



IEEE

# Broadcast Technology

The technologies to deliver information and entertainment to audiences worldwide, at home and on the go

*2019 BTS Symposium examines new and evolving broadcast technologies; coverage begins on p. 5*

# From The Editor

## Hats Off To BTS Members; ‘Cyberpeople’; And Reflections On Our Digital World

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The “rush season” as it pertains to technical conferences, trade shows, symposia and the like is finally over for the year, as I prepare this column on a beautiful and very autumnal late-October day in Northern Virginia.

I’m finally home for a couple of months before boarding a plane for Las Vegas and the Consumer Electronics Show there in

January, and have time to reflect a bit on the events I’ve been covering since early September—IBC, the NAB Radio Show, our own Broadcast Symposium, NAB NY, AES, and SMPTE. In looking back at all of these, there is a very visible common denominator—BTS members. It’s been quite gratifying to see so many members of our Society at these events, not only walking the isles looking at the new equipment exhibits and asking questions, but also up on the dais, either presenting technical papers, participating in group discussions, or even receiving awards and other accolades.

I am very proud to be a member of an organization that is so visible within this industry of ours, and one that has in the past, and still continues to have such a positive influence and to make such a difference in shaping the technology that drives broadcasting.

### ‘It Was Déjà Vu All Over Again!’

Speaking of technology, some time ago in this column I related a story about my first experience with virtual reality and how that experience triggered a memory about a radio drama broadcast in 1962 that not only described virtual reality, but also went a step further, describing a VR system that did away with the cumbersome goggles and substituted a much more practical way to experience images and sounds originating from another (distant) location—a chamber where the ceiling, the floor and the walls were high-res video displays. I remarked that the more-than-half-century-old radio production (which anticipated the VR/AR technology that has become commonplace now) was an excellent example of a situation where life and science finally catch up and begins to imitate art.

This year at the IBC Show I had another such “déjà vu” moment. This took place at the Fraunhofer Institute stand near the end of the show when I finally had a few minutes for “sightseeing.” I asked “what’s new at the show this time?” and

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*Cover photo: The U.S. TV broadcast spectrum repack is well underway, and was featured in presentations at the October BTS Symposium. Pictured here is the “repacked” transmission facility of WSYX, Columbus, Ohio. Two of the three planned new transmitters are shown, with a third to be installed in a later repack “phase.” (Photo courtesy of Bo Hoover, Technical Services Group, Inc.)*

the answer was “have you experienced our volumetric video production and workflow demonstration?”

Well, I hadn't, and was escorted to the area of the stand where it was being demonstrated. The Fraunhofer representative explained to me that a human model had been scanned in a cylindrical chamber with high resolution cameras, and the resulting three-dimensional “clone” of the person was stored in a computer as a sort of “cyberperson.” The software that had been developed for this application allowed the computer to place the “cyberperson” in a real-world scene and realistically move the synthesized being in such a way as to emulate the actions of a real human being walking about in a living room environment. This was what I witnessed on a large flat screen display.

I was then asked to don VR goggles, and all I could say was “wow.” The “cyberperson” took on the appearance of a real person standing there in front of me. I was asked to walk around this synthesized image, and the experience was just as if I were walking around real person. As I moved from front to back, the perspective changed just as it would in a real-world environment. If I tilted my head to take in the cyberperson's features, the sensation was just as I were staring at a living, breathing individual just inches away from me! I actually felt a bit self-conscious about being close enough to trespass upon someone's “personal space.”

It was at about this point that the “light” in my head went on, and I knew I'd seen something like this somewhere in the past. It took me a little while to completely “pull up” this prior experience, but I finally remembered it—a 1981 Hollywood movie titled “Looker,” that was written and directed by Michael Crichton, and starred Susan Dey (“Laurie” in the 1970s sitcom, “The Partridge Family”), Albert Finney, and James Coburn. I won't go into a lot of detail, but the plot of the movie is predicated on the creation of 3D images of supermodels (Dey is one) after the flesh-and-blood models don't make the grade in terms of achieving just the right moves to pitch a product in commercials, according to a computer scoring system. After giving up on Dey and the others, the ad agency uses their computer-manipulated clones to sell products at the maximum theoretical level of effectiveness. Dey and the other models get a paycheck for life, and all is sweetness and light; well, not quite. (This is a very condensed version of the plot. If you've got 90 minutes or so, the movie can be streamed on Netflix or other services, and it's available on DVD from Amazon.)

Although it took 38 years, life and science have once again mimicked art. What I witnessed was indeed amazing. Yes, there were some slight issues—a slight breakup or jerkiness of the image in the VR goggles if I moved my head too fast—but I reminded myself that this was a first iteration and it's only going to get better and better with time. I also can't help but wonder where this is eventually going to go—a popular model or TV anchorperson is “volumetrically scanned” and then gets a paycheck for life while their virtual persona (which never ages) is used to sell all sorts of products or an-

chor the evening news; will this technology eventually lead to “live” television productions with no cameras and no live talent on the premises? It also creates the possibility of distorting the truth and creating fake news even more effectively than is possible today with skilled editing and Photoshopping-type tools. That old question “is it real or is it Memorex?” could become completely meaningless. Scary maybe, but this is real, and if you missed the demo, you possibly missed a glimpse into the future.

### **10 Years Of U.S. DTV, 30 Years of Digital Tech In Broadcasting; Embracing The Next Wave**

Obviously, the Fraunhofer demonstration I witnessed would not have been possible without digital technology, and I couldn't help but thinking that this past June marked the tenth anniversary of the final signoff of all high-power analog TV transmitters in the United States in order to make way for digital-only transmissions, thrusting us, like it or not, into a completely digital world. (See Ian MacSpadden's story about this anniversary elsewhere in this issue of **BT**.)

Time really flies! It seems just yesterday that I purchased my first HDTV (a large-screen Philips CRT model), which was rather curiously supplied with only an analog tuner/demod. This purchase took place several years before the mandatory U.S. analog TV switch-off, and I had to locate and purchase an outboard ATSC 1.0 tuner in order to view the HD offerings that were being transmitted by the Washington, D.C. broadcasters serving the northern Virginia area where I reside. I recall also, replacing the Philips CRT set with an even larger Sony flat screen unit (which did incorporate both analog and ATSC 1.0 tuners). And I recall taking advantage of the government subsidy available to purchase ATSC 1.0 set top boxes for my remaining NTSC receivers prior to the June 12, 2009 analog shutoff. Interestingly, my family and I had become so appreciative of the greatly superior picture quality afforded by digital over-the-air television that we seldom used the older analog sets with their associated STBs after digital-only transmissions became the law of the land. It wasn't that long after that very memorable June 2009 day that I checked out 1.0-to-analog STBs on eBay, and couldn't help but notice that these initially rather pricy items were selling: (new and unused) for as low as 20 cents (\$0.20).

This drove home the message that it really didn't take the public that long to forget about analog and move to something new (and better), and to dump their CRT TVs and outboard converters in the process.

My point here is that it's amazing how a new technology that initially was met with some amount of resistance can become mainstream in a very short amount of time, with no one really wanting to revert back to “the good old days.”

This was underscored in another one of my musings; this time, it was some 30 years ago when my employer sent me to an overnight seminar which was rather prophetically (and ominously, to some) dubbed “The Digital Dawn.” (If there's

a dawning, the sun must be also be setting on something.) This regional conference attracted a number of television engineering personnel, and exposed us to the latest and greatest in terms of applying digital technology to TV broadcast plants. It featured presenters from a number of major equipment manufacturers, all with a common message: “digital is coming sooner or later; better start getting ready for it.” (Not that we hadn’t been dealing with digital in one way or the other already, digital logic chips in numerous flavors has been around for some time then, digital time base correctors were well entrenched, as were digital synch generators, digitally-controlled VTR servos, digital frequency counters and DVMs, and for some, even the ponderous two-rack Marconi DICE (digital intercontinental standards converter)). However, save for an early-1981 demo of a conceptual “all-digital” TV plant (dubbed “Component Coded Digital Video Demonstration”) set up at San Francisco’s KPIX television operation, digital technology in the TV world at that time was limited to individual devices or small “islands.”)

The “take-homes” from those “Digital Dawn” presentations were: (1) we’d better start thinking seriously about shipping digital signals around in our plants, (2) digital, like it or not, was going to edge out analog, and (3) digital technology was going to make all of our lives a lot easier!

Of course, it was just a matter of time before the first two prophecies became reality. (As for the third one, however, I think most would agree that the jury is out.)

In looking back at that “digital dawning,” I see something of a parallel situation with regard to where we are now. Thirty years ago, TV broadcasters were all deeply entrenched with analog technology involving 75-ohm coaxial cables and one-volt peak-to-peak video flowing through them, along with shielded twisted-pair 600-ohm balanced cables carrying our audio. To consider running A/V signals around in any other way in a TV plant was sacrilege.

However, as more and more new equipment started rolling off the assembly lines equipped with serial digital interfaces (SDI), we adapted. We began incorporating this new gear into our analog universes by constructing digital “islands” and using plenty of A-to-D and D-to-A converters (which just about all manufacturers sold in boxcar lots then). Pretty soon, we’d arrived in the all-digital world, with no more “islands.” Both digital video and audio were flowing through the same run of coaxial cable, and we considered analog video and audio gear as now passé and antiquated.

I see that situation as much like one that exists now. Only this time it’s IP connectivity that’s edging out the SDI we grew to love (well, at least to accept and appreciate!).

Even though IP started moving into the radio side of the house some years ago, and has become more or less accepted as a way of doing business, there still seems to be some reluctance to embrace it within the video realm. (I heard someone not that long ago advising his friends that IP was coming, and suggesting that “if you’ve been thinking of retiring, this just might be a good time to do it.”)

To me, this is not a particularly wise philosophy. However, it’s human nature to want to hang on to something that has been part of your life for a while, and to be reluctant to try something new. However, back when digital was starting to “dawn,” I recall someone with a more realistic view of things stating “yes, you can stay with an analog plant, but after a while, manufacturer support is going to dwindle, and you’re going to find yourself perpetuating a very expensive and difficult to maintain broadcast plant museum!”

I firmly believe that this is the message we should take to heart here on the dawning of the all-IP broadcast plant. Yes, it’s a bit intimidating at first—maybe even scary—but so was SDI when it began to make its way into our some of our lives. (I know that I’m dating myself here, but I recall the same song-and-dance when solid-state began to edge out vacuum tubes!) However, IP brings with it a lot of advantages. If you haven’t already started, it’s time to begin learning as much as possible about it, and the AIMS-sponsored IP Showcase is an excellent place to begin.

This “Showcase” has been demonstrating all-IP connectivity for the past several years at NAB, IBC, and other industry events. Their message is that IP technology is very applicable to broadcasting, and an all-IP TV facility does work, with educational presentations and testimonials from early IP adopters. I applaud the efforts of the AIMS group (now with more than 50 participating equipment manufacturers on board). If you’ve managed to somehow miss the IP Showcase (it drew quite a bit of traffic at the September IBC Show), do check it out at future broadcast conference events (look for the IP Showcase at the April 19-22, 2020 NAB Show). IP connectivity is the way of the future and you can learn a lot in just talking with the people who put the Showcase together.

I hope to see you at the “Showcase” when April rolls around!

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