The World's Only AV Platform for the Newly Released HDMI 2.1 Specification

XTP II CROSSPOINT

50 Gbps ULTRA PERFORMANCE BACKPLANE

AV Infrastructure for an 8K Future

XTP II CrossPoint Series

The Extron XTP II CrossPoint® modular matrix switchers are the only AV platform capable of supporting the 48 Gbps data rate of the recently released HDMI 2.1 specification. Designed and engineered to the highest standards, the matrix switchers' 50 Gbps digital switching backplane represented a monumental leap in engineering and product design when it was introduced in 2015. XTP II still delivers the ultimate level of performance in the Pro AV industry. It already supports the HDMI 2.1 specification's range of higher video resolutions and refresh rates, including 8K @ 60 Hz and 4K @ 120 Hz with HDR.

XTP II is the future-ready technology platform. With performance and reliability unmatched in the Pro AV industry plus modular flexibility and system upgradeability that is ideal for corporate, government, higher ed, and retail installations, you can depend on the XTP II CrossPoint Series now and to meet the challenges of an 8K future.

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- State-of-the-art EverLast™ power supplies engineered by Extron

HDMI 2.1 Supported Resolutions and Refresh Rates*

4K	4K/50	4K/60
	4K/100	4K/120

5K	5K/50	5K/60
	5K/100	5K/120

8K	8K/50	8K/60
	8K/100	8K/120

10K	10K/50	10K/60
	10K/100	10K/120

*Source: HDMI.org

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SOUND & COMMUNICATIONS
COMMERCIAL AV TECHNOLOGY AND APPLICATION

February 19, 2018
Vol. 64 No. 2

TURNKEY REAL-WORLD TRAINING

IMMERSIVE TECHNOLOGY TRAINS POLICE, FIRE AND EMTs IN MONTGOMERY COUNTY MD

GOVERNMENT SOUND AND COMMUNICATIONS

This $5.2 billion vertical is adapting to technology evolution and to growth, as well

INSIGHT INTO GOVERNMENT APPLICATIONS

IP distribution, archiving and bulletproof reliability are key factors

On The Cover:

Networked Display Systems In Government

Cultivating effective communication in government facilities and public works command centers

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LEADING THE WAY

Ultra Fine Pitch Comparison Vanguard vs. Leyard vs. SCI

FEATURE	Vanguard Axion	Leyard TWS	Silicon Core Lavender
Pixel Pitch	1.26	1.25	1.25
Warranty	4 Year Standard	2Year Standard	2Year Standard
Access	Full Front	Rear Only	Front + Rear
Refresh Rate	3840	1920	1920
Grey Level	18 Bit	16 Bit	16 Bit
Video Processing	24 Bit	16 Bit	16 Bit
USA Service Facility	Yes	Yes	No
Fully Front Serviceable	Yes	No	No
Zero Latency Processing	Yes	No	No
Macroblock IC Drivers	Yes	No	No
Heat Dissapation	Yes	Yes	No
Moiré Reduction Mask	Yes	No	No
Half Size Cabinet	Yes	No	No

UPCOMING DEVELOPMENTS

- Sub 1.0mm Pixel Pitch - ETA=Q1/Q2 2018
- Touch Screen Integration for all Axion Series - ETA Q1 2018
- DC - DC Remote Power Supply - ETA Q1 2018
- HDR 10/12 Bit Support - ETA Q2 2018
- TOP COB technology with resin to protect modules
- Rental Cabinets with corner protection for LED's
- Low Latency System reduces latency from 4 frames to .5 frame
- New LED Lamp supplier. Can effectively compete with CREE and Nichia with respect to contrast and color depth. Can support HDR. Guarantee of less than 10 ppm failure rate.

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LED DISPLAYS
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AXION SERIES

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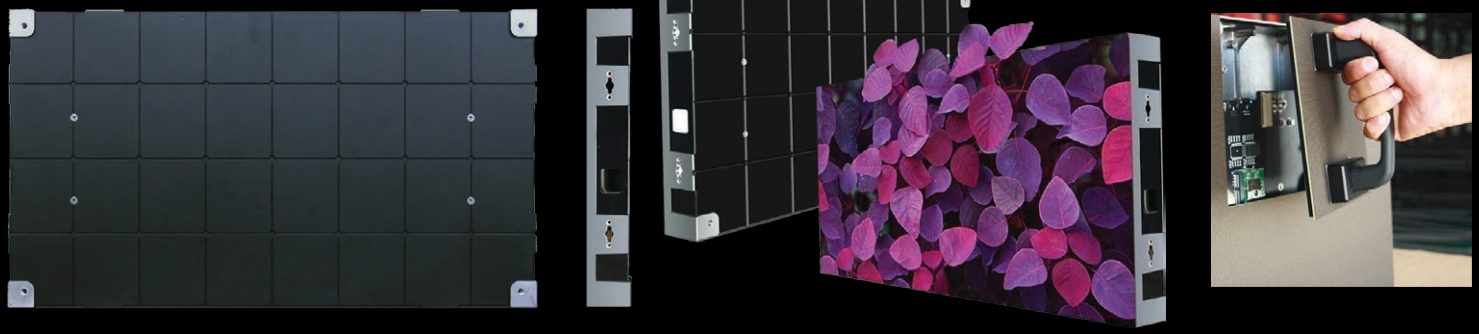

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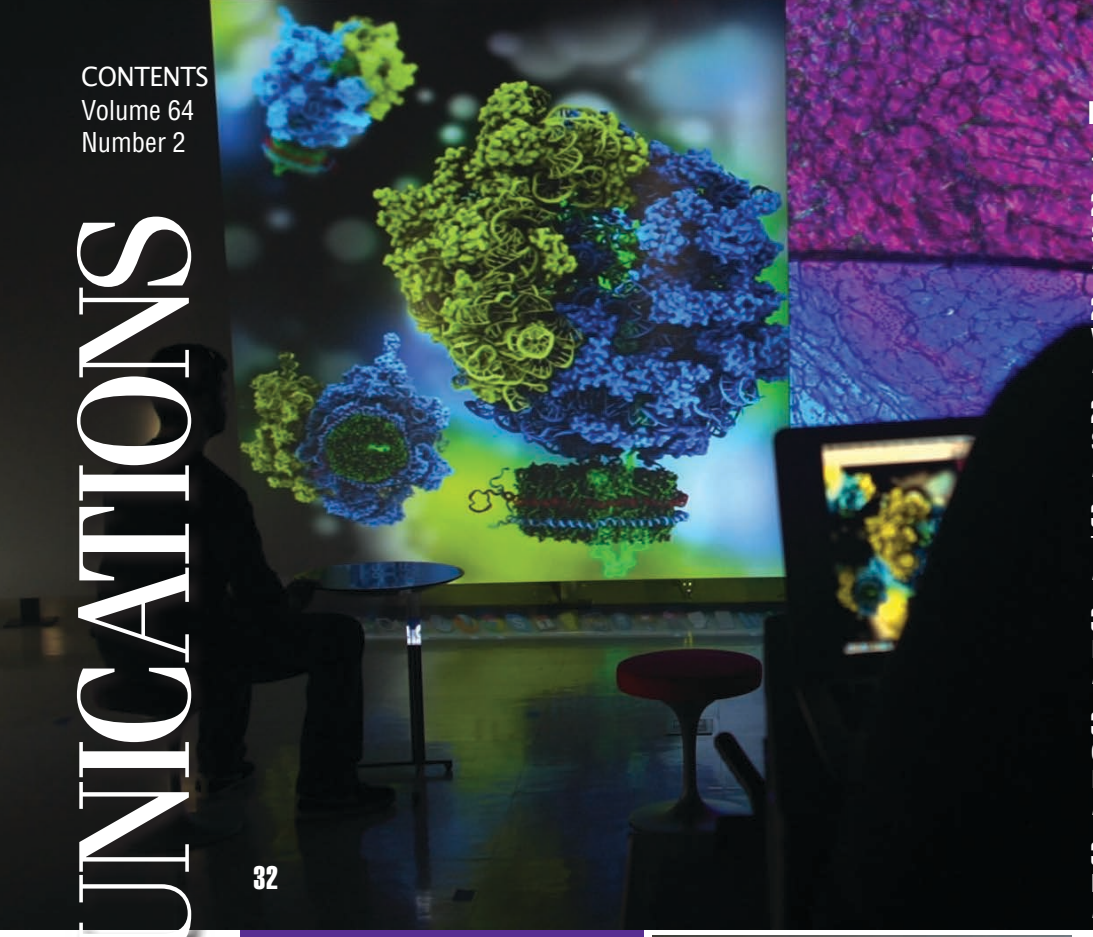

DEPARTMENTS

FEATURES

COLUMNS

matrox® Digital Video Solutions

City of Orem Webcasts Live Council Meetings and Records for VOD with Matrox Monarch HD and PrimeGov Software

H.264 encoder offers transparency and convenience to every citizen

City of Orem council meeting.

Overview

Ever wondered if it's ok to feed the squirrels that come out foraging after hibernation? Or use pesticides on the lawn? The City of Orem, Utah communicates its stand on such common and not so common issues that residents seek answers to through periodic council meetings and by-laws. To be aware of changing regulations, residents were required to be physically present at the council meetings. The City of Orem wanted to find a new, better way of communicating this information.

Residents are now able to view a video on demand (VOD) version of council meetings from the comfort of their homes. Furthermore, live streams and VOD of internal committee meetings have brought greater transparency to the public.

Steaming and recording are driven by the Matrox Monarch HD H.264 encoding appliance paired with a real-time meeting manager application by Prime Government Solutions (PrimeGov). Monarch HD is used for live streaming videos of the council meetings and simultaneously recording them for later VOD use. PrimeGov lets the public search for an item of particular interest from the meeting agenda and view related video snippets.

Workflow

Cameras capture and send HDMI feeds to Monarch HD, which outputs RTMP streams compatible with many popular CDNs including YouTube and Ustream. Monarch HD is set to stream at a bit rate of 12 Mbps with 720p resolution, and simultaneously record meetings to a USB at the same bit rate and resolution.

PrimeGov used Monarch HD's API to integrate remote access to streaming and recording start/stop actions from within PrimeGov's cloud based application. When a user clicks on Start or Stop on the city's web portal, the application communicates with and instructs Monarch HD through API calls that happen behind the scene. The ability to integrate with the unit through the straightforward API is one of the main reasons that Monarch HD was selected.

PrimeGov manages the legislative process and integrates it into the recorded video. After the meeting, the MP4 files copied to a network location by the city are accessed by the PrimeGov cloud-based software, trimmed lightly and uploaded to a public portal. PrimeGov timestamps the video when a motion is called to vote and provides links (jump points) to the meeting agenda items. Residents who wish to view specific items can click on the corresponding title in the agenda and go directly to the relevant video snippet.

Results

The City of Orem prefers to work with YouTube to save costs because a media server is not required. However, Monarch HD's flexibility to work with several CDNs has saved the day for them in some difficult circumstances. The day before a council meeting, the City of Orem's building was struck by lightning that disabled a major part of their network equipment. Scrambling to get the equipment back, Matrox technical support walked PrimeGov through the process of connecting to Ustream as an alternative temporary workflow. Consequently, the city was able to successfully stream and record the next day's council meeting without hiccups.

Richard Drew, the CEO of Prime Government Solutions, appreciates how Monarch HD allows them to be expertise focussed;

"Monarch HD is a life saver for us because it takes care of something that we're not good at. We don't do video at all. We make the calls to Monarch HD through the API and it does everything video related for us."

The commercial audio, video and lighting (AVL) industry from which I departed more than six-and-a-half years ago is tremendously different from the industry to which I happily returned last June, when I succeeded David A. Silverman as Editor of *Sound & Communications.* It need not be said that the technology is vastly different—and different in a way that's *revolutionary,* not *evolutionary.* Projection, once the toast of InfoComm shows—remember the Large Venue Display Gallery from the mid-'00s?—has begun to lose market share to LED panels. 4K-capable flat screens are ubiquitous and inexpensive, and people are already talking about 8K, even if content rollouts might be lagging behind. And, of course, networked AV/IT systems have become so prevalent that, at last June's InfoComm, most every commentator agreed an inflection point had been reached.

Apart from technological changes, so, too, has the industry itself changed. The amount of consolidation in just the last six years is incredible. Today, we have Harman International, a wholly owned subsidiary of Samsung Electronics; Chief, Da-Lite and Vaddio are brands within Legrand; and, just last month, Mike Belitz, President and CEO of Ultimate Support Systems, acquired Radial Engineering Ltd. and its associated brands. That's not even to mention the degree to which manufacturers are grouping in support of technologies, as exemplified by the HDBaseT Alliance, the Dante protocol and the SDVoE Alliance. InfoComm International even redefined itself as the Audiovisual and Integrated Experience Association (AVIXA), underscoring that commercial AVL is no longer about integrating gear, but, rather, about fostering experiences.

During my absence from *Sound & Communications,* I covered the music products market for a sister publication, *The Music & Sound Retailer.* So, I've been attending the NAMM Show in Anaheim CA since 2010; that gives me perspective on that category's own evolution. Walking the aisles of the ACC North Hall last month, I was blown away by the turnout of commercial audio brands—and by exhibitors' attestations that they were seeing commercial integrators in numbers equaling music store buyers. When did *that* happen? It's no surprise that some in attendance facetiously called that portion of the show floor "NAMM-foComm." Dovetailing with that evolution—and perhaps feeding it—was the Audio Engineering Society's (AES) presence at the show, including the AES@NAMM Pro Sound Symposium: Live & Studio.

Dan Ferrisi

In much the same way that companies like Harman Professional realize synergies by uniting audio products, control systems, lighting and display technologies, we're increasingly seeing manufacturers and trade associations finding synergies among and between each other. And that synergetic spirit, perhaps more than anything, is powering our industry to an unknowable, but very exciting, future.

SOUND&COMMUNICATIONS

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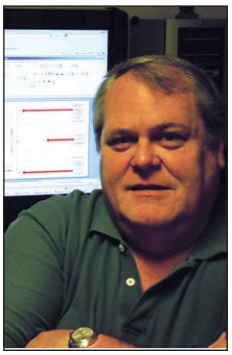
As CTO of Crestron Electronics, Fred Bargetzi is responsible for driving the company's technology vision and overseeing all aspects of the company's innovation and development groups encompassing more than 500 engineers. He has been instrumental in growing and shaping the company to its current position as a provider of commercial and residential integrated solutions.

As VP of Sales, East Coast & International, NanoLumens' Almir DeCarvalho is responsible for a growing network of regional sales managers, while also expanding the global footprint of NanoLumens. One of the first 15 employees and an active member of the NanoLumens leadership team, DeCarvalho brings his straight-shooting ideas and strong work ethic to this already talented team.

Bob Ehlers is currently VP of Business Development for RGB Spectrum. In this role, Ehlers is focused on strategy, channel and partner development for the security, transportation and medical markets. He has a rich history of control room solution design in these vertical markets. Prior to this, he was VP of Marketing for RGB Spectrum.

James Fife has had a 13-year career as a systems engineer, technical sales specialist and designer. His role at rp Visual Solutions (RPV) as Consultant Extension takes his understanding of a consultant's job to enable them to achieve new heights. His passion for maximizing the visual display experience drove him to join the InfoComm PISCR standards committee.

As Crestron's Director of Enterprise Technology, Dan Jackson spearheads all new product development for the global leader in automation technology. He leads a team of engineers who are actively researching the latest trends and products across key industries including education, enterprise, hospitality, government and luxury residential.



John Mayberry, a member of AES, NFPA and ASA, and author of *How to Make Millions in the AV Business,* has worked with Disney, NBC, AT&T, Sony, the Olympics, Technicolor and Microsoft in various design and managerial roles. For the last 10 years, he has focused on retail rollouts, network operation centers and networked digital signage. Contact him at emmaco@emmaco.com.

Rob Read has been an AV professional for more than 20 years. He's worked for Roland's Professional AV division, owned his own production company, and produced and streamed numerous live broadcasts, webinars and events. He works with popular online video platforms, and he has helped to develop audio and video production programs for public schools and universities.

Dave Rodgers, Marketing Manager for Elite Screens Inc., has 20 years' experience in the AV and wireless communications industries. He has made numerous television, radio and editorial appearances providing installers and do-it-yourselfers with easy solutions toward creating larger-than-life big screen applications.

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NEWSLETTER

BELITZ ACQUIRES RADIAL ENGINEERING LTD.

Mike Belitz, President and CEO of Ultimate Support Systems (Loveland CO), has acquired Radial Engineering Ltd. (Port Coquitlam, British Columbia, Canada). Established in 1991, Radial Engineering was originally developed as a range of cable products by the outgoing President and CEO, Peter Janis. The release of its first direct box in 1996, the Radial JDI, set the company in motion as a provider of direct boxes and audio solutions. The Radial brand family and distribution network eventually grew to include a catalog of brands encompassing Primacoustic, Tonebone, Reamp, Hafler, Dynaco, Iso-Max and Jensen Transformers Inc.

Ultimate Support and Radial Engineering, the announcement indicated, will enjoy shared strategic and logistical advantages under the leadership of Belitz. The result will be wider availability to retailers, distributors and end users all over the world.

LMG ACQUIRES AV-INTEGRATORS

LMG (Orlando FL), an Entertainment Technology Partners (ETP) company, has acquired AV-integrators (Belmont CA), an audiovisual and broadcast video integration company. Founded in 2002, AV-integrators is a systems design/build firm that provides customized solutions to industries throughout northern California. LMG is a national provider of video, audio, lighting and audiovisual support. It's known for systems integration and delivering show technology for corporate events, trade shows and concert tours around the country.

LMG is the keystone brand of ETP, a parent company formed in 2014 that unifies a collection of brands that serve the live event and entertainment industry. This acquisition is ETP's fourth in three years. LMG has offices in Orlando, Las Vegas NV, Dallas TX, Nashville TN, Seattle WA and Silicon Valley CA. Brian Owens, President of AV-integrators, will now be the Silicon Valley facility's General Manager.

OUTLINE US IS FORMED

Outline Srl (Flero, Brescia, Italy) has announced the expansion of its home offices with the formation of Outline US as the sole representative of Outline Srl in the US and the Caribbean. Outline US is newly created, owned and operated by Jeffrey Cox and Jason Farah, audio authorities who have had more than a decade of hands-on implementation of Outline systems.

Outline US is based in Winston-Salem NC and Taos NM. A presence in two quadrants of the US allows for more rapid deployment, while also accommodating multiple time zones. With access to an extensive inventory of Outline products, Outline US is immediately capable of providing product demonstrations, performances and alternative product side-by-side presentations.

CYBERSECURITY, COMMUNICATIONS SOLUTIONS AVAILABLE TO NSCA MEMBERS

NSCA (Cedar Rapids IA) has announced additions to its Business Accelerator program, helping integrators improve cybersecurity and internal/external communication with new services offered by industry experts and created exclusively for NSCA members.

Indarra works with integrators to create tailored cybersecurity employee-training programs. By performing detailed security-awareness assessments and providing roadmaps to help NSCA members improve employee security maturity, integrators can secure their workforces to protect against data breaches. Indarra can also conduct testing to see how susceptible employees are to opening unknown attachments or providing vulnerable data to attackers.

Launch Security helps integrators establish simplified cybersecurity programs that are comprehensive, encompassing key components of framework, culture and technology. Testing and assessments help integrators understand where they stand and what improvements they should make. Launch Security can also help NSCA members create company-wide cybersecurity guidelines and policies, while employing technology solutions that go beyond traditional antivirus and firewalls to secure networks and data.

You could have received this NEWSLETTER information about three weeks ago, with more detail and live links, via email. Go to www.soundandcommunications.com to sign up!

NEWSLETTER

Videxio, managed by Visitec, offers a way for integrators to deploy videoconferencing to improve internal and external communication. This reliable, secure cloud videoconferencing solution is available to NSCA members; it deploys quickly and eliminates the hassles of setting up expensive equipment. Videxio has also helped integrators reduce operating and travel costs by hosting video meetings for up to 50 participants, offering the benefits of face-to-face meetings without the associated expenses.

NSCA members also have access to services and solutions from alliantgroup, Avis/Budget, GreatAmerica, Insperity, Lenovo, Office Depot, OneBeacon/TrueNorth, Solutions360, StockRoomExchange.com and UPS.

OPENGATE CAPITAL ACQUIRES MERSIVE TECHNOLOGIES

OpenGate Capital (Los Angeles CA) has acquired Mersive Technologies Inc. (Denver CO) from shareholders of the business. Terms of the transaction remain undisclosed. Mersive launched its suite of wireless collaboration solutions in 2013, enabling multiple users to share content collaboratively from laptops and mobile devices to in-room displays, securely, with a high-quality user interface. Mersive Solstice puts content at the center of the meeting experience.

Andrew Nikou, Founder and CEO of OpenGate Capital, stated, "OpenGate Capital has successfully invested in technology businesses acquired from KPN, Philips and Damovo going back to 2006. Since realizing our last technology investment in Getronics in late 2016, we have made specific investments in our business development team and sourcing processes to find another tech-related opportunity."

The acquisition follows four years of exponential growth for Mersive. Mersive represents the seventh acquisition through OpenGate Capital's first institutional fund following the firm's previous acquisitions of Power Partners, Energi Fenestration Solutions, Bois & Matériaux, Alfatherm, Ever-Zinc and Hufcor.

MARANI PROAUDIO EXPANDS DISTRIBUTION, PARTNERS WITH PEAVEY

Marani Proaudio (Boretto, Italy) has announced the launch of Marani USA to expand global distribution of its digital audio processing and sound-reinforcement products. Marani USA has partnered with Peavey Electronics Corp. (Meridian MS) to market and distribute Marani USA's line of digital audio processing products. The complete range of Marani Proaudio loudspeaker management and audio processors will be available through Peavey Commercial Audio sales representatives and distributors worldwide.

Marani USA and Marani Proaudio (formerly SEED Srl) built on its foundation as an early developer and adopter of digital signal processing (DSP) technologies and techniques to become a leading European designer and producer of audio DSP products and intellectual property. SEED's applications have reached beyond traditional sound reinforcement to include noise suppression and enhancement processing in the automotive, broadcast and appliance markets worldwide.

WAVEGUIDE OPENS NEW YORK OFFICE

Independent technology consulting firm Waveguide LLC (Decatur GA) has opened a New York NY office and hired Pete Christensen as Senior Consultant and Director of the New York office. The new location is Waveguide's ninth in the US. Late last year, Waveguide topped 100 employees, placing it among the largest independent consultants in the industry.

Most recently, Christensen served as Director of Sales Engineering at Video Corp. of America. Prior to that, he served as Senior Consultant and Director of the Healthcare Studio at Shen, Milsom and Wilke. At Waveguide, Christensen will support the company's growing enterprise-client project work in the northeast, including expanding the technology services being offered to clients of Waveguide's parent company, Compass Group USA, and the FLIK Hospitality division under which Waveguide is managed.

Waveguide's office is located at 275 7th Ave., New York NY 10011.

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Under Cover Part 2

It's all about size and frequency.

By Peter Mapp, PhD, FASA, FAES

Last month, I pondered on where the "6dB down" coverage angle came from, and why we use it. In many situations, either where there is a benign acoustic environment or when outdoors, it works well. However, in a difficult reverberant space, a 6dB variation can be too great, leading to a very noticeable drop in speech intelligibility. The coverage angle of many loudspeakers is not consistent, but, rather, varies significantly with frequency. I can think of one product, for example, where at 400Hz the coverage angle is around 150 degrees, but it's just 15 degrees at 4kHz. So, I suppose that, if you pick the right frequency, you can effectively have any coverage angle you want!

This means that, unless you are using a fairly large constant directivity (CD) horn or phased array, the coverage is going to be frequency dependent. Or, to put that another way, you will hear something different depending on where you are located. In benign environments, there is generally some latitude relating to what we hear; however, in a difficult acoustic space, due to background noise or high reverberation—or, worse still, both—there will not be so much scope. In those cases, hearing a good direct-to-reverberant ratio or signal-to-noise ratio, extending over the frequency range important for speech intelligibility, will be crucial. So, what frequency should you use to pick the coverage angle?

Some people use the 1kHz band for loudspeaker coverage design, but the 2kHz and 4kHz bands are more important for speech intelligibility. So, as a minimum, I would use the 2kHz data, while keeping a wary eye on the 4kHz band. For example, Figure 1 shows the coverage from a single row of ceiling loudspeakers. They are located at a height of approximately 12 feet and spaced 24 feet apart. The upper plot shows the coverage within the 1kHz octave band. There is a 6dB variation throughout the space (*i.e.,* from on-axis to off-axis positions)—so pretty reasonable, you might think.

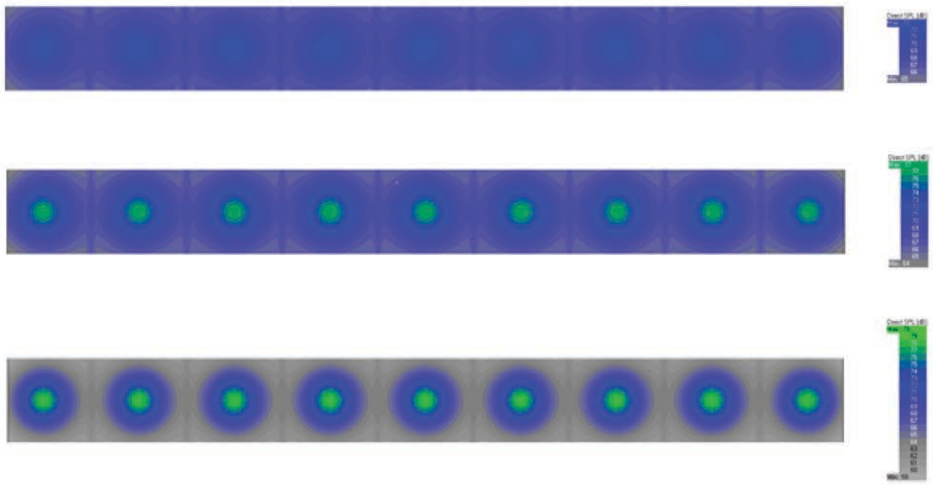

Figure 1
Coverage at 1kHz, 2kHz and 4kHz from a six-inch paging loudspeaker (coverage variations are 6dB, 13dB and 20dB, respectively).

At 2kHz (center plot), however, the variation is 13dB, and distinct hotspots and patches of poorer coverage are apparent. At 4kHz (lower plot), the variation is 20dB—a huge, and unacceptable, variation. So, clearly, using 1kHz could be misleading.

To put this aspect into context, I was recently asked to comment on a loudspeaker manufacturer's proposed layout for a distributed series of semi-directional loudspeakers in a shopping mall. The loudspeakers were located at just over 12 feet above floor level, or about seven feet above the listener's ears, although the apex of the glass roof was much higher than that. The reverberation time was about 3.5s. Now, experience tells me that any form of passive, low-directivity, distributed loudspeaker system is not going to work in such a space. Yet, without modeling, the manufacturer was putting forward his idea and, already, he had the installer onboard. So, I had to protect my client (the mall owner) by showing that it wouldn't work. And, indeed, detailed computer modeling showed that it would not—for a number of reasons.

Figure 2 shows the predicted intelligibility for the proposal in terms of Speech Transmission Index for PA systems (STIPA). Because it's difficult to see the values on Figure 2, I zoomed in on a section in Figure 3.

Now, the failing values can be seen with the average for the area in question

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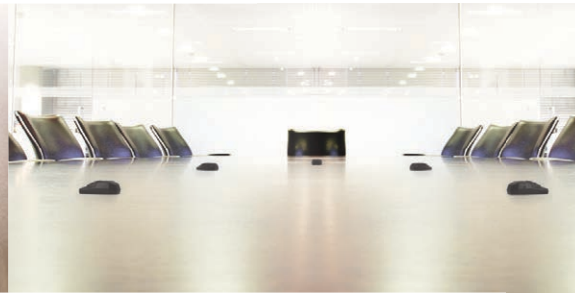

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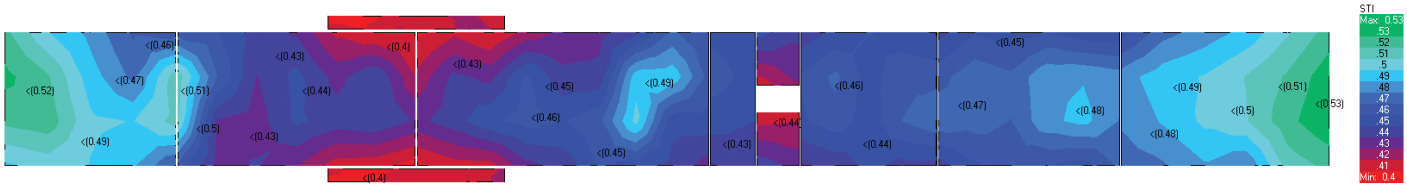

Figure 2
STIPA plot for section of mall.

being just 0.43 STI, and a significant percentage of the area only achieving 0.40 STI. (It should be borne in mind that the target is to have an average of at least 0.50 STI, with a maximum permissible deviation of 10 percent of the area below 0.50 STI and above 0.45, minimum.) Looking at the speaker coverage was truly enlightening. The claimed coverage angle was 170°x60° at 1kHz and 140°x55° at 2kHz. Figure 4 shows the projected 3dB and 6dB contours, but filled out as solid shapes to show the coverage more clearly.

As can be seen at 2kHz, the speaker covers the central section of the mall quite well, but it doesn't cover the perimeter. However, the 3dB contour only covers a tiny fraction of the mall. (Remember, last month, that I noted that, in difficult spaces, I often revert to working with the 3dB contour.)

Now, let's take a look at Figure 5 and see what happens at 4kHz, where only small parts of the central strip are covered, whereas the majority of the mall is not. You might think that the STI plot would look a bit like the plots shown in Figures 4 and 5, with small patches of intelligibility occurring at regular intervals (*i.e.,* directly under the loudspeakers). This is often the case. However, as I wrote last month, "There is more to designing a sound system than just providing adequate coverage." Sadly, in this case, the loudspeaker design did not even achieve that basic aim.

The underlying point, to which I alluded above, is that the mall is just too reverberant to support intelligible speech from a relatively low-directivity distributed loudspeaker system. The loudspeaker manufacturer should have known this. Certainly, it should have checked the viability of the design *before* presenting it and, in so doing, causing the budget for the system to be set far too low.

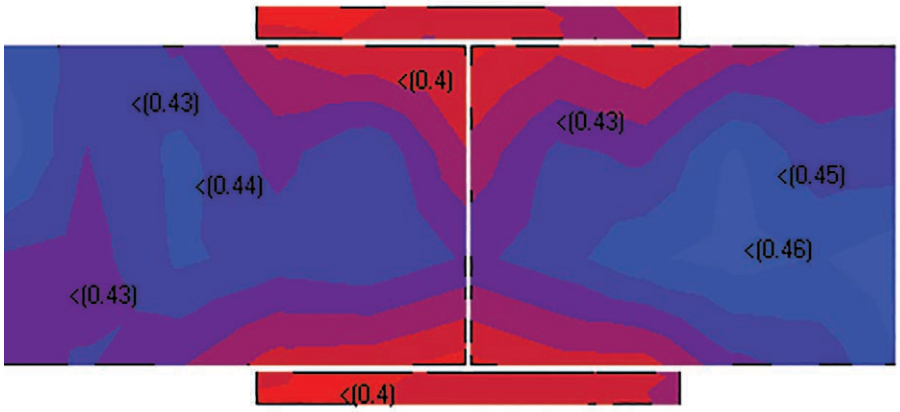

Figure 3
Zoom of part of STIPA plot.

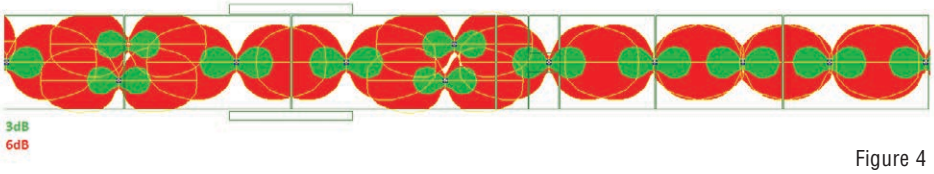

Figure 4
Mall coverage at 2kHz (3dB and 6dB contours).

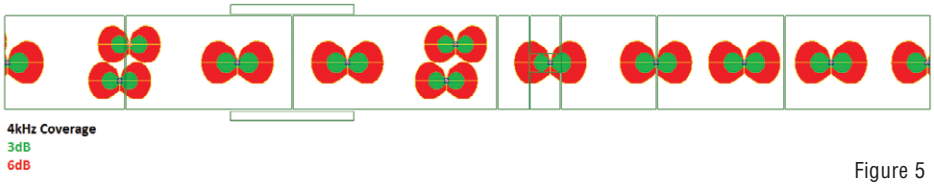

Figure 5
Mall coverage at 4kHz (3dB and 6dB contours).

It's said that "a little learning is a dangerous thing," which is certainly the case in audio and acoustics. Now, I guess many of you are wondering, "Is there a solution to this particular problem?" Perhaps you're asking, "How can you achieve intelligible speech in that building?" Well, that's a story for another time (but, yes, it is possible). However, the really worrying aspect for me is that the PA system is a life-safety system, and it's the major element for informing the public of an emergency situation and helping to evacuate the mall in a safe, controlled manner. What chance did the above proposal have of achieving that?

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There's Green In Green

Looking at opportunities in transit-centric projects.

By Shonan Noronha, EdD

The recent installation of digital displays in the Helmsley Building walkway, adjacent to New York NY's Grand Central Station, is part of the expansion of OUTFRONT Media's advertising-driven network.

Recent projects involving the expansion or renovation of transit systems, suburban transit-oriented development and "Smart City" projects are creating new opportunities in digital signage and AV/IT system design and integration. Early identification of these projects, and the establishment of the right partnerships, is essential to ensuring your company gets some of the green (*money*) from these, and other, sustainable (*green*) developments.

To become a player in this market, your company should have a strategy to get involved and stay in it for the long haul. For starters, identify and connect with the GCs, architects and consulting firms specializing in this market sector. These projects require expertise at many levels—from sales and project management, to installation, integration and programming.

Several systems integrators and digital out-of-home (DOOH) network operators have already added staff who have the skills necessary, or acquired companies with innovative technologies, to expand into transit-related signage and AV/IT system deployment. For example, over several years, OUTFRONT Media (OUT) invested in the development of its ON Smart Media platform, added a creative services division and built a team that focuses on opportunities in the real estate market. Last fall, the company was awarded a long-term contract by The New York Metropolitan Transportation Authority (MTA) for its advertising and digital communications platform to be deployed across displays in subway trains and stations, commuter trains and buses, and billboards.

That contract is regarded as a partnership to develop and deploy dramatically improved customer communications, as well as generate higher advertising revenues. The project calls for more than 50,000 digital displays to be installed across the vast MTA transit system, with the rollout starting this year. Meanwhile, OUT's real estate team continues to locate properties that are best suited for digital signage. A recent deployment was at the Helmsley Building walkway, adjacent to Grand Central Station in New York NY.

Smaller firms should not be intimidated by the presence of mega players, but, rather, see them as potential partners, pitching their expertise in specific areas. For instance, Fairfield NJ-based Pearl Media, which has a track record in brand campaign activations, was selected as the promotional partner for San Francisco CA's Transbay Transit Center, scheduled to open this spring. Pearl will design and manage the venue's 274-screen DOOH network, which will display transit updates, weather, wayfinding and advertisements. In addition, Pearl will be responsible for branded events in the venue, sponsorship cultivation and experiential marketing.

So, if this is the area into which you want to move, it's time to do some homework! Research your immediate area and then look beyond, but nevertheless

(continued on page 76)

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Sharing The Faith Part 1

There's an app for that.

By David Lee Jr., PhD
Lee Communication Inc.

The smartphone is perhaps the most important electronic communication technology ever created for people to share their faith, and sharing faith is the central tenet of every credible house of worship (HoW). The largest faiths have centralized their teaching around holy scriptures. For example, Christianity is grounded in the Bible. Judaism is grounded in the Torah. Islam is grounded in the Quran. Hinduism is grounded in the Vedas. Buddhism is grounded in the Tripitaka. Most of these holy scriptures are historically found in a large book, or a large number of books. Today, all these holy scriptures can be accessed with an app on a smartphone. But there is more potential for the use of an app than just to seek content. First, though, let's look back in time in order to understand the opportunities we have today to share faith using an app, and the opportunities that using an app creates for our industry.

Historically, believers met (at least weekly) in a central location—church, temple, mosque, etc.—to learn their respective tenets and share community. From these gatherings, they typically embraced a lifestyle that corresponded to their belief system. The physical worship space was vital, because it enabled worshippers to get away from their day-to-day activities and let them concentrate on the teachings—and let them encounter moments of personal reflection in a place considered holy. Today, most faiths still share a physical worship space to embrace their faith and share community with other people. Unfortunately, I think most of us can agree that we (for better or worse) are living in a chaotic world, as well as one that's very aural and visual. We might desire community with people in our worship groups in a face-to-face setting on a frequent, even daily, basis; however, that desire is obstructed by our frenetic lives. The good news is that communication technologies have enabled us to stay connected with people in the moments we have for personal time.

The use of electronic communication technologies began to take a prominent place in sharing faith in the early 1990s, using email. This proved to be an effective means to connect with members of our worship community. In addition, many HoWs created websites on which pastors and worship leaders could host podcasts, and where they shared important information. We used computers with a telephone (dial-up) to access this information. Thankfully, providers eventually developed technologies to give us faster access to the internet.

Many of us living in the western world could afford to purchase computers. I remember thinking I had experienced a slice of heaven as I explored this new cyberspace world. However, people in Africa, Asia and South America, some with low to no income, were not able to connect to the internet because they could not afford to purchase computers, and because the internet was barely available. And, if it was available, it was expensive to access.

Then, people really *did* become connected when the smartphone was born, with apps that enabled us to consume enormous amounts of valuable (and worthless) content. The overarching gain was that we were delivered from being tethered to a cable in a fixed location. With our wireless smartphones, we were free to roam the streets, highways and shopping centers—even other nations—yet remain connected to our cyber communities.

In my mind, the real game changer regarding the smartphone and interactive communication occurred when Facebook introduced its app. As we all know, within a relatively short time, many people, of all incomes, found a way to purchase a smartphone, inspired by the passion to connect instantly with people who were located across the room—or on the other side of the world—using Facebook. Thus, with this much power to connect with so many people worldwide, I say again, the smartphone is perhaps the most important technology ever created for people to share their faith. But let me drill down a little deeper.

Forward-looking HoW leaders have already developed unique apps that enable them to create their own, unique ecosystem (similar to Facebook and YouTube combined). With this app, leaders can create their entire communication structure to provide information, grow the number of people who attend their HoW and cultivate community with people on a daily basis, wherever they are, be it at work, at home, in a shopping mall or at the beach while on vacation. In addition to these apps being used on a smartphone, they can be used on devices that include Apple TV and Roku.

I believe that the physical worship space will always be the central location where people gather to worship and learn more about their faith. I also believe that we need the face-to-face worship experience to remain connected to humans and to our deity. Furthermore, I believe that HoWs will continue to thrive in the 21st century. I am excited about the new opportunities we have to work with HoW leaders who understand the importance of creating both an exciting worship experience in a physical location *and* valuable content in worshippers' app, which is built to keep them connected to their HoW on a daily basis. This is good news for those of us who conduct business with HoWs!

In the second part of this article, I will provide a vision that explains ways that an app can be used to share faith and cultivate community. I believe you can use this vision to motivate leaders to purchase communication technologies that will enable them to create effective worship experiences inside the physical worship space, and create content that can populate their app.

That is what I believe. What do you believe?

When A Plan Comes Together

FBC Texarkana's aesthetic upgrade and AVL overhaul coordinated efforts between several contractors and trades, including two integrators.

By Anthony Vargas

Video is central to the ministry of First Baptist Church Texarkana. The Texas-based church has been using local television broadcasts to spread its message of faith for more than five decades, and its emphasis on video has continued to grow under the leadership of Pastor Jeff Schreve, who joined FBC Texarkana in 2003. Under Schreve's direction, FBC Texarkana has expanded its reach by broadcasting content on national and international cable networks and streaming over the internet.

Schreve also recently spearheaded an ambitious two-year project that saw FBC Texarkana make several upgrades to its sanctuary and production spaces. The project included a dramatic facelift to the sanctuary décor, complete with new theatrical lighting, seating, carpets, paint—the works. But overhauling the physical look of the space wasn't enough; church leadership also knew it needed to make a heavy investment in video technology to bring the church's visual presentation to the next level. This investment included an overdue upgrade from standard-definition cameras and production equipment to HD-capable tech. And, to create a more positive in-house experience for the church's congregation each week, FBC Texarkana also overhauled its audio system, installing new speakers, mixing consoles, acoustic treatment, and more.

"When you start talking about a project like this, one thing tends to drive another," FBC Texarkana's Facility Supervisor Olin Owens explained. "We started talking about the sound. Next thing you know, we can't do much to the sound system until we do something to the acoustic treatment in the building. And we wanted to upgrade the TV system, so then you look at doing that, and you see the old carpet and pews need to go. So everything ends up driving something else, and we had to pull it all together to make it happen."

Such a holistic overhaul of the sanctuary involved pulling quite a few threads together, including multiple contractors and trades. And, further adding to the complexity of the project, two separate integration companies were contracted to handle the audio, video and lighting upgrades; Ford AV (www.fordav.com) was tasked with the audio and lighting side of the installation, while The Field Shop (www.fieldshop.com) handled the video upgrade.

FBC Texarkana's weekly Sunday services are a blend of traditional and contemporary worship styles. The music leans toward the contemporary side, with drums, bass and electric guitar in play, while still relying on traditional worship music elements like a choir, pipe organ and orchestral instruments. The spoken-word portions of each service are typical of the Southern Baptist milieu, with a 40-45-minute sermon delivered by a single speaker.

The sanctuary, constructed in 1985, is a fan-shaped auditorium with high ceilings, rounded walls and tiered balcony seating in addition to floor-level seating. "The building is a challenge for a lot of people," Owens said. "The ceiling height, for one thing, makes it a challenge, and then the circular shape is another thing that's tough for the sound people. From the floor to the ceiling is an average of 54 to 55 feet, and from the stage to the back wall, it's about 114 feet." The sanctuary seats around 2,400, and average attendance at Sunday services is between

Each of the five sections of main floor seating is covered by a speaker. Extensive acoustic treatment, some of which is visible along the front of the balcony, was used to make the sanctuary more suitable for live sound.

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1,700 and 1,800. Like many churches, the sanctuary is not an ideal environment for live music thanks to its many reflective surfaces and rounded fan shape. "I don't think it was built for live-sound purposes. Amplified sound seemed to be an afterthought," Eric Russell, FBC Texarkana's Audio Engineer, said.

Before any new audio, video or lighting equipment could be installed, changes had to be made to the building itself to accommodate the new equipment. This included remodeling the venue's video control room, which is located in a hallway off the balcony. "We had been using SD equipment, so all our screens were SD, and the furniture was made for SD monitors," Jay Budzilowski, FBC Texarkana's Director of TV and Media, explained. "We wanted to move to a different setup because, over the years, we've added positions, and we started doing IMAG from the control room, and as a result, we were not very streamlined in how we were set up. With the renovations, we were able to set up the positions in a better way—to put the video engineer where he needs to go and put the director where he needs to go."

To allow for a more streamlined, purposeful workstation setup in the control room, the entire room had to be reoriented. The video control room overhaul was handled by The Field Shop; the team was comprised of President/Systems Engineer Kris Reed, Director of Engineering Pat Reed and Systems Engineer Mike Major. "We spun the room 90 degrees from the way it was before," Kris Reed described. "The room used to be turned the other way, so it was longer than it was wide. Now it's wider than it is long, and that allowed us to put more console space in there with two rows of consoles, and to build a larger display monitor wall." All new control room furniture was custom-built by The Field Shop.

The equipment that was not required for video production was moved from the control room to a newly constructed, dedicated rack room. "In our previous setup, all of the AV equipment was in one room, including everything that made noise," Budzilowski said. "So we made a separate equipment room for all the rack-mount devices. It cut down on the noise considerably."

The video control room was reoriented by 90 degrees and outfitted with new furniture to accommodate the new HD-capable equipment and create a more streamlined workflow for the production staff.

As part of an extensive renovation to the building itself, a separate room was created for the production of the audio-for-video mix.

A separate room was also built to house the equipment used to mix audio for the video broadcasts, and it doubles as a recording studio. "The audio-for-video room is attached to the control room," Budzilowski said. "That's actually Eric's office. Previously, he was in a nine-by-six closet. We reoriented the room and made it wider, and constructed a separate recording booth to use for voice overs, music overdubs, etc."

The video production system is built around a 72x72 Blackmagic Smart VideoHub router. "The Blackmagic router is the heart of the system," Reed explained. "All sources run into the router, and all destinations are fed out of the router, which allows us to basically route any signal to anywhere, which gives us a high level of flexibility in that system."

The video control room also contains two Ross Video production switchers: a new Carbonite Black 1, which is used to produce the broadcast TV feed, and a preexisting CrossOver Solo, which is used for the in-house IMAG feed. The feed from the CrossOver Solo is fed to two preexisting (but recently installed) Christie HD projectors, which fire on two motorized screens in the sanctuary. A Blackmagic MultiView 16 and a Blackmagic MultiView 4 round out the video switching system. "Those Blackmagic multiviewers are for monitoring up on the monitor wall," Reed elaborated. "They allow us to monitor any sources that aren't readily available within the multiviewers built into the Ross switcher. For example, Ross doesn't allow you to monitor your aux outputs in their multiviewer, so we have supplementary multiview monitoring systems for things like that, because a lot of times we'll use the aux output of the switcher to feed the in-house RF system or some other auxiliary feed that needs to be monitored." The in-house RF system uses a ZeeVee HD modulator to send video signals to lobby displays and overflow areas located within the building.

The display monitor wall is made up of four Samsung 50-inch LED LCD screens. The signals from both Ross Video switchers and both Blackmagic multiviewers are displayed on their own individual screens on the monitor wall.

Three Hitachi Z-HD6000 operator-controlled HD cameras (two on tripods and one on

a jib) and two Hitachi DK-H200 cameras mounted on Eagle PT-101 pan/tilt heads are used to capture content for both the broadcast and in-house video feeds. "We have two cameras that are positioned basically rear center," Reed described. "One camera shoots a tight shot, and then one camera shoots a medium-wide shot. The jib camera is off to stage right. One PTZ is in the rear of the room, stage left, and then the other PTZ is on the stage, also stage left, shooting a reverse angle." All three Z-HD6000 operators use JVC DT-N17F broadcast studio LCD monitors. The DK-H200s are remotely controlled from the video control room.

The new HD cameras don't just boost the resolution of FBC Texarkana's video content; they also helped solve a problem the video production team was having with low lighting and color quality. "There are some low-light areas in the room, and the new cameras are much better in low-light situations than our old cameras were," Budzilowski said. "We never need to crank the gain up."

An Apple Mac mini running ProPresenter is used by the production team for onscreen graphics and lower thirds. "The Mac mini has one of the Blackmagic UltraStudio 4K devices that connects via Thunderbolt to the Mac," Reed explained. "That gives us a channel out of the unit so that we can use it in the production switcher to do the lower third keys or any of that other stuff that we want to do, or we can use it in a full-screen graphic mode."

All of the video content is stored on a makShare media storage server, which is a custom product by The Field Shop. "The makShare media storage server is a shared storage server system that allows the church to have a full seamless end-to-end tapeless workload," Reed said. "So, they record their media during production directly to the server. As soon as that's on the server, it's immediately ready to be edited by any of their five video editors. It gives them a lot of added flexibility to where they don't have to worry about sneakernetting files or making sure files are on this computer that aren't on this computer. Everybody is connected to the media server, and they can use files off of that server in real time so they don't have to copy them." The makShare media storage server has 60 terabytes of storage. It exists on the venue's dedicated Wi-Fi network, which also features an Aurora IP control system.

From the server, the broadcast TV feed is distributed to a variety of television stations. "Up until Pastor Jeff came, we were broadcasting regionally out of Shreveport," Budzilowski said. "He started a separate ministry to fund broadcasting beyond the Texarkana area. Our first station was FamilyNet, and then from there we grew to broadcast on multiple outlets. We're on TV all over the world now, and we are now on more than 730 radio stations. We produce two versions of our television broadcasts: One is a 60-minute show that airs locally and regionally, and then there's the 'From His Heart' broadcast, which is a 30-minute broadcast that features an edited-down sermon from Pastor Jeff, that airs nationally and internationally."

Thanks to an overdue upgrade to its cameras, FBC Texarkana can now record video content for broadcast, live streaming and VOD in full HD.

Content is also streamed via Facebook Live and hosted on FBC Texarkana's website. "Online streaming, for me, is a no-brainer," Budzilowski shared. "If you've got a video camera at your church and you have the internet, you're only a step or two away from streaming online. And we always post all our services online after the fact so people can watch them there, too."

On the audio side of the installation, the main goals were to update to more modern equipment, address some spotty coverage areas, and expand the input capacity of the system to accommodate the church's recently adopted, more contemporary music style.

"The old system was one of those deals where you had one microphone at the front, and the worship pastor is going to come up and sing, the preacher is going to get up and talk, and there was a piano and a big pipe organ, which we still use today. At the time, that was all they could foresee happening in that room," Russell recalled. "And, as worship and music in general changed over the decades, for at least 20 years, we were continuing to do the same thing stylistically. Sometimes we would implement orchestras and things like that back when I was first getting involved here in 2002, but we were very limited in what we could accomplish. We had an analog console that was very limited. We knew there was a need for change."

Ford AV carried out an extensive modeling process of the sanctuary using EASE. "They were having some issues with coverage along the main floor, as well as some spots up in the balcony," Ford AV Senior Account Manager Tim Hendrix recalled. "We were able to identify those areas in the assessment that we did and in our analysis of the room."

The first step was replacing some of the old acoustic paneling with new panels by Perdue Acoustics. "Perdue Acoustics had supplied the acoustical treatment that was in there previously," Hendrix explained. "Before, they had flat panels on the balcony face but, this time, we went with their Wedge Diffsorber product. In the analysis, there were some areas that were identified where the acoustic treatment could be enhanced, which would help with the sound reproduction in the room itself. I wouldn't say it was bad, there were just some areas that needed some help. So, through the analysis, we were able to identify that and provide the treatment to work with those areas."

Once the acoustic treatment was in place, Ford AV specified five JBL PD6322 12-inch three-way loudspeakers to cover the bulk of the sanctuary. Seating on the main floor is divided into five sections, so each of the five speakers is positioned to cover one seating section. Additional speakers include preexisting delayed fills that cover the balcony and under-balcony. The speakers are powered by four Crown DCI amps: specifically, two four-channel amps, and two two-channel amps.

The subwoofers are all preexisting. "Their subs are flown," Hendrix described. "One of the issues that we were having was that they were getting a lot of low-end on the stage itself, so we put treatment on the ceiling above the stage and adjusted where the subwoofers are located in order to combat that."

The front-of-house mixing location is located near the front center of the balcony, just a short walk from the video control room, audio-for-video room and rack room. "We went with an Allen & Heath S7000 for their front of house and an S5000 in their production room for their audio-for-video mix," Hendrix said. These new consoles feature a Dante digital audio interface. "The Dante system just gives them the flexibility that any Dante system gives you as far as routing the signals," Hendrix elaborated. "They have a full-blown broadcast audio production, and that gives them the flexibility they need to do

the switching they need to do." An Allen & Heath DM64 and DM32 are used for audio inputs, and a BSS Audio Soundweb London BLU-806 handles digital signal processing.

Ford AV was also tasked with upgrading the theatrical lighting in the sanctuary to make it more TV-friendly, particularly with the arrival of the new HD equipment. "They had a lot of dark spots on the stage that were magnified in their television broadcast," Hendrix said. "We did an analysis of their existing lighting and found that they had quite a few fixtures that were not the right fixture for the location—they didn't have the right degree of throw on the fixture. There were 10 or 12 fixtures that we ended up replacing the lens tube on to go with a sharper-angled throw, in order to throw the distance that we needed to. Also, they didn't have any backlighting for the stage, so we added a truss at the upstage back wall and put in some backlighting to give depth to the onstage subjects on camera." All new lens tubes and backlighting were by ETC. Ford AV also upgraded the lighting control console to an ETC Gio @5.

The AV production staff communicates via a two-channel Clear-Com intercom system, which was installed by The Field Shop. "The 2-channel system allows them to have a production channel and a second channel that can be used for any number of things," Reed explained. "Having two channels instead of one channel that's used by everybody gave them a bit more flexibility. The audio guys don't really want to be on headset the whole time, so we set up a telephone-style handset with a call-signal flasher, so you can hit the call button and flash those guys when you need them to get on intercom, but they're not on headset the whole time so they can really focus on doing their audio mix. The video production guys are all on headsets."

FBC Texarkana was pleased with the work done by both integrators on the project. "The week before we were in the sanctuary the first time, The Field Shop wanted to make sure everything was up and running," Budzilowski recalled. "We went through every piece of equipment, every signal chain, just to make sure everything was working as it should." Russell added, "On the audio end, Ford AV was there for us. I would say Ford AV's Jim Tassey went over and above the call of duty. We had a couple of pieces of equipment that were working fine, and then started failing the day before we were supposed to have our first rehearsal. He called all over the place to find a comparable unit in Dallas and took it upon himself to drive to Dallas that day to pick it up and drive it back, and he had it up and running for us the very next morning when we had our rehearsal."

For his part, Owens was pleased with how all the various moving parts on the project came together. "To do something like this takes a lot of planning and scheduling," he said. "It was a scheduling nightmare, quite frankly. But the communication between the contractors and everybody going in and out of the building, including the painters and the carpet people, was really good. They had to work together to get it done. I was really satisfied."

In the AV industry, the end users are typically represented by two separate, yet equally important, groups: the designers, who specify the systems, and the integrators who install them. My company acts as a third party to commission these systems. These are our stories.

System Staging

Why it doesn't happen more.

By James Maltese, CTS-D, CTS-I, CQD, CQT
Audio Visual Resources, Inc.

AV9000 Checklist Item Under Test: All AV9000 Staging Tests (Section 5).
Reasoning: Whenever staging is discussed, everyone agrees that it is a crucial process in successful AV projects. However, it is commonly disregarded, or not completed, due to there being "too little time in the schedule," even though skipping it will lead to more time in the field. If staging is so important, why is it neglected so often? There is a three-to-one ratio when it comes to shop fabrication versus installation that says it will take three times as long to do anything in the field as it does in the shop. So, if tracking down an issue takes an hour in the shop, it will take three hours in the field due to various reasons, including the lack of human resources (engineers, technicians, etc.), tool/equipment resources, good internet connectivity, dedicated phone lines, etc. Why is such a valuable process so consistently unheeded?
The Story: January is the busiest time of year at the gym. So many new faces on the treadmills. So many Instagram #NewYearNewMe posts. As Robert Frank says, "Swole is the goal; size is the prize!" Come February, though, spots start to open up again. Super Bowl weekend, in my experience, is the point at which many of us give up. We had a good six weeks of "doing work," getting our blood pressure under control, sleeping better, eating healthy, reducing stress and just feeling great. But, sometime in February, the urge to hit the gym started to dissipate, and we went back to our old habits. We didn't put in the time to change our lifestyle, and being unhealthy is so alluring.

Naturally, this got me thinking about testing AV systems….

Staging systems is a crucial process for all providing AV systems. All devices are tested and proven to be functioning well *before shipping to the site!* The control system is sorted out at the shop. All firmware and communication conflicts are addressed. Network devices are preconfigured with their actual IP information, so they can be plug and play when they are delivered. Staging certifies that the system is ready to be installed. All the bugs are flushed out so that, if anything arises during the installation, the issues are mostly reduced to field cabling problems, because everything else has been thoroughly tested. It makes the installation go like a hot knife through butter.

So, why doesn't everyone do it?

The major reasons I see are as follows:

1. No buy in from management. Quality has to come from the top down to be truly effective. And, if the boss continually pushes for systems to be delivered without having been totally staged, it sends a clear message to the entire company where the priorities of the organization lie (sizzle > steak).

2. No holistic vision of the project. It is very easy for companies, especially large ones, to adopt a "not my monkeys, not my circus" attitude between departments.

A shop manager might be inclined to ship a system before it has been staged, just to pass the buck, despite the fact that doing so will jam up the installation team. It might be great for the shop schedule, but the installation schedule is destroyed, the project schedule sees delays and the service team might be tasked with finishing the installation…again. If people are focused only on *their* piece of the puzzle, rather than the big picture, it is very easy for them to ignore the value of quality.

3. Lack of education or experience. If people don't understand the purpose and/or value of staging, they are less likely to do it. If the people building the racks never had an AV Installation Nightmare (check them out on "The Facebook"), they are less likely to do it. Whenever staging is taught in an AQAV class, participants—designers, installers and technology managers alike—are constantly saying things like, "This would have saved me a week in the field…*if I knew about this.*"

4. Lack of discipline. If a single person isn't responsible for the staging, and the company just expects "the team" to get it done, it very rarely happens. The responsibility of staging must be designated to one person on the team, and it must become a habit of the organization. It takes discipline, but, once the process is ingrained in the entire team, projects begin to go smoothly. As Jocko Willink says, "Discipline Equals Freedom"—freedom from stress, worry, having to remember every little thing…oh… and losing profits.

You can see why these thoughts came to me at the gym. The comparisons between going to the Glorious House of Gains and staging AV systems are uncanny. First, ain't no one going to the gym without management's (aka "the spouse's") buy in. There are costs involved and time away from the family, but the benefits cannot be argued. Second, looking at one's health holistically is the only way for it to be improved. We are suckers for "mouth pleasure." Grabbing that extra slice of pizza, marching toward that carb-coma, often trumps opting for the bowl of kale. So, overall wellness must be the focus. Third, if you have never hit that runner's high, nor ever experienced what your body feels like when you live clean, it is very easy to dismiss it as mere myth—so why bother? Lastly, if going to the gym doesn't become a habit, it won't stick. Diets (temporary fads) don't work; you need to change your lifestyle.

It's the same with AV. Applying cute, little project-management tools and tricks won't produce the results that adopting the AV9000 approach can. Your team has to live, breathe and *be* quality. It's gains o'clock, my AV peeps. *Let's goooooo!*

The Case Of The Distorted Audio

Trust your instincts…and your established procedures!

By Douglas Kleeger,
CTS-D, DMC-E/S, XTP-E, KCD

First off, although the "How Do You Do…Your Engineering?" series is off to a good start, I need more feedback. Come on, all you engineers—write in and share! So, I am going to delay my next column in the engineering series and, instead, talk a little about a recent experience I had. It'll give me the opportunity to offer a few reminders and tips for those who work in the field.

Recently, I spent some time in the field to commission and troubleshoot some government facility systems. For example, we did some upgrades to an emergency operations center (EOC) main conference room. New equipment was mixed with owner-furnished equipment (OFE), and I was called on to "fix" severely distorted audio. This was "an immediate need," as described to me. I was informed that the audio DSP was causing problems during videoconferencing calls, and it had to be adjusted.

The system worked fine before, but not now, after some other work was done. The on-site AV technician—let's call him "Eddie"—met me there, and another tech and Eddie proceeded to give me a live demo of the distortion when they tried to make a call.

Sure enough, it was really distorted. So, I proceeded to connect directly to the DSP and look at the settings, gain structure, inputs, outputs, cross points, levels, AEC settings—*everything* in the DSP! I lowered the levels, went into the equalization and compression/limiting, made a dozen calls, but it was to no avail. No matter what I did, and after five hours straight, there it was, slapping me in the face and challenging me to find the issue.

I can't mention the exact agency, but, let me tell you, it was not an option to leave the room in its current shape to be used by others the next day. So, I called it and said aloud, "It's not the DSP!"

You see, I had been told by three different people—all of them knowledgeable—that the DSP was the issue. Could they *all* be wrong? Yes! I said to myself, "There is another issue here," and I looked elsewhere, while the others were baffled. (The client never left my side for hours, watching every step I performed. No pressure there!)

I decided to venture into the guts of the codec. Perhaps the issue was there…. So, I started to look at its gain structure, the equalization, levels, etc. And, sure enough, I saw that, no matter what I set the levels at, it was too hot! I started to think of the impossible—after all, it worked before, right? It looked like…there was a mismatch in level?

My mind went to a live mixing console—you know, where you have the mic/line switch at the top. It's the first thing you set. And what happens if you have a line level going into a channel adjusted to mic level? *Distortion*—that can't be adjusted!

Sure enough, I found out there was an internal switch in the codec to adjust the input we were using and toggle between mic and line level. That was it. When I set it to line level, the distortion was gone. Then, I had to go back to the DSP and readjust everything I had turned down and set matching gain structure, and then make a few calls.

But how could it be? It worked before, right?

So, after watching, Eddie described to me how, when they made some connections, they used a couple of adaptors to match connectors and get the signal into the codec. *Ah ha!* It's the old "client tampering with the system device cabling and not saying anything" trick!

Ultimately, at 6:30pm, after a full six hours working on this, Eddie and I left the conference room in great shape—problem solved—and went for a celebratory dinner, rather than facing hours of traffic to go home. The story had a happy ending.

So, here's the lesson: I reflected that I did not use my own, step-by-step method of troubleshooting, which is, after verifying that the problem exists, to check all the hardware and cabling. I was predisposed to think that it was the DSP, because of other professionals. Therefore, I bypassed my normal process and procedure.

Don't assume anything, and always follow Troubleshooting 101. When I get some time, I will compile my tried-and-proven method (when followed) for troubleshooting. I'll put it in the Resources section, under "Doug's Docs," on the website for *Sound & Communications* for all to use!

Does anyone have any other examples in which you deviated from your regular path, only to find your way back? Would you like to share? Please contact me at dkleeger@testa.com.

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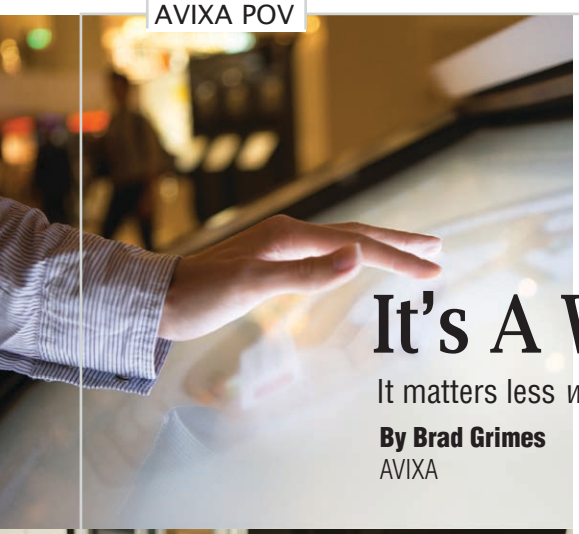
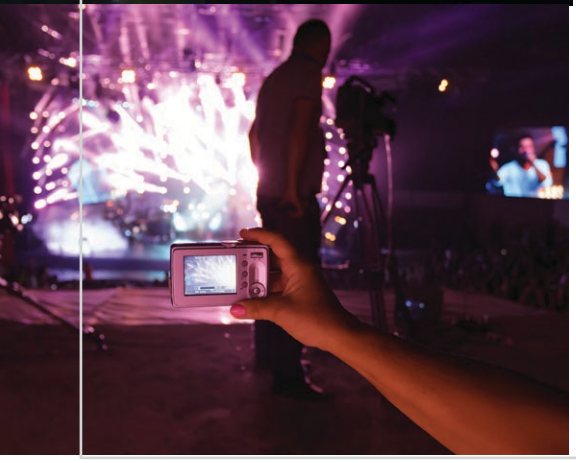


It's A Wonderful, Integrated Life

It matters less *where* your solutions go than *how* they create an integrated experience.

By Brad Grimes
AVIXA



As I write this, the International Consumer Electronics Show (CES) recently ended. By all accounts, it was another celebration of cutting-edge audiovisual technology, personal devices, artificial intelligence (AI), augmented reality and virtual reality (AR/VR), and more. AVIXA's own (in conjunction with CEDIA) Integrated Systems Europe (ISE) exhibition in Amsterdam, the Netherlands—a massive showcase of both commercial and residential AV, as well as smart building technologies—is about to welcome another record crowd. And, for all the early-bird-gets-the-worm types out there, registration for June's InfoComm 2018 show in Las Vegas NV—the first InfoComm since the trade association became AVIXA last September—should be opening any day at www.infocommshow.org.

What do all of them have in common? A new reality. For years, we've talked about enterprise audiovisual solutions blowing out the walls of the traditional conference room to reach across corporate campuses, or offices around the world. Now, of course, they also touch the home office. Moving ahead, audiovisual experiences will be all around us and, increasingly, they will come to define a more seamless, integrated way of experiencing the world.

At CES, Carnival Corp.'s CEO, Arnold Donald, showed off what the cruise company calls the Ocean Medallion. It's basically a wearable device that's designed to customize the cruise experience on ships where there could be 3,500 or more passengers and up to 20 different decks, not to mention hundreds of amenities and entertainment options to keep you busy. Slip the Medallion into your pocket, or wear it around your wrist or neck. Thousands of onboard sensors and screen interfaces are integrated to help make that huge ship feel a little smaller—and more personal—through simple conveniences (keyless entry to your cabin), recommendations (the ships "learns" your preferences), wayfinding (you finding your way, and staff finding you more quickly when, for example, you order a cocktail), and more.

Carnival's Princess Cruises line will be the first to roll out this integrated experience. AVIXA has been fortunate to work with Derrin Brown, Princess Cruises' Manager of Production Operations, as we engage with the hospitality industry, among other end-user markets. In addition to the Ocean Medallion, Princess Cruises continues to invest in new and better AV technology—from videowalls, to immersive, 360-degree audio, to adaptive lighting—with the firm understanding that it must keep pace with the ubiquity of AV experiences in order to draw passengers and build loyalty.

"It's a really dynamic, evolving challenge," Brown said. "We want to provide the platforms and availability for people to use their technology on our cruise ships seamlessly." (Read more about what Princess Cruises is doing at www.avixa.org/princess.)

This is what AVIXA calls "the Integrated Life." It's where commercial and residential AV intersect…where personal and public technology interoperate…where the AV that people experience at work, at home and everywhere in between starts to blend.

InfoComm 2018 in June will represent one of our first major forays into Integrated Life. Since we announced the plan to introduce programming and exhibitions devoted to this confluence of commercial, residential and personal technologies, we've partnered with respected research firm Parks Associates to bring the Integrated Life…well…to life. Parks Associates runs the popular CONNECTIONS Conference Series at events like CES and elsewhere, as well as summits devoted to smart energy and connected health. Its analysts have unique insight into the Internet of Things (IoT) and connected-home technologies, and they can put them into the context of commercial AV and integrated solutions.

The daylong Integrated Life program at InfoComm 2018 will be held the Tuesday before the exhibit floor opens, on June 5. The goal is to bring new voices, solutions and opportunities to InfoComm, and to get the creative juices flowing. How *else* can audiovisual technology make life better? Have you seen video of Samsung's Safety Truck prototype, for example? With cameras on the front of the truck and a 2x2 videowall on the back, cars following behind the truck can see what's ahead of it and avoid accidents. Viable? Time will tell. A potentially innovative, creative use of AV in everyday, integrated life? You bet.

The Integrated Life program that Parks Associates brings to InfoComm 2018 is still in development, but topics will include simplifying AV experiences across platforms; opportunities for building business ecosystems that span the commercial and residential markets; trends in the deployment of voice, artificial intelligence, AR/VR and more across customer applications; future developments in smart home and IoT technologies; and, of course, issues of security and privacy in an AV world that's increasing defined by bring-your-own-device (BYOD) mobility.

Having spent Tuesday of InfoComm 2018 learning about the Integrated Life, you'll be able to experience it on the show floor, where technologies not normally associated with commercial AV integration will be on display. Distinctions are falling away. There are very few boundaries left between the way you experience technology in your work life and your personal life.

In a roundtable discussion with hospitality designers and operators, seated next to Princess Cruises' Derrin Brown, AVIXA's CEO, David Labuskes, summed up how all of them described their strategic use of AV technology in hotels and ships, saying, "What we're really doing is creating these microcosms of life itself…. At the center of it all is not the technology—it's the human being."

The industry is headed toward an exciting future. Learn, innovate and enjoy. See you in June.

Communicating Through Stories Isn't Trendy—It's Critical

Storytelling, not data slinging, builds meaningful connections.

By Chuck Wilson
NSCA

Recently, while sitting in my office on a web conference, I listened to a salesperson go on (and on) about the features of his company's new customer relationship management (CRM) product. NSCA isn't actively looking to change its CRM system, but we always like to keep our eyes open for tools and technologies that might help us better communicate with integrators, manufacturers and our members.

It's hard enough to sit in a live sales meeting with a person who's reading from a spec sheet, as he or she tries to sell you the new "thingamadoo." But, in a web conference, it's downright painful. Distractions are many: You can check e-mail, put the presentation on "mute" and have side conversations, etc. Often, we allow phone calls or meetings like this to carry on, but, at the end, we retain nothing. The presentation, the long PowerPoint, the discussion about features and benefits…. As Aloe Blacc would say, "Wake me up when it's all over!"

We don't get excited to go to conferences and listen to people spew data that we could easily search for on Google. Besides the social aspect of events, we attend to learn, be inspired and be entertained. This is true of sales calls, training…even lunch meetings or coffee breaks. We seek to connect to, empathize with and relate to the information we consume. That's why we learn better when the subject matter interests us, and when the "teacher" helps us make connections between a topic, its importance to us and our desire to act based upon the content presented.

Here's a stat for you: Fewer than 10 percent of people will recall the data you share in a presentation, but more than 60 percent will remember the stories you tell. Data might help us validate an idea, but providing data to an audience is as snooze-worthy as watching a movie with no video. It's data without context. When you deliver this type of information, you alienate your audience. (Next week, you likely won't remember this statistic about recalling data—but you might very well remember my story about the web conference I mentioned above.)

In a sales call, we likely receive all the information we need to make a buying decision, but there's failure in one major area—telling a meaningful story. Stories let people into our organizations, and they allow them to see the passion we have for our ideas. When we hear these stories, we feel more entertained and we find ourselves more interested in the subject matter. The connectedness that comes with a good story helps us learn and retain more, which translates to better results from our presentations, whether they are to a large audience or a single individual.

The moral of the story? We need to rethink how we present, sell and communicate. We must remember that telling stories is a way to connect to, and build a rapport with, our audiences. Even though it's easy to share features and data, that isn't how we should teach or sell.

As we prepared for the 20th annual Business & Leadership Conference (BLC), which is coming up in just a few weeks, we spent a lot of time searching for high-impact presenters and keynote speakers who won't just share their knowledge with attendees but who, rather, will relate to integrators by telling stories that instantly create a connection.

We want attendees to retain as much as possible at this conference. The value isn't just in listening and learning, but also in taking the information home and putting it to work.

NSCA has countless stories we can tell to help our members learn and grow—and we're working on sharing them through our events and conferences, YouTube channel, blog and newsletters, as well as here in this column.

I find that, when I share these stories, I always make deep connections and help people see not only the factual value of our association, but also the vast knowledge that a partnership with NSCA can bring to an integrator or a manufacturer. Telling stories might be a trendy marketing topic right now, but it's much more than that; it's also a critical piece needed to build real loyalty among your company, your employees and your customers.

If that poor CRM salesperson on the web conference could have spun a tale about his solution, a company or an industry association like NSCA, and a problem that was solved, I probably would have listened. Why? Because that's how I'm wired—and that's how most people are wired. Tell us a story, and we'll listen. Sling data at us, and we're gone.

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Network Segregation?

The IT versus audiovisual war seems over. Guess who lost.

By John Mayberry
Emmaco, Inc.

The great irony of engineering is that, if you do your job well, you are generally expendable in the short term. If you do the job poorly, while staying below the radar, you just might have a job for life.

Before you argue otherwise, consider the case of a well-documented and well-engineered design. Essentially, you could drop dead on Friday and another engineer could pick up the task on Monday. Now, if you're disorganized and generally incompetent, it will take weeks just to get back to "ground zero." No competent engineer would want to put up with such nonsense, and he or she would gladly pass on the "opportunity."

Now, consider the war between audiovisual and IT in the commercial space. Audiovisual is losing, if it hasn't already lost, the war to share the same network. Had we played together nicely, there should have been a single compatible network. Sadly, AV thought this was a battle over packet sniffers and protocols. It wasn't, though, and IT's "solution" makes the Treaty of Versailles' reparations look reasonable by comparison. We haven't just lost—it's as if we got stomped on by Godzilla.

Note: I am defining "losing" as not being able to share a network and having to build an entirely separate one for AV users only. For a campus environment, it means an enormous and potentially unnecessary expense, often on the order of hundreds of thousands of dollars in switch, cabling, labor and associated costs. That's a high price to pay for not having to talk with each other.

Audiovisual and IT departments still can't play nicely in the same sandbox.

And let's not forget that IT has been eating audiovisual's lunch while doing a terrible job tending to its own knitting. IT's inability to secure even basic consumer data is appalling. Equifax alone had data breaches of 143 million of its customers in 2017, or roughly the entire US working population. More customers' collective data has been breached than there are working humans at this point, so you're likely to be on someone's list a few times. Reference the list at www.identityforce.com/blog/2017-data-breaches if you have any questions on the subject. Apparently, 2017 was considered a good year, too, even when it was found that anti-virus programs had been hacked worldwide. In fact, it might be difficult to find a single customer they haven't failed. And, yet, they've kept their jobs for lack of a better alternative.

That is likely the main driver behind why the great merger between the worlds of audiovisual and IT hasn't happened. Audiovisual, in most cases, could technically travel upon their networks, adding a host of functionality that would enhance most every experience. But, generally, it doesn't, especially on large projects and where it adds significantly greater cost.

In fact, most of the larger projects I've seen have gone to great lengths to *separate* the two systems. They use fancy words like "bifurcate" to obfuscate the simple fact that IT guys are running scared, and the last thing they want is to provide fixed IP addresses for AV data to travel upon their system, outside of their control. Although I can't find a single instance in which a breach occurred due to an audiovisual system, there's always the possibility of one in the future. And that, it seems, is enough for any IT person to believe we dabble in the black arts and, therefore, deny access to audiovisual systems. The result is two unshared, "separate but equal" data-transmission-and-distribution systems.

That is the epitome of having lost.

Mind you, the audiovisual industry hasn't done itself any favors. To the best of my knowledge, there was only one company in the audiovisual industry using IP technology that had a truly serious Defense Department-level data-security specialist on staff. And let's not forget that we started with protocols inherently incompatible with IT.

There are two major exceptions to this state of affairs: teleconferencing and remote CCTV viewing. Both seem to have ended up under the aegis of the IT department,

even though the IT guys have no idea how to treat a room acoustically or light it. Not exactly a merger, in retrospect… more of a case of complete domination.

Strangely, many IT departments will connect remote networked CCTV systems manufactured by even the shadiest of manufacturers, likely to be reporting to some foreign entity with green, gold and red epaulets. I never have figured that one out, but the level of trust placed by IT departments in some of these fly-by-night operations is almost comical.

We've seen many IT departments ignore the issue of IT and AV "incompatibility" for decades now. Generally, the issue never comes to head. The typical IT strategy is just to do nothing at all, knowing the clock will run out on audiovisual and it'll have to pony up for a virtually identical, but separate, network on most projects. "Get your own network, pal!"

The greatest irony is that home systems have happily shared emails, purchases, payments, audio downloads and video streaming for some time now. You'd think it would be the same in the business world. It's not. Just ask the digital signage folks about their struggles to connect to the internet in a commercial space.

Trying to find some industry mechanism that would certify audiovisual components for use on corporate networks is a challenge. The American military has had one for years—DoDIN APL—but I'm struggling to find a commercial version that serves the same purpose.

Many readers will respond to this column by shaking their heads. I would hope they look past the obvious and really think about the implications of this systemic failure. Consider one system we were involved in that had remote theaters, all sourced from a single location, to locations all around the world, under touchpanel control, back in 2002. Now, the same system is unable to report even basic component failures back to the mother ship. It was only a temporary pause in the war.

Why? Because audiovisual and IT departments still can't play nicely in the same sandbox.

Voice Control Capabilities Enter The Workplace

Once-fantastical dreams are coming closer and closer to reality.

By Fred Bargetzi and Dan Jackson
Crestron Electronics

Unproductive, inefficient meetings cost US businesses an estimated $37 billion annually, while the average meeting starts 10 minutes late due to technology-related challenges. Whether it's not being able to get a PowerPoint to present or failing to get clear audio on a videoconference, everyone has experienced a meeting room horror story that completely kills the productivity in the room. However, employees are no longer so quick to accept these mishaps as just an everyday, unavoidable workplace frustration. Employees are now demanding easy-to-use technology, such as voice control capabilities, in office spaces of all sizes and functions.

In the past decade, the power in the workplace has shifted from employers to employees. In late 2008, jobs were hard to come by and, thus, workplace culture, flexibility and compensation took a back seat to simple job security. But, as the market has shifted, future-focused companies need to rethink what they're offering employees, if they want to continue to attract the top talent in the industry.

As a result, workplaces are listening to what employees want, and they're becoming more flexible in how, when and where employees do their jobs. There is a huge window of opportunity for the technology community presented by a workforce that, increasingly, is becoming remote. Right now, *3.9 million Americans* work remotely on a regular basis. Tools that aid in real-time collaboration are becoming a necessity, not a luxury, in maintaining productivity levels. At the same time, mobility is blurring the line between home and office, and, thus, workers are beginning to demand the technology that they use at home—such as Amazon's Alexa—in the workplace, because it's more comfortable and intuitive for them to work with.

How best to meet their demands? Bring the home to the office. Alexa, originally just an at-home smart assistant, provides the convenience of voice control in the office setting. For instance, now, employees can start a meeting simply by saying, "Alexa, start my meeting." From launching a web conference to pulling up on-screen presentation materials, Alexa helps ensure meetings are timely, productive and free from the technological fumbling that typically plagues the meeting environment. Additionally, Alexa is a tool that many are familiar with using in their everyday lives; therefore, the office training time is virtually zero.

Think about the adoption of apps in the workplace just five years ago. We were already familiar with them on our personal phones; thus, when companies began to deploy their own apps, training wasn't necessary. This is the same concept—giving employees the capability to start a meeting, find a meeting room, request IT help, dial a number, etc.—all hands-free, as they're already accustomed to. And, most importantly, it's what employees want in their workplace environments: seamless to use, intuitive technologies that make their jobs easier, rather than introducing more steps and added headaches.

Voice control is transforming the way that we live and work, as one of the first personal—and, now, professional—forms of artificial intelligence to penetrate our daily lives. The demand isn't just in traditional homes or offices, either, but, rather, in every space in which we live and work, including hotels. For example, thousands of guestrooms at the Wynn Hotel in Las Vegas NV feature voice-control capabilities. [For additional information, turn to page 69.]

As Alexa becomes smarter, with a greater number of skills and capabilities, we will soon be able to offer a nearly touch-less living and working experience. Soon enough, the idea of having a virtual personal assistant in any environment, trudging through our emails and organizing our everyday schedule, or just adjusting room settings to our liking, will no longer be a fantastical dream but, rather, a lived reality.

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Leveraging Live Video For Corporate Communications

Across all vertical markets, decision makers are learning to 'lead with live.'

By Rob Read
Roland Pro AV

Live video is a great way to extend and expand your reach, allowing you to engage with and grow your audience. Leveraging live video as part of the corporate communications strategy can have a profound effect on a company's bottom line. In recent years, I have had the privilege of working with Fortune 500 companies to enhance their communications by using live video. I'm amazed at all the creative ways companies are using live video to engage audiences, and then leveraging that content. They're using it, for instance, for monthly sales meetings, product introductions, training sessions, town halls, trade shows, seminars and "how-to" informational sessions—all with the goal of engaging and informing their audience.

When creating video content, consider the lasting influence that AI could have on your content; make sure to include keywords, subject-matter indicators, and audio and video cues to reach more of your audience.

Why live video? A phrase borrowed from a recent conference that I attended is a mantra I would recommend to businesses of any scale: *"Lead with live."* Live video is engaging, interactive and cost-effective; and, if it's properly leveraged, it can be accessed on demand in the months and years following a live event. A prediction for this year is that 80 percent of live video will be online or streamed. Moreover, the average viewing time of live video is 20 minutes, as compared to two to three minutes for prerecorded video. Furthermore, the general population tends to prefer visual content—a simple form of communication, easily understood and often interactive—to content that's written. All of those points underscore the power of live video.

Servers around the world are filling up with video content that we are consuming on a daily basis. We're getting smarter about indexing, categorizing and finding video content that is relevant to us. You should consider the type of content you want to make, and then consider how posting it online can influence how it will continue to be consumed in the future. AI (artificial intelligence) is starting to be used to tag, classify and search visual content, utilizing machine learning to do so quickly and accurately. When creating video content, consider the lasting influence that AI could have on your content; make sure to include keywords, subject-matter indicators, and audio and video cues to reach more of your audience.

What type of equipment do you need to get started? Start by looking at your input options, which include video sources and audio sources. Keep this in mind: The audio component is often even more important than the video component. Make sure that you don't skimp on the audio, and that you have a mixer/switcher with good audio effects and features. Visually, you want it to be engaging; for that reason, consider having more than one camera, so you can show two different angles of whatever you're trying to capture.

To mix and switch your live content, you will need an AV switcher. Look at the all-in-one solutions in the marketplace, as they will streamline your workflow and make it easy to set up and operate. Then, you'll need an encoder to format and transport your audio and video to your online video platform (encoders come in the form of hardware and software formats). Lastly, you'll need to choose an online video platform (OVP) to deliver your live video.

Given that there are free and paid services, offering so many options, how do you choose the best platform to deliver your content? To answer that, consider who your audience is and how, most likely, they will watch your event. Will they watch on their phone, computer, tablet or smart TV? What are the demographics of your audience? What social-media platforms do they use? Do you want your content to be free of third-party ads? After you've researched the answers to those questions, you'll be able to narrow things down to your best-suited OVP.

In relation to live video, I am often asked, "My organization doesn't have experience producing live events. How do I get started?" A great solution is to find an expert and volunteer to shadow him or her, helping that person with his or her next live event. Great opportunities might be found at a school, house of worship or community center. That type of volunteering can be quite a bit of fun, and it'll give you a well-rounded overview of the process, along with some real-world experience. Then, you'll have the tools to plan your own events suitable for live video.

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Guiding Customers In Projection Applications

Standard, short-throw and ultra-short-throw projectors each have their place.

By Dave Rodgers
Elite Screens Inc.

As an industry manufacturer, trainer and workplace evaluator, I can attest to countless sales opportunities missed because either the customer didn't know what to ask for or the industry professional failed to give answers that were easy to understand. Keep in mind that the average consumer has no idea about the basic concepts of AV. Fortunately, people's questions represent a golden opportunity to demonstrate why you were brought in and why you earn the big bucks doing what you do.

Putting complex technical topics into layman's terms gives your customers a better understanding of the lengths to which you're going to assemble and integrate their system. It'll make it easier for them to understand why you would up-sell them on one product and, on other occasions, steer them away from brands that are costlier. More importantly, it builds trust and establishes you as the go-to source for all of their industry questions.

The topic at hand here is one of the biggest industry questions among commercial AV customers: *"What are the differences, strengths and weaknesses among standard, short-throw and ultra-short-throw (UST) projection?"*

Three Different Types

As the question itself stipulates, there are three basic types of projection: standard (long throw), short throw and UST. The difference between these different types has everything to do with the throw distance between the projector's lens and the projection surface itself.

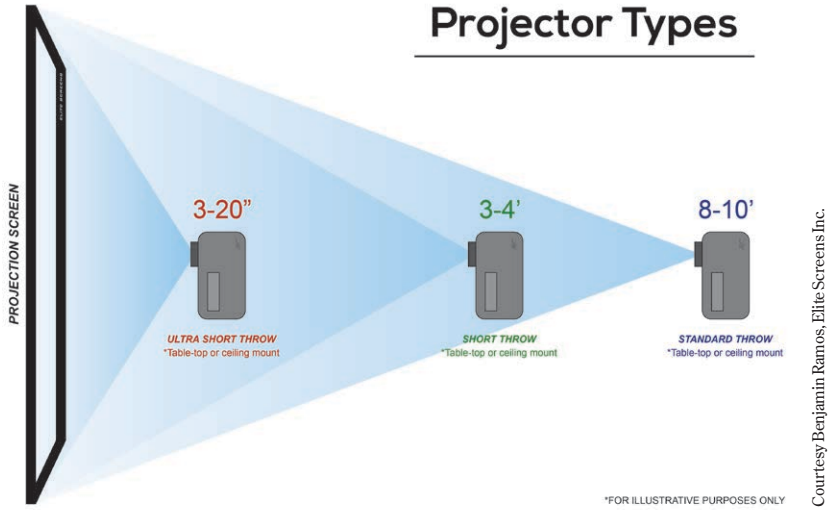


Figure 1

Don't be afraid to start from the ground up, because even the smartest customers out there still might not have any idea what the term "throw distance" means. Simply put, throw distance is the measured expanse that the light must travel from the projector's lens to the projection screen's surface. Figure 1 shows the amount of distance required for each projector to create a 100-inch-diagonal image at a 16:9 (HDTV) aspect ratio using each of the projector types.

Standard Or 'Long-Throw' Projectors

With a standard projector, creating a 100-inch (16:9) image will typically require about eight to 10 feet of throw distance. Larger images will require considerably more space. Standard, or long-throw, projectors are the most common type used in most facilities. They are compatible with virtually all projection materials. The exception would be ultra-short-throw ambient-light-rejecting (UST-ALR) or ceiling-light-rejecting (CLR) materials.

- Strengths are versatility and, often, cost.
- Weaknesses are that a lot of space is required for long-throw projection, and it's annoying when people shadow the picture by passing between the projector and the screen.

Short-Throw Projectors

With a short-throw projector, creating a 100-inch (16:9) image will typically require about three to four feet of throw distance. Short-throw projectors were specifically developed for presenters to work closer to the screen in the tight confines of, for ex-

ample, a classroom. They typically have a bulbous "fish eye" projection lens. Because non-tensioned screens are not uniformly flat, they distort the image of short-throw projectors. They project at an angle, so they are not compatible with ambient-light-rejecting (ALR) materials.

- Strengths are suitability for the confines of classrooms and forum presentations.
- Weaknesses are the inability to work with anything but "fixed-frame" or "tab-tensioned" screens. They are also not compatible with any type of ALR materials.

Ultra-Short-Throw Projectors

With a UST projector, creating a 100-inch (16:9) image will typically require about three to 20 inches of throw distance. UST projectors are designed to be positioned flush with the screen, but still create a huge image. Pull it back a few inches, and the picture nearly doubles in size. Because shadowing is minimal, they are typically used in interactive whiteboard displays, and they're a favorite with teachers and trainers. There are also specialized CLR screens that are compatible with them.

- Strengths are the ability to deliver a big picture in close confines. Flush design eliminates the shadow problem, making it suitable for training or home-theater applications. CLR projection materials are available for them.
- Weaknesses are the inability to work with anything but a perfectly flat projection surface. Larger CLR material sizes currently have limited availability.

In summary, a standard projector, despite some drawbacks, can be used with most applications. Short-throw projectors are ideal in training environments, but not necessarily in interactive whiteboard scenarios. UST projectors are better for training environments where an interactive whiteboard presentation is desired, and in which the instructor will be standing close to the projection surface.

Some of this might seem like basic stuff to us, but this is a topic about which clients are often afraid to ask. Never overestimate a customer's capacity to understand industry jargon. Break it down, and help them choose the right projection technology to meet their needs.

Insight Into Government Applications

IP distribution, archiving and bulletproof reliability are key factors.

By Bob Ehlers
RGB Spectrum

What makes government applications of AV different from, or unique among, general commercial applications in 2018? What trends do we see evolving for government over the coming year? We'll explore those questions in this discussion.

When we talk about government applications of AV, we're typically focused on a few specific areas of government, such as law enforcement, emergency response, traffic management, and city and urban planning. Of course, there are other areas that are classified as government, such as military, education and airports, but, for purposes of this discussion, we'll leave those as separate and distinct.

Government tends to be organized around geography—towns, cities, counties, states, regions and countries. So, it's natural for government to manage itself using Geographic Information Systems (GIS). It is "the map" that is the central feature of government system design. The system is built using technologies such as United States Geological Survey (USGS) maps, satellite maps, Light Detection and Ranging (LIDAR), Open Streets, Google Earth, Bing and building plans (computer-aided design), as well as zoning maps. The maps become the index for searching information throughout the city, and they're constructed so that every point in the city has a polar coordinate (longitude, latitude and elevation).

Data of many sorts—structures, assets, people, traffic, behavior patterns, events—can be laid on top of these maps. Through advances in technology, video data, audio and acoustical data, and sensor data can be tracked in real time. For example, the Internet of Things (IoT) generates loads of data that can be populated onto GIS. GPS trackers in buses, taxis or ride-sharing systems, for instance, allow real-time traffic monitoring.

Social media also generates data that can be mapped. Tools like Geofeedia summarize, track and map events as reported through social media. That information, too, can be displayed and combined with all other sources of data. And computer-aided dispatch systems (not to be confused with computer-aided design) can track city assets, such as vehicles and personnel, as well as caller locations, in real time.

So, government applications, then, often fall into displaying maps, representing data or summaries of data onto the maps, and disseminating portions of that data to people who need to see it: police officers, firefighters, inspectors, the media and citizens at large.

On the back end, this data flows into systems that can run correlation models and look for patterns of behavior. This information can be displayed on the maps, as well, in the form of heat maps, pinpoints, animations and alarm indicators.

The result of this is that smart cities, which are lit up with all of the above technology, require a hub for control—typically, an emergency operations center or something similar.

AV systems must be able to support the operations of these centers in several ways. Let's look at them.

Workflow: Video and audio are generally monitored by a user who is responsible for a subset of a city's resources. That person has front-line responsibility for dealing with day-to-day operations. He or she needs an AV workstation that supports a myriad of incoming systems, that's intuitive to use, that can be monitored by a supervisor, and that can shared quickly and easily with others when an incident occurs. Keyboard, video and mouse sharing, or remote desktop access, are typically part of this workstation design.

As an incident evolves, data might have to be summarized, compartmentalized and distributed from the front-line staffer to a supervisor, and then from a supervisor to field assets or other interested parties. AV systems have to be able to deal with video and audio routing and information distribution flexibly.

Security is also a critical factor to workflow. Who has privileges to access information? Who can share it, with whom, when and how? All of these issues have to be addressed in the workflow of a modern AV system for government. It's difficult to predict exactly what the requirements will be; for that reason, AV systems have to have flexible tools, such as standard, open programming languages like Python, C++ and Java.

Distribution over IP: Once real-time data is collected and analyzed, and it's deter-

mined it should be shared, a ubiquitous distribution system has to be used. AV systems can consolidate video from many sources onto one screen or into one data stream. This can be done using windows from various systems, or by overlaying data with color keying. Once composited, the video can be packetized into standard formats, such as H.264, which can be streamed out to smart devices over virtual private networks (VPNs) or private content-distribution networks. AV systems have to support this type of capability, so that agencies can share information internally, or with other agencies, easily. Standards for formats, codecs, access methods, permissions, etc., all have to be planned well in advance. AV systems have to interoperate with these supporting technologies.

Archiving and Records: Government agencies are held accountable for maintaining public records of all the information that they gather, produce and process. Freedom of Information Act (FOIA) requests are common, and agencies are being held accountable for providing records on demand. AV systems must be able to support archiving of information for government agencies.

AV systems typically have the fullest context of information flowing through them, because they are displaying many discrete systems and reflect the information that decision makers are actually using. As with distribution over IP, the ability to display many sources of data as windows in a single display—sometimes referred to as a multiviewer—and then stream that video to a digital recording system, can allow government agencies to create archives of data more cost effectively.

Reliability: Government operations centers often deal with life-and-death situations. Emergency response, law-enforcement activities, disaster management and other critical operations mean that government entities are held to a higher standard in system reliability. AV systems must be built with complete reliability in mind.

As 2018 rolls on, government entities will continue to have a growing demand for data visualization, control, workflow management and information distribution, and they'll insist on the highest level of reliability. Technologies are evolving to support this, and AV is adapting to the market's new paradigms.

Networked Display Systems In Government

Cultivating effective communication in government facilities and public works command centers.

By Almir DeCarvalho
NanoLumens

Government facilities and public works entities require an immense amount of information to be distributed, analyzed and acted upon, simultaneously, to ensure the efficient and unbroken operation of their services. In such a high-stakes environment, where mission-critical decisions are made constantly, temporary hiccups stemming from display technology performance malfunctions are not acceptable. Every member of the organization needs to be able to receive and process vast swaths of data with a versatility and dynamism that traditional display technologies have proven incapable of achieving. Networked digital display systems, with their ability to consolidate countless inputs of data into one versatile platform, provide the most reliable information-distribution ecosystem on the market.

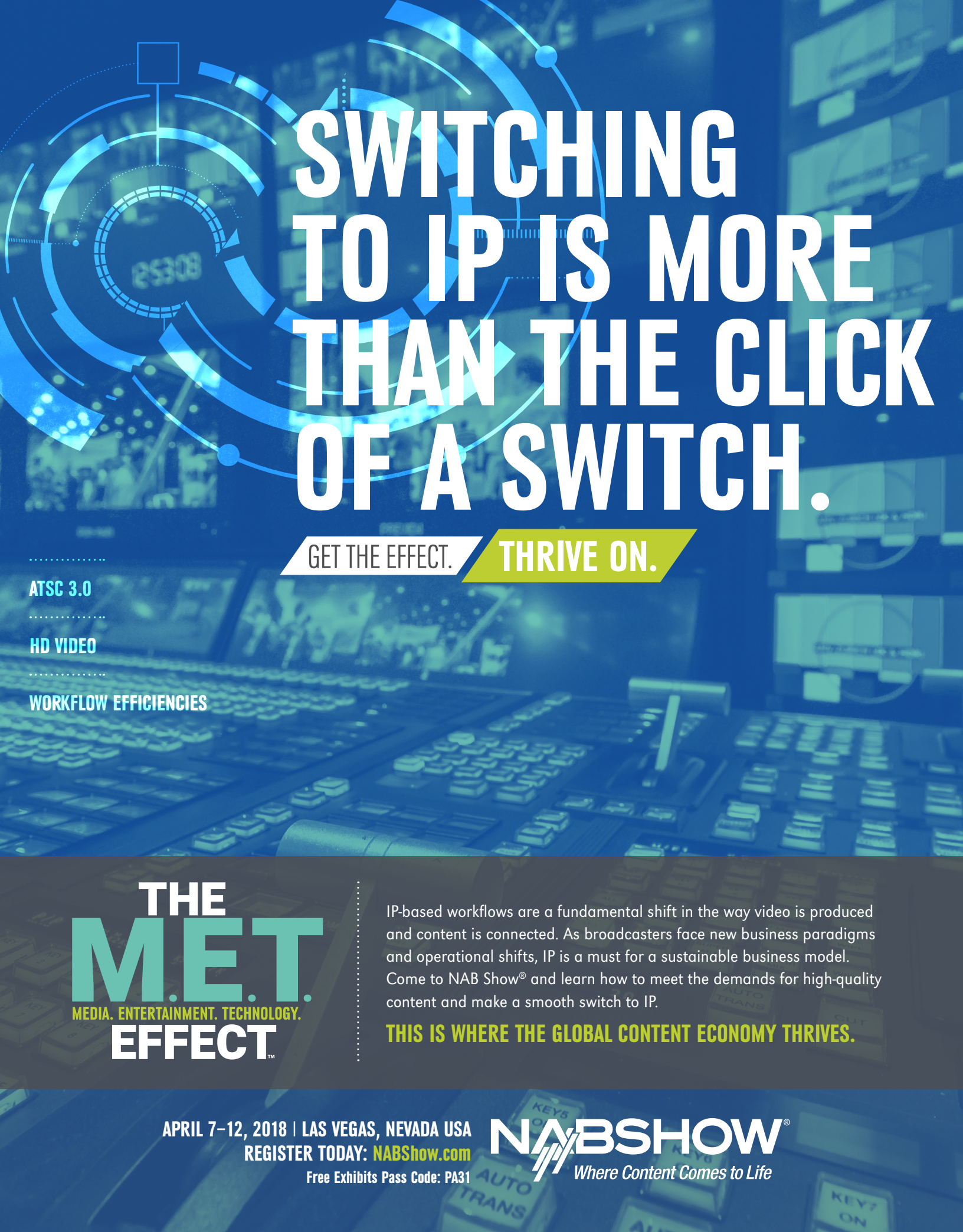
The comprehensive overhaul of an aging physical infrastructure is a challenge that many governments are reluctant to undertake, given the cost in time and resources; however, the path to safer and more efficient public services is not exclusively paved with concrete. Rather than renovating the external body of facilities and utilities, government organizations would be better served by retrofitting their internal nervous system with a networked suite of large-format digital display solutions. An example of this kind of digitized modernization can be found at the New York Power Authority (NYPA)'s headquarters in White Plains NY, where Andrew Cuomo, Governor of New York, plans to incorporate a state-of-the-art asset monitoring and diagnostic center. This networked display integration furthers the NYPA's broader goal of becoming the nation's first end-to-end digital utility, and it will enable actors at the command-and-control level to communicate more swiftly and efficiently with representatives on site at the operational level.

The primary reason that government facilities and public works organizations will reap so much utility by incorporating networked display solutions is that these groups are responsible for such sprawling matrices of operation, which require constant communication. Communicating in real time with every part of this sprawl is absolutely necessary, but, to this point, it has proven too tall an order for traditional display solutions. Information just simply isn't being accessed and distributed quickly and easily enough.

A networked large-format digital display system is ideal for this challenge, because it enables a command-and-control center not only to assess and act on information from each data point in its matrix, but also, perhaps obviously, to see these workings as part of the same uninterrupted image. The internal digitized network of a display system is where the majority of its communicative efficacy is derived from, but let's not forget that, sometimes, the best way to get a handle on the whole picture is actually *to see* the whole picture. Networked, large-format display systems allow for exactly that. Visualizing the entire scope of an organization on a single, uninterrupted display will make performance patterns easier to identify, and it will streamline the problem-solving process if, and when, issues arise.

The NYPA headquarters communicates data on its web of operations with an 81-foot-long digital display composed of an array of smaller display units. The sheer size and informational comprehensiveness of the installation allows several teams from within the organization to work alongside one another effectively. This has created a collaborative work environment, better facilitating the sharing of decision-critical insights, as well as the interspersion of disparate expertise and perspectives. This sort of open workspace concept has grown in popularity in recent years, as other industries look to capture the free-flowing creativity that it has fostered in the tech

(continued on page 80)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An innovative approach to production technology for multi-site churches.

Mankin Media Systems' Guardian Services

By Anthony Vargas

Mankin Media Systems created a $1.3 million network operations center to provide real-time production support through its Guardian Services offering.

As more and more houses of worship adopt multi-campus approaches to ministry, both systems integrators and church AV teams have had to come up with innovative ways to support broadcast-quality video production and online streaming. As is frequently the case in the worship market, these integrators and AV teams are often working with small budgets and volunteer staff, which can make delivery of high-quality streaming video seem out of reach. However, some integrators have responded with innovative service offerings in an attempt to fill the gaps in their clients' AV budgets and staff expertise.

Franklin TN-based Mankin Media Systems devised its own ambitious solution, Guardian Services, in an attempt to solve these all-too-common problems. "Guardian is a managed service offering that is designed to respond to a trend that we see growing increasingly significant within the house of worship market," Michael Wells, Chief Technology Officer at Mankin Media Systems, explained. "The fastest-growing churches, and, in fact, most of the growing churches in America, are growing by employing a multi-site church strategy, which is highly dependent upon technology. This technology-driven growth strategy is centered on the video delivery of teaching, as well as extending the style and liturgy of a successful primary location to as many satellite locations as possible. It's not unlike franchising."

A fundamental flaw in this franchising model, however, is that not all of the new satellite locations will have the staff and budget resources that the central location has, and the central location's staff is often stretched thin enough as it is, and certainly unable to micromanage AV production at satellite locations. As Wells put it, "There are very few toolsets available to churches to provide quality of experience, monitoring and intervention, in order to take all these individual locations and make sure they represent the primary church's expression and worship faithfully."

Further complicating matters, there is a shortage of skilled AV professionals for churches to hire as they expand to additional locations. "When churches are launching campuses, they can't afford to extend full-time roles to production technicians—and even if they could, there aren't enough of them to go around," Wells said. "For instance, there are at least 2,000 churches, as of 2014, that have more than one location in the United States. That number has probably grown significantly since 2014. Let's just say that half of them want to start a new campus next year to extend their ministry reach. And, if those are technology-driven approaches that are complex enough to require, at the very least, a skilled part-time person, if not a regular contractor or full-time production guy—let's say 80 percent of them are—that's 800 positions that would need to be filled."

Wells continued, "We feel that the market is not producing qualified people fast enough, and the ones whom it is producing are actually in demand by a lot of different industries that don't require people to work on weekends, and that can pay more than your average house of worship."

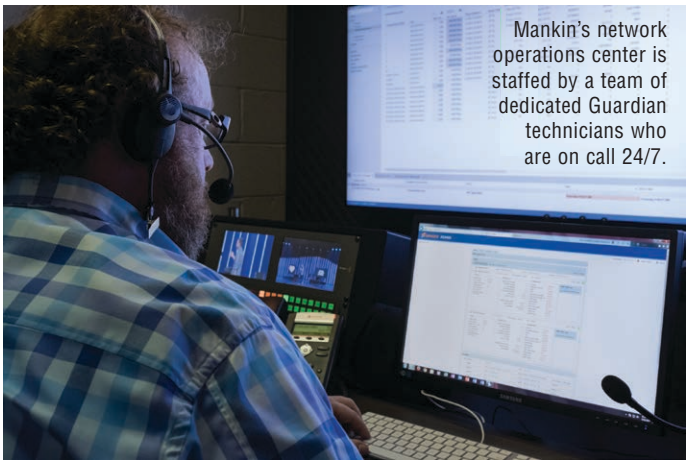
By providing the on-demand services of experienced AV technicians, Mankin hopes to give its clients the freedom to make hires that will impact their ministry outreach, rather than worrying about finding people to run its systems. In order to do this, Mankin's $1.3 million network operations center is staffed by a team of dedicated Guardian technicians who are on call 24/7. And these technicians are backed up by Mankin's integration team. As for the network operations center, Mankin went to great lengths to ensure it met the highest industry standards. "We basically built a full Tier IV data center in terms of certification requirements," Wells described. "For redundancy, we have dual-redundant 10-gig fiberoptic paths coming into the building. We have a natural gas backup generator, and we have dual-redundant power, as well as a flywheel UPS and battery backup UPSes."

The Guardian Services offering consists of four separate services—Lifeline, Protect, SlipStream and GameFilm—that are offered in a la carte packages, depending on the client's unique needs. These packages are available for virtually any production system installed in the last six to eight years, whether it was installed by Mankin or another AVL integrator, or self-installed by the client. Lifeline and Protect are geared toward troubleshooting and quality assurance, whereas SlipStream and GameFilm are specially curated, video-oriented services aimed at facilitating the "franchise" model of worship, alluded to earlier.

Lifeline is Guardian's real-time support offering, which provides clients with on-call access, via intercom, to Mankin's team of virtual staffers stationed at the network operations center. "The brand promise of Lifeline is a guarantee that we will respond to the problem in real time and solve it in conjunction with the local team," Wells said. For problems that cannot be solved immediately, Mankin will work with the client to devise a temporary solution that *can* be implemented immediately.

"Protect is our proactive monitoring service," Wells continued. "Most equipment, statistically speaking, has no higher probability of dying right before the service than it does on Tuesday morning. The problem is, nobody will find out until they have to go into the room. The brand promise of Protect is that we will identify any issues while there's still time to do something about them, so that they don't create an unexpected situation during weekend services."

To illustrate the Protect offering, Wells described a hypothetical application that should be familiar to most integrators. "A projector can talk if you have the right software to listen," he began, "and it can tell you on Tuesday morning at 9am that the lamp is about to blow, or has blown, or there's an airflow problem, or any number of things." He continued, "But you have to have the right software to listen, and the right people to maintain that connectivity and understand how to interpret the messages into an action item. Our system will detect a problem with that projector, our team will open a case that next morning, and we'll remote in through exclusive IP connectivity links that we set up to the projector itself to do some diagnostics and formulate a plan for making sure that projector works on the weekend."



Mankin's network operations center is staffed by a team of dedicated Guardian technicians who are on call 24/7.

The SlipStream streaming-video service is the offering that's most tied to delivering broadcast-quality video to satellite campuses. "SlipStream is a product that is designed to outsource the delivery of video from point A to point B, including time-slipped playback, for both multi-channel video and multi-channel audio, in any resolution, including 4K," Wells explained. "It is a suite of off-the-shelf, broadcast-grade products and software assembled in clever ways to produce a highly reliable, fault-tolerant method that is remotely managed and serviced for a setup fee and a monthly fee in perpetuity, as long as you have the service." He added, "It's designed to prevent the need to have a highly specialized video engineer on staff. And, compared to some of the other turnkey options on the market, it's a full broadcast-based approach. It's not based on consumer IT technologies, such as Flash or HLS. And we can provide full real-time and proactive support using the Lifeline and Protect topology."

"GameFilm is a system for archiving video point-of-view feeds automatically, 24/7," Wells continued. "The archived content is accessible for 30 days minimum, or up to 90 days on a cloud-based archive platform. You can watch all your campuses at the same time, and rewind them and fast-forward them. It really is a huge efficiency improvement on other ways that churches have attempted to gather video data from their multi-site campuses." He added, "It's all in full high-definition video and 48K audio. In fact, it can do multi-channel audio, too."

According to Wells, "Most everyone else in our industry, in our vertical, in church world, think, 'Our job is to install a system, finish the punch list and teach them how to use it. And we'll answer the phone on Sunday morning if they call us and they're having a major emergency.' This is such a different model in the house of worship market specifically, and it allows us to implement a state-of-the-art, high-level broadcast production system without the church needing to add more staff resources, while also allowing us truly to be able to own the outcome of the problem we're trying to solve."

To find out more about Mankin's Guardian Services, go to www.guardianbymankin.com/services, or check out a brief video on the service and its offerings at www.guardianbymankin.com.

TURNKEY REAL-WORLD TRAINING

Immersive technology trains police, fire and EMTs in Montgomery County MD.

By Jim Stokes

A woman screams inside a home. The police follow through, as they've been trained to do. In another incident, there's a fire in a six-story commercial building on the same lot. Fire and rescue are on the scene. However, it's not a movie lot; rather, it's a replicated Cityscape. There's no director to yell, "Cut!"

These are examples of reality-based training scenarios—ranging from domestic violence, to barnstorming a building, to fire and rescue—at the Public Safety Training Academy (PSTA) at the Montgomery County Multi-Agency Service Park (MASP), in Gaithersburg MD (www.montgomerycountymd.gov/psta). The

Lifelike simulations help prepare public safety officers for real-world situations.

recently completed $73.5 million update depends heavily on AV support inside classrooms and in the field. After classroom instruction, students follow through in simulated police, fire and rescue scenarios.

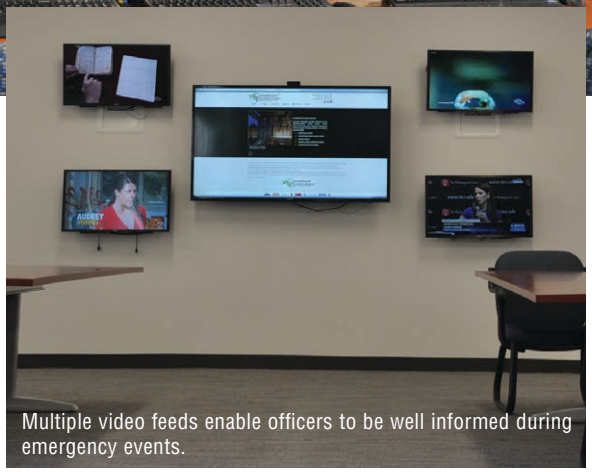
As you'll find out, the woman's scream from inside the house, delivered by a speaker, is just the tip of the iceberg for technology-intensive education and training. We'll explore the facility's purpose, operation and technology, as explained by design consultant spokespersons at Convergent Technologies Design Group (CTDG) (www.ctdginc.com), while also discussing how training is carried out by police, fire and rescue services/EMS instructors.

Design Criteria

The overall design intent for the systems, and the infrastructure that supports it, was to provide Montgomery County with cutting-edge technology for the newly constructed complex. Therefore, previous gear, such as VCRs and 8-track tapes in classrooms, was updated with such advanced AV components as LCD projectors, LED flat-panel displays, wireless micro-

A view of a real-time tactics and training scenario.

Technology has a wide range of applications for officer training.


Multiple video feeds enable officers to be well informed during emergency events.

phones and intercoms, and high-quality ceiling speakers. The systems have been designed to be turnkey and easy for instructors to operate. And, as mentioned, after traditional classroom introduction and training, real-world simulations on the training lot follow.

A brief aside: In writing this piece, I drew an analogy to grenade training in the Army. "Here's a grenade," the field training sergeant said. "You pull the pin. You throw the grenade onto the field. It goes 'boom.' Each of you take a grenade from the table and follow through." That was called "Hands On Training" (HOT). Public safety training, however, requires a lot more sophistication, which invites AV support both inside and outside of the classroom.

To get the story about the PSTA, we turned to Bill Holaday, CTS-D, Principal, and Brian Whitlock, Project Manager, both of CTDG. We also got detailed user perspectives from fire and rescue/EMS spokesperson Capt. Lee R. Silverman, paramedic, EMS Training Officer, and Sgt. John Mullaney, Police Instructor, of PSTA. Special thanks to Rassa Davoodpour, Section Chief, Studio 4, Division of Building Design and Construction, Department of General Services, with Montgomery County, for supplying background information and securing interviews.

Overview

Holaday noted that CTDG designed not only the audiovisual systems, but also the security systems and telecommunications cabling systems for the project. "This is one of the benefits for the client having a firm such as ours designing all these systems," he explained. "Instead of an AV package, a security package and a telecommunications package, they're all working together. In some instances, it made sense to use the security cameras in an AV sense. The benefit to the client was the consolidated design of all these different systems."

The Academy offers a true wealth of capabilities. It allows staff to provide scenario-based training for current law-enforcement officers, as well as new recruits, from the Montgomery County police and sheriff's department, Gaithersburg city police, Tacoma Park police, the Department of Corrections, Chevy Chase village police and Montgomery County fire investigators. We'll explore the fire-response and police aspects in considerable depth.

Among the new structures are a 117,000-square-foot, two-story academic building, as well as a police and fire Cityscape. In the Cityscape, there's a two-story residence that's designed for live training of various scenarios, such as domestic violence and house fires. Fire-event training scenarios, complete with natural gas-produced flames and theatrical fog effects, have a real-world feel. A six-story high rise further enables real-world public safety and fire-emergency training.

Talking about the installation itself, Whitlock, who managed the construction administration process for CTDG, affirmed, "It worked rather smoothly. No challenges on the install side." The integrator on the project was SigTechS (Crofton MD). "The biggest challenge during design was to look forward and make sure we were planning infrastructure and pathways for future flexibility," Holaday added. "So, we looked to capture the latest technologies, but also planned for future technologies, should things change during installation."

Holaday highlighted the collaborative process between the design team and the decision makers from Montgomery County. He said, "As a design consultant, CTDG worked for the architect of record, Michael Baker International, as a design team. We worked with Montgomery County to identify all the requirements of the project, which included the AV basis of design, drawings and specifications, all of which went out to install bid."

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Academic Building

The academic building houses nearly a dozen standard classrooms, as well as four tiered and four divisible classrooms. Mediatech lecterns offer presenters auxiliary AV inputs to connect owner-furnished laptops at the work surface. In addition, rooms share an Elmo digital document camera on a portable cart. AV access is through a Crestron touchpanel with a custom user interface. Signal routing is via a Crestron DMPS-300-C DigitalMedia Presentation System 300. Speaking of the Crestron systems, Whitlock noted, "Looking at the user's needs and available electronics, Crestron made for an efficient and streamlined system. It's the central hub of each classroom. We use the efficiency of these all-in-one devices as far as inputs and outputs."

Presentation material in classrooms is displayed via ceiling-mounted, 4,000-lumen Panasonic LCD projectors, which shine onto Draper screens. Classrooms are also equipped with wall-mounted flat-panel LED displays from Sharp. A variety of screen sizes—mostly 60-inch and 23-inch models—were installed in the classrooms, conference rooms and various surveillance monitoring sites. (The complex's lobby, museum and gymnasium have flat-panel displays with local inputs, as well.)

Distance conferencing is done in the tiered classrooms using the room cameras and microphones. On the audio side, presenters use Shure wireless lapel microphones. Program audio is provided by JBL Control ceiling-mounted speakers distributed throughout the spaces.

The Second Floor

The second floor of the academic building is designated for fire and rescue and EMS paramedic training, which includes classrooms and CPR medic training. "Students usually get their classroom cognitive training through a PowerPoint presentation, videos we've produced or from YouTube," Capt. Lee R. Silverman said. "After that, there's a safety briefing to help them understand how to deal with emergencies."

Silverman is also in charge of all video productions at the Academy. Three rooms are allocated for the video studio, which functions as a combined police and fire training area. "We've been creating more of our own videos," he explained. "It's better for people to see our department and how we do training. Every section has its own way of doing things slightly differently, so we've been making our own in-house videos to meet those needs." Production equipment includes Sony HD cameras, lighting and a Mac with Final Cut Pro X editing.

Hands-On Training

"Let's say we do automobile fire training today," Silverman described. "The students would get classroom lectures ahead of the outside training. They'd learn the concepts of how to fight a fire that's under the hood, in the passenger compartment or underneath the vehicle. The students would get all the cognitive training to begin with." In addition, he noted, there are different tracks for different personnel, depending on their experience level. Accordingly, there are tracks for those who are just starting, and others for those already certified who are coming back for retrain-

ing. After classroom instruction, training continues outside.

Video cameras were selected for both inside and outside applications in training locations. Mobotix wide-view cameras with integrated microphones and Vicon V910 dome cameras were used, variously, in classrooms and for surveillance purposes. Amplifier distribution for inside and outside areas throughout the training area emanates, variously, from Extron, Lab. gruppen and QSC models.

Getting into the hands-on training, Silverman said, "[Trainees] get on the fire truck, leave the apparatus building and drive to the simulator. They practice either laying out the hose or pulling the hose off the engine and extinguishing the fire. They do that over and over again, so each person gets a chance to hold the nozzle. The whole time, they'll be wearing breathing apparatus. It's a lot of work pulling a changed hose line with 110 to 120lb. of pressure. It's not easy."

The complex has several different training buildings; we'll detail how two burn structures are used. The six-story high rise has its concrete protected with fire tiles, so there's no damage to the building. For safety, all fire created is natural-gas-fed. There are several scenarios within the high rise, including a kitchen set with a stove and other appliances. The simulated blaze can range from one floor to an inferno engulfing the whole building. "We can adjust the amount of fire or flame coming through," Silverman explained. Theatrical fog is also used, to create smoke.

Similar Simulation

Fire in the two-level, single-family residence, complete with an attic and a garage, is simulated similarly. The blaze could be as small as a kitchen fire or something worse. Options include the previously referenced automobile on fire.

"Each person going through training gets the same scenarios and same type of training," Silverman added. "We don't want one person getting more training than another. That's one of the reasons we use natural gas. If we were using wood to burn, the fires would be different every time."

Let's take a moment to discuss the EMS/paramedic program at the Academy. "We simulate medical calls, too," Silverman said. "We have an ambu inside our building for the paramedics to practice on. We're only one of two fire departments in the state of Maryland accredited to teach a paramedic program. We meet the same requirements as the University of Maryland and other universities that teach paramedic classes."

When an instructor requests it, scenarios are recorded on video for later analysis back in the classroom. New recruits who come to the Academy for the 26-week course have a montage of their training recorded. Upon graduation, a video is made for them.

Police Training

The first floor of the academic building is designated for police department classrooms. "I help supervisors teach supervisors how to be better supervisors," Sgt. John Mullaney, PSTA Police Instructor, stated. He noted that there are essentially three learner types: auditory and visual types are taught in a classroom setting, whereas kinesthetic learning involves

"getting up and doing," outside of the traditional classroom. PowerPoint presentations with animation and the Multiple Interactive Learning/Training Objectives (MILO) Range Theater system—the latter will be discussed later in this article—are adjuncts to AV-powered instruction.

Within the Academy, kinesthetic learning starts in the padded-floor defense-tactics training room. "It teaches people how to tackle correctly, without injuring yourself and not injuring the suspect," Mullaney said. After training in the Academy building, students are actively involved in real-world scenarios in the Cityscape.

The main building has hands-on-training indoor firearms ranges. The static range has 15 lanes with stationary booths for shooters to walk into, with targets on moving rails. On the tactical range, meanwhile, shooters move around in a huge, open concrete room with the bullet trap at the back and yard markers. "We even have a garage door where you can bring in cars and SUVs and set up traffic stops," Mullaney pointed out. "So, there are a lot of capabilities on this range."

Clear-Com intercom systems are used on the two firing ranges. The static range has intercoms in each booth location, whereas the tactical range uses intercoms and distributed loudspeakers throughout, as shooters move back and forth, and up and down, within the range. The intercoms provide essential two-way communication between the control booth and the bays. Instructors also have wireless intercoms, enabling them to communicate with the control booth.


Even the indoor shooting range needs a control room to manage its complement of technology.

Into The Cityscape

The new Cityscape, located outside the main building, has several buildings, all built to code with plywood walls, instead


The optical fiber and structured cabling distribution equipment rack.

EQUIPMENT

Axon body cameras
2 Biamp Nexia SP DSP speaker processors
2 Clear-Com MS-704 4-channel main intercom rack stations
2 Clear-Com WBS-680/B4 2-channel wireless intercom base stations
1 Clear-Com WTR-680/B4 2-channel wireless transceiver beltpack
4 Clear-Com HS15 intercom headsets
15 Clear-Com KB-701 single-channel intercom speaker stations
4 Contemporary Research 232-ATSC+ HD TV tuners
4 Crestron DMPS-300-C DigitalMedia Presentation Systems
1 Crestron DM-RMC-100-C DigitalMedia 8G+ Receiver and Room Controller
8 Crestron DM-RMC-SCALER-C DigitalMedia 8G+ Receiver and Room Controllers w/scalers
1 Crestron DM-TX-200-C-2G Wall Plate DigitalMedia 8G+ Transmitter
2 Crestron DM-TX-201-C DigitalMedia 8G+ Transmitters
3 Crestron HD-DA-2 1-to-2 HDMI distribution amps and audio converters
1 Crestron HD-EXT1-C HDMI over shielded twisted pair extender
3 Crestron MPC-M10-B-T Media Presentation Controller M10s
4 Crestron TSW-750-B-S 7" touchscreen
4 Crestron remote-control button panels
1 Elmo P10 digital document camera w/cart
4 Extron Cable Cubby 600 furniture-mountable enclosures
1 Extron MVC 121 Plus 3-input stereo mixer w/DSP
3 Extron XPA 2001 mono 70/100V amps (200W)
2 Extron XPA 2002 2-channel amps (200W per channel)
1 FAAC Inc. MILO Range Theater system
1 FSR CB 22P ceiling enclosure
4 Gefen EXT-USB2.0-LR USB 2.0 extenders
34 JBL Control 26CT ceiling-mounted speakers
28 JBL Control 28 surface-mounted speakers
4 Mediatech lecterns
2 Middle Atlantic ERK-1825 ERK Series racks (18RU, 25"D)
6 Mobotix wide-view cameras w/integrated mics
5 Panasonic PT-VW435NU 4,000-lumen LCD projectors w/mounts
7 QSC CX302V 2-channel 70V power amps
13 Sharp 60" LC-60LE550U LED flat-panel displays w/mounts
4 Sharp 23" LED flat-panel displays w/tuners and mounts
2 Shure MX418S/C gooseneck mics
5 Shure ULXP14/51 lavalier wireless mic systems
1 SMART Technologies SP518 18" digital annotation device
12 Whirlwind custom audio/video I/O plates

List is edited from partial information supplied by Convergent Technologies Design Group.

of drywall. Structures include a townhouse with two one-story apartments, a single-family home, a bank, a 7-Eleven and a small school. In addition, there are also two metro subway cars and two CSX railroad train cars for additional training options.

"We utilize scenario-based learning with living role players as often as we can, because it helps bridge the book knowledge into practical application," Mullaney said. "The scene could be domestic, where we give recruits police radios set on a training channel. We dispatch them on mock calls that will make them run 150 yards up a hill to get their heart rate up. Then, they'll have to interact with role players on a domestic violence call. The role players are either officers, volunteers or interns for the police department." A real Glock pistol is used with simulation, non-lethal training rounds.

Personnel in police and EMS training use Axon body cameras. Mullaney noted, "All of our 800-plus veteran patrol officers use the body cameras, which show 143 degrees of view." The cameras store 64GB, with a record time of 70 hours. Expanding on the training application, Whitlock said, "The focus of the cameras is to observe in real time, as well as in playback scenarios for the educational benefit of the participants performing the tasks." Discussing having officers' handling of situations recorded and shown in the classroom, Mullaney added, "It's of tremendous value. It can show that we told them to look to the left, but they looked to the right."

Giving another example of the cameras' utility, Mullaney brought up teaching personnel the correct procedures in a high-risk traffic stop. "How are you going to get the guy out of the car?" he asked rhetorically. "The simulation you see has one of the instructors doing it with a GoPro camera mounted on their head, [to give] an officer's point of view. We can show tactilely how to order the guy out of the car and put him in a position of disadvantage."

The Cityscape also has four video-surveillance cameras further to record training activities.

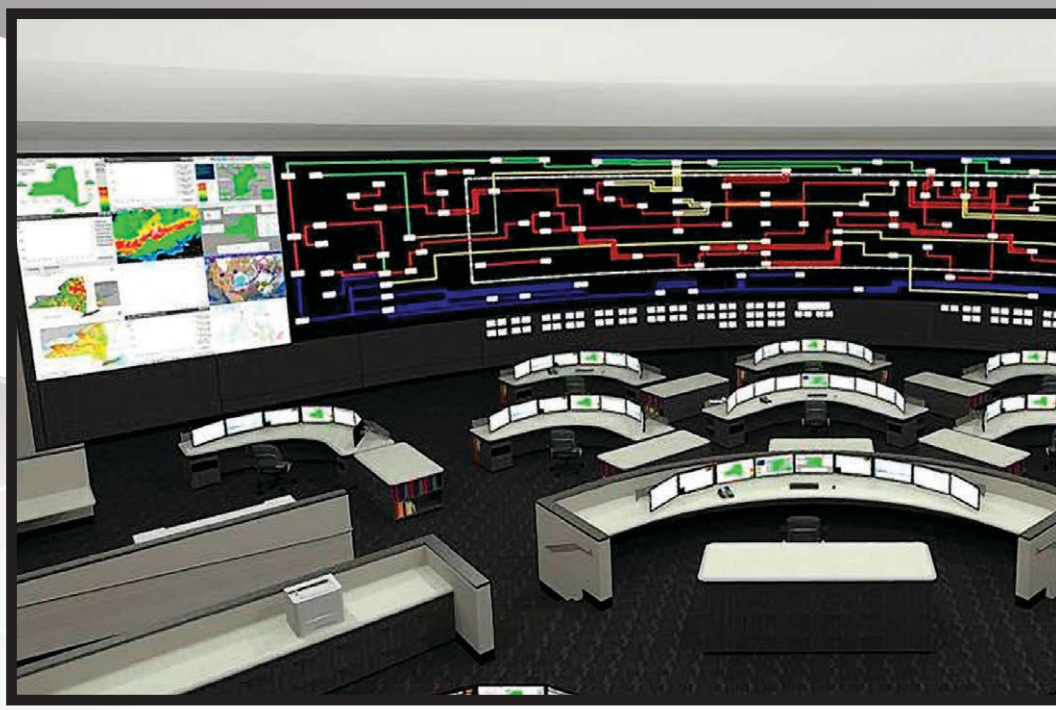
Immersive Environments

As previously mentioned, PSTA has a MILO Range Theater system on premises, which is used to create a more immersive training environment. The system is composed of three HD projectors that fire on three 180-degree viewing screens with surround-sound audio. Instructors sit in a control room behind the students, manipulating the scenario on the screens via a desktop computer. Although there are many pre-recorded scenarios from which to choose, users also have the ability to devise their own scenarios and upload them to the MILO Range Theater system.

Student officers in training interact with action on the panoramic screens. "The role player has a knife and the officer orders, 'Drop the knife!'" Mullaney said. "We can make the guy drop the knife and comply, or we can make him hold the knife and come at the officer." MILO allows officers to practice de-escalation techniques in an environment that forces them to maintain situational awareness in the same way they'll have to do on the street. He added, "The technology allows us to track the use of deadly force and immediately review with each participant the choices they made, and the rationale for those choices."

GOVERNMENT SOUND AND COMMUNICATIONS

This $5.2 billion vertical is adapting to technology evolution and to growth, as well.



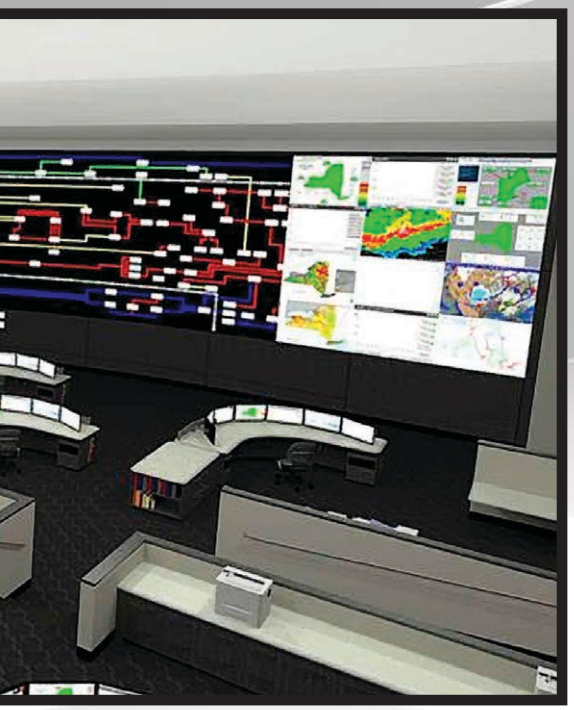
By Dan Daley

Ask any New Yorker about the city's near-mythical Second Ave. subway and you'll get an idea of how government and public works projects can stretch out over entire lifetimes. That newly opened extension of New York NY's underground railroad was authorized in 1929, first broke ground in 1972, stalled and was restarted 35 years later, and finally saw its first trains in 2017. The fact is, government projects are the same as, yet different from, other AV systems verticals. The most apparent differences are in scale and timeline, as the Second Ave. subway amply illustrates. However, the procurement and bidding processes can be especially arcane, and the Byzantine levels of security sometimes required to insulate entire agencies from one another reflect what one observer of the process called "the native paranoia of government."

An AVIXA overview of the government vertical from 2015 (when the organization was still known as InfoComm International) lists many of the enduring characteristics of the sector. For instance, whereas corporate and education verticals pursue cutting-edge technology, the government sector, it informs us, historically displays a preference for proven, although less advanced, technology. "When dealing with taxpayer money, fiscal responsibility is a top priority, and, so, government customers typically invest in AV technology that has been tried and tested," it says. Similarly, although return on investment (ROI) is a front-line criterion in most AV verticals, AVIXA finds that, because government is not intended to produce profits, ROI is virtually never the most important factor to justify spending on AV technology in the government sector. Instead, it emphasizes stability, reliability and security.

Government might be a slower-moving vertical, but it's also a substantial one. AVIXA's latest Industry Outlook and Trends Analysis (IOTA) revealed that commercial AV revenues from the government and military vertical are predicted to grow globally to $7.1 billion in 2022, from $5.2 billion in 2017, a compound annual growth rate (CAGR) of 6.6 percent. That growth will be fueled by several trends, including advances in simulation and visualization, command and control, and digital signage solutions.

"Simulation and visualization solutions are largely driven by a need to bring operators more quickly and efficiently up to speed on increasingly complex equipment and



New York NY's new Public Safety Answering Center (PSAC) II houses the most advanced and complex communication systems in the country, providing fast and efficient emergency 911 services. The facility offers more than 300 consoles for police, fire and emergency medical services in one location.

> 'We're being brought in much earlier than ever before on government projects—sometimes, even before the architect is hired.'
>
> —Tracie Bryant-Cravens

technology," Sean Wargo, AVIXA's Senior Director, Market Intelligence, stated. "Command and control goes without saying, but also reflects ongoing modernization efforts of the various centers to allow for better observation, coordination and communication. Displays, lighting and AV-related IT infrastructure are all part of this."

Security Concerns Drive AV

Recent events are accelerating the sector's growth and, perhaps, its uptake of technology. Some AV systems integrators who have experience in the government and public works sector have seen an expansion in the market in the last year or so, driven by the need to update infrastructure. Tracie Bryant-Cravens, VP of Sales for Enterprise Accounts at AVI-SPL, said that law enforcement and security, in venues that include police command-and-control centers and network operations centers (NOCs) used by emergency services, have been benefiting, in particular, from increased federal and state grant funding.

Bryant-Cravens referenced the Texas Department of Public Safety's NOC, which AVI-SPL built 22 years ago, and for which the company just submitted its proposal for a technology update. It was prompted, she said, by recent events, such as Hurricane Harvey, which flooded much of Houston TX last year. Florida's state-level emergency-services response to Hurricane Irma last year is also compelling officials to look at the state's response infrastructure. What turned out to be the most expensive US Atlantic hurricane season ever, racking up $202.6 billion in damages, will likely stimulate wider spending on emergency operations centers nationally and, thus, create demand for AV systems and services. All of that helps underscore Bryant-Cravens' point when she said that last year was the best year ever for the company's Control Room Group. "It was our number-two department in 2017 in terms of revenue," she noted.

A focus on security is also making AV integrators more, well, integral to the entire governmental apparatus. "We're being brought in much earlier than ever before on government projects—sometimes, even before the architect is hired," she stated. "That was almost never the case before." It's also restructuring how monies are allocated for AV. Whereas, once, AV systems worked from a separate budget on these types of projects—a budget that, often, was an afterthought and, sometimes, was plundered by other services before AV integration was completed—AV is increasingly part of larger budget domains, such as those for the general contractor or the architect. That serves to protect those funds, she observed. "They're now including AV into the project budget itself, not as an add on," she added.

That, in turn, is creating closer collaboration with those architects and contractors, which oftentimes results in better use of all the funds. "We're not just being brought in at the end, when we'd have to rip out some of the walls they'd just finished putting up," she concluded.

Networked AV

Government AV projects are often compared to corporate ones; they just take a few years longer. Three to five years, more

'We have to balance the needs of between four and six different people versus one or two on a corporate or other type of project.'

—Wayne Lusthoff II

precisely, which mirrors the approximate terms of the extended contracts under which many AV integrators work in this highly regulated sector. More even than corporate CFOs, government fiscal watchdogs want predictability, which extended-term contracts offer. They're also good for the integrator, whose firm benefits from a predictable revenue stream that's often made more comfortable by the continued decrease in costs of AV technology.

What frequently makes government work more difficult than corporate work, however, is the level of bureaucracy involved. "We'll have to balance the needs of between four and six different people versus one or two on a corporate or other type of project," Wayne Lusthoff II, Account Executive at iSpace Environments, stated. The Minneapolis MN-area integrator has been deeply involved in Minnesota state facilities, especially courthouses, for the last half-decade. "It's a bigger hierarchy you have to deal with," he added.

Lusthoff believes the most significant change in the sector in recent years is the enthusiastic uptake in collaborative media in courtrooms. Attorneys are increasingly amenable to the idea of virtual *corpus delecti* when it comes to witnesses and evidence, and judges are able to handle much heavier caseloads when suspects can be arraigned through video portals that connect jails and courtrooms. Incidentally, it also considerably reduces transport and security costs.

Much of this has migrated to a network, with those same platforms being used over IP. Most of that video is at 1080p, and Lusthoff doesn't expect it to jump to 4K or ultra HD anytime soon. "Neither the content nor the need are there at this point," he opined. However, cases with critical engineering or medical testimony might change that in the future. Audio, which is increasingly being routed over IP, as well, is seeing a wide range of microphone types—ranging from ceiling-mounted arrays, to wired goosenecks and table mics, to handheld wireless (many of which are being replaced with models that avoid the 600MHz range, which was repurposed last year in the wake of a Federal Communications Commission (FCC) auction). Meanwhile, according to Lusthoff, he's seeing the increased use of personal wireless mobile devices, especially tablets.

All this is making courtrooms and other meeting spaces in government facilities resemble corporate media environments. "It's becoming harder to tell the two apart in many cases, because the technology in both is so similar now," he commented. "It's not at the point yet where people are using their smartphones in this environment like they are in business, but that's where it's heading."

Design consultancy Convergent Technologies Design Group (CTDG), in the Baltimore MD area, is close to the federal government's hub, and the firm recently did AV updates for the US Geological Survey's offices. Bill Holaday, Principal, said personal mobile devices are making some inroads into government AV systems de-

signs, which, he added, could be an inflection point in this traditionally staid vertical. However, there is also some pushback against that. "It's the security issue," he noted. "They can't let someone who is making a presentation onto their [internal] network. That AV will have to come in through a separate network," which, he said, creates a kind of technological "moat" around a facility's AV culture. That keeps it from achieving true parity with other sectors.

On the other hand, there is often more at stake, when it comes to security, on a government level. Holaday cited how judges have to balance their desire to have more advanced AV systems in their courtrooms with the potential for those systems to interfere with judicial processes. "If an attorney or a witness were to inadvertently bring the wrong image or information in, because the AV system was so accessible, it could create a mistrial," he explained. (One way to avoid that type of problem—and provide an AV-centric solution—is to design in a previewing system at the judge's bench.)

The Changing Matrix

Although collaborative AV tools are becoming more common in government environments, they are doing so in one of AV's most security-conscious spaces. "We've done projects that, literally, have 52 levels of data networks," Steve Emspak, a Partner at consultancy Shen Milsom & Wilke, said. "At the same time, they have a hundred consoles in an operations center to be able to share in real time, with full redundancy. It's a challenge." But that challenge, he added, is increasingly doable, thanks to more innovative technology and products, with decreasing costs. "You can actually reconcile the 'cheap, fast, good' equation, because the competitiveness between manufacturers is creating great technology at affordable prices," he observed, even as a highly consolidated AV integration service sector is able to add purchasing power, as well as more predictable labor costs. That produces another kind of challenge, he said—one in which not all integrators might be familiar with the entire range of product solutions in a fast-changing market. For that reason, Emspak noted, when his company specifies certain complex systems, it also prefers to choose the integrators, as well, to ensure that the consultant's and agency's visions are fully and properly integrated, particularly as government data moves onto multi-layered secure networks.

A Different Business

Government projects have historically tended to be walled gardens, available to vendors whose firms complete a circuit

> 'If an attorney or a witness were to inadvertently bring the wrong image or information in, because the AV system was so accessible, it could create a mistrial.'
>
> —Bill Holaday

of often-arcane bidding and other processes across a relatively lengthy timeline, and they've tended to favor system reliability and security over state-of-the-art technology. However, that's changing, as personal mobile devices and accessible software begin to transform the sector. Bruce Kaufmann, President and CEO of design/build firm Human Circuit, which once saw as much as two-thirds of its business come mostly from the federal government to its base in Washington DC, cited that dynamic, as well as a changed vendor culture around government projects, as the reason the future might not resemble the past.

"An article? Maybe you should be writing a book instead!" he quipped. Kaufmann cited the proliferation of types of procurement vehicles used by the federal government and a shift toward big contractors, such as Northrop Grumman and Boeing, which often subcontract work like AV integration themselves as part of larger bids, rather than contracting directly with the AV integrator. He also referenced the increased commoditization of AV technology and services. "The government game has become a big-player game with some niches now," he observed, noting that government projects now account for closer to one-third of Human Circuit's work. "That's making less work available to smaller companies."

Holaday agreed that government bid processes can still take considerably longer than most other types of projects; that characteristic becomes a vulnerability when it comes to AV technology, which is changing at a faster pace than ever before. To counter that, he said, CTDG will often delay providing the AV package bid component of an overall project design, while also building in terms that compel manufacturers to replace elements that become obsolete or discontinued in that time, at no additional cost. "The rapid rate of change in AV equipment is much more noticeable in government than in other AV verticals, and that can be a struggle," he admitted. "Those are some of the ways we can keep their technology closer to the edge."

The Future

Periodically, larger events will reshape the government narrative. The 9/11 attacks were an extreme example, but 2017's litany of natural disasters—from hurricanes in Texas, Florida and Puerto Rico, to massive brushfires across California—are already having their effects. Holaday said he's noticed that the architects and general contractors whose firms lead the agenda for government facilities contracts are moving their focus away from the broader landscape and toward those affected regions. "Normally, they might be looking at an airport in Tennessee or a healthcare facility in Pennsylvania," he said, "but, instead, they're focusing on public-safety projects in Florida or Houston. We haven't seen the uptick in actual projects yet, like new emergency operations centers, but we expect it will come soon."

Data breaches in general, and the hacks surrounding the 2016 presidential election in particular, are putting new emphasis on cyber security, Bryant-Cravens observed. That will accelerate AV/IT convergence. The good news for the AV side of that, she said, is a growing need for more advanced display and communications platforms, as well as more interaction with security re-

> 'You can actually reconcile the "cheap, fast, good" equation, because the competitiveness between manufacturers is creating great technology at affordable prices.'
>
> —Steve Emspak

sources. She cited AVI-SPL's collaboration with InfraGard, a non-profit information-sharing and analysis partnership program between the FBI and the private sector that's intended, according to its website, to "expedite the timely exchange of information and promote mutual learning opportunities relevant to the protection of critical infrastructure." She explained, "We're taking their footage and other content and putting it across multiple screens, to show them how AV can help manage it. It can get pretty 'Minority Report'-like. And we're already seeing some penetration of 4K and ultra HD video in fusion centers," which are joint information-sharing facilities created under the Department of Homeland Security and the Office of Justice in the Department of Justice.

The consensus is that government AV will remain its own universe, where installations remain in place far longer than they would in other verticals, leaving it perennially a kind of time machine: In some places, CRT televisions are still mounted on large brackets and projectors shine onto bare walls. But, any of those spaces can be shot forward in time through periodic updates. And even as staid a vertical as government cannot resist the leavening effect that IT convergence and mobile-device integration are beginning to have.

Kaufmann said the sector is beginning to evolve its own CIO cohort, asserting greater control within agencies and departments, in the form of managers who can coherently guide AV and IT onto networks. It's part of a larger process in which, he said, "AV is becoming a subset of IT. We are seeing the arrival of the government CIO, and that's part of putting government and corporate IT in the driver's seat for technology decisions. Government has always lagged the corporate marker, but it's closing the gap."

FILL FACTOR

THE NEXT WAR IN DISPLAY TECHNOLOGY.

By James Fife
rp Visual Solutions

When it comes to display properties that affect performance, one of the most misunderstood is visual acuity. Acuity in a display can be related to the hardware, content and overall image size. This article is in relation to the hardware and how it relates to human eyesight. Determining a display's acuity allows a designer to determine if the system has acceptable detail at the nearest usable viewer and the ideal viewer distances, while being display-technology agnostic.

Visual acuity, regarding eyesight, is the ability to see fine detail in a high-contrast, stationary setting. With any movement, the human eye can discern a dot that is 1′ (′ = arc minute, or 1/60 of a degree) when it is black on white. This is a well-known value, but what is imperative to take note of is what is being measured: It isn't the distance between two-line centers but, rather, the distance between the edges of the change of state. Refer to Diagram A, which points out the edges where it changes from dark to light to dark. The amount of blue top and bottom is not relevant to acuity measurements. It is the distance in the middle that is critical, because it can be vastly different when comparing differing technology types, even while pixel density remains the same.

Before we dive into displays, a short dive into the math to calculate the acuity height of human vision is required. In order to calculate acuity for human vision, any two of three values must be known: (a) acuity height of target item, (b) distance to target item and (c) the angle the human eye can see. It is worth repeating that the angle the human eye can see is a constant that is known to be 1′. The formula for solving distance to a viewer is as follows: Distance (D) = acuity height (H) / tan (1′). This formula holds true, and only values for either D or H are required to solve the equation. To make this easier, the formula can be reduced by solving the tangent, creating H = D / 3438, or D = 3438H (both rounded to nearest single digit). This is a fairly well-known equation, but, historically, it has been applied incorrectly to pixel density, and this is where things get interesting.

With regard to acuity and the image on a display, the smallest detail any display can create is one dot. That is done by turning a single pixel off. This is also the smallest artifact size that can be created by a display, creating a darkened spot in the image. This distance also adds up to create jagged edges on curved lines or bright/dark lines, due to incorrect spacing of pix-

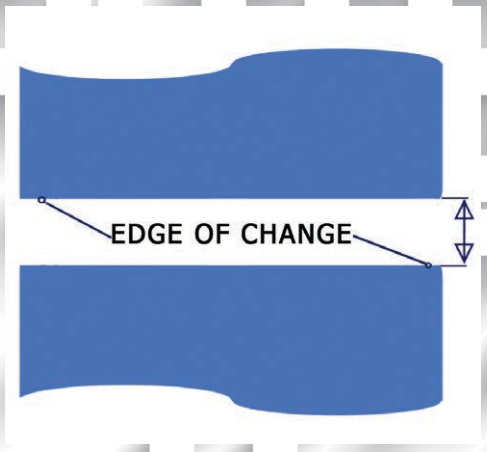


Diagram A

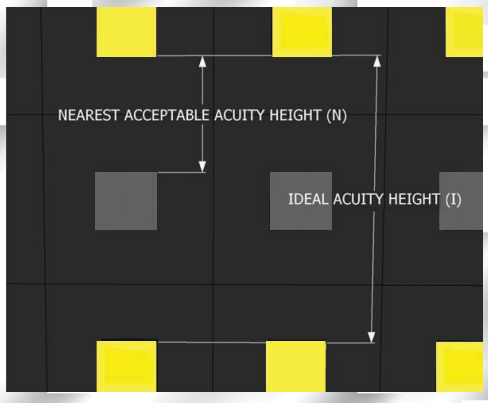


Diagram B

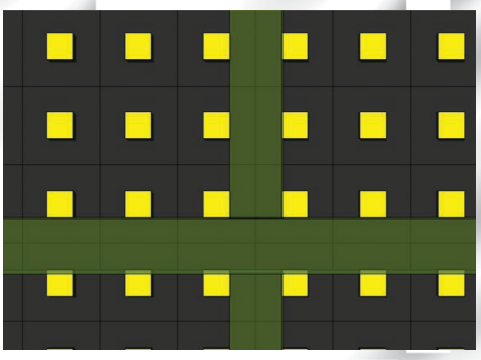


Diagram C

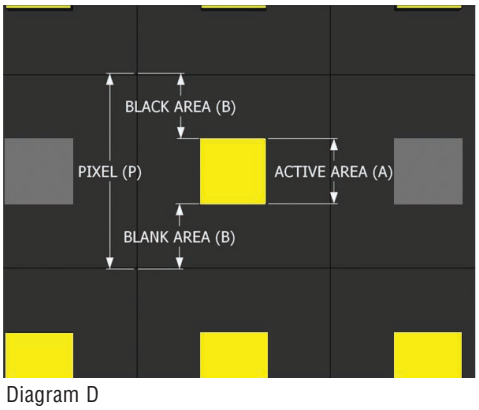


Diagram D

els or panels. In order not to see any artifacts in an image, the viewer must be far enough away so that his or her distance makes the detail uniquely unperceivable. That distance can be found using the Ideal Acuity Height (I). In a display, this is the distance between two pixels with the center one off.

Refer to Diagram B, showing Ideal Acuity Height to be from the inside edge of the pixel that is on to the inside edge of the next pixel that is on, with a pixel off in the middle. If you are closer to the display than this distance, the image will still appear to be pixel-based, and it won't look as smooth as an analog solid line (like a painting or a drawing). To calculate the Ideal Acuity Height, take the equation for acuity for human vision and substitute variable H with I, giving the equation D = 3438I. Beyond that distance, there will be no perceivable pixels or artifacts, regardless of content. Also, take note that, beyond that distance, any more resolution is of no benefit to a viewer.

The other distance that is often required in a display system design is the minimum viewing distance. Although this is somewhat subjective, the definitive closest viewer is where artifacts are visible, but the pixels start to convolve into an image. Put another way, it is where the screen door effect starts to go away. There are several rules of thumb for this, but none of them is technology-agnostic, and none takes into account pixel fill factor. To solve for this, it is required first to look at what allows the image to start to merge. The screen door effect is caused by the eye seeing the lines rather than the image that is being created. In a pixel-based image, there are lines that are solid across or up/down the image between the active areas, as seen in Diagram C. Once a person moves beyond the thickness found using N for Acuity (refer to Diagram B), they start to see the image, not just individual dots. To calculate the nearest acceptable viewing distance, use the formula D = 3438N by exchanging height H with N in the acuity formula.

Returning to human optics, what is interesting to note is that the human eye is able to see a line 60 times more easily than a dot, as long as the line extends beyond 30′ in angular width. This means that, for any pixel-based image, alignment between the rows of pixels is critical. A variance in alignment vertically, horizontally or front to back between panels affects N for a single line space, and differences become painfully apparent. Narrow-pixel-pitch, direct-view LED is the one technology that demands very-high-accuracy mounting and integration. It is imperative that the pixel spacing be very

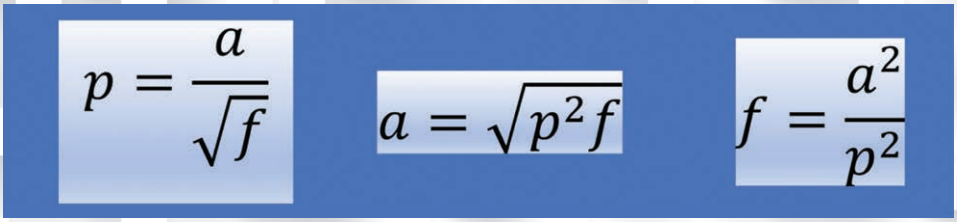


Diagram E

Technology	Fill Factor	A (mm), P=1.2mm	I (mm), P=1.2mm	N (mm), P=1.2mm
Newer DMD based projectors	87%	1.1193	278	4403
D-ILA projection	93%	1.1572	147	4272
LCD projection	70-80%	1.004-1.073	674-436	4799-4561
Low fill DVLED	15%	0.4648	2528	6653
Medium Fill DVLED	25.5%	0.606	2042	6167
High fill DVLED	40%	0.7589	1516	5642
Micro DOT DVLED	0.001% or less	0.0038	3995	8120

Table A
1.2mm pixel pitch with different display technologies.

consistent across the entire image to give the illusion of a single image, rather than a set of separate tiles.

At this point, it has been shown what the nearest and ideal distances are, and why. The issue is that most manufacturers do not state what these dimensions are for fixed arrays. Additionally, for some technologies, the distances are not always the same, because they change based on zoom capabilities. However, they can be solved for by using the dimensions of the pixel itself, or pixel density and fill factor. The parts of a pixel are shown in Diagram D, which shows the pixel height, the blank area and the active height. The easiest way to solve for the pixel-size values is to use the variables, pixel height and the fill factor. For variable-size technologies, like projection, the pixel height is the display height or width divided by the number of pixels.

Fill factor is the next thing for which to solve. Fill factor is the relationship between the area of the entire pixel and the active portion of the pixel. Fill factor (f) is expressed as $f = A^2 / p^2$, where (A) is active size within a single pixel and (p) is the total pixel size. This equation can be rearranged as shown in Diagram E. The key is that fill factor is a relation of area, and not distance. So, a value of 0.25 is a 25-percent-full pixel, which means four active areas of that size would be required to fill the pixel.

Luckily, fill factor is stated by some manufacturers of projectors and LED products, and it can also be measured physically. For general use, in Table A, there is a list of generic fill factors, along with calculations for a 1.2-millimeter pixel density. As can be seen below, the larger the fill factor, the closer both the nearest and ideal viewing distances can be. Fill factor is certain to become a heated battle in display technologies, as many have reached a point where more density is nearly impossible, or simply cost prohibitive. It cannot be stressed enough how important fill factor is to overall image quality.

It is possible, using fill factor and pixel density, to solve for all the other pixel values—specifically, the active height. The distances that are of interest are Ideal Viewer Distance (I) and Nearest Viewer Distance (N). In reference to Diagram B, I is nearly two full pixels tall in the diagram. It is shy of two pixels by the height of one active (A) height. That means that 2p (pixels) minus 1A (active area) gets you distance I. This is expressed I = 2p – A. Looking at N, it is very similar. For distance N, it is nearly one pixel, but short by the active area, as well. So, N is 1p (pixel) minus active height shown as N = 1p – A. This now offers the height to use for ideal and nearest viewing distances.

Finally, the last stage is to combine the formulas to create the master nearest and farthest equations. For nearest viewer, this was done by removing N from D = 3438N and substituting that with p – A, yielding D = 3438 (p – A). Then, remove the A and replace it with $\sqrt{f} * p$, as seen in Diagram E. That gives the final equation of D = 3438 ($p - \sqrt{f} * p$). The same exchanges can be done with the Ideal Viewer to get the final equation pair as follows:

Ideal Viewer Distance is D = 3438 ($2p - \sqrt{f} * p$). Nearest Viewer Distance is D = 3438 ($p - \sqrt{f} * p$).

In conclusion, a great-looking display requires many factors to be considered, all of which are interrelated. Fill factor plays a very critical role in overall image quality. Small changes in fill factor can dramatically change the I and N values. By designing around these values, a designer can save a client a lot of money by ensuring the right technology is chosen for a given environment. Most important, however, is that the nearest and ideal viewer positions can be solved for using math related to human visual acuity. These are real values, removing the marketing aspect. Have fun designing and running the numbers, and ensure you get that alignment right. The appearance of the final image depends on it.

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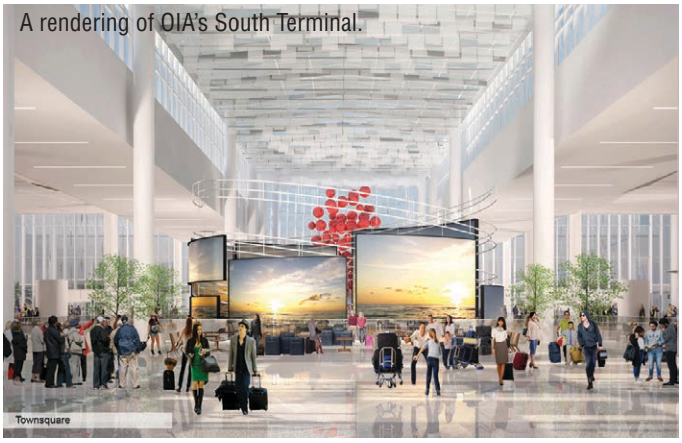
Compiled by Matt Van Dyke

Government Facilities And Public Works: Earn Your Wings

There were nearly 37 million flights in 2017—more than any year in history—as reported by the Aviation Safety Network. And what are airports inundated with crowds doing about it? They're expanding, of course, and it's often to the tune of billions of dollars on complex, multi-year projects. If things seem tight right now, don't worry; space is definitely on most airports' radar. (I'm talking about buildings, not planes—legroom is still going the way of the dodo.)
Here's a sampling of expansion projects currently in the works.



A rendering of OIA's South Terminal.

Florida Flights

At Orlando International Airport (OIA), a $2.1 billion project recently began, involving the construction of a new South Terminal, which, airport officials explained, is critical for relieving crowding at the airport's existing North Terminal. The billion-dollar price tag covers Phase I construction, which will include a 2.7-million-square-foot domestic and international terminal building that will have 16 gates when it's completed in 2020. According to officials, the ultimate vision for the South Terminal is to match the existing North Terminal with 120 gates, so as to handle between 80 and 100 million passengers a year, as reported by the *Orlando Sentinel* last month.

At the South Terminal, through the use of interactive digital signage, visitors will experience the attractions of central Florida and departing passengers will be able to project their own vacation images onto screens to share with friends and family. This is the third attempt by OIA to build a terminal, with earlier attempts having been derailed by the terrorist attacks in 2001 and then the recession. Further overhauls to ticket and baggage-check areas will also be completed this year.

Also in Florida, Tampa International Airport has revealed the $543 million Phase II of its expansion, which will include express curbside drop-off and the commercial development of 17 acres of airport property, as reported by the *Tampa Bay Times.* The highlight of Phase II is the "Gateway": two hotels; an eight-story, 240,000-square-foot office building; a 20,000-square-foot retail strip; and a gas station with a convenience store. The Gateway will also include a large atrium, pedestrian connections and commercial curbsides for transit and ground transportation. Site preparation for Phase II is set to start in the middle of the year, with construction launching in 2019 (pending board approvals) and completion around 2023.

A rendering of Concourse A North interior.

Courtesy Charlotte Douglas International Airport.

Charlotte Connection

Charlotte Douglas International's new Concourse A North is a $200 million project that is expected to open in late June or early July, boasting nine new gates, according to *The Charlotte Observer.* Travelers can expect a wider building (30 feet wider, to be exact) as compared to pre-existing concourses, along with glass windows and chargers at every seat. Concourse A North will bring Charlotte Douglas to a total of 111 gates. The additional gates will largely handle local travelers, because a majority of the airport's 44.4-million annual travelers are changing planes to make a connection at American Airlines' hub there.

On the tech side, each of the 370 glass panes in the new concourse will be internet-connected, with a computer adjusting the tint intermittently, thereby helping to ensure climate control and lighting are more energy efficient. A 139-foot-wide LED videowall will display changing artwork in the terminal; lights and colors will be determined by running the airport's data through an algorithm. Retail tenants that will reside in the new space include a bar from NoDa Brewing Company, Smashburger, Panera, The Body Shop, Jamba Juice and Starbucks. The airport is funding the concourse expansion with revenue bonds and the proceeds of a $3-per-passenger charge. The addition of 16 more gates to Concourse A is planned for the future; construction will possibly start in 2021.

Another major project currently underway at Charlotte Douglas is to expand and replace the roadway in front of the terminal lobby: The eight-lane road is scheduled to open this summer. The $50 million project is expected to improve traffic flow. Once the new lanes open, the airport plans to tear down the old road and start construction to expand the terminal lobby—an estimated $247 million project. In addition, the Federal Aviation Administration is building a control tower that's more than twice as tall as the current tower. That's scheduled for completion in 2020. Other plans include adding gates at Concourses B and C.

Compiled by Matt Van Dyke

Crestron, Alexa Continue Blossoming Partnership

Underscoring the applicability of voice control—particularly Alexa—in the commercial AV industry, the Wynn Hotel in Las Vegas NV has extensive voice-control capabilities in 4,700 guestrooms on its luxury property. According to an article on www.cnet.com, written by Andrew Gebhart, the guestrooms are equipped with Crestron technology, which Alexa can control. The integration of Alexa voice control with Crestron technology is just one example of the Rockleigh NJ-based company's blossoming partnership with the intelligent personal assistant from Amazon, which includes Alexa having a Crestron Skill. Further penetration into the commercial segment is currently underway.

NSCA Releases Updated 'Electronic Systems Outlook'

NSCA's "Electronic Systems Outlook" report has been updated for winter 2017, and it includes information based upon actual data from January through November 2017, as well as forecasted information for this year. By tracking new construction and renovations across multiple markets, including healthcare, lodging, retail, education and house of worship, NSCA pinpointed which verticals should do well this year and beyond. NSCA partnered with FMI to provide this report.

The "Electronic Systems Outlook" winter 2017 edition also provides an updated view of construction data by market for electronic systems/technology, including AV, data/IT, building automation/control, life safety/fire/security and digital signage/lighting.

"This report makes it easier for members to decide where to focus their efforts," Chuck Wilson, NSCA's Executive Director, said. "Primary growth segments in 2018 are expected to include corporate offices, retail and lodging—all with forecasted growth rates of five percent or more."

Most other segments are likely to grow (roughly at the rate of inflation) and should be considered stable. The house of worship market is the only segment expected to decline this year, according to the report.

At the 20th annual Business & Leadership Conference (BLC), in what has become an annual tradition, Chris Kuehl—Chief Economist for several organizations, and Managing Partner for a firm that provides forecasts and strategic guidance—used the "Electronic Systems Outlook" winter 2017 edition to analyze long-term trends, current conditions and the economic outlook. In addition, NSCA will host a free, one-hour webinar on March 20 to help integrators learn more about this data and how to apply it to their own businesses.

Powersoft Opens East Coast Headquarters

Powersoft, a provider of amplifier platforms, has opened a headquarters in the New York metro area. The 3,700-square-foot facility, located in Kearny NJ, will house Powersoft's operations, sales, support, warehousing and distribution for the US and Canada. The east coast headquarters location is also logistically advantageous to the Powersoft executive team, which takes frequent flights from Italy into Newark Liberty International Airport in New Jersey. The reduced time difference, according to the company, enables more direct communication among the executive team at Powersoft to support the business better. The headquarters features product demo rooms, collaborative spaces and a full restaurant with views of New York NY.

"Our new regional headquarters location in New York is a testament to the tremendous growth potential we see in the North American region," Luca Giorgi, General Manager, North America, commented. "We are looking to increase our presence in the US and Canada—in both footprint and scale. This will be achieved by streamlining our operations, increasing our sales presence and becoming more successful in the small to medium-sized installation market." Giorgi comes from Powersoft's international headquarters location in Florence, Italy.

The headquarters will provide several advantages for customers, including increased stocking and inventory, reduced ship times, greater accommodation of expedited customer orders, increased regional support, and greater contact and engagement with regional sales representatives, the company stated.

Powersoft's new North American location is at 78 John Miller Way, Kearny NJ, 07032.

TMP-Pro Adds To Video Presence With JVC, Teradek

TMP-Pro, the pro distribution division of The Music People, has added JVC cameras and Teradek video streaming solutions to its line card. TMP-Pro also featured both companies at this year's NAMM Show in Anaheim CA.

"Having worked with TMP-Pro for more than 20 years, I'm continually impressed with their brand relationships and the knowledge of their manufacturer-certified specialists," Tony Price, Roland's VP of Sales, said. "And now," he added, "the addition of JVC cameras and Teradek video streaming enables them to offer clients cutting-edge, turnkey video solutions."

Clear-Com Celebrates 50th Anniversary


Mitzi Dominguez, CEO, with Bob Boster, President, Clear-Com.

Clear-Com, a provider of real-time communications solutions and service, is celebrating the 50th anniversary of its founding. Throughout the year, the company welcomes its employees, partners, users and the wider pro-audio community across the world to commemorate the Clear-Com brand and its history. The anniversary marks an important milestone for the company, as it looks back on its heritage of communications advancements and the people who contributed to its success.

Founded on April 18, 1968, Clear-Com traces its beginning to a two-person team in San Francisco CA, where the music scene flourished and ear-deafening music became the norm. It was at that time that Bob Cohen and Charlie Button met and worked together to create the first production intercom, known as the RS-100 distributed amplifier analog beltpack system. The RS-100 was used for production communication by San Francisco rock bands and artists that included Jefferson Airplane, Janis Joplin and the Grateful Dead. Since then, Clear-Com has stayed true to its roots with analog-based intercom systems for the live performance market, while the company has also expanded into the broadcast, military, aerospace and government, sports operations, house of worship, theme park and offshore-marine markets.

The company will be celebrating in different ways in various parts of the world—at trade shows, in local events with partners and customers, on social media channels and on its dedicated 50-year anniversary website (www.clearcom50.com).

Cybersecurity Summit On Integrated Systems To Launch This Year

Cyber:Secured Forum, a cybersecurity summit that focuses on integrated systems, will launch with an inaugural gathering in Denver CO, June 4 to 6. The summit is backed by a partnership between PSA Security Network, a systems integrator cooperative; ISC Security Events (Reed Exhibitions), the global trade show company; and the Security Industry Association (SIA), a trade association for global security solution providers.

Cyber:Secured Forum will feature content on cybersecurity trends and best practices, as related to the delivery of physical security systems and other integrated systems. Content will be collaboratively developed by SIA and PSA Security Network's education teams, and it's expected to feature top cybersecurity leaders. Additionally, sponsor exhibits will help showcase solutions related to cybersecurity, integrated systems and physical security solutions.

The two-day event will provide leaders in the IT and physical security industries with opportunities to connect and share information on risks and liabilities, how to respond to cybersecurity threats and how to establish security control standards across IT systems and, particularly, when integrating physical security solutions and devices on IT networks.

"Sophisticated cyber-vulnerabilities and threats are emerging every day, and it is critical for the physical security and systems integration industry to accelerate its delivery of compelling education to help all industry stakeholders mitigate the risk of cyberattacks," Don Erickson, SIA's CEO, said. "To that end, SIA, PSA Security Network and Reed Exhibitions created the Cyber:Secured Forum to cover the waterfront when it comes to producing an impactful conference that will provide thought-provoking insight into cyber trends, and practical advice for new business practices that will raise the industry's cyber posture."

Bose Professional Expands Partnership With Stampede

Building on a distribution partnership that began in May, Stampede has now been appointed by Bose Professional to represent Bose's professional product line throughout the Caribbean, as well as in Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Argentina, Paraguay and Uruguay. The appointment is effective immediately, according to Stampede's President and COO, Kevin Kelly.

"We're honored to have the opportunity to expand our relationship with Bose Professional," Kelly commented. "With this additional appointment, Stampede can now present the Bose Professional value proposition throughout the US, Canada, the Caribbean and much of the Latin American region. We are committed to bringing Bose's professional solutions to more resellers in more parts of the Americas, and beyond."

CALENDAR

March

TEC 2018
Mar. 12–16
Denver CO
PSA
www.psatec.com

GlobalShop 2018
Mar. 27–29
Chicago IL
Emerald Expositions, LLC
www.globalshop.org

Digital Signage Expo (DSE) 2018
Mar. 27–30
Las Vegas NV
ExpoNation
www.digitalsignageexpo.net

April

NAB Show
Apr. 7–12
Las Vegas NV
National Association of Broadcasters
www.nabshow.com

Prolight + Sound
Apr. 10–13
Frankfurt, Germany
Messe Frankfurt Exhibition GmbH
www.pls.messefrankfurt.com

InfoComm China 2018
Apr. 11–13
Beijing, China
AVIXA
www.infocomm-china.com/en

Telestream Reorganizes Corporate Structure

Following the appointment of Scott Puopolo as CEO in October, Telestream, a provider of file-based media workflow orchestration, media streaming and delivery technologies, has announced a new corporate structure.

The company is now organized into two business units, supported by shared corporate functions in finance, operations, marketing and HR. The company's Media Workflow and Production business unit, under the leadership of newly appointed President Anna Greco, will focus on technologies that enable customers to manage the scale and complexity that have resulted from growth in live and file-based content production and workflows. This business unit includes solutions for live and on-demand encoding and transcoding, live streaming production, workflow automation and orchestration.

The Video Quality Monitoring and Analytics business unit will focus on solutions that ensure quality content is delivered, providing video data acquisition and quality assurance across live, linear and on-demand networks. Calvin Harrison, who was formerly IneoQuest Technologies' President and CEO, prior to its acquisition by Telestream last March, serves as President of this business unit.

LYNX Technik Joins AIMS

LYNX Technik AG, a provider of software-defined modular interfaces for commercial AV, as well as broadcast and industrial signal processing applications, has joined the Alliance for IP Media Solutions (AIMS). LYNX Technik's solutions are installed at facilities worldwide, supporting applications that range from global sporting events, houses of worship and government, to broadcast production, playout and distribution, to medical installations and theatrical events.

"At LYNX Technik, we strongly believe in enhancing our customers' workflow with the help of innovative products and solutions," Sebastian Schaffrath, Chief Technology Innovation Officer, said. "By joining the Alliance for IP Media Solutions, we are not only committing to standard IT-based technology, but also extending our product functions to support our customers on their road toward IP-based media infrastructure."

AIMS works with industry standards organizations, including the Video Services Forum (VSF), the Society of Motion Picture and Television Engineers (SMPTE) and the European Broadcasting Union (EBU), to facilitate the industry's transition from SDI to IP through industry standards and interoperable solutions that enable the rapid evolution to open, agile and versatile production environments.

QSC Celebrates 50th Anniversary

In 1968, the company known today as QSC was born as Quilter Sound Things in a small industrial building in Costa Mesa CA. The original focus for QSC was hand-built guitar amplifiers; the company only later evolved to become a major brand in power amplifiers.

"Our early vision was to take over the world with high-powered, giant guitar amps, but we missed that boat and refocused our efforts on power amps," Pat Quilter, QSC's Co-Founder, said. "Since the beginning, QSC has always focused on staying close to our customers, which is the foundation for the company's success."

"Our story is one of constant innovation and forward transformation, always with the passion to serve our customers' needs," Barry Andrews, QSC's Co-Founder, added. "When we decided to enter the loudspeaker category, for example, we listened carefully to our customer feedback to develop the K Series…. Our passion to serve our customers is the mission in every aspect of our business."

"Looking forward, we will continue our commitment to be both a technology platform leader and a customer experience leader in the markets we serve," Joe Pham, QSC's President and CEO, affirmed. "The future at QSC is about continuing to innovate and deliver connected, integrated technology platforms that elevate customer experiences, and that create new opportunities for our employees, more value for our partners, and new applications and capabilities in the markets we serve. In this world, everybody wins."

The 50th anniversary of the company's founding will be celebrated this year with a number of events, activities and key product introductions that will take place during the year all around the globe.

AlltecPro Launches Operations

AlltecPro, a Fairfield NJ-based manufacturer and provider of commercial AV products and consumer technology for commercial and residential applications, has formally launched business operations. The company will focus on the corporate, education, construction, hospitality, entertainment and home markets. Vincent Bruno has been appointed President of the company. Previously, Bruno was CEO of the Custom Electronic Design & Installation Association (CEDIA) and the Director of Marketing for Crestron Electronics.

"This is an exciting period for our industry, as technological innovation advances rapidly, and the opportunities are tremendous," Bruno enthused. "AlltecPro already works with thousands of technology integrators around the world that professionally design, install, upgrade, repair, monitor and manage systems for their customers." He continued, "Our industry delivers exceptional experiences by providing simplified technology workplace environments and personal lifestyles. Our clients include technology integrators, audio-video dealers, retailers, consultants, facilities managers, IT professionals, electrical contractors, plumbers, HVAC installers, builders, designers, architects, educators and homeowners. We work with respected manufacturers that build innovative products, and we lead with our own house brands…."

PEOPLE

Compiled by Matt Van Dyke


J. Boitnott


R. Naqvi


B. Costin


J. Nilsson


C. Osika


A. Greco


B. Poucel


R. Whittaker


J. Little


F. Pisano


T. Davis


(L-R): S. Zaccaria, D. Mochi, D. Strasserra


M. Capuzzo


E. Wooton


A. Kunz


D. Nowak


L. Long


M. Feldmann


C. Cavins

PreSonus promoted Jim Boitnott to COO, Rick Naqvi to Senior VP, Global Sales, and Bret Costin to Senior VP, Research and Development…**d&b audiotechnik** welcomed Jens Nilsson as CFO and Managing Director…**Telestream** has appointed Susan White as Chief Finance and Operating Officer, Chris Osika as CMO, Anna Greco as President, Media Workflow and Production Business, and Calvin Harrison as President, Video Quality Monitoring and Analytics Business…**Broadcast Pix** promoted Bob Poucel to General Manager and Russell Whittaker to Worldwide Director, Channel Sales…**Thinklogical** appointed Jillian Little as VP of Sales, US Federal Government Solutions…**BrightSign** announced Frank Pisano as VP of Sales…**Utah Scientific** promoted Troy Davis to VP, North American Sales…**K-array** promoted Stefano Zaccaria to VP of Sales and Marketing, Daniel Strasserra to Sales Engineer and Daniele Mochi to Project Manager…**Electrosonic** appointed Maurizio Capuzzo as VP of Marketing…**Datapath** hired Eric Wooton as Senior Sales Manager…**Yamaha Pro Audio** welcomed Aaron Kunz as District Manager, Commercial Audio Sales, and David Nowak as District Manager, Commercial Installation Solutions, Southeast US…**GLP US** appointed Lewis Long as Business Development Manager and rehired Michael Feldmann as Product and Portfolio Manager…**VUE** hired George Dreyer as Senior Product Engineer, and Jon Garner and Brandon Rinas as Sales Reps…**ETC** recruited Carrie Cavins as Architectural Field Project Coordinator….

Product information supplied by manufacturers and/or distributors.

Compiled by Dan Ferrisi and Anthony Vargas

WyreStorm's Ultra HD Splitter

WyreStorm has released the SP-0208-HDBT-H2, a 4K ultra HD splitter that features the multiple transmission platforms of HDMI and both Class A and Class B HDBaseT. Suitable for multi-screen and signage applications in hospitality and retail environments, it was developed in line with WyreStorm's multi-platform approach to AV signal management as an alternative to transmitting an HDMI source over multiple distances to multiple locations, where a matrix switcher is either too expensive or would be over-specifying. Boasting 3 transmission technologies, the SP-0208 features dual HDMI inputs that can be automatically or manually switched to any of its 4 HDBaseT Class B, 2 HDBaseT Class A and 2 HDMI outputs. The result is a set of transmission options that enable the distribution of 4K to 115' or 1080p to 230' using Class B HDBaseT or, for longer distances, 4K to 230' and 1080p to 328'.

WyreStorm
www.wyrestorm.com

tvONE's AV Matrix Routers

tvONE's C3-340 CORIOmatrix (4RU) and C3-310 CORIOmatrix mini (1RU) are ultra-flexible, modular, multi-format AV matrix routers with 4K capability. CORIOmatrix and CORIOmatrix mini leverage tvONE's CORIO technology in a single-box solution, which suits integrating mixed AV, broadcast, IP and legacy sources at very low latency. CORIOmatrix products are appropriate for applications that integrate mixed audio and/or video formats, and when SDI is used in conjunction with 4K HDMI, DVI and H.264/H.265 IP feeds. CORIO technology allows the user to up-scale, down-scale and cross convert between a wide variety of analog and digital video formats. The 16 modular AV slots (4RU chassis C3-340) provide the ability to mix and match video formats in the switcher. The quantity and type of modules selected determines which formats will be accommodated and the matrix size (12+ input/output modules to choose from).

tvONE
www.tvone.com

Barco's LCD Videowall Platform

Barco has launched UniSee, an LCD videowall platform. It's based on a modular platform, with individual in-house designed and produced LCM panels fitted onto a unique mounting system. The entire LCD videowall is completely bezel-less, creating a seamless viewing experience. The mounting system, which ensures alignment of the LCM panels, also hosts all input and power modules. This results in reduced setup and maintenance requirements for installers, IT professionals and facilities managers. NoGap technology makes the inter-tile gap almost invisible from normal viewing distances. UniSee Mount uses gravity to self-align the LCD tiles, which slide into place in any direction along the X, Y and Z axes, allowing easy undocking of the panels in case servicing is required. Sense X, a continuous, real-time color and brightness calibration system, ensures a balanced image at all times, with no variation between center and edges.

Barco
www.barco.com

Extron's Preconfigured Collaboration System

Extron's TeamWork Connect 300 is a pre-configured collaboration system for 2 digital and 1 analog sources. The package includes 2 HDMI Show Me cables, 1 VGA Show Me cable, an HC 404 Meeting Space Collaboration System and other system cables. The Show Me cables facilitate simple source switching using the "share" button at each device. Built-in control capabilities facilitate automatic source switching, display control and integration with optional occupancy sensors. The VGA Show Me cable enables the system to support legacy analog computer sources. Low-profile mounting hardware is included, and optional mounting hardware is available to facilitate a range of collaboration-table and work-surface designs. For applications with different requirements, the online TeamWork System Builder can be used to create a customized solution. The TeamWork System Builder is an interactive tool that guides users through the creation of a customized solution best suited for the collaboration environment.

Extron Electronics
www.extron.com

tvONE's C3-340 CORIOmatrix, C3-310 CORIOmatrix Mini


Extron's TeamWork Connect 300


WyreStorm's SP-0208-HDBT-H2


Barco's UniSee

PRODUCTS

Newline's Unified Collaboration System

Newline Interactive's TRUTOUCH X Series unified collaboration system lets users collaborate with anyone, anywhere, no matter the UC software that they use. The TRUTOUCH X Series interactive display focuses on creating a seamless user experience by combining advanced technology with a sleek design. The open-platform, non-proprietary design lets you use any software or operating system you prefer on the powerful onboard computer, giving you complete collaboration without limits. TRUTOUCH lets you use Skype, WebEx, Zoom and more. 2 built-in 1080p cameras on the TRUTOUCH X Series let you be seen from anywhere in your conference room. A mic array, complete with noise-reduction and echo-cancelling technology, provides clear sound for everyone in the meeting.

Newline Interactive
www.newline-interactive.com

Avenview's 4K Component

Avenview Corp.'s HDM-C6MWIP4K-SET is a 4K component that rounds out the MSERIES HDMI-over-IP line. The MSERIES is a modular video-over-IP product that uses a combination of encoders and decoders utilizing a network infrastructure to distribute HDMI using H.264 compression for high-quality and low-bandwidth signals over a 1GB network switch. The HDM-C6MWIP4K-SET provides a complete, end-to-end solution for the distribution of 4K content across an IP network using the same 1GB network switch. The new 4K components are compatible with the previous MSERIES 1080p line of products, allowing easy expansion of an existing system with the same easy setup. The 4K device gives the flexibility to control any HDCP-compatible 4K HDMI source from an iPad or Windows 10 application with live preview to create a videowall or matrix solution.

Avenview Corp.
www.avenview.com

Gefen's Ultra HD Scaler

Gefen, from Core Brands, has released EXT-UHD600A-12-DS, its 4K ultra HD 600MHz 1:2 scaler with EDID Detective and audio-de-embedder. It incorporates scaling, EDID management and audio break-out functions in 1 product. Because of independent scalers built into each of its 2 HDMI outputs, 1 output can downscale a 4K 600MHz signal to 1080p full HD, whereas the other can upscale an HD signal to 4K ultra HD 600MHz, maximizing compatibility in a mixed-resolution display system. A single 1080p input can be split and scaled to separate 1080p and 4K ultra HD 600MHz outputs, providing upscaling functions that increase the fidelity of the original input for use with 4K ultra-HD-capable displays. Advanced EDID management includes built-in, pass-through and user EDID capabilities, which can be used to control how the source outputs its AV signal.

Gefen
www.gefen.com

Arista's HDBaseT Extender/Transmitter

Arista Corp. has released the ARD-0301-A01-TX HDBaseT extender/transmitter. Featuring 3 inputs, it transmits analog video to digital HDMI displays, enabling advanced HDMI display devices to be used with legacy VGA sources. The ARD-0301-A01-TX is suitable for integrating older PCs into environments where newer display technology is in use. It incorporates HDBaseT technology to eliminate multiple cable runs and signal degradation that can occur with transmission of signals over long distances using traditional VGA and HDMI cables. Easy-to-terminate category cable (Cat5e/Cat6) provides additional integration benefits. It features 2 HDMI inputs, plus a VGA input and a 3.5mm audio input connector, as well as a Power over HDBaseT output. It supports HDMI video signals up to 1080p/60Hz with embedded audio. VGA input signals up to 1920x1200 video can be extended up to 330'.

Arista Corp.
www.goarista.com

Avenview's HDM-C6MWIP4K-SET

Gefen's EXT-UHD600A-12-DS

Arista's ARD-0301-A01-TX

Newline's TRUTOUCH X Series

Datapath's Application-Sharing Software

Datapath's Quant advanced application-sharing software suits videowall users working in collaborative business environments. Quant's capabilities allow users to view and share application windows, as well as interact and make changes to original source files. The software works in conjunction with Datapath's WallControl 10 software. With its ultra-secure sharing structure, this enables Quant to be equally suitable for command-and-control rooms as it is for classrooms and boardrooms. Providing full interactivity with any applications shared, Quant allows application windows to be dragged and dropped between peers or onto a videowall. This functionality makes it easy to share important information, regardless of whether the shared party has the application installed on his or her computer. The software provides complete security, as it's within the same network, working behind the firewall, and not loading data through company servers. Users also have full control over each application, deciding editing and sharing rights.

Datapath
www.datapath.co.uk

Marani's Speaker Processor

Peavey Commercial Audio has partnered with Marani Proaudio to distribute Marani's line of sound-reinforcement products. The complete range of Marani Proaudio speaker-management processors will be available through Peavey Commercial Audio worldwide, including the new LPP480F speaker processor. An expanded 4-in/8-out digital speaker-management system, the LPP480F adds astonishing features to Marani's flagship FIR-series controllers. The LPP480F provides ample processing for any live sound application, including 2 stereo AES/EBU and 4 Dante inputs. The 3 onboard Marani DSP engines include full 96kHz processing, 24-bit AD/DA converters, 13-band PEQ, multiple filters, gain control, noise gates, RMS compressors and delay on each input channel. Each output features 7-band PEQ, 512 tap FIR or IIR crossover filters, peak limiter, compressor and delay. All processing is controlled via the front-panel graphic LCD and joystick, via the included software and front-panel USB connector or via the rear-panel network port.

Peavey Commercial Audio
www.marani-proaudio.com

JVC's Projectors

JVC Visual Systems' DLA VS4700 projector offers native 4K resolution with e-shift technology to display up to 8K resolution. Meanwhile, the DLA VS4010NLG is JVC's brightest simulation projector. Both 3-chip D-ILA projectors feature BLU-Escent technology, JVC's solid-state, laser phosphor, hybrid-illumination system that delivers consistent performance and more than 20,000 projection hours. Each model also offers high-contrast IR output. Available with fixed or zoom lenses, the DLA VS4700 offers 3,000 lumens with greater than 12,000:1 contrast ratio. Its chassis is for motion-based operations; unlimited pitch and roll allows operation in any orientation. I/O terminals include 4 DisplayPort 1.2a, LAN, RJ45, RS232C, USB, mini wired remote and sync out. Other features include digital smear reduction via black frame insertion, 12-bit color bit depth and 6-axis color-management system.

JVC Visual Systems
www.pro.jvc.com

ATEN's Video-Over-IP Extender

ATEN's VE8900/VE8950 video-over-IP extender is a professional AV-over-IP solution. The VE8950 delivers visually lossless 4K@30Hz (4:4:4) AV signals with low latency over long distances via a standard Gigabit network, whereas the VE8900 supports resolutions up to 1080p. The VE8900/8950 video-over-IP extender extends AV connections from simple point-to-point to complex multi-point-to-multi-point setups via LAN cable, without distance limitations, while offering multi-functionality in extender, splitter, matrix switch and videowall applications. Digital signage installations can mix and match the latest 4K displays and 1080p screens by virtue of the VE8900/VE8950's built-in scaler, which automatically scales incoming video signals to match the maximum capability of the connected display device. The VE8900/VE8950 features top panel pushbuttons and an ID display, allowing users to switch source inputs. No extensive IT experience or extra learning required.

ATEN Technology, Inc.
www.aten.com

Marani Proaudio's LPP480F

ATEN's VE8900/VE8950

JVC's DLAVS4700, DLAVS4010NLG

Datapath's Quant

MEDIA

Compiled by Anthony Vargas

The latest literature, whitepapers, new or updated websites, course materials, webinars, training videos, podcasts, online resources and more. If you can read it, watch it or listen to it, you'll find it here! Send details, with photos, if available, to dferrisi@testa.com.

Wainhouse Research's "Prescribing New Solutions for Communications in Healthcare"

Wainhouse Research's Whitepaper

Wainhouse Research's "Prescribing New Solutions for Communications in Healthcare" report claims healthcare managers realize better results when they use streaming video for communication. According to Wainhouse Research, the report addresses issues that include what's driving bigger investments; why some are missing the boat on video technology, making their jobs harder when it comes to communicating work-related information; and key benefits of telehealth, including better patient care and increased productivity. Download the report at www.sndcom.us/2DxQegM.

Wainhouse Research cp.wainhouse.com

Insight Media's Whitepaper

Insight Media has released a whitepaper called "Measuring Resolution in a New Way." It describes some of the metrology issues with measuring a flat-panel display that uses non-RGB stripe pixel architectures, along with the difficulty in determining the actual resolution of the panel using the established contrast modulation method. To address this, a metric based on Structural Similarity (SSIM) has been developed. SSIM is a technique used for evaluating the fidelity of a compressed image as compared to the original. The whitepaper describes the technique and resulting metrics, along with some user evaluation studies to try to correlate results. Display metrologists are encouraged to look at the method to try to duplicate results and/or improve the technique. According to the company, this method will be considered by the International Committee on Display Metrology (ICDM) for standardization. The whitepaper can be downloaded for free by registering at www.sndcom.us/2CnpQGR.

Insight Media www.insightmedia.info

SIGN AGE: THERE'S GREEN IN GREEN

(continued from page 18)

continue your research with a local focus, looking deeper and wider within a specified area. Look for a comprehensive plan, transit-oriented development plan or waterfront renaissance project plan—by any name, a municipality's intention to go forward with major transit-centric or other development projects will likely offer opportunities to implement digital signage. Notices seeking GC-level bids and proposals are often published well in advance of signage/AV/IT system-design decisions. Also, keep an eye out for related request for proposals (RFPs) from GCs or design consultants.

You've probably already read the regional business papers and magazines, and you probably regularly check the public notices in your area's "paper of record." The agendas and minutes of planning boards and similar agencies are another good source for advanced intelligence, where you can find information about "conceptual presentations" and other items that surface long before any formal proposals for new projects. Reports of these proceedings are often published in small, local papers, even when they are too speculative for regional coverage.

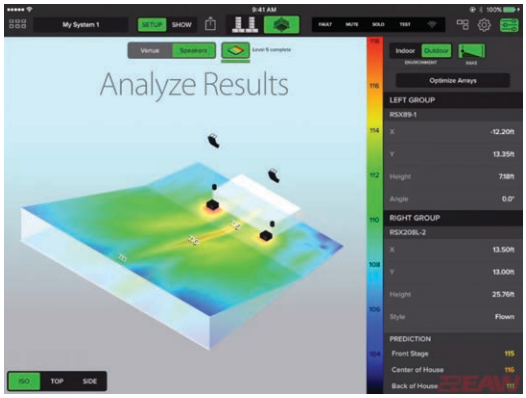
Knowledge of the specific applications of digital signage and AV in this market sector is also vital, even before you participate in preparing a proposal. A major project with a city's transit authority might involve the installation of customer-focused displays that show schedules, routes and advertisements, and might involve the installation and integration of a videowall in the traffic-monitoring and -management center. You probably have significant experience with this class of technology—but do you have expertise with broadband, wireless and other technologies that might be required in Smart City or transit-oriented projects?

To learn more about Smart Cities, you might consider attending IEEE's conference in Kansas City MO in mid-September. The organization's GreenTech conference is scheduled for early this year, April 4 to 6, in Austin TX. Good information, including whitepapers, project news and schedules for upcoming conferences on transit-oriented development, can also be found at www.tod.org.

Looking beyond the usual horizons to find new ways to apply your valuable expertise is a well-tested way to profit from rapid technology changes in society. Sometimes, the other side of this rainbow can be as close as a fast-growing town next door.

Compiled by Anthony Vargas

Information about the latest software releases, apps, online tools, and software and firmware updates. Send details, with supporting graphic, if available, to dferrisi@testa.com.



EAW's Speaker Control App

EAW's EAWmosaic v1.1.1 adds several improvements and fixes a number of bugs, and it includes support for macOS. EAWmosaic is an iOS app for prediction, control and monitoring of the EAW RADIUS loudspeaker family. Via a wireless access point, users can access all functionality via Dante-networked RADIUS loudspeakers to route audio, optimize the system and monitor every device in real time. Network functionality is only available when online with a RADIUS system, but system design and prediction can be done offline, anywhere, at any time. EAWmosaic v1.1.1 can be downloaded for iOS via the App Store, or for macOS via the EAW website.

Eastern Acoustic Works eaw.com

Hiperwall's User-Authentication System

Hiperwall's HiperAccess user-authentication system has been introduced in Hiperwall Premium Suite 5.0 software licenses, and as an optional add-on capability for Hiperwall Core Suite licenses. HiperAccess enables videowall administrators to create user profiles and assign users to groups with different levels of accessibility. In addition, HiperAccess technology provides enhanced accountability, with detailed logging of actions that include user information, actions attempted, and whether the action was allowed or denied. Using a simple graphical interface, the administrator can create profiles, add them to groups and change the permissions associated with groups. Because a user profile may be in more than one group, the permissions for that user profile are the union of the permissions for all the groups to which it belongs. Users will authenticate themselves by logging into the Hiperwall system. A user can be logged in via multiple Hiperwall interfaces simultaneously.

Hiperwall www.hiperwall.com

Yamaha's Console Control App

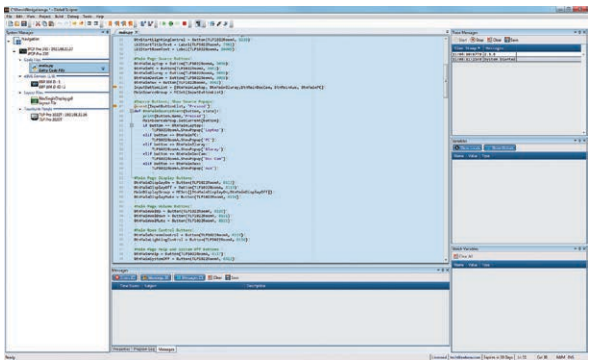
Yamaha's StageMix v7 is an iPad app for Yamaha CL and QL digital audio consoles. With v7, both CL StageMix and QL StageMix acquire a new "CUSTOM" meter area and a more flexible fader area layout capability. The input-patching feature that was added in v6 has been expanded in v7 to include a multi-channel input patch function that allows multiple consecutive input channels to be patched as a group. Because of the ongoing collaboration between Shure and Yamaha, control and monitoring support has also been added for Shure wireless receivers that are non-Dante compatible, including the AXT400, QLXD4 and ULXD4. StageMix v7 for the CL and QL is available for free download from the iTunes Store.

Yamaha www.yamahaproaudio.com

D-Tools' Pricing Quote App

D-Tools' Mobile Quote 2.0 is a native iPad companion app for the D-Tools System Integrator (SI) platform. Redesigned for a more intuitive, expedient and visually impactful experience, Mobile Quote 2.0 allows industry salespeople to generate a project scope and pricing estimate for client review and approval during the initial client meeting. The data collected is then instantaneously transferred into D-Tools SI for further design development and project management. The app can pull a price allowance from the list of items in the appropriate sub-category in the D-Tools product catalog based on a global or item-specific good/better/best selection. Mobile Quote 2.0 leverages project templates and packages from the D-Tools product catalog to complete an accurate system design and price—by room and by system—in minutes. The app enables the entry of room notes, system notes, item notes and even images snapped right from the iPad. Users can also make pricing and labor adjustments on the fly.

D-Tools www.d-tools.com



Extron's Control System Programming

Global Scripter is Extron's powerful and versatile control system programming software. This integrated development environment is used to program Extron Pro Series control systems, and it utilizes the easy-to-learn Python scripting language. Global Scripter includes an Extron-exclusive Python library—ControlScript—that is designed to increase the productivity of AV programmers through incorporating functions used in AV control system projects, as well as helpful documentation, reference materials and sample code. Extron built Global Scripter and the ControlScript Python libraries with programmers in mind. Working together, these components make it easier to develop refined and innovative programmable control systems.

Extron Electronics www.extron.com/globalscriptersc

VocoPro

Wireless DigitalQuad-Conference Digital Wireless Mic System

VocoPro's DigitalQuad-Conference digital wireless conference mic system uses Mic-On-Chip technology. Up to 16 individual frequency sets can be combined to accommodate 16 people with their own wireless mics. The DigitalQuad-Conference requires no syncing or setting up. The system's quiet 24-bit digital transmission is also digitally encrypted to keep the content of meetings private and secure. The turnkey system includes 1 compact receiver and 4 digital wireless conference mics. Each channel has a dedicated volume control. The system utilizes the 900MHz frequency band. It can transmit a professional-quality signal up to 200'. Its wide frequency response (50Hz to 20KHz) ensures natural-sounding vocals. It features 4-16 balanced XLR outputs and a 1/4" mixed output, and includes brackets for mounting in a rack case. The receiver measures 8.38"Wx1.25"Hx5.25"D.
WEB ADDRESS: www.vocopro.com

Audix

M62 Hypercardioid Boundary Microphone

The M62 boundary microphone utilizes The Micros™ series technology hypercardioid condenser capsule that rests in an industry-exclusive, patent-pending internal shock-mount suspension system. Optimized for voice clarity and designed with logic remote or local programmable on-off switching and dual color LED status indicators, and off-set button for interference-free operation, as well as a tail out or tail down cable exit to accommodate a variety of installation or mounting requirements. The M62 is an excellent solution for distance learning student tables, conference and huddle room applications.
WEB ADDRESS: www.audixusa.com

AVENT HORIZON: WHAT A LONG, STRANGE TRIP IT'S BEEN….

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tors. They only cost $5,000 to $15,000 (at least, the good ones did), which was about half the cost of a good CRT projector.

In the late 1990s, a 50-inch plasma monitor (not a TV) with 1366x768 resolution would set you back as much as $30,000. Fifteen years later, the last plasma factories began to shut down as LCD displays and TVs swept into the market. And today? You can buy a 55-inch Ultra HDTV with basic high dynamic range support for around $500. The scaling chips needed to get from full HD (1080p) to ultra HD can be built into an HDMI plug.

But the biggest change of all is the migration to solid-state "everything." When I first started in the AV industry, much of the AV hardware we used was very mechanical in operation (slide projectors, filmstrip projectors, 16-millimeter movie projectors, cameras, vinyl records, cassettes and reel-to-reel tape recorders). By the mid-1990s, much of the mechanical stuff was gone, having been replaced by computers. MP3 audio was in its infancy, as was optical disc media. Hard drives were starting to serve up video and audio, and anything with tubes in it could see the writing on the wall. Solid-state projection technologies (LCD, DLP, LCoS) were sweeping through our industry.

Today, I pause to marvel that I'm writing this column on a laptop that doesn't even use a hard drive or a disc drive. I have 256GB of solid-state storage built in and an additional 500GB to 2TB on external drives for archiving. I can record and edit video, stream TV programs, log into my home network and monitor it, and send this column to my esteemed editor over a 50Mb/s internet connection.

The migration to solid-state everything has accomplished four things: First is the commoditization of hardware that I discussed in my November column. Second is the movement of just about everything AV to a network infrastructure for signal management, distribution and control. Third would be the current movement to solid-state illumination (aka light-emitting diodes) for everything from room lighting to projectors and videowalls.

And the fourth thing? Portability and accessibility. We're redefining the concept of presentation rooms (think huddle spaces), presentation platforms (think smartphones and tablets), and presentation creation and storage (think cloud servers). Video, audio and metadata are all at your fingertips to be viewed, saved, edited and sent to anyone you want, anywhere, anytime you desire.

The AV world in 2018 couldn't possibly look more different from how it did at my first job in 1978, and I've enjoyed the ride, even with all its ups and downs. Can't wait to see where my journey takes me from here….

IDK America

IP-NINJAR 4K Video Over IP @ 60 4:4:4 Switching and Extension

IP-NINJAR is a game changing IP based, turnkey, high definition audio/video signal delivery solution. System Control, Signal Extension, Distribution, Seamless/KVM Switching, Videowall, and Multiviewing capabilities are fully integrated into the platform. Boasting full format agility, true 4K/60 4:4:4 HDR HDCP2.2 capabilities, edge-to-edge zero frame delay and unparalleled stability, the IP-NINJAR leverages off-the-shelf 10Gb Ethernet infrastructure to replace traditional baseband AV architectures. With an elegantly simple architecture, unlimited I/O and footprint scalability and individual node-level monitoring, the IP-NINJAR unleashes valuable signal management advantages for Pro AV and IT. IDK is developing a series of new I/O node models, expanding the flexibility and universality of IP-NINJAR. We're introducing the NJR-04HD series, four-channel input and output nodes that support 4 full HD HDMI signals over a single (1) duplex fiber. The new NJR-T01SDI offers a 3G-SDI input and the NJR-01UHD-CAT enables CAT6a infrastructure to support the IP-NINJAR platform.

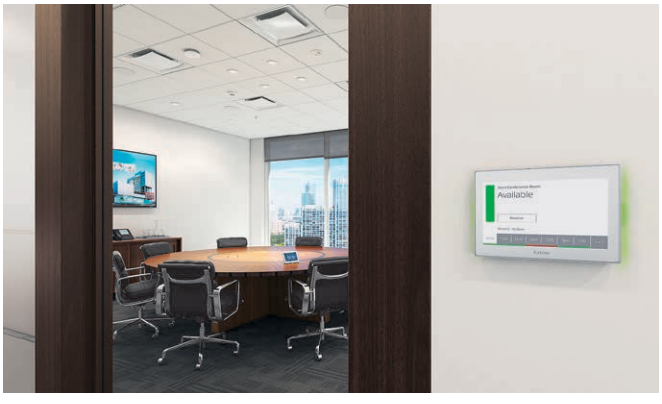
WEB ADDRESS: http://idkav.com
E-MAIL: sales@idkav.com

Vanguard LED Displays

Axion Series - The Best Fine Pixel Pitch LED Display In the World

The above headline is an assertion based on objective data, not subjective claims. We encourage you to objectively compare the exclusive features of Vanguard's Axion displays to the displays of Planar/Leyard and Silicon Core. The conclusion you will inevitably reach is that Axion by Vanguard is the best fine pixel pitch display in the market. The exclusive attributes of Axion by Vanguard, a USA based company include: 4-year warranty; Fully front serviceable; No exterior cables- Flat back for easy wall installations; Unobtrusive interior power and data connections. No ribbons; Up to 24-bit color video processing; 18- bit grey scale; Refresh rate- Up to 3840hz; Macroblock IC drivers; Anti-moire mask available; Zero Latency Processing; Half size cabinets available. Doesn't it make sense to buy the best LED video displays in the market at the best prices from Vanguard?

WEB ADDRESS: www.vanguardleddisplays.com



Extron Electronics

Room Scheduling: Book a Room the Easy Way

We have simplified the room booking experience with Extron Room Scheduling. This stand-alone system consists of elegantly-designed TouchLink Scheduling Panels that connect directly to Microsoft Exchange, Office 365, or Google Calendar. Users can reserve rooms with a couple taps on the panel or from their mobile device. Free Room Agent software makes setup a breeze, allowing you to customize the touchpanel interface with the meeting options you need. Multiple mounting choices are available for the touchpanels, including on-wall, in-wall, as well as secure mounting to almost any flat surface, including glass or granite.

WEB ADDRESS: www.extron.com/roomschedulingsc

Jupiter by InFocus

PixelNet 2.0: Massively Scalable 4K Display Wall System

PixelNet 2.0 is a powerful new way to capture, distribute, control, and display video and audio sources, both direct and over IP, for audiovisual applications. PixelNet 2.0 adds native support for 4K video, fiber network, and audio for a scalable and ultra high definition video distribution system. PixelNet 2.0 increases the density of processing power, connecting more sources and displays to a single Input or Output Node, while providing centralized control to support a wide variety of installations with live audio and video, streaming data, and other real-time sources of information for control rooms, conference rooms, lobby displays, offices and classrooms. New features enable real-time HD or 4K information display to a virtually unlimited number of screens at sites spanning a building, a campus, or a continent.

WEB ADDRESS: http://marketing.infocus.com/PixelNet2.0.html

AD INDEX

MARKETPLACE

INDUSTRY POV: NETWORKED DISPLAY SYSTEMS IN GOVERNMENT

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sphere. By integrating a large-format digital display, networked throughout an entire organization, a command-and-control center can break down (literally and metaphorically) communication barriers between departments. This is what the NYPA hopes its project accomplishes.

Regarding the physical displays themselves, there are various digital display technologies, each of which brings its own advantages and disadvantages to the table. For a display that must be viewed clearly by large groups of people from wide angles and a range of distances, such as, for example, in the NYPA headquarters, LED technology is almost always the best solution. For one thing, LED carries greater off-axis viewability, which is a key component in shared workspaces because it allows coworkers to see the same image, in the same way, from opposite sides of the room. For another, LED shines brighter than rival display solutions—naturally, a plus—*and* it leads the field in cost efficiency and energy efficiency. Other types of display technology can outperform LED in their own specific ways, but, for the purposes of command-and-control-center usage, LED has reliably established itself as the best bet.

The proliferation of digital technology has made communication faster and easier than ever. However, this progress has brought with it heightened expectations. Citizens rely on government facilities and public works entities to provide services that simply cannot stop working—a task that requires lightning-fast administration at the command-and-control level. Trains can't stop running, water can't stop flowing and the integrity of the power grid can't be compromised. Why? Because society depends on them, and government facilities and public works organizations have promised to deliver.

Communication is the key here. The only way to administer these assured services effectively is for each member of the operation to be in sync. By accessing, analyzing and acting on information in real time through a fully integrated networked display system, command-and-control centers will be able to streamline productivity, reduce maintenance costs and eliminate inefficiencies. And that's how you keep a promise.

What A Long, Strange Trip It's Been.... Part 2

The journey continues, bringing us up to the present day.

By Pete Putman, CTS
ROAM Consulting LLC

Picking up where I left off last month….

I started writing for AV trade publications way, *way* back in 1987. And it all came about because a now-gone monthly publication I received ran a feature article about multi-image projection and staging that contained several technical and factual errors. Back before email, although fax machines were somewhat exotic items for a small office, I had one—and I put it to work with a long letter to the editor, pointing out all the flaws in same article.

No sooner had I sent the last page than my phone rang. It was the editor, who basically said, *"A critic, eh? So, you think you could do a better job?"* and challenged me to write up a feature on the same topic—which, of course, I did in just two hours. And then, I printed it out and faxed it back to his office that evening. (How *did* we ever survive before Word, Acrobat and email?)

'The AV world in 2018 couldn't possibly look more different from how it did at my first job in 1978, and I've enjoyed the ride, even with all its ups and downs.'

And that's where it all started. Before long, I was contributing features and columns, along with an ever-increasing number of product reviews. By the mid-1990s, I was cranking out a feature and a product review almost every month. Not long after, my editor-in-chief departed for a different publishing group, and dragged me along. Soon, I was writing for three different trade magazines in three different markets: TV and film production, AV systems integration, and video and multimedia design.

About that time, I made my first trip to InfoComm in Anaheim CA, ostensibly to review the infamous Projection Shoot-Out. Trips to Comdex, NAB and Show West were soon added to my calendar, with the Consumer Electronics Show close behind. The result? I found myself making as many as five trips a year to Las Vegas NV by the end of the decade.

Around my third InfoComm, I was invited to participate in a panel discussion about projection technologies. That apparently constituted my first stint as an InfoComm instructor, and it didn't take long before I was creating my own classes for the show. Being highly motivated, I passed the Certified Technology Specialist (CTS) exam when it was first offered in the late 1990s as a 110-question multiple-choice test.

The growth of solid-state projection in the 1990s, and the transition to high-definition digital TV, along with the introduction of flat-screen plasma and LCD/DLP rear-projection TVs, had me working overtime to review products. My office became a mess of cabling, racks, test pattern generators, and all kinds of set-top receivers, DVD players, and rudimentary signal switchers and distribution amplifiers.

I love building systems and always have, going back to my days as a ham radio operator in the 1970s. Now, I found myself resurrecting a lot of my acquired knowledge about RF and wireless. Specifically, I was testing and installing antennas to pick up HDTV broadcasts for myself, and for family and friends. That culminated in my first Super Bowl HDTV Party in 2000, where I invited over friends to watch the game on a projection screen with a Sony VPL-VW10 LCD projector and a Princeton AF3.0HD 30-inch HDTV monitor.

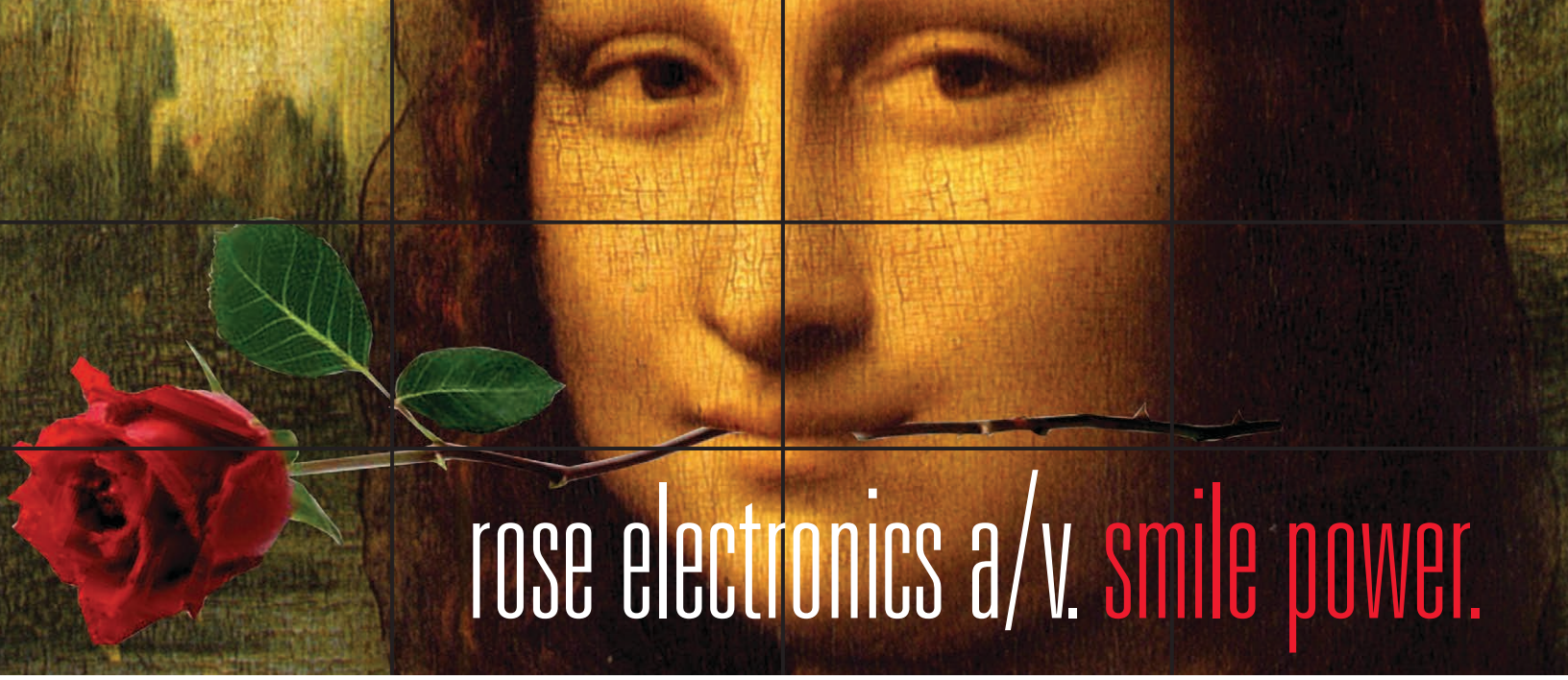
Those parties became legendary, as I filled up the house with TVs and projection systems. At its peak, 70 guests could watch the game on 14 different plasma, LCD and projection HD screens—some as small as seven inches (an LED projector) and as large as 30 feet. (I projected the game onto the snow in my front yard from an upstairs window, using image-warping software to correct for skew and focus.) After 10 years of those, I decided to call it quits. HD just wasn't a big deal anymore by 2010.

The trips to Las Vegas continued, though. By my count, I've visited Sin City 86 times for trade shows, manufacturer tours and sales meetings, and I'll likely be there three more times this year. Some of the hotels I've stayed in have been demolished, whereas others have undergone name changes and extensive remodeling. But it's still Las Vegas, after all….

What's changed the most over the past four decades is the technology. I remember paying nearly $700 for a JVC top-loading VHS recorder/player back in 1985 (stop laughing!) to drive my 26-inch Hitachi color TV through its composite video input. In the mid-1980s, Japan was completing its takeover of the US television-manufacturing business and cable TV was a rudimentary system for delivering hard-to-receive channels to the home.

Ten years later, I forked over almost the same amount of money for a Sony DVD player. At InfoComm 1994, the hot product was something called a "line doubler," which converted interlaced video into progressive-scan formats for driving projec-

(continued on page 78)



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Quad screen or Picture-in-Picture mode.
Connect a USB 2.0 port to any or all computers.
Layout control from OSD or network.
Supports audio.

QuadraVista™ 2
Multiviewer - DVI/VGA

Quad screen or Picture-in-Picture mode.
Connect a USB 2.0 port to any or all computers.
Each port VGA or single link DVI.
Supports touch-screen.

UltraVista™ Plus
Video Wall Controller

Splits 1 DVI input into 4 outputs.
Input resolution up to 2560 x 1600 (dual-link DVI).
Programmable cropping, scaling, rotation, and gap.
Expandable up to 32 monitors.

UltraMatrix™ AV
Video Matrix Switch - VGA DVI Audio

VGA 8 x 8 or 16 x 16 - resolution to 1600 x 1200.
DVI 4 x 4, 8 x 8, or 16 x 16 - resolution to 1920 x 1200.
Select from front panel or serial port.
Software switching utility included.

Video Splitter™
1 Video to Multiple Monitors - VGA DVI CAT5

VGA resolution up to 1600 x 1200.
DVI resolution up to 1920 x 1200.
CAT5 up to 1000 feet.
Audio and serial on some models.

Solutions for Data Centers, Digital Signage, Command and Control, Broadcast, Security, Entertainment, Mission Critical, Financial, Transportation, Military

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ROSE ELECTRONICS

The World's Only AV Platform for the Newly Released HDMI 2.1 Specification

XTP II CROSSPOINT

50 Gbps ULTRA PERFORMANCE BACKPLANE

AV Infrastructure for an 8K Future

XTP II CrossPoint Series

The Extron XTP II CrossPoint® modular matrix switchers are the only AV platform capable of supporting the 48 Gbps data rate of the recently released HDMI 2.1 specification. Designed and engineered to the highest standards, the matrix switchers' 50 Gbps digital switching backplane represented a monumental leap in engineering and product design when it was introduced in 2015. XTP II still delivers the ultimate level of performance in the Pro AV industry. It already supports the HDMI 2.1 specification's range of higher video resolutions and refresh rates, including 8K @ 60 Hz and 4K @ 120 Hz with HDR.

XTP II is the future-ready technology platform. With performance and reliability unmatched in the Pro AV industry plus modular flexibility and system upgradeability that is ideal for corporate, government, higher ed, and retail installations, you can depend on the XTP II CrossPoint Series now and to meet the challenges of an 8K future.

XTP Systems Offer the Highest Performance

- Industry-leading 50 Gbps digital backplane
- Supports current and emerging video standards
- Switching of 4K/60 @ 4:4:4 HDMI signals
- Provides future-ready upgrade path for new formats
- 4K fiber and twisted pair plus local AV distribution
- Configurable I/O sizes from 4x4 to 64x64
- State-of-the-art EverLast™ power supplies engineered by Extron

HDMI 2.1 Supported Resolutions and Refresh Rates*

4K	4K/50	4K/60
	4K/100	4K/120

5K	5K/50	5K/60
	5K/100	5K/120

8K	8K/50	8K/60
	8K/100	8K/120

10K	10K/50	10K/60
	10K/100	10K/120

*Source: HDMI.org

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