the advanced television systems committee

THE FUTURE OF TV IS OUR FOCUS

ATSC
2013
I am often asked to make predictions about the future of terrestrial broadcast television. Of course I have my own thoughts about the future of our industry. Most importantly I have a strong belief that industry collaboration will create that future. As pioneering computer scientist Alan Kay said “The best way to predict the future is to invent it.” For the past thirty years, ATSC has been inventing the future of television. Specifically, our focus is on terrestrial television broadcasting. Television broadcasting remains the most efficient means to move popular content to a very large audience because broadcasting is an infinitely scalable one-to-many technology. If broadcasting did not exist, we would invent it! Whether it’s building on existing platforms as we are doing with ATSC 2.0 or starting with a completely new design as we are doing with ATSC 3.0, our goal is to create new capabilities for broadcasting.

ATSC 2.0 is a bundle of new capabilities including Advanced Video Coding, conditional access, Internet-related features and enhanced service guides for TV broadcasts capability. ATSC 2.0 also includes the capabilities of the recently approved ATSC A/103 standard which allows broadcasters to deliver file-based content, including programs and clips to both fixed location and mobile DTV receivers. The new Non-Real Time standard gives broadcasters the capability to deliver all types of file-based content to consumers. Using broadcast television, programmers will be able to send content that a viewer may watch at their convenience.

The revolutionary ATSC 3.0 standard will define the next-generation digital terrestrial television broadcast system. ATSC 3.0 represents a fundamental technology shift that will provide performance improvement and additional functionality significant enough to warrant implementation of a non-backwards compatible system. The new standard will be highly efficient in terms of the number of bits available for a given bandwidth (bits/hertz) and improved video and audio compression technologies will maximize the use of the data rate capacity. The system will be highly robust providing improved coverage & service.

Broadcasters around the world face many challenges. Like all other industries, broadcasting must seize opportunities brought about by rapidly advancing technologies.

I have the honor of chairing the international Future of Broadcast Technology (FoBTV) initiative. FoBTV will provide the international collaboration necessary to define a core set of highly efficient global standards. This effort highlights the commitment of the broadcasting industry to embrace new technologies and leverage interest from global technology developers to develop next-generation products. Many of these products will be portable, handheld and mobile devices that move across international borders making the goals of FoBTV to develop a global standard for terrestrial broadcasting essential.

At the core of ATSC is collaboration among individuals from various organizations in our industry. I offer my thanks to those already involved in the work of ATSC and, to other organizations interested in inventing the future of broadcasting, an invitation to join us on this exciting journey.

- Mark Richer, ATSC President
January 2013
OUR MISSION

To create and foster implementation of voluntary Standards and Recommended Practices to advance terrestrial digital television broadcasting, and to facilitate interoperability with other media.

Formed in 1983, the Advanced Television Systems Committee is an international, non-profit organization developing standards for digital television. ATSC member organizations represent the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries.

Founding members of the organization include the Consumer Electronics Association (CEA), the Institute of Electrical and Electronics Engineers (IEEE), the National Association of Broadcasters (NAB), the National Cable and Telecommunications Association (NCTA), and the Society of Motion Picture and Television Engineers (SMPTE).

An ATSC Standard is a document comprised of specifications or criteria that are necessary for effective implementation and interoperability of advanced television systems.

JOINING ATSC

Being an ATSC member provides an excellent opportunity to collaboratively shape the capabilities of new technologies and services and to gain early insight into emerging standards. Membership is open to any organization having an interest directly affected by ATSC Standards development. Members have access to the flow of early information and standards development. Membership information is available at www.atsc.org/join.

“I wish that we had joined 20 years ago, quite honestly. What I like about ATSC is that it’s a member-driven organization. It’s not dominated by any one particular industry. Broadcasting’s votes are just as important as those of device manufacturers or software companies. I like that we are playing a role. If you are just blind or silent to how the technology is developed, then you have no voice in what going into a particular standard. Being involved with ATSC insures that we have a voice. Of course, you do have to play an active role.”

- CRAIG HARPER, BELO
“ATSC is an eclectic group. The total number of participants is large enough to be productive, small enough that you can converse freely. This leads to idea sharing and exchange among participants. I think it’s that face-to-face exchange and interaction that allows ATSC to be so successful.”

- BILL HAYES, IEEE
As the number of connected TVs continues to grow and linear television evolves into a hybrid TV model, one challenge facing broadcasters is how to take the best advantage of these new capabilities. One solution is to harness an emerging, powerful broadcast standard dubbed ATSC 2.0. The new standard, which is currently under development, will provide broadcasters with a sophisticated toolbox for delivering media and interactive hybrid television content to connected TVs.

Technology continues its rapid pace of change, with more consumer devices being Internet-enabled, which in turn enables new distribution and consumption models for entertainment programming and information. Viewers are expecting more, and broadcasters are adapting to those demands. Among other things, ATSC 2.0 is the marriage of broadcasting and the Internet. The standard will feature services carried in the DTV broadcast channels without interfering with legacy transmission or reception equipment.

The concept of ATSC 2.0 is to take the experience of television watching to the next level by introducing a number of enhanced features based on newly-developed standards and the focused application of existing standards.

The emerging ATSC 2.0 standard will enable new functionality including non-real-time transmission, advanced video compression, enhanced service guides, audience measurement, and conditional access. ATSC 2.0 will provide interactive capability by creating connections between live TV and Internet content, as well as live TV and non real-time content, through triggers and objects in the broadcast stream. Broadcasters will be able to insert interactive elements into the broadcast stream. Triggers cause the content to be activated, whether delivered in the broadcast stream, or obtained from the Internet.

ATSC has formed the ATSC 2.0 Implementation Team (2.0 IT) to provide a venue for industry discussion of issues related to implementation of the emerging ATSC 2.0 Standard. Activities of the 2.0 Implementation Team may include market studies, demonstrations; interoperability tests (“plugfests”) and field trials.

"The ability to participate in the development of technologies and standards that shape our industry is certainly a valuable part of our membership. In broadcasting there’s an un-written partnership between receiver manufacturers and broadcasters. Both sides of the equation are necessary to provide a universal broadcasting service. ATSC is at the center of that partnership and provides the conduit for agreement in the development and enhancements to the broadcast television service.”

-DENNIS WALLACE, MANAGING PARTNER, MEINTEL, SGRIGNOLI, + WALLACE, LLC
The DTV Standard (A/53) was approved by the Advanced Television Systems Committee (ATSC) in 1995. Since that time, we have successfully extended the system with new functionality such as the Mobile DTV Standard (A/153) and Non-Real-Time Content Delivery (A/103).

ATSC is now planning for terrestrial broadcast television's next big development – a transition to an “ATSC 3.0” system that will provide even more services to viewers, but also require a clean break from the technologies of earlier-generation DTV systems.

Broadcasting is similar to other industries – technology leads the way and is the impetus for major transformation. A dramatic change will be needed to adapt to expected technological advances. So, while working on the backwards compatible ATSC 2.0 enhancements, we’re simultaneously looking even farther down the road to ATSC 3.0, a revolutionary over-the-air transmission system that we expect to emerge within the next decade.

On September 6, 2011, ATSC announced formation of a new Technology Group (TG3) to develop ATSC 3.0. The ATSC Board of Directors defined the TG3 Scope of work as follows:

“The ATSC 3.0 Technology Group (called TG3) will develop voluntary technical Standards and Recommended Practices for the next-generation digital terrestrial television broadcast system. ATSC 3.0 is likely to be incompatible with current broadcast systems and therefore must provide improvements in performance, functionality and efficiency significant enough to warrant implementation of a non-backwards-compatible system. Interoperability with production systems and non-broadcast distribution systems should be considered.”

The initial work of TG3 has been focused on the development of “use cases” that define potential functions that a new DTV system could provide to consumers. These scenarios are now being used as the basis for development of the technical requirements for ATSC 3.0.

Regardless of what transmission methods and technical details ultimately become part of ATSC 3.0, it’s a certainty that mobility will be a cornerstone – given the exponential growth of the smartphones and tablets that are carried by more and more people each month. At the same time, broadcasters are increasingly interested in the exciting potential of delivering Ultra High Definition services to the home for 4K and higher resolution.

The move to ATSC 3.0 will be an enormous step that must be managed carefully, but it will also allow broadcasters to do more, reach more viewers, and respond faster to the evolving marketplace. ATSC 3.0 will usher in a new generation of services and devices for decades to come. Information about ATSC is available at www.atsc.org.
The **Non-Real-Time (NRT) Standard (A/103)** is an important new standard which will enable broadcast delivery of file-based content.

NRT content is delivered in advance of use and is stored to be played when desired by the consumer. The service comprises of a collection of NRT content items, much like a television channel. The NRT content items consist of a collection of program elements that the provider combines together in a single unit for presentation purposes. The delivery of non-real-time services via the A/103 standard will include a variety of file-based content, including programs and clips, information for emergency alerts and even commercial applications such as digital signage. The new ATSC NRT broadcast standard will support terrestrial transmission to both fixed location and mobile DTV receivers designed to make use of the new flexibility.

Typical applications for NRT services will include Push VOD; news, information and weather services; personalized TV channels; music distribution; emergency alerts and reference information on a wide variety of topics.

The ATSC’s new NRT standard gives broadcasters the capability to deliver all types of file-based content to consumers. Using broadcast television, programmers will be able to send content that a viewer may watch at their convenience. Broadcasters can continue to capitalize on a unique advantage—the wireless delivery of localized content to devices. The development of complete end-to-end standards to enable NRT service delivery is expected to be a critical part of the future of broadcasting.

NRT capability is a centerpiece of the emerging “ATSC 2.0” standard. When the viewer wants to view NRT content, it’s already available. NRT is especially attractive for mobile services, since consumers have clearly demonstrated a desire for on-demand applications.

“ATSC membership is central to our ability to serve our customers. It provides us with early information about current standards, future standards, and adaptations of these standards. This information is very useful for the development of our products.”

- Michael Hanel, Decontis
With more than 130 stations now transmitting Mobile Digital TV signals based on the ATSC’s A/153 standard, broadcasters are now offering services that give viewers the ability to take along their favorite channels wherever they go. Broadcaster business groups Mobile Content Venture (with its “Dyle mobile TV” service) and the Mobile500 Alliance are now working to add affiliates, with the objective of enhancing the utility of mobile devices.

Mobile DTV devices now or soon to be available include phones, tablets and portable televisions with built in receiving capability. External adapters for existing tablets and phones are also available.

Since broadcast-originated Mobile DTV doesn’t utilize cellular services for TV reception, the enjoyment of favorite video programs won’t tax a data plan for devices that are equipped to do both. Nor will video watched via Mobile DTV suffer from stuttering and buffering that are common with streamed video.

Mobile DTV is a very spectrum-efficient technology, giving broadcasters the flexibility to reach viewers wherever they go – leaving the house for errands at the store or a Little League game.

So what is M-EAS? Based on the ATSC A/153 Mobile DTV Standard, the Mobile Emergency Alert System (M-EAS) is a new technology that provides interactive, on the demand emergency information over live television on capable mobile DTV handsets. Specifically, M-EAS uses ATSC non-real time (NRT) datacast capabilities to deliver potentially life saving information to mobile devices via an over-the-air broadcast television signal. It requires no cell towers, no cell phone data plan and no Internet access. It is the only system that has the capacity to deliver on-demand emergency messages to so many people simultaneously. M-EAS has the potential to reach millions of people with a single digital TV broadcast. The system requires no additional radiofrequency spectrum and is an additional use of existing TV transmitters and towers. M-EAS can deliver enhanced alerts that include video files, audio files, images and even interactive HTML pages.

Why is M-EAS important?
In times of crises, we need to be able to reach folks with vital information whenever and wherever they are. M-EAS enables this.

- Local broadcasters provide the ability to deliver targeted alerts. They can be local, regional or national in scope.
- Broadcasters provide the only truly scalable solution free of bottlenecks and queues. Alerts can instantly and simultaneously be delivered to millions of users.
- Broadcasters are reliable and have hardened infrastructure that is designed to run 24/7/365.
- Broadcasters provide a redundant solution with several stations in each market.

M-EAS is content rich. It enables the delivery of several different media types (video, audio, graphics and HTML pages) so users can get the latest and most complete information without the need for an Internet connection. In contrast, the Commercial Mobile Alert System (CMAS) only provides 90 characters of text- that isn’t even two-thirds of a tweet. These messages also regularly state, “check local media” for more information.

Mobile devices run on batteries and can be recharged in the car, so information can be distributed even when the power goes out.

ATSC has formed an M-EAS Implementation Team that will facilitate activities that may include interoperability tests, field trials, and demonstrations.

For more on M-EAS, visit www.atsc.org
The 2012 Lechner Award was presented to S. Merrill Weiss.

Merrill is very adept at analyzing complex issues, putting them in perspective and recommending strategies to move the process forward. He has played a key role in many ATSC standards development efforts.

Weiss is a well-known industry consultant with over 45 years’ experience in broadcasting. He is a Fellow of SMPTE, received its David Sarnoff Gold Medal and its Progress Medal, and has chaired numerous standards-writing committees. A graduate of the Wharton School of the University of Pennsylvania, he was the 2006 recipient of the NAB Television Engineering Achievement Award. Weiss is certified as a Professional Broadcast Engineer by SBE. He is a member of the IEEE Broadcast Technology Society and serves on its Administrative Committee. He holds four issued U.S. patents and two international patents on broadcast transmission technology.


In addition, he made significant technical contributions to the development of A/153, “ATSC Mobile DTV,” and also has been a longtime contributor to work on video and audio coding in TG.
LIST OF ATSC STANDARDS

Standards

A/49: Ghost Canceling Reference Signal For NTSC
A/52: Digital Audio Compression (AC-3) (E-AC-3) Standard
A/53: ATSC Digital Television Standard
A/57B: Content Identification And Labeling For ATSC Transport, Revision B
A/63: Standard For Coding 25/50 Hz Video
A/65: Program And System Information Protocol For Terrestrial Broadcast And Cable
A/70 Part 1: Conditional Access System For Terrestrial Broadcast
A/70 Part 2: Conditional Access System for Terrestrial Broadcast Service Protection using Simulcrypt for IP-Delivered Services
A/71: ATSC Parameterized Services Standard
A/72 Part 1: Video System Characteristics Of AVC In The ATSC Digital Television System
A/76B: Programming Metadata Communication Protocol Standard, Revision B
A/81: Direct-To-Home Satellite Broadcast Standard
A/82: Automatic Transmitter Power Control (ATPC) Data Return Link (DRL) Standard
A/90: Data Broadcast Standard, With Amendment 1 and Corrigendum 1 and 2
A/92: Delivery Of IP Multicast Sessions Over Data Broadcast Standard
A/93: Synchronized/Asynchronous Trigger Standard
A/94: ATSC Data Application Reference Model
A/95: Transport Stream File System Standard
A/96: ATSC Interaction Channel Protocols
A/97: Software Download Data Service
A/98: System Renewability Message Transport
A/99: Carriage Of Legacy TV Data Services
A/100: DTV Application Software Environment - Level 1 (DASE-1)
A/102: ACAP Service Signaling And Announcement
A/103: Non-Real-Time Content Delivery
A/110: ATSC Standard for Transmitter Synchronization
A/153: ATSC Mobile DTV Standard, Parts 1 – 9 Virtual Channels From The Range 70 - 99 As Described In ATSC A65, Annex B, Section 1, Item 9

Recommended Practices

A/54A: Guide to the Use of the ATSC Digital Television Standard, with Corrigendum No. 1
A/64B: Transmission Measurement and Compliance for Digital Television
A/69: Program and System Information Protocol Implementation Guidelines for Broadcasters
A/74: Receiver Performance Guidelines
A/75: Developing DTV Field Test Plans
A/78A: Transport Stream Verification
A/79: Conversion of ATSC Signals for Distribution to NTSC Viewers
A/85: Techniques for Establishing and Maintaining Audio Loudness for Digital Television
A/91: Implementation Guidelines for the Data Broadcast Standard
A/111: Design Of Synchronized Multiple Transmitter Networks
A/112: E-VSB Implementation Guidelines
A/154: ATSC Mobile DTV Recommended Practice
A/174: Mobile Receiver Performance Guidelines

An ATSC Standard is a document comprised of specifications or criteria that are necessary for effective implementation and interoperability of Advanced Television Systems.

An ATSC Recommended Practice offers specifications or criteria determined to be advisable and may improve the efficiency of implementation or reduce the probability of implementation errors. Standards and Recommended Practices require three levels of approval before publication: Specialist Group, Technology and Standards Group, and full ATSC membership.

A complete list of all Standards, Candidate Standards and Recommended Practices can be found online at www.atsc.org
**TG-1**
The ATSC Technology and Standards Group, with due regard for existing standards organizations and activities, develops and recommends voluntary, international technical standards for the distribution of television programs to the public using advanced television technology. Technologies considered may be improvements to current systems or entirely new systems that are compatible or incompatible with current systems. All forms of distribution systems may be considered, such as terrestrial broadcasting, cable systems, direct satellite broadcasting, and pre-recorded media. With respect to distribution systems, sound, vision, display, conditional access, and data sub-systems may be considered. TG-1 is chaired by Dr. Rich Chernock, Triveni Digital.

**TG-3**
The ATSC 3.0 Technology Standards Group (called TG3) will develop voluntary technical Standards and Recommended Practices for the next-generation digital terrestrial television broadcast system. ATSC 3.0 is likely to be incompatible with current broadcast systems and therefore must provide improvements in performance, functionality and efficiency significant enough to warrant implementation of a non-backwards-compatible system. Interoperability with production systems and non-broadcast distribution systems should be considered. TG-3 is chaired by James Kutzner, PBS.

**PLANNING TEAMS**
Planning teams explore opportunities in three important areas: terrestrial broadcast delivery of 3D TV, next-generation television broadcasting systems and Internet-connected TV technologies. The 3D TV Team (PT-1) analyzes and reports on the likely benefits and limitations of a standard for terrestrial broadcast delivery of 3DTV. The Next-Generation Broadcast Television Team (PT-2) explores potential technologies to be used to define a future terrestrial broadcast digital television standard. The Internet Enhanced Television Team (PT-3) considers the opportunities brought about by Internet connected broadcast receivers.

**IMPLEMENTATION TEAMS**
ATSC Implementation Teams bring together relevant players to help drive marketplace execution of ATSC standards and recommended practices.
MEMBER COMPANIES

ABC
Association of Public Television Stations
Axcera
Belo
BIM Local
Broadcom
CBC - Canadian Broadcast Corporation
CBS Broadcast Group
CEA -- Consumer Electronics Association
Cisco Systems
CMMB Vision
Coherent Logix
Comcast
Communications Research Centre
Cox Media Group
dbX-tv
Decontis
DiBCom
Digital Stream Technology, Inc.
DirecTV
Dispatch Broadcast Group
Dolby Laboratories, Inc.
DTS
DTV Interactive
DVEO Division of Computer Modules, Inc.
Echostar Communications Corporation
Elgato Systems LLC
Envivio
Ericsson Television, Inc.
ETRI
EW Scripps
Expway
Fraunhofer USA
FreeTV
Gannett
Gray Television
Harmonic
Harris Corporation
IEEE -- Broadcast Technology Society
IEEE -- Consumer Electronics Society
Imagination Technologies Ltd.
IneoQuest Technologies
Intel
ION Media Networks
Jampro Antennas
Junger Audio
LARCAN Inc.
Legend Silicon, Inc.
LG Electronics
LIN Media
Linear Acoustic
Marvell Semiconductor Inc.
Max Linear
Media General
Meintel, Sgrignoli & Wallace, LLC
MIT Advanced Television and Signal Processing Group
Mitsubishi Electric
MobiTV, Inc.
NAB -- National Association of Broadcasters
Nagravision
NBC
NCTA -- National Cable & Telecommunications Association
News Corp.
NHK General Bureau of America
Open Mobile Video Coalition
Open Smart Alliance
Panasonic Corporation of North America
PBS -- Public Broadcasting Service
Philips Electronics North America Corp.
Post Newsweek
Qualcomm, Inc.
Raycom Media
Rohde & Schwarz
RRD USA
Ryerson University
Samsung Electronics America, Inc.
SANYO Manufacturing Corporation
SBE -- Society of Broadcast Engineers
SBS (Seoul Broadcasting System)
SCTE -- Society of Cable Telecommunications Engineers
Sencore Inc.
Sharp Electronics Corporation
Siano Mobile Silicon
Sigma Designs, Inc.
Sinclair Broadcast Group
SMPT -- Society of Motion Picture & Television Engineers
Sony
Strategy & Technology, Inc.
SyncBak, Inc. Technicolor USA, Inc.
Technische Universitaet Braunschweig, Institute for Communications Technology
Telecommunications Technology Association
Televisa
TelVue Corporation
The Nielsen Company
Thomson Broadcast
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Samsung Electronics congratulates the Advanced Television Systems Committee on another great year.

Samsung is proud to introduce the Galaxy S® Lightray™ 4G for MetroPCS—the world’s first commercial smart phone supporting the ATSC A/153 Mobile DTV standard. The Galaxy S Lightray 4G, now available from MetroPCS, offers live, local broadcast television with Dyle™ mobile TV.

Dyle mobile TV keeps consumers informed and entertained while on the go and allows them to watch local and national sports, news and entertainment broadcast programming on their mobile phones.

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Widespread Adoption
Now in more than 920 million devices

Strong Industry Support
Supported in a wide range of professional solutions, by DRM providers, and in online delivery frameworks

Consistent and Reliable
Provides a consistent and reliable playback experience across multiple devices

Multiscreen Solution
Delivers highest-quality experience across all screens, from the living room to smartphones

No Compromises
You want one format that can do it all—deliver premium audio across the range of new devices and services, but also remain compatible with existing systems. That’s Dolby® Digital Plus. It’s the audio format of choice for today’s online services, and the only true no-compromise solution. There’s no reason to settle for less.

Learn more at dolby.com/streaming.
The Open Mobile Video Coalition Salutes Members of the Advanced Television Systems Committee for Bringing Mobile Digital Television to Viewers Throughout America.
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The cost of a transmitter extends well beyond the purchase price. But with groundbreaking innovations like PowerSmart®, Harris Maxiva™ and Platinum™ transmitters provide higher performance that saves money, every day. Less space, power and maintenance required — this is technology you can bank on.

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