

INDUSTRY 4.0 IS ABOUT TO EXPLODE, AND VICON IS READY

FELIX TSUI, PRODUCT MANAGER FOR ENGINEERING AT VICON, EXPLAINS HOW VICON AND TRACKER 4 ARE ENABLING THE FOURTH INDUSTRIAL REVOLUTION



Dr. Felix Tsui,
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As Vicon turns 40, it is humbling to reflect on the innovation and impact our company has delivered since we helped transform the world of clinical gait analysis. In the engineering world we now see Tracker, an engineering tool originally built to help facilitate training in virtual reality caves, being used in drone light shows or for developing robots for space exploration. It has absolutely become an essential part of the innovator's toolkit and I am incredibly proud to be a part of that legacy. Tracker continues to innovate alongside the users it serves, helping to build the technologies and infrastructure of tomorrow.

Industry 4.0 is undeniably the next frontier—a revolution that will integrate intelligent digital technologies into manufacturing and industrial processes. This concept has been circulating for over a decade now, but the past few years have really accelerated its timeline.

The pandemic forced certain organizations to rely on automation to backfill their workforces where in-person work has not been possible. Meanwhile, AI and machine learning have benefitted from exponential growth in computing power over the same period. Even automation itself is better understood and has reached a level of maturity that means it can be trusted at a much larger scale.

Vicon has been facilitating smart sensing since it first introduced its Tracker software almost 15 years ago. This includes creating solutions that were not only suitable for research, but also those that could be used in situ on the factory floor. As the Product Manager for Tracker, it's an exciting time to realize the future we've envisioned for this product for quite some time.

HISTORY OF FACILITATING AUTOMATION

Our technology has been helping engineers to automate their robotics for years now. That much certainly isn't new. Tracker systems are used by many of the world's leading technology companies to develop early control algorithms or to provide ground truth in the development of other movement-based sensors.

Bell is a great example of this. The aerospace company is developing a mobility-as-a-service offering that will deploy networks of autonomous drones to move both cargo and people around cities. It flies smaller drones in a warehouse-sized space to model this service, and uses its Vicon system to track and monitor the network.

In earlier phases of automation, motion capture was used to facilitate very simple operations, such as static obstacle avoidance. Now, however, we're seeing glimpses of more advanced automated robots such as self-driving cars or Boston Dynamics' famous robot dog, even if they still remain on the cusp of being operated in public settings.

VICON IN INDUSTRY 4.0

The real differentiator between Industry 4.0 and previous waves of automation, however, is the recent advances made in AI and machine learning. Technologies such as neural networks are enabling software to make more non-trivial decisions in situations beyond highly-controlled environments. For these algorithms to make decisions, they need 'smarter' sensors working in real-time and with lower latency. Crucially, they need incredible accuracy, especially in manufacturing, where every last millimeter counts.

Driven by these advances, Industry 4.0 is impacting the world at multiple levels.

A powerful example of this is Northrop Grumman, which has used its Vicon system for digital transformation, testing maintenance procedures on digital models of aircraft that have been simulated down to the last component. Northrop Grumman conservatively estimates that this process saves it around \$4 million per

30 assessments. In the real world, catching a problem at this stage can mean the difference between a relatively easy design fix and a product recall on aircraft that may be located in remote locations across the world.

Another great example is the work Nitin Sanket is doing at Worcester Polytechnic Institute's Robotics Engineering Department with miniature drones (see page __). He and his team are building small autonomous robots that they hope to design down to the size of insects. For these tiny drones to reach speeds of 30-40 meters per second, Sanket needs to improve their perception so that they can navigate cluttered, dynamic environments using only onboard computing, and his Vicon system is enabling him to do it.

TRACKER 4

Tracker 4 was our banner release in 2023. It brings our flagship Valkyrie camera, which features the highest resolution on the market, into the engineering world. Leveraging advancements in computational power, Tracker strives to 'leave no pixel behind'. That means simultaneously providing its users with the lowest latency and highest data fidelity in terms of tracking and accuracy. One such example is Tracker's long-standing ability to uniquely identify merged markers in real-time—functionality that is unparalleled.

In the spirit of Industry 4.0, Tracker 4 also combines with Valkyrie to enable users to 'set and forget' their system. Features such as automated system healing allow users to operate their setup with minimal input—crucial for applications in challenging outdoor environments or huge volumes, and for projects with highly complex automated robotics.

It's a privilege to be part of this new wave of technologies reshaping our physical infrastructure, but we know we've earned it by delivering decades of excellence. I look forward to seeing what you do with our technology over the next 40 years.

For more on Tracker 4,
download the brochure.