



NAB Broadcast Engineering Conference 2010 Summary of Presentations

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Las Vegas Convention Center :: Las Vegas, Nevada USA

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64th Annual NAB Broadcast Engineering Conference

April 10 – 15, 2010
Las Vegas Convention Center
Las Vegas, Nevada

SUMMARY OF PRESENTATIONS

This booklet contains summaries of the presentations at the 64th NAB Broadcast Engineering Conference held at the Las Vegas Convention Center, April 10 – 15, 2010 in association with NAB Show. The 64th annual NAB Broadcast Engineering Conference will address the most recent developments in broadcast technology and focus on the opportunities and challenges that face broadcast engineering professionals around the world. The highly technical conference features presenters delivering papers in all the varied fields that make up broadcasting today. The conference is produced in partnership with the Society of Broadcast Engineers and the IEEE Broadcast Technology Society. NAB would like to thank Advanced Broadcast Systems, Video Clarity and National Semiconductor for sponsoring the NAB Broadcast Engineering Conference.

The full text of many of these presentations is contained in the NAB publication *The NAB Broadcast Engineering Conference Proceedings 2010*. This book and accompanying CD-ROM (or just the CD-ROM) are available at the NAB store at the convention or can be ordered through NAB store by calling: +1 (202) 429-5373 or +1 (800) 368-5644 or NABStore.com.

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Saturday, April 10, 2010

8 a.m. – 5:30 p.m. | LVCC Room S219

SBE Ennes Workshop: Continuing the Digital Transition

Chairpersons: Fred Baumgartner, SBE Education Committee, Elizabeth, Colo.; Andy Butler, PBS, Alexandria, Va.

8 a.m.

Audio over IP Tutorial: Part I

The session will provide an introduction to Audio over IP (AoIP) systems, and their application to radio broadcasting facilities. Subjects covered will include a general introduction to networked audio technology, AoIP's advantages over traditional audio distribution architectures and how AoIP systems are implemented in typical radio stations. The session will also consider the closely related technologies of VoIP and IP codecs, and how they may be interfaced to the radio broadcasting environment. Although tutorial in nature, the session will take a decidedly real-world, practical approach to its presentation, with plenty of illustrations and ample time for questions.

Skip Pizzi, Media Technology Consultant, Fairfax, Va.

9 a.m.

Opening Remarks

John Poray, Society of Broadcast Engineers, Indianapolis, Ind.

9:10 a.m.

Audio over IP Tutorial: Part II

Skip Pizzi, Media Technology Consultant, Fairfax, Va.

10 a.m.

Next Generation EAS

Continued development of the Emergency Alert System (EAS) and the Common Alerting Protocol (CAP) make it difficult to determine just what will be the news come the NAB Show. With that in mind, Gary will provide an update with as much information that is available surrounding the advances and discuss how that impacts broadcasters and broadcast engineering.

Gary Timm, Journal Broadcast Group, Milwaukee, Wis.

10:45 a.m.

Considerations for Adding Mobile DTV to a Broadcast Station

ATSC Mobile DTV is a new, emerging technology that offers considerable potential to a broadcaster, including new business models and retention of viewers.

Some of the changes needed to add MobileDTV capabilities to a station involve obvious additional or modified equipment (encoders, multiplexer, transmitter).

This presentation will provide a summary of the considerations necessary for adding MobileDTV and discuss what has been learned so far on these topics.

Richard Chernock, *Triveni Digital, Princeton Junction, N.J.*

11:30 a.m.

SMPTE Update

Standards, in particular SMPTE technical standards, define much of how the broadcasting arts are accomplished. Peter Symes will give us a brief tour through the old and new standards, as well as those in the process of becoming standards.

Peter Symes, *SMPTE, White Plains, N.Y.*

1 p.m.

Management/Media Skills and the Future of Broadcast Engineering

Current economic conditions have combined with major changes in media to challenge the position of over-the-air broadcasting as the primary force for distribution of news, entertainment and advertising in America. What does this mean for broadcast engineers? How do we redefine our roles? This presentation will first discuss the relationship between broadcast engineering and the “traditional” broadcast media, particularly between senior management and engineering, covering points of conflict and agreement, and reinforcing those practices that can improve that relationship. The presentation will then spotlight the evolving work product of broadcast engineers, and attempt to show what kinds of training and skill sets will be required in the future for those involved in the production and delivery of media.

Terrence Baun, *Wisconsin Educational Communications Board, Madison, Wis.*

3 p.m.

HD Radio Update

This presentation will discuss the current issues surrounding HD Radio™, the power increase, industry status, and the challenges facing equipment manufacturers and broadcasters who wish to implement the technology at elevated power levels. Results of studies completed in late 2009 by NPR Labs and the commercial broadcasters to show interference versus coverage improvements will be shared.

Hal Kneller, *Nautel, Ltd., Punta Gorda, Fla.*

3:30 p.m.

Wireless Mikes after the DTV Transition

Nothing beats wire for audio connections from microphone to equipment, but wireless operations are preferred in situations

where connecting wires would get in the way of other staging factors. The FCC part 74 licensed wireless mikes spectrum has changed drastically in recent months and misinformation runs deep. This presentation will help unscramble the wireless mystery and provide useful information for a perfect broadcast.”

Ralph Beaver, CEO, Media Alert LLC, Tampa, Fla.

4:00 p.m.

Impacts of 3D Television on Video and Broadcasting

New display technologies that are being deployed in the home are now capable of delivering a stereoscopic, three-dimensional illusion of depth TV experience. This seminar will explore the end-to-end requirements from production to display technology for delivering 3D television. Comparison of anaglyph, stereoscopic, and auto-stereoscopic technologies will be presented. Encoding technologies, including MVC, and transport requirements for broadcast will be covered in depth.

Dan Holden, Comcast Media Center, Littleton, Colo.

4:45 p.m.

Reorganization of Broadcast Workflows

Program automation is the standard in most broadcast facilities today; but just how automated and efficient is a given facility? New technologies and standards exist that allow the reorganization of the step-by-step processes that keeps facilities running and makes the broadcast workflow more agile and responsive to business needs. The presentation examines an existing broadcast workflow and describes how it can be changed through the implementation of BXF, MXF and XML to establish a service based workflow. From this derives a new model of operation based on a separation of services and not the physical infrastructure or hardwired devices.

Greg Doyle, Diversified Systems Inc, Santa Clara, Calif.

Sunday, April 11, 2010

9 – 9:30 a.m. | LVCC Room S219

NAB Broadcast Engineering Conference Opening Session

Chairperson: Lynn Claudy, NAB, Washington, D.C.

Keynote: Dr. Barry Blesser, Director of Engineering, 25-Seven Systems and Columnist for Radio World, Belmont, Mass.

A Path for Restoring the Lofty Status of Broadcast Engineers

A system is a collection of elements that interact with each other such that the personality of the system cannot be found in any of the individual pieces. Engineers are just one of the elements in broadcast systems that include investors, managers, listeners, colleagues, advertisers, competitors, journalists and of

course, technology. This creates a paradox: today's systems have become more complex while technology has become more of a commodity. This broader definition of "system" dethroned traditional broadcast engineers from their lofty status as brilliant wizards. argue that augmenting an engineers' skill with non-technical expertise dramatically enhances their added value and stature. Technology is necessary but not sufficient.

Sunday, April 11, 2010

9:30 a.m. – noon | LVCC Room S226

Digital Radio: Advancements in Technology

Chairperson: Michael Cooney, *Beasley Broadcast Group, Inc., Naples, Fla.*

9:30 a.m.

AM IBOC Update From iBiquity

iBiquity Digital Corporation, inventors and developers of the HD radio in-band/on-channel digital radio system, will provide an up-to-date look into new developments in their AM IBOC system.

Jeff Detweiler, *iBiquity Digital Corporation, Columbia, Md.*

10 a.m.

When and How Will Terrestrial Radio Go Digital in Europe?

Radio digitalization in Europe is a patchwork in progress at an early stage. No common medium and long-term success models are in sight yet, and the repeated call for an FM switch-off does not seem to help level the playing field between the countries and the market players. The strategies and the economical necessities, as well as the media political standpoints, differs much between public and private broadcasters. Adapting regulations to today's realities seems to be extremely difficult and the widely discussed technical platforms do not make this process easier. Private broadcasters are looking for gradual, low cost implementation scenarios and very soon they will be ready to go on air.

Markus Ruoss, *Ruoss AG, Rotkreuz, Switzerland*

10:30 a.m.

Electronic Program Guide Field Trial: How HD Radio EPG Works

David Maxson and Steve Riggs coordinated the HD Radio Electronic Program Guide Field Trial in the Boston/Providence/Worcester markets. The trial was part of the larger NAB FASTROAD- sponsored initiative to thrash out EPG technology, conducted by BIA Kelsey, Broadcast Signal Lab and Unique Interactive. This paper describes the mechanics of how EPG data is organized, transmitted and received.

David Maxson, *Broadcast Signal Lab, Medfield, Mass.*

11 a.m.

Laboratory Test Results of Digital Radio Technologies: DAB, DAB+, T-DMB Audio and HD Radio

We are evaluating the digital radio technologies to prepare a technical background of digital radio switchover in Korea. Among lots of digital radio technologies, we have chosen the DAB, DAB+, and T-DMB audio for testing digital radio service in VHF III Band, and HD radio and DRM+ for testing digital radio service in VHF II band. In order to verify the performance of the technologies, we performed laboratory tests this year and compared the results with computer simulation results. In this paper, we show the laboratory test results.

***Yong-Tae Lee**, ETRI, Daejeon, South Korea*

11:30 a.m.

Digital Power Enhancement for DRM

During the last years TRANSRADIO has spent a lot of work in improving their DRM product line in order to fulfill the tight requirements for DRM easily. The result of these efforts can be seen in numerous DRM installations all over the world. Comparing the DRM signal with the AM signal it is found that the DRM signal shows large variations of its envelope. Hence using the same amplifier the transmitted DRM power is significantly lower than the transmitted AM power. As transmit power is directly related to coverage area, TRANSRADIO has developed techniques to enhance the DRM power. In this paper a method is presented which increases the DRM transmit power by applying digital signal processing to the DRM signal. This is what we call "Digital Power Enhancement (DPE) for DRM".

***Christian Hörlle**, Transradio, Berlin, Germany*

Sunday, April 11, 2010

9:30 a.m. – noon | LVCC Room S219

Mobile Television: Part I

***Chairperson: James Kutzner**, Public Broadcasting Service, Alexandria, Va.*

9:30 a.m.

Intro/Update to Mobile DTV

The OMVC has been involved in spurring the development of Mobile DTV since its inception in 2007. In that short period, the voluntary association has helped craft a comprehensive standard for mobile television, encouraged the manufacturing community to develop innovative end-user devices and transmission equipment, and promoted the technology to consumers. In 2010, the OMVC will spearhead an extensive consumer showcase of Mobile DTV technology in the Washington, DC area.

This session will update progress on implementing Mobile DTV and discuss challenges and opportunities in the year ahead.

Anne Schelle, *Open Mobile Video Coalition, Washington, D.C.*

10 a.m.

Open Mobile Video Coalition Testing Program

For the past eighteen months, the OMVC has undertaken a field measurement program to evaluate coverage performance of the Mobile ATSC system in a number of markets and reception conditions in the United States. The presenter will describe the OMVC measurement program and present measurement data and findings to date.

Victor Tawil, *Association for Maximum Service Television, Washington, D.C.*

10:30 a.m.

Field Testing of ATSC M/H Mobile DTV

MSW has conducted extensive field testing of the ATSC M/H system for the OMVC. This presentation will cover the field test methods, techniques, and some of the field testing results.

Dennis Wallace, *Meintel, Sgrignoli, & Wallace, Waldorf, Md.*

11 a.m.

Design Realities for Fixed, M/H, and “All-SFN” Single-Frequency Network Applications

Design of a Single-Frequency Network (SFN) begins by considering the characteristics of the receivers that will be used. Particularly for 8-VSB systems, adaptive equalizer performance is the principal receiver characteristic of consequence. Service objectives in Mobile & Handheld operation may be different from service objectives for fixed reception. With a single transmitter and “gap fillers,” it generally is understood that consistent service may not be available everywhere, but it is possible for viewers to take steps to improve their reception, even in areas where there are relatively weak signals. For M/H service the goal may be to provide continuous service along heavily traveled routes. In such situations, viewers may not be able to take measures to improve reception.

In a tightly spectrum-packed, “all-SFN” scheme, a network design using a large number of transmitters would be expected to result in improved reception reliability. This could be treated as an extension of the type designed for M/H service, but a variety of other network characteristics come into play – such as inter-market interference constraints and a range of infrastructure and economic considerations.

S. Merrill Weiss, *Merrill Weiss Group LLC, Metuchen, N.J.*

11:30 a.m.

New Revenue Models for Mobile DTV Service

Mobile DTV is a new ecosystem that brings new business opportunities to broadcasters. Every wireless TV device can soon become a two-way data communications system that handles entertainment and information. The new ATSC mobile DTV system offers a fundamental shift in broadcast TV device capability through user interactivity. A range of business options make mobile data transmission attractive and profitable for broadcasters. The technology can be used to upload personalization information, content consumption and user behavior data. New revenue models are based on a flexible combination of transaction and distribution fees, advertising and subscription arrangements with content providers and carriers. In addition, mobile device purchase may be subsidized.

Aldo Cugnini, *Vimionix, Long Valley, N.J.*; **Louis Libin**, *Vimionix, Long Valley, N.J.*

Sunday, April 11, 2010

1 - 2:30 p.m. | LVCC Room S219

Broadcast Technology Evolution in 5, 10 and 20 Years

Chairperson: Lieven Vermaele, *EBU, Geneva, Switzerland*

An analysis by members of the worldwide Broadcast Technology Futures Group.

Panelists:

An NHK Perspective – UHDTV as a Near Horizon

Dr. Keichi Kubota, *NHK*

A BBC Perspective – Our Archives will Unlock the Future

Dr. Andy Bower, *BBC*

A RAI Perspective – Options for the Future of Television Broadcasting

David Wood, *EBU*

A CRC Perspective – The Future of the Broadcast Spectrum

Bernard Caron, *CRC*

An IRT Perspective – Standardized Hybrid Broadcasting

Dr. Klaus Illgner, *IRT/ARD/ZDF*

An NAB Perspective

Lynn Claudy, *NAB*

Mobile Television: Part II

Chairperson: James Kutzner, *Public Broadcasting Service, Alexandria, Va.*

2:30 p.m.

ATSC A/153 Overview

The DTV transition ended in 2009, with all high power broadcast television stations turning off their analog transmissions. Despite this major technological change, the existing ATSC digital standard was still only designed to reach fixed antenna installations, such as those mounted on the rooftops of homes. Broadcasters began to recognize that the digital transition could allow for an expansion of broadcast services for the benefit of consumers if the technology could continue to evolve. So over the past two years, the broadcast industry has worked with unprecedented speed to create an innovative new way to use broadcast spectrum to reach mobile and portable devices. The new ATSC standard, called A/153, provides just such a mechanism and was ratified in late 2009. This presentation will give a brief overview of that standard: how the technology works, what capabilities it provides, and how broadcasters might use the standard in practice.

Brett Jenkins, *Ion Media TV, New York, N.Y.*

3 p.m.

Enhancing DTV Coverage: Implementing Vertical Polarization for Existing Broadcast Antenna Systems

Possible shortcomings regarding DTV coverage have been discussed for several years. Low power levels, incorrect assumptions regarding receiver systems, UHF vs. VHF, interference and more, have been topics of numerous presentations. Based on field experiences for both analog and digital TV systems, this paper will discuss a method for evaluating reception quality and then discuss the use of vertical polarization for improving reception.

Kerry Cozad, *Dielectric Communications, Raymond, Maine*

3:30 p.m.

Mobile DTV Service Guide and Data Services

While mobile DTV leverages decades of experience found in the broadcast TV industry, today's consumers have grown accustomed to the richer experiences found in mediums like cable and satellite as well as Internet video. A key component of the experience on these other platforms is a rich Electronic Service Guide (ESG), a launch pad to seamlessly access multimedia services quickly and intuitively on any mobile device. Detailed studies have revealed, for example, that more than 10

percent of a subscriber's total viewing time in these media is spent in the service guide and more than 20 percent of their total service satisfaction derives from the guide experience.

To meet these challenges, ATSC M/H technology supports multiple service guide models starting with services found in terrestrial Digital TV and evolving all the way to the full, digital cable TV-like time/grid ESG. Roundbox will present an overview of these different experiences, their advantages and disadvantages, and discuss how they can be enabled by the broadcaster and by device OEMs.

Peter Mataga, Roundbox, Florham Park, N.J.

4 p.m.

Practical Applications to the Installation of ATSC-MH

The paper will discuss the key considerations and implementations that Harris has encountered during the installation of ATSC-MH systems. This paper will cover topics from the main or legacy ATSC interconnection to the final ATSC-MH transport stream. There will also be a discussion on what you will see when stations use legacy ATSC measurement techniques on ATSC-MH streams pre- and post-transmission, and what PID/PIDs to look for in each scenario. The paper will conclude with a brief discussion on ATSC-MH exciter installations in vendor and non vendor-specific transmitters.

Don Tenhundfeld, Harris Corporation, Mason, Ohio

4:30 p.m.

Audio Processing Requirements for Portable/Mobile Video Applications

In the 12 years between the original acceptance of AAC encoding April 1997 and the latest version defined in ISO/IEC 14496-3:2009, mobile television went from dream to reality. Along with this reality have come new audio challenges. This paper illustrates various methods used to prepare audio content originally produced for HD TV to fit the limitations of mobile devices and the challenges broadcasters face when producing content for multiple target platforms.

Ed Simeone, Linear Acoustic, Lancaster, Pa.

5 p.m.

Perceived Video Quality and Bit-Rate in the ATSC Mobile DTV Standard

This paper presents the results of a subjective assessment experiment that was conducted to examine the relation between bit-rate and perceived picture quality in the new ATSC mobile digital TV standard. A group of non-expert viewers used a single stimulus methodology to rate the perceived quality and commercial acceptability of several short video sequences. Video quality was rated using a standard continuous scale. The sequences

were displayed on a mobile device (Apple iPod Touch®). The video material was processed at eight different bit-rates (from 192 to 2Mbps) using a video encoder that supported the ATSC mobile DTV standard. The 192 Kbps produced poor video quality and had less than 40 percent acceptability rate. The 288 and 384 Kbps bit-rates resulted in video quality with acceptability rates of 60 percent and 72 percent, respectively.

Finally, the bit-rates from 480 Kbps to 768 Kbps resulted in good video quality with acceptability rates ranging from 80 percent to about 95 percent. The results suggest that bit-rates around 300-400 Kbps might be adequate for a mobile service, if high video quality is not deemed necessary and/or the broadcasted content does not have complex spatiotemporal characteristics.

Filippo Speranza, *Communications Research Centre, Ottawa, Canada*

Sunday, April 11, 2010

2:30 – 5:30 p.m. | LVCC Room S226

FM Digital Radio

Chairperson: Michael Cooney, *Beasley Broadcast Group, Inc., Naples, Fla.*

2:30 p.m.

Planning for the Increase in Digital Power for FM HD Radio Signals

This session will provide an update on the technical approaches available to support FM HD Radio transmission at elevated digital power levels.

Michael Troje, *Continental Electronics Corp, Dallas, Texas*

3:00 p.m.

Extending Your HD Radio Footprint

The purpose of this paper is to help the radio station engineer understand the facility planning requirements and technology choices to improve the HD signal coverage.

Topics to Be Covered Include:

- The need for increasing HD Radio sideband power
- Optimized 6dB power increase
- The RF amplifier linearity challenge
- Combining methods to reach higher HD Radio sideband levels
- Space Combining
- Common Amplification

And much more.

Geoffrey Mendenhall, *Harris Communications Division, Mason, Ohio*

3:30 p.m.

Practical Tools for HD Radio™ including HD Power Boost, Increased Sideband Levels and More

As digital radio continues to roll out, there is increased interest in technologies which allow cost-effective delivery of the HD radio signal. This session will examine practical approaches including increased sidebands and peak-to-average power ratio reduction implemented as Nautel's HD Power Boost and some other system enhancements intended to optimize transmission. Theory and practical measured results will be examined, and graphical demonstrations will be used to illustrate the concepts.

Hal Kneller, Nautel, Hackett's Cove, Canada

4:00 p.m.

HD Radio, The Way Forward

Now that the dust is beginning to settle with respect to the respective HD power levels, it is time for the broadcaster to look forward and decide on the best course of action in order to realize HD radio in the marketplace. Each site is different and, as such, there is no all encompassing solution to be routinely assigned. In addition, many broadcasters who have already deployed equipment to comply with the initial -20dB digital level is looking for ways to utilize some of their current equipment. This paper seeks to highlight the various options available to the broadcaster with a view to presenting solutions available from numerous manufacturers.

Henry Downs, Mega Industries LLC, Gorham, Maine

4:30 p.m.

Translators and Boosters – What You Need to Know

This paper provides an overview of the major trends in translators and boosters, and what broadcasters need to know to plan for, implement and manage these services. He will offer tips from the field for reducing the noise as well as the footprint of interference zones in booster applications, including little-known techniques for aligning pilot and audio frequencies, and cover new IP connectivity techniques for remote monitoring and control of boosters and translators in out-of-the way locations.

Tim Bealor, Broadcast Electronics, Inc, Quincy, Ill.

5:00 p.m.

Putting the IBOC Quality Metric to the Test

Broadcasters transmitting the In-Band On-Channel (IBOC) signal used in HD radio broadcasting up to this point had very few tools available to ensure that their on-air broadcast is transmitted with a reasonable degree of fidelity as presented to an HD radio receiver. As a National Radio Systems Committee (NRSC) working group, various broadcast equipment manufacturers, iBiquity, NAB and other broadcast professionals has presented a proposal of a mathematical definition for an IBOC quality metric in September 2009.

By providing broadcasters with the definition of the IBOC quality metric, a means to measure the metric for themselves and a frame of reference based on real-world measurements, this presentation allows broadcasters to optimize their IBOC transmission for improved coverage and an overall cleaner on-air signal.

Philipp Schmid, Nautel, Hackett's Cove, Canada

Sunday, April 11, 2010

5:30 – 7 p.m. | LVCC Room S224

Broadcast Engineering Conference Reception

Sponsored by



Monday, April 12, 2010

7:30 – 8:30 a.m. | Hilton Ballroom A

A Breakfast Invitation – Mobile DTV: Rewing the Engines and Ready to Go!

With the new Mobile DTV standard ratified and more than 20 new consumer products ready for retail introduction, broadcasters are revving their engines for the full-scale deployment of Mobile DTV throughout the country. Never before have mobile consumers been able to take their favorite live, local programs on-the-go, and Mobile DTV promises to bring broadcast television to viewers wherever they go with informative local news and entertainment. The Open Mobile Video Coalition (OMVC) will bring it all together for NAB attendees, with the latest information from broadcasters, transmission equipment experts, consumer device manufacturers, and innovators who are eyeing Mobile DTV as broadcasting's next big opportunity.

Panelists: **Brandon Burgess**, Chairman and Chief Executive Officer, ION Media Networks; **Dave Lougee**, President, Gannett Broadcasting; **John Thode**, Vice President, Small Screen Devices, Communication Solutions, Dell, Inc.

Host: **Nicole Petallides**, Anchor, FOX Business Network

Monday, April 12, 2010

10:30 a.m. – noon | LVCC Room S226

Radio Facilities

Chairperson: **Jeff Smith**, Clear Channel Radio - NYC, New York, N.Y.

10:30 a.m.

The Smart Site: Integrating Intelligence into All Facets of the Broadcast Facility

Rule your world! Learn about the benefits and challenges of completely integrating a broadcast site into an overall facility control system. New systems and capabilities allow broadcasters

to extend their facility control beyond the normal connection of transmitters, antenna switches, and other traditional equipment. Some of these technologies use advanced communication techniques such as IP networking, SNMP protocols and wireless linking, while others involve use of older communications protocols such as serial connections. .At this session, Tony Peterle will outline the various alternatives available for broadcasters seeking to implement an integrated control system. These control plans go beyond the usual broadcast equipment to include HVAC, security, elevator control, servers, firewalls and more. The session will explore the advantages and cost savings that this type of integration can bring to broadcasters in all market sizes.

Tony Peterle, *WorldCast Systems Inc, Miami, Fla.*

11 a.m.

Reducing Operation Costs with Better Monitoring and Control of Transmitter Facilities

With digitalization, transmission systems have become more complex, and additional test equipment needed to monitor correct operation is needed. Monitoring and controlling these facilities effectively from central locations improve reliability and reduces operations costs. This paper will examine new strategies for centralized monitoring and control based on a TCP/IP backbone. Real-world examples will be shown.

Kevin Rodgers, *Nutel, Hackett's Cove, Canada*

11:30 a.m.

Radio in a Cloud

Cloud computing is the use of shared computing resources that are mostly assumed to be located outside of your physical plant. Cloud computing services provide common business applications via networked connections while all the software and data are stored on servers that are maintained and controlled by a third party and offers an alternative to expensive storage of archives on-site and along with biometrics, assists in transferring a great deal of computerized processes off-site. Standard users in a broadcast station do not need knowledge or expertise in controlling the cloud that supports them, they only need to know how to use the specific applications. This session will examine cloud computing as it is used today, its benefits and pitfalls, and then how cloud computing can benefit broadcasters and broadcast engineers.

Andrew Janitschek, *Radio Free Asia, Washington, D.C.*

Monday, April 12, 2010

10:30 a.m. – noon | LVCC Room S228

DTV Transmission and Reception Issues

Chairperson: Joe Snelson, *Meredith Broadcast Group, Henderson, Nev.*

10:30 a.m.

Enhancements on 8VSB Transmission Technology

There have been some dramatic and recent development improvements in 8VSB signal technology including specialized algorithms for non-linear pre-correction, device memory effects compensation and crest factor reduction. Add to that echo cancellation, gap filling and ATSC mobile TV implementation and it is clear the transmission side of digital technology is trying to keep up with broadcasts' ever-changing demands.

This paper will profile the continuing advancement in 8VSB coverage optimization techniques and address new signal algorithm techniques like memory effects compensation and efficiency gains of crest factor reduction in RF power amplifiers.

Henry Rodrigues, *Linear Industries, Elgin, Ill.*

11 a.m.

What We Learned About VHF DTV Reception Problems

Shortly after the June 12, 2009 analog shutoff, many stations that had moved from their transition UHF digital channels back to their VHF analog channels experienced numerous viewer complaints indicating that they could not receive the station's digital signal. Over the past several months our firm has been significantly involved in assisting stations with this problem. This has included extensive field tests in five different televisions markets. These tests involved verifications of the stations' transmission as well as visits to numerous viewer homes where many hours were devoted to diagnosing the reception problems. This presentation will cover the test results, describing in detail commonly encountered indoor reception conditions that caused the poor reception and what was done or can be done to resolve such problems.

William Meintel, *Meintel, Sgrignoli & Wallace, Warrenton, Va.*

11:30 a.m.

An 8VSB SFN Distributed Translator System

In this session, an 8VSB distributed (DTx) translator system will be introduced. Without using a GPS system, a DTx translator is implemented in a single frequency network (SFN). Input frequency is different than the output frequency, but, all the DTx Translators are implemented with the same transmitting frequency. This allows a local DTV broadcaster to require only one channel for all of its translator system. The DTx Translators are also implemented with a full digital demodulation and re-modulation of 8VSB to take advantage of RS decoding and Trellis decoding. This gives resistance to input channel distortion and offer adjacent channel rejection while fully adhering to a regenerative 8VSB translator.

Steve Kuh, *Ktech Telecom, Chatsworth, Calif.*

Monday, April 12, 2010
1 - 6 p.m. | LVCC Room S228

IEEE-BTS Tutorial: Audio Technology for Television

Chairpersons: *Yiyang Wu*, Communications Research Centre
Canada, Ottawa, Canada; **Tom Gurley**, IEEE

1 p.m.

Audio Loudness

A substantial amount of work is being done to provide solutions to the problem of excessive and unwanted variations in audio loudness. This tutorial will provide an overview of the topic describing the sources of the problems and the new standards intended to help solve them. The accomplishments to date and the work still underway in different organizations (ITU-R, ATSC, EBU) will be summarized.

Craig Todd, Dolby Laboratories, San Francisco, Calif.

1:30 p.m.

Broadcast Loudness and Loudness Range

Previous studies by the author have proven how important it has become to define and control loudness and loudness range reliably from production to delivery for various broadcast platforms.

The presentation details work in EBU's specialist group on loudness, P/LOUD. EBU's recommendations are based on open standards. They work with linear PCM audio as well as any data reduction codec, and therefore complement recent ATSC audio recommended practices having a more narrow focus on DTV and AC3.

Thomas Lund, TC Electronic A/S, Risskov, Denmark

2 p.m.

Establishing Convenient Loudness Monitoring and Control within Existing Broadcast Workflows

The issue of loudness has attracted increasing attention in the United States with the introduction of the bill H.R. 1084, the Commercial Advertisement Loudness Mitigation, or CALM Act, which would direct FCC regulation of audio volume in television advertising. This presentation will take a quick look at the bill's ramifications and explore cost-effective strategies for instituting convenient, highly automated loudness control and monitoring across the broadcast plant. With experience in providing loudness solutions to broadcast facilities, Carl will discuss options for integrating loudness control and monitoring with minimal impact on existing operations, whether staffed or unattended, and how new adaptive control algorithms are making it easier than ever to comply with both internal and federally mandated loudness standards.

Carl Dempsey, Wohler Technologies, Hayward, Calif.

2:30 p.m.

Dynamic Range Control: The Other Part of Loudness Management

Measuring and matching the average loudness of programs, commercial advertisements and interstitial material goes a long way towards producing a consistent entertainment experience but it stops short of a complete solution. A major additional consideration involves the dynamic range or loudness range of the content. Consider two examples: a sudden train crash in the middle of an action/adventure program and a program of average loudness with a very quiet scene at the end followed by a commercial that is not quiet. Both demonstrate a variation in loudness range, but the second example usually produces more complaints. Careful use of dynamic range control can alleviate the annoying differences, but this has traditionally resulted in complaints from the creative community as the content has been irreversibly changed. By combining advanced metadata and signal processing techniques, it is now possible to control dynamic range to satisfy consumers and regulators, and do so in a manner that can be bypassed if desired, thus preserving the content and satisfying the program producer. This paper will explore these new techniques and offer recommendations for a successful balance between control and quality.

Tim Carroll, Linear Acoustic, Lancaster, Pa.

3 p.m.

Managing Audio Loudness within Large-Scale Advertising Insertion Systems

In late 2007, Time Warner's Southwest Regional Operation Center finished development and deployed an automated file-based approach to managing and maintaining consistent audio loudness for more than a quarter million advertising insertions across 2400 (inserter) channels on a daily basis. This initial development and deployment provided Time Warner Cable Media Sales with a practical blueprint for simple duplication across several facilities that would provide very large scale automation to effectively manage commercial advertising audio quality control, dialnorm validation, and non-destructive dialnorm (loudness) correction built on commercially available equipment and tools. Since the initial deployment in 2007, the approaches outlined in this presentation have dramatically improved consistency for the viewer. The process is scalable, and thus relevant to many stages of commercial production, from program creation to network delivery.

Ivan Larsen, Time Warner, Dallas, Texas

3:30 p.m.

Break

3:45 p.m.

Audio Video Synchronization

Audio/Video synchronization (“Lip-sync”) is an ongoing problem in digital multimedia broadcasting. This presentation will review some of the sources of the problem (end to end in the system), as well as current work towards resolving it by different organizations (EBU, ATSC, CEA). A major focus will be the new CEA “CEB-20” which provides detailed decoder implementation guidance.

Patrick Waddell, Harmonic Inc, Sunnyvale, Calif.

4:15 p.m.

Lip Sync – Solutions Are in Sight!

This paper discusses new techniques that may be used for detection and correction of audio-video synchronization errors, providing potential solutions to the lip sync problem in broadcast systems. It explains the significance of target tolerances for A-V delay through the broadcast chain, the subjective testing on which such tolerances are based, and the need to preserve producers’ intentions. Standards and recommended practices needed to ensure uniformity of sync error assessments and the interoperability of associated measurement equipment are considered, with a focus on the current work going on in SMPTE.

Graham Jones, NAB, Washington, D.C.

4:45 p.m.

Audio Quality Loss Due to Concatenation of Audio Codecs

Low bit-rate audio codecs typically offer the ability to trade-off quality vs. coding efficiency (bit-rate). However, in the broadcast area, codecs are often concatenated with multiple generations of encode-decode taking place. Codecs differ in their ability to maintain high quality over multiple encode-decode cycles or when concatenated with different codecs. Results from EBU sponsored tests will be shown to illustrate the issues.

Gerard Stoll, IRT, Munich, Germany

5:15 p.m.

Audio Technology for Television – Panel Discussion

Monday, April 12, 2010

1 - 4:30 p.m. | LVCC Room S226

IP Audio for Radio

Chairperson: Jeff Smith, Clear Channel Radio, New York, N.Y.

1 p.m.

LANs, and Drivers, and Fares – Oh My!

AES obsolete? Is multi-channel digital audio a proprietary protocol? These are questions we often hear that indicate there is much confusion about digital audio, multi-channel audio and its transport mechanisms. AES and MADI are digital signals, not a protocol, and while there are many products available for multi-channel audio distribution of AES and MADI, there are many different variants to encapsulate these very same digital signals around Ethernet layers (AoIP) for transport and distribution. This session will take an in depth look at the differences between synchronous multi-channel distribution hubs (AES, MADI), LAN-based distribution (Ethernet layer 2) and WAN-based distribution (IP layer 3). Lastly, we will look at the emerging IEEE standards for Ethernet audio as an open source which will result in broader direct interconnectivity.

***Al Salci**, Sierra Automated Systems, Burbank, Calif.*

1:30 p.m.

Extending AoIP to the Transmitter

Audio-over-IP (AoIP) routing and mixing systems are becoming commonplace in radio studios. Yet, in most cases the advantages of linear AoIP and Ethernet/IP networking are not extended from studios to transmitter sites. FM transmitters are now available with AoIP network connections. This implies that, for the first time, audio may be routed from PC play-out systems or other sources all the way to the transmitter and be transported by linear IP-Audio packets across a standard Ethernet/IP network. Further implied is that now all of a radio station facility's engineering infrastructure can be interconnected using Ethernet/IP. Separate functions and systems such as real-time linear audio transport, audio content backup, IP-video security systems, monitoring and control of studio and transmitter gear, plus VoIP and routine IP traffic can all share a common, ubiquitous transport infrastructure. Tangible benefits accrue quickly to busy engineers when such a flexible, accessible and affordable infrastructure is used.

***Kirk Harnack**, Linear Acoustic, Cleveland, Ohio; **Chuck Kelly**, Linear Acoustic, Cleveland, Ohio*

2 p.m.

Beyond Automation – Intelligent Software Design For Live Assist Applications

Over the past 20 years digital audio delivery software has become the norm for how radio stations originate programming, but has your software evolved from its roots as a tool for automation to a truly robust live-assist application? This presentation will look at the past, present and future of studio software and delineate the difference between making that software work for your application and finding a solution that fits perfectly into your desired workflow.

GUI development, third party software and hardware integration, information accessibility and ease of use will all be discussed.

Patrick Campion, ENCO Systems, Inc., Southfield, Mich.

2:30 p.m.

VoIP in the Broadcast Studio

Together with Ethernet for transport, Audio over IP (AoIP) is driving a revolution in audio studio design, replacing traditional purpose-built mixers, routers and switchers with an architecture that's more computer-friendly, more scalable, faster to install and future-proof. At the same time, Voice Over IP (VoIP) telephone switches are replacing old-style PBXs. VoIP phone systems and AoIP studio networks can be tightly interconnected, creating numerous benefits with regard to ease of installation and support of desirable features. This paper shows how a VoIP-based studio phone system can give increased operational flexibility, equipment compatibility and cost-efficiency.

Steve Church, Axia Audio, Cleveland, Ohio

3 p.m.

Going National: Special Considerations for Large Scale Deployments of Audio over IP

This session will examine the key considerations for those interested in deploying large-scale IP audio networks. It will include an overview of the main challenges and draws on the experience of national public and commercial broadcasters who have already migrated to IP. We will provide an overview of the key concerns such as jitter, delay and link reliability that are valid for an IP network of any size. However, this paper will focus mainly on the issues arising from the greater complexity and scale of large national and country-wide deployments. The session will include illustrations and network applications from real-world deployments in the US and internationally to illustrate the points.

Greg Massey, APT, WorldCast Systems, Belfast, United Kingdom

3:30 p.m.

An Introduction to IEEE 802.1 Audio/Video Bridging for Radio Broadcasters

Audio video bridging (AVB) is an IEEE 802 standard for multimedia networking that provides bandwidth, latency and synchronization guarantees for multichannel audio and video over 802/Ethernet networks. The 802.1 standard is the result of a several year effort by researchers and leading companies in the professional audio and video, networking, computer, and consumer electronics industries. This paper provides an overview of the low-level standards that make up IEEE 802.1, the services that they provide and illustrations of how they work together for predictable and guaranteed audio delivery.

Al Salci, Sierra Automated Systems, Burbank, Calif.

4 p.m.

Point-to-Point Audio Distribution: It's Not Just Satellite Anymore

For many years now, satellite has been the primary distribution system for network programming with ISDN and T1 used as the standard methods for transporting programming to satellite uplink sites. Audio over IP (AOIP) has had a huge impact on audio at the studios, as well as for Studio-Transmitter-Links. This paper will examine how AoIP networks can provide an alternative to satellite for multi-point audio distribution. In particular, we will examine Multi-Protocol-Label-Switching (MPLS), a relatively new network type being offered by providers. It is a virtual private network that is fully meshed meaning that any network site can send data to any other site without going over the Internet.

Rolf Taylor, *WorldCast Systems Inc, Miami, Fla.*

Tuesday, April 13, 2010

9 a.m. – noon | LVCC Room S226

Radio Data Services

Chairperson: Dom Bordonaro, *Cox Radio, Inc., Milford, Conn.*

9 a.m.

Emerging Bonded Meta-Data Applications Accessible Radio Services

The presentation will provide an update on the Technology Research Center's (TRC) work on radio accessibility issues in support of the UN Convention on the Rights of Persons with Disabilities (CPRD) as well as a briefing on new bonded metadata initiatives to support a host of new service initiatives. The TRC was established by the Public Radio Satellite System in October 2009 to combine the satellite transmission expertise of the PRSS with the technical innovation of NPR Labs. The TRC provides broadcast technology research, consulting and testing capabilities for members of the public radio community and producers of public radio content and shows.

Mike Starling, *Public Radio Satellite System, Washington, D.C.*

9:30 a.m.

Saving Lives with FM Radio-Based Mass Notification

Most people are still surprised when cell networks can't handle the extra load during emergencies. The reality is that cell phone networks are switched (point-to-point) and were not designed to handle the loads put on them today. Even more alarming is the lack of awareness that wireless carriers have the potential to further safeguard individuals and communities with the activation of a standard FM receiver chip that exists in most cellular handsets today which is capable of receiving personal alert messages from a standard FM radio tower used to listen to your

favorite music. FM chips are readily available for insertion into cell phones and are used extensively outside the U.S. Secondly, the technical barriers of battery drain and internal antennas have been overcome. The chips available provide signal sensitivity capable of tuning and receiving FM radio signals without external headset antennas. As emergency communication channels continue to receive close scrutiny, the role of broadcasters will advance as the FM network infrastructure is considered to provide efficient and solid support for the vigorous delivery of time critical, lifesaving messages.

Matthew Straeb, *Global Security Systems, LLC, Fort Lauderdale, Fla.*

10 a.m.

The Benefits of using FM RBDS Data in Integrated Public Alert and Warning

Any mass alerting technology needs to consider the last mile – getting the alert to the end user, and if/how that alert will actually reach the desired audience. Will it wake people at 3 a.m.? What percentage will be reached? How long will it take? Broadcast FM data stands out with its ability to notify and wake up a million people in a few seconds with a single text message broadcast out across a city to specially equipped receivers as well as car radios, MP3 players and soon cell phones. That same broadcast capability can be used on a targeted basis to alert only specific groups like first responders or residents living near a threat. FM is well known for its reliance after disasters and is the medium people turn to after a major hurricane when the lines are down. We discuss how FM data warning systems work in both hardware and software and highlight the benefits of the technology, with some case studies from around the world.

Bill Marriott, *viaRadio, Melbourne, Fla.*

10:30 a.m.

Do More with RDS Data

New media expert and former radio host Jim Roberts with The Radio Experience will give working examples of text applications in use by stations today to improve P1 numbers and increase advertiser buy rates. He will detail creative uses of RDS and HD radio text for promoting advertisers, concerts and shows, plus present simple text applications to increase listener loyalty using sports scores, community bulletins, weather updates, traffic alerts and more. He will also cover emergent interactive applications that are enabling broadcasters to reach out to listeners where they live and play, such as iTunes, Twitter and Facebook and on mobile devices such as iPod, iPhone, Zune and others. He'll conclude his presentation by walking broadcasters through a typical datacasting setup.

Jim Roberts, *The Radio Experience (TRE), Quincy, Ill.*

11 a.m.

Providing Media-Rich Content Using Digital Radio

Almost since its inception, HD radio has held the promise of a media-rich, visual user experience far beyond the transmission and reception of audio-only program content. Digital radio data services have the capability to deliver new revenue streams to broadcasters by enhancing digital radio broadcasts with synchronized visual content. By leveraging the streaming data and file transfer capabilities of these platforms, it is possible to present media-rich content to the user on media-enabled receiver devices. Listeners will be able to enjoy station logos, artist pictures and album art and information, as well as advertising, stocks and weather graphics and many other visual presentations on their radio screen. The author will discuss the principles, systems, protocols and applications required to present graphical content through enhanced broadcast transmission and receiver platforms, thereby offering a unique visual experience for radio listeners.

Tim Anderson, Harris Corporation, Mason, Ohio

11:30 a.m.

Enhanced Radio Broadcasting: Next-gen Features for Connected Devices

A number of technologies have recently emerged or been proposed for adding enhanced features to radio broadcasts and receivers. Such new systems exploit the convergence of broadcast radio and the Internet, which an increasing number of devices now or will soon implement in one form or another. These include “tagging,” RadioDNS/RadioVIS, a radio EPG, various mobile radio “apps,” and social networking how-applications. This presentation will summarize the workings and current status of these systems, and forecast and when they might be best applied by radio broadcasters.

Skip Pizzi, Media Technology Consultant, Fairfax, Va.

Tuesday, April 13, 2010

9 – 11:30 a.m. | LVCC Room S228

Shared Services for Television

*Chairperson: David Folsom, Raycom Media, Inc.,
Montgomery, Ala.*

9 a.m.

Reconsidering Centralized Multi-Station Operation

This paper will explore two models for multi-station centralized transmission. Both models use a “hub and spoke” topology, but with different distributions of ingest, playout and control functions between hub and spokes. Descriptions of the models include detailed workflows for content management and comparisons of redundancy and failover options.

John Wadle, OmniBus Systems Inc, Lakewood, Colo.

9:30 a.m.

Centralization of Master Control

This paper presents an overview of the implementation of a hub and spoke broadcast architecture to support centralized delivery and distribution of assets that also offers the flexibility for local programming for commercials and news. The hub and spoke infrastructure does not increase operational costs in terms of duplication of ingest processes and storage nor does it increase operational or manpower costs. In addition the approach offers a suitable level of resilience without the need for increased investment at the spoke sites.

Philip Wilton, Snell Group, Reading, United Kingdom

10 a.m.

Centralization – It's Back!

A few years ago, it was hot. Then, it wasn't. Now, centralization is hot yet again! Current economic conditions have refocused the broadcast industry on the benefits of centralizing transmission facilities. Big drops in the cost of bandwidth have helped enable this, along with the availability of other mechanisms (www) to support workflows that would previously have required private, dedicated circuits. However, these alone do not provide a workable alternative without associated advances in workflow solutions to support them.

Chris Simons, Harris Corporation, Mason, Ohio

10:30 a.m.

The Virtual TV Station Broadcast Operations as a Hosted Service

Concerns about the limitations of using IT and IP-based networks in a mission-critical real-time environment have prevented the broadcast industry from fully adopting these technologies. Advances in technology have addressed these issues and IT / IP-based infrastructure is fast becoming the future of broadcasting. The model of a common IT infrastructure for broadcast operations brings with it the new concept of a running a Virtual TV station where broadcast operations can be provided as a hosted, central service with signal delivery via IP. This brings opportunities for smaller organizations to start their own channel and the potential for new revenue streams to large organizations. This paper will cover in detail how the latest digital broadcast technologies can enable the creation of Virtual TV stations and how this can be done as a hosted service.

Jan Weigner, Cinegy, Hollywood, Calif.

11 a.m.

Beating the Budget Crunch – Building an Enterprise News Production Platform in a Down Economy

The economic crisis has badly impacted the broadcast industry. Both advertising revenues and budgets are down, forcing broad-

casters to find ways to reduce their overhead without losing the competitive edge. To overcome the financial limitations, many broadcasters are pioneering a new business and technology model that provides a much faster return on investment. The key to each of these success stories is the open MAM platform that provides integration across the workflow. Centralized ingest, desktop production and news-wheel automation connected and orchestrated by a broadcast workflow engine eliminate redundant tasks all while providing a modern platform to add new channels, increasing revenue opportunities without increasing resources.

The commonality lies in the media asset management infrastructure each has deployed, combined with the workflow engine that integrates production tools and processes, allowing team members to do far more in less time. This presentation will discuss two business case studies on how broadcasters deployed these businesses models and used technology to achieve lower costs and higher revenues.

Thomas Zugmeyer, *Dalet Digital Media Systems, New York, N.Y.*

Tuesday, April 13, 2010
1 – 5:00 p.m. | LVCC Room S226

Radio Case Studies

Chairperson: Andy Laird, *Journal Broadcast Group, Inc., Milwaukee, Wis.*

1 p.m.

Satellite Distribution of HD Radio and Analog FM using HDC

KUVO, with an R&D grant from the Corporation for Public Broadcasting, and in conjunction with National Public Radio Satellite Service and Nautel, has developed a system to use the HD radio HDC UDP stream on a single 300 kbps satellite channel to feed both the HD radio and FM analog signal to both translators and full stations. The advantage of this system is that it uses a single 300 kbps satellite channel to deliver both the HD radio and analog FM signals. Prior systems required two satellite channels making them cost prohibitive. Features of this system include burst data rate management on the UDP stream, host audio extraction from the HDC stream to derive the FM analog audio and an advanced error correction system that allows the remote translator and transmitter sites to request retransmission of lost or damaged HDC packets. The systems is up and running on KUVO K209ED translator in Breckenridge, Colo., and is being installed on KUVO's station in Vail, Colo., KVJZ.

Mike Pappas, *KUVO Radio, Denver, Colo.*

1:30 p.m.

Maximizing the Reliability of Studio-to-Transmitter Links for Radio

This talk will share real-world experiences with the audience regarding Greater Media's experience with 11Ghz and 18Ghz high capacity IP and T1 STL Radios. Greater Media owns and operates five class B FM radio stations in Boston. Recently, due to increased capacity needs and reduced reliability observed on unlicensed spread spectrum links, we have completed the installation of a network of high-capacity radios in a sonet ring configuration to connect together three transmitter facilities and a studio location. The advantages of this "self healing ring" are numerous, and are particularly attractive for broadcasters who demand high up time, but also require significant bandwidth to support today's modern radio needs (HD radio, audio over IP, real time traffic and PAD data). Practical considerations valuable to those contemplating such a system will be discussed (i.e., what distances are practical, selecting dish sizes, radio capacities and licensing considerations). A breakdown of STL payload will be shared to indicate the different services supported by these links.

Paul Shulins, Greater Media, Boston, Mass.

2 p.m.

Indoor Noise Conditions in the FM Broadcast Band

The impact of indoor noise for AM broadcast reception is well known, but less so for FM thanks to the receivers' ability to hide the noise. Steve Johnston's hypothesis was that the growing levels of indoor noise from modern electronics may be masking weaker FM signals and probably digital HD radio and HDTV as well. To get a sense of the noise present in the FM band in a variety of indoor situations, and see if it might explain the trouble some listeners are having with digital reception, he made some measurements of listener and staff homes using a portable spectrum analyzer and antenna. He studied several urban apartments, suburban houses and urban offices. All were found to be much noisier inside than outdoors on the adjacent property. He also pinpointed some common sources of this noise. This presentation documents these tests in a manner that is easy to understand and very useful for broadcast engineers worldwide.

Steve Johnston, Wisconsin Public Radio, Madison, Wisc.

2:30 p.m.

Case Study: PRSS Next Generation Content Delivery

The Public Radio Satellite System (PRSS), managed by NPR's Distribution Division, is embarking on its first system-wide refurbishment of ground system equipment since the launch of "ContentDepot" in 2005. The project involves replacing streaming decoders and storage receivers at more than 400 interconnected public radio stations nationwide, and the acquisition and

installation of new head-end equipment for the system's Network Operations Control (NOC) at NPR headquarters in Washington, D.C. The project will also include the replacement, as needed, of downlink antennas throughout the system.

Pete Loewenstein, *NPR, Washington, D.C.*

3 p.m.

Radio Living in a Multimedia World

Radio stations today must step up their game in order to compete. What worked only 5-10 years ago cannot be expected to keep a station on the edge with its audience. How does a network or station on a shoestring budget compete on a national level while remaining within its resources? In this paper we will examine today's multimedia options and share with you some of the secrets we have learned while expanding beyond the radio waves and embracing the world of multimedia. We will provide an in-depth view of our radio information systems but also how we incorporate video for use on the Internet and maximize the use of other contemporary multimedia tools. Lastly, we will address what we are planning for the rest of 2010 and beyond, ensuring we continue to meet our goal of providing accurate and timely news and information to our audience.

Andrew Janitschek, *Radio Free Asia, Washington, D.C.*

3:30 p.m.

Detuning in the MOM Era

This is a presentation on the use of Method of Moments (MOM) to predict the need for and evaluate detuning of structures erected near AM antenna arrays. The FCC is about to adopt new rules for cellular, PCS and private radio licensees that will replace the currently required pre- and post-construction field measurements of AM arrays when structures are constructed or modified. The new rules will allow the use of MOM modeling in lieu of these field measurements. John Warner will present information on how the model is constructed and analyzed and what the results mean to the broadcaster.

John Warner, *Clear Channel Radio, Lineboro, Md.*

4 p.m.

Telephones in Your Studio or Newsroom: Big Changes Coming

This session will cover how to use newly available technologies to dramatically cut costs while improving your operation. Talk is cheap, but talk radio content production, isn't always cheap. With new technologies such as VOIP, you can have better quality on air phones, interviews, and remotes. You don't have to spend much money, and in some cases, no money to enjoy the benefits of these changes.

Joseph Talbot, *Citadel Broadcasting San Francisco KGO/KSFO, San Francisco, Calif.*

4:30 p.m.

Power Quality in Communications Facilities

Power quality wiring considerations are applicable to every building, but are particularly emphasized in 911 centers and broadcast facilities. The primary focus of this presentation is to recommend wiring and grounding techniques and practices that should be part of the design of new or renovated structures. We will examine several case histories, including television, radio and 911 communications centers. The power quality wiring and grounding practices to help prevent power quality problems from occurring, or diminish their effect, are applicable to every industrial end use. The particular case studies will amply illustrate application of proper electrical infrastructure in the elimination and prevention of power quality problems, and the results that were achieved at minimal cost.

David Brender, *Copper Development Association Inc., New York, N.Y.*

Tuesday, April 13, 2010
1 – 5 p.m. | LVCC Room S228

Television Workflow and File Management

Chairperson: Glenn Reitmeier, *NBC Universal, New York, N.Y.*

1 p.m.

Workflow Automation: Where's the ROI?

Media companies frequently evaluate opportunities to automate their video workflows. Yet, it is often unclear where the real value of workflow automation lies. Is it through reduced errors, less manual labor, or new revenue opportunities? Does it even exist? This paper summarizes key findings gathered from decision makers and influencers at nine major media companies. It further provides insights for engineering and video operations managers to use when evaluating how workflow automation will pay for itself, and when.

John Pallett, *Telestream, Inc., Nevada City, Calif.*

1:30 p.m.

Broadcast Media File Interchange: Strategies and Pitfalls

Because of the real-time requirement to store and deliver content, broadcast (or on-air) media servers fundamentally require deterministic performance and access to every media file they store.

They also need to intrinsically support stream-oriented workflows such as playback during capture, editing and file transfer. This leads to specific requirements for stream able files that support concurrent access and deterministic performance, as well as interfaces into IT file interchange and access mechanisms.

Together the Server File System, Media File Format, Essence Type and Interchange Mechanism determine the compatibility.

Todd Roth, *Harris Corporation, Mason, Ohio*

2 p.m.

The Business of Media: Optimizing File-based Content Workflow

Across the industry, content has quickly become file-based in nature – driving media companies to change the workflow and systems supporting production, management, distribution and repurposing of those file-based media assets.

This presentation will provide case studies from Discovery Communications that deliver file-based solutions at different points in, or across, the digital media supply chain. Hearing from senior level executives, this panel will deliver a practical look at how the promise of file-based solutions is achieved. Additionally, the author will provide his thoughts on which media technology trends will most immediately affect the business, and how to effectively apply these developments to the overall strategy.

John Honeycutt, *Discovery Communications, Silver Spring, Md.*

2:30 p.m.

Using RFID to Create Efficiencies and Savings in a Broadcast Environment

The paper describes how an integrated RFID system can cut operating costs by helping to improve physical workflow and asset tracking in a typical broadcast operation. Particular attention will be focused on management and control of physical assets as they are used in normal day-to-day operation. Specifically in the area of mobile production, news gathering and how substantial amounts of staff time can be saved using RFID technology. The paper will present some real world business models that show where and how operating costs are saved and describes some typical ROI realized using RFID.

Stephen Pumple, *Azcar, Markham, Ontario, Canada*

3 p.m.

Captioning Challenges in the Modern Workflow

As broadcasters, networks and content originators switch to file-based operations, the traditional captioning workflow has ceased to be a viable way of handling the growing requirement for captioning, especially as much content is now delivered by multiple formats. At the same time, the use of server-based assets creates new opportunities to add captions much closer to air time than before, either by automation and integrated workflows – or even live – by manual means. Seamless integration with automation systems is essential to robust and efficient captioning operations. The paper sets out the challenges for broadcasters in creating an

efficient captioning operation, and examines the solutions offered by the leading integrated captioning systems.

Sam Pemberton, *Softel, Norwalk, Conn.*

3:30 p.m.

Compression in a 3G Workflow

The drive towards 3G progressive high definition workflow is in its infancy. Many broadcasters are however contemplating bridging the technology gap between existing interlaced infrastructures to a common 1080p 50/60 format.

This paper will focus on how to handle video compression in a 3G workflow to meet the demands for increased picture quality. It will compare video compression formats like JPEG 2000 and AVC-I with examples to highlight their strengths and weaknesses for a variety of contribution networks and applications. As IP is increasingly being the dominant transport medium for high quality contribution links, this paper will cover the options around choosing the transport stream formats for carrying these new compression formats. It will assess the strength and weakness of MPEG-2 versus MXF formats and how network error resilience can be added to protect the content.

Are Olafsen, *Grass Valley, Reading, United Kingdom*

4 p.m.

A Strategy for Production and Delivery of Multiplatform On-Demand Content

Broadcasters must make their content available on television, Web and mobile, in both linear and on-demand formats. This paper assesses multi-platform production and delivery strategies and will highlight the traditional trade-offs between control, cost and complexity experienced by the content owner and platform operator.

This paper will introduce new approaches to multi-platform content management that simplify content production, preparation, workflow, ingest and distribution. It will look at how advertising assets can be managed in a multi-platform environment, exploring the relationship between content and metadata management, advertising campaign management and ad insertion.

Jim Alexander, *Ericsson, Duluth, Ga.*

4:30 p.m.

Building Workflows to Support Multi-platform Content Delivery

Traditional broadcasters need to be anything but traditional thanks to the proliferation of devices and platforms that their viewers are using to consume content. Establishing seamless workflows that ensure content follows viewers wherever their eyes

may wander and vice versa is now critical. This presentation will identify the most significant of these new devices and platforms and then demonstrate how broadcasters can cost-effectively build tapeless, mixed file format workflows that take the guesswork out of meeting these new demands.

Venkat Krishnan, *SeaChange International, Acton, Mass.*

Wednesday, April 14, 2010
9 a.m. – noon | LVCC Room S226

Disaster Preparedness, Recovery and Security

Chairperson: Andy Laird, *Journal Broadcast Group, Inc., Milwaukee, Wis.*

9 a.m.

Strategies for Disaster Preparedness: Staying on the Air if the Worst Happens

When disaster strikes, what strategies do you have to assure that you can stay on the air, or get back on air quickly? Worldwide disasters such as hurricanes, tsunami and earthquake can devastate broadcast facilities, both transmitter sites as well as studios, as well as cripple power and communications infrastructure. Radio is at its best when it serves a community in distress, but what if you can't get back on air? This paper will examine strategies that can be used to create a low cost but effective kit of items to be prepared for the unthinkable. Most businesses today have a disaster recovery plan. Shouldn't your radio station have one, too?

Charles Kelly, *Nautel, Hackett's Cove, Canada*

9:30 a.m.

Are You Prepared for a Disaster?

A disaster can strike anywhere at any time. This presentation gives engineers and managers some sound suggestions and ideas of actions they can take now to be better prepared, as well as some simple daily procedures that they can continue to do that will help with the stress of an emergency situation. Be prepared when the insurance company calls. Have a plan of action when your corporate office calls.

This presentation explains how this plan will help not only in an emergency, but will also be very helpful in day to day routine operations.

Steve Fluker, *Cox Radio, Orlando, Orlando, Fla.*

10 a.m.

Putting the Final Touches on Next-Generation EAS Panel

"We interrupt this program for a special broadcast from the Emergency Alert System." We all know what these words mean,

whether it's for an actual emergency or hopefully just a test. Less clear is the important role that broadcasters play in the Emergency Alert System (EAS), and whether your responsibilities may change as the government implements the next generation of EAS. The Federal Emergency Management Agency (FEMA) is rolling out a new Common Alerting Protocol that will allow the same warning message to be delivered for many different warning systems, and the FCC is exploring a new process of required annual nationwide EAS tests. What do these developments mean for you? Come find out from our panel of EAS experts from FEMA, the FCC and the industry.

Panelists: *Antwane Johnson, FEMA, Washington, D.C.; Wade Witmer, FEMA, Washington, D.C.; James Barnett, FCC, Washington D.C.; Thomas Beers, FCC, Washington, D.C.; Suzanne Goucher, Maine Association of Broadcasters; Damon Penn, FEMA, Washington, D.C.*

Wednesday, April 14, 2010
9 a.m. – noon | LVCC Room S228

Television: Case Studies

Chairperson: *Michael Dolan, TBT, Inc, Del Mar, Calif.*

9 a.m.

Workflow and Asset Management Challenges in Multi-channel Broadcast Operations

The move to an all file based operation includes considerations of elements in media asset management and Workflow, which are typically addressed in varying perspectives. AZCAR's case study presentation will highlight a multiyear project for Medcom, a multichannel broadcast operations service in Panama, which is planning the conversion of their analog facility to an all file-based digital operation. AZCAR's consultants evaluated their current automation, traffic and database systems, their current air and production workflows, and those systems that would be modified as the transition progressed.

This presentation describes what needed to be studied, how it was studied, how the recommendations were evaluated and which were adopted.

Michael Walter, AZCAR Technologies, Inc., Canonsburg, Pa.

9:30 a.m.

Media Asset Management ROI

Achieving an HD tape-less workflow was a daunting task for VERSUS, a national cable sports network in more than 75 million homes. In 2007, Paul Koopmann, director of Broadcast Engineering, launched an aggressive project to archive VERSUS' growing video tape library. Budgeting for this was as difficult a task as was obtaining the goal of a tape-less HD workflow would be.

VERSUS' key budget objective was to find out what the annual costs is to keep one video tape on a shelf at their facility in Stamford, Conn. The secondary budget objective was to calculate the annual cost and time it takes to move the content off of that single tape and into an edit room and eventually to air. Key factors for determining these costs were broken down into facility, operational, and production categories. Once all of these factors were tallied up, the annual cost to utilize one 60-minute video tape once a year was shown to be outrageously expensive. This gave the archive project momentum.

Paul Koopmann, *VERSUS, Stamford, Conn.*

10 a.m.

New Studios for Real-Time Closed Captioning: Their Configuration and Operation

Closed captioning in television broadcasts is part of the trend in recent years to make information more "barrier free" in various contexts. NHK began offering a screen-captioning service for the hearing-impaired and the elderly in 1985. The captions are normally produced and provided using pre-recorded videos, which mean this method is incompatible for live telecasts. NHK accordingly developed a real-time closed-captioning system for simultaneously producing and providing captions for such telecasts, which has been in operation since 2000.

The system has operated with two studios, but the increasing amount of live telecasts where captions are called for, and the dated nature of the existing system prompted NHK to build new studios for real-time closed captioning. NHK has built and put into service three new studios for real-time closed captioning in order to offer more programs with captions. This paper reports on their configuration and operation.

Muneki Ikeuchi, *Japan Broadcasting Corporation (NHK), Tokyo, Japan*

10:30 a.m.

Launching MediaCityUK

MediaCityUK is an impressive new development in the North West of England, which aims to establish a regional digital media sector as an economic regenerator and community builder. The nine buildings of the MediaCityUK campus are centred on an HD Studio Block, serving as the head-end for digital workflow services, which will connect with the media industry globally. Core media services will be provided via a jointventure formed by Ascent Media and Peel Holdings, the site's builder.

This session will present the vision and strategy for MediaCityUK, the services to be offered, and the aspirations of the BBC in moving to the site.

Carol Owens, *Ascent Media Group, London, United Kingdom;*
Mark Harrison, *BBC, London UK*

11 a.m.

Enterprise MAM – What is the Real Benefit for Broadcasters?

Implementing a Media Asset Management (MAM) system can bring many benefits to broadcasters. Understanding the full capabilities of MAM benefits is often the challenge. Broadcasters can utilize a MAM system to re-engineer processes and streamline complex workflows, reducing their operating costs by more than 30 percent while simultaneously gaining a platform for employing new streams of revenue without adding a single headcount.

This paper will go into detail the key benefits of MAM providing two case studies on how broadcasters have implemented MAM to reduce their costs and expand their revenue opportunities. It will identify the key benefits an enterprise MAM system can bring as well as what to look for when selecting a solution.

Thomas Zugmeyer, Dalet Digital Media Systems, New York, N.Y.

11:30 a.m.

Skype HD Video for Broadcasting – The Evolution of Video Calling Over the Internet

Broadcasts from all around the world have been supplementing traditional electronic news gathering (ENG) with high-quality video (HQV) calling services from companies like Skype. Video calling over broadband Internet connections extends availability, improves interactivity, and lowers overall cost. As the broadcast industry moves towards high-definition (HD) technology there is a need for improved video calling technology over the Internet as well. This presentation will discuss challenges and solutions for HD Video Calling for Broadcasters and introduce new technologies that may lead to easier and faster adoption of HD Video Calling.

Julian Spittka, Skype, San Francisco, CA

Wednesday, April 14, 2010

12:30 – 1:45 p.m. | Las Vegas Hilton Barron Room

Technology Luncheon Sponsor



LG

Life's Good

Technology Keynote Speaker – Shelly Palmer



Shelly Palmer is the host of “Digital Life with Shelly Palmer,” a weekly half-hour television show about living and working in a digital world which can be seen on WNBC-TV’s NY Nonstop Tuesdays at 10p Eastern and online, and the host of “MediaBytes,” a daily news show that features insightful commentary and a unique insiders take on the biggest stories in technology, media, and entertainment. He is Managing Director of Advanced Media Ventures Group, LLC an industry-leading advisory and business develop-

ment firm and the President of the National Academy of Television Arts & Sciences, NY (the organization that bestows the coveted Emmy® Awards). He invented the underlying technology for Enhanced Television (Who Wants to Be a Millionaire, Monday Night Football), the most popular form of interactive television in the United States. His professional vitae includes years of experience in television production and musical composition. He created and produced HotPop, a teen lifestyle and music show airing on Starz/Encore's WAM! A prolific composer, Palmer was the recipient of the American Society of Composers, Authors and Publishers (ASCAP's) 12th Annual Film and Television Music Award for ABC's hit series Spin City. He is a weekly columnist for the Jack Myers Media Business Report, The Huffington Post and a technology commentator for CNN.com. Palmer is the author of Television Disrupted: The Transition from Network to Networked TV 2nd Edition (York House Press, 2008) the seminal book about the technological, economic, and sociological forces that are changing everything and the upcoming, Get Digital: Reinventing Yourself and Your Career for the 21st Century Economy (2009, Lake House Press) For more information, visit shellypalmer.com

Radio Engineering Achievement Award

Winner – Steve Church



Steve spent the first part of his career as a Chief Engineer at such stations as WFBQ/Indianapolis and WMMS/Cleveland. Then he developed the first digital audio product for the radio broadcasting industry, the Telos-10 on-air phone interface and founded Telos Systems to manufacture and market it. Twenty years later he remains head of the company, which has grown to include Zephyr ISDN/IP codecs, Omnia processing, and Axia IP-based studio equipment. He was the first to use MP3 in a product. He is a co-inventor of Livewire, an Ethernet/IP technology for the transport and routing of professional studio-grade audio.

TV Engineering Achievement Award

Winner – Mark S. Richer



Mark Richer, this year's recipient of the NAB Engineering Achievement Award for Television, has led the ATSC for the last decade, navigating the complexities of the transition from analog to digital broadcasting. Before joining ATSC, Richer spent 16 years with the Public Broadcasting Service (PBS), eventually serving as vice president of engineering and computer services. He also served as chairman of the working party on system testing and evaluation for the FCC Advisory Committee on Advanced Television Service.

NAB Technology Innovation Awards

This is the second year NAB will award the NAB Technology Innovation Awards. This award honors organizations that bring

advanced technology exhibits and demonstrations of significant merit to the NAB Show. Candidates for the Technology Innovation Awards are organizations currently exhibiting at the NAB Show. The exhibits present advanced research and development projects in communications technologies that have not yet been commercialized. The merit of the technology exhibit is the sole factor that is taken into account. The awards will be presented at the NAB Technology Luncheon on Wednesday, April 14 at the Las Vegas Hilton Barron Room.

Best NAB Broadcast Engineering Conference Paper Award

Each year, presenters at the NAB Broadcast Engineering Conference are urged to submit written papers on the subject of their presentations. The yearly Proceedings of the NAB Broadcast Engineering Conference, published as both a book and a CD-ROM, and sold at the NAB Store in the Las Vegas Convention Center during the NAB Show (and at www.NABStore.com after the Show) is a compendium of these technical papers, and an important archive of the leading edge of broadcast engineering issues. The new NAB Best Paper Award honors the author(s) of a paper of exceptional merit published in the Proceedings. Being presented for the first time at the 2010 NAB Show, the recipient of the award will be honored at the NAB Technology Luncheon taking place at the Las Vegas Hilton Barron Room on Wednesday April 14. Tickets are available with registration packages or can be individually ordered at www.nabshow.com.

Wednesday, April 14, 2010

2 – 5:30 p.m. | S226

Spectrum Issues for Broadcasters

Chairperson: *Steve Davis, Clear Channel, New York, NY*

2 p.m.

Leveraging White Spaces and an Introduction to the New Networks Being Built with Them

In November 2008, the FCC ruled that the unused broadcast channels left over from the transition to digital TV (known as white spaces) would be made available on an unlicensed basis. These channels still offer promise for the industry, with potentially hundreds of Megahertz at frequencies with excellent propagation characteristics. White spaces networks are leveraging software defined radios and Web-based databases to manage dynamic channel assignments. They are showing tremendous promise and proving that white spaces can be used for highly-reliable wireless access, middle mile and point-to-point solutions. The FCC is planning a database that serves as a registry to help assign non-interfering frequencies to white spaces devices, as

well as protect TV band users operating in the area. Although some see the technology as a threat, white spaces can also present opportunities. This paper will discuss the various options that companies can pursue to leverage white spaces spectrum and how they can determine how and what role white spaces can play in economical business models.

Rick Rotondo, *Spectrum Bridge, Lake Mary, Fla.*

2:30 p.m.

Wireless Microphone Testing for White Space Proceeding in Mid-town Manhattan

The Broadway League, in cooperation with the New York chapter of the SBE (#15), the SBE national office and the local SBE <1GHz coordinator (Louis Libin), and Henry Cohen, from Production Radios representing the Broadway League, will conduct simulated television band device (TVBD) testing in midtown Manhattan, prior to Thanksgiving. This test will simulate OFDM and COFDMA signals (we're not quite sure which protocol the TVBD community is going to settle on) approximately 6MHz wide, at both 40mW and 100mW levels as per proposed Part 15.709(a)(2) rules for unlicensed devices operating in the TV bands as outlined in FCC DA-08-260 / ET 04-186. The actual transmission of test signals will only be about 30 seconds, and probably no more than five or six times in the course of a couple of hours. This test will be conducted in accordance with FCC Experimental Special Temporary Authorization issued August 10, 2009, and expiring on December, 31, 2009. Call sign WD9XZQ, File Number 0364-EX-ST-2009.

The purpose of the testing is to determine the interference potential inside theaters and TV/cable studios from a portable TVBD outside on the street. Our paper will report on the results of the tests, as well as describe the tests, the test equipment and conditions.

Louis Libin, *BroadComm, Inc., Woodmere, N.Y.*; **Henry Cohen**, *Production Radio Rentals, White Plains, N.Y.*

3 p.m.

What Wireless Mic Users Need To Know About White Spaces and the 700 MHz Band

Broadcasters and production companies rely on wireless audio gear to create the kind of compelling content that viewers and listeners demand. But changes in FCC rules regarding the spectrum used by these devices have both operational and financial implications for users. The reallocation of the 700 MHz band means that some existing wireless equipment must be retuned or replaced to avoid interference. Even with new equipment, the planned introduction of consumer wireless devices into the TV white spaces requires a new approach to planning for remote broadcasts, ENG operations, and field production. This paper will

discuss a summary of the regulatory changes affecting wireless audio equipment, as well as specific advice on how broadcasters and content creators can insure that they continue to get peak performance from their equipment.

Christopher Lyons, *Shure Incorporated, Niles, Ill.*

3:30 p.m.

Radio Communications in Today's Complex RF World

Reliable wireless communication is absolutely essential in today's fast-paced broadcast and live production markets, but licensing requirements, radio spectrum reallocation and the wide variety of technologies competing for clear spectrum have created an array of problems for system administrators and end users throughout the world. Areas of the spectrum that have traditionally been used for wireless intercoms are becoming increasingly crowded and more difficult to use.

We will cover Frequency Hopping Spread Spectrum and other digital RF techniques used to overcome spectrum crowding and collocation issues. We will also look at some of the practical challenges and solutions to operating low power auxiliary equipment in an unlicensed spectrum.

Tom Turkington, *CoachComm, Auburn, Ala.*

4 p.m.

Broadcast Operation and Co-existence in the White Space Era

New unlicensed devices in the television band present new spectrum sharing challenges to broadcasters and their viewers. A brief review and analysis of the FCC's test program and technical requirements for white space devices or TVBDs will be presented to provide some understanding of the actual potential for interference from these devices. The implications of the FCC's recent wireless audio device proceeding will also be discussed.

Victor Tawil, *Association for Maximum Service Television; Washington, D.C.*; **Bruce Franca**, *Association for Maximum Service Television, Washington, D.C.*

4:30 p.m.

Spectrum Issues Panel Session

Wednesday, April 14, 2010

2 – 5:30 p.m. | S228

New Technologies for Television

Chairperson: William Miller, *Miltag Media Technology, New Rochelle, N.Y.*

2 p.m.

The Benefits for Media Operators of Smooth Streaming and Adaptive Streaming over HTTP

As media operators look to be platform agnostic, they face the challenge of content over IP and potential bandwidth issues that frustrate and interfere with the viewing experience, potentially undermining the content's brand identity. Television distribution over the air or via cable/satellite has always been very strong in supporting the viewing experience.

The new HTTP-based delivery, with all the scalability benefits of the existing HTTP infrastructure, makes truly global events possible, reaching millions of consumers all around the globe. And the new streaming technologies protect the viewing experience to a level that people are familiar with via television. This paper will address these benefits of smooth streaming for today's media operator.

Mark Darlow, Harris Corporation, Mason, Ohio

2:30 p.m.

Doubling the Number of ATSC HD Channels

Since the initial deployment of ATSC in the mid 1990s, using MPEG-2 compression, the continued goals of researchers, engineers, developers, and manufacturers has been to deliver as many content revenue streams as practical, while still retaining a level of quality that meets the end-users requirements. Progress on HD MPEG-4 AVC (aka H.264) has fuelled new ideas in video compression algorithm design, which also has benefited HD MPEG-2.

This paper at NAB2010 will update delegates on HD MPEG-2 encoding improvements for ATSC. It will address the technical aspects and also the business impacts of this evolution.

Jean-Louis Diascorn, Grass Valley, Cesson-Sevigne, France

3 p.m.

Mixed Signals: Broadcast and Broadband Hybrids

Hybrid services, bringing the benefits of broadcast and broadband delivery, offer viewers a convenient combination of conventional television channels and video-on-demand services, with the opportunity to blend premium programming with the world of the Web.

New and existing service providers can exploit the economies of conventional broadcast channels and supplement these with a wider range of services delivered over broadband. The issue of standardization remains a real issue, with many different approaches being taken.

Drawing on case studies and practical experience from a range of current and prospective service providers, this paper examines the technical, operational and commercial considerations involved. It addresses the issue of how to combine the benefits of broadcasting with the wider world of the web using open standards, and how to deliver a reliable and consistent end user experience

William Cooper, *informativ, London, United Kingdom*

3:30 p.m.

A Biological Framework for Perceptual Video Processing and Compression

The recent rapid evolution of video compression and HDTV have given consumers richer more varied experiences than any time before. Not surprisingly, content providers find themselves searching for ways of providing ever better video quality more efficiently. Technical advances in MPEG compression has occurred, but there are limits that are being approached. Fortunately, there are emerging technologies that are inspired by the biology of vision that could enable MPEG compression to gain new levels of quality and efficiency.

This paper will introduce a framework for image and video processing that is based on decades of research into the biology of human vision. Dr. McCarthy will describe how visual information is processed in the retina and early visual system and also explains how design principles that are at work within the human visual system can be incorporated into advanced MPEG encoders and other broadcast equipment.

Sean McCarthy, *Motorola, Inc., Horsham, Pa.*

4 p.m.

Advanced Television Platform

For many years, the television industry has seen tremendous activity towards enhancing the television-viewing platform, with generally disappointing results. This platform, while declining in use due to emergence of alternatives for home leisure such as the Internet or video gaming, still logs a tremendous number of hours in the average home. Because of this status, an enhanced form of television has been the Holy Grail of the broadcast industry for a considerable time. The CE industry, meanwhile, has seen its ability to differentiate and deliver enhanced concepts to the TV consumer relegated to HD screens and Internet delivered TV-widgets.

This paper describes a new, advanced television system that overcomes these obstacles, allowing the broadcaster to bypass the barrier and send enhanced, interactive content that can be rendered by an advanced television platform.

Rich Chernock, *Triveni Digital, Princeton Junction, N.J.*

4:30 p.m.

Migrating from MPEG-2 to MPEG-4 AVC

Due to the large savings in bandwidth that MPEG-4 AVC compression provides over MPEG-2 Video, content providers are now, or soon will be, migrating to MPEG-4 AVC for distribution to local broadcasters and service providers. MPEG-4 AVC enables improved picture quality of existing services or additional services to be provided, or a combination of both. Migrating to MPEG-4 AVC introduces many changes to the programmer's infrastructure. This presentation will cover an overview of the changes required. Visitors to this presentation will gain valuable information about the challenges that must be overcome for a successful transition from MPEG-2 to MPEG-4.

Matthew Goldman, *Ericsson, Bedford, N.H.*

5 p.m.

Live TV Program Production by Using a Millimeter-wave Wireless Hi-Vision Cameras

Recent progresses of millimeter-wave transmission technologies have made it practical to use millimeter-wave link for large capacity communication. Technology of this digital transmission system for TV program contribution has been standardized as "ARIB STD-B43 standard" in June 2008 in Japan. We have developed a wireless HDTV camera complying with the standard and named as a "Millimeter-wave Mobile Camera (MiMoCam)." The MiMoCam has been used in program production and it has achieved high-picture-quality and low-latency transmission. In this paper, the features of MIMO-OFDM technique and its application to a millimeter-wave transmission and the performances of MiMoCam will be described. And the examples of MiMoCam in the productions of music program, information program and golf live program will also be introduced.

Shinichi Suzuki, *NHK (Japan Broadcasting Corporation), Tokyo, Japan*

Wednesday, April 14, 2010

6 – 8 p.m. | Hilton Ballroom B

Amateur Radio Operators Reception

Always one of the most popular events at the convention, this reception draws hundreds of broadcasting's best and brightest from company CEOs to shop technicians for a relaxed evening talking shop, enjoying the fellowship of the amateur radio community and winning fabulous door prizes!

Sponsors



Thursday, April 15, 2010

9 a.m. – noon | S226

Green Technologies for Broadcasters

Chairperson: Dom Bordonaro, Cox Radio, Inc., Milford, Conn.

9 a.m.

Sustainable Facilities and LEED Certification: A Broadcaster's Guide

The design and construction of the Broadcast Facility is evolving. The facility and their supporting spaces are being affected by the growing trend of states and municipalities to integrate sustainable design requirements to building codes. The LEED (Leadership in Energy and Environmental Design) rating system developed by the U.S. Green Building Council (USGBC), which rates completed projects in four levels. LEED, its core, is a voluntary process which has evolved into a program increasingly garnished with incentives of all types and is now into its first signs of being prescribed as a code requirement.

This paper will present to Broadcasters an introduction to the structure of LEED and its six primary areas of impact. It will also describe how it applies specifically to Broadcasters in its two relevant LEED versions, New Construction and Commercial Interiors.

Antonio Argibay, Meridian Design Associates Architects, New York, N.Y.

9:30 a.m.

Building a LEED, WEEE, and RoHS Facility

To lower costs, protect the environment and anticipate emerging environmental regulations, KLVX-DT in Las Vegas describes how they and their vendors designed a new broadcast facility that incorporates low energy consuming lighting and electronics, clean indoor air products, recycled and agriculturally based furnishings, day lighting, solar and geothermal power, water conservation and end of life electronic waste disposal strategies. The strategies have dramatically lowered operating costs, reduced absenteeism, and generated considerable community news coverage.

Tom Axtell, KLVX-DT, Las Vegas, Nev.

10 a.m.

Hollywood East: Home of Sustainable Production

Plymouth Rock Studios, a new Digital Media production center in Plymouth Mass., seeks to be the world's first green, smart, full digital film and television production center.

The project leverages New England's media industry, educational partners, state government and local industry to make the first permanent studio facility for the region's growing media industry. Combining educational, production and sustainable initiatives to create industry growth and support at all career levels, the project looks to create jobs, migrate production to the state and demonstrate faster, lower cost and sustainable production opportunities. We discuss the development, how the production process will be changes, and how it will affect all production going forward. Gensler, an architect firm with a long history of innovation and planning experience with the media industry, will describe the features of the development and explain the culture and goals of the project. Using video, animations and testimonials, the presentation will enlighten attendees about the project that has Hollywood talking and looking "East."

Stephen Newbold, *Gensler, Boston, Mass.*

10:30 a.m.

Best Practices for the Design Facilities: How Better Design, Better Acoustics and New Media Impacts the Cost of Operations

New media has changed the way we communicate and collaborate. Streaming media, video content creation, webcasting, and communication through IP devices are all de facto standards in the design of today's environments. Architects are concurrently required to design for sublime spaces that respond to the user's needs and the need for this increased technology and increased energy efficiency. But what are the impacts on the design and significantly on the cost of facilities' operations? And how does efficient design and technology integration impact this cost?

Peter Bloomfield, *Bloomfield & Associates, Philadelphia, Pa.;*
Christopher Pollock, *Shen Milsom & Wilke;* **Robyne Hamilton**,
Shen Milsom & Wilke

11 a.m.

HD Quality Energy Efficient, Low Heat Broadcast Lighting

This paper will describe energy efficient broadcast lighting technologies and their application showing how these technologies can be employed in a variety of installations from HD network studios to webcasting suites in order to create high quality broadcast lighting that cuts power and cooling get up to 80 percent over standard incandescent fixtures. Participants will be able to look at this technology on camera to see how various fixtures employing LED, CDM and fluorescent technology can be applied to various talent and scenic lighting configurations and judge the practical applications specific to each approach. This technology is increasingly being used at major broadcast installations to cut down on energy, cooling and lighting maintenance costs. Most importantly it can be used to greatly reduce the

cooling capacity required when building, renovating or upgrading a broadcast facility.

Dennis Size, *The Lighting Design Group, New York, N.Y.*; **Mark London**, *The Lighting Design, City, New York, N.Y.*

11:30 a.m.

Alternative Power Options for Broadcasters

KGO partnered with several vendors and the power utility to install 20 kw worth of solar generating capacity at KGO's transmitter site. The paper covers obstacles and suggested paths to success for similar projects.

Joseph Talbot, *Citadel Broadcasting, San Francisco, Calif.*

Thursday, April 15, 2010

10 a.m. – noon | S228

Television Test and Measurement

Chairperson: Joe Snelson, *Meredith Broadcast Group, Henderson, Nev.*

10 a.m.

DTV Video over IP Quality Assurance: Assessment and Troubleshooting

This paper will discuss key proven techniques that have been successfully used to rapidly track down and isolate root causes of common video over IP transient impairments. Current video over IP delivery systems offer new features but are more complex to troubleshoot. Real time Monitoring and Quality Assurance systems with easy to understand performance metrics like Media Delivery Index (MDI) and Program Availability (PA) from program ingest to the off-air signal are valuable. What does it even mean to strive for five 9s (99.999 per cent) Availability? Included in this paper are techniques and metrics that can help broadcasters measure and automatically report end-to-end system health and identify impairments before viewers start reporting them.

James Welch, *IneoQuest Technologies, Mansfield, Mass.*

10:30 a.m.

Broadcast Service Quality Monitoring Strategies

Today's digital television broadcast systems are quite complex. The systems range from single station operations to large, centralized station groups. The ultimate goal of the broadcaster is to provide a quality viewing experience for the customer. Monitoring service quality throughout the broadcast system is therefore necessary.

For DTV content, video packets must be delivered on time, in-order and compliant with MPEG and ATSC standards. The correctness of a broadcast DTV flow is critical to ensure that all viewers will be able to watch the content. Approaches and

strategies for applying distributed monitoring to the broadcast architectures will be discussed. Additionally, a distinction will be made between monitoring and troubleshooting modes of operation. Examples of the use of troubleshooting specific problems will also be discussed.

Ralph Bachofen, *Triveni Digital Inc., Princeton Junction, N.J.*

11 a.m.

Grade-1 LCD Monitors

After the demise of CRTs, many LCD monitors claim the throne of a grade-1 monitor. However this is not an easy task. What are the ingredients of a grade-1 LCD monitor?

Goran Stojmenovik, *Barco, Kortrijk, Belgium*

11:30 a.m.

The Role of End-to-End Quality Assurance Testing for Video and Audio in Meeting Viewer Satisfaction

With the current ubiquity of DTV, the importance of controlling video and audio quality has only increased, especially when we consider the sophistication of picture of sound systems used by today's television viewers. Additionally, with the majority of television viewers receiving their network and local broadcast television programming through satellite or terrestrial content services providers, the number of touch points that can affect overall quality has increased.

This paper will present an end-to end approach that may be used for monitoring, measuring and correcting video and audio quality.

Dave Higgins, *Comcast Media Center, Littleton, Colo.*

Thursday, April 15, 2010

1 - 4 p.m. | S228

Television Production

Chairperson: Joe Snelson, *Meredith Broadcast Group, Henderson, Nev.*

1 p.m.

Trends in Video and Audio Compression Standards: What to Use When

In the last 15 years, compression of video and audio has revolutionized the way the broadcast industry collects, stores, and distributes multimedia content. In addition to saving countless millions of dollars on bandwidth and storage costs, MPEG-2 made the promise of high-definition TV a reality for the home audience, leading to the home theater explosion, and making content more valuable than ever.

The speaker will lead the group through real-life experiences with the various compressions standards – “what was used when and why” – allowing attendees to learn from real-life examples of dealing with the issues surrounding the variety of compressions standards.

Bryan Wilson, *International Datacasting Corporation, Kanata, Canada*

1:30 p.m.

Surround Sound for Broadcast: Capturing the Future

While the broadcast world has made its transformation to HDTV, audio for ENG is still stuck in the stereo dark ages. With new products and technologies that have been released, it is now possible to capture full 5.1 channel Dolby Surround Sound in addition to traditional ENG audio capture on virtually any ENG Video Camera. Location video requires quality location audio. Viewers at home can now experience the news as though they were there with the use of the latest surround technologies. The HD image is breathtaking. The audio needs to match – each and every time. This does not mean the videographer needs to become an audio Engineer – quite the opposite – the videographer can be easily equipped with the right technology, which can be easily incorporated into their existing workflow. These innovative surround sound tools can enhance the HD image being captured through the use of surround sound.

Jonathan Godfrey, *Holophone®*, *Schomberg, Ontario, Canada*

2 p.m.

Technical Challenges of Audio Routing and Processing in All-Embedded Applications

Embedded audio systems offer considerable advantages, but there are also important limitations and ramifications to consider when deciding whether to implement an all-embedded solution. While routing discrete signals comes with its own set of complications, handling embedded audio properly requires a deeper understanding of synchronization, processing delays, audio metadata, and other factors that can result in serious problems in a facility.

This paper will equip engineers of all levels with the basic knowledge and tools necessary to support their embedded audio routing systems. In addition to exploring general considerations surrounding all-embedded applications, the session will focus on routing embedded audio and the necessary system requirements to support error-free operation.

Mark Sizemore, *Harris Corporation, Mason, Ohio*

2:30 p.m.

Video over IP: SMPTE 2022 vs. Ethernet AVB

Video over IP is not new. People have been putting video over the Internet for years. But, now there is talk about putting broadcast quality uncompressed 3Gbps video over IP. This is new! How can it be done? Currently, there are two standards-based options being proposed: SMPTE 2022 by the Society of Motion Picture and Television Engineers (SMPTE) and a collection of IEEE standards called Ethernet AVB.

There are many ways to evaluate these two standards, such as WAN vs. LAN, FEC technology, guaranteed bandwidth, timing transfer capability, media clock recovery methods, etc. We will dive into these and other details of both standards to truly understand their similarities and differences. We will also look at what systems comprising each of these standards look like, and explore the types of applications that may be best suited to SMPTE 2022, Ethernet AVB or perhaps both in some instances.

Ben Runyan, *Xilinx, Inc., San Jose, Calif.*; **Matt Klein**, *Xilinx, Inc., San Jose, Calif.*

3 p.m.

Video Bonding: Aggregating Multiple Connections for Enhanced Newsgathering Bandwidth

This presentation and paper presents the methods and techniques of ganging multiple connections together for a video feed with higher quality than what can be done with just a single connection. The emphasis is on multiple wireless connections, specifically 3G and 4G cellular connections, but it also discusses multiple satellite connections, WiFi connections, as well as mixed connection types. There are a number of issues with wireless connections, and these issues are even more apparent when used in an environment with multiple connections. Different methodologies can be used to mitigate various issues (redundancy, error correction, buffering, variable encoders), but the each methodology also has its limitations and trade-offs. Both static (non-moving) and dynamic (moving) environments are discussed. Real-world case studies and scenarios of different setups and issues seen are discussed, along with how these issues were mitigated and the resulting video quality. The presentation includes vendors with the technology and differences among them, encoders and decoders used in the various systems, and the required IP video workflow in each case.

Brian Smith, *WAAV, Inc., Cambridge, Mass.*

3:30 p.m.

Development of a Compact Microwave Transmitter with Built-in No-Delay (10msec) MPEG-2 Encoder Using Intra-Column Structure Coding

The digital microwave QAM, OFDM transmitter for HD video production has been developed. It generally uses the MPEG-2, AVC/H.264, JPEG2000 to compress the HD video signal into a transport stream. However, the transmission delay caused from that compression process has some problems, such as switching directly between a delayed wireless camera and a no delay wired camera. In any case, it is difficult to smoothly communicate between studio reporters and remote site reporters, etc.

We have developed the MPEG-2 codec with 10msec process delay using intra column structure coding and portable digital microwave QAM and OFDM transmitter with this built-in encoder board, which is operable by battery pack, and weighs a total of less than 2.65kg. We have achieved almost real-time wireless transmission for HD live news and sports content in the program production chain.

***Tsukuru Kai**, Nippon Television Network Corporation,
Tokyo, Japan*

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