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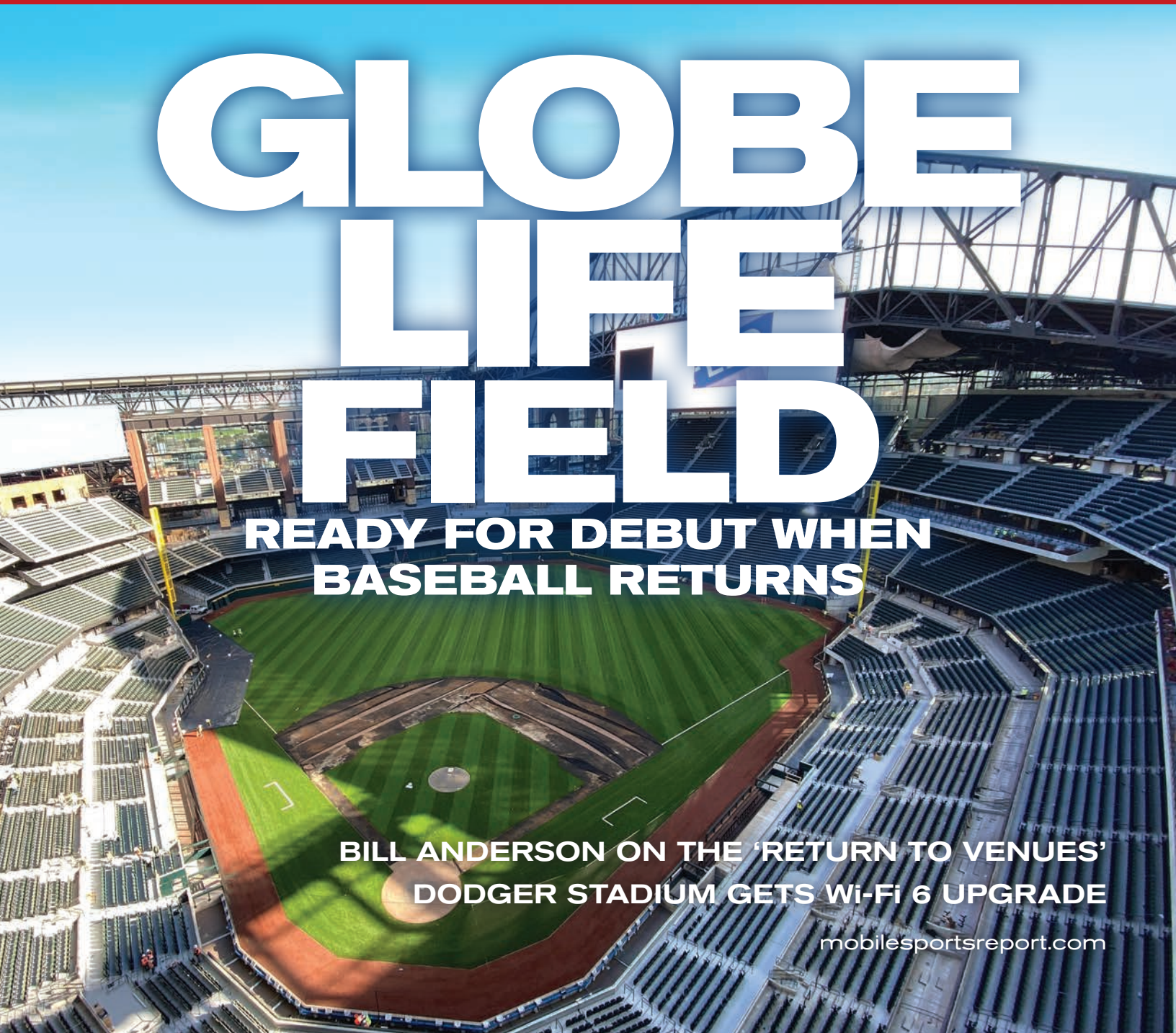
SUMMER 2020

STADIUM TECH REPORT™

COVID-19 AND VENUES: WHAT'S NEXT?

GLOBE LIFE FIELD

READY FOR DEBUT WHEN BASEBALL RETURNS



BILL ANDERSON ON THE 'RETURN TO VENUES'

DODGER STADIUM GETS Wi-Fi 6 UPGRADE

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STADIUM TECH REPORT™

Welcome to the second issue of our SEVENTH year of STADIUM TECH REPORTS, the Summer 2020 issue! These quarterly 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.

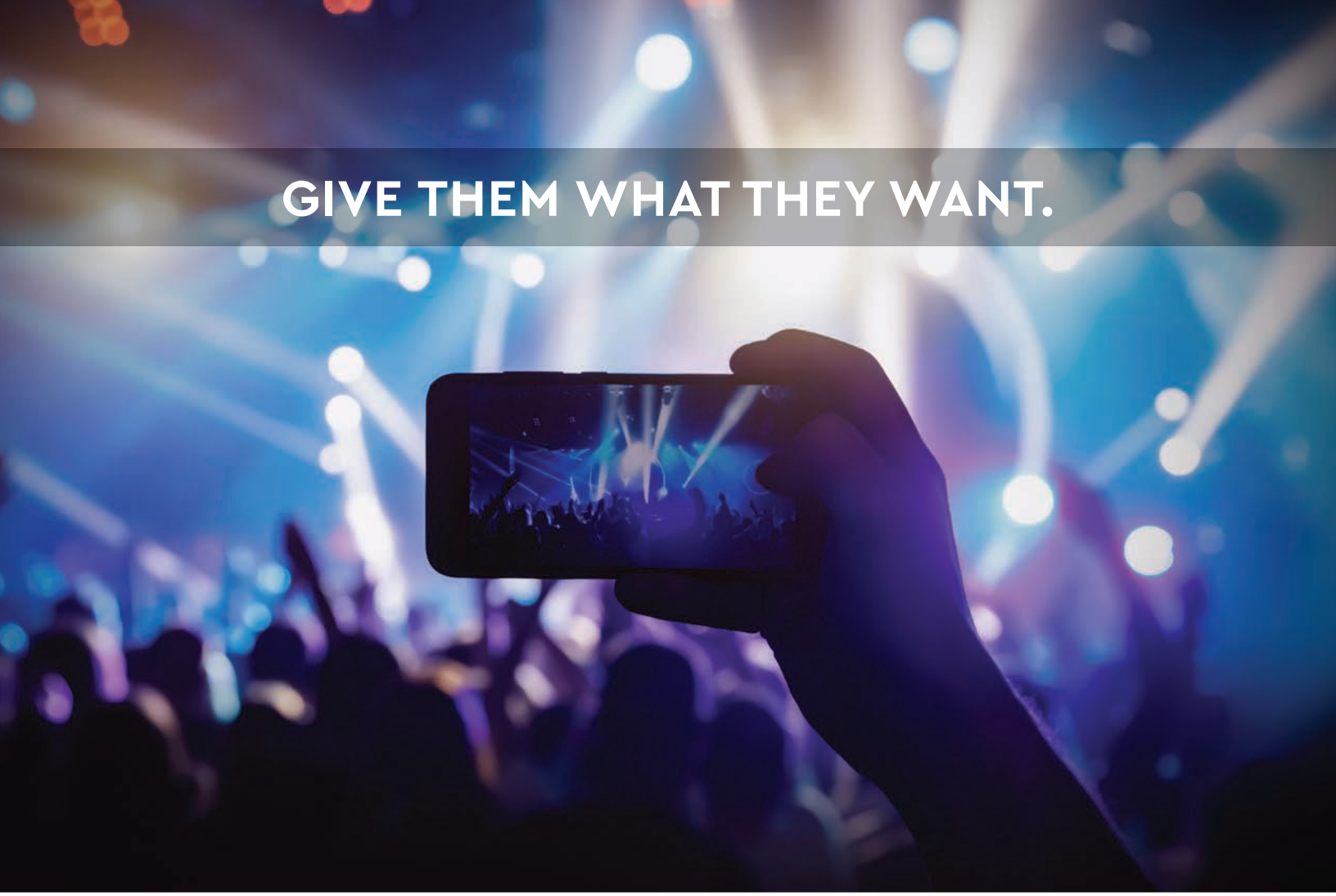
Our stories for this issue include our first comprehensive look at how venue owners and operators, and teams and schools, might find a way back to live action and fans in stadiums following the current pandemic shutdowns. This feature is just the start of an ongoing series of research papers, interviews and other offerings of timely information we will be grouping under the "Return to Venues" title, a series of offerings done in part through an editorial and research partnership with AmpThink. We also have two profiles in this issue, one on the extensive network deployments at the ready-to-open Globe Life Field in Arlington, Texas, and another on a new Wi-Fi 6 network deployment at Dodger Stadium. Plus an explanation of our overall name change from Mobile Sports Report to Stadium Tech Report – read on!

We'd like to take a quick moment to thank our sponsors, which for this issue include Corning, Boingo, MatSing, Cox Business/Hospitality Network, Comcast Business, Samsung, and American Tower. 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. We'd also like to thank the SEAT community for your continued interest and support.

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

IN THIS ISSUE:



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EXPANDING OUR SCOPE

WELCOME TO STADIUM TECH REPORT!

BY PAUL KAPUSTKA

Welcome to the strangest time ever for sports. For venue technology professionals, it's even tougher, since they need to not just deal with the present but also must plan for the future. And that would be an incredibly uncertain future, with uncertain needs, perhaps fulfilled by untested technologies, which need to be paid for at a time when no money is coming in. All that makes it tough to show up for work every morning.

As much as we can from our home offices, we feel your pain. And in what we hope is a good move for us and our readers, we are taking a big step toward providing even more information we hope will help you with your jobs. As of today, the entity formerly known as Mobile Sports Report will now be known as Stadium Tech Report. What does that mean for you? Quite simply, it just means "more." Let me explain, with a quick look back at where we came from:

MOBILE SPORTS REPORT IS NOW STADIUM TECH REPORT

When I started Mobile Sports Report nine years ago, we had a fairly uncertain focus. The only thing we really knew was that digital technology would impact the consumption of sports in huge ways. It wasn't that bold of a prediction, but what was unclear was what would matter most, and what we could make a business out of covering. In our business, that means finding an audience that needs information about a topic that matters to them. Would it be watching football on your phone? Would it be sports social media? Would it be figuring out wireless connectivity in stadiums? We covered a lot of topics at the start, and the title "Mobile Sports Report" was chosen purposely to be non-specific, giving us latitude to move wherever it made sense to move.

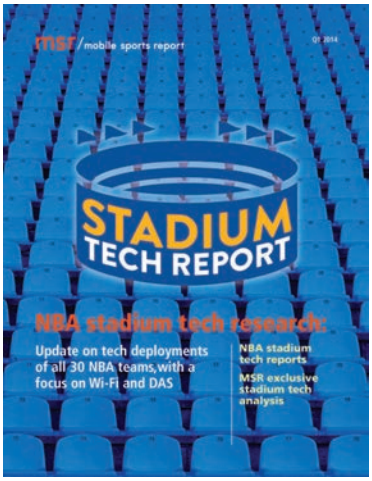
In 2014, we launched what would become the focal point of our business: Our quarterly "Stadium Tech Report" series, which began with a venue-by-venue survey of the wireless connectivity at each NBA arena, and a few profiles of deployments at stadiums, including the brand-new Barclays Center. The simple idea then remains powerful today: Since deploying wireless in stadiums is a complex and unique problem for each venue, we needed time and space to tell the stories completely, so that other technology professionals could learn and inform their own plans and strategies.

With team, school and venue reps telling us for years that wireless connectivity (or lack thereof) was one of the biggest pain points for fans, it made sense to focus on that part of the stadium technology puzzle. Over the years, we've had a front-row seat to all the trials and errors of Wi-Fi and cellular deployment strategies and told as many tales as we could, covering both the highs and the lows.

Along the way our audience steadily grew from friends and family at the start to a mailing list now surpassing 4,000 active members, attracted we think in no small part by our commitment to honest, objective journalism. There is no pay to play at our house, no stories done in exchange for sponsor dollars. Our business premise has always been, that if you deliver a solid, honest product, the audience will appreciate it, and sponsors will want to reach those readers by showing their support for the outlet of the information. The continued interest of our readers and the continued support of our sponsors is an honor we cherish.

But just like we called the main publication "Mobile Sports Report" for flexibility, there also was a reason why we purposely called our flagship publication "Stadium Tech Report," and not something with mobility

or wireless in the title. Yes, mobility and devices will always be at the forefront of any game-day experience and even more so going forward, especially as digital interactions will likely replace many human ones for safety reasons in the near future. But now more than ever, more technology will come into venues, in areas only remotely related to mobility. Scanners, digital signage and camera systems will become need-to-know-about technology now added to the to-do list for IT teams inside venues. And we will embrace those with the same direction as we did with wireless.



OUR INAUGURAL ISSUE

It's a subtle but necessary change. It may not seem so to those on the outside reading in, but titles matter. You are, at some point, what you say you are on the biggest sign you have – a Restaurant, a Dry Cleaner, a Pet Store. Changing our main name to Stadium Tech Report says, out loud, that all technology for stadiums and other large public venues is now in our purview. That doesn't mean we're going to back down at all from our perch where (in our humble estimation) we cover stadium wireless technology more closely, deeply and objectively than anyone else out there. What the name change says is: We're going to take the same approach with every other technology that goes inside the arenas, mainly because that's what's happening to our audience. If they need to become instant experts on thermal imaging and detection, self-serve concessions operations, or AI-assisted crowd camera systems, we want to help them on that learning curve.

Watch for more improvements as the summer rolls on – we have some new directions coming in design and content to better address the changing way our audience consumes what we put on the table. One of the first endeavors is a joint research/editorial project with our friends at AmpThink we are calling the "Return to Venues," an open-ended idea to expose all the best ideas, thinking and practices of the smartest people we know in the business in regards to the challenges presented by the coronavirus. We're still in the process of putting this all together, but stay tuned for more in-depth reports, more live or recorded interviews, and other things all meant to help elevate the shared discussion about where we're all headed next.

In the narrow-focus field of stadium technology, it's going to be an incredible time over the next six months, over the next year, over the next two years. There's going to be lots of experiments, some of which may bear fruit, some which may flame out, and others that will need tweaking and lots of trial and error before things work the way they should. We've seen this story before, if you think about ideas like in-seat delivery and stadium apps. What sounds great in a first headline doesn't always translate to success in the seats. You can expect a lot of this in the days to come, where every "new" thing is touted as a savior, especially by those without a lot of background in the business. But will they follow up to see if those things worked, and if not, how venues eventually solved the problems? Like you, we're in this for the long haul.

For the nuts and bolts that matter – how will you install and run it, how will it be paid for, what is the total cost of ownership, will it really be necessary two years from now – you can count on us and our great audience, our readers who are our sources, to help figure out what works and what doesn't.

If you think about it in math terms, running tech at an arena just went from algebra straight to calculus, no stops in between. Instead of just trying to figure out if you want your Wi-Fi antennas overhead or under-seat, now you have to contemplate an entirely new way of getting fans into a stadium, perhaps scanning them for body temperature or blood-oxygen levels on the way; you may have to completely reroute concourses and pathways to seats, sometimes in stadiums that were originally built over 100 years ago; And you may have to remake everything you ever did on a concessions standpoint, as the entire world switches to contact-free payment systems and shies away from someone taking your order face to face, taking your money and then wrapping and handing you a hot dog.

And just for kicks, the need for all the critical wireless networks underlying everything doesn't go away, it only gets more necessary as all the new stuff like cameras, sensors, displays and POS terminals will need more, not less, connectivity. Same with outreach to fans and staff, who will all need more, not less, communication. It's scary stuff, almost as scary as the pandemic that has caused the shutdown. But staying still or moving backwards is not an option. That's the same for us, and it's why we chose this time to double down on what we do, mainly again because what we've learned in a month-plus of deep-dive interviews. Nobody knows what's happening, there is no silver bullet, no single plan of action. It's going to take a lot more Zoom calls, trials, errors, adjustments and re-adjustments until we get it figured out.

The one thing to me that makes this industry different from other tech-specific markets is that its practicioners share information with each other like no other. We'll do our best to help that process along at a time when it's needed more than ever. Join us at our new home – same as the old place, just with more room and an expanded menu. Welcome, then, to Stadium Tech Report! –STR–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WHAT'S NEXT

THE UNCERTAIN PATH FORWARD IN THE 'RETURN TO VENUES'

BY PAUL KAPUSTKA

As the world enters the summer of the global coronavirus pandemic, there is only one thing certain in the world of large public venues and mass-attendance events: Nobody, anywhere, has any complete idea what is going on right now, or exactly what the future holds for live audiences at sporting events or concerts.

To be sure, sports of all kinds are starting to test the waters on how they might return to action after the coronavirus shutdowns, and eventually how they might start welcoming fans back into their venues. But without any coherent top-down direction from the federal government, the current state of how fans will return to venues in the U.S. is an uncoordinated chaos, with teams, leagues, schools, governments and fans all trying to find a way forward on their own that balances the need for safety (we hope) with the desire to see live events in person.

After conducting a wide-ranging series of interviews with subject matter experts, industry thought leaders and representatives from teams, schools, leagues and venues over the past couple months, Stadium Tech Report has come to some early conclusions about what the remainder of 2020 and beyond might look like for the world of professional and big-school sports. While all of these are still only best guesses as to what might happen, there are some trends that seem to be the way most operations will proceed as the search for a vaccine or some other type of coronavirus cure or treatment goes on.

FACING PAGE: WHEN WILL THE HORSESHOE BE FULL WITH FANS AGAIN? THIS PAGE: LINES OUTSIDE OKLAHOMA'S STADIUM MAY LOOK DIFFERENT DURING THE PANDEMIC. CREDIT BOTH PHOTOS: PAUL KAPUSTKA, STR.

1. Get ready for events without any fans, maybe until next year.

In our research partnership with AmpThink (see Bill Anderson column in this issue) Stadium Tech Report agrees that the AmpThink-developed theory of a "stages of return" process is what we think most venues will need to go through in order to safely start allowing fans to attend events again. The first two parts of that process, getting government approval to open the doors to crowds and satisfying liability issues surrounding the safety of people in any building, are a combination that we see likely to push many venues into hosting events without fans – or in some cases, with severely restricted numbers of fans – since having only competitors and necessary staff, and perhaps a small number of fans inside the venues is likely an order of magnitude easier (and cheaper) to accomplish.

Granted, there are many sports and concert operations that may not have any incentive to hold events without fans, since their revenue models may lean heavily on game-day spending for food and beverage. However, the bigger sports with big TV deals would at least be able

FROM LEFT: PAYMENT WITH A FINGER SCAN (AT SEATTLE'S CENTURYLINK FIELD) OR WITHOUT CASH (AT MERCEDES-BENZ STADIUM) MAY BECOME THE NORM AS MORE VENUE CONCESSION OPERATIONS REDUCE THE AMOUNT OF PERSONAL CONTACT. CREDIT, LEFT: DAVID KAPUSTKA, STR; RIGHT: PAUL KAPUSTKA, STR

to earn some percentage of their incomes by holding empty-stadium events that would still be broadcast. Both NASCAR and the PGA have plans for limited-fan events, but none have yet taken place as of this writing.

At the start of June the NBA and the MLS took the biggest steps forward with solid plans to finish their seasons in a "bubble" type atmosphere in Orlando, where teams would be sequestered and would play at close-by facilities. The NHL and Major League Baseball also traded ideas between owners and players for similar shortened seasons, with most plans from all leagues pointing to live action sometime by July.

POLLS ARE SHOWING THAT A MAJORITY OF PEOPLE ARE STILL IN FAVOR OF RESTRICTING BUSINESS ACTIVITY TO KEEP EVERY-ONE SAFE FROM THE VIRUS.

The key thing similar to all the ideas? As of the first week of June, nothing was yet fully determined because of all the variables that still needed to be addressed. And even if league owners and players come to agreements on revenue shares, safety procedures and plans for determining a champion, some of those plans still face huge hurdles when it comes to legal jurisdictions and health-department concerns, factors that may still leave some sports facing even shorter seasons or at worst, full season cancellations.

Since President Trump's administration has made no effort to provide any type of national guidance for the re-opening of businesses, the result in sports is an ever-changing overlap of directions, with some governors proclaiming that their states are ready to host big events with fans in stands, while other state and international leaders are saying that they won't allow big public events like sports and concerts to have fans in attendance until perhaps 2021. College conferences that span several states are already trying to confront the scheduling confusion that may arise if some schools are in states ready to host events, while others are in states where large events are still closed for safety reasons.

No matter what the state or local governments decide, satisfying the combination of the second stage of the "return to venues" model – addressing the legal liability of the venues – and the third stage, which is gaining confidence of the fans – will likely push many venues to hold fan-free events first, while they work on plans and technology deployments to help get them to a place where they can earn government approval to open, to feel legally confident that they can keep fans safe, and then convince fans of that feeling.

While there will always likely be some fans willing to attend events no matter what the risk is, with national polls showing that a majority of people in the country

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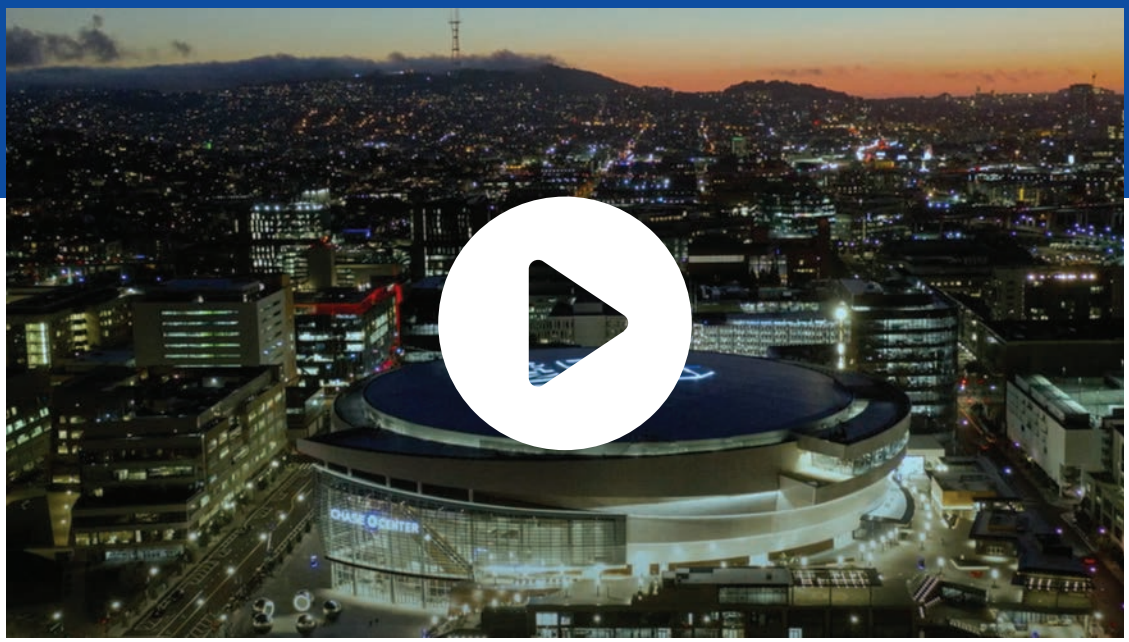

We are experiencing unprecedented cancellations and delays of events. With sports seasons called off and concerts postponed until later in the summer, venues that have the flexibility to support a diversity of events will be one step ahead in the race to make up for lost revenue.

Discover

- The nuances of different fan bases
- How to create adaptable AV technology solutions
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Free Guide

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TAILGATE AREAS, LIKE THIS ONE LAST YEAR AT LEVI'S STADIUM, WILL ALMOST CERTAINLY CHANGE WITH SOCIAL-DISTANCING RESTRICTIONS IN PLACE. CREDIT: BRIAN NITENSON, STR

are still in favor of restricting business activity to keep everyone safe from the virus, it might not make business sense for venues to try to open widely if big crowds don't want to show up just yet. And events with less than full-house attendance may also not be economically feasible for many venues, given the large costs associated with just opening the doors of a stadium-sized facility; if you can't make enough money to cover costs with a smaller audience, does it make sense to hold the event at all?

So just from a baseline measure of costs, safety and operational complexity, the feedback we've received from our interviews leads us to guess that most "big" events for the rest of the year will have no fans or strictly limited, small amounts of fans in attendance, if the events happen at all.

2. When fans do return to venues, new technologies and processes will be required, especially for venue entry and for concessions.

When it comes to social distancing to keep the virus from spreading, at large public venues it's all about the lines.

With the prospect of an all-clear vaccine a year away at best, after some time the economic pressures of the current closures will become untenable if teams and venues want to survive as businesses. So, opening venues to some number of fans before a vaccine is available seems extremely likely; and in all discussions we've had so far, it's apparent that venues believe they will need to enforce social distancing among guests, much like we are all doing in various phases of public activity today.

In seating areas, social distancing will be an easier task, given that venues can more easily keep seats unsold or erect barriers to keep unrelated groups apart from each other. The real problem with social distancing in stadiums comes from lines, a historical commonplace occurence at entryways, on concourses and at places like concession stands and restrooms. To eliminate lines and to keep guests from inadvertently getting too close to one another, venues are likely going to need to deploy some kind of combination of technology and procedures to streamline the logjams we all used to just tolerate as part of the game-day experience.

Since the terrorist attacks of 9/11, entry to almost all stadiums in the U.S. has become a more lengthy procedure than it was before thanks to the use of metal detectors. Physical checks of handbags or large coats have further slowed entry procedures in general, as have newer forms of identification for digital ticketing that required a live network connection at the point of ticket scanning.

Even in the face of all those barriers, many fans at big events still waited until near start time at tailgate parties or other outside-the-venue events, leading to large traffic jams of fans at the entry doors near the starting times. To allow fans to attend large events during a pandemic, however, fans may be asked to arrive even earlier to go through more thorough security checks that may include new procedures for temperature scans and perhaps even blood oxygen-level scanning; some venues may even choose to implement on-the-spot testing for Covid-19, new procedures that will likely force many venues to

expand the geographic area needed to support all the new entry procedures.

New technologies, some of which have already been put in use in limited deployments, may offer some help in entryway procedures. The use of near-field communications (NFC) systems to allow personal devices to be scanned for valid tickets without having to present the devices could theoretically significantly speed up entry lines, with the caveat being that fans would have to adopt such payment or ticketing systems before arriving. Other venues are also looking at newer forms of threat-detection devices like metal detectors that can scan groups of people at a single pass instead of the airport-style one-person gate that is currently the de facto standard. A no-tech additional solution being considered by other venues is the idea of reserved or staggered entry times, which could streamline the process if fans are able to or forced to comply. Similar methods have already been proposed for departure, with fans being instructed by section or row by row when it's safe to leave.

HAVING FEWER OR NO HUMAN INTERACTIONS AT ALL FOR CONCESSIONS TRANSACTIONS WILL LIKELY BE THE MOST WIDESPREAD TECHNOLOGY AND PROCESS CHANGE FOR VENUES.

The idea of entering at any gate and being able to wander around the entire stadium may also be something eliminated during a social-distancing audience phase. Some venues are considering highly regulated "zones" inside venues to keep fans apart. What is true of all plans, technology-aided or not, is that any new measures will require huge amounts of communication outreach to fans, a large amount of training and even new staffing for stadium workforces, and a new level of compliance, regulation and policing, all extra-cost measures during a time of significantly reduced revenues.

The contact-free concessions experience

Over the past year or so, many large public venues have already tested or had small deployments of so-called "contact-free" concessions technologies, where fans could order and pay for concessions via their mobile device, then either picking up orders at a specified window or having orders delivered to their seats. Other stadiums have already experimented with various forms of "grab and go" concessions stands, where pre-made items are offered for fans to take, with some deployments also featuring self-scan payment options.

The general idea of having fewer or no human interactions at all for concessions transactions will likely be the most widespread technology and process change for venues opening up during the pandemic. For most of the venue representatives we spoke to, plans that were already in place for some move to contact-free concessions operations will likely just be accelerated since such deployments will probably remain popular even after concerns about virus transmissions subside.

Another trend that had already started in some venues and will likely only accelerate due to pandemic concerns is the move to "cash free" operations, where only digital payment methods are allowed. Though some states have laws prohibiting the complete elimination of cash payments inside venues, it will be interesting to see whether security and health concerns about the virus-spreading possibility of exchanging cash will force changes to those regulations. Some stadiums that have started cash-free operations have provided reverse-ATM type machines where cash can be deposited and stored on a machine-produced debit card for use in that venue. But those machines are costly to operate, and may not be necessary if opposition to cash-free operations declines.

One area of food service where there isn't much consensus yet on what is to come is the area of club and other premium spaces, which in the past few years have mainly trended toward buffet-style offerings, sometimes as part of an all-inclusive cost system. While safety concerns have some observers predicting an early demise for the large-venue buffet, others see possibilities of having more closely staffed buffet operations, like the cafeterias of the past where a server (most likely behind a glass shield) can prepare individual plates. Premium suite services are also seen as an area heading for massive changes, with more prepackaged food and beverage options likely instead of the traditional steam-tray or open-serve catered offerings previously found in most venues.

3. Critical networks will be needed to support everything new and old

If there ever really was a question about whether or not wireless networks were needed inside venues, the advent of the coronavirus pandemic has removed all doubt. According to several sources we've talked to, some networking deployments or upgrade plans that had been "on the fence" prior to the outbreak have now been quickly green-lighted, as venues everywhere realize that critical networks will be even more important going forward, as new technologies and new procedures demand increased levels of connectivity.

On the technology side, it is clear that if venues are looking to add new layers of devices like sensors and threat detectors, there is going to be a need for greater wireless connectivity, sometimes in new areas of the venue that may not have previously had a priority for bandwidth. Entry areas in particular, and perhaps also spaces just outside venues, will likely need more carrier-class connectivity going forward, as venues seek to automate more transactions like ticket-taking and parking payments.

Installation of more mobile concessions technology, like kiosks and even vending machines, will also increase the need for overall connectivity, as will a shift to more fans using mobile devices for concessions ordering and payments as described previously. Venues are also likely going to want to increase the amount of digital displays in their buildings, to assist with crowd control, wayfinding and social-distancing policing – again leading to more demand for both wired and wireless connectivity.

Layer in more increases in communication demands just from a fan-education standpoint as well as any growth in demand for public safety and other operational needs and it's clear that providing or upgrading existing networks to a much more robust state is probably the first to-do item on many venues' work lists as they seek to support the return to venues. The good news is, from a technology and market perspective, there may not be a better time to be seeking new horsepower and capacity on a wireless-networking front.

IF VENUES ADD NEW LAYERS OF DEVICES LIKE SENSORS AND THREAT DETECTORS, THERE IS GOING TO BE A NEED FOR GREATER WIRELESS CONNECTIVITY.

On the Wi-Fi side, the advent of Wi-Fi 6 networking gear – now available from most top vendors – should provide a large boost in performance and capacity for venue networks, at costs only slightly higher than the past generation of equipment.

On the cellular side, 4G DAS networks remain a key tool in bringing a multi-carrier solution to providing basic access to most devices, while the arrival of nascent 5G services will enable carriers and venues to bring new kinds of services to guests, including applications with low-latency needs like virtual reality and other high-bandwidth broadcasts. Also, the emergence of networks using the CBRS bandwidth for potential "private" LTE networks may provide venues with an additional method of adding secure, standards-based communications for things like back-of-house operations, in-venue gaming, and Wi-Fi like services or Wi-Fi backhaul to areas where Wi-Fi signals can't reach.

While budgetary concerns, venue aesthetics and demand for levels of services will still likely make overall networking choices a very local decision, the idea of trying to move forward in a pandemic age without a high level of basic wireless connectivity seems to be a non-starter.

4. What is the new normal? What will the "cover of Covid" change for good?

Perhaps the most interesting technological or procedural shifts that may occur in the pandemic's wake are ones that are not taken solely to address safety or other virus concerns, but ones that use the crisis as a reason to fix things about venues that have been "broken" or continued without question simply because "that's the way we've always done things."

Our good friend Bob Jordan came up with the line of "what will be done under the cover of Covid" that will not just help venues support the return of fans, but will also address problems that may have been around for ages? Jordan is quick to note that the basic format of stadiums hasn't changed much since the days when the Romans built the Coliseum, with lots of things like small numbers of entryways and traffic-snarling collisions of perpendicular paths (like those found on concourses when people stop and turn to get to a concession stand) still persisting in almost every venue today. Will the pandemic force venues to completely change the way people walk around in venues? Will those changes persist if they simply represent a better way to do things that hadn't been thought of before?

Similarly, might not things like timed entries and exits be seen as an attractive alternative compared to a future where we just go back to logjams because it's safe to be close to people again? Will there be any fans who want to go back to the "old way" of waiting in a line to order a hot dog, and then going through the additional waiting of having someone turn around, wrap your food, and take your payment? Or will the shift to a more self-service model – perhaps with fewer choices – become part of the "new normal" that will appear on the other side?

How many other ideas that were put off due to budget constraints or historical opposition will get tested, now that Covid-19 is a "good excuse" to give them a try? And how many others will still stay on the sidelines, hedging bets against any new methods or expenditures in a time of reduced revenues, waiting for things to pass?

As we said at the start – right now, the only thing everyone knows for sure is that nobody knows anything for sure. From our interviews, however, it is very apparent that for almost all the people we have talked to, few see standing still as a viable alternative. There are almost assuredly going to be some missteps, some money and time spent on technologies or procedures that don't pan out, some anger and frustration on all sides, as we all adjust to new ways of doing things we'd long taken for granted. There will also be successful moves, victories small and big, which we hope to share to help accelerate the "Return to Venues" as much as possible.

Here at Stadium Tech Report, nothing has changed in our core directive – trying to help bring the best information possible to our readers so that they can be successful in operating their venues. Stay tuned as we try to find as many ways as possible to keep that communication flowing. –STR–

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GLOBE LIFE FIELD

READY FOR DEBUT WHEN BASEBALL RETURNS

BY PAUL KAPUSTKA

THE TEXAS RANGERS' NEW HOME, GLOBE LIFE FIELD IN ARLINGTON, TEXAS

GLOBE LIFE FIELD READY FOR DEBUT

WHEN FANS ARE FINALLY ALLOWED BACK IN STADIUMS TO WATCH BASEBALL AGAIN, GLOBE LIFE FIELD WILL BE READY.

ARUBA WI-FI GEAR IN UNDER-SEAT DEPLOYMENTS WILL BRING CONNECTIVITY TO MOST OF THE SEATING BOWL. CREDIT ALL PHOTOS: CENTURYLINK

The venue perhaps most affected by the coronavirus-related shutdown of sports, Major League Baseball's newest stadium will offer visitors state-of-the-art wireless connectivity, including a Wi-Fi 6 network using gear from Aruba, a Hewlett Packard Enterprise company. Cellular coverage will be provided by a 4G LTE distributed antenna system deployed by DAS Group Professionals using gear from JMA, with 5G systems slated for deployment later in the year. The technology deployments were directed by CenturyLink's venue integration team, and CenturyLink is also providing a unique backbone bandwidth deployment for the venue with three regionally separate links for greater redundancy.

Originally scheduled to open in March of this year, the new $1.2 billion home of the Texas Rangers – a 40,300-seat venue with a transparent, retractable roof that makes Globe Life Field more than just a baseball stadium – now sits waiting by its neighbors in Arlington, Texas, part of a complex that includes AT&T Stadium as well as Globe Life Park, the Rangers' former home.

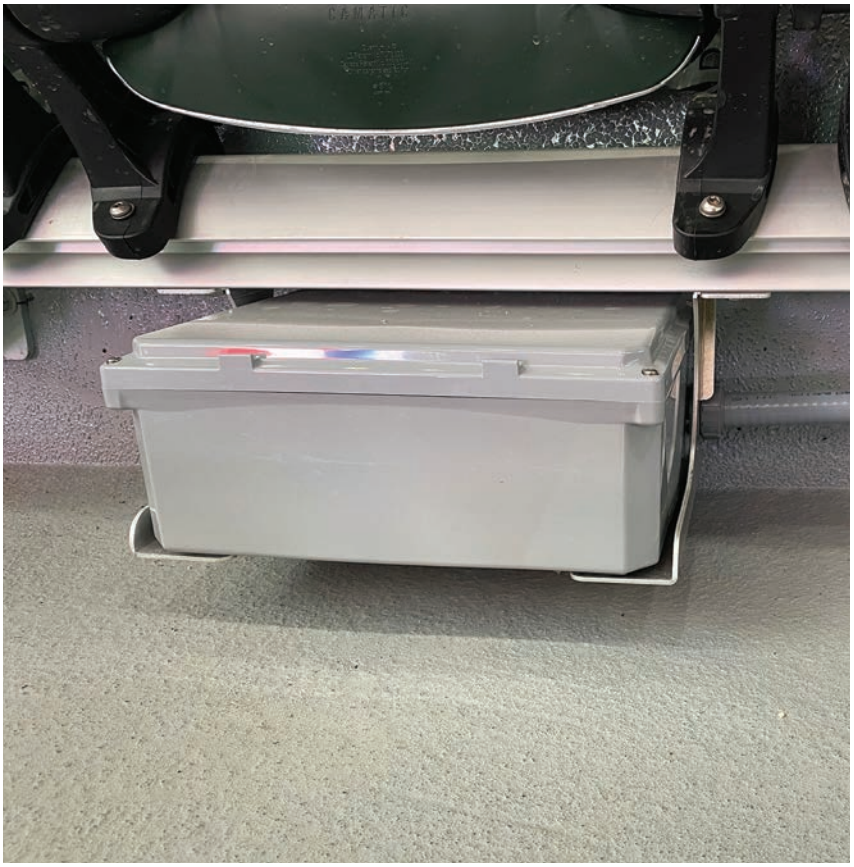
"We are ready to put on a game today," said Mike Bullock, Vice President, Information Technology for the Rangers.

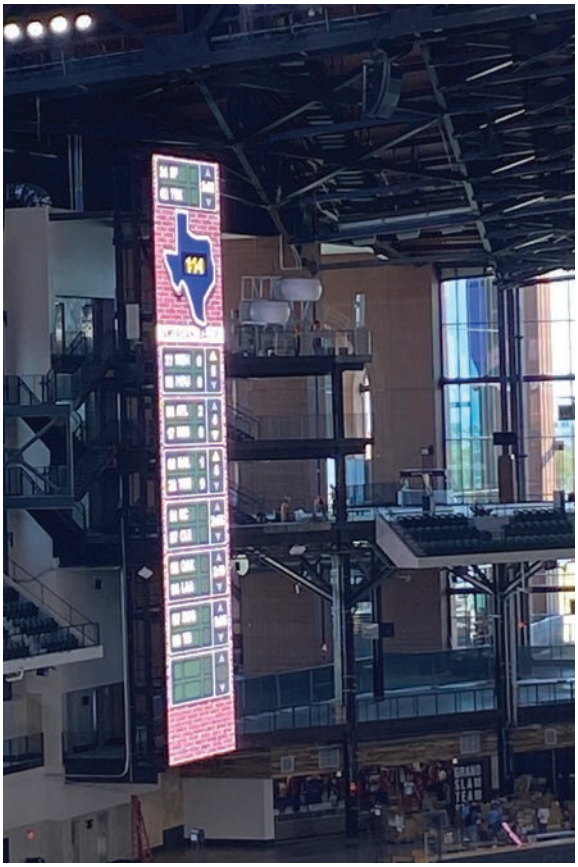
After a planned March 14 concert with Chris Stapleton along with Willie Nelson and Friends was canceled on March 12, the venue has been mostly closed, though it did open up to host high-school graduation ceremonies at the end of May.

Though baseball overall this year might start without fans in the stands, once guests are safely allowed back in venues the experience at Globe Life Field should be among the best in the league, at least from a wireless-connectivity and digital fan-experience standpoint.

In addition to the Wi-Fi 6 network, which will have approximately 1,200 APs, most running the new standard, the DAS will have the top three carriers – AT&T, Verizon and T-Mobile – on the network when the doors open, Bullock said. The Rangers also worked with app developer Venuetize as well as MLB's digital team to produce an enhanced version of the MLB Ballpark app, which will support features like a digital wallet, in-seat ordering, and delivery of merchandise to a system of lockers inside the stadium.

For digital displays, the Rangers partnered with Daktronics, which has installed two large boards – the bigger one, in right field, measures 58 feet by 150 feet, while the left-field board measures 40 feet by 111 feet. According to Daktronics both boards use 15 millimeter spacing, and combined provide 5.2 million pixels over 13,000 square feet of display. The venue also has a 2.5-foot high ribbon board that stretches from foul pole to foul pole along the





LEFT: A CLOSE-UP OF AN UNDER-SEAT WI-FI ENCLOSURE; RIGHT: A VERTICAL DIGITAL DISPLAY AND SOME MATSING ANTENNAS.

seating area, a 925-foot long span; another ribbon board on the suite level stretches 211 feet. Daktronics also provided some 1,400 LCD TV screens throughout the venue.

Finding the best equipment and design

Unlike some other MLB parks that are in the midst of network upgrades, the Rangers and Globe Life Field are not a part of the new MLB "2.0" tech consortium, where like it did several years ago, the league brings in carrier and equipment partners to share deployment costs with the teams.

According to Bullock the new-version MLB consortium plans weren't yet in place when the Rangers needed to start moving forward with Globe Life Field's technology decisions.

"We have a good relationship [with MLB] but our plans came at kind of a gap," said Bullock, who gave high praise to MLB for its efforts to help bring connectivity to ballparks.

Instead, the Rangers signed up CenturyLink as its "technology innovation partner," for professional services including the design and RFP stage, engineering, and "hands-on" install of the Wi-Fi network. CenturyLink also put together the data center and backbone bandwidth for the venue, which includes two 100-Gbps pipes as well as a third link that can be lit up should the need arise.

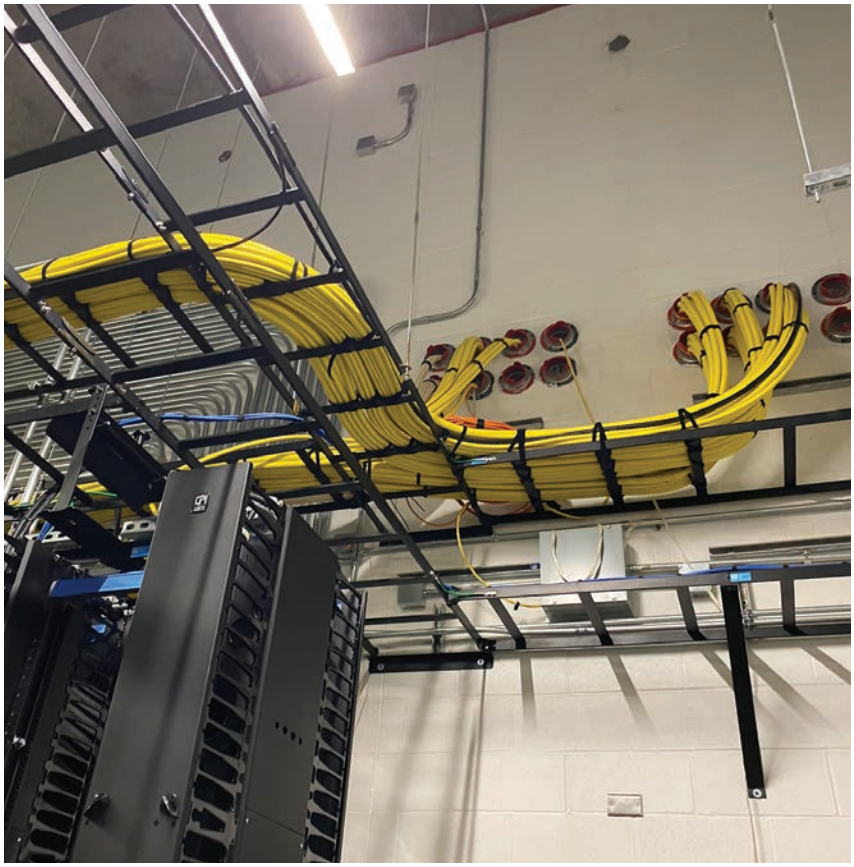
Chip Swisher, Smart Solutions Practice Director for CenturyLink, said there are two active paths coming into the complex, with the ability to add the third later if needed. The active pipes go both east and west to separate POPs; both are 10 Gbps burstable to 40 Gbps, and can be increased up to 100 Gbps. The third route, Swisher said, can provide an additional 40 Gbps.

"It's really focused on resiliance, to engineer around any possible local peering failure. We're probably the first venue to do that," said Bullock. "It's a pretty cool design."

Swisher, meanwhile, jokes that with the triple-backbone design, the venue "has more bandwidth than some countries."

According to Swisher, CenturyLink helped Bullock and the Rangers with the vendor selection process, especially for Wi-Fi equipment. Though Swisher said that all major vendors were considered, in the end the Rangers went with Aruba. Bullock said that approximately 600 of the stadium's Wi-Fi APs are deployed under-seat in the bowl area.

Swisher said the entire Wi-Fi network was assembled and tested at a local CenturyLink central office, with switches and firewalls pre-programmed so that the equipment could be delivered to the stadium ready to install.



BACK-END WIRING SYSTEMS AT GLOBE LIFE FIELD WERE DESIGNED WITH FUTURE EXPANSION IN MIND.

"We palletized it all, IDF by IDF, and took that to the venue," said Swisher.

On the DAS side of the equation the Rangers partnered with DGP, which used JMA gear for the 4G LTE DAS deployment. Bullock said the Rangers also installed some MatSing antennas for coverage in two specific areas: the plaza area at the main entrance, and for the stadium "floor" or field area.

"Since we are going to be an all-digital ticket venue, we were kind of paranoid [about wireless coverage] for the entry area," Bullock said. "And since this is a mixed-use venue we also needed field coverage."

Thanks to a quirk in the building's construction, the Rangers have something other venue IT departments may envy: Plenty of space for the head-end room.

"We wanted to make sure we weren't cramped on space here and as it worked out the [head-end] room is at the end of the building, and it's 8,000 square feet," Bullock said.

More features for Ballpark app

Another technology debut awaiting the arrival of fans to Globe Life Field is the Rangers' version of the MLB Ballpark app, the app used league-wide for game-day services. According to Bullock the Rangers worked with both the league as well as with app developer Venuetize for some custom enhancements to the Ballpark app, including the wallet feature, the ability for fans in some certain select premium seating areas to order food delivered to their seats, and also for retail merchandise to be purchased via the app and then stored in a locker for fan pickup.

On the concessions side of the house, Bullock said the Rangers selected Appetize for its point-of-sale systems.

While the pandemic-related shutdown is certainly one of the biggest obstacles to ever face a new stadium, the construction of Globe Life Field included some other roadblocks for the crews to get by, including some torrential rainstorms that briefly flooded some computer rooms and a small fire on the roof structure.

But now, the stadium is ready to go – it got a trial run by hosting local high school graduation ceremonies at the end of May – and Bullock can't wait to have fans in the stands so his team can do the final network tuning, which requires a full house.

"We're ready for opening day, whenever that is," Bullock said. –STR–

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SPECIAL COMMENTARY

WHAT'S NEXT
THE RETURN TO VENUES

BY BILL ANDERSON
President, AmpThink

On March 11, 2020, a full house of fans had filled Chesapeake Energy Arena in Oklahoma City, in anticipation of an NBA game between the Thunder and the visiting Utah Jazz. But just before tipoff, the referees convened at midcourt for a discussion. Soon after that, the teams were sent back to the locker rooms, and eventually an announcement was made that the game was cancelled. A player on the Jazz, Rudy Gobert, had tested positive for the coronavirus, an incident that sent the fans home from the venue that night – and ultimately, signaled the end of attending spectator sports as we knew it, for the foreseeable future.

What followed in short order was the closing of worldwide economies and social structures as people everywhere entered stay-at-home quarantines designed to help stop the spread of the disease. All kinds of businesses, especially those like sports events, concerts and other activities involving large public groups, were effectively shut down, with no clear path to a future of when and how they might resume.

Now, as some of the positive effects of the quarantines are being realized, societies around the world are asking when and how more business and recreational activities can resume. And while social-distancing best practices that have emerged in places like grocery stores have provided a model that might allow more businesses to safely serve more customers, the idea of large groups of fans assembling packed together in stadiums during a pandemic presents a much tougher challenge.

While the desire to return to the tribal gatherings of sports, concerts and other events is widespread, the timing of the "return to venues" is still unknown. The conversations around this topic are numerous and diverse, and involve many factors and factions, including politics, government, economics, biological science, venue operations, and personal safety. While AmpThink is not be in a position to solve the myriad problems that must be addressed, **we do see that technology will have a significant role in the final solution.** And that role will be layered.

Unfortunately, right now much of the discussion around technology for venue security is increasingly one-dimensional, searching for a silver bullet that doesn't exist. Heat-sensing cameras, robotic cleaners, disinfectant chemicals and mobile-device tracking applications may all have a role, **but no single solution solves the problem of "when will fans return" because there isn't one problem.** Technology will just be one part of a larger solution set.

Starting in late March, AmpThink kicked off a partnership with Stadium Tech Report to look at the future of large public gatherings. The goal of the effort was to have meaningful discussions with industry thought leaders to understand the framework for our collective "return to venues." We are attempting to develop that understanding through the lens of decision makers who will control the process. We've broken our analysis into "stages of return." This phrase reminds us of the top level concerns that must

be addressed before the "return to venues" can occur, including: government approval; legal liability mitigation; and the restoration of fan confidence.

What is it is going to take for the government to allow public venues to open?

While venues can propose their own paths to opening their doors to fans, their ability to execute is premised on the assumption that they will be allowed to open their doors. Though opinions on readiness will likely be different from national and local perspectives, the decision to open the doors of venues will rest heavily on the ability to convince public health authorities that the risks of spreading an infection can be managed to the point that they believe that the benefits of gathering a crowd are not outweighed by the risks of the gathering.

Achieving this approval will require that **venues are able to explain how the venue will identify and then mitigate the risks of mass public gatherings.** This can be achieved on an ad-hoc basis and progress will occur at different speeds in different jurisdictions. However, establishing a national mandate, a framework, and a plan to measure execution can move the conversation along faster – achieving an accelerated return to venues.

If the government says yes to opening a venue, what liability does the venue have and what does it need to do to mitigate the risk?

Any responsible venue operator or owner has to ask if the gains to be made by opening the venue will outweigh the risks. Mortgage payments and balance sheet pressures will influence the decision, but the legal risks will not be ignored.

After addressing official mandates, venue owners and operators must be confident that they can safely open their building. And then, if and when the worst-case scenario happens – infection of some group of attendees – they can answer the tough questions regarding the execution of their plan. Who implemented the plan, how was it implemented, how was its effectiveness measured, were the plan elements repeatable, was training sufficient? The answers could save or damn the venue both legally and in the court of public opinion.

Having a government-endorsed strategy, a well-articulated plan, and a mechanism to document execution will provide venue owners and operators with the legal confidence that they require to open their buildings, and to provide a clear sense of responsibility toward the guests they will invite inside their doors.

Assuming there is an open venue, what has to happen to cause fans to become comfortable with attending a live event?

It is likely that if public health officials and venue owners have reached the decision to re-open public venues, the decision was not arrived at lightly. Buildings will be opening under plans that materially reduce the threat of mass infection at a public venue.

However, fans may remain wary and without an effective vaccine, fans may prefer the comfort (and safety) of their home to the live venue experience.

Communication of the efforts to identify and address the risk of exposure to an infected attendee, proactively identify exposed fans, and otherwise reduce the risks of attendance will need to be effectively communicated. While much of the communication will focus on reaching fans before they arrive at the building, their experience when they reach the venue will be an important part of developing momentum, using fans to build the case that the return to venues is safe.

How technology will help enable the 'stages of return'

Emerging technologies that addresses critical problems for venues relating to coronavirus (for example threat identification, threat mitigation, sanitation, tracking and contact tracing, messaging, and communication) will take center stage in the coming months. **But behind these point solutions there will be a need to build networking infrastructure to make their products work.** Devices will need to be connected (for power, or by wire or over the air for networks), traffic will need to be transported, compute resources deployed, and systems built. **The success of these systems will depend on architecting reliable, scalable, service provider class networks in these venues.**

What is the new normal?

Is the current shutdown permanent? Will all future events be held without fans in attendance? Likely no! But **returning fans to LPVs will take time and require a plan that addresses the needs of all stakeholders: Government officials, venue owners and operators, team owners, concert promoters, leagues, athletes and musicians, venue employees and contractors, and of course fans.**

On behalf of our customers, we can listen, learn, and position them to execute on a strategy that gets us all to a common goal – the opening our stadiums, arenas, convention centers, malls, and other public places to the public within a framework that manages the risk that we pose to each other when faced with a pandemic. Stay tuned as we present more findings of our ongoing research and interviews with thought leaders, subject matter experts, technology company leaders and venue, team and school IT professionals in the weeks and months to come. –STR–

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DODGERS UP THE ANTE WITH MLB'S FIRST WI-FI 6

BY TERRY SWEENEY

NEW WI-FI 6 ANTENNAS WERE PLACED IN THE OUTFIELD ROOFS FOR EXPANDED COVERAGE. CREDIT ALL PHOTOS: LOS ANGELES DODGERS.

Professional sports may have put games and exhibitions on hold, but a handful of IT executives from Major League Baseball teams have been using pandemic downtime to upgrade Wi-Fi and DAS systems in their stadiums.

Case in point: The Los Angeles Dodgers just completed the league's first Wi-Fi 6 overhaul along with adding new 5G cellular antennas to ensure Blue Believers stay seamlessly connected to social media, email, text and good old-fashioned voice calls during home games.

"We're up against the same challenges that every stadium has, which is how to deal with the density of individuals trying to connect simultaneously – a challenge that's unique to our industry," explained Ralph Esquibel, vice president of IT for the Dodgers. "Wi-Fi 6 was created for this kind of high-density environment."

Wi-Fi 6, better known in IEEE circles as the 802.11ax standard, is a significant upgrade for Wi-Fi networks that started appearing last year. Among its benefits are that use of the new standard can increase the amount of available spectrum and number of channels available for users; it can also significantly accelerate users' average data rates, while also decreasing the amount of battery power used by devices searching for a Wi-Fi connection. As long as they have newer phones that support the new standard, Wi-Fi 6 networks provide everything a team could want for its connection-conscious fans.

Replacing the Wi-Fi 4 network

It's been barely five years since the Dodgers installed Wi-Fi 4 in the stadium, making use of under-seat APs and what were the league's first APs cleverly concealed inside hand railings for even denser coverage. There were about 900 APs powering the network then, which easily accommodated 8,000 simultaneous users on its maiden voyage.

"It was state of the art back at that point in time," Esquibel recalled. But usage and uptake quickly soared among fans and it wasn't long before 30,000 simultaneous users were contending for bandwidth at each game.

"That was when I'd get a call from previous ownership, usually sometime in the second inning with, 'I can't get on email or make a phone call…'," Esquibel laughed. Suddenly, it didn't matter how close your seat was to home plate; anybody watching the game became inadvertent victims of Wi-Fi's highly successful rollout at Dodger Stadium.

Other baseball stadiums experienced similar capacity and uptake issues. That's in part what prompted MLB to dispatch its technology committee to look at technol-

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CLOCKWISE FROM TOP LEFT: NEW WIRELESS ENCLOSURES FOR UNDER-BENCH, INTERIOR AREAS, UNDER-SEAT AND UNDER OVERHANGS WERE ALL INSTALLED THIS PAST OFFSEASON.

ogy upgrades to make sure baseball fans could do all the wireless networking they wanted to while watching a game. Though MLB did not respond to a request for more information, STR was able to get some information from other sources about the pending upgrade plans.

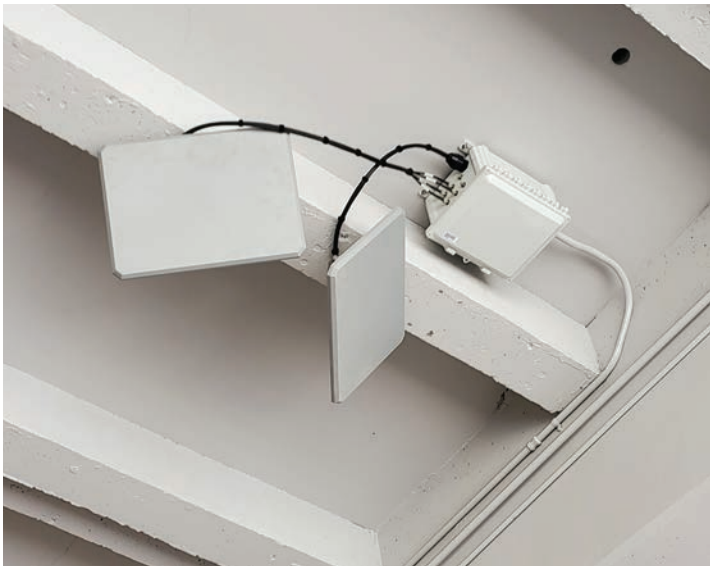
Wi-Fi 6 coming to more ballparks

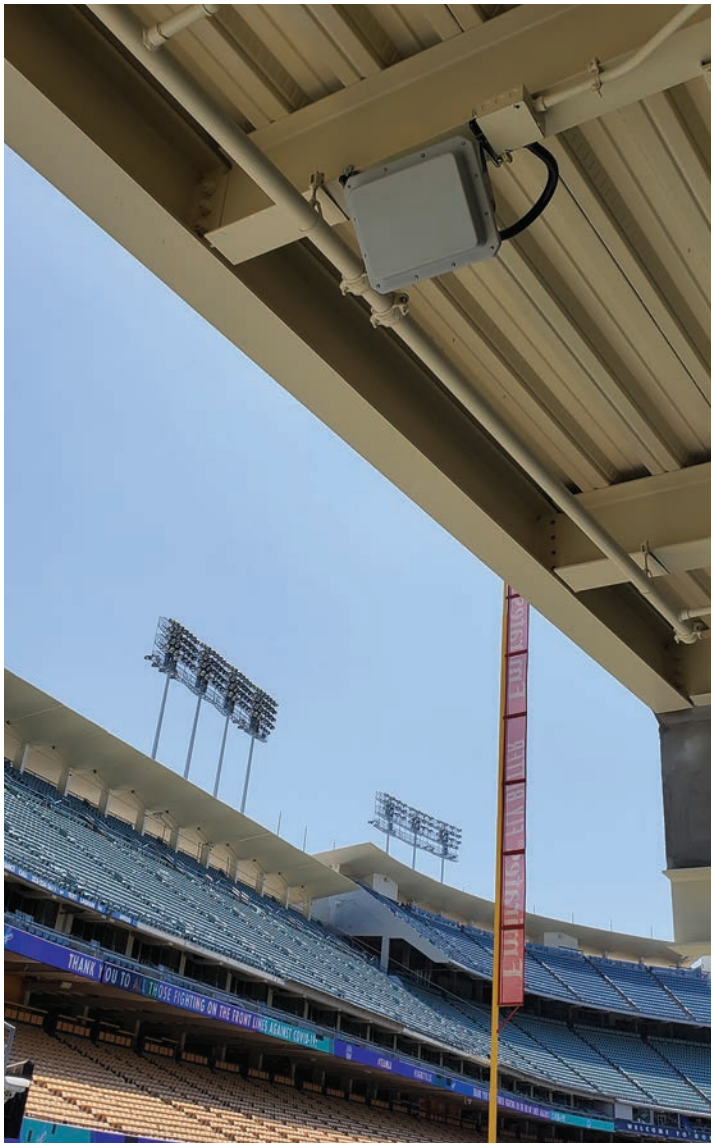
According to our sources, MLB technologists settled on Wi-Fi 6 upgrades as their next strategic push. So while the Dodgers will be the first baseball team to upgrade to Wi-Fi 6, other teams were also reportedly in the first steps of adding Wi-Fi 6 before the coronavirus pandemic put a hold on many upgrade plans.

It's unclear if the MLB technology committee brought any financial help to the table along with their wireless expertise for these six upgrades. When MLB put together a consortium to bring wireless connectivity to parks starting back in 2014, it got financial buy-in from wireless carriers, equipment vendors and teams to help spread the costs around. Esquibel wouldn't specify any dollar amounts for the Dodgers' Wi-Fi 6 budget or whether the league contributed anything. He did note that the team negotiated an upgrade clause into its previous Wi-Fi networking contract.

Construction for the Dodgers' new network began last fall, right after the Dodgers lost to the Washington Nationals in the NLDS playoffs. Back then, there were 880 APs that comprised the Wi-Fi 4 network; the upgrade to Wi-Fi 6 bumped that total closer to 1,100 APs, Esquibel said. The Dodgers installed 9100 series APs from Cisco in most of the same locations, reusing the cabling and conduits in the process. The Dodgers also replaced network switches (Cisco again, and its 9300 switching line) to handle greater throughput and the increased processing capacity, Esquibel added.

On the cellular side, Esquibel said carriers are adding 5G gear to the stadium, with AT&T having the most ex-





NEW WI-FI ANTENNA PLACEMENTS ON CEILINGS, OVERHANGS AND WALLS WILL HELP EXTEND DODGER STADIUM'S COVERAGE.

tensive deployment right now. Customers of AT&T and Verizon will also be able to be switched over to the Wi-Fi network when entering the park.

The upgrades to its wireless infrastructure also set the stage for some new capabilities coming down the pike. The combo of Wi-Fi 6 and 5G services will help the Dodgers deliver 4k and 8k video formats; it will also help as professional sports move toward "probability gaming," i.e., online sports betting. Esquibel credits partners Cisco, AmpThink, Horizon Communications and MLB with building a powerful solution to enable these emerging services and capabilities.

There were other elements to the Dodgers' 2020 tech stack refresh as well. Inside the stadium, they reworked the outfield to create a centerfield plaza with left- and right-field pavilions, with cut-outs and walkways above the pavilions plus more APs than last year to accommodate more seated and standing spectators. Esquibel said the team has also replaced its point-of-sale system, and has added Appetize, a cloud-based POS concessions app, as well as ParkHub to keep closer tabs on the Dodgers' parking lots.

While the Wi-Fi 6 construction is complete, advance testing and fine-tuning are on indefinite hold. Esquibel and his Dodger colleagues are sheltering in place and have been since mid-March. "The pandemic has slowed down testing," he said, nothing that the stadium needs capacity crowds to gauge how well the new networks are engineered and where antennas need adjusting. And it's clear that contemplating the first post-pandemic home game brings out Esquibel's fan boy, broadband wireless notwithstanding.

"I want to smell the grass and be with the crowd," Esquibel said. "Like everyone else, I just want to see some baseball." –STR–

5G and Fiber and DAS, oh my!

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All of us are experiencing unprecedented cancellations and delays of events right now. With sports seasons called off and concerts postponed until later in the summer, venues that have the flexibility to adapt are going to have an easier time making up for lost revenue. In our latest guide for multi-use venues, the experts at Samsung discuss the nuances of different fan bases and what it means for your venue's AV technology solution.

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