

ATSC 3.0 and Public Broadcasting

A White Paper Supporting Public Broadcasters Efforts in ATSC 3.0/NextGen TV

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The ATSC 3.0 television standard presents unique opportunities for Public Broadcasters; opportunities that can take our content services to the next level to enrich the lives of our audience. As a new member of the ATSC Board of Directors, and a Public Broadcaster, I look forward to supporting our community in the deployment of technology and the development of applications that will provide measurable benefits for those we serve.

PBS and its member stations have led media technology innovation for decades. In the late 1970s PBS developed the first nationwide satellite content delivery network to serve all Public Broadcasters. Additionally, and in cooperation with technology partners and member stations, Public Broadcasting led efforts in the development and implementation of Closed Captioning for the deaf and hard of hearing.

Innovation has also been driven at the local level. Early in my career at WTTW/Chicago, I assisted in the development of stereo audio for television, which became the BTSC audio standard. And now, stations like Arizona PBS (KAET), Public Media from Michigan State University (WKAR), New Mexico PBS (KNME), and PBS North Carolina are leading the Public Broadcaster charge with the implementation of ATSC 3.0 (often referred to as "NEXTGEN TV").

The Public Broadcasting Service is comprised of 160 licensees which represent over 336 full power transmission facilities, along with hundreds of translators that blanket the continental United States, Hawaii, Alaska and many territories with a broadcast television signal. This large network already has a national impact via PBS WARN, which provides a resilient, reliable backup path for the nationwide Wireless Emergency Alert System.

PBS North Carolina is the largest wireless network in the state. With 12 full-power UHF transmission facilities, combined with a large number of translators and a Distributed Transmission System (DTS), we cover nearly the entire state with broadcast television signals. With that signal footprint, and ATSC 3.0's enhanced capabilities, the opportunities for applications that could empower a public broadcaster to better serve those in their viewing areas are endless.

ATSC 3.0 offers many new capabilities and benefits. It converges RF broadcast delivery with internet delivered services and since it is Internet Protocol based, it enables broadcasters to develop applications that will enable their consumers to engage with their content in familiar ways. ATSC 3.0's advanced video coding allows for a significant increase in data-carrying capacity to enable additional services. It utilizes robust Orthogonal frequency-division multiplexing (OFDM) for the data transmission, and various modulation and coding (mod-cods) schemes integrated into physical layer pipes (PLP's) that can be created to meet service requirements.

The benefits of ATSC 3.0 and its capabilities are good for all broadcasters. So why are public broadcasters vital to its success?

A key opportunity for public broadcasters will be developing interactive elements to our local programming. Work pioneered at WKAR/Michigan State University showed the value of creating engaging opportunities with programming. Smart TVs connected to the internet could bring a far richer viewing experience by bringing in and overlaying information related to the subject of the program. Experimentation will be needed for non-internet connected TVs to see what kind of engagements can be created through the station-specific broadcast application.

We can also look to upgrade the experience by taking our broadcast services up to Ultra High Definition (UHD) and enhancing it with high dynamic range (HDR) processing. And, we can greatly improve the audio experience for our viewers; including the ability to adjust the narration track to assist those, like me, who sometimes have difficulty discerning conversations within the program material.

Public Safety Communications have been near and dear to me. When ATSC 3.0 was first announced nearly a decade ago, it was clear that this new standard would have features and capabilities far beyond the current digital television system. PBS North Carolina was approached by visionary Public Safety Communications Officials in North Carolina asking whether this new broadcast technology could solve an old problem, the archaic way emergency notifications are sent to first responders. Colleagues, including Red Grasso, Program Director, First Responder Emerging Technologies (FirstTech) at the North Carolina Department of Information Technology, and I authored a white paper promoting how ATSC 3.0 might solve it. The paper is available for download at - <https://pbsnc.org/Paging>. This carefully thought-out solution has evolved from a concept to a US Department of Homeland Security funded research effort, to a soon to be launched field test evaluation of custom-built, ATSC 3.0 enabled receivers. PBS North Carolina and its small business partners, Device Solutions Inc, the Wireless Research Center of North Carolina, and other key industry technology partners will be testing various PLP's, mod-cods, and operation points to determine the optimum performance configurations. This is a use case that can be easily replicated for many wide-area, secure, emergency notification applications, applications which could sit on a local, trusted public broadcaster's ATSC 3.0 transmission signal.

Public broadcasters have experimented with and have deployed solutions to reach students homes not connected to the internet. This effort was quickly launched during the initial stages of the COVID-19 pandemic and they continue today, including efforts to test the service via ATSC 3.0 in our NextGenTV lab, followed by testing over a wide area, using our WUNK-TV transmission facility. My white paper on remote learning and the use of ATSC 3.0 can be downloaded at: <https://pbsnc.org/BroadbandGap>

There are many other public-facing applications that could be easily adapted to ATSC 3.0 that would require the design of simple devices to implement. Many dual licensee public broadcasters provide reading services for the visually impaired over their FM radio stations. These services could be deployed on ATSC 3.0 and would use a miniscule percentage of the available bandwidth. Stations could look at other audio services that might provide weather or health and safety information to serve their communities beyond regular programming.

I have shared many thoughts as to why Public Broadcasters can continue their technology leadership role with this innovative technology, ATSC 3.0. To be sure, there are plenty of challenges including costs, market transitions, and educating our boards and key stakeholders to the need for this deployment. But the advantages far outweigh the challenges. It is my hope that Public Broadcasters will embrace ATSC 3.0 and bring its capabilities to their audience and constituents.