



THE CONNECTED ATHLETE

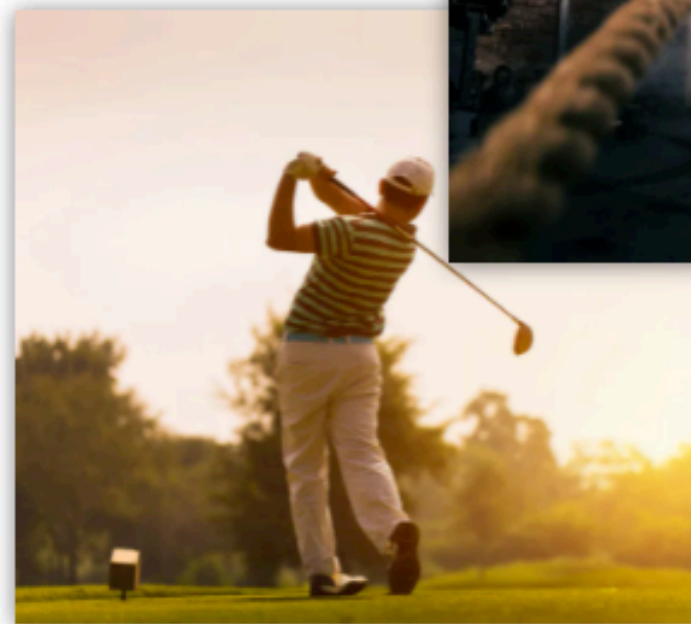
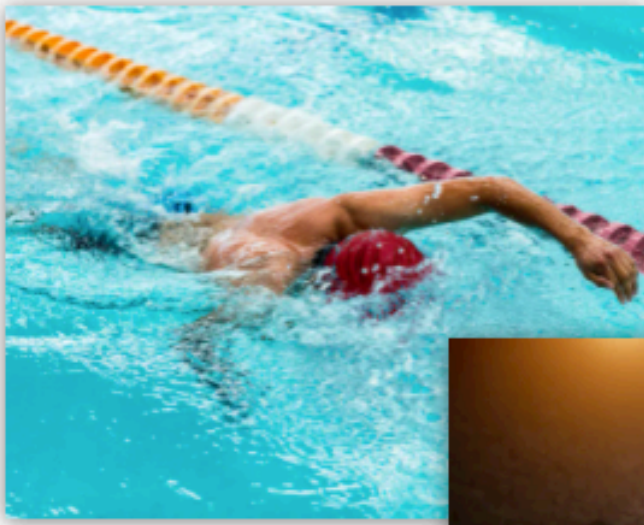
IT'S TRUE WHAT THEY SAY: YOU CAN'T COACH SPEED.
BUT YOU CAN BE THE FASTEST IN THE GAME WITH VERIZON 5G.

 **SPORTTECHIE** X **verizon**^v

The Connected Athlete

At the highest levels of competitive sports, coaches and sports scientists are constantly trying to find new ways for measuring athletes' performance and obtaining a micro-edge over the competition.

"The Connected Athlete" has every movement precisely tracked and analyzed to enhance training, recovery and performance. The most successful modern athletes are embracing this approach to achieve unprecedented feats and longevity. As a result, more and more coaches, trainers, and players are laser focused on enhancing sports performance through data analysis. And team owners at the professional level, as well as AD's at colleges and universities are doubling down on their investment in sports tech innovation. Read on to take a deep dive into the makings of a Connected Athlete today.



"The players love feedback because the process is the part that usually gets lost. You really can't measure the process in sports. It's very hard, you look at the outcome. But we spend most of our time in the process."

- Phoenix Suns General Manager, James Jones, a three-time NBA champion as a player.

The Connected Athlete Survey

We surveyed leaders from the top collegiate and professional sports programs around the globe to learn how they are leveraging technology to improve player performance and maximize team success. Our key takeaways from this survey were:

1. Top teams and organizations are focused on implementing athlete performance technology to help establish a culture of excellence.
2. Teams are prioritizing sensor based and video capture technology to visualize statistical and performance analytics.
3. All levels of a sports organization— from management, to coaching staff, to players—are becoming more data literate than ever before.
4. Budgets for deploying technology are increasing and are mainly determined by input from coaches & training staff.
5. Organizations are evaluating advanced sports technologies on their ability to unlock their players' full potential.

Why It Matters

The idea of blood, sweat and tears is so black-and-white TV. The new measure of greatness in sports is data: 1's and 0's replacing X's and O's. Even half-time adjustments are passé: With the massive bandwidth, super fast speeds, and low latency provided by Verizon's 5G Ultra Wideband network and mobile edge compute platform, teams can get the deepest insights for course corrections in near-real time, which helps organizations to achieve what matters most to them. And what matters most to them? In our Connected Athlete Survey, 70% of leading sports team executives said their number one focus was establishing a culture of success within their organization.

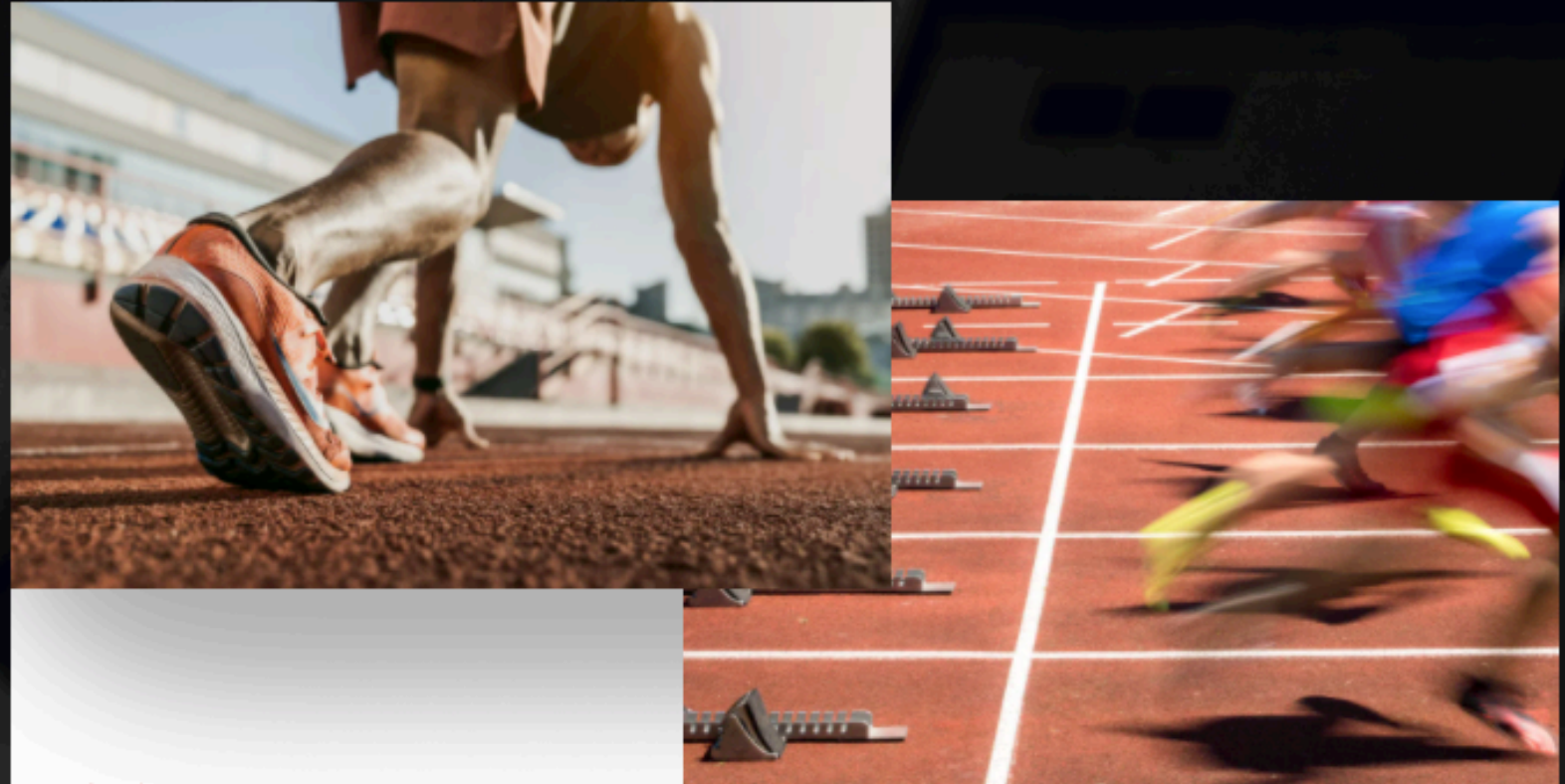


Verizon in Sports

Verizon creates the networks and technology that can help athletes and teams reach their true potential.

Hitters have two-tenths of a second to decide whether to swing at a 90-mile per hour fastball. Quarterbacks are throwing passes into anticipated openings in coverage less than two seconds after the snap, all while dodging a ferocious pass rush. Point guards make immediate reactions to the defense.

Athletes rely on those quick decisions, cognitive might and purposeful practice. To train effectively and efficiently, they need immediate feedback. The results can be powerful: just ask the Phoenix Suns, whose innovative Verizon 5G Performance Center helped propel them from last place to the NBA Finals in two years.



“

For us in sports, every second matters. You're talking about making decisions in real time on the court. Coaches have to make substitutions, players have to make reads. And so when you're trying to evaluate what you're doing, and how well you're doing it, the closer you can get to a real-time evaluation, the better.

”

James Jones, General Manager at the Phoenix Suns





Verizon in Sports

Click each icon to view examples from sports teams and leagues

The Connected Athlete

Verizon's 5G Ultra Wideband network can help empower the Connected Athlete. Its 5G Ultra Wideband network is deployed in more than 60 sports and entertainment venues—and counting—including 25 NFL stadiums.

“The Connected Athlete, for us, means somebody who trusts us with the technology that informs them about their life because an athlete's future, their earning potential, is tied to how they perform,”

Brian Mecum, Vice President of Device Technology,
Verizon





Verizon in Sports

Click each icon to view examples from sports teams and leagues



ShotTracker and NBA

Rapid data transmission was possible with 4G, but what 5G and mobile edge compute make possible is near real-time video overlaid with not just raw data but information that's been processed by algorithms. ShotTracker, a comprehensive sensor-based basketball tracking system that works with numerous college and NBA teams and conferences, is one such partner company whose coaches have a better teaching tool because the two sources—data and video—are married together.



“What they'll be able to benefit from is being able to receive the juxtaposition of that data along with video. A play just happened and, within milliseconds, they should be able to see and replay that and get data integrated into it to really enhance that experience.”



Davyeon Ross, Co-Founder & President,
ShotTracker



Verizon in Sports

Click each icon to view examples from sports teams and leagues



Uplift and MLS

LAFC of Major League Soccer used to do biomechanics analysis of its players before and after every season. Anything more would be too laborious; players had to go to a motion capture lab and get outfitted with dozens of markers to capture data. Now, a startup called Uplift Labs gives similar quality data by syncing two iPhone videos, and LAFC can assess players easily anytime they want—and get the results immediately.



“A lot of companies focus on the movement capture and the data acquisition part, but equally as important is that data visualization and how fast can you get, not time to market, but time to data? So 5G and now 5G Ultra Wideband can definitely help towards that goal of faster turnaround times.”



Sukemasa Kabayama, CEO, Uplift



Verizon in Sports

Click each icon to view examples from sports teams and leagues



NHL

The NHL partnered with Verizon because the fastest sport on two legs needs an ultra-fast network and edge compute. The league invested in a sensor-based puck and player tracking system to power team strategy and analysis, as well as fan experiences. And for that data to be useful, it needs to be available right away.



NHL executive vice president Dave Lehanski has long sought a standard with no more than a 200-millisecond lag, and the 5G and edge compute infrastructure Verizon has installed is going to have “a major impact” on making that happen. The tablet-clutching coaches on the bench are grateful they can watch truly instant replays or dissect the best faceoff matchup without delay. Fans can hold up their phones and see, in augmented reality, player skating speeds and other stats in real time.





Verizon in Sports

Click each icon to view examples from sports teams and leagues



Esports

In Los Angeles, a truly pioneering esports training facility opened recently. The Verizon 5G Gaming Center is the new West Coast headquarters of Dignitas, an internationally recognized esports organization. The new facility targets improving player performance and wellbeing. Dignitas is a sprawling enterprise, fielding rosters for a half-dozen games, with players and analysts all over the globe.

"You literally can't run Dig without seamless connectivity."



Michael Prindiville, CEO, Dignitas



Verizon in Sports

Click each icon to view examples from sports teams and leagues



Team Penske

Before having 5G access, Team Penske would record a six-hour training session to a memory card and review it in the garage at night so the learnings would be available prior to tomorrow's practice. Now with 5G, the material can be there right away to help Will Power better navigate a turn on the next lap, not the next day.





Verizon in Sports

Click each icon to view examples from sports teams and leagues



VR/AR

After all, several years ago Verizon blacked out the windshield of an IndyCar and gave a driver virtual reality glasses connected to a camera feed on the hood of a car. Using 5G mmWave lag was extremely low, enabling the driver to speed around the track safely and effectively.



As a teaching tool, Verizon partnered with a company called Trigger to create interactive holograms of star athletes performing signature moves. Using a volumetric capture studio with 106 cameras—53 RGB, 53 infrared—they collected video and turned it into a moving 3D image that could be seen spatially.

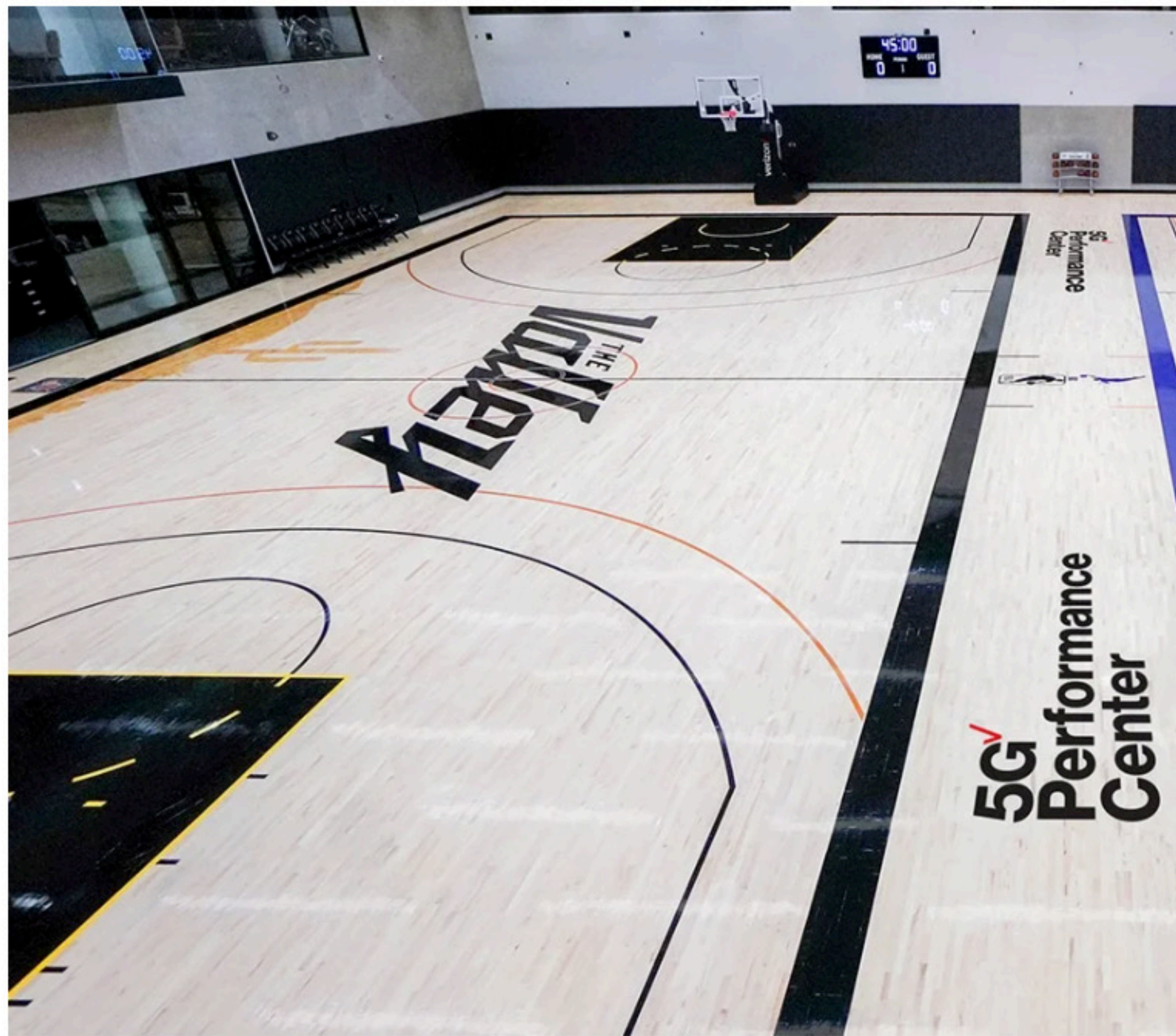


Users could even record video of themselves for side-by-side playback along soccer player Megan Rapinoe kicking a ball, basketball player Ray Allen taking a jumper, golfer Tony Finau swinging a club, tennis player Sloane Stephens blasting a forehand, hockey player Auston Matthews taking a slapshot, football quarterback Justin Herbert tossing a pass and skateboarder Nyjah Houson performing a trick. It's an XR, or mixed reality, experience that 5G can enable. Part of Verizon's mission right now, Mecum says, "is getting people educated and expecting that their phone can do what it can do."



Verizon's high-speed, ultra-low latency 5G Ultra Wideband network is helping to unlock the next wave of player development. Solutions that capture video and data in real time allow coaches and trainers to immediately analyze and utilize key factors for improving athletic performance. Computer vision and machine learning generate insights and visualizations that were previously unimaginable.

"You can do things faster than the human mind can—and you can apply big data to it," Mecum says. "Our tech builds confidence. We like to call it truth. And so when you see the science behind why you're performing that way or what you need to improve on or reinforce something, you believe that it's the truth, and you're comfortable with it."



Verizon 5G Performance Center

Verizon is reinventing what a training center can do with 5G as well. Teams have been using technology for years to evaluate performance, but Verizon has taken it to the next level with the Verizon 5G Performance Center used by the Phoenix Suns. By integrating 5G Ultra Wideband and bringing multiple analytics solutions together into one holistic data set, players, coaches and management now have near real time access to nuanced insights to a degree never before possible. It could change the very nature of sports training forever.

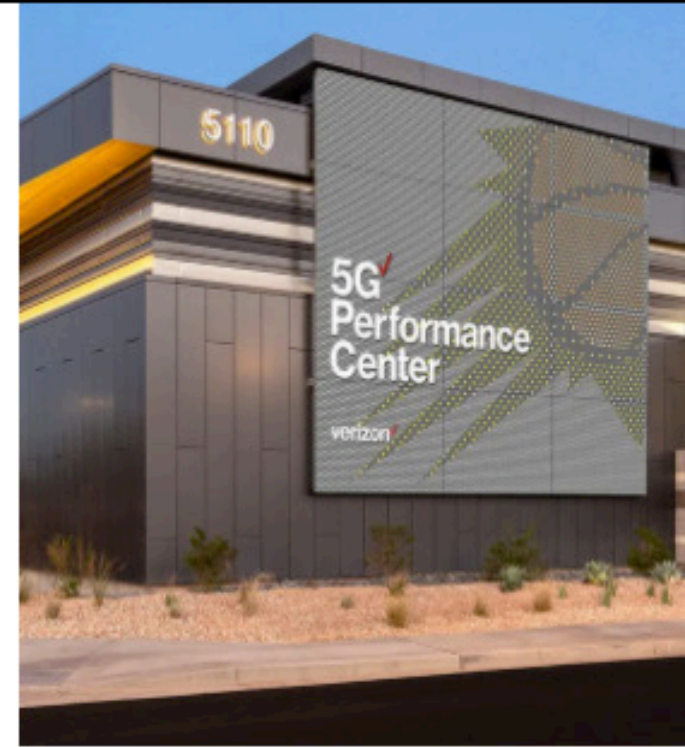
“ It’s always Nirvana when the business side and the basketball side can partner together and demonstrate a brand promise—what can 5G do?—and at the same time authentically showcase a differentiator to help us win basketball games, scout players more effectively, keep players healthy. ”

Dan Costello,
Chief Revenue Officer,
Phoenix Suns



“When you have the ability to use edge compute and process data faster than you can blink an eye—because our edge computing is faster than 300 milliseconds, and you blink your eye at 300 milliseconds—and then provide that back to a coach in real time, or a player through audio in the gym, it changes the way that they grow, develop and learn,” says Verizon VP of device technology Brian Mecum.

The individual technologies the Suns use are hardly unique in the NBA, but the inventory and integration into a singular real-time dashboard is the differentiator. This collection of sync tracking devices creates a new way of thinking about basketball performance, a new data set of immersive size and value, all customized for the team’s specific needs. That’s the power of Verizon 5G Ultra Wideband and mobile edge compute, and its technicians who can support such bespoke products and installations.



Phoenix Suns Case Study

As part of a franchise reset that ultimately put the Phoenix Suns in last season's NBA Finals, the team conceived, built and opened the \$45 million Verizon 5G Performance Center, a state-of-the-art training center on the northeastern edge of the capital city, replacing an outdated facility in the basement of the franchise's arena with just four cameras and a sluggish network.



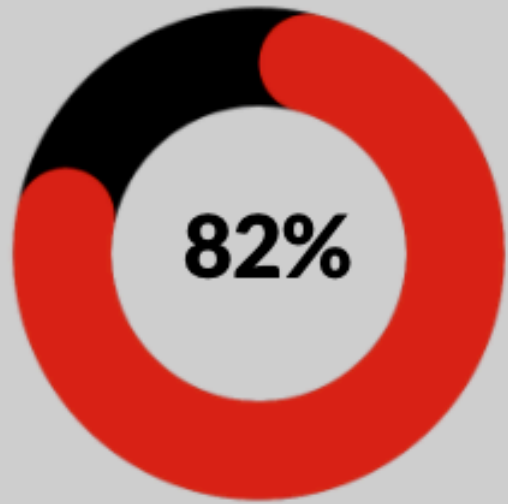
Using Verizon's 5G Ultra Wideband connectivity and mobile edge computing, the first-of-its-kind facility merges computer-aided motion analysis, player and ball tracking, and shot tracking—typically independent technologies—into one integrated system.



The 53,000 square feet of performance space includes courts and workout areas that are surrounded by 150 HD cameras, sensors and nodes tracking the motion of players and the ball. It's less a training center and more a laboratory that provides coaches and trainers with more information about their athletes' biomechanics and basketball development, faster than ever before.



And its impact? The Suns ended a 10-year playoff drought, were two wins away from a championship and now sit atop the Western Conference standings. No less an expert than general manager James Jones says the Verizon 5G Performance Center is "critical."



82%

of respondents to the Connected Athlete Survey said their training facility and utilization of advanced technology is a valuable recruitment and retention tool.

The genesis of the performance center can be traced to a dinnertime conversation and literal backside of a napkin, when Jones and chief revenue officer Dan Costello, who is also a SVP of business innovation, met with Verizon's Mecum. Ideas percolated and were revised in extensive follow-up meetings before they were borne out in the performance center. "It takes constant iteration," Mecum says.

The Suns deployed a wide range of performance technologies—Kinexon wearables, Playsight cameras, Bertec force plates, Simi Motion 3D capture, Noah Basketball and ShotTracker—all of which funnel into a custom dashboard Verizon is helping the team develop.

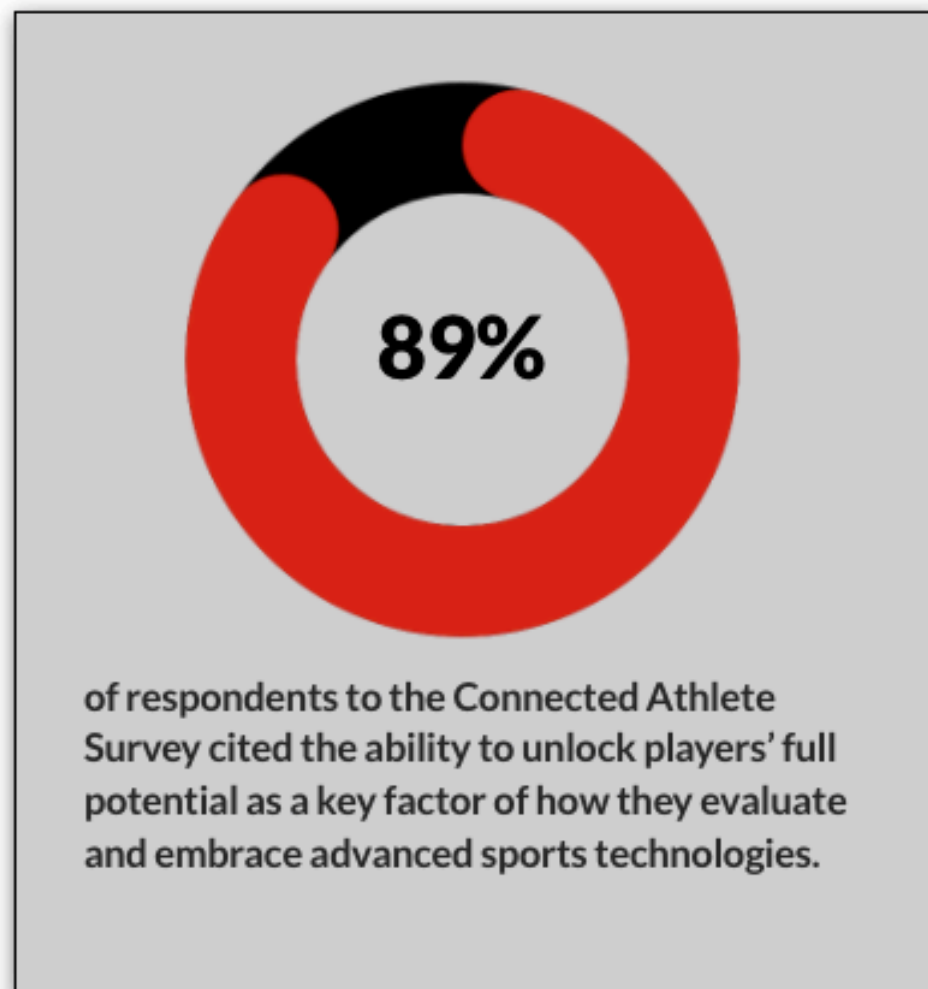
“For me, the must-have was, ‘Can we make sure that the entire building is connected and wherever we are, we can get real-time feedback?’”

James Jones,
General Manager, Phoenix Suns

Training used to be a nebulous process. Players practiced, they did drills, they learned new skills, they hoped to play better. Video review helped inform their progress, but even its interpretation was tinged with subjectivity.

Data trumps all of that.

“As a player, you know exactly, in real time, if you're winning or you're losing, but in the performance and the preparation space, there's usually a lag,” Jones says. “Outside of playing the game, you don't really know how you're performing, how long have you been on your feet? How long have you run? What was your max speed? Was your max speed increasing or decreasing over the last two minutes? Are you getting stronger? Are you starting just as strong as you did yesterday? All of these dots, as I call them—you guess a lot.”



Often the feedback confirms expectations. At other times, it may initially seem contradictory.

One player on the Suns was practicing too much, to the point where the extra work became detrimental.

“We were able to tell a basketball player going into the Finals, ‘Hey, you're actually not improving during practice,’” Mecum says. “And this generation, they grew up on these black rectangles”—meaning, phones and tablets—“and they trust what comes out of these. So when we tell them, You're really dipping down, you're not performing like you should be, you need to take time off. And then when they come back, we show them that they're above par again—they learn to trust it.”



“Being able to track and improve efficiency in shooting means that you can make gains in other areas. Every minute spent on the practice floor is an energy reserve that you're tapping that can be used on the game floor. Our guys started to see that like you can be more efficient and still be effective,” says Jones.

Mecum says Verizon's foot is still pressed on the gas pedal for further development in Phoenix, and Jones is already planning what he wants next.

“We're able to scale,” Jones says. “The 5G capabilities allow us to dream and think bigger and try to connect the systems that we have and the future systems that we want to add—and you couple that with machine learning and artificial intelligence for pattern recognition for offensive and defensive strategic game planning—there's just so many possibilities.”

The Suns have been digital pioneers before. In 2021, they were the first NBA team to use Verizon-connected tablets on the bench. Their business and fan experience initiatives also infuse technology and Verizon 5G connectivity to handle ticketing, retail and concession volume, not to mention in-play sports betting even when games are played at or near capacity of 18,000.

What Differentiates Verizon as a 5G Provider

Verizon's mobile edge compute platform allows mission critical-applications to be processed on the network's edge, rather than in the centralized cloud storehouse. Partnerships with the biggest cloud providers bring the compute and storage closer to the network edge and end user's devices.

AT A GLANCE

\$53 Billion
Spent on C-Band Coverage

161 megahertz
Average bandwidth across
all markets

406
Markets in the United
States

14,000
Newly installed 5G Ultra
Wideband cells sites

Connected Technology

Among the connected technologies helping the Suns at the Verizon 5G Performance Center are:

KINEXON

The most popular training wearable in the NBA for several years now, Kinexon's sensor uses ultra-sideband radio frequencies to collect data from matchbook-sized devices. They precisely track player positions and movements to quantify individual player training load.

PLAYSIGHT

The artificial intelligence-powered Playsight cameras automate the recording of practice video while clipping and tagging key moments.

BERTEC 3D FORCE PLATES

The devices, which look like ordinary floor tiles, track ground reaction forces in three dimensions. By tracking movement patterns such as impact force, balance, acceleration/deceleration and launch and landing angles, the force plates record a player's baseline and track any deviations that might be signs of fatigue, injury or improvement. The Suns have eight cameras circling the force plates to marry video of the activities with the data.

SIMI MOTION

The multi-camera motion capture Simi system provides high-grade skeletal and joint tracking for biomechanical analysis. This enables performance analysis for more efficient movement but also can monitor markers of fatigue or injury.

NOAH BASKETBALL

Cameras and depth sensors track shooters and shots in extraordinary detail. Used by three-quarters of the NBA, Noah generates data of the shot arc and left-right consistency to show trends and provide instant feedback. Its cameras use facial recognition to make the system frictionless: players walk in, shoot and receive all their data without ever pressing a button to record.

SHOTTRACKER

ShotTracker provides comprehensive practice and game analytics. The players, ball and court are all outfitted with sensors to track shot locations, passes, team ball movement and much more, all with sub-second latency. A Verizon Ventures portfolio company, ShotTracker has also received investments from basketball legends Magic Johnson and the late NBA commissioner David Stern.



THANK YOU

 **SPORTTECHIE** × **verizon**^v