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TECH REPORT

WINTER 2022

CONCESSIONS TECHNOLOGY

A FOCUS AT CLIMATE PLEDGE ARENA

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Welcome to the fourth issue of our EIGHTH year of STADIUM TECH REPORTS, the Winter 2022 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 Climate Pledge Arena in Seattle, the revamp of the old Key Arena that has a huge focus on sustainability and on concessions operations. We also take a look at how walk-through weapon detection systems have speeded up entry at Empower Field at Mile High in Denver.

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

VENUES NEED TO RADICALLY RETHINK ENTRY PROCEDURES

After a year of welcoming full-capacity crowds back to stadiums, it's apparent that while technology can assist venues in eliminating fan pain points, it's also clear that sudden shifts to new ways of doing things don't always go as smoothly as planned.

For this column, we're going to focus on the process of stadium entry, where we saw some of the biggest gains and also some of the biggest problems in the first full year back from pandemic shutdowns. Most of those revolved around the full-scale shift to all-digital ticketing, which went smoothly in some places and not so smoothly in others.

While every venue is different in its makeup and customs, we have three basic ideas that should help most venues in making their entry procedures a better thing for everybody. In no particular order of importance, the suggestions include: Expanding the physical security perimeter, to improve walk-in flow; adding more technology and process design to keep bottlenecks from occurring; and stepping up fan education and adding incentives for fans to arrive early to trim the last-minute crowding as much as possible.

EXPANDING THE PERIMETER A BASIC FIRST STEP

Some of these ideas are not new — extending the security perimeter beyond the stadium walls, for example, has been a staple of Super Bowl preparations for years now. Some newer stadiums, like SoFi Stadium in Los Angeles and Lower.com Field in Columbus, Ohio, have built in the idea of distanced perimeters into their venue design. The Denver Broncos were one of the more recent additions to the extended-perimeter club, taking

advantage of a natural barrier of sorts that exists in most areas around Empower Field at Mile High, where the actual stadium entry gates sit a bit higher than the surrounding parking lots and walkways. With a little bit of extra fencing the Broncos were able to create a first line of security where they set up wide entryways each with multiple new walk-through weapons detectors from CEIA USA. After fans pass through security, they enter plaza-type areas where they can use stadium Wi-Fi to download tickets if they haven't done that already, without having to do so while in a line and possibly holding up the process.

After that, fans can then enter via a number of ticketing gates at each entry, where staffers use handheld scanners to verify tickets. From what we saw at a recent Broncos game, the process produces very few lines, with the spaces in between helping fans comfortably through at their own pace.

According to Russ Trainor, VP of IT for the Broncos, the new extended perimeter system has cut entry times down to an average of 2 to 3 minutes, far faster than previous procedures that often involved long lines backing up right at the doors to the stadium. And while the extra distancing is a smart first step, it also is apparent that better technology is also a necessary component for a future-thinking entry system.

ELIMINATING HUMAN CONTACT, SPEEDING UP THE INTERACTIONS

Ever since the industry started moving away from punching paper tickets, there have been many efforts to digitize the ticket-verification process, some more successful than others.

While many stadiums seem to have settled on hand-held scanners for ticket verification, those systems can still have daylight or operator issues that cause delays; fortunately a new era of self-scanning pedestals is emerging, with devices from Axess starting to win wide acceptance among stadium IT teams. Unlike some previous platforms that tried to insert their own software in between fans and ticketing operations, the Axess devices connect directly to ticketing platforms, eliminating fan confusion and streamlining operator functionality.

Just this year, we've seen Axess pedestals at multiple venues, including Lower.com Field, Climate Pledge Arena, and at Empower Field at Mile High, where they are being tested at the entry to club and premium seating areas. Like some other entry systems there are versions of the Axess pedestal that can operate on battery power and via Wi-Fi, making them extremely flexible for changing security needs. The other big step forward in entry technologies is in weapons detection, where walk-through systems are quickly gaining favor for their obvious improvements over the old airport-style single-person gates where fans

have to take metal items out of their pockets. We've seen systems from vendors including Evolv, Patriot One and CEIA are already in use at multiple venues, from the aforementioned stadiums as well as Wrigley Field in Chicago.

MORE FAN EDUCATION AND INCENTIVES NEEDED

What's instructive about watching fans encounter the new weapons detection systems is how hard it is to shed old behaviors. At Lower.com Field as well as at Empower Field at Mile High multiple fans seemed confused by the ease of the process, with many stopping mid-gate to raise their hands or take things out of their pockets. While most fans learn quickly to simply keep walking, the reality is that even the simplest of new procedures could benefit from more fan education, something it seems venues don't do enough of. Ohio State learned that lesson the hard way at the start of this season, when it encountered a perfect storm of sorts. At the first game when 102,000-seat Ohio Stadium tried all-digital ticketing — a sellout matchup with Oregon — a software bug in the stadium's Aruba Wi-Fi network caused some partial Wi-Fi outages, leading to huge backups as late-arriving fans tried to download their tickets all at the same time, right outside the stadium walls. The ensuing snafu — which included some fans trying to push their way past security and ticketing — was corrected before the next

game, in part by Ohio State putting out informative short videos that illustrated the process and experience fans could expect, with an emphasis on having fans download tickets before arriving at the gate, a problem many venues are still facing. In this era of pervasive social media consumption, it seems like it would be easy for teams and venues to provide more information for fans about entry procedures, but we've seen too few examples of such messaging.

What might also help is some more venue incentive for fans to arrive early and get inside, to help eliminate the last-minute crush of fans who have traditionally tailgated until the last possible moment. Some of that behavior is likely caused by the high prices in many venues for food and drink.

If you're charging \$15 for a non-premium beer and \$20+ for a mixed-drink cocktail, you're basically telling your fans to stay outside the stadium as long as possible. We're surprised that more venues aren't following the example set by the Atlanta Falcons and Mercedes-Benz Stadium, where ultra-low prices for concessions staples have actually led to higher per-cap numbers. Combined, all these ideas can help to produce a new style of stadium entry that is more in tune with the times, which still require social distancing and less human-to-human contact as much as possible. If venues want to keep attracting fans and keep them safe, they should start by making it as easy to get in as possible.



CONCESSIONS TECHNOLOGY A FOCUS AT CLIMATE PLEDGE ARENA

Beyond its curious name and the laudable aspirational goals behind it, Seattle's Climate Pledge Arena is also a venue filled with leading-edge technology and forward-thinking procedures all designed to enhance the fan experience.

\\ BY PAUL KAPUSTKA

New entry technologies including walk-through weapons detectors, and innovative “just walk out” concession stands using Amazon technology are just some of the deployments Climate Pledge Arena will be using to help eliminate traditional stadium pain points. More traditional technologies like acoustic baffles and pervasive wireless networks are also part of an experience that is already winning raves from hockey fans as well as concertgoers as the venue hit the ground running with an ambitious 2021 schedule of events following its mid-October opening. While it retained the location and roof of the old KeyArena, the \$1.165 billion privately financed renovation has produced an entirely new venue inside, one dug deeper down farther into the Seattle earth to fit 17,100 seats for hockey and closer to 18,000 for basketball. And while its anchor tenant is the NHL's newest team, the Seattle Kraken, the venue was built to be as busy as possible, with basketball (the WNBA's Seattle Storm and Seattle University) as well as multiple concerts already on its operating schedule.

Speaking at an October sports-events conference that coincided with the venue's opening, Tim Leiweke, CEO of the Oak View Group, the arena's lead owner, was clearly happy about a venue that has become a labor of love during its refurbishing process. And while Leiweke and the venue operations team are clearly solidly behind the sustainability goals, the arena is also clearly designed to be much more than just an example of good intentions – with its high-end finishes and fan-friendly innovations, it is also aiming to be one of the top public event spaces anywhere, and one that has taken Covid complications into consideration as well. Climate Pledge Arena's opening "is an indication that our industry is alive and still entrepreneurial," Leiweke said. "The question is, how do we get back to where we were – and better?"

WALKING THE SUSTAINABILITY TALK

Easily the most curious thing about the new venue is its name, which is taken from the effort co-founded by Amazon a few years ago. Known formally as The Climate Pledge, the movement – which has to date attracted 217 large corporate entities to sign the pledge – has a goal for the world to become carbon neutral by 2040, 10 years ahead of what is called for in the drafted-in-2015 Paris Agreement.

While most corporate sponsors who shell out big bucks for stadium naming rights simply put the company name in lights, for its reported \$300 to \$400 million naming deal (as reported by Sports Business Journal) Amazon chose to put its pledge atop the old KeyArena – and in turn it helped push the venue to be a showplace for sustainable practices.

One of the more expensive moves in the sustainable direction was a mid-renovation replacement of all gas systems (used for heating and cooking) with electric systems. The arena also gets all its power from renewable sources, including some solar panels on the side roof areas of the venue and its parking lots, and also through contracts with Amazon solar farms. The arena will also use some of Seattle's historically abundant rainfall to make the ice that the Kraken will play on.

By keeping the roof (and not having to dispose of all its mass) and the old KeyArena location, Climate Pledge Arena is more sustainable just by geography since it is well served by public transportation, including Seattle's iconic monorail line, which has an endpoint at the Seattle Center. All fans with tickets to Kraken games will get free public transit on the day of their event, including on the monorail and Seattle's light rail system.

Inside the building, most fans will become aware of sustainability efforts on the concessions side, with compostible utensils and recycling efforts designed to make the building as waste-free as possible. The arena is also attempting to source at least 75 percent of all ingredients from within a 300-mile radius, and has said that non-meat alternatives and fresh produce will be emphasized in the concession offerings.



Toshiba self-scan checkout kiosks are part of the arena's drive to speed up concessions. Credit: Paul Kapustka, STR



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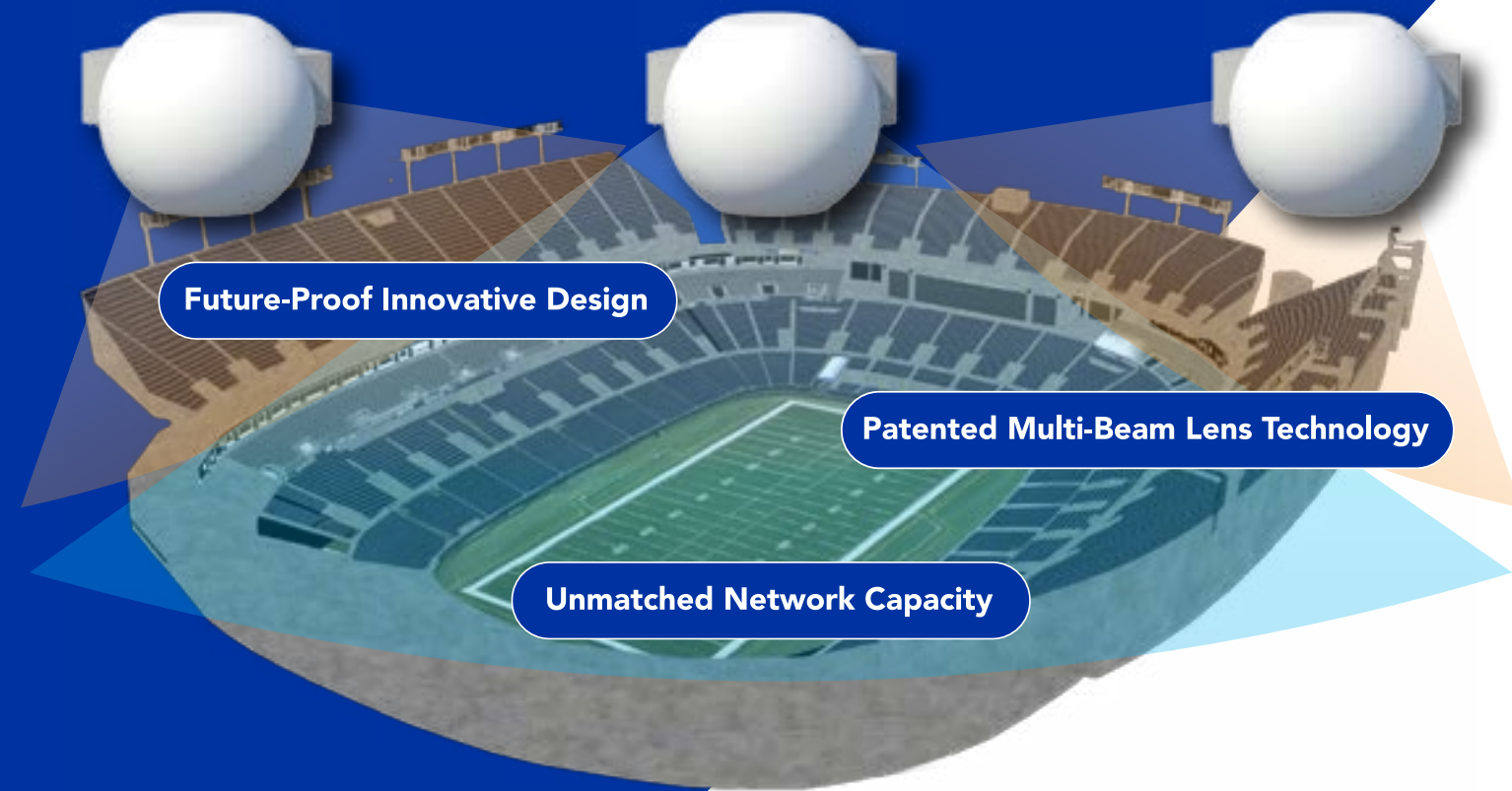


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Multiple checkout terminals at grab-and-go concession stands (left and right) should help eliminate lines.
Credits: Paul Kapustka, STR (left), Dave Curry, Climate Pledge Arena (right)

Other processes, like eventually eliminating the use of single-serving plastic containers, and allowing fans to bring in their own water bottles that can be filled at fountains in the arena, are things that are starting to appear in many places in everyday life and in part in other arenas — but it's likely that Climate Pledge Arena will be the venue-space leader in overall sustainability commitment, something that Leiweke said is worth the effort.

"I don't think we're going to change the world, but we can inspire others," he said at the arena-opening conference.

GETTING IN QUICKLY

As a venue whose final construction phases took place entirely during the Covid pandemic, it's perhaps no surprise that a good deal of the fan-facing technology is aimed at making fans feel safer by eliminating lines as much as possible. That process starts at the arena entry, where Climate Pledge Arena is using ticketing

pedestals from Axess, which support multiple methods of fast, self-scanning technologies like NFC, QR codes or bar codes. Climate Pledge Arena has also partnered with Clear and its Clear Health Pass, which fans can use to quickly show proof of Covid-19 vaccination, a requirement for Seattle-area venues.

For security checks, Climate Pledge Arena is rolling out walk-through weapons detectors from Patriot One, which allow fans to be scanned without having to remove things like keys and phones from their pockets. While there's not enough data yet to know exactly how much faster the walk-through security systems are compared to older metal detectors, you don't need numbers to see how quickly fans get through when you see the new systems being used.

"In our opinion, the walk-through [security systems] are far superior, and the upside is huge," said Michael Downing, chief security officer for the Oak View Group.

GRAB AND GO TO ELIMINATE CONCESSIONS LINES

While many venues are busy testing different kinds of ways to speed up concessions operations, Climate Pledge Arena seems to be going farther and faster than most to make sure fans get food and drink as quickly as possible.

The most visible and notable moves in this direction are the four in-arena stands that are using the Amazon Just Walk Out technology. Like other competing technologies, the Amazon-powered stands use a prepayment scheme involving either a credit card swiped at the entry or through an application signup; for Amazon that means using Amazon's Amazon One system, where registered users need only swipe their palm before entering. Once the gate opens to let you in, you simply take whatever food or drink items you want, and then leave through the gated exit without stopping. The systems use a combination of cameras

and sensors to determine items chosen, and then bill customers after they leave.

Dave Curry, vice president of technology for Climate Pledge Arena, said that the arena is "thrilled" with the Amazon-powered stores, which he said have proven extremely popular with fans during the arena's opening months of events.

"We're really happy that it worked out the way we intended it to," Curry said. "It's just great to see people not standing in lines."

Curry, who took us on a technology tour of the arena the day before it opened, also said fans are catching on quickly to the "other" main concessions-speeding technology, which is part machine and part process. The machine involved is a new Toshiba checkout terminal with a large optical scanner; the process part is a large number of "grab and go" concession stands, where fans simply pick up boxed items and canned drinks, and then scan them at the Toshiba terminals. While other stadiums are trying similar methods, Climate Pledge Arena has made an obvious large commitment to the idea, with one popular local Asian food stand having more than 20 checkout terminals available — again, so fans don't have to wait in lines.

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Fans can scan a credit card or simply wave their palm to gain access to the Amazon One Just Walk Through stores. Credit: Dave Curry, Climate Pledge Arena

"We're doing everything we can to make it work as fast as possible," said Curry, pointing out that the food-item boxes all have large, clearly legible bar codes that make scanning easier. Unlike some grab-and-go stands at other venues, which have limited items, stands at Climate Pledge Arena offer a full range of hot and cold choices, including chicken sandwiches and pizza.

The arena's overall concessions technology got a big vote of approval from fans at the first public event, highlighted by a story in the local tech publication GeekWire that quoted a fan who was amazed by his ability "to get a beer in 8 seconds" at one of the Amazon walk-out stands.

DIGITAL DISPLAYS HELP LIGHTEN UP THE 'BASEMENT' FEELING

By digging down, there's no denying that you do get a little bit of a feeling of descending into somebody's basement when you go to the premium seating areas at Climate Pledge Arena. But thanks to a large number of Daktronics digital displays, including one that wraps around several walls with irregular edges, the arena makes things below-ground feel more alive, especially when the wraparound display shows underwater scenes, complete with sharks and scuba divers swimming through.

digital display screens, which should prove helpful for wayfinding and pre- and post-event information.



Big LED displays help brighten up the lower levels of the arena. Credit: Dave Curry, Climate Pledge Arena

As a top end design, you would expect the connectivity to be first rate at Climate Pledge Arena, and it is. With both the shared cellular networks and Wi-Fi network deployed by Verizon, the Wi-Fi uses Cisco gear and under-seat deployments in the bowl. The venue also recently added some new Cisco Catalyst 9104 Wi-Fi antennas, which have a much greater reach capability, for floor seating coverage at concerts.

In the main seating bowl, Climate Pledge Arena is innovating by using two three-sided main videoboards (nicknamed "the Twins") that are mounted higher toward the ceiling, leaving more open space below and between for improved sightlines. The boards can also retract fully into the upper infrastructure to "disappear" for concerts.

Outside the arena, the surrounding plaza area is also filled with multiple



BELDEN

According to Curry the venue’s cellular DAS already has participation from all major wireless carriers, and also has 5G services available from Verizon. There is also solid Wi-Fi coverage in the plaza area surrounding the arena, with APs mounted on light poles and out-building rooftops.

DOING GOOD WHILE DOING WELL

Even if some of the Seattle locals we know are ambivalent about the arena’s name and purported goals, it’s hard to find anyone who thinks that any business that is trying to be more sustainable is a bad thing. Area hockey fans are simply ecstatic just to have a great place to cheer on a local NHL team, and Seattle’s NBA fans – who still feel scorned by the loss of the Sonics – are hoping that having a first-class arena open and in place can help bring the Sonics back some day.

Big musical acts already seem to be voting in favor of Climate Pledge Arena with their presence, with names like the Eagles, Coldplay and the Foo Fighters already having performed at the venue, and many others scheduled to appear soon.

And if along the way Climate Pledge Arena can change a few minds about the need to make conscious decisions about how whatever we do affects the planet, that’s a good thing. Especially when you can add that positive feeling to all the other benefits supported by a first-class arena experience.



Top: Digital displays line the plaza outside the arena; Bottom: Kraken fans line up for an early season game. Credits: Top: Paul Kapustka, STR; Bottom: David Kapustka, STR



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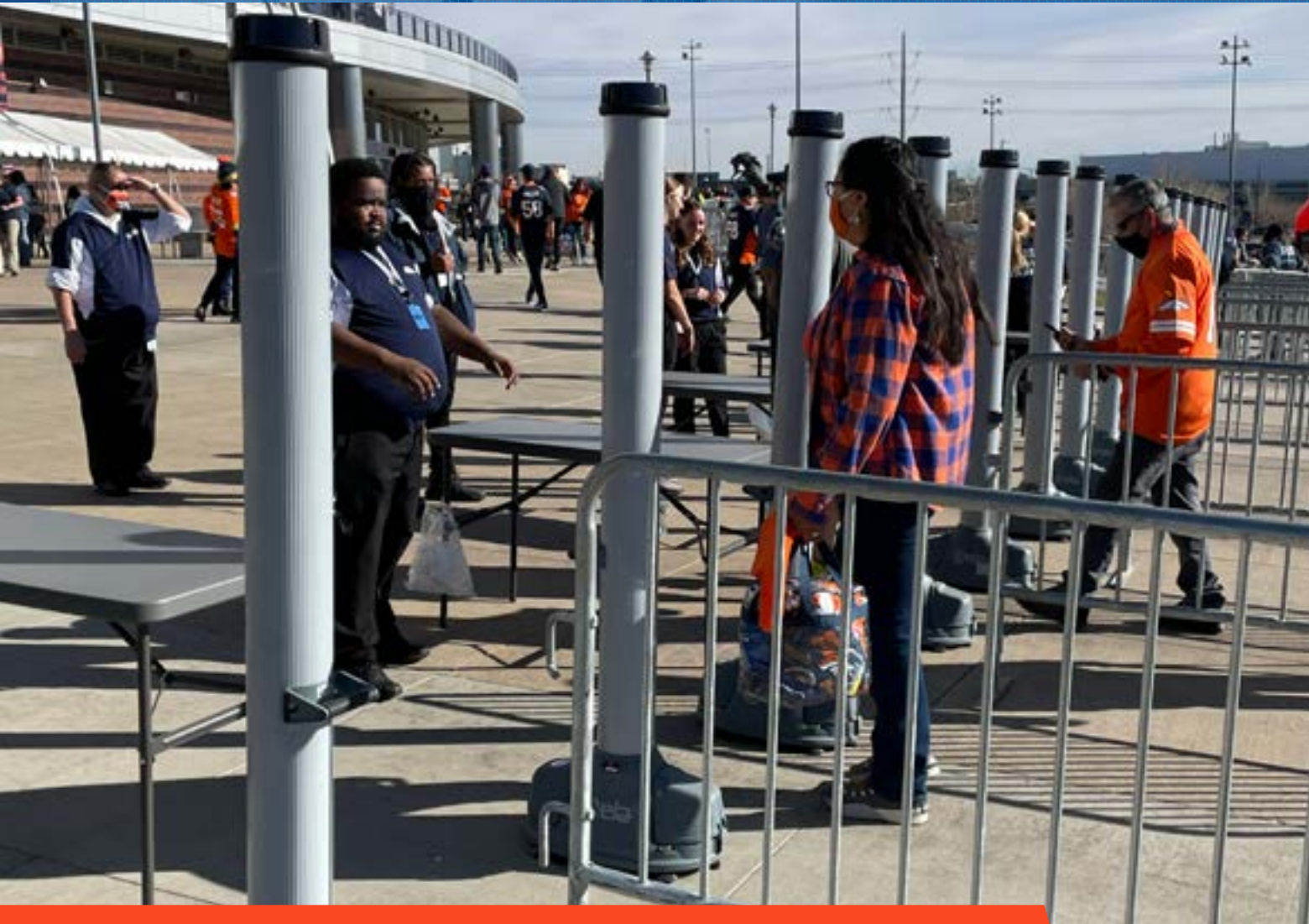
DENVER BRONCOS SPEED UP ENTRY WITH NEW WALK-THROUGH DETECTORS

\\ BY PAUL KAPUSTKA

As one of the latest teams to join a growing trend, the Denver Broncos recently added walk-through weapons detectors to their entry systems at Empower Field at Mile High, greatly speeding up fan entry times, according to stadium IT executives.

By combining walk-through weapons detectors from CEIA USA with a deployment strategy that pushed the initial security perimeter farther away from the stadium gates, the Broncos have been able to speed up NFL home-game entry times to “about two or three minutes” on average, according to Russ Trainor, senior vice president of information technology for the Broncos.





Top: New walk-through weapons detectors from CEIA USA have sped up entry at the stadium. Below: Self-scan ticketing pedestals get a tryout at premium seating gates. Credit all photos: Paul Kapustka, STR

Stadium Tech Report was on hand at a recent Broncos home game to view the new entry strategy, a tactic being deployed at many venues to try to eliminate lines as much as possible. With all stadiums moving to all-digital ticketing en masse after reopening to fans this year, many stadiums and arenas have had entry-procedure challenges mainly due to fans trying to figure out how and when to download tickets. At some venues this past year, large lines have formed when fans attempted to download tickets just before reaching ticketing gates, leading to confusion and frustration.



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Top: Raiders fans celebrate a TD; bottom: A view of the stadium's roof



Top: Messaging helps fans remember to download their tickets; bottom: A close-up look at an Axxess pedestal.

TAKING ADVANTAGE OF SOME BUILT-IN SPACE

At Empower Field at Mile High, the Broncos were able to take advantage of a natural barrier of sorts, the fact that the stadium proper sits on a small hill that rises slightly above most of the surrounding parking-lot areas. By deploying some temporary fencing the Broncos flipped their prior procedure to put security checks first, allowing fans to be inside a secure space before formally entering the stadium by going through individual gates to have their tickets hand-scanned by stadium staff. At entry gates all around the stadium, Stadium Tech Report didn't see any big line backups at either the security or ticketing gates.





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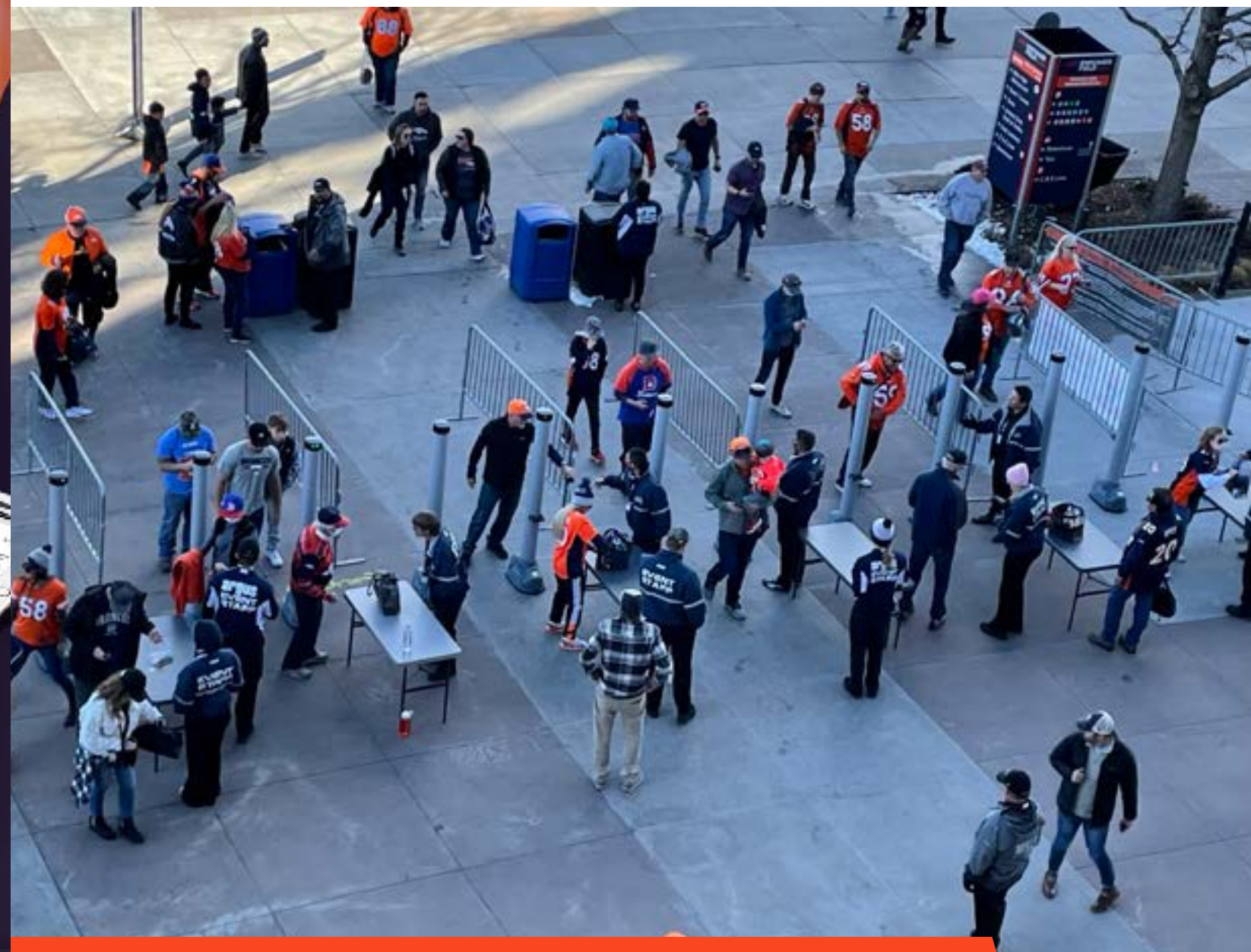
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A M P B O A R D S

According to Trainor the Broncos have been rolling out the new security system throughout the fall, and while there wasn't anything visible in terms of signage or messaging to explain the new technology, most fans quickly caught on that all they needed to do was walk through the post-like gates of the CEIA "Opengate" systems without having to stop or take items out of their pockets or bags. Still, many other fans were

clearly unfamiliar with the systems, as Stadium Tech Report saw multiple instances of fans stopping, taking things out of their pockets, or holding their hands up in the air, behaviors possibly learned from other weapons detection systems like those found at airports.



Broncos fans stream through the new walk-through security gates on the north side of the stadium.

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The calendar year of 2021 was especially interesting for the large public venue business, especially since nobody knew how venue technology teams would cope with both the Covid-related shutdowns and then the return of fans to stadiums and arenas. In our mind, those conditions made it the perfect time to ask the industry participants themselves to assess where they have been and where they are going from a stadium connectivity point of view.

In a partnership with sponsor Verizon, in July and August of this year we reached out to the Stadium Tech Report audience and asked them to participate in our inaugural Stadium Connectivity Outlook survey, which asked a wide range of questions about the current state of a venue's connectivity, and where the venues, teams and schools would prioritize investments and strategies as the sporting world moved back to full arenas in a world that had radically changed almost overnight. Their answers are now available for you to read, in both a survey results format and an accompanying white paper that summarizes the data.

These are not just our words but the insights of our audience - more than 100 respondents spent their time providing answers - honest feedback that we hope will provide an industry-wide perspective on the common issues facing venues of all shapes and sizes, from large NFL and college football stadiums to small concert halls. What emerged was a snapshot of where we're at as an industry, and where we're going as we build on solid basic connectivity as a core and use that to move forward in an uncertain direction but one still with concrete goals: A better, safer fan experience with more control on operations and the bottom line.



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FOOTBALL RETURNS TO WRIGLEY FIELD

\\ BY PAUL KAPUSTKA

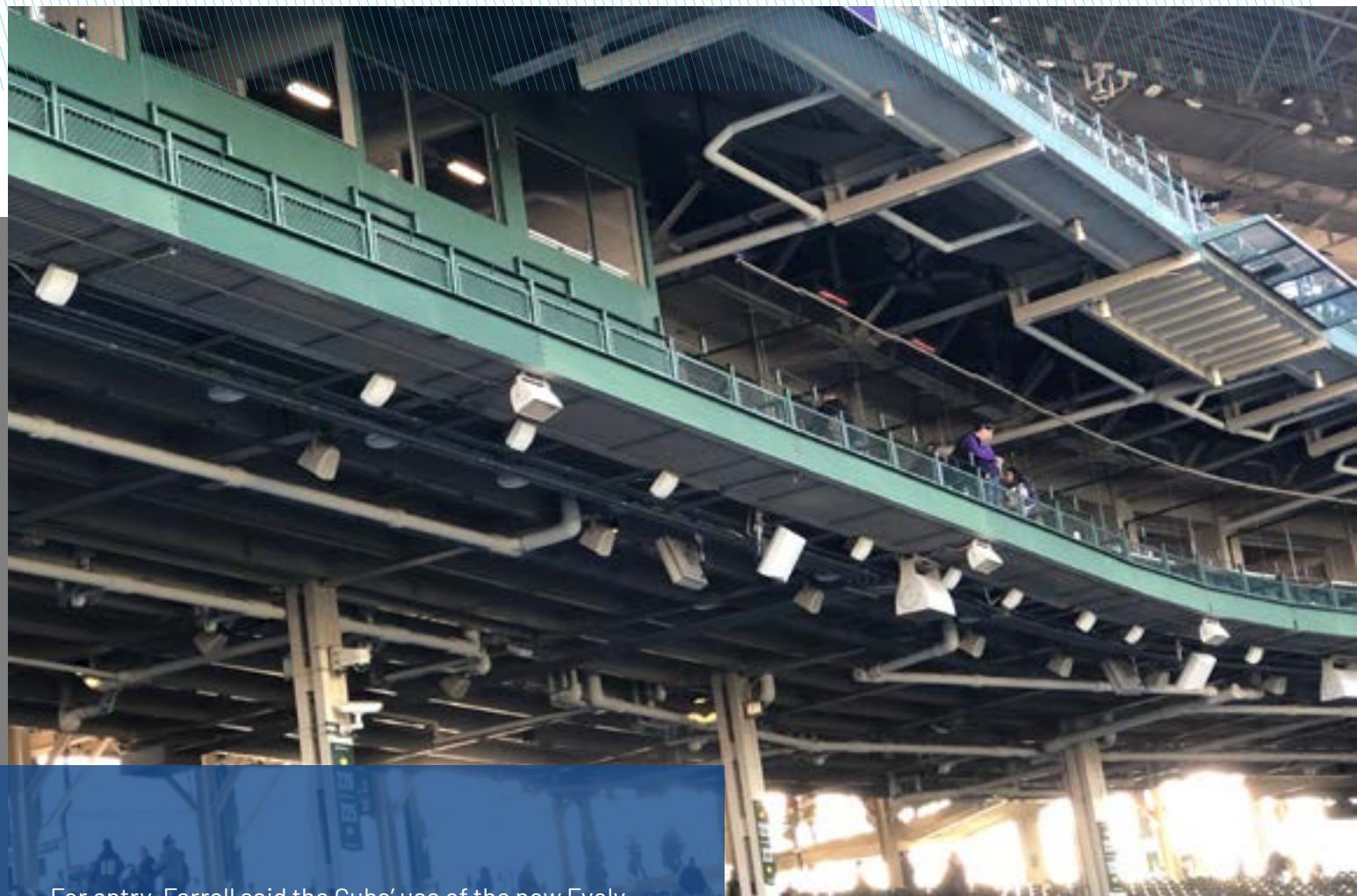
Football at Wrigley Field? Those of us old enough can remember the Chicago Bears playing next to the winter-dead ivy, with Gale Sayers romping for touchdowns next to the outfield bleachers. And in 2010, a college game between Northwestern and Illinois took place, but the teams could only rush toward one end zone because the full field didn't quite fit.

But now thanks to some recent stadium renovations that included making the Cubs' dugout and some third-base seats moveable, football can fit comfortably again in the Friendly Confines.

Stadium Tech Report field scout Lisa Farrell was on hand in November with some family and friends, watching the Northwestern Wildcats take on the Purdue Boilermakers in a Big Ten matchup at Wrigley Field. Here are some notes from Farrell's visit to the game, which she said used concessions operations from the Cubs instead of trying to bring in a temporary operation. Ticketing was through the MLB Ballpark app.



Passes and runs instead of fly balls were featured at the Friendly Confines for a November football game. Credit all photos: Lisa Farrell, STR (left)



For entry, Farrell said the Cubs' use of the new Evolv weapons detection systems made getting into the park a much faster process than previous Cubs games. "A few years ago when [the Cubs] started the digital ticket process, access to the internet either through Wi-Fi or cell service was pretty awful and held up the entry process," Farrell said. "But they have improved connectivity [near the gates] and now entering the park is a breeze. Works very well since they no longer require fans to empty their pockets of keys and phone. Just walk right through."

According to Farrell the stadium still has walk-around concessions vendors, but they now use handheld credit-card readers to bypass having to handle cash. And while the stadium (like many others) bills itself as "cash-free," Farrell said "when my son went for a hot chocolate, they very gladly took his cash at the concession stand. No surprise there!"



Extreme Networks Wi-Fi gear and JMA DAS antennas deployed by DAS Group Professionals cover the lower seating bowl from the upper-deck overhang.

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Wrigley's iconic manual scoreboard, Farrell said, didn't have any problems adjusting to football. "The scoreboard was pretty interesting. They had the other Big Ten games on the board and updated scores. Like baseball, you had to do the math across the quarters to get the score. That got a little challenging with the Ohio State game."

Though Northwestern lost the game to Purdue, and there were some complaints from players about field conditions, overall Farrell said it was a great time for fans. And Farrell also said the stadium entertainment crew didn't forget where they were. "At the end of the third quarter, we had the third quarter stretch," Farrell said "The organist was there and played Take Me Out to the Ballgame."



Top: Walking vendors used digital devices for payments; middle: Some promotion for mobile ordering; bottom: The iconic Wrigley scoreboard shows it can handle football scores.



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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.

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MatSing is a pioneer company in bringing high performance RF lens



solutions to industries including wireless broadband, satellite, measurement and big venues. MatSing has had a strong focus on meta-material development and design, allowing them to construct the worlds lightest and largest RF lenses. Having developed unique high-performance lens antennas for multiple industries, MatSing is now driven to transform 4G networks to lens technology. Holding several RF technology patents, MatSing Inc. has led the development of a new approach to antenna design, focusing on using RF Lenses to outperform traditional phased-array (panel) or dish antennas, providing a needed solution to growing capacity demands. www.matsing.com

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American Tower brings building and venue owners more than 15 years of experience deploying and monitoring in-building and outdoor wireless infrastructure solutions, including Distributed Antenna Systems (DAS), In-Building Small Cells, and Carrier Grade Wi-Fi. Today, we manage more than 400 networks, covering 390 million square feet, in offices, malls, campuses, stadiums, arenas, casinos, and other venues. Our multitenant networks support mobile coverage, high-speed internet, building automation, security, and the Internet of Things, while enabling a path to 5G coverage. As one of the largest Real Estate Investment Trusts (REIT) in the U.S., we have the financial strength and scale to support any in-building wireless communications needs.



Delivering the connected world. Simply. Securely.



Reliably. In today's rapidly transforming environment, we integrate, secure and operate the networks, and mobile technologies that help businesses in the live sports and entertainment sector innovate to bring fans back to stadiums, arenas and LPVs in safe, smart and immersive ways. Our solutions across Connectivity, Security and Advanced Business Communications are designed to help companies pursue new possibilities and create entirely new revenue streams - more efficiently than ever. Verizon has the expertise and solutions venue owners and operators need to create more future-ready facilities.

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Belden's complete, end-to-end infrastructure solutions (including racks, cable and connectivity) are designed to accommodate entertainment facilities large and small - new or decades old - and all the upcoming technologies and future-forward applications headed their way.



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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.

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