ATSC: Beyond Standards and a Look at the Future
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Lynn Claudy
SVP, NAB
Advanced Television Systems Committee Board Chair

Madeleine Noland
President
Advanced Television Systems Committee
Topics

• ATSC 3.0’s Path to Standardization
• Capabilities of ATSC 3.0 for Future Extensions
• ATSC Organizational Structures for Future Advancements
• Results from Planning Team 4 on Future Video Technologies
“What is past is prologue.” -- Shakespeare

Planning
- June 2009: End of DTV transition — ATSC discusses Next Steps
- Sept 2011: PT-2 Final Report released
- July 2010: PT-2 Planning Team on Next Generation Television formed

Standards setting
- Mar 2016: First ATSC 3.0 Standard Approved
- Nov 2011: First TG3 Technology Group Meeting

Implementation
- Jan 2018: ATSC 3.0 Full Set of Standards
- 2020: Deployment begins
ATSC 3.0 Development Process

- Outreach
  - Call for inputs from industry

- Use Cases
  - Use case 1
  - Use case n

- Usage Scenarios
  - Usage scenario 1
  - Usage scenario n

System Requirements
The Current ATSC 3.0 Suite of Standards

- 19 Standards
- 9 Recommended Practices
- Continues to Grow
Physical Layer Frame Structure
ATSC 3.0 Bootstrap Signal: the universal entry point
The format of the bootstrap signal will NEVER change—everything else may change with versions other than 3.0

Bootstrap gives version of data to follow and time of next similar bootstrap

Preamble provides transmission parameters and duration of data frame

Not ATSC 3.0

Bootstr 3.0
3.0 Preamble
3.0 Data

Bootstrap 4.0
4.0 Preamble
4.0 Data

Bootstrap 3.0
3.0 preamble
3.0 Data
ATSC 3.0 Capabilities for Future Expansion

Document Version Control

• A/300:2020 “ATSC 3.0 System”
• Each ATSC Standard Progresses and is upgraded at its own pace
• A/300:xxxx normatively references a particular version of each of the standards for that year
• A/300 updated on an approximate annual basis
ATSC Group Structure

Planning Teams
- Exploratory work
- Consider tech, industry, market forces
- Recommend next steps

Technology Groups
- Technical work
- Consider tech only
- Draft Standards and Recommended Practices

Implementation Teams
- Build-out work
- “Test drive” new Standards
- End-to-end implementations
ATSC Planning Teams

• PLANNING TEAM 4 – FUTURE BROADCAST ECOSYSTEM TECHNOLOGIES
  • “The Planning Team on Future Broadcast Ecosystem Technologies (PT4) will assess the potential advantages and range of improvements that new … technologies might provide to the future Broadcast Ecosystem…”
  • https://www.atsc.org/subcommittees/planning-team-4-future-video-technologies/

• PLANNING TEAM 5 – AUTOMOTIVE APPLICATIONS
  • “The Planning Team on Automotive Applications (PT5) will assess opportunities and challenges related to delivery of ATSC 3.0 services (including video, audio and other data) to vehicles…”
  • https://www.atsc.org/subcommittees/planning-team-5-automotive-applications/

• PLANNING TEAM 6 – GLOBAL RECOGNITION
  • “PT-6 will consider and recommend specific action items for encouraging global recognition of ATSC 3.0 as a leading international DTT standard”
  • https://www.atsc.org/subcommittees/planning-team-6-global-recognition-of-atsc-3-0/

• PLANNING TEAM 7 – ATSC 3.0 SERVICE EVOLUTION ROADMAP
  • “ATSC Planning Team 7 (PT-7) on ATSC 3.0 Service Evolution Roadmap will develop an ATSC 3.0 service evolution roadmap for the deployment of features enabled by A/300:2019/2020…”
  • https://www.atsc.org/subcommittees/planning-team-7-on-atsc-3-0-service-evolution-roadmap/

• PLANNING TEAM 8 – CORE NETWORK TECHNOLOGIES FOR BROADCAST
  • “PT-8 will study the core network concept and consider how it may apply to ATSC 3.0 digital terrestrial broadcasting.”
  • https://www.atsc.org/subcommittees/planning-team-8-core-network-technologies-for-broadcast/
PT-4 Future Technologies
Study on Evolution of Video Technology

- PT-4 studied “how” new technologies can be launched and also “why” they would be launched, with focus on video technology

- Future Codec Projections
  - efficiency, capabilities, timeline, ...

- Future Video Formats/Services
  - resolution (8k), frame rate, point clouds, AR, VR, ...

- Industry Evolution
  - broadcast signals, receivers, MVPD systems, OTT ...
ATSC 1.0 – “Extensibility”

A/72 AVC Codec and A/153 Mobile DTV were standardized for ATSC 1.0, but the commercial reality was that ATSC 1.0 in practice didn’t evolve.

ATSC 3.0 – “Evolvability”

ATSC 3.0 has all the flexibility of ATSC 1.0 and then some

It provides new PHY Layer extensibility

And thorough signaling at each layer

“Evolvability” facilitates launching new technologies, but it does NOT inherently solve business issues associated with non-backward-compatible transitions in the marketplace

Technical evolvability of a standard does NOT guarantee evolution of the market
Video Codec Evolution

- History suggests that each new codec generation reduces bit rate by ~40-50%

- History suggests that new codec generations develop on ~7-9 year cycles
History suggests that improvements in codec efficiency alone may be insufficient to trigger market adoption in some ecosystems.

While receivers might be able to be updated to accommodate a new codec, eventually the ability to incorporate new codecs in deployed receivers will be limited by underlying hardware.

Consider that codec efficiency offers benefits to service providers and distributors, but there is no compelling benefit to consumers or receiver manufacturers for efficiency gains alone (except the ability to provide more of the same services).

**The codec conundrum:** new codecs ALONE don’t drive the marketplace ...
But new codec adoption is essential to remain competitive.
The Entire Ecosystem Influences Codec Adoption

- **Production Capabilities**
  - If a new video format or service type supports a codec’s success, content production systems and content creators will have to keep pace

- **Receiver Capabilities**
  - The existing receiver base typically has the largest audience potential
  - That said, consumer device capabilities often out-pace content production / distribution capabilities

- **Content Distribution Systems**
  - The plumbing between the Production and Receiver might be the most complex part of the ecosystem

- **Consumers**
  - WIIFM? Better compression alone might not be perceivable to consumers

- **Standards Development / Invention**
  - Could this be the easiest part?

*A new codec can be part of a NEW DEPLOYMENT WIN for all players in the ecosystem.*
And much, much more ATSC activity…

• Technology groups continue to draft recommended practices and hone the standards for ATSC 3.0
• Implementation teams explore uses of completed standards including advanced emergency messaging and conformance test development
• Planning teams continue to explore what the “next big thing” might be
ATSC as a Resource

• Technical documents https://www.atsc.org/documents/
  • Standards and Recommended Practices
  • Full report from PT-4 on video technologies
  • Advanced Emergency Information Implementation Guide
  • Initial AC-4 Implementation Technology Report

• Join the conversation
  • Membership info https://www.atsc.org/members/
  • Descriptions of all the groups https://www.atsc.org/subcommittees/

• Stay abreast of ATSC 3.0 deployments and developments
  • Third party resources https://www.atsc.org/nextgen-tv/resources/
  • Deployment tracker https://www.atsc.org/nextgen-tv/deployments/

• Deploy | Converge | Evolve – the ATSC 3.0 Progress Report Spring 2020
  • Read all about updates from the field; find it at atsc.org
This paper
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