV CONTROL

Sub-millimeter position and attitude for single- and multi-drone control, swarming and aggressive-maneuver research, indoors where GPS can't reach.

### AUTONOMY VALIDATION

Independent ground truth to benchmark SLAM, navigation and perception stacks against what actually happened.

### DEFENSE & FIELD TEST

Rugged, large-volume capture for uncrewed-systems evaluation, from wind tunnels to test ranges.

Deployed at national labs, defense test centers and university flight arenas.

For principal investigators, robotics & controls engineers, autonomy leads and lab directors who are measured on the quality of their results.

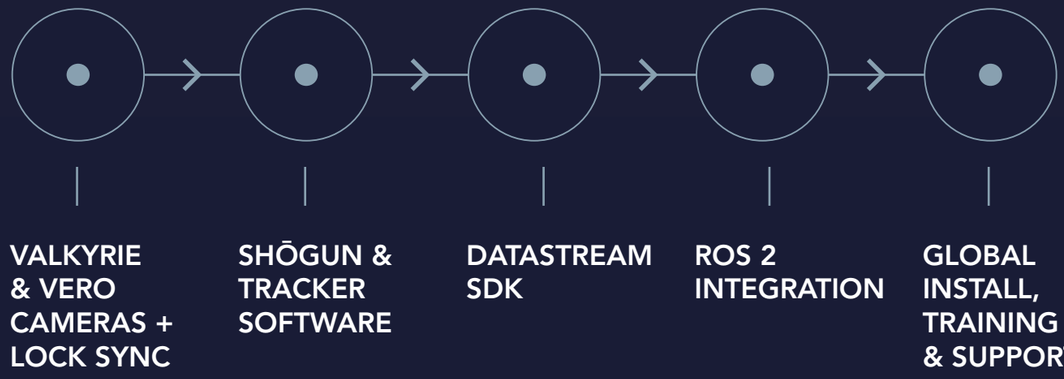
WHY VICON?

# THE PEDIGREE BEHIND THE WORLD'S MOST DEMANDING CAPTURE.

For four decades, Vicon has been the measurement system of choice where accuracy is non-negotiable, from Olympic biomechanics and clinical gait labs to the visual effects behind blockbuster films. That same precision engineering now underpins robotics and autonomy. As part of Oxford Metrics plc, Vicon pairs the reliability of a public company with a global support network and a track record no newcomer can claim.

- 40+ years of motion-measurement authority
- Direct support in the UK, Ireland and North America, plus a global partner network
- Full ecosystem: hardware, software and services from one vendor
- A pipeline, not just a camera: capture, retargeting, cleaning and simulation-ready delivery
- Continuous innovation, including markerless capture
- Hands and fingers tracked with passive markers, labeled in real time with minimal to no cleanup.

## ONE SYSTEM, END TO END




The same platform scales from a single-room lab to a large outdoor volume.



## LET'S MEASURE WHAT YOUR ROBOT CAN REALLY DO.

**Talk to our robotics team, or scope your system in minutes with the Vicon Visualization Tool.**

Contact us to find out more
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