

# ATSC 3.0

## An Introduction

Madeleine Noland, President, ATSC

JANUARY 16, 2019

NEXTGEN TV SUMMIT

SMPTE – SBE – WETA

**NEXTGENTV**

POWERED BY  
**ATSC 3.0**

# *nextgentv* **SUMMIT**

Produced by SMPTE and SBE with support from the NAB and ATSC



and the support of our host, WETA Television



JANUARY 16, 2020



Event Recording courtesy of the following sponsors:

The Telestream logo, featuring a blue arc above the word "telestream" in a lowercase sans-serif font.

telestream

The Panasonic logo, featuring the word "Panasonic" in a bold, dark blue sans-serif font.

**Panasonic**



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JANUARY 16, 2020



THANK YOU TO THE SMPTE DC, SBE AND NAB TEAM  
MEMBERS WHO PRODUCED THIS EVENT

**Fred Willard** Univision

**Rick Singer** Singer Media Engineering

**Skip Pizzi** NAB

**Tom Hackett** Diversified Systems

**Melissa Davis** Evertz

**Louise Shidler** Chesapeake Systems

**Maciej Ochman** CPB

**James Snyder** US Library of Congress

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**Greg Smalfelt** Ch 16 Fairfax

**Alex Snell** BCI Digital

**Peter Wharton** Happy Robotz

WITHOUT THEIR VOLUNTEER EFFORTS THIS SUMMIT WOULD NOT BE POSSIBLE

# Morning Program

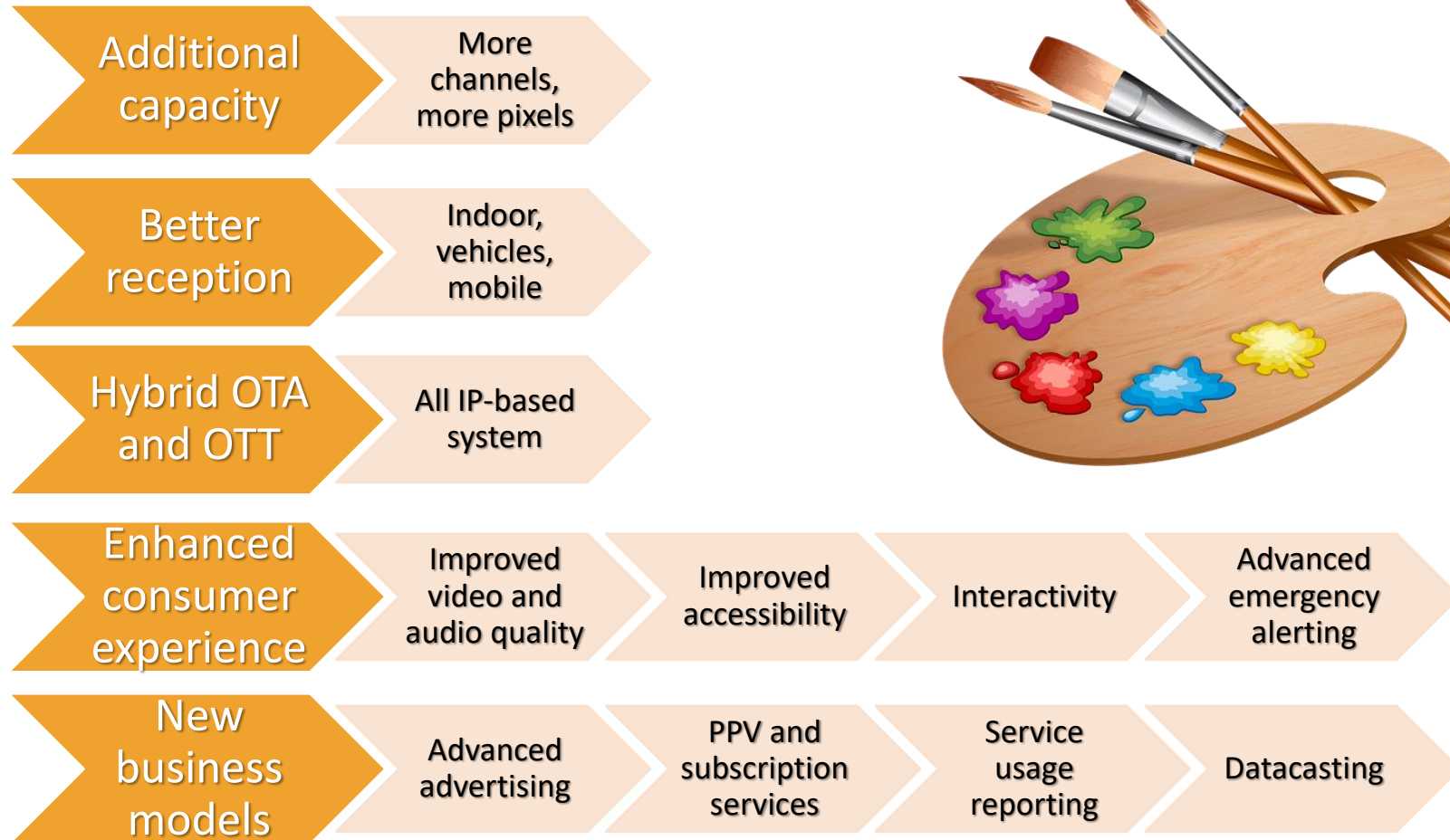


# Afternoon Program

8:00 AM - 9:00 AM	Registration and continental breakfast
8:55 AM - 9:00 AM	<b>Welcome from SMPTE, SBE and AES</b> Fred Willard, SBE Washington Kishore Persaud, SBE Baltimore
9:00 AM - 9:05 AM	<b>Introduction</b> Peter Wharton, SMPTE Membership VP Chris Lane, Chief Engineer, WETA
9:05 AM - 9:35 AM	<b>NextGen TV: Transforming the Consumer Experience</b> Lynn Claudy, SVP Technology, NAB and Chairman, ATSC Board of Directors Madeleine Noland, President, ATSC
9:35 AM - 10:00 AM	<b>Creating New Opportunities with NextGen TV</b> Joonyoung Park, VP and Fellow, DigiCAP
10:00 AM - 10:35 AM	<b>Improved Television Reception for Consumers</b> <i>Implementing NextGen TV Distribution Systems</i> John Lynch, ERI Jeff Andrew, Osborn Engineering
10:35 AM - 11:15 AM	<b>Benefits of a Converged Broadcast and IP Platform</b> Lynn Claudy, SVP Technology, NAB and Chairman, ATSC Board of Directors <b>Content Reception Enhancements</b> Richard Lhermitte, VP Solutions and Market Dev, ENENSYS TeamCast
11:15 AM - 11:30 AM	Morning Break
11:30 AM - 11:50 AM	<b>Consumer Applications for Combined 5G &amp; NextGen TV Networks</b> Josh Arensberg, M&E Business Development, Verizon Media
11:50 AM - 12:15 PM	<b>Case Study: Hybrid Services at "Chicago 3.0"</b> Jean Macher, Harmonic
12:15 PM - 01:20 PM	Buffet Lunch

01:25 PM - 01:45 PM	<b>Protecting the NextGen TV Consumer</b> <i>Advanced EAS and AWARN Capabilities</i> John McCoskey, SpectraRep
01:45 PM - 02:15 PM	<b>Monetizing the NextGen TV Consumer</b> <i>Addressable Advertising and Analytics</i> Rick Ducey & Mark Fratrik, BIA
02:20 PM - 03:20 PM	<b>Personalizing the Consumer Experience</b> <i>Interactive and Personalized Features</i> Mark Corl, Triveni Digital Greg Jarvis, Fincons So Vang, NAB Pete Van Peenan, Pearl TV
03:25 PM - 03:40 PM	Afternoon Break
03:40 PM - 04:10 PM	<b>The Consumer Out-of-Home Experience</b> <i>Mobile &amp; Automotive Applications and FeMBMS (5G Broadcast)</i> Thomas Janner, Product Management & R&D Director, Rhode & Schwarz
4:10 PM - 4:35 PM	<b>The ATSC 3.0 Roadmap</b> Lynn Claudy, SVP Technology, NAB and Chairman, ATSC Board of Directors Madeleine Noland, President, ATSC
4:35 PM - 5:00 PM	<b>The Consumer Technology Roadmap</b> Brian Markwalter, SVP Research and Standards The Consumer Technology Association
5:00 PM - 6:00 PM	<b>Station Group and Industry Deployment Plans</b> <i>Advanced Capability Implementation Strategies</i> Skip Pizzi, VP Technology Education & Outreach, NAB (Moderator) Michael Bouchard, VP Technology Strategy, ONE Media / Sinclair Stacey Decker, CTO, Public Media Group Sasha Javid, COO, The Spectrum Co
6:00 PM - 8:00 PM	<b>Cocktail Reception</b> Busboys and Poets 4251 S. Campbell Ave., Shirlington <i>Heavy Hors d'oeuvres and open bar</i>

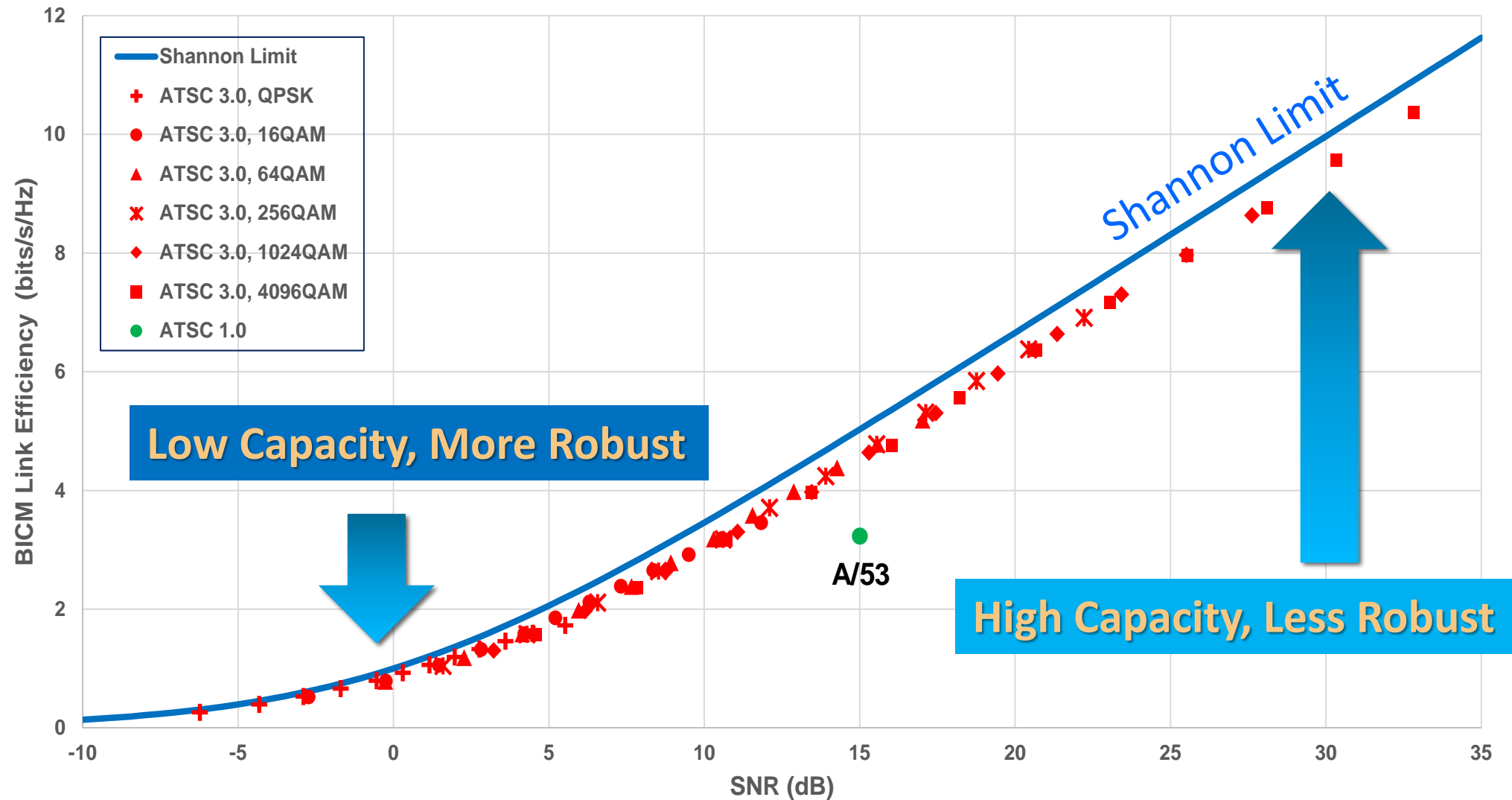
# Key Advancements in 3.0



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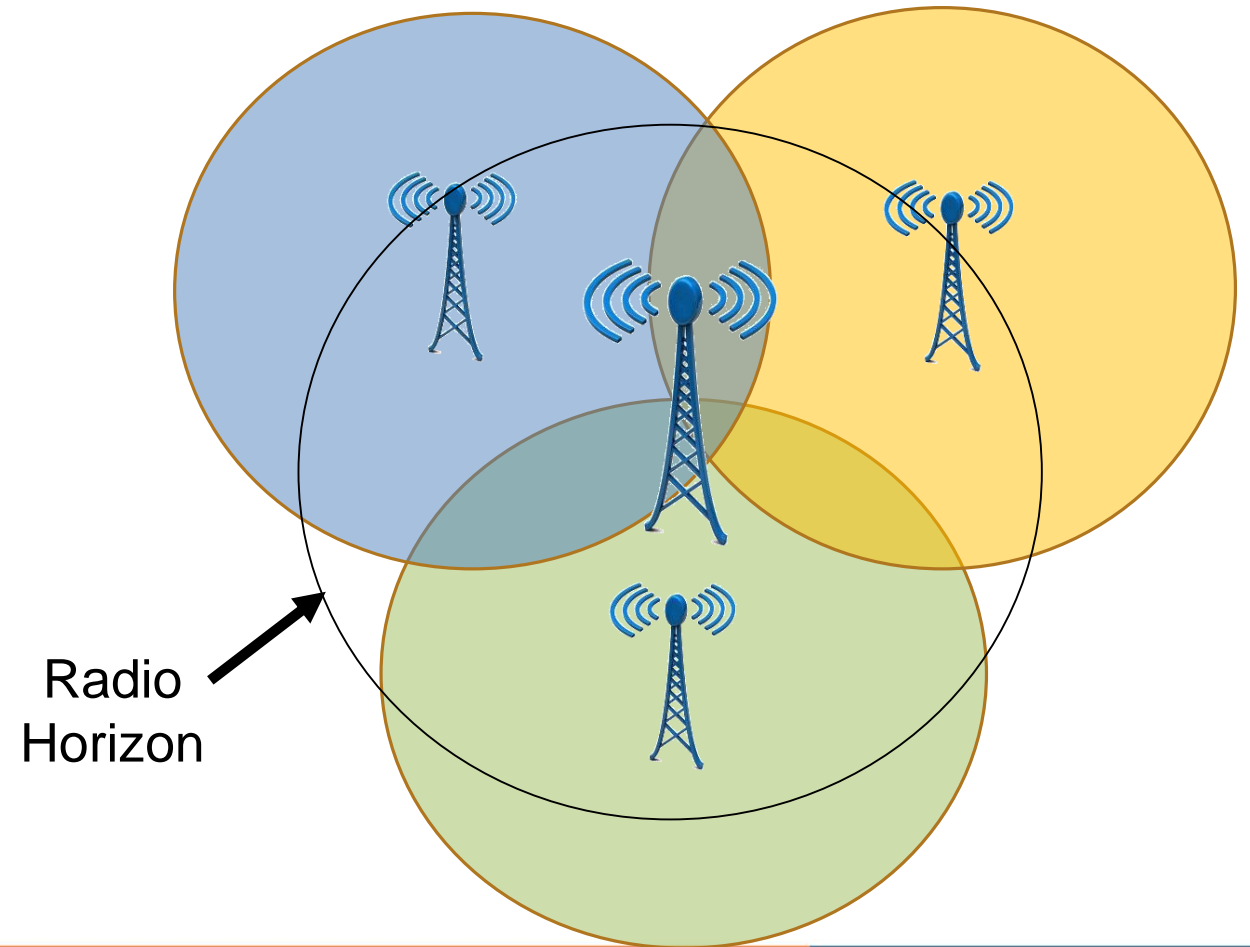
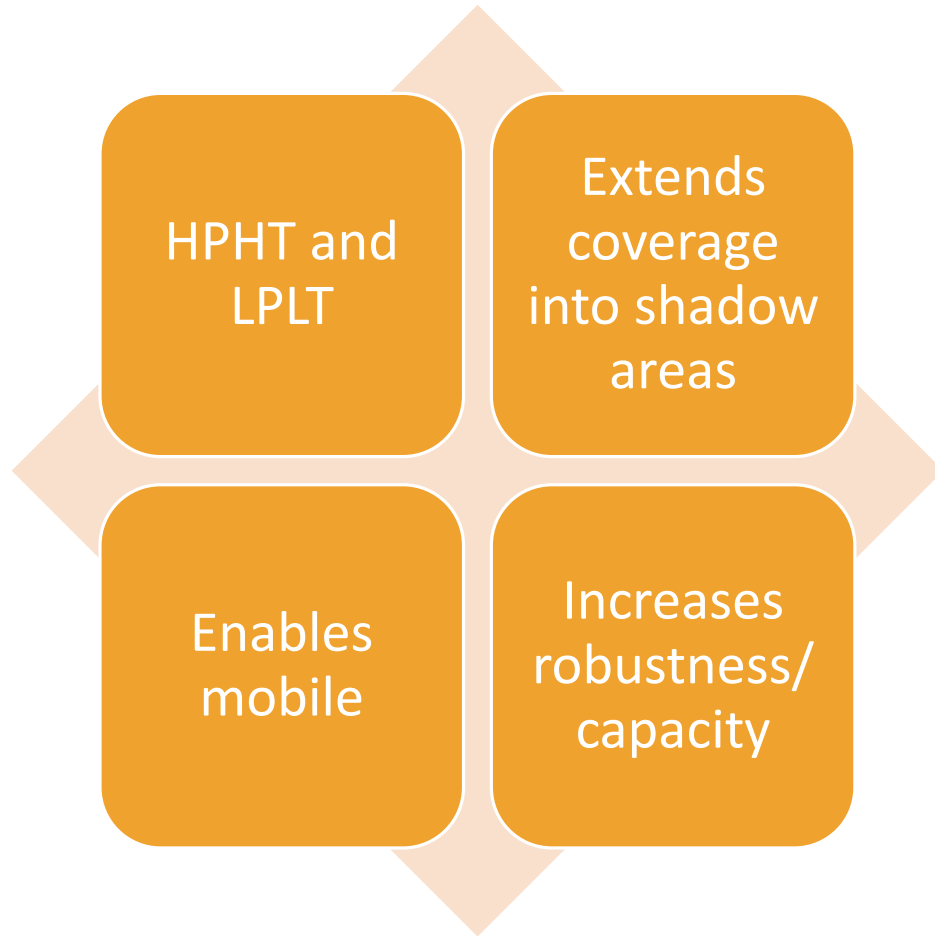
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## Bit Interleaving, Coding, and Modulation Performance





# ATSC 3.0 Single Frequency Networks



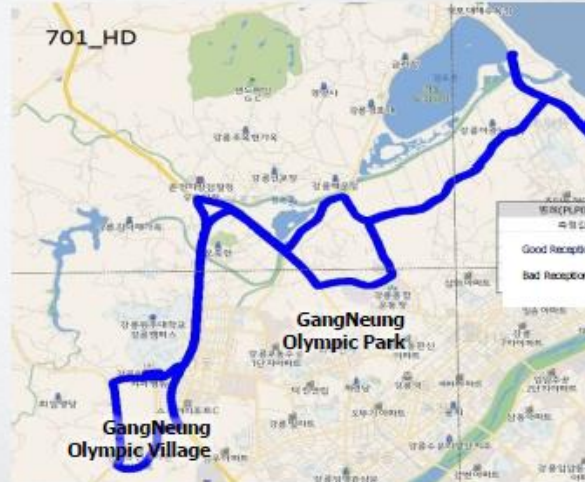
# ATSC 3.0 Mobility

HD mobile on the autonomous shuttle  
(NAB-2018, Las Vegas)

Showcase for ATSC3.0 UHD Mobile  
During PyeongChang 2018 Winter Games



Demonstration Shuttle Bus



Bus Route for UHD Mobile Showcase

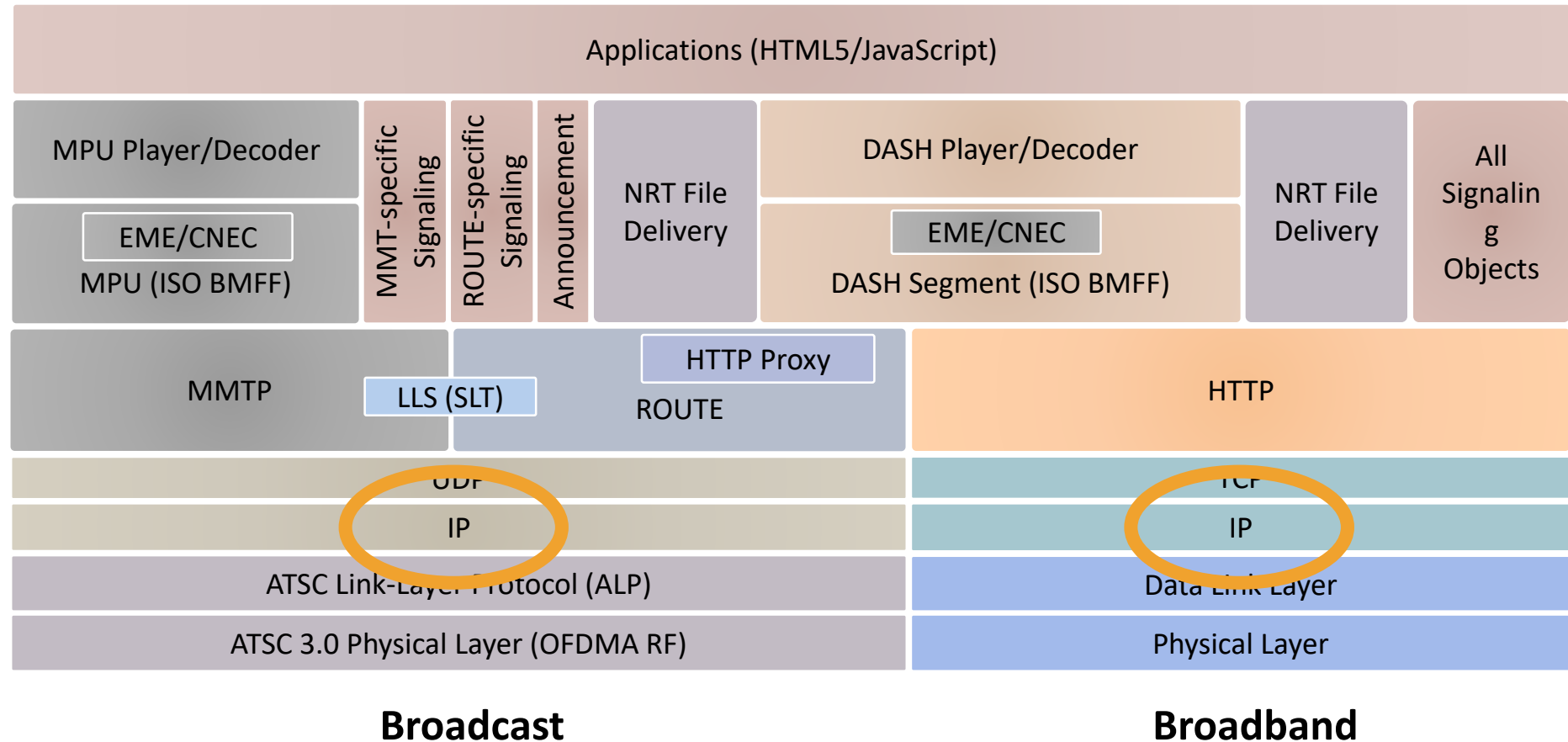


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# ATSC 3.0 Transport Layer – IP Backbone

IP Transport is used for broadcast delivery of both streaming and file content



# ATSC 3.0 Security Features

## Studio-to-Transmitter Link

- Secure path to the transmitter

## Signed Signaling Tables and Apps

- Receivers can validate the source of the emission

## Content Encryption

- Protects content
- Enables new business models such as:
  - Subscription services
  - “Freemium” services (i.e., content is free, but viewers must register)
  - Pay-per-view
- Based on CENC





# ATSC 3.0 Video



Resolutions up to  $3840 \times 2160$

Spatial scalability (SHVC)

High Frame Rate

- Up to 100, 120, 120/1.001 (plus lower framerates)
- Temporal sub-layering enables backward compatibility
- Plus temporal filtering for optimizing both the SFR and HFR pictures

High Dynamic Range

- PQ & HLG transfer functions (plus SDR)
- Metadata for PQ

Wide Color Gamut

- Wide Color Gamut BT.2100 (plus BT.709 for SDR)
- $Y' C_B C_R$  non-constant luminance
- $IC_T C_p$  constant luminance (for PQ)
- Full Range coding (for PQ)
- SL-HDR1 for delivering SDR/709 stream that SL-HDR1-capable decoders can render as HDR/2020

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# ATSC 3.0 Audio

## Two Next Gen Audio Systems

- MPEG-H
- Dolby AC-4

## Dialog Enhancement

## User-selectable Audio Tracks

- Alternate languages
- Alternate sports commentary
- Video description services

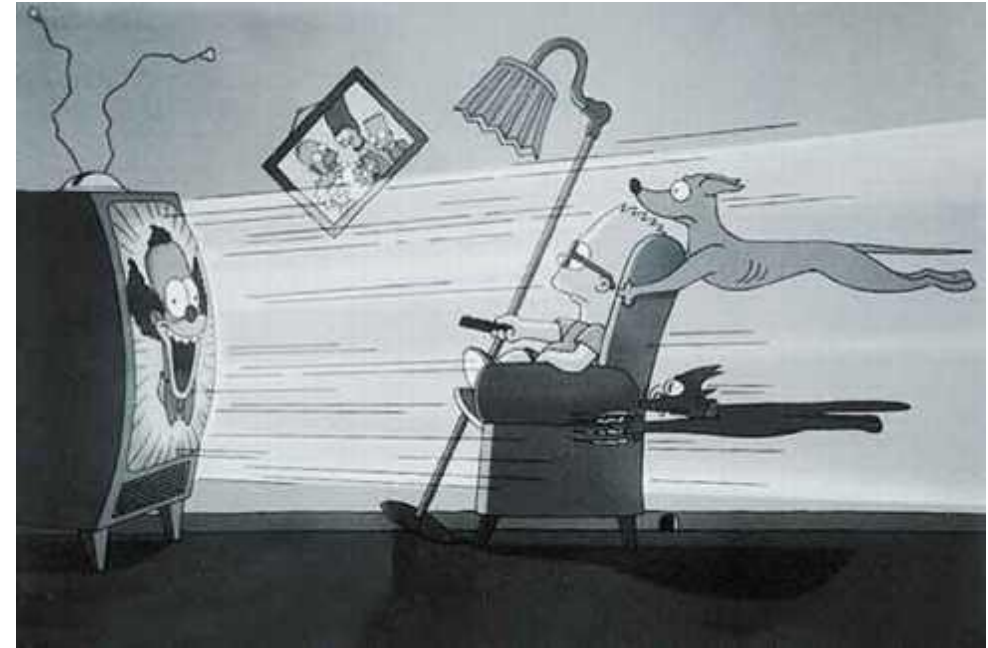
## Immersive Sound

- Sensation of sound comes from all around and above the listener
- Works on soundbars, headphones, and a variety of speaker configurations

## Dynamic Range Control

## Improved Coding Efficiency

- Four complete presentations can be sent at ~384kbps
- E.g., English and Spanish dialog with English and Spanish VDS



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# ATSC 3.0 Interactivity

The system is based on *standard web technologies*.  
It works in a browser.

Describes the conceptual application operating environment

Standard W3C User Agent – HTML5, CSS & JavaScript

Supports seamless, secure delivery of interactive content from broadcast and broadband

Provides a separate, unique context for each application

Defines a WebSocket API to manage the receiver features

# ATSC 3.0 Advanced Emergency Information

Deliver rich media such as video, web pages, etc.

Target messages by geo-location and more

Update or recall messages as needed

The screenshot displays an emergency alert interface. At the top, it reads "LOCATION - WASHINGTON, D.C." in orange text. Below this is a map showing the area around the derailment, with a purple plume indicating the hazard. To the right of the map is a video feed showing the scene of the derailment. Below the video, a red banner reads "DEVELOPING STORY" and "CSX TRAIN DERAILMENT". Underneath the video, a black box contains the text: "Shelter in place order for Brentwood, Trinidad, Noma, Eckington and Capitol Hill. Remain indoors. Close all windows and doors." At the bottom of the interface is a red banner with the "AWARN" logo on the left and the text "<< HAZMAT ALERT >>" and "AMMONIA GAS LEAK" in white. Below the red banner is a black bar with several icons and text: a location pin icon for "HAZMAT LOCATION & PLUME", a house icon for "SHELTER IN PLACE", a plus sign icon for "SYMPTOMS & FIRST AID", a red 'H' icon for "HOSPITAL LOCATIONS & WAIT TIMES", and a speech bubble icon for "CONTACT & MORE INFO".

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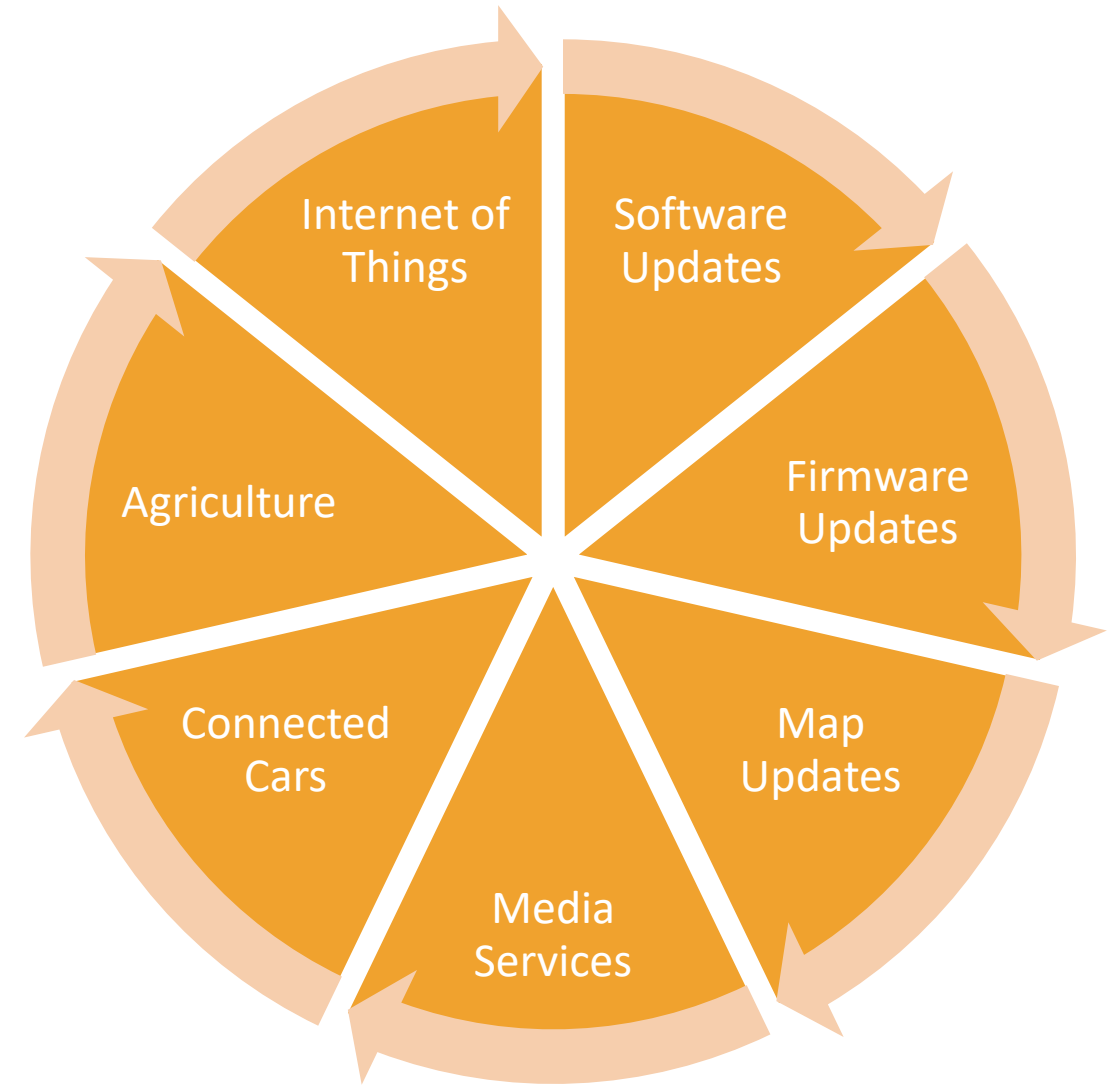
# Datacasting as a Service

ATSC 3.0 is a large digital data delivery pipe

Operation as a wireless nationwide data delivery network is possible

Terrestrial broadcast can compete with other data delivery networks on price and service level for one-to-many use cases

It's not just about television any more



# Thank you

ADVANCED TELEVISION SYSTEMS COMMITTEE

[INFO@ATSC.ORG](mailto:INFO@ATSC.ORG)

[MNOLAND@ATSC.ORG](mailto:MNOLAND@ATSC.ORG)

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FROM THE SMPTE WASHINGTON DC SECTION

THANK YOU