

Table of Contents

5G Opportunities for Broadcast

5G-MAG Reference Tools: Putting 5G in Action for Media

Daniel Silhavy, *Fraunhofer FOKUS, Berlin, Germany* Klaus Kühnhammer, *Bitstem GmbH, Hausleiten, Austria* Johann Mika, *Austrian Broadcasting Services, Vienna, Austria* Thomas Stockhammer, *Qualcomm, Munich, Germany* Jordi J. Gimenez, *5G-MAG, Geneva, Switzerland*

ATSC 3.0, DVB-I and TV 3.0 Services Via 5G Broadcast - System Design and Reference Tools

Christophe Burdinat, *Ateme, Velizy-Villacoublay, France* Thomas Stockhammer, *Qualcomm, Munich, Germany* Romain Bouqueau, *Motion Spell GPAC, Paris, France* Mickaël Raulet, *Ateme, Rennes, France*

Practicalities and Analysis of Using PTP Over 5G Systems with Dedicated Time Synchronization Support for Media Production

Ievgen Kostiukevych, Pavlo Kondratenko, *European Broadcasting Union, Le Grand-Saconnex, Geneva, Switzerland* Thorsten Lohmar, Mohamed Nabil Ibrahim, *Ericsson GmbH, Eurolab, Herzogenrath, Aachen, Germany* Thomas Kernen, *NVIDIA, Zürich, Switzerland*

AM and FM HD Radio

A Cloud-Capable Synchronized Transport Architecture for FM and HD Radio Broadcasting

Philipp Schmid, Nautel Limited, Halifax, Nova Scotia, Canada

Exploring the Effects of Directional Antenna Pattern Bandwidth on MA3 Transmissions

David Kolesar, Hubbard Radio, Washington, District of Columbia, United States Mike Raide, Xperi Corporation, Columbia, Maryland, United States

The Time to Consider All Digital Radio Has Arrived

E. Glynn Walden, CBS Radio (retired), Marlton, New Jersey, United States

Artificial Intelligence Applications for Broadcast

CLEAR AI for Segmentation

Harish Bharadwaj, Prime Focus Technologies, Bengaluru, Karnataka, India

Green, AI-Based Video Compression

Xavier Ducloux, Jean-Louis Diascorn, Thierry Fautier, *Harmonic Inc., San Jose, California, United States*

Real-World Use of AI for Better Video Compression

Tony Jones, MediaKind, Southampton, United Kingdom



Table of Contents

ATSC 3.0 / Next Gen TV Applications

Interactive NextGen Broadcast TV Mike Kralec, Sinclair Broadcast Group, Hunt Valley, Maryland, United States

NextGen TV Trends: Lessons Learned from Pioneering and Groundbreaking Application Examples

Oliver Botti, Fincons Group, Milan, Italy

ATSC 3.0 / Next Gen TV Datacasting

ATSC 3.0 as a Use Case for Public Safety Communications - Development Milestones

(Winner, 2022 BEIT Conference Proceedings Best Paper Award)

Fred Engel, PBS North Carolina Research Triangle Park, North Carolina, United States Red Grasso, North Carolina Department of Information Technology, Raleigh, North Carolina, United States Chris Lamb, Device Solutions Inc., Morrisville, North Carolina, United States

Tony Sammarco, Device Solutions Inc., Research Triangle Park, North Carolina, United States

Building a Core Network to Seamlessly Connect Data Producers to Data Consumers

Azita Manson, OpenZNet Inc., Mountain View, California, United States

Broadcast Workflows

Advanced News Workflows Ernie Ensign, Sinclair Broadcast Group, Hunt Valley, Maryland, United States

Cybersecurity in Broadcast Facilities

Advanced Security Using a NoCode Media Integration Platform Julián Fernandez-Campón, *Tedial, Málaga, Spain*

IP-Based Video Facilities

NDI in the Master Control Room Fabio Gattari, Etere Pte Ltd., Singapore, Singapore

Optimized Camera Integration in IP-Based Workflows and Infrastructures Klaus Weber, *Grass Valley Germany, Bonn, NRW, Germany*

Synchronized Multi-Stream Transport Using RIST

Ciro A. Noronha, Cobalt Digital Inc., Champaign, Illinois, United States



Table of Contents

New Radio Transmission Technologies

Changing the Landscape of FM Broadcast Antenna Technology (Winner, 2022 BEIT Conference Proceedings Best Paper Award) John L. Schadler, Dielectric LLC, Raymond, Maine, United States

Saving Lives - Rapid Alerts Using RDS for Earthquake and Fire Warnings Matthew Straeb, *Global Security Systems/ALERT FM*, *Sarasota, Florida, United States*

The Flared-Skirt or Umbrella-Spoke Feed for Grounded Medium Wave Antenna

Towers Benjamin F. Dawson III, *Hatfield & Dawson Consulting Engineers, LLC, Seattle, Washington, United States* Bobby L. Cox II, *Kintronic Laboratories, Inc., Bristol, Tennessee, United States*

OTT 1: Emerging Developments

The 99.99% Solution: Four-Nines Reliability from Cloud-Native Television Architectures Prabu Chellardurai, Jerald Mejarla, Juan Martin, *Firstlight Media*, *Toronto*, *Ontario*, *Canada*

Towards Efficient Multi-Codec Streaming

Yuriy A. Reznik, Brightcove, Inc., Seattle, Washington, United States

Using Real-Time Data to Drive Engagement and Build Community - Lessons from Gaming

Simon Crownshaw, Brady Woods, Microsoft, Redmond, Washington, United States

OTT 2: Open Caching and the Network Edge

CDNI Metadata Model Extensions

Glenn Goldstein, William Power, *Lumen Technologies, Broomfield, Colorado, United States* Alfonso Siloniz, *Telefónica, Madrid, Spain* Guillaume Bichot, *Broadpeak, Cesson Sevigne, France*

Open Caching: An Innovative Way for Content Providers to Serve Customers

Sanjay Mishra, ErinRose Widner, Jeff Budney, Verizon Business Group, Basking Ridge, New Jersey, United States

What the Future Holds for Content Protection with CDN Edge

Gwendal Simon, Lionel Carminati, Gwenaël Doërr, Alain Durand, Synamedia, Rennes, France



Table of Contents

OTT 3: Business Considerations

How to Capitalize on NextGen Targeted Advertising Opportunities With AI and Analytics

Dror Mangel, Guillaume Lossois, Viaccess-Orca, Paris, France

Hybrid Video on Demand - An Intersection of Technology, Media & Economics Ted Staros, *imediat, Carlsbad, California, United States*

Remote and Work-from-Home Operations

Adopting New Cloud Workflows and Making Live Happen in this New Normal Daniel Pisarski, *LiveU Inc., Hackensack, New Jersey, United States*

How 5G Technology Simplified Live Remote Broadcasts During the Pandemic

Jim Jachetta, VidOvation Corporation, Anaheim, California, United States

Ultra HD Video and UHDTV Broadcasting

HDR Challenges and Solutions

Bill Redmann, David Touze, Frederic Plissonneau, Alan Stein, *InterDigital, Wilmington, Delaware, United States* Guy Ducos, *Philips IP&S, Eindhoven, Netherlands*

Live-PSTR: Live Per-title Encoding for Ultra HD Adaptive Streaming

Vignesh V. Menon, Hadi Amirpour, Christian Doppler Laboratory ATHENA, Alpen-Adria-Universität Klagenfurt, Austria Christian Feldmann, Adithyan Ilangovan, Martin Smole, Bitmovin, Klagenfurt, Austria Mohammad Ghanbari, Christian Doppler Laboratory ATHENA, Alpen-Adria-Universität, Klagenfurt, Austria and School of Computer Science and Electronic Engineering, University of Essex, United Kingdom Christian Timmerer, Christian Doppler Laboratory ATHENA, Alpen-Adria-Universität, Klagenfurt, Austria

Using Drones and Other Technologies for Broadcast Engineering

Ground Assault: Obsoleting of Facility Protections

Tom LaBarge, Nancy Swartz, John H. Belk, *GroundLinx Technologies LLC, Blue Ridge, Georgia, United States*

Thermal Imaging Using Small Unmanned Aircraft Systems (SUAS) for Radio and TV Broadcasters

Paul Shulins, Shulins' Solutions, Wickenburg, Arizona, United States