Overview of the ATSC 3.0 Effort

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Tune In to the Future
What is the goal?

• To improve the television viewing experience
  – Higher audio and video quality, more accessibility
  – Personalization and Interactivity
• To address changing consumer behavior and preferences
  – TV content on all devices, both fixed and mobile
• To add value to broadcasting’s service platform
  – Extending reach, adding possible new business models

…All without the restriction of full backward compatibility
Why is this change worth doing?

- Technology marches on
  - ATSC 1.0 is approaching 20 years old
- Audience expectations are growing
- New competition and disruptive forces
- Wiser use of spectrum
- Leveraging power of OTA + Online
Why should broadcasters care?

• Maintaining and building audience
• Putting content where viewers are
• Benefiting from new technologies
• Quantitative and qualitative growth
• Developing new revenue streams
ATSC 3.0 “Usage Scenarios”

1. Flexible Use of Spectrum
2. Robustness
3. Mobile
4. Ultra HD
5. Hybrid Services
6. Multi-view/Multi-screen
7. 3D Content (Video)
8. Enhanced and Immersive Audio
9. Advanced Accessibility
10. Advanced Emergency Alerting
11. Personalization / Interactivity
12. Advanced Advertising / Monetization
13. Common World Standard
ATSC 3.0 Timeline

Planning (2010-2011)

Requirements (2011-2013)

Standard(s) (2012-2015)

Products (2016→...)

You are here
ATSC 3.0
Because Technology Matters.

Tune In to the Future
The ATSC 3.0 Standard: What’s being done where?

Rich Chernock, TG3 Vice CSO, Triveni Digital
Specialist Groups and ad hoc groups have made preliminary decisions to select technologies for incorporation in ATSC 3.0. Selections of all technologies are subject to approval of TG3 and ultimately the Voting Membership in accordance with ATSC due process.
The Elevator Pitch

**ATSC 3.0**
- Configurable
- Scalable
- Efficient
- Interoperable
- Adaptable

- Next generation broadcast television
  - Significantly higher data capacity
  - Flexible spectrum use
  - Higher physical layer robustness
  - Future extensibility
  - Mobile handheld support
  - Hybrid broadcast + broadband delivery
  - Advanced A/V compression
    - Immersive audio
    - UHD support
Extensibility/ Evolution

- ATSC 3.0 meant to last, but technology advances rapidly
- Methods to gracefully evolve must be in the core
  - Signal when a layer or components of a layer evolve
  - Signal minor version changes and updates
  - Signal major version changes and updates
- Goal is to avoid disruptive technology transitions
  - Enable graceful transitions
S31 - System Requirements and Program Management

- Usage Scenarios created
- Requirements set
- Requirements assigned to SGs
  - Address questions from SGs on Requirements
  - Prioritize work
  - Keep big picture in mind, tracking progress between and across all groups (x-layer items)
  - Verify fulfillment of Requirements
What do we need (1)?

- A means to OTA broadcast “bits” to a multitude of receivers simultaneously
- Efficient use of spectrum
- Ability to control robustness
- Ability to select operating points to match broadcasters business needs
  - And to utilize multiple operating points simultaneously
- Ability to reach all devices
  - From large screen & rooftop antenna to handheld portable devices and anything in between
- Ability to utilize different network topologies
S32 - Physical Layer

- S32: PHY Layer
- S32-1: Common Elements (Merrill Weiss)
- S32-2: Modulation & Coding (Lachlan Michael)
- S32-3: Waveform (Nejib Ammar)
- S32-4: AHG on Core Broadcast Services (Jim Kutzner)
What do we need (2)?

• A means to transport the components to the receiver
  – Both in broadcast and over broadband
• A means to segment and reassemble into/out of the physical layer
• A means to organize the bits associated with components of a service
• A means to associate components of services
• A means to tightly synchronize component presentation
  – No matter how the components are delivered
• A means to provide a guide for the viewer
• A means to personalize services
• A means for a receiver to understand what it is playing via an intermediary system
S33 - Management and Protocols

S33-1: Service Delivery & Synchronization
(Sich Chen and Charles Lu)

S33-2: Service Announcement & Personalization
(Sachin Despane)

S33-3: Interactive Service & Companion-Screen
(Madeleine Roland)

- Announcement
- Personalization
- Content Advisory
- Usage Reporting
- 2nd Screen
- Interactivity
- Redistribution
- Protection
- Emergency Alerts

- Delivery
- Synch.
- Signaling
- Error Recovery

- S33-1
- S33-2
- S33-3
- S36
What do we need (3)?

- A means to provide “pretty” moving pictures
  - UHDTV: 4K (initially), High Dynamic Range, Extended Color Gamut, High Frame Rate
  - On a multitude of devices – from large screens on the wall to small hand-held devices
  - Coded as efficiently as possible
- A means to provide high quality audio
  - Immersive in 3 dimensions
  - Personalizable – control of dialog, selection of audio tracks
  - Rendered at receiver to match device capabilities/speaker configurations
  - Loudness and Dynamic Range control capabilities
- A means to support accessibility – including captioning
- A means to support applications and interactivity
  - Application environment
Applications and Presentation

HbbTV signaling APIs
- Broadband streaming A/V
- Apps
- Broadcast-related
- Broadcast-independent
- App Events API
- TV Remote Control Key Events
- PVR API
- Content/Service Protection API
- Download

App Events API
- App-based services
- Personalization
- Usage Reporting
- Communication with Companion Screen Apps

Communication with Companion Screen Apps

ATSC signaling APIs
- ATSC 3.0
- Broadcaster Notifications

Ultra-High-Definition Television

HbbTV

Web

HTML5

ATSC 2.0
What do we need (4)?

- A generalized ATSC 3.0 broadcast station architecture
  - May not exactly match individual implementations
  - Close enough to be familiar to all
  - A guideline to use for station design

- S35 – Merrill Weiss
What do we need (5)?

- A means to support subscription and pay-per-view services
- A means to support security for broadband services
- A means to support 2 way trust between primary and second screens
- A means to support certificates and their revocation
- A means to support security for interactive applications

- S36 – ATSC 3.0 Security (Adam Goldberg)
What do we need (6)?

• The ability to present and support a personalized, interactive and engaging experience with the consumer such as: Voting/Polling, Shopping, Gaming, Coupons, Social, Interactive EPG
• A more immersive experience with enhanced program data, richer content and more audio channels
• Second screen support
• A means to replace and target content and advertisements (geographic and demographic)

• Personalization and Interactivity Implementation Team (PI-IT)
  – Previously ATSC 2.0 Implementation Team
What do we need (7)?

• A means to distribute emergency alerts to all receivers in an affected area simultaneously
• A means to wake sleeping receivers if an emergency alert occurs
• A means to efficiently broadcast rich media information to augment text and audio alerts
• A means to geographically target emergency alerts

• Cross layer activity
  – S32, S33, S34 & Advanced Emergency Alert IT
Probable ATSC 3.0 Document Structure

- System and Services Standard (S31)
  - Security Standard w/Parts (S36 stuff)
  - Application Environment Standard w/Parts (S34 Stuff)
  - Management & Protocols Standard w/Parts (S33 Stuff)
  - Physical layer Standard w/Parts (S32 Stuff)
  - System Discovery and Signaling Part

- Core Content Standard - Audio
- Core Content Standard - Video

Configuration Signaling & Interface
Overall Schedule

<table>
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<tr>
<th>Year</th>
<th>System Requirements</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<td>Technology Demos</td>
<td>Testing</td>
<td>Product Design</td>
<td>Commercial Launch</td>
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Transition Challenges

• The spectrum challenge – no additional spectrum for a second service
  – Stations within a DMA could channel-share to create a dual service during transition

• The receiver challenge – new devices needed for consumers
  – Possible “stick tuner” (dongle, thumb drive, etc.) for current flat panel TV’s, and/or set-top converters
  – Industry-driven campaign to include tuner in portable devices (tablets, lap tops, smart phones, etc.)
  – Adoption by other countries will foster product development
Critical Next Steps

• Complete the standard
  – Develop practical transition scenarios
  – Update current business plans, and develop new business strategies
  – Gain regulatory approval for use of ATSC 3.0

• Commercial launch, which includes
  – Broadcast hardware build-out
  – Cooperative new product development with the CE industry
  – Sell the product to consumers

• Industry collaboration is essential
In Summary

- Will not be backward compatible to the legacy system
- Acknowledges changes of user environments and needs
- Understands broadcast spectrum regulation issues
- Supports viability and new business models of broadcasters
- Flexible to accommodate future improvements and developments
Thanks. Questions?

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ATSC 3.0
Because Quality Matters.

Tune In to the Future
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