

### **Advanced Advertising Technologies**

Addressable TV Over ATSC 3.0: A Dream Come True!

Fayssal Kartobi, ENENSYS Technologies, Cesson Sévigné, France

#### **Advanced Emergency Alerting**

## The Coming Transformation of TV Newsrooms to Include ATSC 3.0 Emergency Alert and Information Distribution

Michael E. Bouchard, ONE Media / a subsidiary of Sinclair Broadcast Group, Hunt Valley, MD, USA

#### **Activity of Disseminating Japanese EWBS Technology**

Yasuji Sakaguchi, Yasuo Takahashi, Seiji Sakuma, *DiBEG (Digital Broadcasting Experts Group), Tokyo, Japan* 

#### **Creating and Maintaining a Statewide EAS Monitoring Service**

Larry Wilkins, Alabama SECC, Birmingham, AL, USA

#### **Artificial Intelligence Applications for Media Production**

A Novel White-Balance System for Broadcast Cameras Using Machine Learning Edmundo Hoyle, Alvaro Antelo, Leandro Pena, *GRUPO GLOBO, Rio de Janeiro, Brazil* 

**Exploring the Creative Frontiers of AI for M&E Production and Distribution** Gary Olson, *GT Digital, Ltd., New York, NY, USA* 

The Podcast Promise: Topic Extraction for Monetization and Brand Targeting Ryan Steelberg, *Veritone, Inc., Costa Mesa, CA, USA* 

## **Broadcast Facility Design**

#### **Colocating AM Transmitter Facilities with Cellular Monopole Towers**

James A. Dalke, *Dalke Broadcast Services, Inc., Bellevue, WA*; Stephen S. Lockwood, *Hatfield and Dawson Consulting, Seattle, WA, USA* 

## Toward a New Understanding of Frequency- and Impedance-Related Failures in Grounding Systems

Thomas LaBarge, Nancy Swartz, Gordon Wysong, John Broccoli, John H. Belk, *GroundLinx Technologies, Blue Ridge, GA, USA* 

#### **SNMP** in the Broadcast Plant

Wayne M. Pecena, Texas A&M University, College Station, TX, USA



#### **Broadcast Workflows**

News Workflow 2020 - An Extreme Case Study for Cloud and Al Enablement and a Brave New Way of Planning

Raoul Cospen, Dalet, Paris, France

**NDI** in the Master Control Room

Nurul Natasha Bte Rahyiu, Fabio Gattari, Etere Pte Ltd., Singapore

#### **Converting to Ultra HD Television Broadcasting**

**HDR for Full HD** 

John Humphrey, Hitachi Kokusai Electric America Ltd., Woodbury, NY, USA

Machine Learning Based UHD Up-conversion Using Generative Neural Networks Alex Okell, Tony Jones, MediaKind, Hedge End, Hampshire, United Kingdom

Another New Step Towards UHD: Nationwide Installation of 4K News System for Delivering BS4K Daily News

Tetsuya Yahara, Yuko Kawano, Ikuya Kumai, Tatsuro Honda, Hidenori Konishi, *NHK (Japan Broadcasting Corporation), Tokyo, Japan* 

## **Cybersecurity for Broadcast**

Cybersecurity for Operators, Broadcasters and Suppliers: Key Areas of Focus Johan Craeybeckx, *Eurofins Digital Testing, Hasselt, Belgium* 

#### **Cybersecurity Framework for Broadcasters**

Yanni Garcia, Omeir Khan, Gemini Team Security, Arcata, CA, USA

## **Designing Cloud-based Facilities**

The OnRamp to Video Production in the Cloud - How Openness, Al and Security Will Facilitate Better Storytelling Workflows

Andy Liebman, Stephen Tallamy, EditShare, Boston, MA, USA

#### **Transitioning Broadcast to Cloud**

Yuriy Reznik, Jordi Cenzano, Bo Zhang, Brightcove, Inc., Boston, MA, USA

A Unified Cloud Pipeline for Production, Post, Mastering and Localization Using IMF and Open TimeLine IO

Richard Welsh, Sundog Media Toolkit Ltd., Bristol, United Kingdom



#### **Emerging Radio Technologies – On-air and Online**

Audio-Specific Metadata to Enhance the Quality of Audio Streams and Podcasts
John Kean, Cavell Mertz & Associates Inc., Manassas, VA, USA; Alex Kosiorek, Central Sound at
Arizona PBS. Phoenix, AZ, USA

## A Case Study in All-Digital HD AM Broadcasting: Refinements, Performance Tests, and Lessons Learned

Dave Kolesar, Hubbard Radio, Washington, DC, USA; Mike Raide, Xperi Corporation, Columbia, MD, USA

### Improving OTT Video Quality

## How to Optimize ABR Video Delivery With Server-side Quality Control Guillaume Bichot, Pierre-Jean Guéry, Nicolas Le Scouarnec, *Broadpeak*, Cesson-Sévigné, France

#### **Machine Learning for Per-Title Encoding**

Daniel Silhavy, Christopher Krauss, Anita Chen, Anh-Tu Nguyen, Stefan Arbanowski, Stephan Steglich, Louay Bassbouss, *Fraunhofer FOKUS*, *Berlin, Germany* 

#### IP Conversion: Broadcasters' Research and Recommendations

## JT-NM Tested August 2019, What Is in It for You? Results, Findings, and Methodologies

Andrew Bonney, BBC R&D, Salford, Greater Manchester, United Kingdom; levgen Kostiukevych, European Broadcasting Union, Geneva, Switzerland; Pedro Ferreira, Bisect, Porto, Portugal; Willem Vermost, Flemish Radio and Television Broadcasting Organisation, Brussels, Belgium

### Transitioning a Network Operations Center from HD-SDI to IP

James (Andy) Butler, Public Broadcasting Service (PBS), Alexandria, VA, USA

#### Orchestrating Systems to Get Data Where Users Need It

Jemma Phillips. Ivan Hassan. BBC. London. United Kinadom

### **Managing HDR and SDR Content**

## **Current HDR Drama Productions and Approaches to Parallel SDR/HDR Production Workflows**

Kosuke Hara, NHK (Japan Broadcasting Corporation), Shibuya-ku, Tokyo, Japan



#### **Media Over IP: Security and Timing**

Security for Discovery and Connection Management of ST2110 Media Devices
Arne Bönninghoff, Riedel Communications GmbH & Co. KG, Wuppertal, Germany

A Multi-Pronged Approach to Effectively Secure SMPTE ST 2059 Time Transfer Nikolaus Kerö, Oregano Systems, Vienna, Austria; Thomas Kernen, Mellanox Technologies, Russin, Switzerland

How to Successfully Commission a SMPTE ST 2059/PTP System Leigh Whitcomb, *Imagine Communications, Toronto, ON, Canada* 

### **New Directions in IP-based Media Systems**

Next Steps of Broadcast Camera Integration into Full IP Infrastructures
Klaus Weber, Grass Valley Germany GmbH, Weiterstadt, Germany; Ronny van Geel, Grass
Valley Nederland BV, Breda, Netherlands

#### **New Spectrum Issues**

Wireless Microphone Operation for Mega-Events in the 1425-1525 MHz Band Joe Ciaudelli, SENNHEISER Research & Innovation, Old Lyme, CT, USA

**Development of 8K UHDTV Wireless Camera Using Millimeter-Wave Band** Yoshifumi Matsusaki, Fumiya Yamagishi, Tomohiro Shimazaki, Fumito Ito, Takayuki Nakagawa, Naohiko Iai, *NHK (Japan Broadcasting Corporation), Tokyo, Japan* 

## FM 8th Harmonic Interference to a Cellular Service Not Caused by an FM Station: A Case Study

David Maxson, Isotrope, LLC, Medfield, MA, USA

## **New Technologies for Sports Coverage**

#### **Automated Brand Color Accuracy for Real-Time Video**

Emma Mayes, John Paul Lineberger, Michelle Mayer, Andrew Sanborn, Hudson Smith, Erica Walker, *Clemson University, Clemson, SC, USA* 

## Artificial Intelligence: Transforming the Live Sports Landscape Adrish Bera, Amer Saleem, *Prime Focus Technologies, Burbank, CA, USA*

Implementing Al-powered Semantic Character Recognition in Motor Racing Sports Jose David Fernández Rodríguez, David Daniel Albarracín Molina, Jesús Hormigo Cebolla, Virtually Live, Málaga, Spain



### Next Gen Academy I: The Broadcast/Broadband Revolution

#### **ATSC 3.0 Personalized Targeted Advertising**

Luke Fay, Sony, San Diego, CA, USA; Lucas Gregory, Mickaël Raulet, ATEME, Rennes, France

#### **Next Gen Academy II: Transport Matters**

#### Can UHD OTT be Complementary to Terrestrial UHD Broadcast?

Thierry Fautier, Harmonic, San Jose, CA, USA

#### Statistical Multiplexing of DASH Segments in the ATSC 3.0 System

Elke Hungenaert, Nick Fielibert, Samie Beheydt, Mark Myslinski, Jovo Miskin, *Synamedia, Ltd., Middlesex, United Kingdom* 

### **Next Gen Academy III: Next Steps**

#### ATSC 3.0 - Building Media Networks for Next Gen TV

Christer Bohm, Per Lindgren, Arielle Slama, Net Insight AB, Stockholm, Sweden

#### ATSC: Beyond Standards and a Look at the Future

Madeleine Noland, Jerry Whitaker, ATSC, Washington, DC, USA; Lynn Claudy, NAB, Washington, DC, USA

## **Next Gen Academy IV: Planning for SFNs**

## Overcoming Obstacles to Design a Robust Single Frequency Network in San Francisco

P. Eric Dausman, *Public Media Group, PBC, Boulder, CO, USA*; Ryan C. Wilhour, *Kessler and Gehman Associates, Inc., Gainesville, FL, USA* 

## Impact on Full Service and LPTV Television Stations of Proposed DTS Rule Changes

S. Merrill Weiss, Merrill Weiss Group LLC, Metuchen, NJ, USA

## Virtualization and Cloudification of Next Gen Broadcast Chain: Consequences and Opportunities

Prabu David, Michigan State University, East Lansing, MI, USA; Chandra Kotaru, Gaian Solutions, San Jose, CA, USA

## **Next Gen Academy V: Implementing SFNs**

#### **Broadcast Industry Guide Specs for SFN Design and Implementation**

Dennis Wallace, Meintel, Sgrignoli, & Wallace, LLC; P. Eric Dausman, Public Media Group, PBC, Boulder, CO, USA



#### **Next Gen Academy VI: PHY Layer Issues**

#### ATSC 3.0 Backward Compatible SFN In-Band Distribution Link and In-Band Inter-Tower Wireless Network for Backhaul, IoT and Datacasting

Yiyan Wu, Liang Zhang, Wei Li, Sébastien Laflèche, *Communications Research Centre Canada*, *Ottawa, Canada*; Sung-lk Park, Jae-young Lee, Heug-Mook Kim, Namho Hur, *Electronics and Telecommunications Research Institute, Daejeon, Korea; S.* Merrill Weiss, *Merrill Weiss Group, LLC, Metuchen, NJ, USA;* Eneko Iradier, Pablo Angueira, Jon Montalban, *University of Basque Country, Bilbao, Spain* 

#### **Next Gen TV Audio**

Demonstration on Next-Generation Immersive Audio in a Live Broadcast Workflow Hélio Kuwabara, Rubens Carvalho, Leandro Pacheco, *TV Globo, Rio de Janeiro, Brazil* 

## Personalized and Immersive Sound Experience Based on an Interoperable NGA (Next Generation Audio) End-to-End Chain

David Marston, Thomas Nixon, Chris Pike, *British Broadcasting Corporation, London and Salford, United Kingdom;* Matthieu Parmentier, *France Télévisions, Paris, France;* Paola Sunna, *European Broadcasting Union, Geneva, Switzerland;* Michael Weitnauer, Benjamin Weiss, *Institut für Rundfunktechnik GmbH, Münich, Germany;* Satoshi Oode, *NHK, Tokyo, Japan* 

### **Optimizing the OTT User Experience**

## Easy Authentication for a Seamless TV Everywhere Experience

Steve Oetegenn, Verimatrix, San Diego, CA, USA

## **Refining Radio Delivery**

## Comprehensive Study of FM Multipath With Repeatable Results

Frank Foti, Telos Alliance, Cleveland, OH, USA

#### **Audio Streaming: A New Professional Approach**

Greg Ogonowski, Nathan Niyomtham, StreamS HiFi Radio/Modulation Index, LLC, Diamond Bar, CA. USA

## TV Repack and Next Gen Transition Preparation

#### **Using TV Transmission System Commissioning Reports**

Karl D. Lahm, Broadcast Transmission Services, LLC, Traverse City, MI, USA



## Changes and Impact of ANSI/TIA-222-H on Existing and New Broadcast Infrastructure

Bryan Lanier, American Tower Corporation, Cary, NC, USA; John Wahba, Turris Engineering, Inc., Georgetown, ON, Canada

## Repacking ATSC 1.0 Programs on a Full Power, Two CDs, and Translators with New Encoders

Sid Shumate, Gray Television Stations, Harrisonburg, VA, USA

### **Using 5G Broadcasting for Content Delivery**

Inbuilt Convergence: A Review of Emerging 3GPP and ATSC 3.x Terrestrial Broadcast Offerings (Winner, 2020 BEIT Conference Proceedings Best Paper Award)
Ahmed Hamza, Mark Earnshaw, David Starks, Coherent Logix, Inc., Waterloo, ON, Canada;
Kevin Shelby, Coherent Logix, Inc., Austin, TX, USA

## Public Demonstration on Future Television Using 5G FeMBMS-Enabled Transmission

Leandro Pacheco, Bruno Martins, Carlos Cosme, Leonardo Chaves, Jéssica Santana, Gabriel Melo, Pedro Leite, *TV Globo, Rio de Janeiro, Brazil* 

#### **5G Meets Media and Entertainment: Opportunities and Challenges**

Peng Tan, Jia Liu, TELUS Communications, Inc., Toronto, ON, Canada

## **Using 5G Technologies for Media Production**

### Introduction to the 5G Media Action Group (5G-MAG)

Gregory Bensberg, Digital 3&4/ITV, London, United Kingdom

## The 5G Opportunities for Contribution and Digital News Gathering Applications Mathieu Lagrange, Philippe Lemonnier, Ludovic Noblet, *b*<>*com*, *Rennes*, *France*

### **Using Artificial Intelligence for Closed Captioning**

## A Review of State-of-the-Art Automatic Speech Recognition Services for CART and CC Applications

Misha Jiline, David Kirk, Greg Quirk, Mike Sandler, Michael Monette, *Epiphan Video, Ottawa, ON, Canada* 

## Towards Designing a Subjective Assessment System for the Quality of Closed Captioning Using Artificial Intelligence

Somang Nam, *University of Toronto, Toronto, ON, Canada*; Deborah Fels, *Ryerson University, Toronto, ON, Canada* 



Watson Captioning Live: Leveraging Al for Smarter, More Accessible Closed Captioning

Brandon Sullivan; The Weather Company Solutions, Austin, TX, USA

### **Using the Cloud for Live Production**

Broadcast Media Creation as a Service: Dynamically Scalable Environments Powered by Infrastructure-as-Code and the Public Cloud Kevin Fornito, Chris Zembower, Steve Sneddon, NBCUniversal, New York, NY, USA

Is the Technology Ready Yet for Live Standards Conversion in the Cloud? Paola Hobson, InSync Technology, Ltd., Petersfield, United Kingdom