



## EDUCATION UPDATE

By Fred Engel, CPBE  
Chief Technology Officer  
UNC-TV Public Media North Carolina  
Research Triangle Park, NC  
fengel@unc.tv.org



Reprinted from the April 2020 issue of



# UNC-TV, ATSC 3.0/NextGen TV and Public Safety

I have worked in this exciting and changing business for more than 40 years. It has been gratifying to have had a front-row seat in cutting-edge technological innovation. Early in my career, I participated in the development of stereo audio for analog broadcast television, very early high-definition television production work, and (my favorite) with our team at Kentucky Educational Television where we engineered a live video event with astronauts on the International Space Station who were interviewed by middle school students. Now I find myself in the latter part of my career immersed deeply in ATSC 3.0/NextGen TV. What a ride!

UNC-TV is North Carolina's statewide PBS network. Our licenses are held by the University of North Carolina System, and we broadcast from 12 full-power UHF transmitters and 25 translators to serve our state. Our microwave and tower network, shared for decades with more than 40 federal, state and local public safety communications organizations, is critical to the well-being of our citizens. The shared infrastructure along with our emergency weather-related announcements coordinated with the North Carolina Department of Public Safety has been a pillar of our mission.

We have kept our eye on developments with ATSC 3.0/NextGen TV since it was first introduced. We see immediate benefit to the consumer in higher picture quality, a greatly enhanced listening experience, interactivity with internet-connected TVs, advanced emergency alerting, and the promise of much improved over-the-air reception (including mobile).

With ATSC 3.0's advanced video encoding, HEVC, and overall channel data carrying capacity increase, we are looking at how to provide an exceptional viewing experience for our viewers, but also to determine how to use the leftover data capacity within the channel.

In 2016, members of the North Carolina public safety community approached us with a very real problem. Analog voice pager service, based on 1960s technology and used by 80% of volunteer firefighters in the United States, is an alert system that needs a refresh. After several dis-

cussions, it was hypothesized that ATSC 3.0/NextGen TV might be an effective technology to address this critical technology need. The next step was to write a white paper (link below) that describes the problem in detail and the potential solution.

The white paper was followed by the creation of a proof of concept whereby 911 dispatch data was tunneled to the WRAL/Capitol Broadcasting Company's Raleigh, NC-based ATSC 3.0/NextGen TV experimental transmitter and successfully decoded and displayed. This work resulted in UNC-TV winning the prestigious National Association of Broadcasters 2017 Pilot Innovation Challenge Grant First Prize, a competition of 150 national and internal applicants, for creative uses of broadcast technology.

### The Public Safety Research Center

The next step for us was to develop a facility to continue the research. We have created the Public Safety Research Center of North Carolina. The Center has all the needed ATSC 3.0/NextGen TV systems, from encoder to receiver, to test various configurations and applications with the goal of researching, testing and, hopefully, deploying public safety communication applications.

ATSC 3.0/NextGen TV's use of OFDM, the multi-carrier modulation scheme, promises to provide far better OTA reception than the current technology. With the added benefit of creating Physical Layer Pipes (PLPs) customized for delivering multiple quality-of-service applications, we will fine tune our designs to best meet the need for our consumer audience and public safety communications needs. One of the focus areas will be on-body receivers to test the robustness of delivery and reception to validate our hypothesis.

UNC-TV plans to take these lab tests to the field, hopefully soon. We have identified one of our transmission facilities in the state where we have significant overlap from other transmission sites. We have begun the process of research on coverage predictions and legal concerns to determine if this is feasible. With this launch, we hope to make this facility available as a living, broadcast lab to



Vendor community members joined the UNC-TV engineering team to commission the end-to-end research environment, which is being used to further test public safety communication concepts.

field test equipment and applications, especially those focusing on public safety communications.

These are exciting times with a new technology that may provide applications far beyond the dreams of those who designed it. It is our intent to explore those opportunities with partners who share that same vision for curiosity and innovation.

### WHITE PAPER

[unc.tv/paging](http://unc.tv/paging)

## Education Almanac

### Upcoming Webinars

- April 29: AoIP Series, Module 3 – Manufacturer Deep Dive
- May 14: RF Safety Webinar

[sbe.org/webinars](http://sbe.org/webinars)



### Ennes Workshop

May 29: El Paso, TX

[sbe.org/ennes\\_workshop](http://sbe.org/ennes_workshop)

### Leadership Development Course

August 4-6: Atlanta

[sbe.org/ldc](http://sbe.org/ldc)

Have an idea for a webinar?  
Contact Education Director Cathy Orosz at  
317-846-9000 or [corosz@sbe.org](mailto:corosz@sbe.org).

For more information on any SBE education program, contact Education Director Cathy Orosz: [corosz@sbe.org](mailto:corosz@sbe.org) or 317-846-9000.