

# STADIUM

## TECH REPORT

WINTER 2023

### WIRELESS UPGRADES

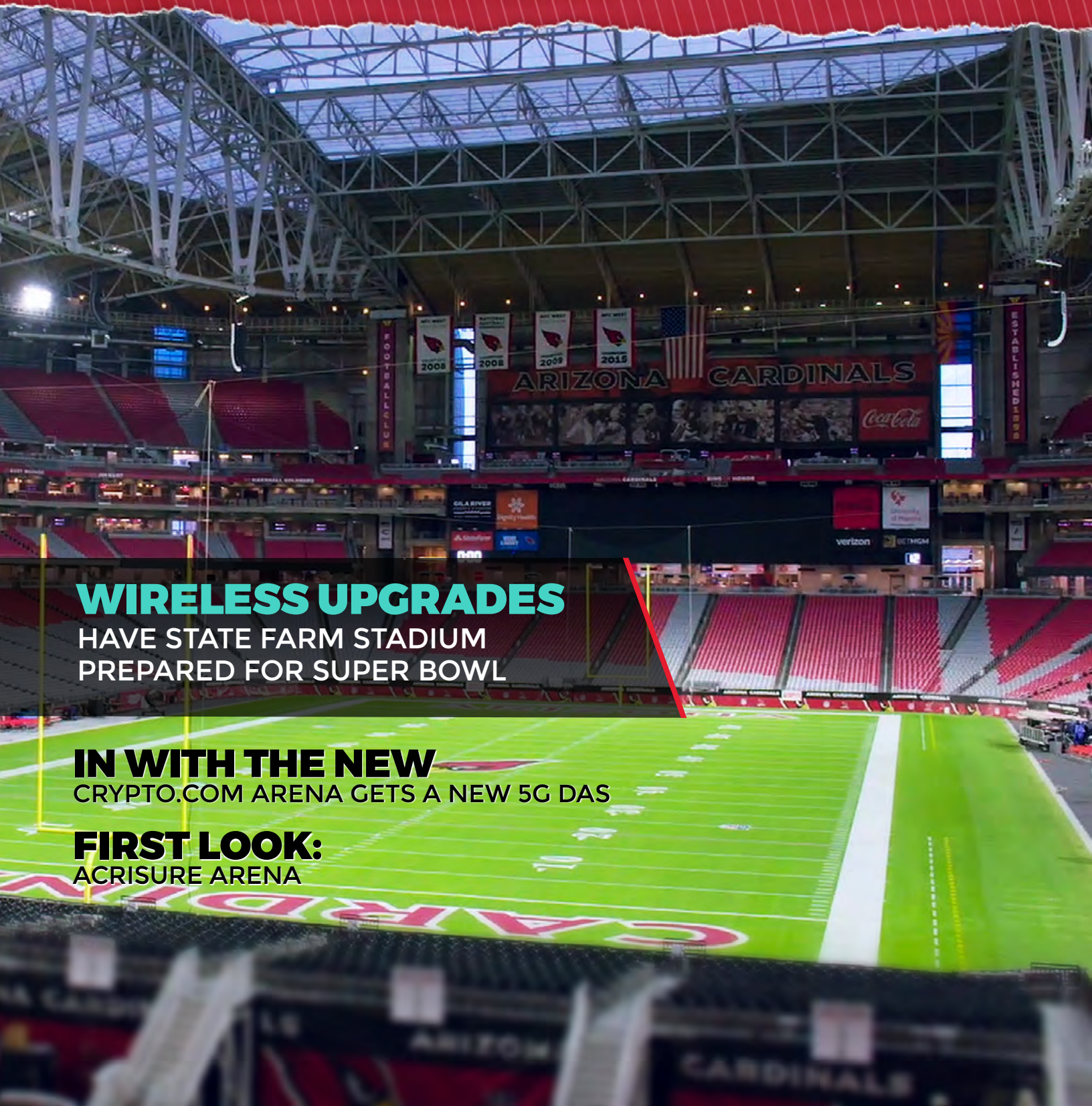
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# STADIUM

## TECH REPORT

### Welcome to the fourth issue of our NINTH year of STADIUM TECH REPORTS, the Winter 2023 issue!

These long-form reports are designed to give stadium and large public venue owners and operators, and digital sports business executives a way to dig deep into the topic of stadium technology, via exclusive research and profiles of successful stadium technology deployments, as well as news and analysis of topics important to this growing market.

Our stories for this issue include an in-depth look at a new DAS deployment at Crypto.com Arena and LA Live in Los Angeles; a visit to the new Acrisure Arena in Palm Springs; and a detailed description of all the wireless upgrades installed at State Farm Arena in Glendale, Ariz., to prepare the venue for Super Bowl LVII.

We'd like to take a quick moment to thank our sponsors, which for this issue include Verizon, ExteNet, MatSing, Cox Business/Hospitality Network, Boingo, American Tower, and AmpThink. Their generous sponsorship makes it possible for us to offer this content free of charge to our readers.

We'd also like to welcome members of the The Association of Luxury Suite Directors (ALSD) and the International Association of Venue Managers (IAVM), who now have access to Stadium Tech Report content. We'd also like to welcome readers from the Inside Towers community, who may have found their way here via our ongoing partnership with the excellent publication Inside Towers.

As always, we are here to hear what you have to say: Send me an email to [kaps@mobilesportsreport.com](mailto:kaps@mobilesportsreport.com) and let us know what you think of our STADIUM TECH REPORT series.

Paul Kapustka, Founder & Editor  
Stadium Tech Report





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Paul Kapustka

## WHAT STADIUM TECH MIGHT PROLIFERATE IN 2023?

Looking back at 2022, it's easy to proclaim it as a banner year for stadium technology. Innovation on multiple fronts arrived, not just as ideas but actual products and services that brought immediate improvement to stadium business areas like concessions, ticketing, security and infrastructure.

Will 2023 bring more acceleration of new ideas and technology deployments as venues continue to try to solve existing pain points as well as address newer ones, like staffing concerns? Here is our quick-take outlook on a number of the topics we tracked last year and will continue to do so going forward, to help venue owners and operators better understand what their peers are doing and how that might inform their own plans.

### NO SLOWDOWN AHEAD SEEN FOR CONCESSION TECHNOLOGY

The area of stadium operations that saw the most visible growth of new technology use had to be

concessions operations, with multiple new ideas not just launched but already building up a head of steam as 2022 progressed.

One of the more revolutionary ideas that caught on instantly with both fans and operators was the checkout-free concession stand, where customers simply scanned a credit card (or their palm) at entry, went through the stores picking out the items they wanted, and just left, with billing taking place later online. Though we haven't yet seen any detailed reports of revenue generation, the general feedback so far from venues and caterers is that the stands can significantly

outperform traditional stands in both revenue and speed of transactions.

From August 2022 until January 2023 the number of stadium-based checkout-free stands from the two market leaders – Zippin and Amazon – almost doubled, from 44 in late summer to 81 at our latest count. Though we have heard some pushback from stadium reps about the upfront costs of the stores, some recent additions to store designs, including smaller, less expensive stripped-down versions of the stores, should convince more venues to test the checkout-free waters in 2023.

We also expect to see growth in the simpler self-serve terminals market, where leaders like Mashgin and Toshiba are providing devices that allow for much faster concession transactions with fewer live staff needed.

Mashgin, which has terminals that use cameras to determine items placed on its base, and Toshiba, which has special-built units with large scanning screens designed to be faster and easier than similar grocery-store devices, are winning deployments based mainly on flexibility and cost, as they can be added to existing stands without much reconfiguration.

Facial authentication technology for even-faster payment and age verification tasks is also making concession-stand inroads,

especially at single-purpose stands like the TendedBar stands. We wouldn't be surprised to see Zippin add facial-authentication technology as a payment and verification choice going forward, since it seems a good fit.

### ADOPTION OF WALK-THROUGH SECURITY SCANNERS SPEEDS UP

Walk-through security scanners, a topic that we highlighted early last year, saw its acceptance grow during 2022 as big-name stadiums adopted the technology that is replacing the older metal-detector devices. By allowing fans to walk past scanning devices instead of stopping, the devices can significantly reduce the time fans spend in venue-entry procedures, one of the biggest pain points of the game-day experience.

Evolv Technology got a big boost when SoFi Stadium signed up with the company as its security provider, adding the venue to a list of top NFL stadiums using Evolv that grew throughout the year. The Evolv Express systems, which were in place for the full 2022 NFL season at SoFi, joined deployments at Atlanta's Mercedes-Benz Stadium, Nissan Stadium in Nashville, First Energy Stadium in Cleveland, Acrisure Stadium in Pittsburgh and Gillette Stadium in Foxborough, Mass., among other venues.

Xtract One, the company formally known as Patriot One, signed a formal deal with venue owner and

operator company Oak View Group in 2022 to be a preferred security systems provider. The deal netted Xtract One some early venue wins, including the new Moody Center at the University of Texas in Austin and at the new Acrisure Arena in Palm Springs. CEIA, the longtime provider of traditional metal detectors, was also winning conversion deals for its new walk-through OpenGate line.

### LONG-THROW ANTENNAS ARE ADDING MORE CUSTOMERS

Innovation on the wireless antenna front for both cellular and Wi-Fi networks jumped ahead in 2022 as well, with the lens antennas from MatSing and Cisco's new 9104 "Marlin" Wi-Fi antennas giving venue network designers new options to cover previously hard-to-reach areas.

MatSing antennas, which now seem to appear regularly in new stadiums and retrofits, were used to completely redo the cellular coverage for the upper decks at Acrisure Stadium, a deployment of approximately 60 antennas. And the new Cisco Wi-Fi antennas were key to a top-down deployment at Geodis Park, new home of the Nashville SC MLS team (look for a profile later this year in Stadium Tech Report).

The 9104 antennas were also used in the Wi-Fi upgrade at State Farm Stadium prior to this year's Super Bowl (see profile in this issue), and

have found homes in several arenas we know of where they are being added to bring Wi-Fi coverage to stadium floor areas for concerts and other events. UBS Arena is just one of the venues known to have installed the 9104s for this purpose.

### FACIAL AUTHENTICATION THE NEXT TO TAKE OFF?

Finally, 2022 also saw several live deployments of facial authentication technology used in several different applications, including ticketing and concessions purchases. At First Energy Field in Cleveland, the NFL Browns deployed Wicket's facial authentication technology for faster ticket verification a tactic also used by the New York Mets at Citi Field and at Mercedes-Benz Stadium in Atlanta.

The Browns also experimented with Wicket technology, along with ID verification services from IDmission, to support beer purchases where age and payment verification, were done by looking at a screen. We expect to see more uses of facial authentication technology as 2023 unfolds.





# WIRELESS UPGRADES HAVE STATE FARM STADIUM PREPARED FOR SUPER BOWL

\\ BY PAUL KAPUSTKA

**E**ight years ago, the state-of-the-art networks inside the venue now known as State Farm Stadium set one-day records for fan wireless data consumption at Super Bowl XLIX. While the stadium has remained one of the most active large-event venues since then, the ever-increasing demands of wireless users meant that to properly host this year's big game, a full network rip-and-replace was required.

As it gets ready to host Super Bowl LVII on Feb. 12, State Farm Stadium is once again at the forefront of big-venue network technology deployments, with a brand-new Cisco Wi-Fi 6 network and a completely upgraded digital cellular DAS using gear from CommScope that includes support for shared 5G services, alongside separate 5G millimeter-wave gear from all the leading carriers.





A mix of underseat (above) and overhead (below) antenna deployments were used to densify signals in all areas. Credit both photos: Verizon

According to Mark Feller, vice president of technology for the Arizona Cardinals, the complete network overhaul was a 2-year project, completed while the stadium hosted its usual slew of big events, including NFL games, concerts and the Fiesta Bowl. And after this year's Super Bowl the stadium will host the NCAA Men's Final Four next year, in what Feller calls "the big one-two" of big-time U.S. sporting events.

"The projects are very difficult, and it's a long process for us," Feller said. And while he's not sure if State Farm Stadium will follow tradition and set new high Wi-Fi and DAS marks like Super Bowls have historically done since the then-University of the Pacific Stadium did eight years ago, he is confident that the new network infrastructure is more than ready to handle whatever demands the big games now require.



#### OUT WITH THE OLD, IN WITH THE NEW

When it comes to the history of advanced wireless networks inside large public venues, State Farm Stadium holds a unique spot. While its first Super Bowl, XLII in 2008, was before the current explosion of mobile device usage (the first Apple iPhone had only been available since June 2007), by the 2015 game the stadium-networking revolution was in full motion.

With a new Cisco Wi-Fi network that included mostly top-down and some handrail antenna deployments, the stadium saw 6.23 TB of Wi-Fi data used, the most seen to that day. The cellular DAS from third-party operator Crown Castle, using CommScope gear, brought improved signals to areas both inside and outside the venue, which helped Verizon Wireless, AT&T and Sprint to host a combined total of 6.56 TB used in and



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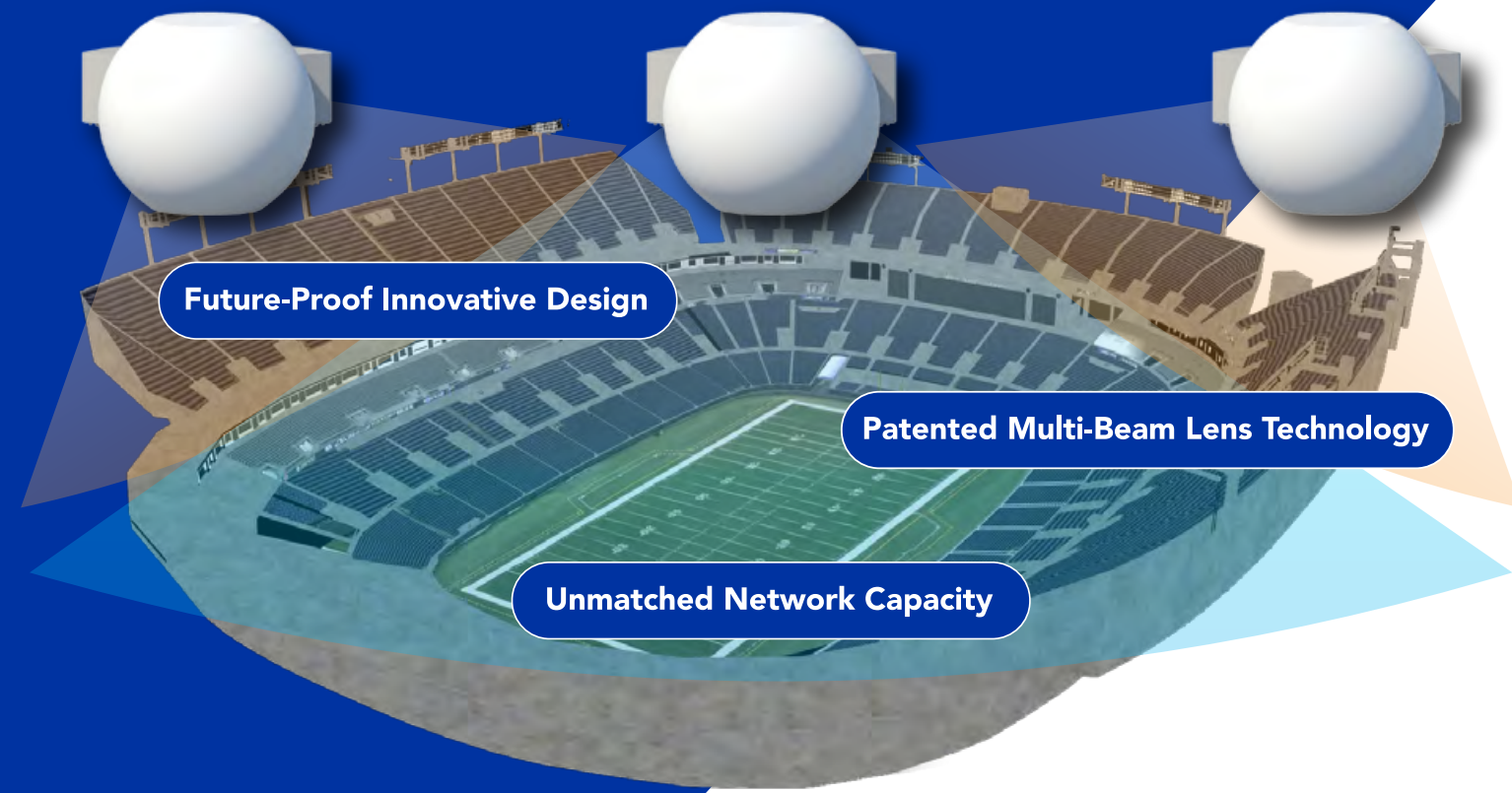


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around the stadium. The combined total 12.79 TB was, according to us at the time, "far and away the biggest single day of wireless data use we've ever heard of."

Now just eight years later, those totals seem like numbers a big venue might see in the first hour after fans' arrival. At last year's Super Bowl, SoFi Stadium set the new high-water mark with 31.2 TB of Wi-Fi data and 30.4 TB of cellular data on the Verizon and AT&T networks.

To handle the new requirements of the NFL's big game, and of subsequent big events that will follow, State Farm Stadium replaced its entire Wi-Fi network (along with its core network components) with new Cisco gear, including 300 of the new 9104 "Marlin" antennas, which provide a longer, more focused connectivity beam.

According to Feller, the 9104s were part of a new combination Wi-Fi design – for the upper seating deck, the 9104s were mounted overhead in the roof infrastructure, an area that was too far away for previous Wi-Fi antenna designs to work properly. In the lower bowl, the stadium added approximately 600 under-seat enclosures for both Wi-Fi and DAS gear.

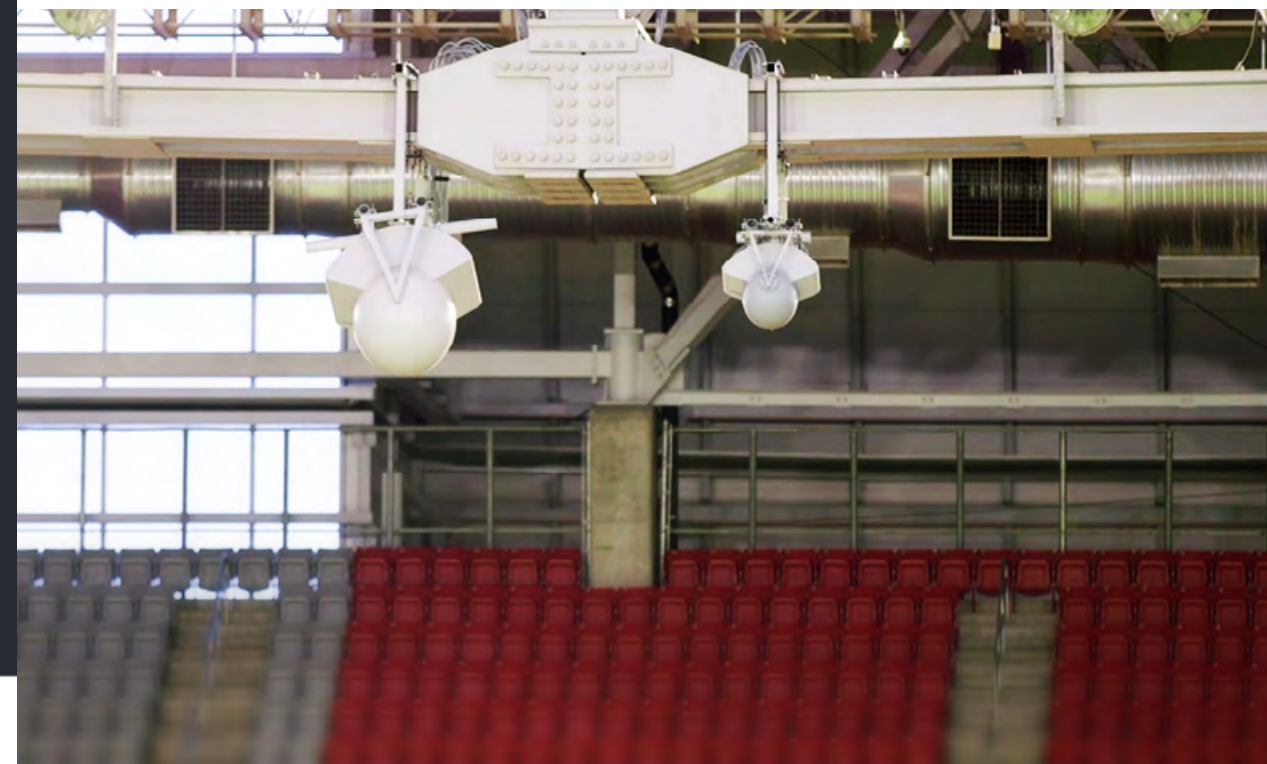
The underseat deployment, which Feller said was started in 2021 and completed last year, was able to use existing expansion seams to cut down on the number of concrete core drills required. While underseat has become a proven design, the farther-reach capabilities of the newer Cisco gear is already winning rave reviews.

**“Kudos to Cisco,” Feller said about the new antennas. “They perform really well.”**

The upgrade to a full Wi-Fi 6 network should also significantly improve overall connectivity, as more fan devices are now in use that support the standard. Ohio State's Ohio Stadium, which installed a Wi-Fi 6 network in 2019, recently reset the single-day Wi-Fi mark with a 34.8 TB event, where a majority of the traffic was fully Wi-Fi 6 based.

### GETTING READY FOR INCREASED 5G USAGE

Newer devices in fans' hands could also make Super Bowl LVII the first real "5G" big event, something the



MatSing lens antennas were deployed to cover sidelines and some hard-to-reach end zone seats. Credit: Verizon





carriers are prepared for with their own network improvements. Like the Wi-Fi network, the old DAS was fully replaced with new CommScope gear that supports shared 5G signals in the midband “C” spectrum, as well as all the 4G LTE spectrum ranges.

“The scale of 5G deployments in the new DAS is huge,” said Upendra Pingle, senior vice president of intelligent networks for CommScope. Pingle, like the carriers, expects there to be a huge use of 5G services this year. As such, the new fully digital network from CommScope includes full 5G NR support in C-band spectrum for Verizon and AT&T, and in band 41 (~2.5 GHz) for T-Mobile.

This year, the top carriers believe that the promise of 5G services – lower latency, faster speeds – will become a reality to more customers at the big game. While 5G services have been touted at Super Bowls for several years now, the majority of devices now in users’ hands can finally support the technology, and it is showing up in statistics. Add in the 5G support in the new DAS – which Pingle thinks may be the largest stadium 5G network ever built – and the signs point toward a big 5G usage day.

Adam Schieber, vice president for access construction and engineering at AT&T, said the carrier “saw an uptick” in overall 5G usage at the recent Fiesta Bowl at State Farm Stadium, which was a perfect “dry run” for all the new networks in use. “This could be the first time 5G really takes off [at a big event],”



said Schieber. Desmond Jackbir, director of network engineering at Verizon, said Verizon also expects to see an increased level of 5G data use, and has designed its new deployments to be ready.

**“We saw more 5G than ever, and more 5G than 4G near the end of the [NFL] season,” said Jackbir of the State Farm Stadium network.**

The cellular infrastructure also includes eight MatSing Lens Antennas, whose long-range coverage abilities will provide service to the sidelines as well as to the “Red Zone” seating area at one end of the stadium. The new DAS design, Upendra said, has 118 sectors and uses approximately 2,000 antennas, with about 1,000 of those deployed underseat in the main bowl. T-Mobile is also part of the stadium DAS, adding coverage for its main 5G spectrum band at 2.5 GHz to both the inside and outside DAS deployments. “The network upgrades we have made to State Farm Stadium, Phoenix and the surrounding cities will provide our customers with a vastly improved experience for years to come,” said Neville Ray, President of Technology at T-Mobile, in a prepared statement. On the 5G millimeter-wave front, both Verizon and AT&T have each

added hundreds of antennas to support their different spectrum bands, with placements in the upper infrastructure as well as in small-cell deployments outside the venue. T-Mobile said it has also added new millimeter wave deployments, both inside and outside the stadium.

According to representatives for both Verizon and AT&T, their designs and deployment have also been a 2-year project, a process similar for every Super Bowl these days.

“We started planning and preparing [for Phoenix] 2 years ago, and we’re already doing the same thing for Las Vegas and New Orleans,” said Verizon’s Jackbir. “We show up every year, and we know where the challenges are.”

And while Verizon customers will also have the ability to have their devices auto-authenticate onto the stadium’s Wi-Fi network, Jackbir said the carrier turned that feature off during some late-season Cardinals games to “stress test” Verizon’s cellular infrastructure.

“We were able to handle all our traffic on 4G and 5G, with plenty of headroom,” Jackbir said. “While having our own [Wi-Fi] SSID provides a comfort level, knowing we could do it all on cellular helps us validate our design.”



An AT&T cell on wheels (left) uses a MatSing antenna for supplementary outdoor coverage. The indoor DAS (right) supports 4G and 5G signals. Credit, left: AT&T; right: Verizon



# MOBILITIE BRINGS NEW 5G DAS TO CRYPTO.COM ARENA

Fans attending games and events at Crypto.com Arena and L.A. Live now can count on solid 5G cellular connectivity thanks to a new distributed antenna deployment (DAS) from Mobilitie.

DAS operator and design **MOBILITIE**  
DAS infrastructure gear **SOLID**  
Lens Antennas **MATSING**

\\ **BY PAUL KAPUSTKA**

**R**eplacing an older DAS design, the new deployment at possibly one of the busiest basketball/hockey-sized arenas in the world uses lens antennas from MatSing to provide top-down coverage to most of the 20,000-capacity seating bowl. In addition to participating on the DAS, all three major U.S. wireless carriers also have their own millimeter-wave antenna deployments, ensuring 5G coverage across a wide range of spectrum offerings.

The deployment of the new network was not an easy one — in addition to having been started during the Covid pandemic, construction efforts also had to work around live events being held on an almost nightly basis, according to representatives from Mobilitie and the arena.



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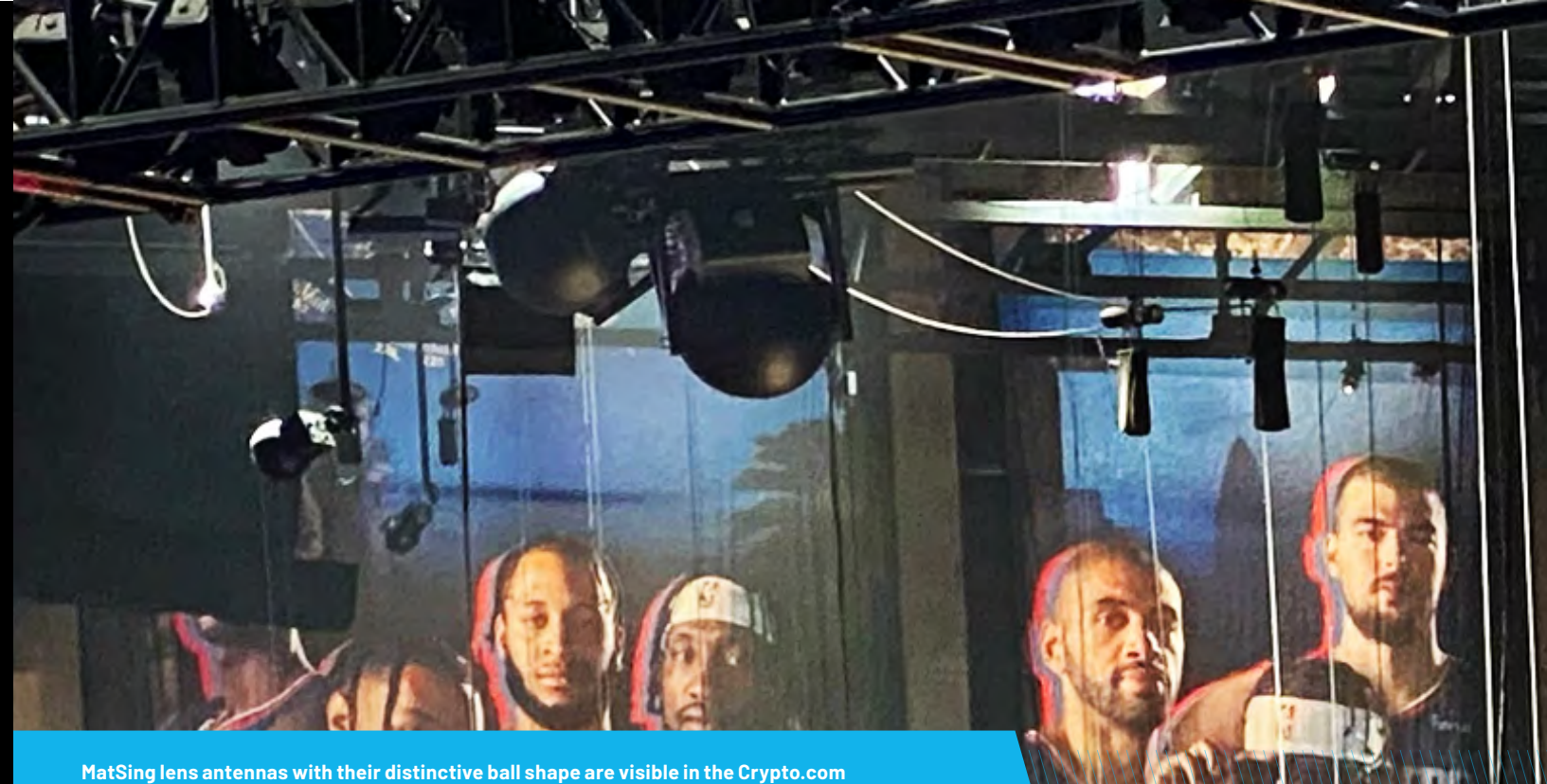
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MatSing lens antennas with their distinctive ball shape are visible in the Crypto.com Arena upper infrastructure. Credit: Terry Sweeney, STR

But according to Mobilitie, the stadium and its surrounding entertainment district now has a network capable of supporting 5G NR (new radio) technologies on the widest range of spectrum, including traditional low-band and mid-band cellular channels as well as the newer C-band and ultra-high bands, the latter used for millimeter wave (mmWave).

With the venue network and the surrounding L.A. Live part both nearly complete, Crypto.com Arena heads into the remainder of its multi-phase renovation project knowing that from here on in, cellular connectivity for fans is a problem already solved.

### TIME FOR NEW TECHNOLOGY ARRIVES WITH 5G

Formerly known as Staples Center, the arena at the center of the L.A. Live district can most likely lay claim to being the busiest pro sports venue, as it is currently home to the NBA's Los Angeles Lakers and Los Angeles Clippers, as well as the NHL's Los Angeles Kings and the WNBA's Los Angeles Sparks. Throw in a regular mix of top concerts and "jewel" events like the recent Grammys, and you have a stadium whose doors basically never close.

As such, the building known now as Crypto.com Arena has always had good connectivity networks. While

updates and refreshes along the way can help keep pace with the always-increasing demands for wireless connectivity, at some point there is no evading the generational rip and replace.

Lee Zeidman, president of Crypto.com Arena, Microsoft Theater and L.A. Live, said the natural "end of life" of the previous network brought about talks on what a new network would look like — and who would help provide it. Executives from the global partnerships group of stadium owner AEG Worldwide, Zeidman said, knew Mobilitie from its previous DAS work at Dignity Health Sports Park, another AEG facility. Zeidman said discussions both internally and with Mobilitie on a new cellular network began prior to and then through the start of the Covid pandemic.

### BUILDING THE FLYING AIRPLANE

If there's an overused stadium renovation analogy, it's the theme of "trying to build an airplane while it's flying." But in this case, putting a new network into Crypto.com Arena was more like building a flying plane that was simultaneously hosting an ice show, a concert and a women's hoops game during the construction.

It's a scene that will be repeated over the next few years, as the stadium undergoes a "nine-figure"





Possibly the busiest arena anywhere, Crypto.com arena is the home venue for two NBA teams, one WNBA team, and NHL hockey (right), as well as concerts and special events. Credit both photos: AEG

renovation that includes “new LED screens and ribbon boards, upgrades to the concourse levels and improvements to in-arena dining as well as a ‘refresh’ of the locker rooms for the Lakers, Kings and Sparks,” according to the arena.

**“The biggest challenge is, each summer we do not know when we can start [any renovations] due to playoffs but we must be ready each Oct. 1 due to the start of the NBA/NHL seasons,” said Zeidman.**

For the first phase, which included the network overhaul, Zeidman said the stadium had a window of 131 days for completion — all while at the same time hosting 45 events such as concerts, family shows and the Los Angeles Sparks home games.

Jammie Witherspoon, senior director of technical solutions for Mobilitie, said the trick during deployment was how to keep as much of the network running as possible while replacement gear was being installed.

The technical direction for the new network, which Zeidman said was an overhead design using MatSing lens antennas chosen by AEG’s global technology division, did provide some help in Mobilitie’s decision to deploy a temporary DAS network that would overlay the original one during construction. While the building’s upper catwalk infrastructure would be the final location

for most of the new equipment, a capacity situation there meant that temporary gear had to fit somewhere else while the existing infrastructure elements were swapped out.

The solution, Witherspoon said, was a MatSing antenna placement on a permanent wall that sits at one end of the stadium. As equipment was replaced, he said, different carrier signals were routed through the temporary antenna, which backfilled the coverage in the bowl seating areas. Once the dust settled on the new construction and the carriers were on-air, the temporary solution was then decommissioned. Lighter remote gear from DAS infrastructure supplier Solid also helped with the new design, reducing the weight needed on the upper-infrastructure installs.

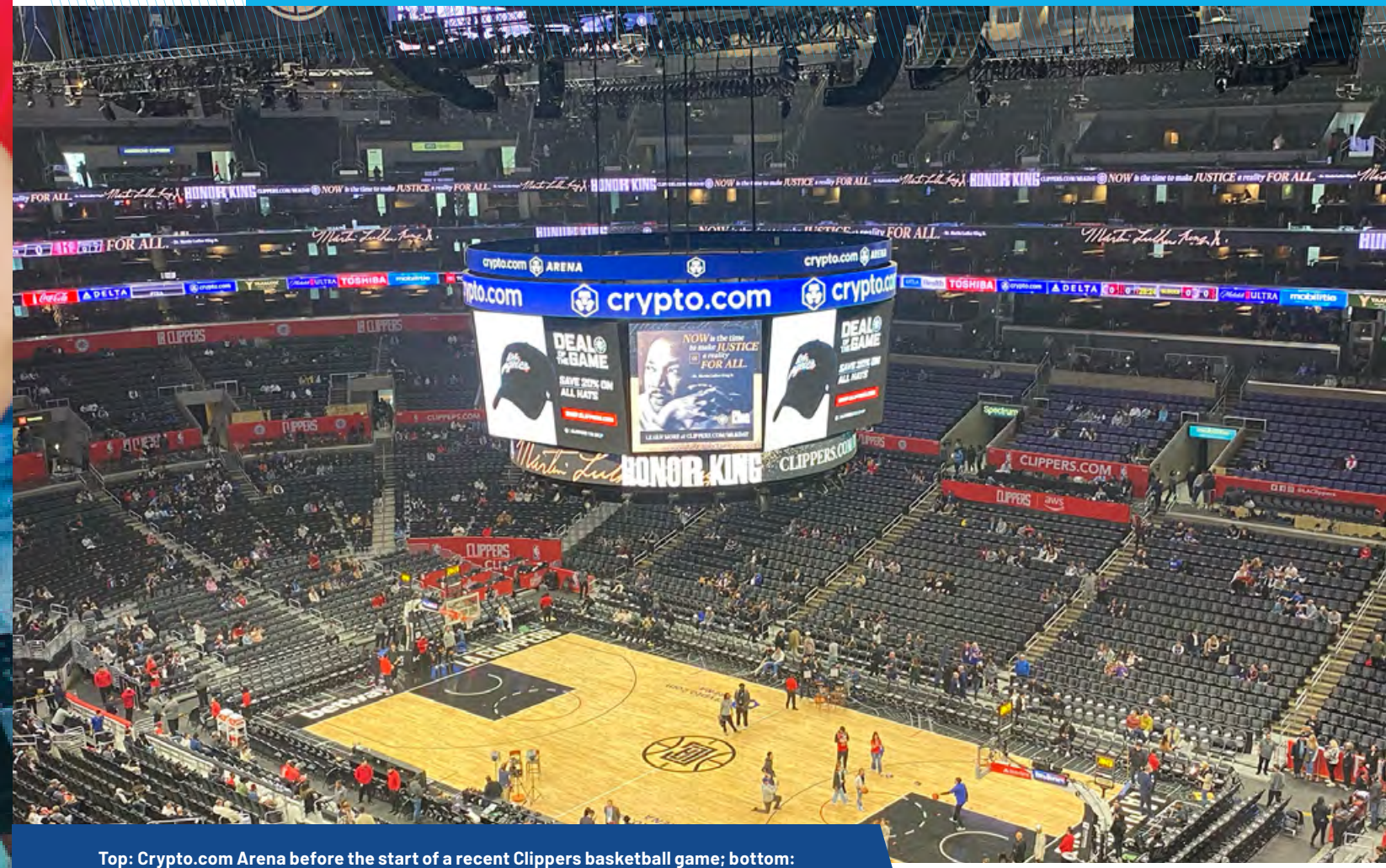
**“It was a challenge, but we had a great team between us and the venue people we worked with,” Witherspoon said.**

#### MORE THAN DOUBLE THE DENSITY

In the end, Crypto.com Arena now has a cellular network inside the building that is more than double the density of its previous one, going from 9 sectors to 24. Outside the building, an 8-sector ODAS will cover outdoor events as well as foot traffic in the reimagined L.A. Live space, where one street will be changed into a pedestrian plaza, among other enhancements.







Top: Crypto.com Arena before the start of a recent Clippers basketball game; bottom: Another view of a MatSing antenna in the upper infrastructure. Credit: Terry Sweeney, STR

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“Mobilitie has been a great partner and we look forward to the completion of the entire L.A. Live campus,” Zeidman said.

Once fully completed, Zeidman said the new DAS “will give us one of the fastest, most technologically advanced multi-carrier wireless networks in the country, which will improve our venue operations and enhance our fan experiences.”

**STR**  
STADIUM  
TECH REPORT





# ACRISURE ARENA BRINGS HOCKEY, BIG CONCERTS TO THE DESERT

\\ BY TERRY SWEENEY

It's almost the stuff of fever dreams: 28 feet below the sunbaked surface of the southern California desert sits an ice rink that's home to a professional hockey team. And on at least one Sunday in late January, the arena looked darn near close to capacity.

This dusty corner of the Sonoran desert may not look like the most auspicious place to spend almost \$500 million on an 11,000-seat arena. But sports venue developer and manager Oak View Group made that bet and in June 2021 broke ground on Acrisure Arena, 12 miles east of Palm Springs.

As if the combined size and remote location of the venue weren't enough of a challenge, there's also the reality that the region is better known for golf and tennis. But OVG was looking to find a home and practice facility for its American Hockey League team, the Coachella Valley Firebirds, the minor league



Hockey and luxury suites are part of the game-day experience at the new Acrisure Arena in Palm Springs. Credit all photos: Terry Sweeney, STR





Left: Wi-Fi antennas cover the outside spaces; right: Xtract One walk-through security scanners speed up the entry procedure.

Joyce Szudzik, vice president of marketing for Acrisure Arena, said the venue is the right scale for this location, when you consider what else is available in the region for sports and entertainment. McCallum Theatre in nearby Palm Desert has only about 1,200 seats. The “big rooms” of local Native American-owned casinos top out at around 3,500 people. The region has been ripe for a medium-sized facility for some time, Szudzik explained.

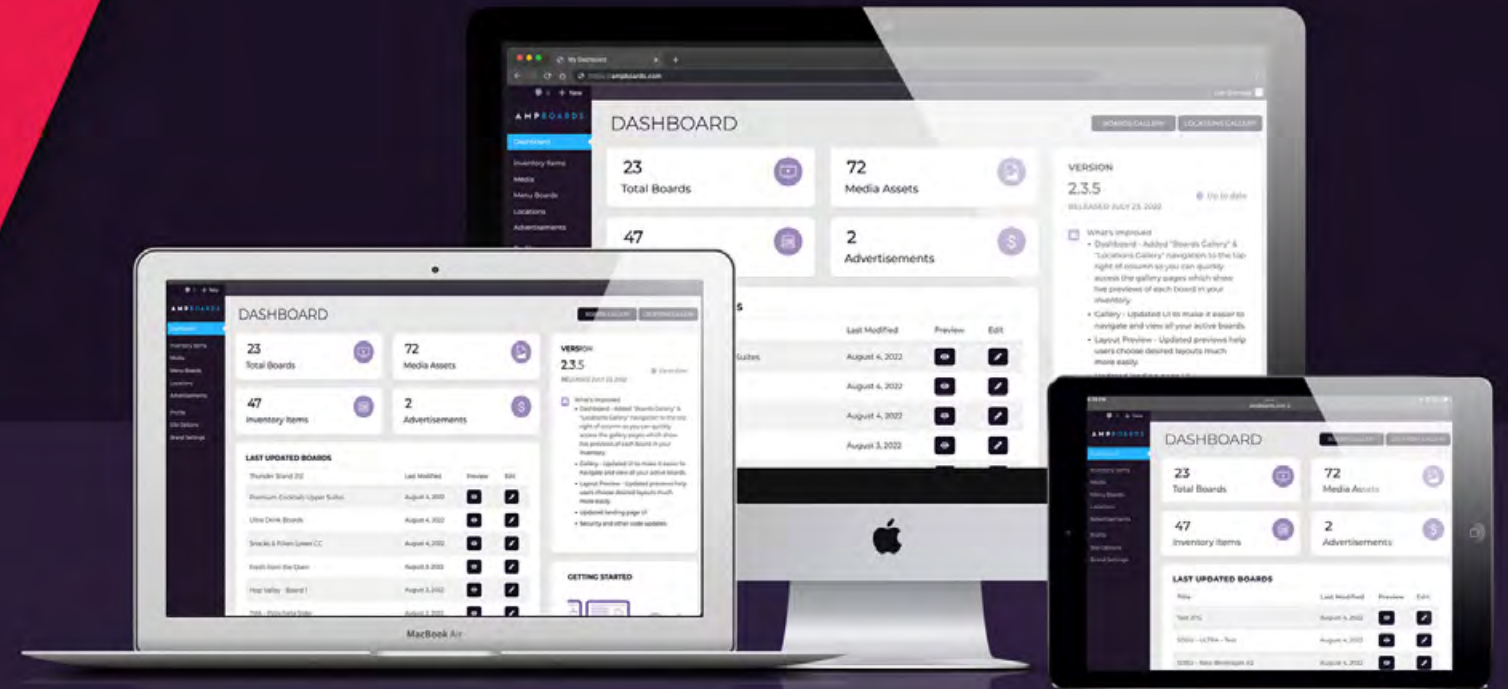
OVG also isn’t relying solely on hockey to fill seats at Acrisure. Dave Chappelle and Chris Rock headlined the facility’s grand opening in mid-December 2022. Musical acts on the Acrisure schedule like Shania Twain, Jimmy Buffet and Harry Styles each draw different demographics. And the arena was built with that kind of adaptability in mind. The seats under the main video board retract, a stage goes up, and the hockey rink transforms into a concert hall relatively quickly.

#### ACRISURE’S TECHNOLOGY MEASURES UP

OVG owns and operates several sports and entertainments venues around the country, and recognized that robust, seamless technology is a baseline customer expectation at facilities like Acrisure.

counterpart to the National Hockey League’s Seattle Kraken, which OVG also partially owns.

OVG’s desert bet starts to make more sense when you consider that the Coachella Valley, better known for its eponymous music festival, isn’t the collection of quiet little desert towns it was 20 years ago. The region between Palm Springs and Indio has been filling in steadily, now counting more than 400,000 residents.



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The close-in roof provides space to mount all kinds of connectivity gear

Verizon handled the technical design and initial management of the IT infrastructure at the new area, said Phil Montford, senior manager of technology for Acrisure Arena. The backbone network is 10-Gigabit Ethernet with redundant dual connections, with switches made by Extreme Networks. This backbone handles all the data, cellular and video needs of the venue, and connects to Acrisure's two Internet service providers, Spectrum and Frontier.

Two Wi-Fi networks are also in operation; a public SSID for fans, the other for back-of-the-house corporate use. There are 346 Wi-Fi access points across the property, Montford said, also Extreme gear.

Acrisure's APs are mounted overhead, which Montford views as a benefit that limits exposure to interference. "When you have a bowl like this with its concave shape made of concrete, radio waves tend to bounce around," he said. "We haven't had to do much [Wi-Fi] tuning... only a little bit for the first two games."

Wi-Fi supports other Acrisure requirements like the Xtract One SmartGateways, used at all the arena's entrances for security screening. With no pocket emptying or shoe removal required, the system is allegedly able to distinguish between a smartphone and a weapon, even a plastic one. The system also makes arena entry six times faster for patrons and reduces staffing costs by 50 percent, according to Szudzik.

Concessions are making limited use of Wi-Fi. Patrons in the arena's suites can order from a QR code menu. Acrisure's long term goal is that seats in the premium bowl areas will have QR codes attached to them for in-seat ordering and service, but that capability is not



currently activated, said Pablo Villareal, the arena's director of premium.

Acrisure's cellular distributed antenna system (DAS) sports eight zones and 146 antennas; it's currently occupied only by Verizon, though AT&T is expected to join sometime this year.

#### CONNECTIVITY GOOD FOR FANS AND BACK OF HOUSE

Speed tests of fan-facing Wi-Fi and DAS inside Acrisure showed adequate performance for most attendees. Best overall performance for the Wi-Fi was in Section 127 closest to the concourse entry level of the bowl at 54.43 Mbps upload/50.36 Mbps download; Wi-Fi was slowest in our test in Section 103 at 19.19 Mbps/13.82 Mbps.

Verizon's DAS proved faster on download speeds and pokier on the upload; best performance was near the top of Section 115 with 81.18 Mbps/16.37 Mbps. Speeds were slowest in our test halfway down in Section 118 at 21.82 Mbps/1.7 Mbps.



Average speeds in our Acrisure tests for Firebirds\_Fan\_Wi-Fi was 26.71 Mbps/46.43 Mbps; Verizon's DAS averaged 55.1 Mbps/7.93 Mbps overall.

The Firebirds' video requirements of the IT infrastructure aren't inconsequential. Montford and his team ensure there's a video feed for broadcasting games on AHL-TV; the local ABC affiliate, KESQ, is broadcasting 10 Firebirds' game this season and draws from the feed. And there's an in-house radio communication for AHL officials; IP cameras point down over each goal, connected to a server, and an iPad, Montford explained.

"There's also ViPr cam, which produces a 4K ultra-wide video feed of the entire ice throughout the game and goes straight to the AHL only, for play reviews," he added. A network-attached storage (NAS) system is used for instant replay; a separate NAS is devoted to inhouse video controls.

Montford is also quick to credit his IT counterparts at other company-owned sporting venues. "OVG has opened five other new arenas in the last 14 months," he said, noting that his colleagues at these other venues generously shared their knowledge with him. "It's a pleasure anytime you have a blank slate like this," Montford said.

Acrisure Arena is also aiming to be more carbon-neutral by 2025, taking advantage of all that sunshine with solar energy panels over most of the parking areas. The entire building will be able to operate on a non-game day using 100 percent solar, and 70 percent on a game day, Szudzik noted. "The venue has been thoughtfully designed in a number of ways, by people with years of experience, who understand how things work," she added.



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Boingo Wireless is a leading provider of cellular and Wi-Fi networks at stadiums and arenas, universities, airports, military bases, convention centers and commercial properties. You'll find Boingo connecting people and things at sports and entertainment venues across the NFL, NBA, MLS, NCAA and more. These venues include Soldier Field, Vivint Arena, State Farm Arena, University of Arizona's Arizona Stadium, University of Nebraska's Pinnacle Bank Arena and more. Boingo's industry-leading Distributed Antenna System (DAS) networks leverage state-of-the-art design to deliver comprehensive stadium coverage and maximize carrier participation to ensure more fan access and meet the demands of the 5G era. As a global leader in managed Wi-Fi services, the company maximizes access to networks through global roaming agreements via carrier offload and major brand sponsorships through the Boingo Media Platform. For more information, visit [www.boingo.com](https://www.boingo.com).



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AmpBoards is a creative and development agency which specifically designs, builds and implements the AmpBoards digital signage and menu CMS HTML solution in large venues and arenas. The powerful platform assists with removing the burden of making menu board and signage updates from Event Day Operators and hands that power to the people who need it most... concessionaires. F&B groups now have the ability to make menu board and other signage updates quickly and easily through an intuitive user interface. AmpBoards currently partners with concessionaires such as Levy, Aramark, Delaware North, VenueNext, Legends and others to build eye-catching menu and signage designs using data and best practices. AmpBoards also currently works with multiple POS and DB providers including SpotOn Enterprise (formerly Appetize), Oracle Micros, Clover/Bypass and VenueNext. Learn more at [www.ampboards.com](https://www.ampboards.com).





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