September 8-10

Madison Marriott West

#WBABC21

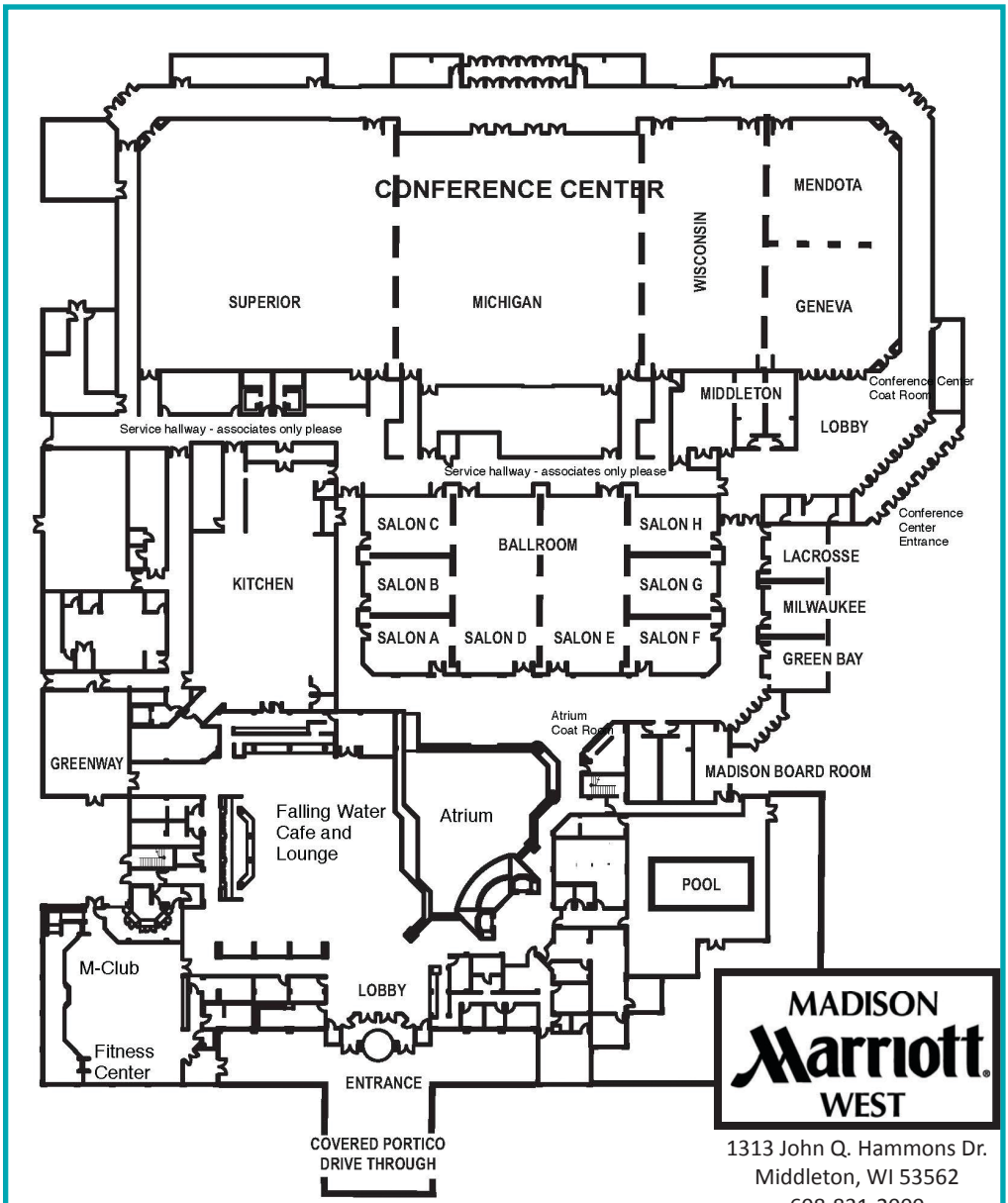
2021

WBA Broadcasters Clinic

WELCOME TO THE BROADCASTERS CLINIC

The primary goal of the Broadcasters Clinic is to bring together the very best in the industry.

We believe that our diverse and dynamic group of speakers, panelists, and exhibitors provide in-depth insight, as well as, actionable and practical tools and life experiences, models, methods and mechanisms needed in today's broadcasting environment.



Wednesday, September 8, 2021

All Sessions are in the Superior Room

8:30 a.m. **Practical Virtual and Cloud Broadcast Infrastructure**

Kirk Harnack, Telos Alliance

Virtual business infrastructure touches our daily lives – nearly every hour each day. Radio broadcast infrastructure is not just headed toward virtualization, it's there now. Whether in the space of public cloud, private cloud, or on-premises, virtualization is making sense for broadcasters, now more than ever. There are challenges, however, to implementing a mostly-virtualized broadcast facility. AoIP protocols are different in the public cloud than for on-premises data centers. And, not every crossroad on this path has a green light ahead. There are still some missing pieces to this puzzle.

This presentation will focus on the functions available right now, demonstrating practical implementation and application of a virtualized broadcast plant. If you've seen any of Jeff Welton's presentations you will have noticed that he occasionally makes use of a "shouldn't have done it that way" photo – a picture taken demonstrating something that is done in a less-than-ideal manner. This presentation will highlight some of those photos, discussing what was done wrong and what could be done to prevent such an occurrence. Remembering that the photos will highlight situations every broadcast professional encounters, simply taken to the extreme, there will be a lot that applies to even the best run stations. Names of stations shown will be withheld to protect the innocent.

9:15 a.m. **A Year in the Life of Studio Virtualization**

Maryann Seidler, Telos Alliance

The pandemic was a catalyst for virtual operations. Back-office workflows migrated to off-site locations. Forward-thinking broadcasters virtualized at least some of their infrastructure. A year later, the broadcast industry has had the experience of working on multiple virtualization projects. What lessons have we learned? What works, and what doesn't? What technological issues do broadcasters need to watch out for and how do they prepare for the road ahead? We will discuss key virtualization projects and what equipment has been replaced with virtual. We will also discuss how stations have used 'the cloud' for some projects, when that works, and when it doesn't. Telos Alliance will give you an update on the virtual broadcast picture to help guide you on your journey to virtualization.

10 a.m. **Using Computer Modeling instead of Range Testing for FM Directional Antennas**

John Schadler, Dielectric

Many FM stations could improve coverage by using directional antennas. Currently, applications proposing the use of directional antenna systems must include a tabulation of the antenna pattern through measurements performed on a test range of either full scale or a 4.4:1 scale model setup.

Dielectric is requesting that the FCC accept computational modeling of directional FM antennas in lieu of physical measurements of the antenna for purposes of application and licensing. The use of 3D high frequency simulation will in many ways yield results which are superior and more accurate than traditional range measurement proofs.

The presentation will go into detail on the many benefits of using 3D high frequency simulation computer modeling to demonstrate that a directional FM antenna will perform as authorized.

10:45 a.m. **Break**

11 a.m. **A Cloud-Ready Solution for Radio and Internet Streaming Audio Processing**

Mike Pappas, Orban & Bill Rounopoulos, Ross Video

Broadcasters are encountering a rapidly-shifting media landscape, providing new business opportunities through cloud-based and Internet workflows. Recognizing these new needs, Ross Video and Orban Labs have partnered to offer best-in-breed audio processing for on-premise or cloud deployment. Ross' Radio and Streaming Audio Processor (RSAP), part of the scalable softGear™ platform, will be reviewed. RSAP is a centralized, multi-channel audio processor for radio broadcast and streaming services, which provides best-in-class OPTIMOD audio conditioning from Orban. This solution is fully AES67/Livewire+ compatible, providing a complete end-to-end broadcast solution for processing.

11:45 a.m. **Leveraging Secure Reliable Transport (SRT) Protocol for Distribution of Radio and TV Signal Distribution**

Nick vanHaaster, GatesAir

The scalability of this technology makes it ideal for applications that require multiple channels of audio encoding and decoding at head-end sites. The high-density solution reduces cost and provides a path for convergence of IT and broadcast infrastructure. The interoperability between codecs provides a complementary solution for remote contribution and distribution use cases.

12:30 p.m. **Lunch (Mendota Room)**

1:30 p.m. **Metadata: An Integral Component of Radio Broadcasting**

David Layer, NAB

Broadcaster-provided metadata for radio programs is now an integral component of content which all radio broadcasters need to be supporting. Good and consistent metadata reflects well upon radio broadcasting as a service, and is especially vital for listening on modern automotive receivers which support multiple sources including AM and FM radio, SiriusXM, online radio, and podcast channels. In this presentation, David will provide background information on the types of metadata currently in use, as well as information on what radio broadcasters need to do to properly use metadata and make sure their stations and programs can look their best on a variety of platforms, both over-the-air and streaming.

2:15 p.m. **Saving Power in FM Transmitters**

Tony Peterle, Worldcast Systems

An overview of the Smart FM technology from Ecreso – a revolutionary patented solution that does for FM what MDCL does for AM. Successfully tested in the US and Europe, it can reduce operating power costs of an FM transmitter by up to 40 percent, with no negative effects on the listener experience.

3 p.m. **Break**

3:15 p.m. **The Glass Cockpit Broadcast Studio – and Why Virtualization**

Bill Bennett, ENCO Systems

Virtualization is here to stay — while at the same time, some things once called "virtual" have become very real. In this presentation, we will discuss the continual evolution of the broadcast studio to see where the future is headed and how these once "virtual" devices are now just part of the normal gear today. Yet other forms of virtualization are very much here to stay and grow – we'll talk about those too. And we'll explore how what's "bleeding edge" today, will be a broadcaster's bread and butter tomorrow. Much of this means taking the physical devices, servers, and interfaces of today, and re-imagining them yet again to something more familiar on today's Starship Enterprise and so much more. The presentation is geared toward both radio and television audiences, and is focused primarily on the engineering crowd with a tip of the hat to production, and will not go too deep into the technical weeds. Beam on up! It'll be a fun and enlightening ride!

4 p.m. **Exclusive Exhibit Time (Michigan Room)**

7 p.m. **Nuts and Bolts: Broadcast Equipment Now Comes in Containers, Not Boxes**

Kirk Harnack, Telos Alliance

From audio processors to video time-base correctors, from audio consoles to transmitters, and from RDS encoders to talk show phone systems, broadcast engineers have for decades been installing, adjusting, and maintaining hardware boxes full of electronics. Each box has its purpose and function, and each box presents a different set of operating and maintenance parameters for engineers to learn and deal with. And these boxes were mostly purposed-designed and purpose-built.

Many broadcast functions have been replaced with computers. Others are further instantiated as Virtual Machines – VMs – running on a server's hypervisor. However, lately the web services sector is moving to "software containers" with industry-standard frameworks led by Docker. Wikipedia says, "Docker can package an application and its dependencies in a virtual container that can run on any Linux, Windows, or macOS computer. This enables the application to run in a variety of locations, such as on-premises, in a public cloud, and/or in a private cloud."

Our WBA Broadcasters Clinic Nuts and Bolts session will focus on containerized software installation and configuration. Together we'll install and use a broadcast audio console within a Docker software container. We'll do the same with a broadcast talk show phone system, and a broadcast intercom system. Each of these three critical broadcast functions use Audio over IP, and each can be quickly installed on a PC or server in a few minutes. Together we'll understand the deployment and installation process for containerized software so you can leave feeling confident that this technology will work well in your broadcast facility.

Thursday, September 9, 2021

All Sessions are in the Superior Room

8 a.m. **Fiber Optic Cables for HD Broadcast**

Ben Nemser, Nemal Electronics & Daniel Ritts, Nemal Electronics

This presentation provides an overview of the practical applications for fiber optics in HD AV and broadcast, including an online demonstration of fiber termination, cleaning, and testing. We will discuss the different types of fiber optic cables, connectors, and media converters used in AV applications, including SMPTE, opticalCON, and Tactical Fiber products. We will also cover installation considerations and maintenance, for inside plant, arenas and other venues, studios, and mobile use. We will discuss termination, cleaning, and testing procedures including interferometry and insertion loss.

8:45 a.m. **Virtual Studios – Coming to a Location Station Near You?**

Stan Walbert, multiCAM Systems

It used to be that virtual studios were only used for large Hollywood productions and major network telecasts. But that is changing incredibly quickly. This presentation will show how robotics and virtualization can bring virtual studios to small studio spaces, radio stations, podcasters, and TV stations in any market size.

This presentation can show people how to see possibilities and ways to create more interactive programs using techniques that would have been impossible a few years ago. Virtual studio technology has rapidly advanced just in the past year.

Stan has a master's degree in robotics and has created and built all types of virtual studios and has a lot of great stories to tell.

9:30 a.m. **By the Book: A Review of Common ABIP Violations**

Dennis Baldridge, Baldridge Communications

This presentation will address the most common ABIP violations, who is responsible, and the proper way to correct them. These issues, and commonly misunderstood FCC rules that almost everyone occasionally misses, will be discussed. It will be emphasized that stations would be well-served to participate in an ABIP inspection rather than taking the chance of an FCC inspection, which could result in heavy fines.

10:15 a.m. **Exclusive Exhibit Time, Lunch, and Door Prizes (Michigan Room)**

1:30 p.m. **How to Keep Your Weekends Boring: Everyday Cybersecurity Tips**

John Nagler, University of Wisconsin

The best way to recover from a cybersecurity breach is to prevent it from happening in the first place. This presentation will cover new concepts developing in the network security field and some inexpensive tools engineers can deploy to protect their facilities before the nightmare occurs.

2:15 p.m. **Ready for Prime Time? The State of AI-Based Air Talent**

Paul Stewart, Summit Tech Group

The year 2020 forced many stations to adopt a 'broadcast-from-home' way of life. While this may have limited content creation and audience engagement, technology has risen to the challenge. Paul discusses how natural sounding synthesized speech tools, coupled with AI-based data aggregation, are providing audiences with engaging and up-to-the-minute content. This presentation covers how radio and television stations can use this technology to reduce costs and deliver engaging and timely content to their listenership.

3 p.m. **Break**

3:15 p.m. **Benefits of LED Obstruction Lights**

Alex Fuellgraf, Fuellgraf Companies & Tom Amador, Dialight

This presentation will discuss the benefits of replacing xenon and incandescent obstruction lights with Dialight LED lights, as well as the technology in the LED obstruction lights. This includes energy cost savings, reduced liability, savings from unexpected lighting failures, and the company employee's time involved to have them fixed.

4 p.m. **Operating in a Post Pandemic World – Where Do We Go from Here?**

Bill Hubbard & Kent Aschenbrenner, E.W. Scripps

Maybe it is not simply a return to the way things were. This roundtable session gives you the opportunity to share strategies with your colleagues and discuss your view of the state of the industry as we move toward a future with less isolation and more socialization. Consider what we have learned since March 2020 that might serve us well in the future. What practices do we need to return to since the time before COVID-19 overwhelmed our lives?

6 p.m. **SBE Meeting – WebRTC: The Future of Communications?**

Chris Crump, Comrex

When Apple, Google, Microsoft, and Mozilla team up, you might think, "Nothing good is going to come of this." But then, you might be wrong. An Open Source project is typically the last thing these tech behemoths would ever want to be involved in, let alone with their fiercest rivals. WebRTC is a pretty fascinating example of how good things can be born of necessity and how they can foster cooperation on multiple levels. We'll discuss the basics of WebRTC and the multitude of applications that are already using it to change the way the world communicates. This is especially important in light of the rapid evaporation of our "traditional" telco infrastructure. We'll also cover broadcast-specific applications and the future of live content creation.

Friday, September 10, 2021

All Sessions are in the Superior Room

8:30 a.m. **The Progress of ATSC 3.0 Rollout from the Broadcaster and Consumer Electronics Perspective**

Dave Folsom, Pearl

Despite the impact of the pandemic, television receiver sales and home viewing are up. With that backdrop, NextGen TV market rollout has begun in earnest with great strides in the coverage of U.S. television households with enthusiastic broadcast participation. This presentation will try to provide the status of the current transmission technology as well as consumer receiver availability. NextGen TV is an enormous opportunity for television broadcasters that can provide unique challenges to equipment and receiver manufacturers, content programmers, distribution partners, as well as station owners. This presentation will also describe those challenges as well as strategies as guidance in navigating within and benefiting from this enormous opportunity.

9:15 a.m. **The Transition from SDI to ST 2110 IP and ST 2059 PTP – Best Practices and Lessons Learned**

Karl Kuhn, Telestream

This presentation will be a tutorial on what you need to know to understand the challenges we face in making the transition from SDI to an IP based transport for video, audio, and data. Karl will share what he has learned by being involved in several ST 2110 and ST 2059 deployments with a focus on what questions early adopters wish they had asked. New troubleshooting methodologies are required to visualize variable delay across the network and how critical multilayer trend measurements can be made on the stream to improve QoS and QoE.

10 a.m. **Break**

10:15 a.m. **The Sound Makes the Picture: Making Audio Unforgettable with NEXTGEN TV and Dolby AC-4**

Tim Carroll, Dolby Laboratories

Quite a bit has changed since the original ATSC 1.0 standard was released in 1995. Dolby AC-3 was the specified audio codec and it had one job: Get audio from the input of the encoder to the output of the decoder. At that time, digital signal processing power was limited resulting in fairly large and expensive encoders and the consumer decoders could do little more than simply decode audio. ATSC 3.0, or NEXTGEN TV in consumer-friendly parlance, arrives at a time when processing power is fairly abundant and far less costly and consumer devices already support many advanced audio features like Dolby Atmos. Dolby AC-4 is the audio codec specified for use in North America and puts these processing cycles and capable consumer devices to good use. Following the traditional Dolby approach, much of the time-consuming and heavy processing work is done in the encoder. This allows the decoder to remain more lightweight and use available processing power instead for things like virtualization (i.e. making two speakers sound like more than just two speakers), and applying dialog enhancement or Voice + which is pre-calculated in the encoder. Remarkably, all of this functionality is actually more automatic and less complex to implement than ever before. Metadata is either preset or calculated on the fly, and features like Voice + and loudness management are present from the moment the encoder is powered on. There are also additional features that can provide better descriptive audio, alternate languages, and even selectable announcers. This presentation will describe what is possible at the encode side as well as the consumer side to help engineers enable spectacular audio for their stations as soon as NEXTGEN TV is on air today, and how to make it even better in the future.

11 a.m. **A Post-MPEG-2 Vision Encoders and Beyond**

Joel Wilhite, Harmonic

The A in ATSC stands for "Advanced." When compared with the NTSC analog system, the two can be distinguished apart by the distinctive features which were state of the art technology at the time. With ATSC the movement started the shift from analog into digital TV delivery systems and included many more "advanced" features not possible before when compared with the NTSC standard. Now fast forward, as ATSC rolls out the 3.0 standards, some of the new features are getting buried in a myriad of functions and features overloaded by a litany of three letter acronyms used to describe them.

This talk will cover the three core tenants of the ATSC 3.0 standard and then explore some of the advancements being made in the ATSC 3.0 standard and what they represent to our future business. I will attempt to cover the details of why each of the three main technologies are critical to understand the myriad of underlying elements of each for making the business decisions and planning in a post MPEG 2 world.

11:45 a.m. **Lunch (Wisconsin Room)**

12:45 p.m. **Public Service in a Next Gen TV World**

Susi Elkins, WKAR Public Media

Granted the FCC experimental license in June 2018, WKAR launched the NextGen Media Innovation Lab to accelerate development of public service applications and NextGen business services for public broadcasters.

1:30 p.m. **ATSC 3.0 Public Safety and Datacasting**

Fred Engel, PBS North Carolina

PBS North Carolina is researching ways to use ATSC 3.0/NextGenTV in innovative ways to serve the public safety communications community as well as providing remote learning connections for students in homes that lack internet connectivity. PBS North Carolina Chief Technology Officer, Fred Engel, will share insight into their award-winning work for public safety. He will talk about the exciting efforts that public broadcasters are doing to address the learning communications equity gap.

2:15 p.m. **Pros and Cons of SMPTE 2110**

Kurt Miller, Diversified

In the last several years every trade show you go to, the mantra has been that the whole world is IP. There are definite advantages in moving to a full IP facility, but there are still challenges as well. Is IP right for every application? Learn what to look for and be knowledgeable about when making the decision about what steps to take and when in your own transition to IP.

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SPEAKERS

Tom Amador, Dialight

Tom Amador has worked for Dialight Corporation since 2014 in the LED Obstruction Lighting Division helping broadcast customers reduce tower lighting operational costs and improving performance and reliability with our LED solutions. He has 20 years of national strategic sales experience in telecom, wireless infrastructure, and distribution experience, having worked for some of the top companies in the U.S. His goal at Dialight is to provide the highest quality LED Obstruction tower lights at the most competitive price in the industry.

Kent Aschenbrenner, E.W. Scripps

Kent Aschenbrenner has been a TV and radio broadcast professional for 44 years. Based at WTMJ in his hometown of Milwaukee, he is part of the Scripps Media corporate engineering team that oversees 61 television stations. Aschenbrenner earned his A.A.S. in Electronic Communications from Milwaukee Area Technical College and a B.S. in Business and Management Systems from the Milwaukee School of Engineering. He serves on the NAB TV Technology Committee and is a volunteer pilot for United States Civil Air Patrol.

Dennis Baldridge, Baldridge Communications

Dennis Baldridge, a veteran broadcast engineer of more than 40 years, is a contract engineer, operates Baldridge Communications, LLC, and has been the Wisconsin ABIP inspector since 2006. Dennis holds the following SBE certifications: CPBE, CBNT, ATSC3, 8-VSB, AMD, and DRB. A member of the SBE's Technical Presenter's group, he also serves on the SBE Education Committee. In 2013 Dennis was named the SBE Educator of the Year. He is the author and presenter of several SBE webinars including the popular Chief Operator Responsibilities and the complete RF101 series.

Bill Bennett, ENCO Systems, Inc.

Bill Bennett joined ENCO Systems in early 2019 after a sales engineering position with the German manufacturer Lawo. He's currently the Media Solutions Account Manager for ENCO Systems. Before Lawo, he was a long-time remote broadcasting engineer, consultant, and project manager overseeing venue technical setup and operations for five Olympics and countless U.S. broadcasts spanning the NBA, NHL, NFL, and more. He exercised the right-brain as an executive producer and new media business development executive at QVC and owned a laser display production company (where he got to play with really big lasers).

Tim Carroll, Dolby Laboratories

Tim Carroll is Senior Director Sound Technology, Advanced Media Systems Group in the Office of the CTO at Dolby Laboratories. Prior to this, he was CTO of the Telos Alliance, comprising Telos, Omnia, 25-Seven Systems, Axia, Minnetonka Audio, and Linear Acoustic, a company he founded. Previously, Tim worked for Dolby in New York mastering films and DVDs, moving to San Francisco to manage professional broadcast products for Dolby Digital (AC-3), Dolby E, and metadata. He has been honored with Prime Time, Technology and Engineering, and Sports Emmy Awards for his work with Dolby E, television Audio Processing, and the Beijing, Vancouver, and London Olympic games. He is a member of AES, IEEE, SBE, and SMPTE, and is an active participant in the work of the ATSC. He holds several patents in the fields of audio and data systems.

Chris Crump, Comrex

Chris Crump has served as the Sr. Director of Sales and Marketing for Comrex since 2004. In 1987, he began his professional radio career at ABC/Cap Cities Detroit before taking the Features Editor position at MediaBase Research/Monday Morning Replay. On-air, remote broadcast engineer, creative services director roles followed for Capitol Broadcasting (subsequently Paxson Communications) in Orlando and the Ron & Ron Radio Network in Tampa/St. Petersburg. In 1996, Chris moved to the manufacturing side of the broadcast business performing sales and marketing roles for Spectral, Inc., Euphonix, Symetrix and Klotz Digital America. Chris resides in Buford, Georgia (outside of Atlanta) with his wife Seval, 16 year-old daughter Zara, and their Affenpinscher Olive. He is a CBNE certified member of SBE Chapter 5 in Atlanta as well an Assistant Scoutmaster with Troops 597 and 5597 in Dacula, GA.

Susi Elkins, WKAR Public Media

Susi Elkins is director of broadcasting and general manager of WKAR Public Media at Michigan State University. WKAR is home to public radio and television for the Michigan capital region, bringing the best of PBS, PBS Kids, NPR, Classical music and award-winning original content to more than 500,000 mid-Michigan residents each week.

Under Susi's leadership, WKAR has increased its commitment to early childhood education through the launch of the PBS Kids 24/7 channel, WKAR Family original content, and the PBS KIDS Playtime Pad research collaborative. Elkins also led the launch of a new WKAR News/Talk FM station, and strengthened local news coverage with an emphasis on education and public affairs reporting.

In collaboration with MSU, Susi led the effort to launch the first ATSC 3.0 experimental station licensed to a public media organization. Granted the FCC experimental license in June 2018, WKAR then launched the Next Gen Media Innovation Lab to accelerate development of public service applications and NextGen business services for public broadcasters.

Susi currently serves on the PBS Board, the board of America's Public Television Stations (APTS), and the University Licensee Association Executive Council (ULA). Prior to her appointment in March 2017, Susi served in a variety of roles at the station, including interim director, television station manager, content and community engagement manager, public television producer, and instructional television multi-media producer.

Susi holds a bachelor's degree in telecommunication and a master's degree in educational technology, both from MSU.

Fred Engel, PBS North Carolina

Fred Engel, Chief Technology Officer at PBS North Carolina, has been in the broadcast industry since graduating from Ferris State University in 1978. He spent 27 years at WTTW Chicago rising from an engineering maintenance technician to Vice President of Technology. He spent three years with a systems integration firm in Chicago as Vice President of Broadcasting, joined Kentucky Educational Television (KET) in 2010 as Senior Director of Technology, and in 2016 took a similar role with UNC-TV in Research Triangle Park, North Carolina. Fred and his team in Chicago received a Midwest Emmy award for the design and construction of WTTW's Digital Broadcast Operations Center. At PBS North Carolina he and his team won the 2017 NAB Pilot Innovation Grant competition for Digital Paging over Public Broadcasting using ATSC 3.0/NextGenTV. He holds a Certified Professional Broadcast Engineer (CPBE) certification with the Society of Broadcast Engineers. He has served on the FCC Communications Security, Reliability, and Interoperability Council (CSRIC), had a six-year tenure with the PBS Enterprise Technology Advisory Committee (ETAC), participates in various PBS ETAC Working Groups, and served on the AWARN Steering Committee.

Dave Folsom, Pearl

David Folsom is the retired Chief Technology Officer of Raycom Media Inc (now part of Gray Television). He now consults full time for Pearl TV and is responsible for the management and engineering of the Phoenix Model Market Station Project as well as other Pearl projects. He is also the author of the Phoenix Project NextGen TV Host Station Manual as well as the Pearl webinar series about NextGen TV. His focus throughout the development and rollout of NextGen TV is in advancing NextGen TV through operational and technical education. He has been in broadcast and engineering management for more than 40 years. His television-engineering career has spanned from commercial design of broadcast equipment and components to traditional broadcast engineering management in commercial, as well as public television. He is the holder of two television equipment design patents, has served on multiple industry standards committees, and is a licensed private pilot. He lives in Montgomery, Alabama with his wife of more than 50 years, Kathleen.

Alex Fuellgraf, Fuellgraf Companies

Alex Fuellgraf has been in the aviation obstruction lighting field since he was in high school working for his father who was the third-generation owner of the family business. With more than 15 years in the business, he has touched on all aspects of the industry including service, installation, sales, and management. Through the 75 years the Fuellgraf Companies have been operating it has worked in and made long lasting relationships with customers in all 50 states and many foreign countries. Its expertise stretches from 150-foot two-way towers to 2,100-foot broadcast towers. In his free time, he enjoys playing rugby for Nashville Rugby Football Club.

Kirk Harnack, Telos Alliance

Kirk Harnack, CBNE, CBRE, brings 40 years of hands-on experience in broadcast engineering and education to his position as Senior Solutions Consultant at the Telos Alliance. His expertise in putting technology to work in broadcast facilities has driven notable expansion in Audio over IP, VoIP for broadcast, audio processing, and virtualized technology adoption by content creators.

Kirk maintains an active, hands-on role in broadcast engineering through his positions as a partner and VP-Engineering of South Seas Broadcasting, Inc., Delta Radio, LLC, and Kaua'i Broadcast Partners, totaling 14 AM and FM radio stations. He is a Broadcast Meteorologist (WSMV, Nashville), fixed-wing private pilot, FAA Part 107 SUAS pilot, and licensed General Class Amateur Radio operator (KD5FYD). He is a member of the Board of Directors of the Society of Broadcast Engineers, and is Program Chair of SBE Chapter 103 in Nashville.

Kirk founded and hosts the Internet video netcast, "This Week in Radio Tech" or "TWiRT". This 1-hour weekly video netcast features regular contributors and guests from the world of radio engineering.

Bill Hubbard

Bill Hubbard has been involved in media technology for more than 40 years serving in technical leadership positions in commercial and public broadcast facilities and information technology management in higher education. He currently serves on the Broadcasters Clinic Program Committee and leads the Media Technology Institute for the Wisconsin Broadcasters Association. Bill is an SBE Certified Professional Broadcast Engineer and was the recipient of the 2018 SBE Educator of the Year Award. He also serves as a Game Day Event Frequency Coordinator for the National Football League.

Karl Kuhn, Telestream

Karl Kuhn is a Principal Solutions Architect at Telestream specializing in next gen test and measurement of ST 2110 IP, ST 2059 PTP, 4K and UHD, HDR and WCG, and transmission. He launched his career at Tektronix Video in 2000. Prior to Tektronix he was the lead Video Test Engineer for IBM in their Digital Video Development Laboratory in Bethesda, Maryland. Karl holds three U.S. patents and one Japanese patent that cover In-service Testing of Digital Broadcast Video. He is a contributing author for the 11th Edition of the NAB Handbook responsible for chapter 2.9 covering Digital Video Standards and Practices. He is the SMPTE Eastern Region Governor and Past SMPTE North American Sections Director. In 2015 Karl was raised to SMPTE Fellow. He is also a Certified Project Management Professional thru PMI and the George Washington University.

David Layer, NAB

David Layer is vice president, advanced engineering in NAB's Technology department. David has been with NAB since 1995 focusing primarily on the radio technology and standards setting area.

David's principal responsibilities include serving as a project manager for technology projects being conducted by PILOT (NAB's innovation initiative), and as principal administrator of the NAB Radio Technology Committee, a group of technical executives from NAB member companies that advises NAB on technology development and technical regulatory matters. David is actively involved in NAB's technical conference planning and technical publication activities, and has been an author and contributing author for numerous technical publications, including IEEE Spectrum magazine (a leading journal of the Electrical Engineering profession), the McGraw-Hill Yearbook of Science and Technology, and the 9th, 10th and 11th editions of the NAB Engineering Handbook. David is an occasional author of NAB's Broadcast Blog covering timely radio and TV broadcasting-related technical topics.

Currently, David is the chairman of the RadioDNS Steering Board and is the NAB representative to the RDS Forum. He is also vice-chair of the North American Broadcasters Association (NABA) Radio Committee. David is a senior member of the IEEE and is active in the IEEE Broadcast Technology Society (BTS), where he's served multiple terms as a board member on the administrative committee, is a distinguished lecturer, and has been the chair or co-chair of numerous annual IEEE Broadcast Symposia (most recently in 2017). David is a member of the Association of Federal Communications Consulting Engineers (AFCCE) where he is a past board member and past chair of the AFCCE Scholarship Committee.

David was the recipient of Radio World's 2015 Excellence in Engineering Award and was recognized by Radio Ink Magazine in November 2010 as among the top ten best engineers in radio. In 2014 David received the Consumer Electronics Association Technology Leadership Award. The IEEE BTS awarded David the Matti Siukola Memorial Award for the Best Paper of both the 2014 and 2018 IEEE Broadcast Symposia.

Kurt Miller, Diversified

Kurt has been working in the broadcast industry with system integration for 27 years. The last nine years he has been with Diversified, working on systems ranging from stadiums to studios and corporate event spaces to education facilities. Two of the most recent jobs have been fully IP based facilities: Marqee Sports in Chicago and Bally Sports in Tampa. Before Diversified, he spent 18 years with Roscor, 12 of which were doing field engineering in Indonesia working on everything from transmitters to studio facilities to post-production facilities.

John Nagler, University of Wisconsin

John Nagler is a UW-Madison graduate and current cybersecurity analyst for the UW. He has been an IT professional for 22 years and has helped broadcast facilities recover from debilitating ransomware attacks.

Ben Nemser, Nemal Electronics

Benjamin Nemser founded Nemal Electronics in 1979 and is currently its CEO. Ben graduated from University of Miami (BBA and JD) in 1981 and holds a FCC General Radio Telephone Certificate as well as an Amateur Extra Class License (WA4DZS). On weekends, Ben trains for marathons and gives flight instruction in business jets. Ben has more than 45 years of experience in the design, manufacture, installation, and troubleshooting of cable for AV, Broadcast, and RF.

Mike Pappas, Orban

Mike Pappas is Vice President Business Development for Orban Labs. His technical experience spans several decades, including roles in broadcast engineering, government communications, and railway communications. Mike joined DaySequerra in 2015 as VP of Business Development and has assisted this forward-thinking and progressive company in the development of new products, new markets, and new business opportunities. In 2016, DaySequerra acquired Orban Labs, Inc., one of the broadcast industry's best-known names in audio processing. Mike has been heavily involved in Orban Labs since the acquisition, helping to steer the development and market opportunities for a dozen new products. He has installed all of Orban's beta sites for the new XPN-AM audio processor, and has developed specialized field testing methodology for MDCL operations at different AMC levels. Mike is proud to be part of this revitalization of Orban as it again leads the way in audio processing for radio, TV, and internet streaming.

Tony Peterle, Worldcast Systems

Tony Peterle has been involved in radio broadcasting continuously for more than 40 years, working in Ohio, Kansas, Hawaii, and Washington State in both on air and engineering positions. Tony has held chief engineer positions in Kansas City, Wichita, and Honolulu, A commercial pilot, Tony spent several years flying traffic watch in Kansas City and Honolulu, acquiring more than 8,000 hours pilot in command time. Tony enjoys helping customers solve problems, traveling, driving a 74-year-old car, and seeing familiar faces at SBE and other events.

Daniel Ritts, Nemal Electronics

Daniel Ritts is the VP of Engineering at Nemal Electronics and is a leading expert on broadcast fiber optic cables. Danny has more than 30 years of experience in designing, building, and testing all types of fiber optic cabling systems for AV and broadcast including SMPTE and opticalCON. He has conducted advanced hands-on training for engineers from around the world on the SMPTE and opticalCON product lines and has designed numerous devices to facilitate the termination and testing of fiber optic cable systems.

Bill Rounopoulos, Ross Video

Bill Rounopoulos, Business Development Manager for OEM and Partnerships at Ross Video, is leading the company's effort to provide open solutions technology based on AES67, RAVENNA, and SMPTE ST 2110 to OEMs serving the broadcast and professional audio industry. Prior to Ross, Bill's career spanned more than 25 years in the semiconductor industry, holding senior management positions at Lucent, LSI, and Broadcom, focused on networking technology, and was actively involved in the communication industry transition driven by open standards and the internet. Bill holds a B.A.Sc. in Electrical Engineering and a B.Econ degree from Queen's University in Kingston, Ontario, Canada.

John Schadler, Dielectric

John Schadler has been with Dielectric 34 years and is currently the Vice President of Engineering. After receiving his BS in Electrical Engineering from Penn State University, he began working for Dielectric Communications in New Jersey, formerly the RCA Antenna Division. He then earned his master's degree in electrical engineering from Drexel University. His research and development achievements have been focused on unique TV, MobileMedia, FM, cellular, wireless and many other special bi-directional and broadcast antenna designs. John has 44 issued and multiple pending patents. In 2005, he was awarded the distinction of joining the ranks as one of SPX's Master Inventors. He is also the author of the VHF and UHF Television Antenna Test Range Measurements chapter in the NAB 11th edition Handbook.

Maryann Seidler, Telos Alliance

Maryann Seidler works for the Solutions division of Telos Alliance. She's been involved in the broadcast equipment industry for more than 25 years. She first joined Telos in 1995, as their 10th employee. Her speciality with Telos now is in the area of helping stations transition to virtualised infrastructure.

She also works with multiCAM systems overseeing their north American division.

She is also a HAM radio operator and a member of the SBE.

Paul Stewart, Summit Technology Group

Paul Stewart is President and Founder of Summit Technology Group, a broadcast software manufacturer and broadcast engineering firm specializing in regulatory compliance for the broadcast and communications industry. Summit Technology Group develops and markets products such as SideCAR Media Logger, ATMOS Automated Weather Reporting, PostMaster File-Based Media Transport, and TundraCast Audio Streaming Platform. Paul formerly worked as an applications engineer and contributed much to the evolution of automation and playout standards as it pertains to metadata and hardware compatibility.

Nick vanHaaster, GatesAir

In his current role, Nick has been helping broadcasters big and small find transmission & STL solutions that are reliable, easy to operate, and efficient. With a proven track record of experience for more than 20 years, Nick has played a critical role for project management and the broadcast architecture of some of the largest radio and TV implementations both domestic and international.

Stan Walbert, multiCAM Systems

Stan Walbert is the co-founder and CEO of multiCAM Systems. Stan and his two business partners founded the company more than 10 years ago. The company has offices in Paris and New York. Stan has a master's degree in robotics engineering as well as a background in live video production. His goal with the company has been to create automated video equipment that mimics what a live operator can do. In addition to multiCAM system, Stan also owns a production company called Stello productions and Dreamcorp. Stan splits his time between Paris and New York.

Joel Wilhite, Harmonic

Joel Wilhite is a Senior Systems Design Engineer at Harmonic. He started his career at DiviCom when the first MPEG-2 encoders were just being launched and has focused primarily on broadcast television contribution, distribution, and emission technology. He has held several positions within Harmonic and has contributed his system knowledge during the draft phase of several ATSC specifications and more recently for ATSC 3.0. He has presented at many industry conferences and authored and co-authored a number of technical articles for publication. Joel studied electronics engineering at DeVry Phoenix and served in the U.S. Navy aboard the U.S.S. Missouri (BB-63).

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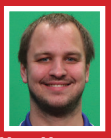

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