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AV FOR SYSTEMS INTEGRATORS, CONTRACTORS AND CONSULTANTS

HD STADIUM

CONVERGED NETWORK ENABLES NEW MEADOWLANDS TO HOST GIANTS, JETS.

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NEW ORLEANS' CHAMPIONS SQUARE HELPS THE SAINTS SHINE.

GETTING THE LEAD OUT

EPA RULES MAY AFFECT COMMERCIAL AV INSTALLATIONS.

EXCLUSIVE INTERVIEW: New Meadowlands Stadium CTO Peter Brickman

HD STADIUM

Converged network enables New Meadowlands to host Giants, Jets.

BY SHONAN NORONHA, EdD

The New Meadowlands Stadium is the first in the United States built to serve as the home field for two National Football League teams. Every aspect of the 82,000-seat facility located in East Rutherford NJ, from signage to HDTV production and merchandise in the store, must be rapidly reconfigurable to serve the unique needs of the New York Jets and the New York Giants.

Agile, Converged System

To enable these two teams and their legions of fans to "take over" the 2.2 million-square-foot, $1.6 billion facility on alternate game days, the technology teams had to create a new kind of agile, converged system to support digital signage, video, voice, data, WiFi, lighting, point-of-sale, ticketing, security and building management systems. Basically, every function within the facility goes through the same IP network. The design vision was to provide visual unification for the stadium, a clear presence for both NFL teams and corporate sponsors, and an unforgettable experience for the fans.

Heavy hitters such as Verizon, Cisco, Sony and Daktronics worked with owners' representative Robert Jordan, design consultant WJHW (www.wjhw.com), and systems integrators Diversified Systems (www.divsystems.com), Pro Media/UltraSound (www.promediausa.com) and BN Systems (www.bnsystems.com) to build an AV/IT network that was big and powerful, yet flexible enough to meet the distinctive requirements of two quite different NFL teams.

Creating Fan Experiences

The goal was to provide sports entertainment that would compete with even the best television viewing experience, and be so compelling that fans would want to be present at the game.

The excitement builds up even as one approaches the stadium. Outside the bowl, 20 Daktronics LED boards, mounted on pylons (referred to as "digital pylons"), display game videos, stats, advertising and other eye-catching content. Throughout the stadium, there is more than 47,000 square feet of digital display technology, including giant LED scoreboards from Daktronics and 2200 HDTVs from Sony—enough to provide an awesome experience for visitors to any event.

"We wanted to make the real-time game viewable from everywhere and on any screen in the arena, as well as provide game stats and other information to enrich the fans' experience," said Peter Brickman, CTO, New Meadowlands Stadium. "By building a single IP network, we are able to create custom content and deliver it to any screen in the stadium, through roughly 10,000 IP ports. We can send a custom message to a single screen, or to several in different areas within the facility." **[Editor's Note:** To read the author's full interview with Peter Brickman, go to "Industry POV: Converged Network Earns Cheers" on page 44.]

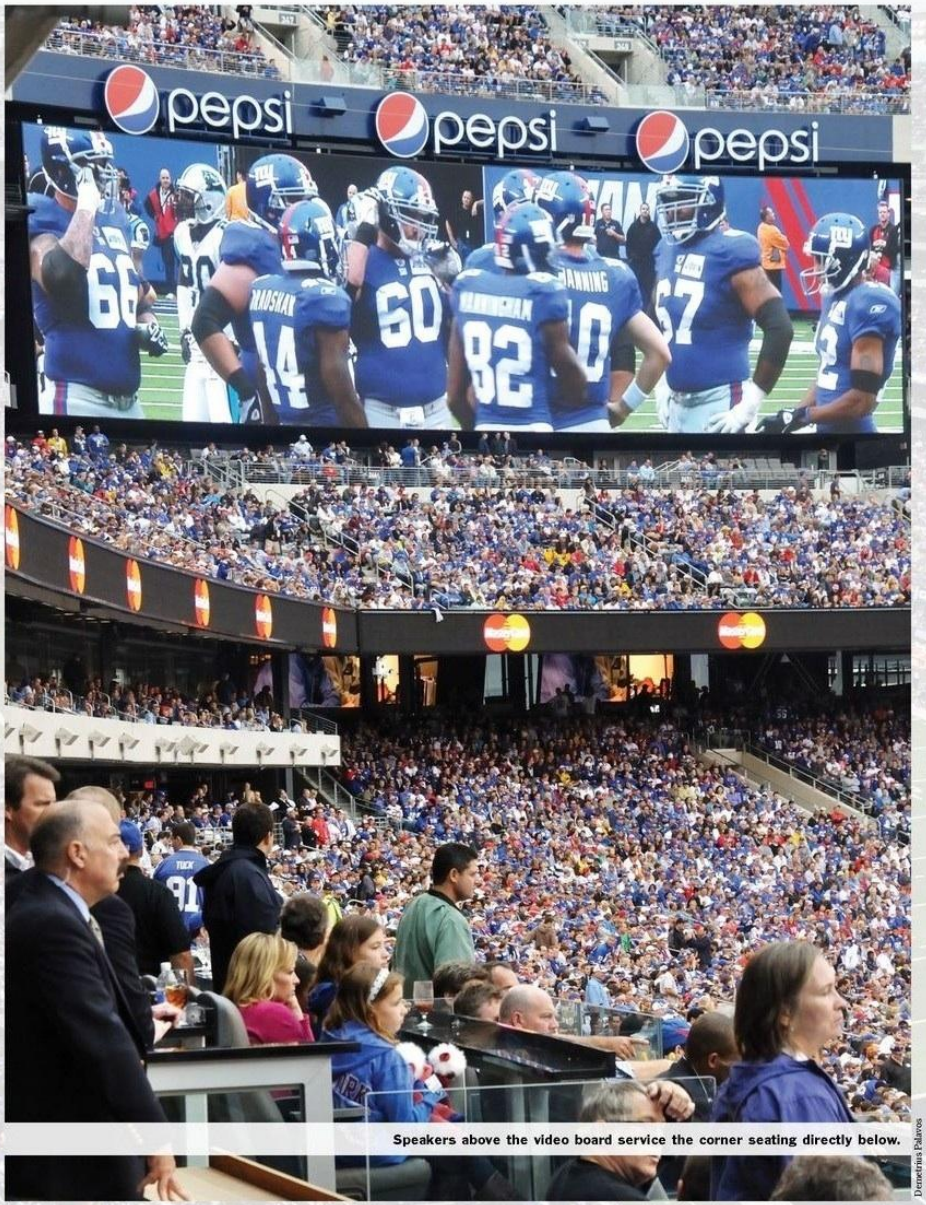
"The teams have made video a central part of the fan experience," said Stephen Stubelt, Director, Sony Electronics Systems Solutions Group. "Having made a substantial investment in display technology, the stadium also invested in a state-of-the-art video control room system, or 'Replay Room' as it is referred to, for HD video capture, production and distribution. The HD Replay Room can produce two simultaneous HD shows during each event. There are 34 channels of IPTV passing through the control room. The Replay Room is actually a master control room." Sony served as video prime contractor for the design/build of the Replay Room.

Digital Signage

About $40 million of the nearly $100 million technology investment was spent on the LED displays. Daktronics supplied and installed all of the LED screens. "Due to the large quantity of LED displays and the many different uses for each, we developed new video processors and front-end control software," said Tom Kreutner, lead Project Manager, Daktronics. "These control solution improvements helped achieve the final amazing look."

Four giant scoreboards, each about 118 feet wide by 30 feet high, anchor the main bowl, and deliver high-resolution HD video (2880 columns by 720 lines of resolution) with split-screen and picture-in-picture capabilities for stats, graphics, sponsor recognition and other content.

Contributing Editor Shonan Noronha, EdD, author of Sound & Communications' *monthly "Sign Age," is an award-winning writer/producer. She has designed and produced networked multimedia content for a broad spectrum of clients from Wall Street to Fleet Street, and consults on the applications of new media technologies for training, marketing and corporate communications. In addition, Noronha is Editor of* Sound & Communications' *twice-annual* IT/AV Report. *Send comments, questions and suggestions to her at snoronha@testa.com.*



Speakers above the video board service the corner seating directly below.

Demetrius Palavos

The fan experience is influenced by AV even before entering the new venue. Twenty LED boards, mounted on "digital pylons" outside the bowl, display game videos, stats, advertising and other eye-catching content.

Daktronics

"Given the aspect ratio of the super-sized LED displays in the main bowl, a decision was made to break up the content displayed on the screen and therefore to produce two shows, namely the 'A Show' and 'the B Show,' simultaneously during the game," explained Sony's Stubelt.

In addition to the scoreboards, the main bowl features ribbon LED displays at the base of the second seating level, which run about 1800 feet wide and four feet high. Outside the stadium, the 20 digital pylons are mounted back-to-back and display the 'A Show' and 'B Show.'

The 2200-plus Sony Bravia HD LCD TVs, ranging in size from 32 inches to 65 inches, are installed all across the stadium, at locations ranging from concession areas to the more than 200 luxury suites.

"Cisco digital media players (DMPs) are mounted to the back of the Sony displays," explained Fred D'Alessandro, President, Diversified Systems. Diversified was the engineering design/integration subcontractor to Sony on the Replay Room and to Verizon on the IPTV network.

Cisco StadiumVision is used for content management and distribution. "Cisco's 4310 DMPs are enabled for streaming and store-and-forward," noted D'Alessandro.

"Content through the channels is streamed. During Jets games, the media players are also used to push out recorded video, which is displayed in a zone, while the main portion of the screen shows the game."

User Control System

Several technologies were deployed to make a dual-team-owned stadium possible, and to create an immersive fan experience. Crestron touchpanels are used to control the audio, video and lighting in the clubs. Crestron systems are also integrated with the Cisco StadiumVision to control the TV monitors in the clubs.

"The Crestron system includes building management integration," said Ted Leamy, COO, Pro Media/UltraSound. Pro Media responded to the RFP from Skanska, the general contractor, and was awarded the audio integration contract.

"The Crestron BMS server allows for global presets to be received from the Square D control systems to access predefined settings in the preset menu in clubs and digital pylons at the gate entrances. For example, using the Crestron presets, it is easy to switch to green lighting for Jets games, blue lighting for Giants games and to preselect the appropriate home radio and TV network for each team."

The more than 47,000 square feet of digital display technology throughout the venue includes giant LED scoreboards.

Daktronics

Wired And Wireless

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Vidblox 3G-SL shown
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Sony

Video plays an important role in all major public venues in today's world. The New Meadowlands Stadium is no exception. For example, there are more than 2200 32- to 65-inch HD LCD displays throughout the facility. These can be seen in the Coaches Club, Commissioners Club, Mezzanine Club and various suites.

Sony

Sony

Sony

multidisciplinary engineers at integration companies and manufacturers.

The ADC wireless system provides the capacity and coverage for fans to download and use smartphone applications to make their stadium entertainment more enjoyable. For example, fans attending a game can identify concession stands with the shortest lines and access other useful information, or use the RedZone Alert app to catch every exciting game moment.

However, not every data connection in the stadium was unplugged. "Our team of approximately 100 people installed about 250,000 feet of multimode and single-mode fiberoptic cable," said Mark Rewers, Vice President of Operations, BN Systems. In addition, nearly 2.5 million feet of Cat6a twisted-pair cable, including about 8600 drop cables, and nearly 100,000 feet of Cat3 and Cat5e cable for voice connectivity are connected through 60 telecom closets and one master facility." CobraNet is also used to deliver low-latency multichannel digital audio throughout the facility.

Winning Production Capabilities

High-level sports video demands the best image capture capabilities, and design consultant WJHW worked with Sony and Diversified to assure that the best technology was available for both NFL teams in the video replay room.

Sports video has evolved into a unique and complex production and distribution environment. "What we build now is a hybrid of video production control room and multichannel master control broadcast studio," explained D'Alessandro.

At New Meadowlands, video capture and production are driven by Sony gear, including four Sony HDC1400R studio cameras with Canon lenses, two Sony PDW700 XDCAM HD professional disc camcorders, a Sony MVS8000G multi-format production switcher, two Sony PDWF1600 XDCAM HD professional disc recorders and four Sony FWDS47H1 professional dis-

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Demetrius Palavos

Speakers cover the shaded club seat areas in the lower field level.

Key Design-Build Team

Stadium
Robert D. Jordan, CFE, VP Design and Construction
Peter Brickman, CTO
General Contractor: Skanska USA
Design-Build Architect: Ewing Cole
Building Architect: 360 Architects
Interior Architect: Rockwell Group
Lighting Contractor: Focus Lighting

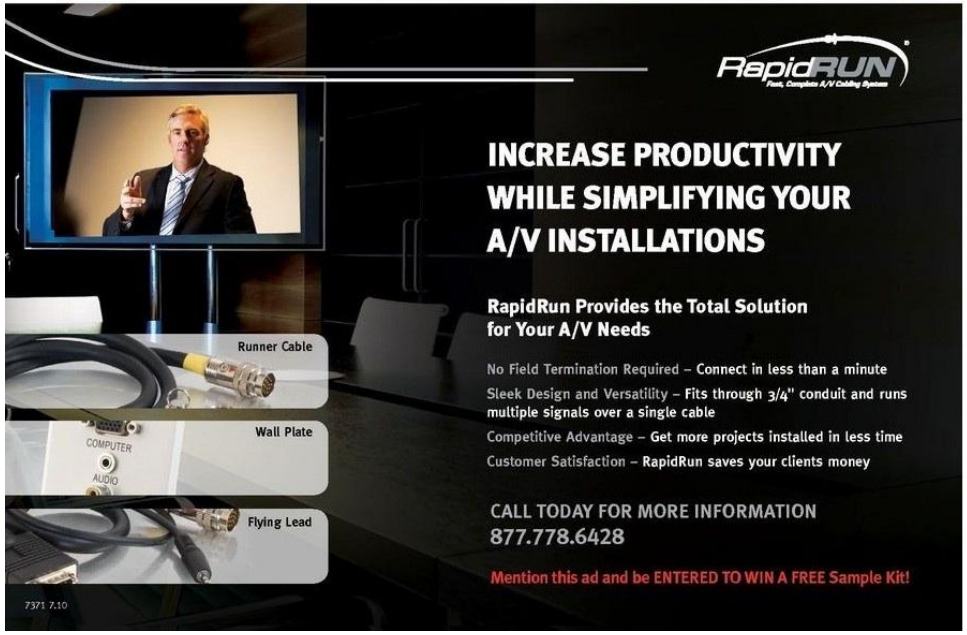
Design Consultants
AV, IPTV, CCTV: WJHW
Building Automation Systems (BAS): Siemens, GE, Lutron
Distributed Antenna System (DAS): Peter Filatov

Prime Contractors
IPTV: Verizon
LED Scoreboards: Daktronics
Replay Room: Sony Electronics

Subcontractors
Audio Systems: Pro Media/UltraSound
BAS: Siemens, GE, Lutron
CCTV/Access Control: KTFM
IPTV sub to Verizon: Diversified Systems
Replay Room sub to Sony: Diversified Systems

Installers
Cabling for Internet, Telephone, IPTV, Access Control, CCTV (fiber, Cat6a), CCTV: AT&T/BN Systems
Cabling for national broadcasts: Bexel, CBS,
Cabling for local broadcasts and in-house AV: Pro Media/UltraSound
CCTV/Access Control: Johnson Controls
DAS system: Nead Electric
Daktronics displays: Daktronics
Electrical contractors: Scholes Electric, Travis Electric, Mehl Electric,
Decker Electric, Star-Lo Electric and others
Sony LCD displays: Advantage, Diversified
Wireless equipment: ADC

The Flagship Store Powered by Reebok
Developer/Operator: Delaware North Companies
Retail Design Architect: Chute Gerdeman
General Contractor: Shawmut Design and Construction
AV Design Consultant: X-nth
AV Integrator: Technomedia Solutions
Virtual Game Developer: EyeClick



plays configured as a monitor wall in the control room.

Other major components in the video replay room include a graphics system from Harris, audio mixing system from Yamaha, Riedel intercom system, and servers from CrossFire, EVS and 360 Systems.

Graphics production and playout capability is another area of rapid evolution and growth in sports video. "Two channels of graphics is typical at stadiums, and the demand for four channels is increasing rapidly," noted D'Alessandro. "New Meadowlands has six channels of graphics, and that's unique."

New Meadowlands uses the Harris Inscriber G7, which delivers real-time HD graphics for playout simultaneously over two channels. The system is capable of integrating the functionality of multiple broadcast-level graphics products for high-performance HD/SD live-to-air.

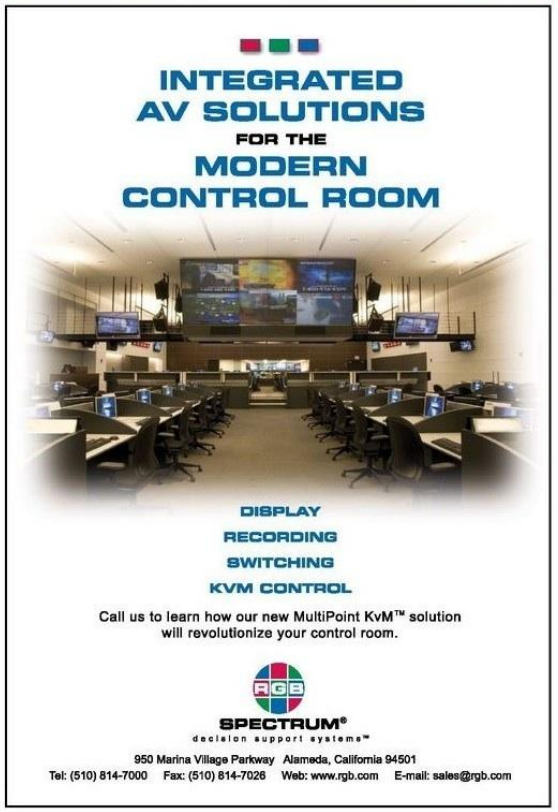
Another highlight of the system is the integration of multiple types of servers with a wide range of functions. Diversified reported that it installed two EVS six-channel units, each configured with four inputs and two outputs, enabling the recording of eight feeds with four channels of playout. "The 360 Systems MAXX 2400HD four-channel device is used to play longer-format clips to the IPTV system and also has the ability to create and run playlists per channel that are used for feeding the pylon displays," noted Tom Sullivan, Senior Engineer, Diversified. "The two-channel Crossfire HD unit is used to feed wipes and transitions to the production switcher, as well as 'pump up the crowd' clips, such as 'DEFENSE' and the like."

One Facility, Two Crews

Production and workflow in the control room have to serve both teams' different needs on their game days, and had to be easily switchable from one setup to the other. System designers at WJHW and the integration team at Diversified Systems collaborated on engineering the system details to assure that there was enough flexibility to enable a rapid and easy changeover

The digital console and digital snake system allow for a lot of flexibility in personalizing sources, sends and settings for the Giants and the Jets, as well as different types of productions and events within the space. Presets can range from level and EQ, to source routing and seating section mute states.

Demetrius Palavos



Equipment

AV Systems

1 Canon HJ22ex7.6B IRSE lens
2 Canon HJ40x14B IASD-V/SS portable super telephoto lenses
1 Crestron joystick control panel
1 Crestron Pro2 dual-bus control system
1 Harris 64PD4228 64-port RS422 data port routing switcher, 8RU Integrator
2 Harris 64X-DIO232 Integrator RS232 data input/output boards
1 Harris CEN-GPIO24E CENTRIO 24x24 GPIO w/Ethernet
7 Harris CEN-OUT-MV Centrio output modules; 2 x DVI or 4 x HD-SDI outputs
1 Harris EDGE router-web
4 Harris FR6800+MB 6800+ mix-box frames, 2 slots
1 Harris GPS3903 GPS receiver, antenna
1 Harris INT-LOGIC redundant logic board for Integrator frames
1 Harris MTG-3901-SYS-3E master timing generator system
7 Harris NUCLEUS-RTR 2RU network control panels
1 Harris OBS+OP+5050D 50/50 optical power splitter
5 Harris OXS+OP+S SD fiber receivers
2 Harris PT-128X256-X28 Platinum 128x256 3Gb/s crosspoints for 28RU
8 Harris PT-AECT-IB Platinum, MX 16 unbalanced AES input modules
8 Harris PT-AECT-OB Platinum 16 unbalanced AES output modules
1 Harris PT-ATDM64-X28 Platinum, MX ATDM crosspoint for 64 slots audio in 28RU
1 Harris PT-FR-28 Platinum 28RU frame assembly
2 Harris PT-FR-EXPS frame assemblies
16 Harris PT-HS-IB+ Platinum 8 HD-SDI input modules
16 Harris PT-HSR-OBG+ Platinum 8 HD-SDIs
1 Harris PT-RES Platinum, MX resource controller module
1 Harris RCP-32X1P 32x1 remote programmable panel
2 Harris RCP-32X32P 32x32 remote programmable panels
9 Harris RCP-ABA1E-XYP Ethernet remote control panels
1 Harris RCP-GPI32P programmable contact closure interface, 1RU, 32 inputs/outputs
1 Harris TSG-3901-SYS NEO modular test signal generator, redundant card set w/ACO
2 Harris TVM-9100PKG waveform monitor/vectorscopes
3 Harris TVM-A3-OPT2 audio options
1 Harris VTM-4100PIG waveform monitor/vectorscope
6 Harris XOS+OP+13S SD fiber transmitters
2 Harris XOS+OPT+SDHD SD to 1.5Gbps HD software upgrades for transmitter modules
5 Marshall Electronics R171-IMD-HDSDI rackmount monitors
2 Marshall Electronics V-R1042DP-AFHD DUAL 10" (CPXM7)color video monitors
8 Marshall Electronics V-R1042-IMD-TE4U dual 10.4" 1024 x RGB x 768 HD/SD monitor sets
1 Marshall Electronics V-R18P-SDI rackmount monitor
6 Marshall Electronics V-R842DP-AFHD dual 8.4" HD/SD monitor sets
1 Sony BKM30E14 14" standalone rackmount kit
1 Sony BKM62HS multi-SDI (HD/SD) board, BVM-A series
12 Sony BKMFW16 HDSDI adapters
2200+ Sony Bravia 32"-65" HD LCD displays
1 Sony BVMA14F5U 14" multi-format CRT monitor
3 Sony ECM674/9X shotgun mics
12 Sony FWDS47H1 47" pro LCD displays
4 Sony HDC1400R HD studio cameras w/enhanced Imager
1 Sony HDWM2000/20 HDCAM studio recorder.
3 Sony LMD-2050WHD LCD monitor kits
1 Sony MVE8000A multi-format MVE frame
1 Sony MVS8000G multi-format switcher processor
2 Sony PDW700 pro disc camcorders
2 Sony PDWF1600 pro disc recorders
1 Sony RMM131//A FEC 4RU rackslide kit MSW/HDW/DVW VTR
5 Telecast BS 5422 base station receivers
5 Telecast CA 5442 fiberoptic transmitters
7 TV Logic LVM-071W 17" monitors w/rackmount kit
2 Vitec CP2 CamPac wireless HD camera packages
2 Vitec DR2-HD Package NewsCaster diversity receivers

Character Generators, Image Servers

3 Harris INSG7-PROMO systems w/second channel

Slow Motion

2 EVS MLT-F Multicam LSMs (Fixed Configuration)
2 EVS XNGE2 slow motion disc recorder/players
2 EVS XT2H-7U-666-300 6-channel XT[2] HD broadcast servers
2 EVS XT2H-6-A3 broadcast servers

Clips Workstation

1 EVS IPDENG IP Engine IP Director Database
1 EVS IPLOG IP Logger Intuitive user interface
1 EVS IPDACC IP Access IP Director Database Explorer, Channel Explorer, Recorder Panel
1 EVS IPDPL IP Production Playlist Create
1 EVS IPDWS1 IP Director 1RU Workstation
1 EVS IPDRMT IP Director remote control panel

Server System Configuration

1 360 Systems MAXX-2400HD SD/HD shared storage baseband video server
1 360 Systems 1-TB DRIVE-2400 Backup 1TB MediaDrive, drive shuttle
1 360 Systems DXP-1 codec
1 Ward Beck IMP20A Series high-density rackmount impedance converter panel

Configuration, Control Software

1 Harris NAVIGATOR-SRV control software
50 Harris DA-DH6802+D dual 1x4 or single 1x8 distribution amps
8 Harris VDA6800+D 1x8 analog video distribution amps
23 Harris X50-AV-2PS 1RU frame sync, converter, processors w/audio processing
2 Harris DAV6800+D SDI to analog component video converters
1 Harris HDC6800+AD utility quality HDTV downconverter
2 Harris ADV6800+D component analog to digital converters, SD-SDI output
11 Harris ADC6800+A4BCD audio analog to digital converters
15 Harris DAC6800+BCA4D 2-input AES (balanced or coaxial) to 4-channel analog audio converters
3 Harris VDA6800+D 1x8 analog video distribution amps
5 Harris HDC6800+AD utility quality HDTV downconverters
1 Harris X50-AV-2PS 1RU frame sync, converter, processor w/audio processing

Time Code Distribution Amp

6 Harris ARG6800+D remote gain, signal activity analog audio DAs

Audio Distribution Amp, Interface

1 Harris arg6800+s remote gain, signal activity analog audio DA
2 Harris ARG6800+S remote gain, signal activity analog audio DAs

Audio Mixer

1 Yamaha DM100V2 mixer
1 Yamaha MY16AE-CA 16-channel AES/EBU I/O card
1 Yamaha MB1000 DM1000 meter bridge
1 Yamaha MY16-CII 16-channel CobraNet network I/O card

Intercom

8 HME BP850 dual-channel wireless intercom belt packs
3 HME PRO850 2-channel system wireless intercom base stations
1 Riedel Director Configuration Software for Artist
6 Riedel AIO-108 G2 transformer balanced analog interfaces
36 Riedel Air E1/XLR4F headsets
4 Riedel CAT5-108 G2 Matrix client cards
4 Riedel CPU-128F G2 Artist Node controllers, fiber
2 Riedel Artist 64 matrix mainframes
9 Riedel RCP-1012E/O 1000 Series 12-key LED rackmount control panels
6 Riedel RCP-1028E/O 1000 Series 28-key LED rackmount control panels
1 Riedel RIFace G2 universal radio interface

(continued on page 62)

from Jets' to Giants' preferred setup and workflow.

"The Giants and the Jets do approach video capture, production and distribution differently," said D'Alessandro. "For instance, where one might be using a particular server just to roll out long-form content to a channel, the other will use the same server in a playlist mode to deliver signage. The production crews of the teams use the devices differently."

The audio integrator echoed the same sound idea. "The design and integration for two NFL teams required attention to detail for separate production crews, making automation and presets critical," said Leamy, whose team installed and integrated the audio components and managed the cabling for local broadcasts and in-house AV. "The digital console and Optocore digital snake system allow for a personalization of sources, sends and settings for both the Giants and the Jets, as well as different types of productions and events within the space."

Presets can also be created for the audio DSP system and amplifier control system parameters, allowing for exceptional flexibility and enhanced functionality of the building. These presets can range from level and EQ, to source routing and seating section mute states.

Distributed Audio

Attention to audio at the new stadium is laudable. Design consultant WJHW had its top audio associate draw up the design and specifications for a distributed system, and Pro Media/UltraSound had its project manager stationed in the area for more than two years.

The distributed audio system required each loudspeaker (there are more than 1000) to be wired and connected to the main network separately.

The audio system is designed around JBL Precision Directivity (model PD5322/64) high-output three-way loudspeakers. "There's a ring of 48 speakers in the upper deck and another ring of 30 of this speaker type with a JBL woofer serving the lower deck," noted Leamy. "Custom JBL woofer enclosures are located at the ends of the aisles and are removable for events, such as concerts, when access to the field is needed using portable stairs." In addition, JBL AM and AC models are used for fill speakers.

Discussing the new open-air stadium, Leamy noted, "All the JBL loudspeakers are weatherized to 'WRX,' the company's highest standard." The Community R.5 speakers, located in the open concession areas, are weather resistant for outdoor applications.

The audio system also features 462 Crown CTs amplifiers, a Digidesign SC48 mixing console, Harman System Architect, Optocore routing system, 24 MediaMatrix NION digital signal processors and wireless system components from Shure and Sennheiser.

Comfortable Listening

As mentioned, more than a thousand JBL loudspeakers are installed in the main bowl, and an additional 600 ceiling speakers from Atlas, JBL and Tannoy are tucked away in clubs, corridors and other ancillary areas.

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Bradford Bean

More than 1000 speakers make up the audio reinforcement system in the stadium.

"The biggest challenge with the audio system design was the ratios between the nearest seat and the distance to the furthest seat a loudspeaker was intended to cover," noted Mark Graham, WJHW's associate who designed the audio system."Due to the building geometry, the nearest seat may be as close as 20 feet, while the furthest listener may be 150 feet away. Therefore, we chose product with high directivity in the mid and high frequencies and used an additional low-frequency cabinet to steer the low frequency forward, creating a null below the loudspeaker to provide more even sound coverage."

Graham believes that the concept works extremely well, and provides an additional 6dB of low frequency without increasing the volume of the low frequency at the near seats. Additional portable low-frequency cabinets were mounted in the field wall where the stairs would be located for a concert event, "to add some punch or warmth to the seating nearest to the field during football games," explained Graham. "This allows us to better control the low-frequency level of the speaker covering this area from 150 feet away." The low head height between some areas of the decks resulted in the use of hundreds of small-format, closely spaced loudspeakers to provide sound coverage for many premium seating areas throughout the building.

Sound Practices

The stadium architecture made systems integration a challenge. For example, the available loudspeaker mounting positions did not allow for optimum angles. "Architectural design concerns dictated the positioning of loudspeakers throughout the bowl, rather than optimal placement for coverage and impact," explained Jim Kinkella, Project Engineer, Pro Media/UltraSound. "This condition necessitated a careful integration of different types of devices and components, as well as requiring a lengthy and detailed optimization process." However, great care was taken to achieve maximum consistency throughout the seating area while minimizing negative effects of any less-than-optimal mounting locations.

With regard to audio system control functions, Kinkella noted that all loudspeakers can be controlled from the audio control room and monitored utilizing MediaMatrix NION and Harman System Architect. "On game day, all audio sources and levels are controlled from the main audio control room," Kinkella said. "The NION DSP is used for source select and message repeater functions. User EQ is achieved via the output of the Digidesign SC48 mixing console located in main audio control."

Additionally, each of the four main clubs can act as a standalone facility with local AV sources or can be combined on game day to have content controlled from the main audio control room, and eight separate sponsor zone areas use the same NION, Harman System Architect and Crestron networks.

Mark Steele Photography

Digital signage and AV technology in "The Flagship Store Powered by Reebok" includes an Elliptical Display consisting of 12 42-inch LCD displays configured in an oval pattern, hanging from the ceiling.

An Optocore system routes audio from the field to the audio control room, video replay room and broadcast dock. The Optocore system also allows the Digidesign SC48 mixing console to be located at secondary outdoor locations at the camera platforms, allowing the operator to be more involved in the audience experience.

"Digidesign's SC48 is built using a tour sound design that enables this move to occur when desired," ex-

plained Kinkella. The Optocore system allows the operator to be located at eight different positions around the stadium. "In addition to the primary operating position in the press suite area, the console can be located in the seating area mid-bowl at a camera platform, as well as six different positions around the field, including end zone and field tunnel positions."

The Flagship Store

Dubbed "The Flagship Store Powered by Reebok," the stadium's key retail venue uses AV technology to the hilt. New Meadowlands Stadium contracted with Delaware North Companies to develop and operate the property, and retail design architect Chute Gerdeman designed the store. Digital signage and all AV for the store was designed by X-nth (www.x-nth.com), and Technomedia Solutions (www.gotechnomedia.com) engineered and integrated the media technologies.

Like other areas of the facility, the store can morph from Gang Green to Big Blue. If the Giants are playing, mirrors and clothing walls at the flagship store can be flipped, revealing their blue and red memorabilia and then flipped back to see the Jets' green and white merchandise for the next game.

The digital signage and AV technology in the store include four separate areas:

- An Elliptical Display consisting of 12 Sony 42-inch LCD displays, configured in an oval pattern, hangs from the ceiling.
- A videowall with 15 Sony 42-inch LCD displays is located at one end of the cash registers.
- Sony PlayStation3 consoles are matched with four Sony 47-inch LCD displays.
- InteractiveFocal, a virtual football field and interactive game, is projected on the floor.

Cisco DMPs are installed on each of the 12 Sony LCDs in the Eliptical Display. For the videowall, the 15 Sony LCDs are positioned in a 3x5 configuration; the video source is served up by one Cisco DMP and then distributed through an HDMI distribution amplifier from Aurora Multimedia to 15 Aurora DIDO LT scalers/processors, one for each respective display. "Aurora's proprietary software assigns each player with its coordinate," explained Peter Levens, Project Manager, Technomedia Solutions.

One of the installation challenges in the Flagship Store was staging and supporting the 15-display videowall in a minimal amount of space. "Installation required precise coordination with the millworkers," noted Levens. "In addition, our site Supervisor/Engineer Blaine Taylor designed a custom aluminum mount to hold the displays within tight coordinates and simultaneously maintain the structural integrity required within the facility." He said that the mount not only worked for the limited space, but also helped in streamlining installation. "We were able to have the videowall installed by only two men in less than two days."

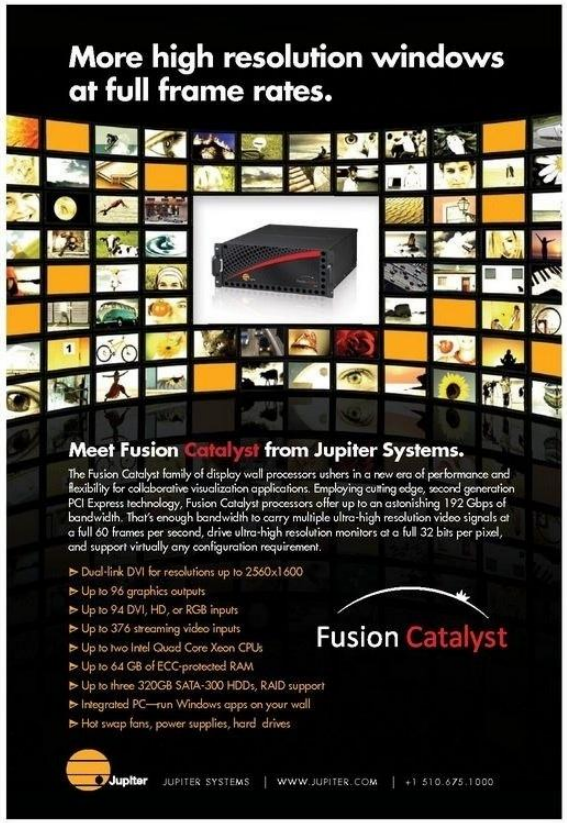
Engaging Games

Interesting games at the InteractiveFocal and Sony PlayStation3 consoles are designed to engage shoppers while in the store. EyeClick developed a projected virtual football field with interactive game. The proprietary Windows-based program is designed to work for both teams' fans. "The virtual football game reflects the overall vision and design of the stadium," noted Ariel Almos, CEO, EyeClick. "The projected field has the versatility to showcase each team's name in opposite end zones or one team's name in both end zones."

Four video sources are processed with TV One edge-blending technology in order to create the illusion of a single image of a football field. The video images are sent over Cat5e using Magenta Research baluns. The video is displayed locally with four 6000-lumen BenQ projectors, which are mounted vertically about 14 feet above the finished floor and aimed toward the floor in a quadrant pattern. A camera is staged locally to track the movements and positions of the users. The users kick an "active" piece of content (a football). The objective is to get the ball into their competitor's end zone, resulting in an audio/video trigger

Games at the InteractiveFocal consoles in "The Flagship Store Powered by Reebok" engage shoppers while in the store.

Mark Steele Photography



(continued from page 56)

1 Riedel VoP-108 G2 w/SIP license software
1 RTS SAP612 source assignment panel
1 Studio Technologies Model 46 intercom interface
22 Telex PH-100 intercom headsets
4 Telex PH-200 headsets

Furniture Console
1 TBC Consoles FP-7500 flat-panel display arm

Patch Panels, Cables Control Wiring
ADC, Belden, CommScope, Gepco, Gilbert Engineering

Portable SDI Generator, Monitor
1 Harris HD Star portable SDI generator, monitor

Wireless Camera System
2 ADC RMG-1000-000B 1RU panels
4 ADC RMG-12ADPQ5 12-fiber coupler panel, LC, SM
2 ADC FST-DV-HS heat-shrink fusion splice trays
1 BTX YV-FOSIST150 single-mode fiber cable
1 Harris PT-MUX-3G Platinum and MX MUX daughter board
1 IDX CW-5HD Cam-Wave HD wireless transmission system
2 IDX P-V2C-IA V-mount female plates
6 Leibert GXT3-2000RT120 UPS, 2000VA
1 Nucomm DR2-HD package Newscaster Diversity receiver
2 Nucomm 70DR2-BDC-03A 5.8-7.75 GHz BDC
2 Nucomm SCR640-12 compact sector antennas
2 Sony BRC-H700 HD 3CCD robotic cameras
2 Sony HFBKHD1 HD SDI output boards

Free Charge Equipment
1 Harris OP+AVR+2+D fiberoptic receiver
1 Harris OP+AVT+2 fiberoptic transmitter
2 Harris FR6800+MB mix box frames

Broadcast System Accessories
ATI SYSTEM10000 W/MIDA100-1 audio distro amp
Evertz 7700FR-C rack frames
Evertz 7705DS fiber splitter
Evertz 7707 ADVR-HD fiber receiver
Evertz 7707ADVT-HD fiber transmitter
Evertz 7707EO-3-HD HDTV fiber transmitter
Evertz 7707OE-3-HD HDTV fiber receiver
Jensen PI-2XX audio XFMR
Ross DFR 8110A-C SDI distro amp frame
Ross DFR 8310-C-BNC SDI distro
Ross SEA-8203 SDI distro
Ross VEA8007 w/VRC7000 SDI distro

List is edited from information supplied by Sony Electronics.

Displays
4 Daktronics HD-12 118'x30' LED video displays
12 Daktronics HD-12 20'x38' LED video displays
4 Daktronics HD-12 20'x48' LED video displays
4 Daktronics HD-12 20'x54' LED video displays
1 Daktronics PS-23 133'x4' LED
1 Daktronics PS-23 48'x4' LED
1 Daktronics PS-23 1810'x4' LED ribbon display
4 Daktronics PS-23 32'x18' LED ribbon displays
3 Daktronics PS-23 4'x3' play/DOG clocks
37 Daktronics AE-3010 2'x1' LED displays
18 Daktronics TI-2013-15 1'6"x8.5" clocks

List is edited from information supplied by Daktronics.

Audio
8 APC AR3100 gate/pylon equipment enclosures
1 Apogee Rosetta 800 AD/DA converter AD/DA-8
1 ATI System 10000 modular DA
374 Atlas FAP42T restroom speakers
14 Atlas FAP62T ceiling pendant speakers
429 Atlas FAP62T ceiling speakers
136 Atlas FAP62T press speakers
8 Atlas SM42T elevator speakers
AVP audio patch panel, accessories
1 Click Effects ProAudio digital playback
130 Community R.5-99TX 2-way, full-range concession speakers
12 Crown CTs 1200 LITE amps
40 Crown CTs 1200 USP3/CN amps
122 Crown CTs 2000 LITE amps
274 Crown CTs 2000 USP3/CN amps
4 Crown CTs 3000 LITE amps
8 Crown CTs 4200-IQ amps
4 Crown CTs 600 LITE amps
1 Digidesign VENUE SC48 console w/22" screen/trackball/kbd/portable case
1 Dorrough 280-D digital level meter
1 Gator GRR-4PL-US portable ALS transmitter kit
5 GE Fiber Options 515R1 Enc w/psu fiber transmitters
4 GE Fiber Options B7722AR-RST fiber receivers
4 GE Fiber Options B7722AT-RST fiber transmitters
4 IDEC PSR5-C12 assistive-listening transmitters
160 JBL AC16-70/60W-WRX club level speakers
60 JBL AC16-70-WRX gate canopy speakers
20 JBL AC16-WRX plaza pole speakers
66 JBL AC18/26-h-70/100W-WRX ticket booth, lower level speakers
230 JBL AC18/26-H-WRX speakers
73 JBL AC18/95-h-70/100W-WRX speakers
66 JBL AC28/95-H-WRX lower level speakers
30 JBL AL6115-WRX cancellation woofers
124 JBL AM6212/64-H-WRX speakers
24 JBL AM6212/95 plaza speakers
200 JBL AM6212/95-H-WRX speakers
93 JBL AM6212/95-WRX speakers
73 JBL Control 19CST ceiling sub
558 JBL Control 226C/T ceiling speakers
79 JBL Control 322CT ceiling speakers
78 JBL Control 328CT ceiling speakers
8 JBL Eon 510 portable speakers
2 JBL LSR2325P monitor speakers
36 JBL ML6134-WRX field wall woofers
78 JBL PD5322/64-H-WRX speakers
2 JBL VT4882DP-AN portable line array subwoofer modules
6 JBL VT4888DP-AN portable line array modules
2 JBL VT4888-SF array stacking frames
2 Lectrosonics IFB R1a synthesized UHF belt-pack receivers
2 Lectrosonics IFBT4 wireless mic, DSP matrix mixers
2 Lectrosonics R400A digital hybrid wireless diversity receivers
1 Listen LA-107 ALS bowl antenna
3 Listen LA-122 ALS ceiling antennas
1 Listen LA-126 portable ALS transmitter kit
32 Listen LA-164 ALS headsets
8 Listen LA-165 ALS headsets
8 Listen LA-166 ALS headsets
4 Listen LA-326 assistive-listening transmitters
1 Listen LA-326 portable ALS transmitter kit
42 Listen LA-362 ALS receivers
32 Listen LR-400-216 ALS receivers
4 Listen LT-800-216 assistive-listening transmitters
1 Listen LT-800-216 portable ALS transmitter kit
1 Lucid Genx192 Master Clock digital word clock
24 MediaMatrix NION n3 DSPs
3 Middle Atlantic BL-1 portable ALS transmitter kits
1 Opamp Labs A-24/2ML portable press feed
5 Optocore DD32e digital fiber I/Os
2 Optocore DD6NE Ethernet module interfaces

Bradford Benn

1 Optocore LX4AP stage rack interface
1 Optocore LX4B console interface
3 Optocore X6P-8/8 analog A/D interfaces
14 Oxmoor MDA16T 1x6 audio DAs
4 Oxmoor RMX44 matrix mixers
1 Rane AD-22b digital delay
1 Roland AR3000 IP message repeater
4 Sennheiser EK 300 IEM G3 in-ear receivers
1 Sennheiser SR 300 IEM G3 in-ear transmitter
1 Sennheiser System 5000 wireless handheld transmitter w/talkback switch option
1 Sennheiser System 5000 wireless receiver
5 Shure 184 mic capsules
5 Shure 577B gate page mics
5 Shure UA221 antenna coupler
10 Shure UA860SWB antennae
4 Shure UR124D/BETA87A dual wireless combos
5 Shure UR124S/Beta87A wireless systems
4 SurgeX SX-1120RT surge protectors
2 Symetrix 322 DSP module
1 Symetrix 528E analog voice processor
20 Tannoy DI8 DCt inc. yoke suite speakers
2 TASCAM CD01VPro CD players
2 Yamaha MS101 cue/mon speakers

Control
10 Crestron TPMC-15-QM-LB club touchpanels
10 Crestron Rack2 controllers
8 Crestron TPS-6L plaza touchpanels

List is edited from information supplied by Pro Media/UltraSound.

signaling the victory score. The audio is output through two Dakota Audio speakers.

The store includes four Sony PS3 gaming stations, with two remote control devices at each station. The audio for each location uses Dakota Audio speakers located above the user. The speakers are directional and aimed at the users below to keep the systems from creating excess ambient noise throughout the space.

"Cisco's latest StadiumVision digital signage CMS is used facility wide, and our client wanted to use this resource for all its local content within the store," said Levens. "Technomedia engineered a network-based system that allowed for communication and interface with the facility server. Crestron Pro2 is used for communication, and local audio is processed using Peavey's MediaMatrix NION N6. This IP protocol-based system allows our end users to select the sources for display at their local destinations by using a simple touchpanel interface." Store operators also can choose from a variety of facility CobraNet feeds. The content feeds are "broadcast" throughout the store and selected with the touch of a button.

Changing Colors

Switching the New Meadowlands from the home of the Jets to the home of the Giants between games requires a lot of expert hands. It takes 350 workers nearly one week to change more than 700 material elements, but the digital communications technology, from the digital signage to the video production gear, makes the resulting transformation, branding and entertainment truly awesome.

Already, fans of the Giants, Jets, Rutgers, Penn State and other great teams have had a chance to enjoy the great ambiance, powerful video and clear audio of the New Meadowlands Stadium. In February 2014, fans from all around the world will have a chance to experience this state-of-the-art sports venue firsthand, when the stadium hosts Super Bowl XLVIII. ■

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