

Digital Television Broadcasting in the United States

By Bill Hayes, Iowa Public Television



When I was asked to put together this year's report on digital television broadcasting in the United States, I went back to review last year's report by Graham Jones of the National Association of Broadcasters (NAB) and immediately wondered what I had gotten myself into. Graham's report was extraordinarily thorough and well researched and clearly illustrated the depth and breadth of resources available at the NAB. I am afraid that my report will not be nearly as thorough or indepth. It will, however, be based on my observations and experiences as the director of engineering for Iowa Public Television and my involvement in the creation of educational programs, including the Iowa DTV Symposium (www.iptv.org/dtv), the IEEE BTS Broadcast Symposium (www.ieee.org/organizations/society/bt/ABS08/abs08program.html), and numerous DTV information sessions that I have conducted for consumers all across Iowa.

Terrestrial DTV Transmission

With a little less than six months to go, the February 17, 2009, shutdown of analog television is fast approaching. As of August 4, 2008, there are 1,629 stations in 211 markets delivering digital signals to virtually 100% of U.S. households. The vast majority of them have access to more digital program streams than analog, because of the number of digital television (DTV) stations that are multicasting. The total number of broadcast hours being presented in high-definition (HD) continues to grow on all of the major networks, and at last count there were more than 100 local stations currently originating their local news in HD. As an increasing number of consumers upgrade at least one of their televisions to HD and the cost associated with local HD origination equipment continues to decline, the industry appears to have turned the corner and is committed to producing HD content. Simultaneously, as encoding and compression technologies have improved, many local stations are adding a standard-definition (SD) stream or even two SD streams to their digital service offerings. At Iowa Public Television, we offer a full-time primary HD service, as well as two SD services, a children's/classroom educators' channel, and a lifestyles/information channel.

As this report is being written a new potential stumbling block might be added to the mix as the U.S. Senate by a vote of 96 to 1 has passed S.2507 "The Digital Television Border Fix Act" and its companion H.R. 5435 is pending in the U.S. House of Representatives. The legislation would allow U.S. television stations within 50 miles of the Mexican border to seek permission to continue both their analog and digital signals until February 17, 2014. Newspaper reports from communities along the border indicate that there is strong support for this legislation among the Spanish-language stations that fear they will lose audience on the Mexican side of the border because there is no mandate to end analog broadcasting for Mexican television stations. News reports indicate that English language stations along the border are opposed to the legislation but may be forced to continue both services, for competitive reasons. In preparation for shutoff of analog, many stations have not replaced aging analog broadcast transmission equipment, but instead have continued to maintain systems that are well past their useful life. Now some stations along the border may be forced to stretch another five years out of their analog transmitters and spend another five years paying two power bills.

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It all depends on whether or not this legislation passes in the House of Representatives and if the president signs it into law.

Education of the Public

In 2007, with the introduction of H.R. 608 (Digital Television Consumer Education Act of 2007), a massive education campaign began, to prepare the general public for what the end of analog television will mean to them and what steps need to be taken to ensure that they will continue to receive television service after the shutoff of analog. Terrestrial television broadcasters have been airing messages to help educate the general public about the upcoming end of analog television and what viewers must do in order to ensure that they will continue to receive television after February 17, 2009. Iowa Public Television, with the support of the Iowa Broadcasters Association, produced a 30-minute program that aired on a number of stations across Iowa. Similar programs have been produced by stations in other markets.

In 2007, NAB kicked off its DTV Answers campaign, which has included the production of spots and programs designed to educate viewers about DTV. They have also created a speakers bureau composed of representatives from local stations and provided presentation materials for use at local events. Currently, they have two mobile vehicles on the road called "DTV Trekkers" that will visit approximately 600 different locations nationwide to help educate consumers. Iowa Public Television will have personnel at all of the Trekker stops in Iowa.

Like many stations, Iowa Public Television also has a strong local commitment to the education of consumers, especially those that rely on over-the-air television. Speaking engagements have been held across Iowa for groups in public libraries; and in educating people, we have also been educated. More than 20% of homes in Iowa rely on over-the-air service and an increasing number of people continue to attend the presentations. Over-the-air viewers may be more important to pub-

lic television stations than to commercial stations. Basic research regarding indicate that approximately 35% of our contributors watch our over-the-air signal. That number is disproportionately large, at least for Iowa Public Television, and these are our most loyal and supportive viewers. When explaining how digital works to our contributors, I often listen to their questions and learn how they use television. Some of the information is surprising and may be an unpleasant surprise to local broadcasters, if they do not become more proactive.

Based on what I have seen in Iowa, I believe that broadcasters, in general, underestimate the number of their viewers who use indoor antennas. In crowds of 60 to 100 people, it is not uncommon to find that over half use rabbit ears, and these are not necessarily people living within the city or grade A contours of the stations. It is also not just the antenna-only homes; the majority of satellite users that have attended the education sessions and even a significant number of the cable subscribers still have televisions that use antennas. Despite all the messages that they have seen, many still do not have a good understanding of what is going to happen and what they need to do. According to a February 7, 2008, press release from the Consumer Electronics Association, consumer awareness of DTV has grown 80% since 2006, and while this is good news, it would be unwise to equate "awareness" with understanding.

Coupon-Eligible Converter Boxes

In early 2008, as a result of the "Digital Television Transition and Public Safety Act," the National Telecommunications and Information Administration (NTIA) began issuing \$40 coupons for the purchase of coupon-eligible converter boxes (CECBs), and manufacturers started delivering boxes to stores late in the first quarter of 2008. The process started out later than originally anticipated and consumers applying for coupons often wait 8 or 9 weeks for their coupons to arrive. A number

of other issues further impede the process. Currently, in many areas there are shortages of converter boxes available for purchase and many consumers find that coupons expire before stores have boxes available. Appealing to the NTIA regarding unavailability of boxes generates a denial with an explanation that does not address the consumer's issue.

Another critical factor that may be contributing to the scarcity of converter boxes is the continued operation of analog translators and low-power television stations and the inability of the majority of the converter boxes on the market to pass the antenna signal through to the television tuner when the box is turned off. This analog passthrough is a standard feature on VCR's but not on many of the first converter boxes available. Many of those initial boxes have been discontinued and their replacement units are not yet being delivered to stores. This problem was experienced firsthand at Iowa Public Television as we initially aired an all-HD service on our digital channel along with a single SD service while continuing to air the normal schedule on our analog channel. As converters began to show up in the market we immediately began receiving complaints from converter box users that although they loved our HD service, they could no longer receive normal programming because the CECBs did not have analog tuners and thus did not allow passthrough when turned off. Our decision was to add a second SD service, which is a clone of our analog service, and by the end of 2008 the PBS program feed will be an HD feed similar to that of the commercial networks.

Translators/Low-Powered Television

Iowa Public Television is not a huge user of translators, however, there are currently eight in service. After spending time with viewers to explain digital, it is clear that there is cause for concern. This will be particularly evident in areas with a mix of full-powered and low-powered services. As of August 2008, the Federal Communications

Commission (FCC) still has not taken a definitive step toward mandating a conversion deadline for low-powered services. The NTIA has two grant programs to address the DTV conversion issues for low-powered stations. The current program allows eligible entities to apply for \$1,000 to purchase digital-to-analog conversion equipment. The low-powered station must broadcast only in analog and must rebroadcast a full-service digital station. This is in essence a CECB for the translators and low-powered television facilities. The second program, which is still listed as a future program will provide \$65 million in 2009 to allow eligible low-powered stations to upgrade from analog to digital in eligible rural communities.

Mobile/Handheld Video Broadcasting

Over the past few years, several manufacturers have demonstrated mobile delivery of content to portable devices using a portion of a station's Advanced

Television Systems Committee (ATSC) stream. In May 2007, the ATSC issued a Request for Proposal for technology to enable development of an ATSC Mobile and Handheld Standard that will enable broadcasters to deliver television content and data to mobile and handheld devices via their DTV broadcast signal. A number of proposals were received. During the first part of 2008, field tests were conducted on the systems, and in May the results of the technical trials and evaluations were submitted to ATSC. The plan is for the standard to be finalized and in place by February 2009, so that manufacturers and programmers can begin creating content and marketing products.

Conclusion

The transition to digital broadcasting is at times very convoluted. It is part evolution and part revolution. Many broadcasters are still struggling with the very different and divergent directions in which the transition is taking

them. On one hand, they are being told that they need to produce rich HD content for delivery to huge movie theater-quality screens in homes with 5.1 channels of surround sound. On the other hand, they are being told that they need to produce content that can be delivered to tiny handheld screens in cellphones and PDAs so that people can watch whatever they want, where ever they are, whenever they want. And, of course, there is the computer industry, where the broadband internet connection is the source of all knowledge and entertainment, in which broadcasters are said to be dinosaurs that have no relevance. So who is right? Everyone and no one. In an environment in which the goal is to provide what the consumer wants at any time and any place, no single technology will meet all of the needs of all of the people all of the time. Broadcasters will continue to deliver products that will continue to be used by consumers. Remember, broadcasters were wireless long before it was cool.

Broadcast Acquisition and Post-Production

By Karl Paulsen, AZCAR

In North America and throughout the world, discerning consumers accompanied by high-definition (HD) programming, plus a significant increase in economical HD-product offerings, have driven up the number and the types of systems deployed for television broadcast. The growth is evident in television news and production. Supplementing the rollout in the professional HD space is a growing number of consumer-level HD cameras now hitting the sub-\$1,000 price range. This overall seeding of the industry is now at all ends of the spectrum—from content creators, to the broadcasters, to home entertainment networks and event or venue distribution.

Large venue applications are now offered a mix of full-sized studio cameras, handhelds, cinematography-level and micro-sized units, all with full HD-capability ranging from HDV through 2K images. Although broadcasters, especially for news, may still be wrestling with the decision to go 16 x 9 wide-screen standard-definition (SD) or convert entirely to HD, the motivation is driven by the type and degree of infrastructure already in place at the facility—as well as the perception that branding “HD” has to the marketplace. This past year has seen significant HD increases in helicopter platforms for air-ENG, beauty cameras that show off the HD-perspective, and the marketing hype that allows stations or channels to brand



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