SPORTS FACILITY PROJECTS

Enhancing the Fan Experience with New Audio Systems and Upgrades

By GeorgePetersen

Audio installations and upgrades within sports facilities typically present severe challenges to integrators and system designers. Perhaps the most formidable of these is the sheer scale of multiple coverage areas. The latter often entails working with enormous, cavernous open-air spaces while also delivering an acceptable listening experience to everyone occupying the seats, whether fans are courtside or in the upper "nosebleed" seats of an arena or — in a stadium project — on the grandstand, bleachers, end-zones or beneath a second or third deck.

Meanwhile, with the rise of multi-use facilities, such as baseball one day, football the next — or basketball/hockey shared with concerts, the situation facing the audio system designer become that much more complex.

The task is further complicated by issues such as reverberation and intelligibility — particularly in enclosed spaces. Another significant factor to be considered is the exuberance of the fans themselves, and the need for the P.A. system to be heard above crowd noise that can easily peak at 105 dB or more. Last but not least are the challenges of getting the entire installation performed correctly, safely, on time and on budget, when those two invaluable commodities — time and money — are so often in scarce supply.

With that in mind, we decided to look into seven widely divergent recent sports facility installation projects. Each of these were entirely different, not only in capacity, but also in system/venue criteria, yet all with successful outcomes that worked for all concerned — designers, integrators, teams, management, and most of all, the fans.

Home of the NFL's Philadelphia Eagles, the Lincoln Financial Field stadium recently got a sonic upgrade.

Lincoln Financial Field, Philadelphia, PA

Opening in 2003 to replace the aging Veterans Stadium, Philadelphia's Lincoln Financial Field is home to both the NFL's Philadelphia Eagles as well as Temple University's Temple Owls football team. The seating capacity is 69,176.

K-array's Anakonda flexible near-field/fill speakers added close-in intelligibility.

Recently the Lincoln Financial Field underwent a two-year renovation plan to enhance the fan experience. Improved amenities included new HD video boards, Wi-Fi and seat expansion. To accommodate some of these updates, the stadium had a requirement to provide top quality sound to premium seating on the edge of the football field. With sub-par sound arriving from distant speakers, the front row seats needed a bit of a boost for optimum intelligibility. With little space available for speaker mounting, K-array offered just the right solution.

Installers Diversified Systems was first introduced to the Italian manufacturer a few years back at a demo and reached out immediately to K-array America to determine a P.A. that would meet all the clients' needs. Together they designed a system using the Anakonda KAN 200+, a flexible, 2-meter (6.6-foot) speaker that has a snakelike-ability to bend to match curves surfaces and up to 16 of these can interconnect to form a continuous 32-meter (105-foot) length.

Each Anakonda KAN 200+module is approximately 2-inches tall and 1.5-inches thick, making them ideal for discreet (indoor or outdoor) front fill or exhibition applications. Components in each are 16 1-inch neodymium drivers with a 300-watt AES power handling.

"The Anakonda is very low profile, offers a built-in daisy chaining feature and can survive outdoor installations," explained project supervisor and engineer, Jeff Dykhouse. "These qualities made it ideal for this sort of application." Dykhouse, along with director of AV engineering Pete O'Neil, project manager TJ Beardsmore, had 22 Ankonda units mounted along the curvature of the stadium seating, powered by a QSC CXD amplifier that's connected to the larger DSP system at the venue.

"The clients are happy and we are sure our efforts will help fans to cheer their teams to winning seasons," exclaimed Dykhouse.

Lincoln Financial Field
Capacity: 69,176
Key Components: K-array Anakonda KAN 200+
Integrator: Installers Diversified Systems
Designer: Installers Diversified Systems

The Ferguson Recreation Center on the Fairleigh Dickinson University campus.

Ferguson Center, Fairleigh Dickinson University, Madison, NJ

Situated on the Fairleigh Dickinson University (FDU) campus in Madison, NJ, the Roberta Chiaviello Ferguson and Thomas G. Ferguson Recreation Center is the home of the FDU Devils, the university's division III sports program. The facility includes three full-size basketball courts, two racquetball courts, a weight-training room, a fitness center, coaching offices, an elevated jogging track and a competition-sized swimming pool.

Four RCF P6215 coaxial speakers form a central overhead cluster.

Recent upgrades at the Ferguson Center athletic complex called for upgrades of the existing public address system. To cover the gymnasium — a multi-purpose facility that seats 2,300 for athletic contests, basketball, volleyball and other activities — the solution called for four RCF P6215 speakers positioned in a centralized overhead quadrant. The installation was done by Andover, NJ-based Jerzy Sound.

The P6215 is a weatherproof full-range, coaxial two-way system that combines a 15-inch RCF woofer with a 1.3-inch exit HF compression driver mounted on a constant directivity, wide-dispersion (60 x 60 degree) CMD horn for high output and longer throw applications. Although used in an indoor facility, the P6215's weatherproof feature was important due to the high humidity environmental conditions within the athletic facility. Each enclosure includes 12 M10 inserts and a stainless steel U-bracket providing mounting flexibility in a variety of installations. A single four-channel RCF QPS9600 amplifier powers the entire system.

Ferguson Center Athletic Complex
Capacity: 2.300
Key Components: RCF P6215 speakers
Integrator: Jerzy Sound

The new stadium in Woldia, Ethiopia opened in January 2017.

Technomad speakers — such as the model Noho Ci outlined here in red — ring the stadium roof, forming the bulk of the sound system.

Sheikh Mohammed Hussein Ali Al-Amoudi Stadium, Woldia, Ethiopia

Inaugurated on January 14, 2017, the new Sheikh Mohammed Hussein Ali Al-Amoudi Stadium and Sport Center in Woldia, Ethiopia, was built at a cost of more than 500 million Ethiopian Birr (approximately $22 million U.S. dollars). Besides being a huge boost for the local economy, construction of the stadium will create opportunities for Woldia to host national and international competitions as it meets FIFA and IAAF requirements.

The facility is Ethiopia's first of its kind stadium fitted with a roof. Besides its large, turf soccer field, the stadium also has 10 entrance gates, a swimming pool, an eight-lane competition track as well as basketball, handball, volleyball and tennis courts.

The sound installation was arranged via XSyn Corporation (Technomad's Ethiopian distributor) and is comprised of 15 Technomad Noho Ci and three Technomad Berlin loudspeakers that ring the stadium, with the speakers making the long trek of more than 6,730 miles from the company's South Deerfield, MA factory. The Berlin speakers are two-way systems with a 15-inch woofer and 2-inch exit HF driver — all in a tough, weatherproof molded enclosure. Intended specifically for installations, the Noho Ci — Technomad's newest speaker — is a two-way, 12-inch/1-inch exit design, also in a molded enclosure. Both the Berlin and Soho Ci are offered in 14 available colors.

Woldia Stadium
Capacity: 25,600
Key Components: Technomad Noho Ci and Berlin loudspeakers
Supplier: XSyn Corporation

Carver-Hawkeye Arena, University of Iowa, Iowa City, IA

Constructed in 1983, the 15,400-seat Carver-Hawkeye Arena is home to the University of Iowa Hawkeye basketball, wrestling, gymnastics and volleyball teams. It also hosts the big-ticket concerts (Whitney Houston, Metallica, and Guns N' Roses, to name a few), graduation ceremonies, and speeches (including Jimmy Carter, Bill Clinton and Desmond Tutu). Recently, the Arena joined the university's 70,000-seat Kinnick Stadium by deploying a Danley Sound Labs sound reinforcement system. Also part of the arena's upgrade was a DiGiCo S21 console, D-Rack stagebox and a QSC Q-Sys DSP system.

Larry Lucas of Anthony James Partners (Richmond, VA), designed and commissioned the new Danley system, with assistance from acoustician Doug Jones, with the Danley team. The same duo was responsible for the recent Kinnick Stadium project. Minneapolis-based Parsons Electric both the Kinnick and the Carver-Hawkeye Arena installs.

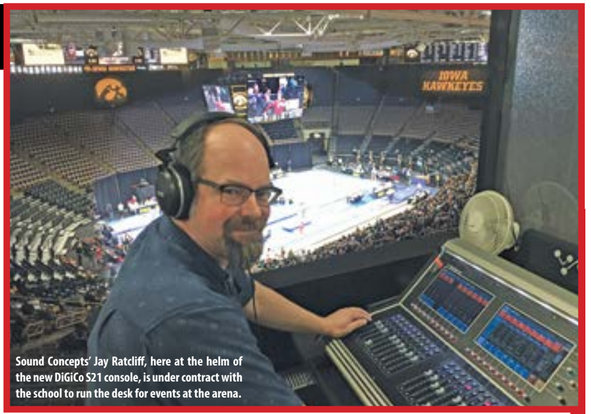
"Amazingly, Carver-Hawkeye Arena managed to get by with the original installed sound system for over 30 years," explained Parsons Electric field systems engineer Dave Potts. "They were hoping for much better intelligibility, greater musical impact, and improved user control. The new system gives them all of that, and we pulled the old system out and put the new system in just six weeks. This included pulling new cable and negotiating with other contractors that were replacing the scoreboards and making other renovations. For a while, we worked around 14 boom lifts, cranes, and crane trucks on the floor — only five of which were ours."

Eight loudspeaker clusters ring the floor to cover the arena's main bowl. Two of the clusters use a pair of Danley SH-96HOs each, and the remaining clusters use a pair of Danley SH-96s each. Two clusters of three Danley TH-118 subs add LF support. Another two Danley SH-96s fire straight down at either end of the basketball court to cover the floor. Ten Danley SM-80s deliver delayed coverage to the upper bowl. Parsons Electric also reconditioned the existing speakers and their wiring in the concourse, separating them into eight unique zones and applying delay to time-align them with the rest of the system.

Fourteen 4-channel Danley DNA 20K4 Pro amps provide 280,000W of powering to the system, with comprehensive signal processing for speaker conditioning. A QSC Q-Sys DSP system provides presets for various arena functions — including the ability to turn individual clusters on/off to scale to the size of an event.

Danley SH-96HOs, DH96s and TH118 subs provided the punch for the install.

"At first I was skeptical whether we'd hit all the close seats with these angles," said Potts. "But Danley's pattern control is really well defined, and Larry and Doug were able to dial everything in so that the system covered precisely to the points they required. The boxes themselves sound great; even before we dialed anything in, the intelligibility and impact were there. Once we time-aligned the concourse, the whole system worked together as one unit, regardless of overall volume. AJP and Danley really nailed the design at Carver-Hawkeye Arena."



Sound Concepts' Jay Ratcliff, here at the helm of the new DiGiCo S21 console, is under contract with the school to run the desk for events at the arena.

» The Mix Side

The school's technology rep company, Sound Concepts (also the systems operator for the venue), selected a DiGiCo S21 digital console, a Purple Box MADI/Optical converter and a D-Rack stagebox — all installed by Parsons audio — as part of the facility's overall upgrade.

The budget for the sound system's renovation was cut substantially from initial estimates. "Nothing comes close to what the S21 can offer at that price point," states Sound Concepts president Marvin Smejkal. "I knew I wanted a DiGiCo console for this project." Sound Concepts has spec'd them for other projects, including for the Kinnick Stadium and the Paramount Theatre in Cedar Rapids, as well as having several in the company's rental inventory. "The budget wouldn't have allowed for one of the SD series consoles. But the S21 delivers so much functionality for an incredibly cost-effective price."

Smejkal cites the inclusion of a fiber interface on both the S21 and the D-Rack; this was important because the project required the use of existing limited cable conduit between the FOH position, the racks and the arena floor. "We needed to use fiber because of the limited amount of conduit and the length of the cable runs," he says. "The S21 addressed that."

The Purple Box MADI/optical converter brought the new system even more signal-transport flexibility. Smejkal enumerates a few of the S21's capabilities, such as its 40 Flexi Input channels, 10 x 8 full processing matrix, 16 assignable graphic equalizers, and Dante connectivity (which allowed the S21 to interface with the Q-SYS network connecting the arena's P.A. amplifiers). "So much of what the S21 can do is included in the price. For a situation like this, with a limited budget but high expectations, the S21 is the only real solution."

Carver-Hawkeye Arena
Capacity: 15,400 seats
Key Components: Danley SH-96HOs, DH96s, TH118 subs; DiGiCo S21 console; QSC Q-Sys DSP
Integrator: Parsons Electric
Designers: Anthony James Partners, Sound Concepts


The facility received a number of improvements including a new grandstand and clubhouse.

Crabble Athletic Ground, Kent, U.K.


Martin Audio's CDD-WR speakers were used throughout the venue.

British National League soccer club Dover Athletic has substantially invested in the facilities at its 6,500-capacity Crabble ground in Kent, both to meet the football league's criteria and provide a better game-day experience for its supporters.

The centerpiece of the venue is the new 1.3-million pound ($1.68 million USD) cantilevered Family Stand, which provided a much needed additional 500-seats (along with improved facilities for players, officials and disabled supporters) and required a state-of-the-art public address system.

Old Barn Audio (OBA) was awarded the contract, and as the company has done in the past recommended a Martin Audio CDD (Coaxial Differential Dispersion) solution — in this case dipping into the "WR" (weather resistant) series. "The weatherized CDD-WR was the perfect choice," states OBA director Phil Clark, "and with 32 enclosures installed, it is the largest U.K. CDD-WR install to date."

The company first carried out a demo for the club chairman, Jim Parmenter, using CDD10-WR's. "He was extremely impressed with both the quality and dispersion," says Clark. As a result, OBA's contract was extended from the Family Stand to all four stands spread over seven zones. The new design would replace a simple 100-volt, horn-based system.

"Updated TV communications also formed part of the new extension," adds Clark, "which required replacement of all the old electronics, whereas we were able to tie into the existing infrastructure on the other stands. Commentary for the TV broadcasts is provided from the new control room."

In terms of speaker deployment, the new Family Stand has been equipped with four CDD10-WR, fixed to the leading edge of the roof, all angled down using standard flying yokes to tilt the angles accurately and ensure even coverage.

The 541-capacity Dover End stand now benefits from six CDD10-WR in a row along the front leading edge in two banks of three (one array angled out and the other reversed) to respectively cover the walkway in front of the stand and the supporters in the stand itself. Intended for visiting team fans, this seating can be addressed independently for advanced post-match evacuation purposes. The facing River Stand offers an identical loudspeaker spec.

The Main Stand is divided into two, bisected by the VIP box and press seating, which covers two levels. The former is equipped with four equally spaced CDD8-WR at either end — each block variously pointing in opposite directions, while another pair of CDD8-WR's operate under separate remote volume control for the VIP box, with two CDD6TX-WR covering the press seating. Finally, the Clubhouse has been equipped with four of the smaller CDD5TX-WR around the outside of the building.

Says Clark, "This is our first football stadium using CDD-WR and we have managed to deliver a fully integrated setup, The layout itself was straightforward, yet the vastness of the site — requiring 1.5 miles of armored cabling — proved challenging."

Clark added that the system was designed to be "bullet proof," yet with true integration implemented via intuitive custom control panels on a 10-inch tablet to control mutes, volumes, etc. — all linked to a fireman's mic for evacuation purposes. The entire system is driven by Powersoft amplifiers and controlled by Symetrix Solus NX DSP.

Crabble Athletic Ground
Capacity: 6,500
Key Components: Martin Audio CDD-WR, Powersoft amps, Symetrix Solus NX DSP
Integrator: Old Barn Audio
Designer: Old Barn Audio


The installation included 160 Community Professional loudspeakers.

Sonoma Raceway, Sonoma, CA


Part of the goal was to provide speakers with a minimal visual impact.

Formerly Sears Point Raceway (later Infineon Raceway, Sonoma Raceway is a 1.99-mile auto racing course and drag strip located at the foothills of the Sonoma Mountains, at the edge of the Napa/Sonoma wine country, about 30 miles north of San Francisco. Capacity is 47,000 in the grandstands and terraces, although that number can swell to more than 100,000 during major races, when hospitality tents and other stages are set up around the track.

The raceway offers one of the country's most comprehensive racing schedules, highlighted by three of the top racing series — the Monster Energy NASCAR Cup Series, NHRA Mello Yello Drag Racing Series and Verizon IndyCar Series, as well as other events, averaging 340 days per year. The 1,600-acre site also incorporates a motorsports industrial park of more than 70 businesses and 104 shops.

Recently, the Sonoma Raceway complex underwent complete refit of its P.A. system to enhance the experience for visitors to its year-round event schedule.

While the previous P.A. system served for most events, it lacked quality and intelligibility and could not provide the levels required for the largest events, which necessitated the hiring of large, obtrusive P.A. stacks. El Cerrito, CA-based Pacific Satellite Inc. — which provided the facility's sound design/build and A/V event management services for over two decades — was selected for the project.

Besides being familiar with Sonoma Raceway's needs, Pacific Satellite Inc. has designed sound systems for many motorsport racetracks, including Phoenix International Raceway and Auto Club Speedway, as well as for many private commercial enterprises. Additionally, Pacific Satellite Inc. is often the operator of the systems it builds.

"To deliver high quality and intelligibility over the roar of the engines and the cheers of several thousand fans takes a very special loudspeaker," says Pacific Satellite's Jerry Coté. Community's R.5 and R.35 loudspeakers are in a league of their own in just how well they achieve this, but they also have other advantages. Their compact size means we can position them closer to the audience, improving audio quality and sound level without spoiling sightlines. Having models with a variety of dispersion patterns really helps system design for optimum coverage and their reliability in all types of weather completes the package."

The refit of the P.A. system covered 14 major seating and paddock areas, along with 18 additional public and competitor audio zones. Some 160 Community R.5HPT, R.5HPT-R and R.35-3896 loudspeakers provide the coverage, with the system driven by a 32-channel Yamaha mixer and a BSS London BLU-100 control system with additional BLU-BOB and BLU-BIB units. Power is delivered by a mix of QSC ISA 800TI and CXD4.5 amplifiers. System software design for the BBS London was handled by Jeremy Yamaguchi of Eagle Multi-Media Productions. Community's TAG (Technical Applications Group) team assisted with soundfield assessment and verification of final designs.

"Sonoma Raceway now has an attractive, year-round, high-performance system that provides quality sound and high intelligibility and eliminates the need for expensive temporary rentals," adds Coté. "It not only offers fans a better experience but also delivers a better product to the worldwide television audience with improved sight lines and accessibility."

Sonoma Raceway
Capacity: 47,000 (grandstand and terrace viewing)
Key Components: Community R.5HPT, R.5HPT-R and R.35-3896 speakers
Integrator: Pacific Satellite Inc.
Designer: Pacific Satellite Inc.

Amsterdam ArenA
Amsterdam, The Netherlands


COURTESY LOOSBERG
Twelve-box hangs of d&b audiotechnik Y-series speakers ring the inside of arena.

The largest stadium in the country, Amsterdam ArenA opened in 1996. The multi-use facility features a retractable roof design with a large lawn surface. Seating capacity is 54,033 when it hosts games by the soccer club Ajax; 68,000 for in-the-round concerts; or 35,000 to 50,000 for end-stage concerts. As part of its ongoing upgrade, Amsterdam ArenA recently installed a new audio solution based on d&b audiotechnik's Y-Series speakers, MediaMatrix NION processing and d&b's 30D and 10D amplification.

Examining the project's needs, Amsterdam ArenA's production manager Tim Oosterop and head of technology Martin Wielaart, defined four main objectives, which included complying with UEFA/FIFA regulations for performance and intelligibility; adhering to national and international safety standards for evacuation systems; addressing the venue's acoustical problems; and enhancing the stadium's ability for non-sport events — especially concerts — with a recognized audio brand.

U.K.-based audio consultant Roland Hemming of RH Consulting, an advisor on the 2012 London Olympics, was brought in to ensure the system performance met the requirements of both international and Dutch regulations. "As far as the challenging acoustics of stadium venues are concerned," says Oosterop, "we wanted a system that allowed us to clearly show concert organizers, band managers and event promoters, that we made serious inroads into making it possible to achieve the highest quality sound."

Oosterop adds that d&b's ArrayProcessing software interfaces invisibly with the arena's existing MediaMatrix NION management system, which creates a simple, easily executed route to accommodating a variety of event formats, without compromising safety standards. "We can present acoustic models and predictive scenarios to those planning to bring shows here," he notes.

Flexible formatting was incorporated into the system design from the very start. "To switch to concert configuration, three of the line array clusters pivot," explains d&b's Stefan Goertz. "These turntable arrays operate on a simple principle. Mechanical pins are pulled by a rope from the catwalk. A second rope allows manually turning the array, and the spring-loaded pin clicks into a second slot to lock the array in concert orientation. It's a reliable manual process; with no need for complex electric motors linked to positional controls. At the end of the football season, the arrays can be quickly and easily repositioned."


The entire system is driven by d&b's D-Series amplifiers, linked via Dante to MediaMatrix NION processing.

Besides providing a vastly improved audio experience for the fans, the new d&b rig also provides massive savings in power consumption. "In order to comply with evacuation regulations, the old system had to be on 24/7, so if you hit the evacuation button the response of the system was immediate," says Oosterop. "The new d&b solution can be off when not in use. Now, at any time, if you hit the evacuation button, the system responds in half a second." Additionally, the new system includes default control presets created by Ampco/Flashlight (the arena's audio service provider), which triggers the evacuation system to move people out zone by zone.

Amsterdam ArenA
Capacity: 35K to 68K, depending on configuration
Key Components: d&b audiotechnik Y-Series, MediaMatrix NION
Designer: Roland Hemming, RH Consulting