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WHAT'S INSIDE

Two Decades of TV Technology

by Randy Hoffner

FALLS CHURCH, VA.

As we celebrate TV Technology's 20th anniversary, it seems the perfect time to take a look back over our collective shoulders and see just how far television technology has come in the past 20 years. It is probably not necessary to tell anyone who has been in television engineering for the past 20 years that a lot has happened during that time, and that a lot of new technology has come down the pike. In this regard, television is little different from any other technology-based industry, of course. But because television has been a familiar presence in virtually every American's daily life for the past 50 years, the pace and degree of change and advancement over the past 20 years, when compared to the 30 preceding years, has been nothing short of dismaying.

In 1983, we in the industry were using the one-inch videotape format. The one-inch age was really just the second generation of professional video recording technology; the first generation, two-inch quad recording, having lasted nearly 30 years. In fact, in 1983, a substantial amount of material recorded on two-inch quad tape was still being used throughout the industry. One-inch tape had given us the ability to do electronic editing, and also had given us a number of stunt modes such as variable-speed playback, slo-mo playback and freeze-frame capability. Many of these new capabilities, and indeed the very ability to use the one-inch format for professional, color video recording and playback at all, were dependent on the digital time base corrector. Without the digital TBC, the constantly varying time base errors generated by thin one-inch tape's stretchiness precluded precluded its use to successfully record direct-color NTSC (or other format) pictures. Another digital device that had recently burst onto the scene and proved itself useful was the video frame synchronizer, with which the broadcaster could easily re-time incoming video signals to the television plant's clock.

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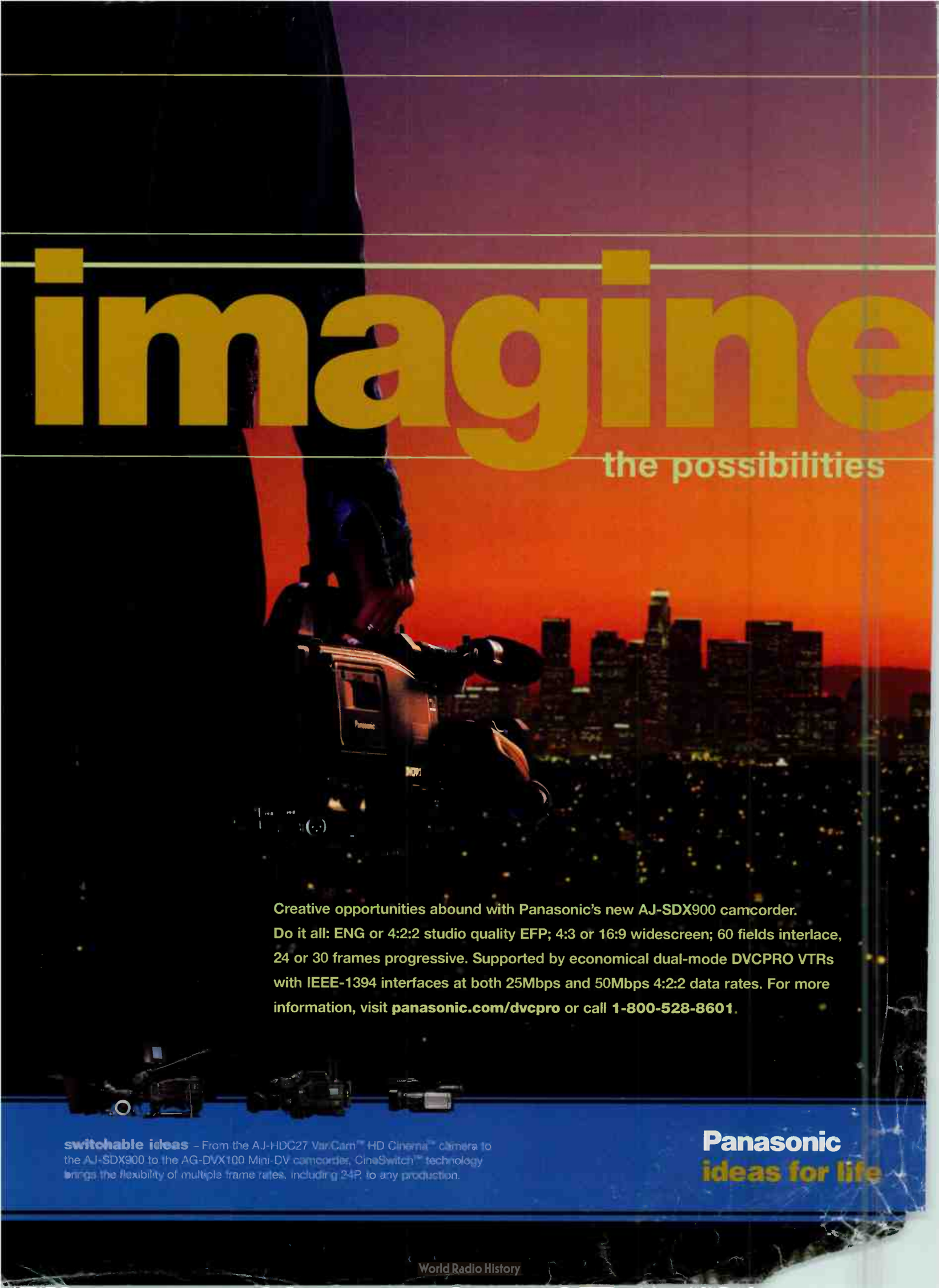

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CONTRIBUTING WRITERS

NAME:
James F. Goodmon

COLUMN:
A Look Back While Looking Forward

Many of us in broadcasting are fortunate to have lived and worked in the golden years of television. Advancements in the medium over the last 20-25 years have been breathtaking. But significant shifts outside of technology have also had an enormous impact on...Page 28

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COLUMN:
Studio Cameras: 20 Years and Growing

In 1983, the 30mm Plumbicon photoconductive pickup tube reigned supreme as the epitome of high-end imaging for top-of-the-line studio cameras. The smaller 25mm sister tube had become dominant in Outside Broadcast (OB) mobile trucks. And, fresh from half...Page 30

NAME:
Mario Orazio

COLUMN:
The Future of Television?

You might not have noticed that there's a word in every language for someone who makes predictions. That word is idiot. Ergo, when my boss approached me about writing about TV technology 20 years in the future, it took me about the duration of an HDTV ...Page 50

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Telephone: (703) 998-7600
Editorial fax: (703) 820-3245
e-mail: tvtech@imaspub.com
Online: www.tvtechnology.com

FROM THE EDITOR

It Was 20 Years Ago Today . . .

One of my favorite movies is "Citizen Kane," the story of a rich newspaper magnate who rocked the publishing world with his sensationalistic and bombastic approach to journalism. In one memorable scene, he writes up a manifesto telling the world what his goals are for his newspapers—today we refer to them as "mission statements."

We've never written up a "mission statement" in these pages because we never needed one. We've known what we wanted to do since the first issue was published 20 years ago—and that is to bring you the most comprehensive and timely news, opinion and technical information about the broadcast and multimedia industries.

What best represents our goals here at TV Technology are summed up by the closing paragraph of publisher Steve Dana's letter to readers published in that first issue:

"So read and enjoy. And remember, while other publications may try to follow in our footsteps, only one will be dedicated to serving your interests fully and honestly, TV Technology."

* * *

With this issue, we welcome aboard a new News Editor for TV Technology. Deborah McAdams is well known for her concise and insightful approach to the industry and for her "acerbic wit" (her words!)

We're sure she'll continue in the tradition of first-rate TV Tech news editors. Got a scoop or want to share news and ideas about the industry? Drop her an e-mail at *dmcadams@imaspub.com*. Welcome aboard, Deborah!

Tom Butts
Editor
tbutts@imaspub.com

LETTERS

Send to Editor, TV Technology at e-mail *tvtech@imaspub.com*

The Real World

Dear Editor:

Regarding Frank Beacham's column in the Aug. 30 issue, if the network affiliate relationship is so obsolete, why do local affiliates still command the share of viewing they do? The network-affiliate relationship, even with a drastic change in the economic structure between the two, is still a most vibrant entity, with the combination being greater than then the sum of the parts.

Frank writes: "Premimum national programming has moved to multichannel subscription services." Wait a minute, when did CBS run "The Sopranos?" That programming was given a home by the wise folks at HBO since no local broadcaster and/or free radiating network could broadcast it due to the content rules and community standards that we subscribe to via the FCC. That argument seems duplicitous at best.

Thinking you can save free over the air TV broadcasting by allowing no cross ownership, groups, etc. and having standalone local programming television stations, free of syndicated or national programs will not happen. There is not an economic model that would support such an entity, otherwise it would already be in place. The things that come closest are public television and public access stations on cable. Does Mr. Beacham really think any given local marketplace could support more than "local-only" stations when in many communities the public station is having a difficult time making ends meet even as they are subsidized nationally?

Those stations that continue to have a commitment to localism continue to be the ones that are typically the market leader because the marketplace is savvy enough to figure that out.

There has to be some common ground and common sense in the ownership issues that nobody can seem to find. But eliminating ownership of more than a single station is simply a ridiculous idea, one not worthy of print.

This column is only slightly more off base then Mr. Beacham's take on digital copyright laws. If he really is serious about taking on the ills in broadcasting on the basis of empowering people why not take on the cable and satellite industries and their practice of bundling services? I for one really don't care to watch the Home and Garden Channel, but I have to pay for it every month even though I have never laid an eyeball on their programming. No offense to their product—I'm sure a lot of people are interested in it and find it fascinating. Well let those fascinated pay the entire freight for it. Why am I forced to subsidize networks and software providers and creators in which I have no interest? It would be interesting to see how many of those networks would survive and flourish. And don't tell me it's not technically possible to deliver a customized channel line-up to end user of cable or satellite system. There are just as many pay-per-view options as "regular" network options on many systems and those systems can discern what the viewer has access to and what that viewer is not allowed to watch. The amount of money spent by cable and satellite consumers on "unwatched television" has to be staggering and probably could put a dent in the national debt.

The difference between radical thinking in the make believe world and fresh thinking in the real world is sometimes a fine line.

Respectfully,
Mike Bell, Program Director
WDBJ
Roanoke, Va

Frank Beacham Responds:

The future of the network-affiliate relationship has been in question for some years and debated at many industry conferences. Most network executives have long desired additional revenue streams beyond commercial advertising for their programming. There is no secret that many find the current terrestrial broadcasting business model inadequate in a multichannel universe. Of course, there is a healthy difference of opinion over how to resolve the issues between networks and affiliates. Openly questioning its future viability—as well as that of over-the-air broadcasting as a whole—is not a diversion from reality. It's the job of a columnist that examines and comments on the industry.

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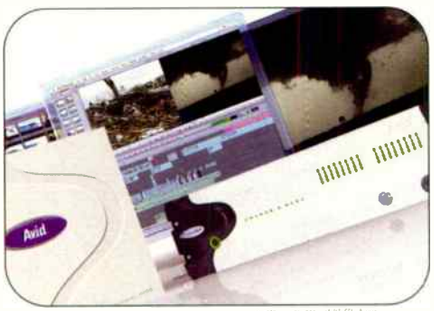

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Football Gets Dolby 5.1 Treatment

SAN FRANCISCO

Football fans will clearly hear the cheers this fall, with networks adding more games in Dolby Digital 5.1 Surround Sound. ABC has decided to do Monday Night Football in Dolby 5.1, along with several regular- and post-

season Sunday games and college games. ABC has been broadcasting the majority of its prime-time programming, including its legal drama, "The Practice," in Dolby Digital 5.1 since November 2001.

Fox has also pumped up its number of Dolby 5.1 football telecasts. Fox first broadcast in Dolby 5.1 in 1998 with the network premiere of "Independence Day." The network did "Super Bowl XXXVI" in the format, adding regular NFL games and NASCAR events last season.

"Fox has made a commitment to broadcast all its Fox Widescreen sports presentations in Dolby Digital 5.1, as we believe that the purest digital audio enriches the viewing experience by making viewers feel like they are at the game," said Andy Setos, president of engineering for the Fox Group.

Audio

Cablevision Claims HDVOD First

BETHPAGE, N.Y.

Cablevision became the first MSO to launch high-definition video-on-demand in early September. Cablevision's digital subscribers who have HD sets *and* HD-capable set-top boxes will be able to access the service at $6.95 per film. The introductory slate included "About Schmidt," "Final Destination 2" and "The Real Cancun," plus two IMAX films, with two more per each ensuing month according to an agreement with El Segundo,Calif.-based K2 Communications, an executive producer of large-format films.

Cablevision began offering HD set-top boxes earlier this year, at the same cost as the standard set-top box rental fee—$2.95 per month, plus 29 cents for the remote. Cablevision's current non-VOD, high-definition content consists of HBO, Showtime, Fox Sports Net New York and Cablevision's own MSG Network—all premium-priced add-ons with a basic subscription. Cablevision counted 600,000 digital customers as of June 30.

HDVOD

BellSouth Bundles DBS

ATLANTA, EL SEGUNDO, CALIF.

BellSouth is still determined to break into television in a big way. The Atlanta-based phone giant struck a strategic marketing alliance with DirecTV to round out its bundled offer with video programming service. Starting in early 2004, BellSouth residential customers will be able to order DSL or dial-up Internet access, local and long distance telephone service (with the usual bells and whistles), cellular and DBS all in one package—BellSouth Answers—at a discount off the combined component prices. BellSouth will do the marketing, selling and scheduling; DirecTV will install the dishes, and BellSouth will send the bill. Both will handle customer service.

The two companies said they would immediately start working on the "integration of digital satellite and DSL technology," that is, sending the programming out over BellSouth's high-speed lines. The company now has 1.1 million DSL subscribers. It also delivers digital television programming to 60,000 homes via fiber, which is too cost-prohibitive for full-market saturation. BellSouth has 45 million customers in nine U.S. states and 14 counties.

BellSouth's television legacy includes a four-year experiment with the wireless service, Americast. Over-the-air reception interference doomed the service, and BellSouth's subsequent efforts to launch and maintain a satellite proved too expensive. BellSouth abandoned its wireless TV operation in May 2001, turning its 80,000 customers over to EchoStar's Dish Network.

DBS

OWNERSHIP DEBATE ESCALATES

As summer came to a close, opposition to the FCC's revised media ownership rules intensified. A week before the Senate was expected to vote on a resolution to overturn the rules in their entirety, the 3rd U.S. Court of Appeals in Philadelphia stayed them. The stay was issued just hours before the rules would have gone into effect Sept. 4, allowing a single company to reach 45 percent of the national TV audience, among other things. Immediately following the Court's decision, the Senate Appropriations Committee voted in favor of a House measure that would hold the national audience-reach cap at 35 percent. Also, two leading consumer groups filed a petition with the FCC to abandon the rulemaking, and declared the stay a victory, even though the three-judge panel simply wanted more time to fact-find.

Photo: Bob Xovacs

FCC Chairman Michael Powell

"The Court would not have taken such extreme action unless highly suspicious of the FCC's rationale for relaxing media ownership rules," said Washington Consumer Union Director Gene Kimmelman in a statement.

The rationale, FCC Chairman Michael Powell has repeatedly stated, is that the D.C. Court of Appeals struck down the 35-percent cap two years ago. Back then, it was lawyers for Fox, which owns stations reaching 39 percent of the national market, who convinced the D.C. judges that the ownership cap was not "necessary in the public interest." The judges directed the FCC to either prove that it was, or change the rules. When the commissioners went back to the drawing board, they were bombarded with letters objecting to easing ownership limits. However, the agency determined that none its ownership studies proved conclusively that the 35-percent cap served the public.

Following the Senate committee vote, Rep. Billy Tauzin (R-La.) continued to support a threatened presidential veto of any repeal of the new FCC rules. Tauzin's camp was bolstered by conservative pollster Frank Luntz, who plastered Capitol Hill with a survey that suggested most Americans don't give a hoot about media ownership regulations. Of the 700 people Luntz questioned, only 11 percent said network ownership of their local station would be a "bad" thing. Ownership rules, Luntz concluded, "fall squarely on the opposite side of public opinion." However, Luntz's findings directly conflict with the thousands of public comments filed with the FCC that are overwhelmingly against lifting the 35-percent cap.

The FCC, meanwhile, did not back down.

"While we are disappointed by the decision by the court to stay the new rules, we will continue to vigorously defend them and look forward to a decision by the court on the merits," said an FCC spokesman.

The revised rules also have drawn fire from large broadcasters, who want ownership caps eliminated altogether. CBS, NBC and Fox filed a motion with the Philadelphia court to have the hearings returned to the deregulatory-leaning D.C. Court. The FCC also favors returning to the D.C. Court, where Michael Powell and FCC Media Bureau Chief Ken Ferree served as law clerks under Harry T. Edwards, a judge on the panel that ordered the FCC to do the revision.

Federal Frequency

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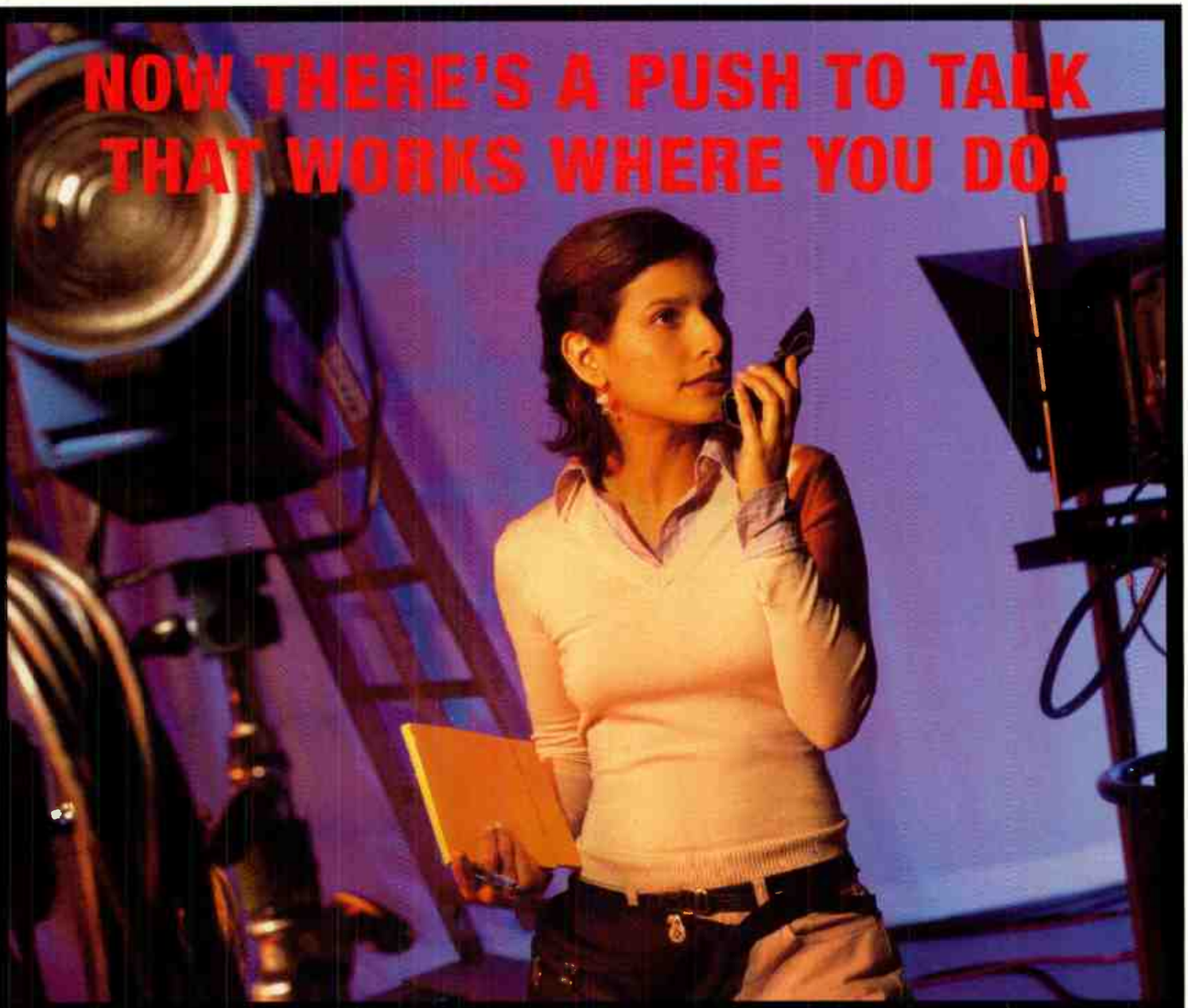

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New Nielsen Count Issued

NEW YORK

The total number of television households in the United States increased by 1.7 million in the last year, according to Nielsen Media Research. Ratings for the 2003-2004 season will be based on 108.4 million households, compared to 106.7 million in the previous television season. One Nielsen rating point represents one percent of the total number of households. The new count took effect Sept. 1, the beginning of television's fall season.

A breakdown of demographics reflected the increasing age of the U.S. population, with the number of children 2-11 in TV households falling by about 1.3 million over the last two seasons. The 12-17 set diminished by a more modest 140,000, while men and women over the age of 18 growing by about 5.3 million over the last two seasons.

Nielsen Count

Battle of the DVRs

NEW YORK, SAN JOSE, CALIF., LITTLETON, CO.

The nation's two satellite operators have launched into a full-court DVR press for the holiday season. DirecTV added about 65 hours of capacity with its latest DVR offering, just in time for its NFL Sunday Ticket season. DirecTV's new TiVo-enabled, 120 GB DVR from Samsung holds up to 100 hours of programming, (previous models held 35 hours), has two USB expansion ports and optical Dolby Digital output.

Although DirecTV is testing a lease option in six markets, suggested retail for the new beefy box is $499, which EchoStar is using to its own advantage. The Dish camp unveiled a satellite receiver with built-in DVR capacity—the 120 GB DVR510—for the suggested retail price of nothing. Dish is giving away the DVR510, along with satellite dish, remote and installation, through Jan. 31, 2004, in a bid to take a bite out of DirecTV's and TiVo's DVR market share. TiVo has about 793,000 total subscribers; roughly half of them through DirecTV.

"We don't have to pay a middleman, like TiVo for DirecTV," said Dish spokesman Marc Lumpkin. "So we can give it away for free."

Free, that is, with a one-year commitment on programming packages that run between $21.99 and $24.99 a month, or $240 for downgrading or canceling the service.

"It's like anything else," said Scott Sutherland of TiVo. "Nobody gives anything away."

The DBS operators lit the fire under their DVR campaigns following TiVo's Q2 report that it added 90,000 subscribers in the quarter, compared to half that many the previous year. Sutherland said DirecTV essentially tripled TiVo's sub growth over the last year. Including stand-alone units, TiVo is on track to surpass sales of 1 million subscriptions by year's end, he said.

Dish doesn't divulge its DVR subscriber count, other than to say it reached 500,000 in April 2002, and that it has "more than the competition," Lumpkin said.

Par for the course, both DBS operators have one eye on each other and one on cable operators, who are just now in the DVR testing stage.

DVRs

DTV Cards Advance

BERLIN, FREMONT, CALIF.

Tuner cards are making headway in DTV on both sides of the big blue, with the introduction of a Linux-compatible HD card in the United States and a mobile terrestrial DTV receiver card released for the European market.

With the introduction of the new HD-2000, Utah-based pcHDTV brings over-the-air HDTV to the Linux community for less than $200. Using chips from Conexant and Oren Semiconducter, the card receives NTSC and ATSC signals and converts them to digital streams that are then transported across the PCI bus. Display and MPEG2 decoding are done on the host computer, using Xine, the open-source multimedia software shipped with the card. System requirements include a 1,200Mhz or more Pentium processor and at least 256 MB of RAM. Up to four cards can be combined in beefier systems for recording and displaying multiple programs. The limited-release, $189.89 HD-2000, which is not Microsoft-compatible, started shipping Aug. 19.

Meanwhile, on the mobile reception front, SCM Microsystems of Berlin and Fremont, Calif., has rolled out the first PCMCIA card for mobile terrestrial DTV reception. The Mobile Terrestrial Receiver made its debut at Internationale Funkausstellung (IFA) in Berlin last month to position it for the German television market. Currently, digital terrestrial broadcast TV (DVB-T) is available in and around Berlin and in some areas of the U.K. and Scandinavia. SCM anticipates complete DVB-T saturation of Germany by 2006. The cards, which are also designed to pick up wireless Internet service, will hit the market in the first quarter of 2004. SCM aligned with German public TV broadcaster ZDF T-Systems, which insured content compatibility.

Tuner Cards

Edgeworx Posts HD Promo

NEW YORK

Edgeworx, a New York-based post-production boutique, helped USA Network create a 30-second HD trailer for its new series, "Peacemakers." USA chose to push its original hour-long drama on big screens to ride the summer wave of action movies, and to achieve national exposure. Edgeworx was charged with combining diverse materials into flowing video.

"With the 'Peacemakers,' theatrical trailer, USA Network wanted us to seamlessly mix blue-screen footage delivered in 35mm, stock footage delivered in 24P HD, and graphics without sacrificing the resolution achieved by shooting film," said Jason Stoff, Edgeworx producer and technical advisor.

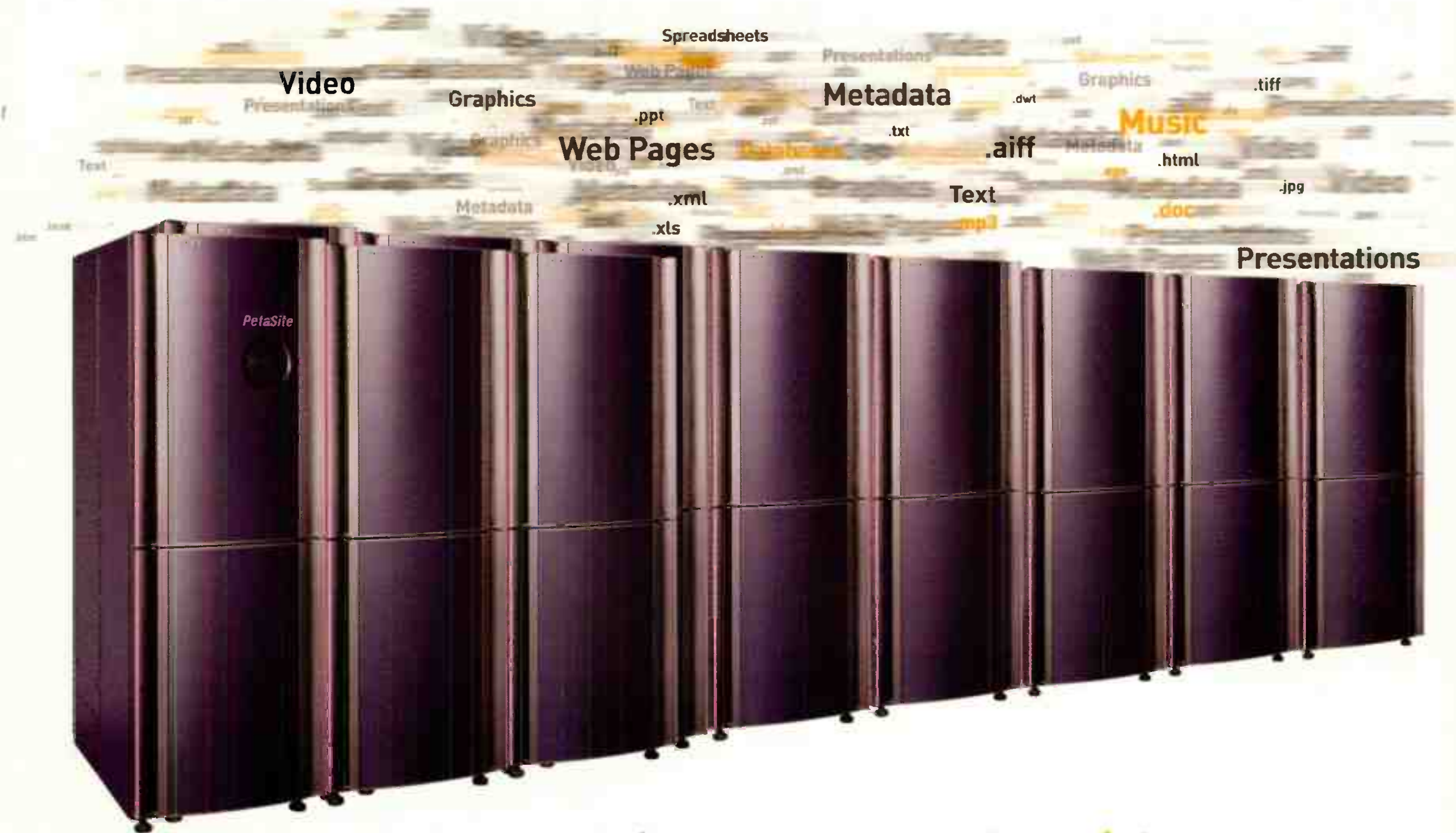
The piece was posted entirely in high definition, output for 35mm and also prepared for digital projection. Using IT capabilities, Edgeworx was able to screen the piece for USA in HD before having it committed to film. Edgeworx also coordinated telecine, compositing and audio elements for the final digital product, which was output as a 24fps-sequence and converted to film by Heavy Light Digital.

"Using their proprietary software and film recorder set-up, Heavy Light was able to deliver 35mm negative and prints within a 24-hour timetable," Stoff said.

"Peacemakers," starring Tom Berenger as a 19th century frontier Federal Marshall confronting new investigative technologies, premiered on USA July 30.

Post

SONY



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NYC Broadcasters Nest at 'New' ESB

Venerable NYC landmark to house antennas until WTC replacement is built

by Art Daudelin

NEW YORK

After the confusion of the post-9/11 era, there came a moment of clarity for New York City's broadcasters on May 27 this year, and a call to action for a veritable Manhattan landmark.

At that time, the Metropolitan Television Alliance (MTVA), a group of 11 area-based television stations (including WCBS, WNBC, WNYW, WABC, WWOR, WPIX, WNET, WPXN, among others) and Larry A. Silverstein, the leaseholder and developer of the former WTC site, had agreed to cooperate in the construction of a broadcast mast at the top of the Freedom Tower, at the site of the former World Trade Center. The tower, slated for completion around 2008-09 and rising to a patriotic 1,776 feet, will welcome a minimum of 22 television antennas appearing as a single structure on a restored NYC skyline.

"The more rapid-than-expected redevelopment of the World Trade Center site and the likelihood that the Freedom Tower will be finished at that time gives us the opportunity to develop a first-class digital broadcast facility on the site," says MTVA president Ed Grebow.

EGGS IN ONE BASKET

That announcement officially ended both the planning and speculation regarding the proposed 2,000-foot tall broadcast tower in Bayonne, much like an earlier and similarly vetoed venture on Governor's Island. The $200 million Bayonne Tower, which would have been the world's tallest free-standing structure, was bypassed at least in part as a result of objections by a division of the FAA responsible for takeoffs and landings in area airports.

When WNBC, the sole member of the MTVA not utilizing the Empire State Building (ESB) since 9/11, migrated back to Manhattan from the Alpine, N.J. site, all 11 stations in the alliance had returned to King Kong's favorite skyscraper. Leases for transmission and antenna space were signed, and sighs of disappointment were heard across the Hudson. "The Empire State Building is our primary facility right now, and (stations) have signed on to stay there until the Freedom Tower is built," Grebow said.

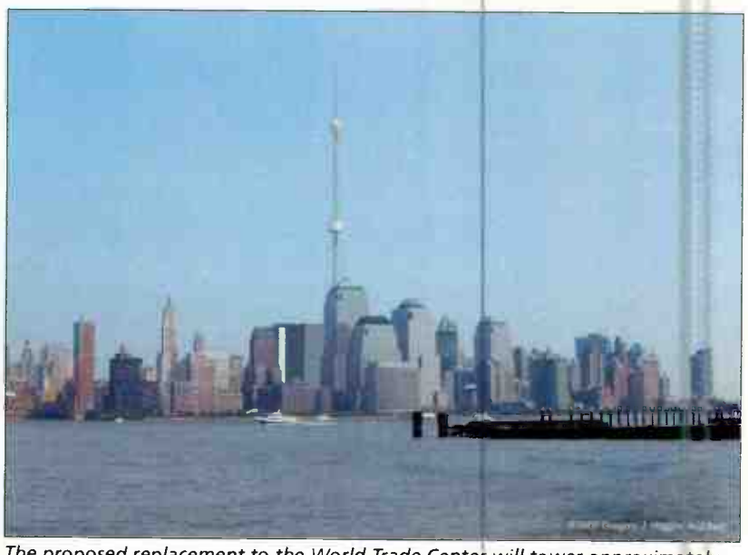
For its part, the ESB welcomes the return to its glory days. "We feel we're recapturing our heyday as the hub of New York City broadcasting," states Hani Salama, director of operations for the Empire State Building Company, (managed by Helmsley-Spears, Inc.) and an active part of the building's upgrade-related work.

The announcement served to intensify efforts at the Empire State Building—efforts that can originally be traced to the first days after 9/11—to render the 72 year-old landmark, and the city's RF transmission center in pre-WTC days, a fully capable site for area broadcasters before, during, and after the new tower debuts on the skyline.

Ensuring that both facilities are fully functional transmission sites will serve to ensure that the dead air that crackled on antenna-based televisions around the metropolitan area during the 9/11 days will not happen again. A desire to avoid a recurrence of the situation, regardless of reason, has given broadcasters some caution about an "eggs-in-one-basket" approach.

"They've made a post 9/11 decision that they won't find themselves in that situation again," said an unnamed source. "But the freedom tower will have much better coverage (than the ESB) because of its height," adds Grebow.

But the workload for the venerable edifice, which currently houses over 1,000 businesses and has its own zip code, is somewhat more demanding than when it surrendered its mantle 30 years ago. According to Alton Stalker, managing director of Darien, Conn.-based Alton Stalker and Associates LLC, and chief technical officer for the MTVA, there was no master plan developed beforehand, other than the broad goal of doing the work needed to enable the MTVA members to successfully run both their digital and analog operations.



The proposed replacement to the World Trade Center will tower approximately 1,776 feet over the Manhattan skyline.

"A series of decisions was taken on what was needed, after the member stations firmed up their permanent locations in the building, their equipment needs, and after it was determined what common work was needed in the building to support those needs," he says.

TRANSMISSION DEMANDS

With a dozen residents (WNYE, a non-alliance member, is a long-standing resident) significant portions of the building's infrastructure had to be increased to accommodate them and find physical transmitter space for the flock of tenants. Communications floors were extended an extra three floors, but that was only the beginning, says Stalker.

"We had to understand everyone's transmission and conduit line requirements for their transmitter operations, and that there was sufficient shaftway space available for everything to get where it needed to go," he explains.

Salama concurs on the issues of bringing a Depression-era building into the third millennium. "We're reinforcing large parts of a 1931 building to accommodate the additional facilities. Of course, it wasn't originally constructed with the forethought that there would have to be capacity for all these additional services and transmission lines."

Working with several structural engineering firms, including Gilsanz Murray Steficek, LLP, the process was lengthy, says Stalker, but paid dividends. "There were a couple of disused and abandoned air ducts, from when they

EMPIRE, PAGE 23

Letters

CONTINUED FROM PAGE 4

I disagree that my commentary is from "a make believe world." Even FCC chairman Michael Powell, in the May 2, 2001 issue of TV Technology, questioned the future viability of terrestrial broadcasting in an era when more than 80 percent of households depend on cable or satellite for their television.

I attempt to use the space I'm granted in this publication to honestly explore and challenge readers on the issues involving television technology in the real world. I suggest that you turn to the NAB if you are seeking to hear arguments that are designed to bolster broadcasting's status quo.

One can easily argue that many terrestrial broadcasters haven't done the necessary soul searching to determine where they fit in a multichannel, digital world. One thing is certain, however. Antennas are no longer needed to transmit national programming to the homes of viewers. The majority of Americans now get their entertainment elsewhere. That leaves local broadcasters to determine and create their own future. If over-the-air broadcasters ignore the changes being brought on by the shift to digital technology, it will be at their peril.

I agree with Mr. Bell's statement that "those stations that continue to have a commitment to localism continue to be the ones that are typically the market leader because the market place is savvy enough to figure that out." In fact, that's the very essence of my August 30 column that he so criticizes. I don't see how more concentrated ownership helps achieve more localism. The opposite has been the case in radio.

Mr. Bell also seems to be arguing that cable be forced to sell its programming a la carte. Many cable customers agree with him and this issue will find its way before Congress, probably this year. But how he associates my past columns on digital copyright protection with the unbundling of cable programming baffles me.

Frank Beacham
New York City

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Panasonic's Answer to Tapeless Trend

Memory card technology puts company on collision course with Sony's optical disc

by Craig Johnston

SECAUCUS, N.J.

Last April's NAB saw Panasonic introduce a professional DVCPRO 25/50 camcorder concept so secret that it wasn't mentioned publicly until the day before the exhibition began.

What made the camcorder so revolutionary was its recording media: solid-state memory. The credit card-sized PCMCIA memory cards package four consumer SD memory chips ganged in an array. Such a card utilizing the soon-to-be-introduced 1 GB SD chips will hold nearly 20 minutes of DVCPRO video material.

By contrast, other camcorder makers at NAB were introducing rewritable optical-disc or hard-drive-based camcorders. But in Panasonic's opinion, optical-disc capabilities come up short for field video acquisition.

"The best optical-disc format that we saw about to become available was the so-called 'blue ray' format, and that has a transfer rate of about 30 Mbps," said Stuart English, who wears two hats as Vice President of Engineering and Product Development and Vice President of Marketing for Panasonic Broadcast and Television Systems.

Panasonic had made a name for its DVCPRO format by allowing customers to use the same tape media for two levels of standard-definition as well as high-definition camcorders. Blue ray optical disc's 30 Mbps data transfer would handle DVCPRO's 25 Mbps transfer rate, and using two separate laser pickups would allow such a system to handle DVCPRO 50's 50 Mbps. But what about DVCPRO HD, which requires a 100 Mbps transfer rate?"

Those optical-disc limitations led the company to look to solid-state memory. The new generation 1 GB SD chips, becoming available the first of next year, will yield a maximum transfer rate of 130 Mbps, "so it's fast enough to do DVCPRO HD on a single chip," said English. "But we've found if we put four of them together into an array, that the capacity not only goes up by a factor of four, but the transfer rate goes up by a factor of four.

"On a single (PCMCIA) card...we have 4 GB of storage and up to 640 Mbps transfer rate."

That data transfer performance not only handles Panasonic's DVCPRO-HD, but has speed headroom for other formats as well.

"If we wanted to keep going, we could record D-5 HD high-definition," said English. "And if we wanted keep going we could potentially record some other high bit-rate recording format on exactly the same media. We don't have to keep re-inventing physical media formats like we would have to with tape or disc."

A 640 Mbps data transfer rate also means the potential to upload DVCPRO material at more than 20 times real-time speed, though the slowest link in the transfer chain (PCMCIA protocol, disc drive, operating system) will determine the actual speed. Still, moving material off solid-state memory media will be considerably quicker than real time.

This uploading speed becomes more important as stations migrate to centralized edit servers that require field-media to be ingested to hard drives before editing begins. "We believe to really leverage the true benefits, the IT model is where we get the most 'bang-for-the-buck,'" said English.

Panasonic says it will be ready to deliver the first memory card camcorder for the broadcast market by next spring.

The credit-card sized memory cards will initially retail for more than $100.

The new generation 1 GB SD chips, becoming available the first of next year, will yield a maximum transfer rate of 130 Mbps.

RUGGEDNESS

While data transfer speed is one of the principal advantages Panasonic has identified in solid-state memory media over optical-disc technology, ruggedness is another. Camcorders in the field can face a hostile environment.

"Being out there in sleet, snow and dust, the reality is that mechanical transports take a hammering," said English. "One of the fundamental advantages of a solid-state media camera is there isn't a transport, so there really isn't anything for dust to affect, or rain to affect, or humidity to affect.

"The other aspect is that without a transport, we have the opportunity to reduce the physical size of the camera as well, because we're not constrained by the need for a certain amount of physical space for tape or disc transport. We have the opportunity to start to reshape the shape or size of the camcorder."

(The prototype shown at NAB was a standard camcorder size.)

When other camera makers at NAB were asked about Panasonic's solid-state memory camcorder initiative, one of the first issues they raised was cost of media. The new 1 GB SD chips will retail for more than $100 each when they appear on the market, and Panasonic has pegged the array of four on a PCMCIA card at a cost of several hundred dollars.

So what about that cost-of-media objection?

"That's an interesting argument," said English. "It's fundamentally misdirected because it makes a massive presumption, which is that the media is like traditional media and that the media gets consumed; it really doesn't.

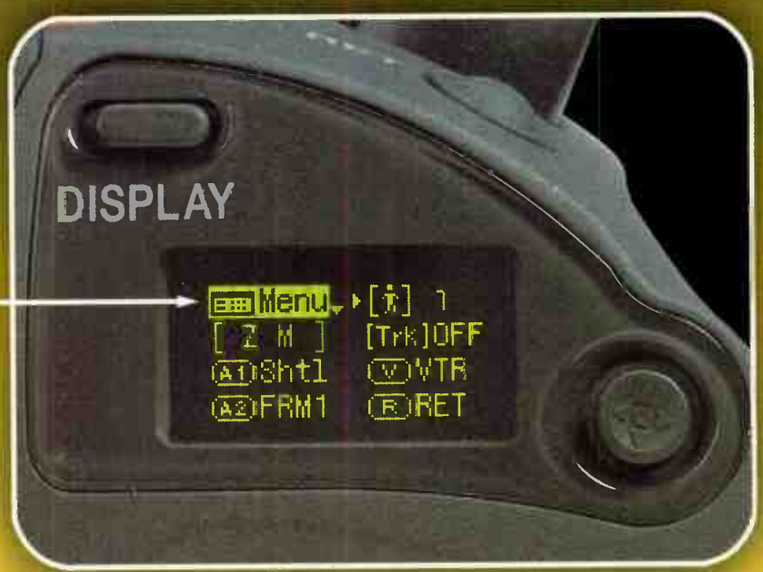
PANASONIC, PAGE 18

Canon's new 'e' lens brings 'e'nhancement to a new level.

From its enhanced features to its environmental design, Canon's new J22ex7.6B IRSD/IASD lens is engineered to impress. The widest angle portable telephoto lens ever produced, the J22ex7.6B is the first in a series of Canon e-IFxs and e-HDxs broadcast lenses. These lenses feature enhanced digital technology, which improves on the performance of the highly useful Digital Drive tools and are manufactured with non-polluting components including lead-free glass, minimizing environmental impact.

Enhanced Features
Environmental Design

J22ex7.6B
First in a series of e-IFxs and e-HDxs lenses



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The Key to Better TV Sports

How virtual graphics technology enhances the game viewing experience

by Claudia Kienzle

NEW YORK

Over the last five years, the look of live sports telecasts has changed dramatically due to live sports graphics production tools. Because this cutting edge technology enables real-time graphics to appear on the playing field, viewers at home are better able to appreciate the progress and challenges of a particular sports event.

There's also a complementary technology, known as Virtual Advertising, where ads, such as signs, banners, and Virtual Jumbotrons, are inserted into the playing field so seamlessly that viewers believe they are really there. In the age of TiVo, where TV viewers can easily skip over commercial breaks, virtual advertising is a very promising way to promote products within the on-air presentation. So statistic-hungry sports fans benefit from useful, timely illustrations and informative displays, such as distances traveled, speeds, lines of scrimmage, and identification of the competitors—well beyond just having the score and clock and advertisers have an innovative, new avenue for marketing products to the coveted television sports audience, and broadcasters have a new source of advertising revenue.

Until now, the one of the leading providers of these systems has been Sportvision, Inc., headquartered in Chicago with offices in New York and Mountain View, Calif. With products considered the de facto standard in live sports graphics production tools, Sportvision's client list includes ABC, ESPN, NBC, Fox Sports Net and Fox, among other broadcast networks. Besides its relationships with the National Football League (NFL), National Hockey League (NHL), Major League Baseball, and other professional sports organizations, Sportvision has expanded its portfolio of live, real-time graphics production systems to enhance the TV viewing of football, ice hockey, baseball, NASCAR, golf, among other sports.

Orad's Cyberset technology allows broadcasters to combine up to four different video sources; the Jumbotron image of former President Bill Clinton is a different feed received from another camera inserted in realtime to the main feed.

When graphics effects like the 1st and Ten are well-executed, TV viewers can almost believe that the yellow line is really there on the field.

Although Sportvision has owned this market domestically, Orad Hi-Tec Systems, based in Israel with a U.S. office in New York, has begun to compete for market share in this sector with its own line of sophisticated live sports graphics production and virtual advertising solutions. While the company has made a name for itself in virtual sets and 2D/3D on-air graphics systems, its sports production tools have enjoyed success mainly in Europe, Latin America, and Asia. But Orad is targeting U.S. broadcasters' business by focusing on the cost-efficiency and ease of use of its solutions.

GO FOR THE GOAL

One of the most successful implementations of sports production technology has been the virtual "1st and Ten" line—the 3D yellow line that appears magically on the grass to illustrate where players are in relation to this strategic play. This Emmy-winning 1st and Ten line technology, which was invented by Sportvision will be featured on all ESPN and ESPN2 NFL and NCAA college football telecasts in 2003. With this August 2003 announcement, Sportvision says the popular yellow line will be used on more than 160 televised NFL and NCAA football games on ESPN and ESPN2.

"It is tremendous that ESPN shares our commitment to maximizing the experience for sports fans who tune in to the network," says Hank Adams, CEO of Sportvision. "We are excited that ESPN continues to stand behind our technologies and by expanding our business relationship, allows every football fan tuned to an ESPN or ESPN2 telecast to enjoy the Yellow Line."

Sportvision also nabbed some ESPN business from Princeton Video Image (PVI), a competitor in the live sports graphics production arena, which recently filed for bankruptcy following de-listing by the Nasdaq. (While Lawrenceville, NJ-based PVI is struggling, it has retained one of its key customers, CBS Sports.)

As a result of this ESPN coup, Sportvision is now providing Behind-the-Batter Virtual Billboards for ESPN's "Sunday Night Baseball." This ESPN program has already been using Sportvision's K-Zone—the virtual strike zone that is inserted into broadcast video to accurately outline the strike zone boundaries while highlighting the position of the ball as it crosses the plate. But, as of March 2003, ESPN began presenting this technology in High Definition Television (HDTV).

While Orad has just introduced a

GRAPHICS, PAGE 24

ADDER 162 and 882i

The heart and soul of any live set, the Adder 162 carries 32 mic/line audio, 6 intercom/IFB, and 4 duplex data and closures, all on one fiber conductor. Supports data for stats and scoring, courtesy audio feeds to the booth and commentator feeds to the truck. Further expand your capacity with the Adder 882i, which carries 10 intercom/IFB, 8 data and 4 closure signals in both directions.

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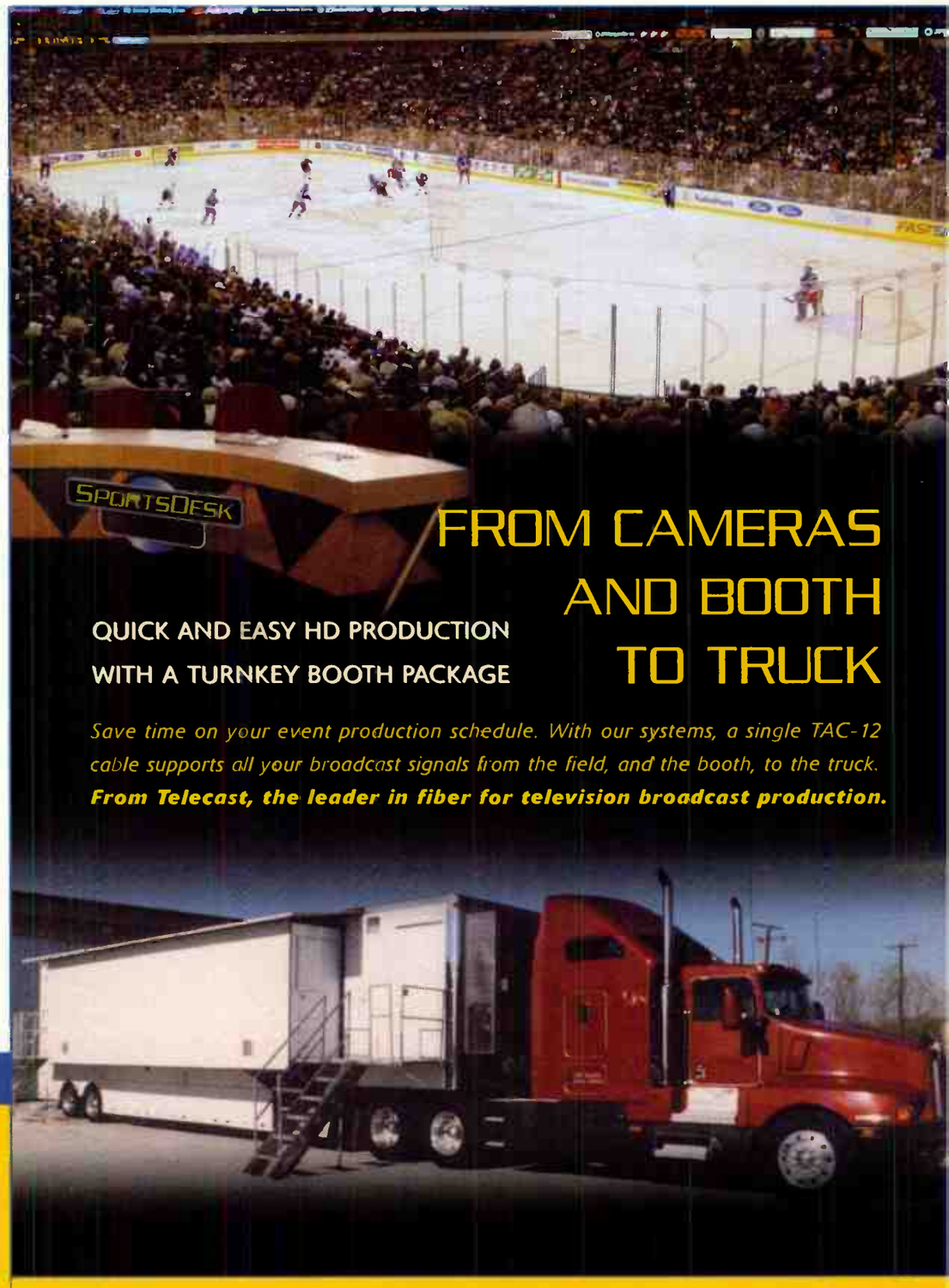

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ATTC Closing Marks End of An Era

DTV's birthplace shuts down after 16 years of technology innovations

by James Snyder

ALEXANDRIA, VA.

Sept. 30, 2003 will witness the end of an important chapter in the history of television. On that day, the Advanced Television Technology Center (ATTC) will close and the only independent, nonpartisan testing facility in the U.S. television industry will be gone. Many do not know its name, but virtually every single person in both the television and radio industries is affected by its activities in some way.

"Everybody was very competitive," said Peter Fannon, the first executive director of the Center. "It was a unique and special place."For those unfamiliar with the ATTC, it was the facility where the current ATSC digital television standard for the United States was developed from several previously tested systems. The lab created and tested many of the compliance benchmarks for the ATSC standard once digital television broadcasting began. It also tested much of the new IBOC (in-band, on-channel) digital radio standard from iBiquity, recently adopted by the FCC.

The need for a testing facility arose in the early 1980s, when demonstrations of the NHK 1125-line high-definition system showed that video quality beyond NTSC and PAL was not only possible, but quickly becoming reality. Other technological currents of the time were also giving birth to direct broadcast satellite service, wide distribution of cable television signals, and the increase of computer technologies in consumer and broadcast electronic devices. It was apparent to many in the industry that broadcast television could end up offering the public the lowest picture quality, audio quality and advanced features enabled by digital coding and software design. Clearly, a more advanced television system would be required if broadcast television was to survive.

Photo: Charles W. Rhodes

ATTC president Peter Fannon explained to visiting television industry executives the testing process used by the test center.

Two distinct ATTCs existed: the Advanced Television Test Center from 1988 to 1996, and the Advanced Television Technology Center from 1996 to 2003. Both facilities were located in Alexandria, Va., in the same building that housed PBS's headquarters in the Washington, D.C. area.

BIRTH OF A TECHNOLOGY

The ATTC began its life as the Advanced Television Test Center, created in 1987 by a group of forward-thinking broadcasters to serve as an independent testing facility for what had been dubbed the "advanced television" process. Although a number of labs gave birth to the analog television industry, such as the old RCA Labs in Princeton, N.J., the CBS Labs in Stamford, Conn., and the Hazeltine Labs in Long Island, N.Y., when the possibility of replacing the U.S. analog NTSC system was grasped in the 1980s, there was no one facility that could test and verify equipment and systems. The first ATTC served as that testing ground.

Maximum Service Television (MSTV) and the NAB were the driving forces behind creating the center. The process started with the creation of the Advisory Committee on Advanced Television Service (ACATS), the industry-sponsored committee whose sole purpose was to supervise the development of advanced television for the FCC. The next step required an independent laboratory to test proposed systems.

"Build it and they will come," was the catchphrase of the founders. Charlie Rhodes, the chief scientist, (who also pens the monthly "Digital TV" column for TV Technology), was the first hire, followed shortly by Fannon, who became president. Other staff members were recruited from the business of broadcast. Most served until the work was completed.

Twenty-three systems were proposed to ACATS. After an extensive vetting process to separate fantasy from systems that could actually be built, six of them moved to the testing stage. All were analog, including NHK's 6 MHz version of MUSE, and Sarnoff Labs' Advanced Compatible Television (ACTV).

That all changed within a week of the June 15, 1990 deadline when General Instrument proposed the first all-digital system for testing. From that moment on, analog was out and digital was the future of television.

After the first tests were completed,

ATTC, PAGE 20

The lab created and tested many of the compliance benchmarks for the ATSC standard once digital television broadcasting began.

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Panasonic

CONTINUED FROM PAGE 12

"The very essence of this work flow is that the camera has its own media, and you record into it and record out of it. Then you just reutilize that media over and over again. So one of the things we're saying to broadcasters is that the media effectively is capitalized in the cost of the camera, and then you don't have a media budget."

English points out that the vast majority of television stations don't archive raw footage for more than a week, and that the raw material could be saved on a server for that period or longer.

He also notes that the absence of critical tolerance parts, such as lasers and scanners, means there's less to go wrong in a solid-state memory camcorder. That equates to real savings in a station's maintenance budget.

The fact that these transportless camcorders will consume considerably less power also means costs-savings in power supplies and batteries.

THE LAST CRUSADE?

When the new camcorder was introduced at NAB, this writer remembers thinking what a leap-of-faith Panasonic was taking, bypassing optical-disc technology. The image of Indiana Jones in the Last Crusade came to mind, where the central figure attempts to cross a chasm on an invisible bridge. Was it a gamble?

English said Panasonic had looked long and hard at optical-disc technology, but when the company weighed its customers' requirements with the capability of optical-disc media, it knew it had to go beyond.

"There was about to become on the horizon an approach that was so right that it didn't make much sense to go to what would have to be an intermediate step," said English. "I think if we were looking at a two- or three-year delay before solid-state memory was available, then maybe 'gamble' would be an appropriate word, but we think we've got the solution that the industry's looking for."

Panasonic's AJ-DE10 DVCPRO mobile nonlinear editor will accept the new memory cards.

Since NAB, Panasonic has sprinkled enough dust on Professor Jones' invisible bridge to allow the rest of us to see some of what the company sees. One point English emphasizes is how the memory-based camcorder fits a station's existing DVCPRO infrastructure.

"One of our fundamental choices was that we chose to use DVCPRO and DVCPRO 50 compression, and DVCPRO 100 compression," said English. "Fundamentally, the laptop systems, the nonlinear systems that are editing DVCPRO, are already compatible with this media."

The Panasonic AJ-DE10 DVCPRO Mobile Non-Linear Editor, introduced at NAB2003, can accept the PCMCIA memory card, so it's ready to edit the new camcorder's video directly now. What about other companies' editors? English said it's just a matter of adapters.

"Do you plug this into a modified drive bay, or do you have an external reader? Those are just physical implementations. But from a file point of view, the files are compatible with everybody's laptop editor right now."

It is well to remember the "Moore's Law" characteristics of the consumer SD cards on which Panasonic's new camcorder media is based. Thus far the capacity of the top-of-the-line SD cards has doubled every year with no increase in price. In two years, a single piece of Panasonic's solid-state media will hold nearly 80 minutes of DVCPRO material.

In fact, that's what the company is waiting for before introducing the HD version of the camcorder.

"We could bring a high-definition camcorder to market in first quarter of 2004; but it wouldn't have much recording time," said English. "(But) you kind of want to be at the four GB consumer chip before you have a camcorder system that is practical in the sense of record times."

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ATTC

CONTINUED FROM PAGE 16

it was clear that no single system was good enough to define the U.S. standard. While waiting to decide how to proceed, the ATTC tested two proposed modulation schemes, QAM and 8-VSB. After considerable negotiations with ACATS chairman and former FCC chairman Dick Wiley, the proponents agreed to merge their systems in 1993 into a best-of-the-best, dubbed the "*digital* HDTV Grand Alliance." The Grand Alliance chose Zenith's 8-VSB for its combined system, (a bake-off between VSB and QAM digital modulations.)

The Grand Alliance system arrived at the test center in April 1995. Testing lasted until August; the reports were completed and submitted by October. Having completed its work and submitted the final report, ACATS disbanded at the end of 1995. The FCC would approve the Grand Alliance system as the standard for the United States in December 1996.

Photo: Charles W. Rhodes

ATTC engineer Chris Knechter operates a Sony digital HDTV recorder.

In early 1996, the Advanced Television Test Center became the "Advanced Television Technology Center."

THE NEXT PHASE

Even with the selection process completed, it was clear to the ATTC's strongest supporters that a test lab was still needed to deal with the issues that would arise out of the transition to digital broadcasting. Though most of the original members of the center had left, PBS, ABC and CBS were determined to not squander the expertise gained from the ATTC. In early 1996, the Advanced Television Test Center became the "Advanced Television Technology Center." It's new mission was to serve as a laboratory for the digital TV transition and to test technologies beyond digital television.

In each case, the second ATTC did its job just as well as the first ATTC. First, an on-channel repeater system was built near Harper's Ferry, W.V. to bring in WETA-HD (the Washington, D.C.-area PBS station) signals to the terrain-challenged area. It was thought that squeezing all the extra digital channels into a smaller TV spectrum would require use of on-channel repeaters, if the technology could be used by the American DTV system.

Second, the ATTC developed a system to capture complete samples of actual RF spectrum, so receivers could be tested with real-time DTV spectrum, and the multipath challenges of using 8-VSB in real-world transmission would be revealed.

Third, an extensive series of tests of early and actual production DTV receivers allowed manufacturers to better understand the pros and cons of their designs. The addition of the RF capture system allowed for extremely accurate and completely reproducible tests across multiple receiver designs.

Finally, the ATTC designed an RF test bed for the digital radio initiative of USA Digital Radio, which would become the iBiquity digital radio standard adopted by the FCC in 2002.

Over the past year, it was apparent that there remained a need for a lab with the capabilities of the ATTC, but the economic downturn caused testing opportunities to dwindle. In addition, a decision by NAB and MSTV to support the development of a DTV test lab apart from the ATTC did not help its cause. By mid-2003, projects and funding weren't arriving quickly enough to keep the center open. The decision to close the ATTC was made and the dissolution began.

THE FINAL CURTAIN

The IBOC test bed was returned to iBiquity in Columbia, Md. The DTV RF test bed will be acquired by CBS and moved to New York; and the tape library and Sony HD machines may follow as well. The rest of the TOC equipment was purchased by a former ATTC employee, who is now a broadcast consultant. The Expert Viewing room is gone, and most of the files have either been discarded or prepared for storage. Sept. 30, 2003 will see the space returned to the building owners and the ATTC will pass forever into history.

As a former ATTC employee twice over, this writer personally experienced the intensity, challenge and occasional emotion of working hard under tough testing conditions. Everyone interviewed for this article expressed the same sentiment: It was a wonderful challenging professional experience with very talented people dealing with issues we all knew would affect the history of both our business and our personal lives.

It's impossible to acknowledge every person or group that participated in the two ATTC incarnations. The staffs were hard-working people who succeeded in the primary goal of both ATTCs—to provide the fairest, most impartial and balanced testing facility possible.

"It amazed me that the lab that was designed was flexible enough to test both analog and digital systems," said Joe Widoff, former ATTC vice president for finance and administration.

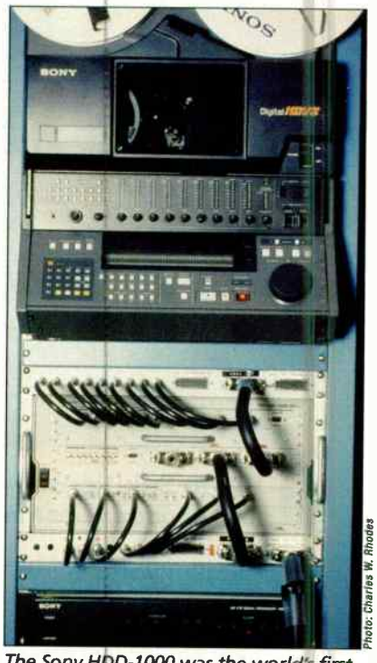

Photo: Charles W. Rhodes

The Sony HDD-1000 was the world's first digital HDTV video tape recorder and ATTC format converter and was used to digitally record all systems tested.

Although the ATTC may be gone, he work accomplished will live on.

James Snyder served in the first ATTC during Grand Alliance testing, and in the second during USA Digital Radio testing. He began his career in 1980 at a small public radio/television facility in Indiana, and now works for Intelsat in Washington, D.C.

SONY

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FIELD APPLICATIONS

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ATSC Moving Toward DVB Harmonization

Vote on standard to globalize interactive DTV could come by November

by Ken Freed

DENVER

American and European broadcasting standards specialist groups within the Advanced Television Systems Committee (ATSC) are working to "harmonize" the ATSC's DASE (DTV Applications Software Environment) standard with the OpenCable Applications Platform (OCAP), based on the middleware specification for Digital Video Broadcasting (DVB).

In separate standards development efforts, ATSC is moving toward the European model of single frequency networks, integral to the design for DVB terrestrial systems.

Recently, members of the ATSC Technology Group on Distribution (T3) discussed the combined "D-CAP" standard and agreed that the draft likely would not be ready for candidate status in time for T3's Sept. 10 "due process" meeting, but said it may be ready by the November T3 meeting.

"No decision was made in that group about D-CAP," said ATSC president Mark Richer, noting that an effort has been under way for a year and half to harmonize the DASE and OCAP standards.

GLOBAL INTERACTIVITY

The OCAP middleware standard for cable set-top boxes is based on the Multimedia Home Platform (MHP) middleware developed in Europe for DVB, the dominant digital television standard worldwide. When completed, D-CAP will allow compliant interactive TV content to be carried by both digital cable and digital terrestrial systems, including HDTV.

"Discussions are ongoing about various elements of the draft specification," Richer said. "We've made tremendous progress in developing a unified standard, and there is very strong support for it. We hope to see ballots going out this fall."

Among the elements still being discussed is D-CAP support for both declarative XTML content and procedural Java-based content for enhanced and interactive TV applications. Both formats are already present within DASE and OCAP, Richer said, but the question is what the consumer electronics manufacturers will support. "We cannot predict what the marketplace will do."

According to Glenn Adams, chair of the T3/S17 DTV Application Software Environment specialist group, "There are big differences between DVB, ATSC and American cable. For instance, OCAP and MHP and voluntary technical specifications, not legally required standards written into the law like ATSC."

Because D-CAP has to go through formal due process under the rules of ATSC, he said, the challenges often are more economic and political than technical, such as making sure that it's feasible or cost-effective to build set-top boxes or DTV receivers that can handle all the different kinds of content possible under D-CAP.

As a consequence, he added, the specifics of D-CAP development are kept private to give all the parties room to negotiate without being prematurely locked into public positions.

"Discussions sometimes can turn on a dime, so that's why I really can't go beyond saying that D-CAP likely will be approved within six months."

A REAL 'GEM'

"On the face of it," said Peter MacAvock, executive director, DVB Project Office in Europe, "ATSC's DASE and DVB's MHP are quite similar. Both are based on Java. Both have a presentation engine and both target broadly the same iTV market. While the technical details of D-CAP have yet to be resolved, there is no doubt that MHP will be the focal point of this harmonization."

To facilitate this process, he explained, the DVB office has worked closely with CableLabs to develop the first version of GEM (Globally Executible MHP), which includes OCAP.

"It is perfectly conceivable that future versions could include links to other standardization body's efforts, such as ATSC in the United States or ARIB in Japan," he said. "The ultimate aim of middleware platform harmonization is the interoperability of iTV content. Wouldn't it be great if a small content developer could produce content to GEM specifications, and be sure that it could run in Europe, North America and elsewhere?"

Another area of overlap between ATSC and DVB is development within the T3 group of standards for distributed single-frequency networks. European DVB broadcasters use this approach for distributing one television signal regionally and nationally. Richer said the focus within ATSC was creating the candidate standard CS/110A for synchronizing the transmitters within a distribution network (available as a PDF file download at *www.atsc.org*).

He noted that transmitter manufacturer Axcera already has implemented the candidate standard, and others like Harris have compliant transmitters in development.

"A prototype distributed network is now up and running in Pennsylvania," he said, "and we expect to be doing more on this in the future."

MacAvock observed that DVB-T transmission is based on COFDM modulation scheme, which was adopted in 1995 specifically "to facilitate the deployment of the spectrum saving concept of single-frequency networks deployed on national or regional levels. In-home repeaters are now on sale in Europe which boost the DVB-T signal to facilitate set-top antenna reception in areas where this might be difficult due to low signal strength. Singapore, Sweden and Spain operate wide-area, single-frequency networks very successfully."

COFDM was rejected in the U.S. by the FCC after a controversial field-test comparison with the single carrier modulation scheme, 8-VSB, mandated for ATSC.

As for using enhanced 8-VSB for single-frequency networks, MacAvock said, "With appropriate and costly measures, it is possible to install a type of on-channel repeater. However, a single carrier system such as 8-VSB was never designed for this type of operation, so it is questionable how technically viable such solutions will be."

Because D-CAP has to go through formal due process under the rules of ATSC, the challenges often are more economic and political than technical.

Empire

CONTINUED FROM PAGE 10

changed to an air-conditioned environment many years ago," he says. "We cleaned them out, made sure the walls were sound, and installed the mounting hardware and access doors necessary, and addressed fire and lighting issues."

Meeting the increased power demands also presented a mountain to climb. "There was nowhere near enough power in the building (to meet the upcoming demands)," explains Stalker, who nods to Lakhani & Jordan Engineers, P.C., which aided in the electrical consulting work. "We had to determine where the power was, and how much was needed," says Stalker. A power hunt ensued, hitting pay dirt at various switchboards on various floors, and in some cases, down into the concourse level at the bottom of the building, where Con Ed transformers also were located. "It also wasn't clear how much excess capacity there may have been on any particular switchboard until it was researched."

New circuits were installed throughout various parts of the building to the 84th floor. "Again, you're running conduits through a 1,250 foot building, so you've got guys with chairs and buckets hanging large amounts of conduit through a 60 year-old building that wasn't intended for these kinds of things to take place," Stalker says.

At this point, says Stalker, the installation of a sufficient power capacity is all but completed. "We can now accommodate all the broadcasters' analog and digital needs," he says.

Those power capabilities are additionally mandated by CBS' DTV antenna, in place for several years. "It's inherently a broadband, high-power antenna capable of accommodating a total of six DTV stations," says Stalker, referring to the six-party agreement currently in place to support those needs. "CBS has been very cooperative," he says. Again, power needs were considered. "You need to have a combiner room established, because you've then got a very high-powered, six-channel DTV combiner room, which is no small feat." With remaining channels already commanding their own DTV antennas, the bases are digitally covered, says Stalker.

But since channels 7 (WABC), 9 (WWOR), 11 (WPIX) and 13 (WNET) are also sharing an antenna aperture, the quartet are also going through combiner systems to get their antennas. "So there's a lot of detail involved," admits Stalker, pointing to additional issues such as administrative matters and contract costs as factors "that go along when you're sharing something like that."

As a result, physical, electrical, RF and communications issues have now been tackled, and remaining work is nearly completed, says Stalker. "We are hopefully getting to the point where equipment can be ordered and get moved here quickly now," he says.

MTVA also had to lobby the Empire State Company to address other structural aspects such as the $6 million project to install steel beams to reinforce the mooring mast and the 204-foot antenna. "They needed reinforcing to accommodate the increased antenna loads, which should be complete by the time the snow flies," says Stalker.

ESB personnel are likewise pleased with the progress. "The renovations we're doing will ensure that structurally, electrically, mechanically, all aspects of the building are ready to accommodate all the telecommunications tenants, both radio and television," says Salama, who points to the backup diesel generators many stations now carry on the ESB site as proof they've comfortably nested at the ESB. "Stations with the units already installed were off the air for only moments," says Salama.

Until the Freedom Tower is up and running, says Salama, the possibility of using the upcoming $25 million tower on the Durst Organization's Conde Nast building at 4 Times Square (expected to be complete in October) as a backup for the ESB is a good idea. "It's not what they're looking for (in terms of its 1,142 foot height) but it's better than Alpine until the Freedom Tower is up," he declares.

Graphics

CONTINUED FROM PAGE 14

competing product to 1st and Ten called CyberLine (at NAB 2003), to enhance televised American football, the company has had great success marketing its CyberSport live graphics production line, for such sports as soccer, track and field, and horse racing, abroad. Orad's soccer system can draw a 9-meter penalty circle around the ball before a free kick, illustrating the zone from which the opposing team is excluded. In addition, offside lines can be drawn onto a video sequence or a recorded video frame; and distances between two points and average speeds can also be instantly extracted.

Also, Orad's HorseTrack, which has been used by The Hong Kong Jockey Club, among others, is able to highlight horses, running order, and real-time stats, such as speed and distance to the finish line. This is accomplished by placing advanced, proprietary wireless transmitters onto the jockeys' helmets or to the horses to track their locations, and graphical simulations of the race can be displayed during the live telecast, or transmitted via the Internet or cellphones. For track and field events, Orad's CyberSport technology can be used to draw a virtual line onto the field showing an athlete's personal best or the current world record to beat.

VIRTUALLY REAL

When graphics effects like the 1st and Ten line are well-executed, TV viewers can almost believe that the yellow line is really there on the field. While the technology used by Sportvision is very powerful and complex, the yellow line is basically achieved by intensive computer processing of data from sensors placed on the cameras to detect pan, tilt, zoom, and focus movements, combined with a computerized 3D model of the field. The system can distinguish between subtle shades, like the green in the grass versus the green in player uniforms so the yellow line always stays fixed on the field and people running over it block it from view.

"By having powerful yet compact processing right at the venue, and by processing to one-sixtieth of a second, the yellow line performs better and the illusion is sustained regardless of how quickly the director changes between camera views, or the movement of the cameras," says Mike Jakob, COO for Sportvision.

However, last March 2003, Sportvision announced the availability of a version of 1st and Ten that allows broadcasters to do in-studio insertion of the effect, as well as 3-D telestration and virtual playbooks, which draw plays right on the field and these markings remain in a fixed position relative to the field regardless of how the video picture moves. "The enhanced system essentially allows broadcasters to utilize the 1st and Ten line in a much more effective manner, without compromises to quality or any aspect of the broadcast," says Stan Honey, president and CTO of Sportvision and inventor of the 1st and Ten system. "Prior to this development, a broadcaster's only option was to stream the technology from the event venue. Now, however, broadcasters are afforded the flexibility to stream on-site, in-studio, or from other locations, depending on their needs and budget constraints."

Orad's sensor-based technology, CyberSport, has a companion in-studio insertion system called CyberSport Studio. "CyberSport Studio is newer technology that was developed to reduce costs and to simplify the technology to make it easier to use," says Kobi Shina, director of sales for Orad, Inc., in New York, NY. "With the hardware sensor-based technology, there is the expense of sending crews and equipment to the venue (such as the stadium), plus the time-consuming process of calibrating the sensors and cameras. With the newer sensor-less, in-studio version, we eliminate those labor, shipping, and travel costs, reducing the overall cost of using this technology by about 50-percent per game. Over the course of the season, that amounts to considerable savings."

With CyberSport Studio, broadcasters can sit in a studio or broadcast center and using a clean feed delivered from the venue, the graphics are added using image processing technologies, such as image pattern recognition. "In response to market pressure, we had to find a creative way to reduce costs, and to make this technology available to a wider range of broadcasters and sports events, and our new CyberSport Studio is the answer."

Looking ahead, both Orad and Sportvision say their solutions have been developed with HDTV in mind. In fact, Sportvision's K-Zone and virtual billboards systems have been used since July 2003 in the HDTV broadcasts of "Sunday Night Baseball" by ESPN. Also, as viewers become accustomed to seeing graphics such as "1st and Ten line" in high-profile sporting events, both Orad and Sportvision believe that growing market demand will encourage broadcasters to use these on-air graphics systems more extensively, in every game of a season, and for many different sports.

In the age of TiVo, where TV viewers can easily skip over commercial breaks, virtual advertising is a very promising way to promote products within the on-air presentation.

Team emblems appear to tower over these two soccer teams, inserted by Orad's Cybersport graphics system.

Sportvision's sponsor-branded virtual imaging as shown on Turner Sport's "Thursday Night College Football."

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20 Years of People

As the saying goes, the more things change, the more they stay the same and in a field that thrives on improvements in technology, articles about people dominate both the first and most recent issues of TV Technology.

For example, the lead story in the September 1983 debut issue was on contract talks at NBC with union engineers. On page 4 are several articles about layoffs at some of the biggest companies in the business, including Ampex, CBS and Harris. No wonder the engineers were nervous about a new contract!

In the Sept. 3, 2003 issue, NBC's labor dispute is long forgotten in the cover story about the network's plan to build archiving system for future broadcasts of the Olympics. The role of this archiving system will be to simplify recalling images of people competing at this premier sporting event.

In the first issue of TV Technology, one cover article was about the impending standard for stereo television audio. A standard for stereo audio was eventually decided and has worked well for many years, although it would have been hard to imagine back then that by 1998 there would be a standard for digital television with 5.1 Surround Sound!

Always evergreen on the pages of TV Technology are articles about FCC regulation. Sure enough, the very first TV Technology editorial was on the FCC and deregulation, a topic that has been repeated in every recent issue, including the August 20, 2003 cover story.


TV Technology

NBC Contract Talks Stall

TV Stereo Closer

SBCE Puts New Name to Vote

ALL Harrison MR 4 and TV4 Consoles can simultaneously interface with

CHECK IT OUT

Harrison

TV Technology's first issue, September 1983

Over the next 20 or so pages, we've asked experts in the broadcast technology industry—some of whom regularly write for us and others you already know—to take a look back and review the breathtaking advances that have taken place over the past two decades.

The magazine may be called "TV Technology" but we like to think that it's really for and about the people who use the technology that makes television work.

Bob Kovacs

20 Years

CONTINUED FROM PAGE 1

These two devices were bellwethers in the otherwise almost fully analog television technology world of 1983, as they signaled the march to digitization that we have since witnessed.

COAXIAL DISTRIBUTION

In 1983, the distribution of network video and audio signals was done on coaxial cable and microwave circuits leased from the still-intact-but soon-to-be-broken apart telephone company. For about the preceding five years, these circuits had carried diplexed video and audio on a single cable or microwave path. Prior to that time, audio and video had traveled via separate paths, with all the quality and reliability problems that implies. Although diplexed circuits constituted a significant improvement over separate paths, anyone who ever saw one of the network "round robin" circuits, in which the signal was looped all around the United States and back to its originating point, knows that satellite distribution was a giant leap forward for quality and reliability. It also changed the face of the television business forever in a fundamental way. With satellite distribution, the staggering cost of a national television network distribution system based on coax and microwave was reduced to a level that spawned the cable network industry and the "500 channel universe" that exists today. Indeed, by the time the major broadcast networks began distributing to their affiliates via satellite, a significant number of cable networks were already operating.

In 1983, television audio was monophonic, and, to put the best face on it, it did not enjoy a reputation for high quality among audiophiles. It was just the next year that the FCC approved the broadcast of mutichannel television sound, and effectively standardized the BTSC system by protecting its pilot. This eventually led to the routine broadcast of stereo and Surround Sound on television, and to the widespread use of a second audio program. The transition to stereo caused stations and networks to augment and replace many components in their in-plant audio distribution systems, and this, combined with the increasing emphasis on audio performance in TV receivers and the resulting upgrades to speaker and amplifier components in receivers, produced a substantial, wide-ranging improvement in television audio for the viewer.

From its beginnings in time base correctors and frame synchronizers, the march toward the digitization of television video and audio accelerated through the 1980's and 90's. The digitization and computerization of television production equipment produced digital recording devices, digital effects generators, digital switchers, CCD cameras, and a vast array of other devices up to and including those that create virtual sets. On the audio side as well, digital recording and mass storage appeared, as well as digital mixing consoles and numerous digital audio effects devices.

The changing face of broadcast technology over the past 20 years are represented by a 1986 ad promoting Sony's (then) new Betacam format, a 1996 ad for Panasonic's newly introduced DVCPRO platform and a 2002 ad from Avid Technology, extolling the benefits of broadcast news editing on a laptop.

TEN YEARS HENCE

By the time TV Technology had turned 10, in 1993, digital video and audio recording and storage had become well established, and the last analog professional video recording format was history. Digital production equipment had also gained a strong foothold, and the trend toward end-to-end digitization of the television broadcast plant was well underway. HDTV, which dawned in the television engineer's consciousness at about the same time that TV Technology appeared on the scene, had metamorphosed with the help of digital compression into digital television broadcasting, with its plethora of choices of scanning formats, audio formats, and data broadcasting alternatives.

Today, we in the television industry are well along in the broadcast of digital HDTV and SDTV, and we are just beginning to see a glimmer of the data services and other enhancements that DTV will facilitate in the future.

TV Technology's first 20 years have chronicled a dizzying array of developments that have truly reformed television in fundamental ways. A three-network world has become a multi-hundred-network world. Television broadcast plants have made virtually complete transitions from analog to digital platforms, and are increasingly becoming computer-networked platforms. HDTV has become an everyday reality. Television distribution, broadcast and reception are in the middle of a transition from analog to digital technologies. What is all this going to lead to in the future? Prediction is difficult, particularly prediction of the future. We can be sure, though, that whatever the next 20 years brings, we will be reading about it in TV Technology.

Randy Hoffner is manager of technology and strategic planning at ABC, New York, N.Y. The views expressed here are his own, and not necessarily those of ABC. Write to him c/o TV Technology.

A Look Back While Looking Forward

Broadcasters face a host of regulatory hurdles during the DTV transition

by James F. Goodmon
President and CEO
and John L. Greene
VP, Special Projects
Capitol Broadcasting Co., Inc.

RALEIGH, N.C.

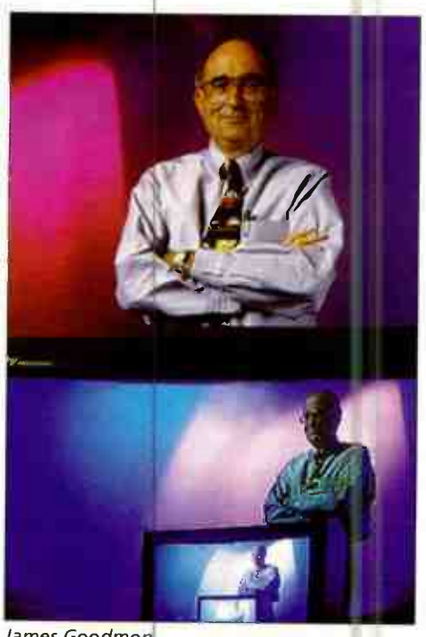
Many of us in broadcasting are fortunate to have lived and worked in the golden years of television. Advancements in the medium over the last 20-25 years have been breathtaking. But significant shifts outside of technology have also had an enormous impact on our craft and in some cases are tarnishing the gold.

Regulatory decisions are having a tremendous impact on the broadcast arena. At the same time, a general shift in the business environment is creating more challenges for all of us and hundreds of options for video are chipping away at our viewing audiences.

Looking back, it is easy to target the transition to digital as the most significant development by far. While the transition may be burdensome to some and expensive for all of us, digital is a "must" for our broadcast future. We live in a digital world and television cannot afford to be left behind. Cable and satellite are clearly moving in that direction and to remain competitive we have to alter our delivery system. The technology offers us a chance to improve our product significantly. Better yet, it gives us the flexibility and versatility to compete at all levels and to build toward a future yet unimagined.

A FUTURE YET IMAGINED

When our company, Capitol Broadcasting, became the first commercial operation to broadcast a digital signal on WRAL-HD on July 23, 1996, we could not imagine, then, the continuing developments and improvements in the technology that would occur over the next seven years. Industry engineers, designers, and researchers began improving the nascent technology daily. Shortly after signing on, we were able to broadcast multiple channels—permitting us to broadcast a high definition channel at all times while providing an additional all-news local channel in standard definition. For the last three years we have been able to offer our basketball fans their choice of any one of four games in the Final Four Basketball Tournament. Digital also provides a platform for data distribution. PCs with video cards pick up our HD signal and receive our normal Web page services, including video clips of news, sports, and weather. We feel the digital transition is more significant than the transition to color that we witnessed in the '50s and early '60s.



James Goodmon

And while color was a major technical accomplishment, the downsizing of our broadcast equipment in later years provided giant leaps for local production, especially newsgathering. Lighter cameras and recorders, and eventually, advancements in wireless and microwave transmissions gave us the mobility needed in a fast paced world. ENG changed the face of local news forever.

While the transition may be burdensome to some and expensive for all of us, digital is a "must" for our broadcast future.

COMPETITION INCREASES

As technology was making us better and faster, competition was also exploding. Cable was beginning to bloom and shortly thereafter, home satellite delivery appeared over the horizon. The overall communications revolution, and the competitive impact it bears for television, continues with the growth of the Internet and its ability to compete in the video world.

Other changes were taking place in the business environment at about the same time. Former family-owned stations caught the eyes of big business and the major conglomerates began to move into the broadcast universe. Programming became more expensive in a much larger buyers marketplace. Large group owners began squeezing out the single stations with programming purchases for their multiple stations. Relations between the major networks and their affiliated stations became more strained.

Beyond the technology and other changes, however, it is our feeling that regulatory issues have had more impact on television broadcasting than anything else. With passage of the 1996 Telecommunications Act, Congress granted us the temporary use of additional spectrum in order for us to convert to digital. Unfortunately, seven years later we are still struggling with the conversion because the FCC did not give us the complete package and rulemaking to complete the transition. Must carry,

BROADCAST, PAGE 32

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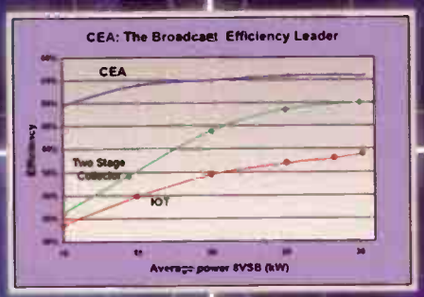

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Studio Cameras: 20 Years and Growing

Moore's Law helps make bring higher resolutions to imaging technology

by Larry Thorpe
Senior VP, Content Creation, Sony Electronics' Broadcast and Production

PARK RIDGE, N.J.

In 1983, the 30mm Plumbicon photoconductive pickup tube reigned supreme as the epitome of high-end imaging for top-of-the-line studio cameras. The smaller 25mm sister tube had become dominant in Outside Broadcast (OB) mobile trucks. And, fresh from half a dozen years of phenomenal success in electronic newsgathering (ENG), the upstart 2/3-inch pickup tube was just daring to challenge these 20-year-old industry mainstays in the sacrosanct studio domain.

Twenty years years later, the 2003 studio/OB camera landscape is comparatively unrecognizable—in terms of the quite extraordinary performance and sheer technological sophistication of presently available products.

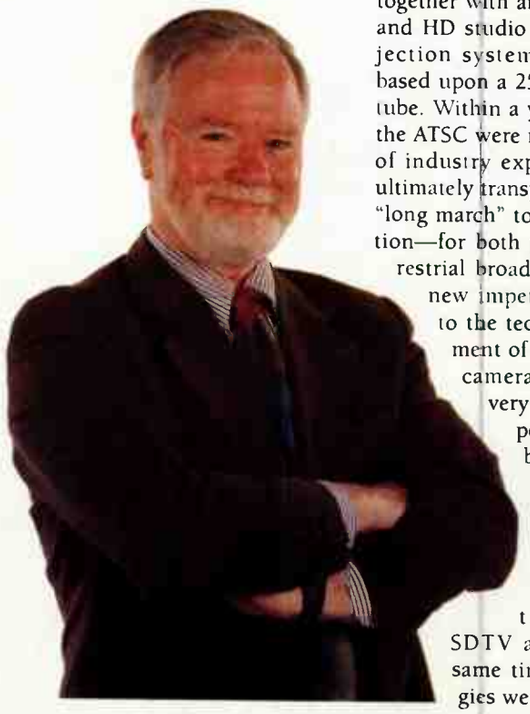
TECHNOLOGY SPEEDS UP

Two decades ago, that daring entrée of the highly compact 2/3-inch pickup tube saw the initiation of a marked acceleration in both the technology and the ergonomic innovation in studio camera design—the 2/3-inch pickup tube was destined to rapidly unseat the long entrenched larger imagers. By the late 1980s, the tube had achieved a remarkably high level of performance—and, more importantly, a significant market penetration.

However, its glory days were to be short-lived. The 1984 debut of the RCA Charge Coupled Device (CDD) imager triggered an explosive competitive race into the new era of the solid-state imager. In rapid succession, NEC, Sony, Philips, Hitachi and Ikegami all introduced 2/3-inch CCD camcorders for ENG. By 1988, the photoconductive pickup tube portable camera was in rigor mortis, the first EFP cameras based upon CCD technology were appearing, and the signals were patently clear that the CCD studio camera was poised to make a dramatic debut. And, indeed, it proved to be so.

But, the legacy of the 2/3-inch image format itself was to prove unusually durable. Twenty years later, that image format size is the undisputed and unique global standard for virtually all HDTV and SDTV high-end studio cameras.

At NAB 1984, the world's first commercially available High Definition Television (HDTV) studio camera made its debut.



Separately, at NAB 1984, the world's first commercially available High Definition Television (HDTV) studio camera made its debut—together with an analog HDTV VTR and HD studio monitor and a projection system. The camera was based upon a 25mm Saticon pickup tube. Within a year the SMPTE and the ATSC were mobilizing hundreds of industry experts to begin what ultimately transpired to be a 12-year "long march" to HDTV standardization—for both production and terrestrial broadcasting. An entirely new impetus had been added to the technological development of the high-end studio camera—in the form of a very high bar in picture performance that had become an ever pervasive presence. The mid-1990s saw the splintering of the marketplace into two distinct tracks—namely, SDTV and HDTV. At the same time, other technologies were looming.

DAWN OF DIGITAL

The dawn of the '90s spawned the digital camera. Global developments in Digital Signal Processing (DSP) had advanced with extraordinary rapidity at both the consumer and the professional level. Introduced with 8-bit A/D conversion following the CCD imaging system, these RGB video processing circuits brought something new and important to the complexities of the video camera—namely, stability and reliability.

Later, digital video signal processing of a sophistication that could never have been implemented in the analog domain was introduced. Creativity—at the hands of the video operator—was to be very substantially augmented. By 1995 the 10-bit A/D had arrived in SDTV cameras—and by 2000 it was 12-bit. DSP microcircuits were in excess of 2 million gates and the nonlinear digital video processing was being computed at 24 bits and higher.

Close on the heels of SD, HD camera technology had picked up serious steam. The year 1992 heralded the seminal arrival of the 25mm high-definition CCD imager and HDTV was never to be the same again. The digital pursuit of motion picture film was now seriously underway, except for one key issue: The ubiquitous 2/3-inch image format was destined to ultimately eclipse the 25mm format. And, by 2000 HD studio cameras had achieved 10-bit capability—and 12-bit by 2002. The analog camera was now totally and irrefutably relegated to posterity.

The industry recognition that digital had inexorably arrived sparked industry standardization activity in 1988, directed at defining and specifying the future *all-digital* HDTV camera chain. The all-important communication link between the camera head and the Camera Control Unit (CCU) was defined within the SMPTE to be a 10-bit digital 1.5 Gbps two-way link. Recent "revisionist theory" has, however, produced HD studio/OB camera systems based upon a simplistic plug-and-play analog triax cable intermediate link between the digital HD camera head and the digital camera CCU. The industry at large has, as a consequence, been thrown into some confusion.

The SDTV studio camera of today is endowed with quite astounding picture performance compared to those of 20 years ago. Back then, a signal-to-noise ratio of 55 dB (measured unweighted over a 4.2 MHz bandwidth) in an SDTV camera was considered breathtaking. Today, it stands at 66 dB and is still inching upward. Horizontal resolution—ever the singular yardstick of studio camera performance—can today exhibit a typical 80 percent depth of modulation at 400 TVL/ph (with no image enhancement) compared to the best of 55 percent of the former top of the line PbO pickup tubes.

The HD studio camera has surpassed the SDTV studio camera in a number of respects, but none ranks more important than the downconverted 4:2:2 digital SDTV output from the HDTV camera. It exhibits a higher depth of modulation (in the useful video passband) and lower aliasing—in both the horizontal and the vertical domain—than the best of the native SDTV cameras. And, with a pricing premium of perhaps 30 percent over that of the SDTV camera, it is small wonder that 60 to 70 percent of studio camera sales in year 2003 are HDTV cameras (even though many are used only for their downconverted output). This trend, coupled with vigorous competition in the HD camera arena, is achieving an important economy of scale that, in turn, is further driving down the costs of HD cameras.

Digital 24P—as it is affectionately dubbed—has swept into primetime television production—and is also originating major movies.

THE NEED FOR MULTIFORMAT

The quite extraordinary turn of events in the long and arduous North American quest for DTV production and transmission standards—which produced two HDTV standards *and* a number of SDTV standards—have had a profound effect on the architecture of the contemporary studio camera. Today, of necessity, that has become a multiformat camera. Camera manufacturers quickly recognized that the size of the total studio camera marketplace could simply never sustain separate cameras for each and every digital format. The only rational solution was to mobilize the most contemporary of digital processing to develop cameras capable of switching between *all* formats. Thus, today, there are studio cameras capable of originating both of the 1920(H) x 1080(V) and the 1280(H) x 720(V) high-definition formats, while also deriving an SDTV 720(H) x 480(V) output. Different technological approaches have been adopted to realize this format nimbleness in picture origination.

The fact that HDTV has now become a broader global agenda has extended the multiformat camera to be additionally dexterous in picture capture rates. All variants of 50 Hz and 60 Hz—including progressive and interlaced-scanning—are widely implemented. Somewhat unexpectedly, digital cinematography surfaced in 1998 as a major new digital HD initiative. And suddenly, the traditional video industry found itself also embracing a picture capture rate that perhaps it had never before properly understood—24 frames per second. Digital 24P—as it is affectionately dubbed—has swept into primetime television production—and is also originating major movies.

Twenty years has indeed borne witness to astounding developments in the high-end studio camera. Life was so simple in 1983. But, the stunning picture quality of today surely portends an unstoppable future dynamic in studio camera development. There is no going back.

Broadcast

CONTINUED FROM PAGE 28

tuner standards, copyright, and other issues were left unresolved. Many of our transitional needs still are ignored while the commission focuses instead on media deregulation, (another potential threat to most local stations.)

public something in return. Broadcasting is a unique medium, distinct from other media. Our licenses are granted to serve "the public interest, convenience, and necessity." This simple philosophy, however, began to shift in the 1980s. Under Federal Communications Chairman Mark Fowler, the agency began to turn away from these obligations and

financial gain. That thinking continues today. It should be obvious that because spectrum scarcity creates a significant barrier to entry, the free market theory simply does not apply to the broadcast industry. Unfortunately today five companies—four of whom are broadcast networks—control most of the voices in the marketplace. Those same companies also own the top-rated cable channels, as well as the most viewed Web sites.

As TV Technology celebrates this anniversary year, let us hope the FCC moves to push digital technology forward rather than concentrating on policies to help the large media companies become even bigger. Years from now when we look back on our history...let's hope that technical advances, and not deregulation, are what we remember and that broadcasters once again are focusing on localism and serving the public interest.

As long as broadcasters are permitted to freely use the public's airwaves, then it is reasonable to expect us to give the public something in return.

All broadcasters would agree that localism and the public interest are the bedrocks of broadcasting. This attention to the local community is what separates local operators from networks and national cable and satellite systems. As long as broadcasters are permitted to freely use the public's airwaves, then it is reasonable to expect us to give the

toward free "market forces" and deregulation. Many of the old rules...ascertaining the community's needs and interests and then programming to those needs...were pushed aside. Ownership rules were relaxed and broadcasting, in some eyes, became nothing more than another commodity to be sold, traded, merged and bartered for

in 2000, WRAL became the first station in the world to produce and air an all-HD newscast, broadcast from a special stage at the North Carolina State Fair in Raleigh.

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ENG: The Whole World is Watching

News gear has come a long way since the early Portapaks

by Frank Beacham

For those who came of age during the portable video revolution, today's tiny digital camcorders are pure magic. Compact, portable, reliable, cheap and exceptionally good—they are the stuff our dreams were made of.

They were also the result of a remarkable 35-year journey that would forever change the medium of television, putting its technology in the hands of ordinary people and extending its communications power far beyond the broadcast airwaves.

As a young 16mm TV news cameraman, I saw my first small format video camera in the streets of Chicago during the 1968 Democratic Convention. Yes, that's the historic event when a vicious police riot was televised live from the streets of Chicago as protesters of the Vietnam War shouted "The Whole World is Watching" in front of live television cameras.

Television's past and future came together that historic summer. The world witnessed the riots live through the last generation of monochrome RCA TV cameras. Far too heavy for humans to handhold, these image orthicon cameras protruded through hotel windows or were mounted atop huge remote trucks. Portability was not in the lexicon back then—camera cable connectors alone weighed more than today's heaviest consumer camcorder.

Our Auricon 16mm news camera was no featherweight. At least 40 pounds of gear was draped over the bodies of two men linked together by cables that were often tangled. Yet, in all the chaos, I'll never forget my first glimpse of a young Japanese man carrying a shoulder-mounted television camera and portable videotape recorder. Compared to the TV technology of 1968, it looked small, enticing and so revolutionary. On first glance, my imagination soared.

That miniature TV system (we didn't yet call it video back then) was an early Sony Portapak—a half-inch, reel-to-reel television recording system on its way to introduction in the United States. Its early adopters would be video artists and groups of young documentary makers who wanted to break the monopoly that the three networks had on television. As an idea, it was revolutionary, but as a technology, its early performance was iffy at best.

It would be a few more years (1975) before I bought my own Sony Portapak. By then, it had color capability, but also had run its course and was on the way out. It was overtaken by Sony's own 3/4-inch U-Matic format, a more convenient, reliable cassette-based design introduced in 1972 as a consumer recording system.

About the same time, I bought a 3/4-inch video recorder called the Sony VO-3800. The 3800, though never designed to be a professional product, was the first portable video recorder adopted by the newly emerging movement called electronic newsgathering, or "ENG." For years, arguments ensued over whether the video recorded on a 3800 was "broadcast quality," though no one really knew exactly what constituted this elusive standard.

It would the next year, at the 1976 NAB, that RCA would introduce the first one-piece broadcast video camera, the three-tube TK-76. It weighed a breakthrough 19 pounds, but that didn't count the huge batteries and other accessories it would take to shoot real video in the field.

Frank Beacham shoots in the pouring rain with an original single-tube Betacam (Serial #3) on Jan. 23, 1983, in the Orange Bowl.

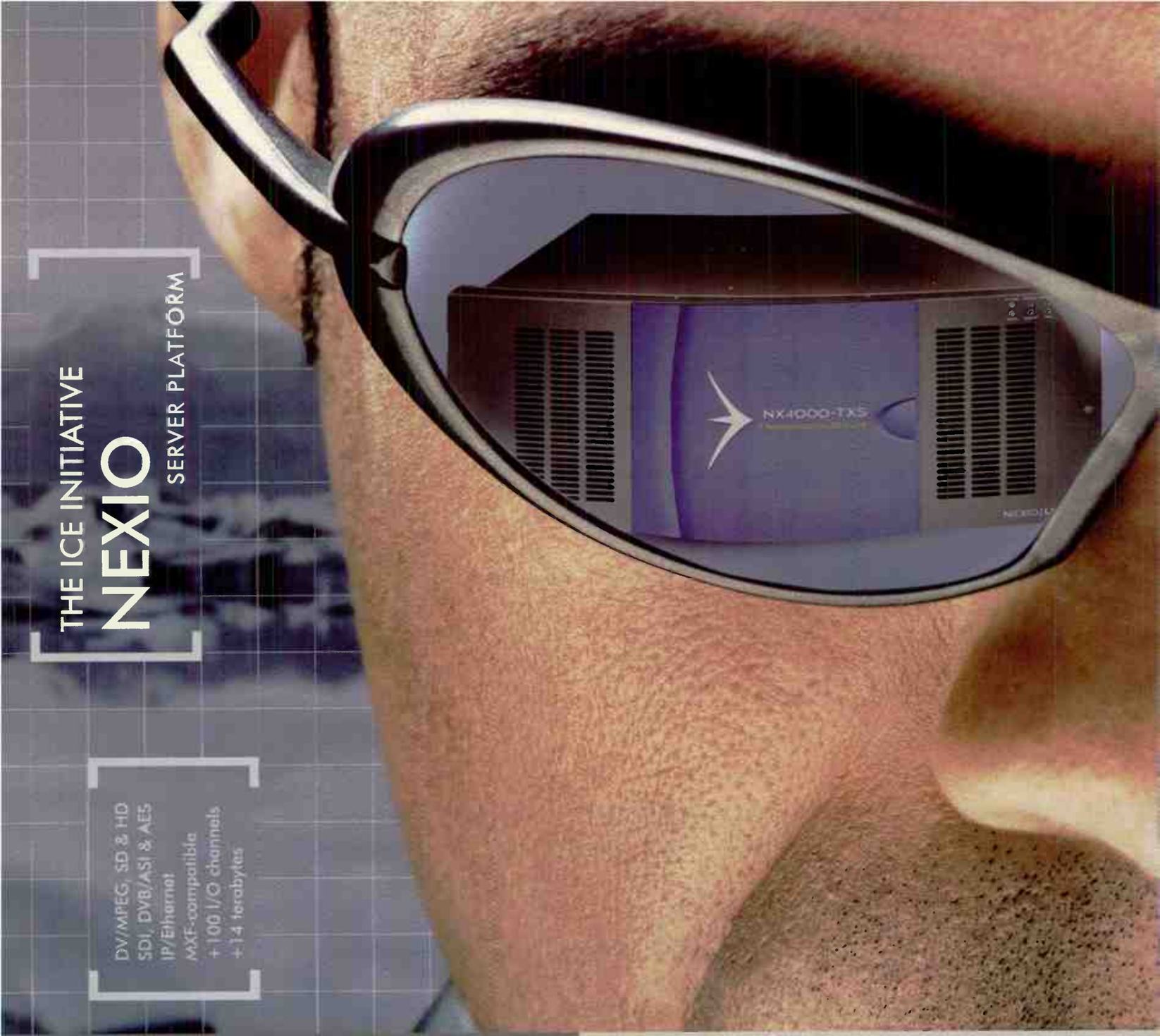
Fully outfitted(with a bag of batteries to compensate for the 20-minute or so running time and a portable recorder plus audio gear(the RCA TK-76 package weighed in at more than 50 pounds. It'ss a miracle that early video crews traveled the world with this gear. Yet we did, and I have the bad back today to prove it.

By today's standards, the TK-76 paired with a Sony U-Matic recorder offered wretched image and sound quality. Early on, video clients were skeptical (rightfully so) and TV station engineers were defiant. The chief engineer of a major network affiliate in Miami(looking at my "ENG" rig told me that over his dead body would anything recorded by it be broadcast over his transmitter. A year later, very much alive, he proudly announced that his station would be the first in the market to adopt electronic newsgathering technology.

LEFT IN THE DUST

By 1978, ENG took a huge leap forward with the introduction of Ikegami's HL-79A portable color camera, a genuine advance in television imaging technology that left RCA's TK-76 line in the dust. RCA would never regain its leadership in portable cameras. Declining sales and superior Japanese broadcast technology forced RCA, a pioneering American broadcast equipment company, out of the business in the mid-1980s. Today, it exists only as a brand

ENG, PAGE 44



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Editing: Tracks in the Sand

Tape reels give way to nonlinear editors over the past two decades

by Jay Ankeney

HOLLYWOOD

Whenever editors walk through the sands of time, we need to periodically take a quick look backward before tides of change erase the landmarks of our heritage. As TV Technology celebrates the end of its second decade, I'm bemused as much by how all things editing have stayed the same as I am by how all things editing have evolved. The biggest change in editing over the past two decades is that back then the technology was all about "Them." Today, it is all about "Us." Yet although the equipment we use has migrated from a linear to a nonlinear paradigm, the creative effect of editing has remained as powerful and dynamic as ever.

When this column began in June 1985, I was the staff editor on a primetime TV show called "PM Magazine" that combined local and national story elements into a nationwide feed so that each affiliated station could customize its own daily edition. Perched in a custom-built edit bay filled with what were then state-of-the-art 3/4-inch U-Matic VTRs, I felt privileged to fly a linear edit controller that could enter timecode locations on-the-fly and store an EDL with a whopping 250 events. It was a time when engineering knowledge was prized as highly as a sense of pacing. Back then, you had to bribe the maintenance department to tweak your H-sync for glitch-free effects, and woe be unto anyone who rerouted the spaghetti swarm of wires inside the towering fan-cooled cabinets. That firewall of technology was a prime reason producers were so dependent on the midwives they called editors.

Today I can bask alone on the beach with a laptop computer and access post-production capabilities that are a quantum factor greater than could be squeezed out of that old A/B roll suite. Yet the creative process of using editing's three great tools—Context, Contrast and Rhythm—to tell my own or my client's story is still the same. The big difference is that back then the capital investment for the hardware required to become a solo player in the editing game would have been prohibitive. The current software-based NLEs usually cost less than the car you drive them home in.

The author works at a CMX340 keyboard in the training room at CMX/Orrox, Santa Clara, Calif. in 1981.

EDITOR'S QUEST

But the technologies involved are only the tools of the editing trade. The essence of the editor's quest has remained constant, although just as in every era since the silent film days its aesthetic has been molded by the vagaries of fashion, style and cultural evolution. If you think that something like the trendy flash cutting of "MTV-style" videos is new, I urge you to reference the dream sequence in Fritz Lang's 1927 sci-fi classic "Metropolis," where the hallucinogenic delirium of Freder Fredersen is revealed with lightning edits and swirling eyeballs. And has anyone ever intercut contrasting screen direction as effectively as Sergei Eisenstein invoked as the Cossacks inexorably cascaded down the Odessa steps in his silent master-

piece "Battleship Potemkin?"

Over the years, several readers have been good enough to remember the statement in that first "Focus on Editing" column: "It is an editor who ultimately takes raw material in the left hand and turns over a finished product from the right. We can take this world, and through the power of our technological media, reassemble its chaos into meaning."

Later that same year, when discussing different approaches to cutting sequences it was postulated, "So, what makes a good edit? It's like mustard on a pickle. You have to try it to find out if it works or not. No amount of theorizing will give a guaranteed answer."

That is still the best lesson any young editor can learn. Your most important tool is your own artistic sense. Twenty years ago, editing was often like serving up a buffet for the producers to sample in an effort to tempt their appetites when their palettes were stuck. Nowadays the availability of cost-effective edit systems means it is often the person doing the editing whose taste determines the whole menu.

How well we remember that in that bygone era of the edgy 80's a powerful triumvirate of manufacturers dominated edit system controllers: CMX, Grass Valley and Sony. It was a very hardware-intensive process with companies like CMX forcing you to purchase custom Intelligent Interfaces called I2 (I-squared) to control each individual device. That's why a CMX system could easily cost more than $60,000, which was real money back then.

But slowly, inexorably, hardware was trumped by software. In 1982 Dave Bargen came up with software drivers that could supplant the I2, and founded the ISC line of linear editor systems. Then at NAB 1984, pioneering video engineer Jack Calaway introduced the first edit system that ran on a desktop PC. The somewhat smug monarchs of the linear editing glen barely noticed that the barbarians were knocking at the gates.

But already many edit system innovators were working to free an editor's creativity from dependence on spooling tape altogether. Many briefly left their mark before the next wave washed them away.

In 1971 the CMX 600 employed stacks of whirring magnetic disks to provide low-rez random-access editing but maybe its tasty $250,000 price tag is the reason only six were ever sold. Then in late 1977 CBS Labs, with the help of nonlinear visionary Adrian Ettlinger, developed what became known as the "CBS-Sony system" that used three Betamax tapes to triple-checkerboard its edits on three record decks. In 1986, Cinedco's Ediflex system won an Emmy for using 12 VHS decks playing identical clones of the source material. Introduced in 1989, Amtel System's E-Pix hybrid editing system used a combination of tape and laser disks directed by Amtel's own DOS-based 386 computer. And did you ever get a gander at the VUES Integrated Digital Post Production System from Videofonics? Its Macintosh II commanded an NEC VSR-10 solid-state digital recorder to mirror the D-2 record master so that it could always effect back in RAM to any single source deck without laying off B-roll.

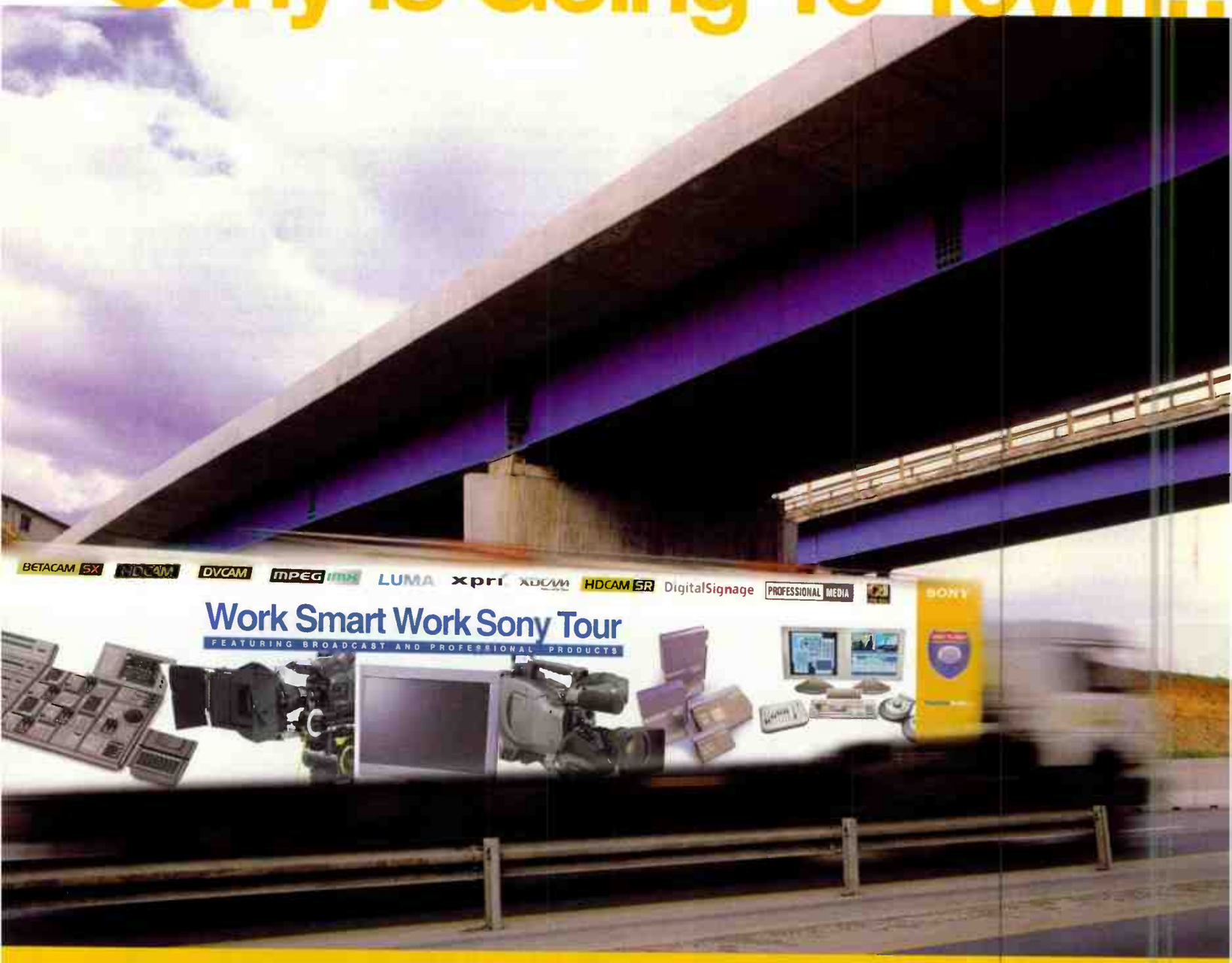
GOING OFFLINE

But every time you lay tracks in virgin sand you leave many significant footsteps behind. We can all hail 1984's Montage Picture Processor that danced with 17 Super Beta tapes to pirouette between edits, but why isn't it in the Smithsonian? Then in 1989, Editing Machines Corp. took the prize for the first affordable disk-based offline system by unveiling EMC2 (that's "EMC squared," like the Einstein equation), using 1/2 screen black-and-white video at 15 fps. Today every editor honors the system that followed it by a scant few weeks, the Avid Media Composer conjured up by Bill Warner and Tom Ohanian, which cracked the barrier of editing at 30 fps for the first time off disk. At NAB89, they sold five systems off the floor, and an editing legend was born.

During these years we also experienced "Cubes" and "EditDroids," "D/Visions" and "Destinys," all leaving their mark by building on the lessons of the past to leave foundations for the future. Just as the dominance of the Sony/GVG/CMX troika was permanently broken by the introduction of new editing approaches, it will only be a matter of time before some new editing concept once again shuffles the deck. While we watch the passing parade, the greatest payoff is that our beloved craft and art form, editing, has been made available to an ever-increasing circle of professional, prosumer, and amateur practitioners who are experimenting with putting "mustard on their pickle." This is the legacy the past years of TV Technology have helped to chronicle. These are the footsteps we have left in the sand.

Jay Ankeney is a free-lance editor and post-production consultant based in Los Angeles. Write him at 220 39th St. (upper), Manhattan Beach, CA 90266 or at JayAnkeney@aol.com.

Sony Is Going To Town...



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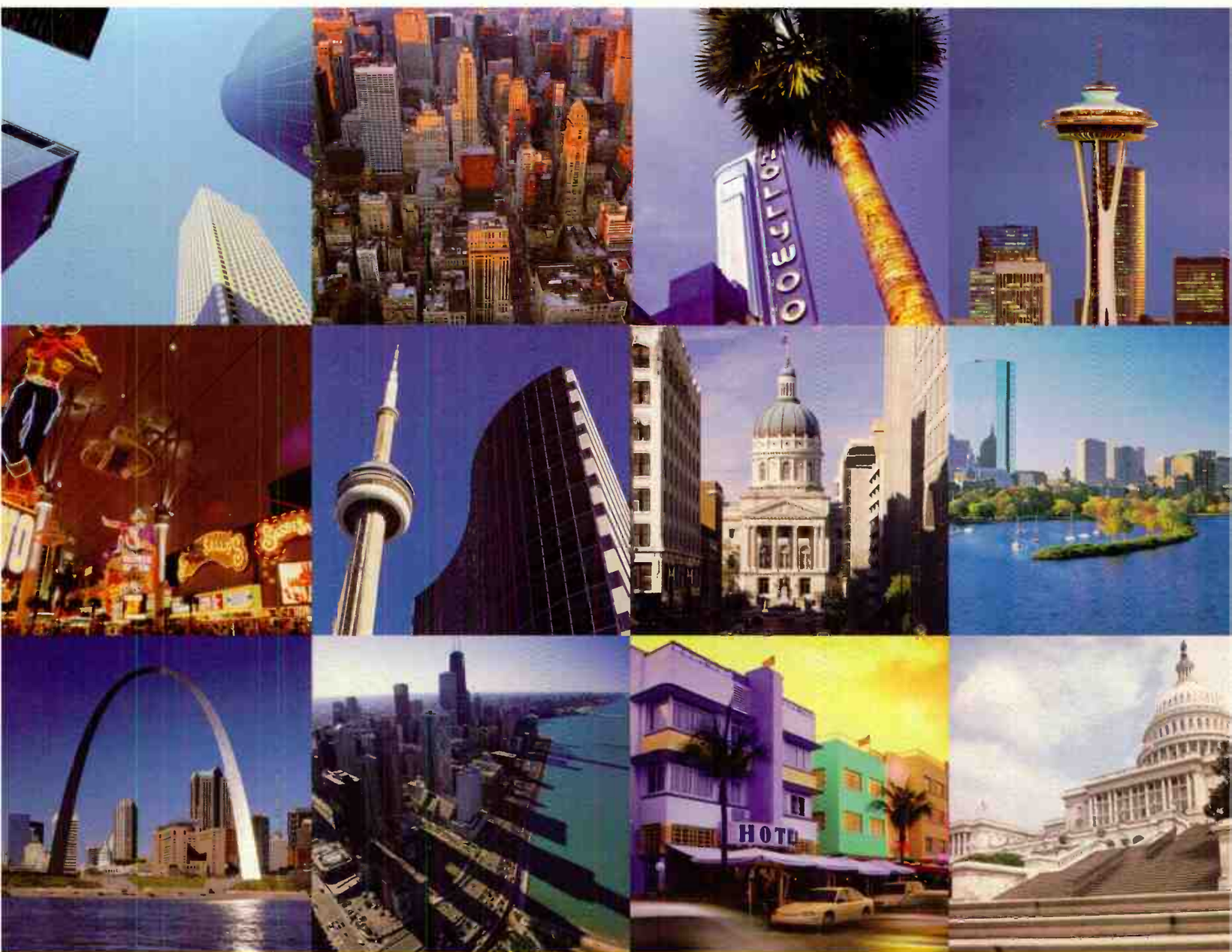

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Two Decades That Propelled an Indu

Cable goes from rural curiosity to dominant player

by Will Workman

Look back with the spyglass of time at the landscape of "cable" in 1983 and it reveals an impossibly prehistoric terrain. TV sets carried 13 channels, and the three broadcast networks (Fox would be born two years later) garnered nearly all viewers who weren't tuning into PBS or a local UHF network. Cable since the 1950s had been filling a very small niche by serving homes where rabbit ears couldn't pick up clear broadcast signals.

Until 1975, however, there had really been no reason for most urban and suburban dwellers to get cable. That year a fledgling pay programming service, Home Box Office, began satellite distribution of programming to cable systems, offering the Ali vs. Frazier "Thrilla in Manila" fight, and commercial-free movies. Suddenly, customers were chasing cable trucks in the street to get hooked up.

In a wave of early programming services, others followed HBO's suit, including regional sports channels and "superstations" WOR and WGN, and cable subscriptions boomed; even so, cable by 1985 had reached only 41.5 million homes, hardly the ubiquitous presence of today. But cable visionaries beginning in the 1970s had prophesied a national interactive network of cable systems (for kicks try reading *The Wired Nation*, by Ralph Lee Smith), and their vision was about to come true.

To get from then to now took some monumental tremors. That said, here's my list, in chronological order, of the Top 10 events in cable history over the last 20 years:

•1979-1985: The Second Programming Wave. The Entertainment and Sports Programming Network (ESPN) launches in 1979, followed shortly by Cable New Network (CNN), Nickelodeon and MTV (which in 1981 kicks off with the first music video: The Buggles' *Video Killed the Radio Star*), The Weather Channel (1982) and Discovery Channel (1985). This marks the first wave of services aimed at audiences of specific genres. Also launching in 1979: C-SPAN, funded as a nonprofit by the cable industry, with nonstop live coverage of Congress. Together these networks build cable viewership and ad revenues with programming that erodes broadcast ratings (in 1987, for example, ESPN landed the NFL on Sunday nights). Subscribers climb to more than 41.5 million by 1985, or more than half of all homes served by cable. That, in turn, increases the coffers of operators for the broadband buildout of the late 90s.

•1986: HBO becomes the first cable service to scramble its signal, causing sales of C-Band dishes (bought primarily to get HBO for free) to evaporate at a time when backyard dish ownership had climbed to two million. HBO's subscription pricing drives John R. MacDougall, a frustrated dish salesman moonlighting as an engineer at an uplink facility, to override HBO's signal with his own teletext message:

GOOD EVENING HBO
FROM CAPTAIN MIDNIGHT
$12.95/MONTH?
NO WAY!
(SHOWTIME/MOVIE
CHANNEL BEWARE)

The "Captain Midnight" legend is born, fueling jokes for Carson and Letterman and putting HBO in a froth. After intense heat from the feds, MacDougall's pleads guilty and is fined $1,000.

•1992: Time Warner Cable begins preparations for the Full Service Network in Orlando, Florida. Partnering with Toshiba, Silicon Graphics and others, FSN is the industry's first large-scale attempt to offer such futuristic services as video-on-demand (VOD), an interactive programming guide, data, telephony and gaming, using a broadband (750 Mhz) backbone and server-based technology. Other operators follow suit with smaller trials, and telcos respond as well. Bell Atlantic in 1993 launches its Stargazer VOD

stry

service, using asymmetric digital subscriber line (ADSL) technology, to 300 employees in Alexandria, Va.

• 1993: John Malone, head of TCI, the nation's largest cable operator, makes his famous "500 Channels" speech, predicting that digital compression will allow for hundreds of channels of programming. Betting heavily on filling that void, TCI and other cable operators, as well as media investors, take stakes in new programming services.

• 1990-1994: The Third Programming Wave. Targeting even more "niche" audiences, services such as the History Channel, Sci-Fi Channel, HGTV, Court TV, Food TV and others launch. History Channel is an excellent example of a service critics thought no one would watch (History? On TV?), but now counts more than 62 million subscribers and an avid fan base. Discovery Channel alone debuts a slew of niche services, including Animal Planet, Discovery Health and the Travel Channel (which it acquired). Cable viewing by 2002 will eclipse broadcast viewing on some nights.

• 1994: Competition Looms. Five months after it's announced, Bell Atlantic's acquisition of the nation's largest cable operator, TCI, falls apart, as well as a proposed merger between Cox and Southwestern Bell. This puts a temporary halt to telco-cable unions until AT&T's acquisition of TCI at the end of the decade. Despite numerous plans and some trials of video service, the Baby Bells never gain a foothold in the video distribution business.

Also in that year, DirecTV launches a high power direct broadcast satellite (DBS) service, and racks up 400,000 homes by year-end. Joined later by Echostar, DBS begins to build a customer base beyond rural dwellers that can't get cable.

Time Warner launches Full Service Network in 1994 and trials for 18 months to 4,000 customers. The technology proves prohibitively expensive, including $3,000 set-top boxes, costing the operator millions. But the lessons learned will pay off for the entire industry a decade later (when boxes drop to a tenth of the price).

The increasingly competitive landscape spurs operators to rebuild to offer "broadband" 750-Mhz bandwidth, igniting rapid industry consolidation as smaller players sell out. Companies and investors outside cable place bets on the industry, capped by Microsoft's $1 billion stake in Comcast in 1997, fueling a surge of capital expenditures that reaches a peak of $5 billion in 1997. Cable's broadband networks set the stage for cable modems, VOD, HDTV, telephony and other futuristic services.

• The Telecommunications Act of 1996, following on the heels of the Cable Act of 1993, which freezes or rolls back cable rates and requires operators to carry broadcast signals, levels the competitive landscape in some areas, but creates a regulatory muck in others. Cable operators can offer telephony service to compete with RBOCs, but the RBOCs don't get much regulatory relief in offering their own video services. Overall, the 1996 Act opens the door for further media consolidation.

• 1997: Tivo launches, becoming the brand synonymous with the personal video recorder (PVR), now more commonly known as a digital video recorder (DVR). Carrying a massive video hard drive, allowing viewers to pause live programming, record only the shows they want, and skip commercials, DVRs threaten to revolutionize the entire TV business model. Attached to cable's broadband network, and using peer-to-peer file sharing, the devices terrify studio executives. Tivo now has nearly 1 million subscribers, and cable set-top box manufacturers are integrating DVRs into the new generation of boxes.

• 1999: AT&T builds itself into the world's largest cable operator by acquiring TCI and MediaOne for a combined $103 billion, in the latter deal valuing MediaOne cable subscribers at a whopping $4,632 per. AT&T boss C. Michael Armstrong, justifying the princely sum he paid, lays out a glowing plan to bundle services into a complete convergence package of wireless, telephony, data and video. But Armstrong fails to execute, the telco bubble bursts, and he's forced to split up the company into four units to please investors. Comcast's Brian Roberts will swoop in on the cable unit, AT&T Broadband.

• 2001: You've got AOL Time Warner. AOL completes its takeover of Time Warner in a $350 billion stock merger. Whereas just a few years earlier Time Warner had looked at acquiring AOL for a few hundred million, AOL on the cusp of the Internet bubble burst is able to cash in on its swollen stock to create the world's largest vertically integrated media company. At year's end, Comcast merges with AT&T Broadband to create AT&T Comcast Corp., with 22 million subscribers.

PRODUCTS & SERVICES SHOWCASE

PRODUCTS & SERVICES SHOWCASE

ENG

CONTINUED FROM PAGE 34

for Thomson's consumer products.

Also arriving on the market in 1978 was the Type C one-inch video format, a reel-to-reel VTR system designed for broadcast television and high-end post production. Type C replaced the aging two-inch Quad recorders that dated back to beginning of video recording in the late 1950s. For the next five years, the Type C format would dominate high-end production, while U-Matic would rule newsgathering and documentary-style production.

The next big development in ENG came in 1982 with the introduction of Sony's Betacam format and the first viable one-piece camcorder. Betacam was the first component video format and was based on the cassette form factor used in the half-inch Betamax consumer video format. The improved image quality of Betacam was achieved through recording the luminance and chrominance as separate signals on the videotape.

Betacam did not arrive without fierce competition. Panasonic in 1982 introduced its competing M format, a pro ENG design based upon its consumer VHS tape form factor. Though VHS won out in the consumer market, its physically larger cassette resulted in huge camcorders as compared to Sony's far more compact Betacam models. Betacam quickly won the ENG format war, replacing U-Matic as the industry consensus.

DIGITAL BETACAM

My company at the time, Television Matrix, based in Miami and Los Angeles, received Betacam BVV-1, serial #3, just hours before the opening of the SMPTE tradeshow in November, 1982. The camera head in the first Betacams had a single Saticon tube. Though lag was prevalent in the images, the recordings from day one were rock-solid, and that recorder (with an upgraded BVW-3 three-tube camera) performed reliably through the first three seasons of the first all-Betacam television series, "Lifestyles of the Rich and Famous."

At first, Sony insisted that Betacam was strictly a news format. But its customers, anxious to retire their very heavy and bulky Sony BVH-500 Type C one-inch field recorders, pushed the new camcorders to the limit. "Lifestyles"—in the fall of 1984—became the first nationally syndicated show shot on Betacam and edited in a Betacam-to-Type C interformat edit bay.

By 1987, an improved Betacam SP format was introduced, and Betacam-to-Betacam post production began to take hold. In 1994, Sony introduced Digital Betacam and it attained success as a high-end broadcast and commercial portable format. Still in wide use today, Digital Betacam uses mild 2:1 compression to record the full 4:2:2 component video signal on half inch-tape.

In the mid-1990s, DV, originally designed as a digital consumer video format, spawned a new generation of both consumer and professional camcorders. Based on a tape cassette barely larger than a matchbox, Panasonic introduced its DVCPRO line of professional formats, while Sony introduced DVCam. Both remain successful.

The original DV format compresses the video signal at a rate of 5:1 and the ratio of sampled data is 4:1:1. Professional versions, however, have far exceeded the original specifications, moving them even to high-definition production capability.

Today's camcorders—ranging from less than $500 for digital consumer models to professional high-definition units for digital cinema—continue to change the landscape of electronic media. With complete professional television studios, including advanced post production, available for well under $5,000, anyone with talent and skill can make media. The trick today is to make it good enough to have the "the whole world watching."

Frank Beacham is a New York City-based writer and producer. E-mail: frank@beacham.com.

'Film...' Er, Make That 'Tape at 11'

by Frank McDermott

WASHINGTON

In 1976, when I was shooting film with a CP-16 RA, the camera was virtually instantly on. In addition, it was lightweight, well-balanced and power-efficient. It has taken the industry more than 25 years to get back to that kind of ease of use for the TV news videographer. And that's in spite of massive technological change that's enabling us to get picture and sound on the air with a speed that was only imagined. Still some of the truths that govern how the TV news videographer does his job haven't changed. My first ENG camera was the Ikegami HL-77 coupled with a Sony BVU 3800 deck. For about five years there was nothing better.

Photo: Frank McDermott

The author (r) and the Channel 9 news crew on location in Mexico in 1974.

In early 1982, we experienced the next big change when Sony brought out the Betacam. The BVP-30 docked with a BVU-1 tape recorder allowed us to become one-man operation, even though the camera and deck weighed 26 pounds.

In 1986, WUSA (then WDVM) once again chose Sony and its BVP-5, which, when docked to our old BVU-1 decks became our front-line news camera. CCDs changed everything—no more burns in the tubes to deal with, no registration issues, a lighter-weight camera, smaller in size with less power consumption meaning more battery life. Little did we know at that time that "news photography nirvana" was right around the corner.

That milestone was Sony's BVW-200, BVW-300, followed by the 300A in the early 90's. Finally we had a one-piece camera that weighed less, was well balanced, and had good low light sensitivity.

We also bought several Sony SX cameras and editors. Although WUSA's plan was to convert to the SX format completely, two years ago we went instead with the Panasonic AJ-D610 camera, which puts out a picture comparable to the Sony SX.

Looking ahead it's clear that the days of videotape may be coming to an end. It's impossible to predict whether our next format of choice will be disc, hard drive, or some other medium. However, this evolution will continue and even with a large professional lens on the front, cameras are getting smaller and lighter, and I'm confident that just around the corner is a video camera that will do it all, just like my CP-16. ■

Frank McDermott is a news videographer for WUSA Channel 9 in Washington, D.C.

Audio Advances Rapidly Since 1983

From BTSC to Surround Sound, audio changed with the times

by Tim Carroll

In honor of TV Technology's 20th anniversary, we will take a look back over the last 20 years of television audio. This is a perfect stretch of time because it seems that almost all the major audio advances we rely on today have happened since 1983. That being said, it feels like it has been a nonlinear increase with the last few years seeing an almost unbearably fast release of technologies, supporting products and accompanying confusion.

STEREO

Arguably the largest jump forward in television audio was the introduction of BTSC stereo broadcast technology to the NTSC system in 1984. To be fair, the work was done a bit earlier than this, but the standard was finished and published in 1984 thereby allowing stereo broadcasts to begin.

As we have discussed before, it was actually called the Multichannel Television Sound (MTS) standard as it defined not only the main stereo channels but also the monaural SAP and PRO channels. The 315-page standard created by the Electronic Industries Association (EIA) was quickly adopted as the standard for "multichannel" television sound by the FCC, but adoption by broadcasters was much slower. Thus far, approximately 725 stations broadcast in stereo, and of those, about 170 are noncommercial. This total is still less than half of the approximately 1,600 FCC licensed television stations currently on the air. Due to the impending switch to digital television, it seems unlikely that these numbers will increase much, and with the age of some of the equipment the count may actually decrease.

DIGITAL AUDIO

The advent of digital video recording began in 1988 with the release of the D-1 component VTR developed by Sony and BTS. For the first time, four independently editable channels of 16-bit, 48kHz audio were available. This obviously allowed a great deal of flexibility in post production, but more importantly it instantly cured inter-channel level and phase problems. Sony followed the D-1 with the composite D-2, and the portable Digital Betacam formats, both of which offered the same four channels of audio but with the resolution increased to 20-bits—better than CD and standard DAT audio quality.

Panasonic was close behind with the release of its first digital VTR, the D-3, which also had four audio channels, albeit with 16-bit resolution. The company's follow-on machine, the D-5, matched the audio performance of D-2 and Digital Betacam with four channels of 20-bit, 48kHz audio.

The next machines to be developed were to support high definition video. One of the first was the Sony HDD1000, which records uncompressed HD video and eight channels of audio. This large, heavy, one-inch tape machine greatly helped during the early days of HDTV testing and demonstrations in the U.S. and abroad. Unfortunately, it was not inexpensive to own or maintain, and it required some skill to operate. Although some legacy material still requires these machines, they are becoming increasingly difficult to find.

BTS and Toshiba developed the D-6 in the late 1990s that is capable of 10 channels of 24-bit, 48kHz audio (12 channels in 50Hz mode). However, it took until the 21st century before more than four channels of audio were included in a popular, compact tape format. Eight audio channels are included as an added feature of the Panasonic HD D-5 format but currently only in 24P mode. The competing Sony HDCAM format has the same video features as HD D-5 but contains only four channels of audio. The very latest offerings from Sony are on the right path and finally do offer eight channels of 24-bit, 48kHz audio.

During this time, nonlinear audio

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Audio

CONTINUED FROM PAGE 45

editing systems from companies like Sonic Solutions and Pro Tools began to emerge. These systems dramatically improved the quality, speed and flexibility of audio in post production and were ready for multichannel sound almost from the start. Today there are even inexpensive systems, such as Cool Edit Pro, that allow for simple nonlinear operations and even support some very basic multichannel features. These packages are finding -scale nonlinear systems cannot be justified.

SURROUND SOUND

Because the BTSC system provides for stereo audio, by default it is capable of carrying matrixed Surround sound. As we have discussed ad nauseum in previous columns, Dolby Surround and other matrix-type systems encode multiple channels of audio into a stereo compatible format called LtRt (Left total Right total). In mono it sounds like mono (with any surround channel information canceling); in stereo it sounds like stereo, and with a surround decoder it will reproduce the multichannel audio. Beware of the stereo "enhancers" found on some television sets because they can overdo it with surround encoded audio and may negatively affect dialogue intelligibility.

Surround is also a part of the ATSC audio system, better known as Dolby Digital (AC-3), approved for use by the FCC in the mid-1990s. This flexible system can carry from one to 5.1 discrete channels of audio; and it contains a whole host of features to make the audio work with many different pieces of equipment in many different listening environments. The ATSC system is also capable of providing full-bandwidth channels for SAP or Descriptive Visual services, which can be stereo or even full 5.1 channels. This system has helped to spur on the added audio channels on VTRs and systems such as Dolby E to support multichannel audio from post production all the way to final broadcast.

LOUDNESS AND AUDIO PROCESSING

The loud commercial problem existed prior to 1983. As new audio processing systems from Orban, CRL and Modulation Sciences hit the market to support the new BTSC system, these problems began to diminish. They later developed dynamics processors that either incorporated the classic CBS loudness algorithm or used multiband processing, which proved to be very effective at controlling the two channel loudness problems.

At least one thing has become worse since 1983. The issue of audio-to-video synchronization (a.k.a. lip-sync) has grown into a gigantic mess.

One of the features of the Dolby Digital (AC-3) system is the ability to pass full dynamic range audio with low distortion and noise, but this has the potential side effect of bringing back the loudness problems. How do you support the benefit of having a wide dynamic range channel while not having large shifts in loudness? New loudness measurement systems such as the Dolby LM100 can help with program-to-program loudness variations by indicating the proper metadata values that need to be set in the Dolby Digital (AC-3) encoder. Another solution is the Linear Acoustic OCTiMAX 5.1, which is a multichannel dynamic range processor designed specifically to work with the ATSC system and Dolby Digital (AC-3).

This popular monitor from TFT Inc. was used to monitor BTSC stereo when broadcasters began transmitting stereo audio in the 1980's.

A/V SYNC

At least one thing has become worse since 1983. The issue of audio-to-video synchronization (a.k.a. lip-sync) has grown into a gigantic mess. It seems that the more digital video and audio technologies that are introduced into a system, the more likely lip-sync errors will be. There is now a whole new market for both measurement and correction equipment. Tektronix developed a system called the AVDC100 that via a video watermark allows for automatic lip-sync correction. The company also has a system originally developed by Intera that allows lip-sync to be checked after transmission.

As we have discussed, the golden rule is that it is always best to correct the sync problems as soon as they are created. Sometimes delay is unavoidable, such as in certain digital video effects devices. The trick is that while the video is being processed, and therefore is being delayed, the audio must be delayed as well. To that end, Pixel Instruments has developed a system that allows for silent adjustment of audio delay that can actually track the changing video delay. I have tested the system and to my ears it does a remarkably good job masking delay adjustments and could prove to be very useful.

To summarize, the last 20 years have brought us from analog to digital, slowly from VTRs with four audio channels to those with eight or more, and from mono to 5.1 Surround Sound. We have also slipped in sync and gotten variably louder, but have figured out how to measure and correct both problems. The pace of audio developments seems to have reached breakneck speeds in the last few years, and I for one cannot wait to see (and of course hear) what will happen in the future.

Tim Carroll is a consultant based in New York City. He is presently the chairman of the audio section of the Systems Evaluation Working Group of the ATSC. He enjoys answering email sent to him at tjcarroll@icce.org.

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From Tape to Disk: Plenty of Advan

1983 marked the dawn of digital storage

by Karl Paulsen

Looking back at the past 20-year history of videodisk recording technologies for the moving image would be incomplete without first taking a glimpse at the development of the magnetic disk drive—which is about 50-years old this year.

Magnetic recording first was proposed in 1888, some 43 years after the discovery of magnetic polarization rotation. In the early 1950s, the commercial development of storing data in a semi-permanent format was in its infancy.

The earliest method for storing data employed cylindrical drums, whereby magnetic patterns were deposited and then recovered by a device that would later become the magnetic "head." In the first generation disk drives, the heads actually contacted the surface, severely limiting the life of a disk drive. IBM engineers later floated the head above the magnetic surface, a fundamental principle that would become the mainstay methodology of the magnetic disk recording technology even through today.

The first manufactured hard disk, introduced Sept. 13, 1956, was the IBM 305 RAMAC, which stood for Random Access Method of Accounting and Control. With a storage capacity of five million characters, it required 50, 24-inch diameter disks, with an aerial density of 2 kb per square inch - as compared to gigabits per square inch today. The transfer rate of the first drive was 8.8 kb per second, and the cost for an IBM model 355-2, single-head drive, at that time, was $74,800, or $6,233 per megabyte. It was 1973 before an 8-inch floppy drive was available and 25 years before IBM would introduce the personal computer, or PC, in August 1981.

By 1962, IBM introduced its model 1301, the first commercially available 28 MB disk drive with air-bearing flying heads, which rode above the surface at 250-microinches, a decrease from the previous spacing of 800-microinches. The first removable disk pack was brought into production in 1965 (remaining popular through the mid-1970s). A year later, ferrite core heads became available in IBM's model 2314, later introduced in the first modern PCs.

The IBM Winchester drive, introduced in 1973, bore the internal project name of the 30-30 Winchester rifle and employed the first sealed internal mechanics. The IBM 3340 Winchester drive had both a removable and a permanent spindle, each with a capacity of 30 MB. The drive's flying head height had now been reduced by 47 times, from the original 800-microinches to 17-microinches.

VIDEO MEETS DISK STORAGE

Seagate introduced the 5.25-inch form factor ST-506 in 1980, featuring four heads and a 5 MB capacity. When IBM introduced the PC/XT, they would use a 10 MB model ST-412 drive, which set the standard for the PC-compatible future. The 3.5-inch form factor RO352 was introduced in 1983 by Rodime, which remained the universal form factor for modern hard drives through the infancy of modern mobile computers until the 2.5-inch was introduced in 1988.

The recording of moving images onto a rotating magnetic storage surface had an equally parallel development. Alongside the development of magnetic recording tape, random-access video-on-demand—predicted in 1921—was said to become available as early as 1950. The concept of recording video onto a spinning platter was demonstrated in the late 1950s, just about the same time as the first disk drive was introduced, (as well as NTSC, adopted in 1954). A rudimentary plastic videodisk was demonstrated at the Salone Internazionale della Tecnica in 1957 by Antonio Rubbiani. A few years later, technologists at CBS developed a procedure for a videodisk.

Videotape recording became commercialized in 1956, and it wasn't until 1964 that 3M showed a snow-plagued videodisk, nonetheless demonstrating publicly that this format had a future. The most recognized first-generation disk recorder would be the Ampex HS-100, introduced in the 1967 time frame, which stored 1800 NTSC fields using analog technology and four stepper-driven recording head units that covered the surfaces of two rotating metal disks. The HS-100 marked the entrance for sports replay and set the standard for slow-motion, instant replay and non-linear recovery of moving images.

The developments for recording moving images to spinning disks continued to develop in lockstep with disk drive technologies. Strongly driven by graphic arts, video recording technology for broadcast commercial applications went into full swing when Quantel introduced the Paintbox in 1981. With no D-1 tape available, digital images were offloaded onto either 8-inch floppies or the FSD removable hard drive, (from Control Data/Hitachi/NEC), then exchanged between proprietary, Quantel-like systems. The Quantel Harry, unveiled in 1986, became the first NLE that used digital technologies for multi-layering of live video. Harry remained the benchmark for television graphics (through Henry and Hal, circa 1992) and, with the 1993 introduction of the Dylan fault-tolerant drives, set the stage for RAID-like protected video storage systems going forward—albeit via proprietary and dedicated systems.

It was only 20 years ago, in 1983, when the storage of computer data began its migration to the compact disc.

CDs EMERGE

And it was only 20 years ago, in 1983, when the storage of computer data began its migration to the compact disc with both NV Philips and Sony showing real products for the first time in November 1985. A year

es in Store

later, Compact Disk-Interactive (CD-I) was announced by the same companies; followed by CD-ROM/XA (Compact Disk-Read Only Memory/Extended Architecture). In 1990, CD-WO and CD-MO were developed, and the age of optical storage was launched into full orbit. The laser disc would be employed first in the arcade game Dragon's Lair in 1983. It was 1997 before the first DVD-movies went on sale.

In the early 1980s, the concept of a graphics-based stillstore was born with the Ampex ESS (electronic stillstore). The first all digital NLE was introduced in 1983, as the last 2-inch quad video tape machine was shown, and one year after the first sale of original Betacam-format VTR. Abekas would soon unveil an affordable, small-form factor disk-based still recorder, the A42, in 1985, marking its entrée into the digital disk-recording marketplace.

COMPLIMENTARY COMPOSITING

From 1984 going forward, more discrete production quality moving image digital-disk recording products appeared. Products from companies such as Quantel and Abekas also brought out complimentary compositing systems. For example, Abekas produced a stand-alone digital-disk recorder, the A60, which recorded 25 seconds of NTSC video onto two Y/UV disk drives, and gave rise to the Abekas A62 (in composite format) and the Abekas A64 (in component digital) formats—pairs of A60 series drives linked with video mixing, layering, and graphics control processors.

It was 1989 when Avid Technology introduced and shipped the original Avid/1 Media Composer, setting off the digital-desktop editing revolution that would change video and film production forever. The non-linear editor used proprietary motion-JPEG imagining on a Macintosh platform, and external SCSI drives for storage.

Since the introduction of the early video-disk recording device, the television industry has functionally transformed the disk recorder from a sports replay device into a tool with extensions well beyond those first single-purpose applications. Even with the 1991 introduction of HDTV disk recording by Philips, with the HDDR-1000; it would take two or three more years before disk recording concepts would mature to the level that a professional video server could be developed and sold, e.g., one of the first Tektronix Profiles, introduced in 1995.

Today, throughout major broadcast and content-delivery centers, spinning disks are becoming the mainstay for moving image asset storage and playback. What once took 50, 24-inch diameter disk drives to store just 5 MB of 7-bit data; we now see redundant mirrored multi-terabyte disk arrays attached to protected DVD-RAM storage in similar footprints consuming an area about the size of the average living room. We can only wonder where the next 50 years will take us.

Introduced in 1985, the Ampex ESS-5G Graphic Composition and Storage System boasted a whopping (for its time) capacity of 160 MB and even had a crude asset management system via an "on-line cataloguing function."

Karl Paulsen is vice president of engineering at AZCAR (www.azcar.com) and the author of the book "Video and Media Servers: Technology and Applications-2nd Edition" (published by Focal Press). Contact him via email at: karl.paulsen@azcar.com.

The Future of Television?

You might not have noticed that there's a word in every language for someone who makes predictions. That word is idiot.

Ergo, when my boss approached me about writing about TV technology 20 years in the future, it took me about the duration of an HDTV luma sample to consider the request. I mean—heck— just look at two of those words. Twenty years ago practically no one had ever even heard of HDTV, and, as for samples, every digital videotape format except for Ampex's Octoplex had yet to be invented.

"But, Mario, what's an Octoplex? And who's Ampex?"

You've illustrated my point exactly. So, when the boss suggested a peek one score hence, I replied, in my inimitable style, "Yeah, right." To my misfortune, that was interpreted as "Yes, of course," and I was given the assignment. I'd still have pulled out but for one thing. I like to eat.

So I gathered up crystal ball, tea leaves, tarot deck, and bones and was about to buy a ticket to Delphi when Nellie the Neuron bade me look at a hitherto unnoticed file on my steam-powered laptop, 2023TVTnews.doc. Well, what do you know? Through what Kurt Vonnegut called a chronosynclastic infundibulum and what we TV techies know as a timecode hiccup, an article from the future somehow landed on my hard drive, just when I needed it! Whew!

I ain't seen this stuff before, either, so I take no responsibility for what it says (but then when have I ever taken responsibility for anything?).

Pals, welcome to 2023.

Washington

The Federal Communications Commission announced today that it has granted the 43rd six-month extensions of time to construct digital television transmission facilities to 303 of the 304 stations that requested them. The 304th was chastised by e-mail using moderately strong, but neither obscene nor indecent, language.

The National Association of Broadcaster (NAB) immediately commended the move. "We are pleased that the government is cooperating in speeding the transition to digital broadcasting at a reasonable pace."

Sole NAB member (and 2,000-station owner) ACFN Warner joined in the praise, cautioning that it was premature to discuss a shutdown date for analog transmissions. The broadcaster pointed to the 212-member Jones family as a reason why analog TV was still necessary. "The Joneses have spread across the U.S.A., with one relative in each market. They don't own digital-TV receivers, and they all vote." Congress immediately passed a resolution asking the FCC to extend analog broadcasting as necessary to keep up with the Joneses.

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Las Vegas

TiVo, the largest exhibitor at the NAB Show, announced a breakthrough in magnetic recording. The company calls it LDT (linear disk technology).

"If you think of the information on a disk as being recorded in a spiral," said a company press release, "then you can think of LDT as a sort of unwound disk. We've discovered that information may be recorded on a magnetically coated film or, as we like to call it, 'tape.' The tape doesn't offer the random access to programming that our customers have become accustomed to, but it does allow programming to be exchanged between machines in a convenient physical package."

TiVo developed a portable Containment and Spooling System (CASS) for the tape. The original was the size of a small suitcase, which was acceptable but inconvenient. After determining that the tape did not have to be as wide as the diameter of a typical disk, however, TiVo engineers managed to reduce the size of the container to about that of a palmtop computer. The smaller system is dubbed a "CASS-ette."

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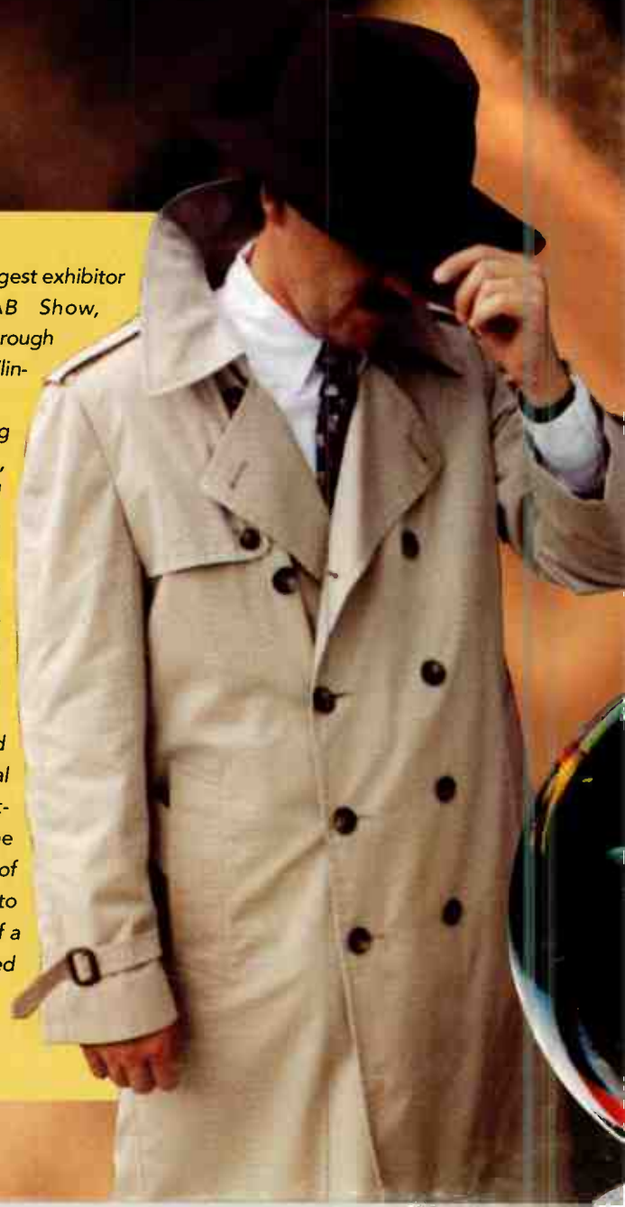

Tokyo

NHK, the Japan Broadband Corporation, has called upon western governments to create new alphabetic characters. After the company developed HDTV, it moved on to ultra-HDTV, with twice the resolution of HDTV in each direction. Then came very-HDTV, with twice the UHDTV resolution. Whoppingly-HDTV came next, followed by eXtremely-HDTV a few years ago, with 32k x 16k resolution.

"Viewers of XHDTV are very pleased with the pictures; they offer a sense of reality that cannot be achieved with mere WHDTV," said NHK's Director of Ongoing Resolution Increases. "But, someday, as human beings improve, there will, of course, be a need for finer detail. Unfortunately, we will soon run out of letters in Romaji [the Japanese term for the Roman alphabet]."

NHK believes its labs can increase image resolution indefinitely, but, of course, there are only 26 letters in the English alphabet. "If something is not done, television might never achieve the goal of a trillion pixels per frame."

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London

Next year, on the 60th anniversary of British television's move from 405-line to 625-line analog TV, the UK government will begin to phase in digital HDTV broadcasts. A new channel, BBC-26, will initially carry only one hour of the HDTV broadcasts per week, but it is expected that the other 25 BBC channels will soon add the higher-resolution signals, followed by commercial broadcasters.

"The Americans have been saying that we missed the HDTV boat when we adopted standard-definition digital television in 1998, but now the joke's on them," said the government's Minister of Transatlantic Gloating. "As we did when we leapfrogged their 525-line system in 1964, we will now have more detailed pictures than any U.S. channel's."

The transition is expected to be completed rapidly. Current plans are to shut down SDTV broadcasts no later than 2050.

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Mumbai, India

On a visit to Bollywood, Motion Picture Association president Jack Valenti, looking remarkably good after his recent age-reversal treatments, decried "wishy-washy" anti-piracy efforts. "Those who would destroy the livelihoods of movie moguls must be stopped," he said.

"Internet content-protection and digital-watermarking schemes have provided only halfway measures. No matter what the electronics industries have come up with, viewers are still able to tell others what they saw and heard."

Valenti compared the problem to the "living books" at the end of the movie Fahrenheit 451, people who could recite the complete content of books that might be burned, "depriving publishers of any revenues that might be forthcoming at the end of the book-burning era." A proposed solution involves advances in inductive neurology. Through appropriate stimulation of the sensory cortices of the brain, viewers will get perfect pictures and sounds—better than XHDTV—as well as smells, tastes, and feel. When viewers unplug themselves, a quick data burst will eliminate all memory of the experience. "Not only will there be no more oral piracy, but audiences will be willing to see the same movie over and over again."

Asked whether the proposed anti-piracy direct-stimulation and memory-destruction system was based on some science-fiction movie, Valenti replied, "None that I can recall."

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San Francisco

Scientists at Dolby Laboratories say they have determined that a sensation of "true" Surround Sound requires 60 separate loudspeakers, arranged in an egg-like shape around the listener. Fifty-nine of the speakers need full fidelity, but the 60th requires only 99 percent of the bandwidth used by the other channels. The system is, therefore, called 59.99.

"We are pleased that we can finally put an end to the need to keep increasing numbers of Surround Sound channels," said the manager of the "ultimate surround" project. DTS applauded the move but indicated its research showed 69.99 was better than 59.99.

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Somewhere Out There

Fragmented information suggests that the central master control room for all of the world's television and digital-cinema content is to be located on the planet Mars. Reasons for the remote location include freedom from terrorists and union organizers and low-humidity and -temperature conditions for media storage.

Preliminary plans reportedly called for just a single master-control operator. Although ACFN Warner International Centralcast was said to be unconcerned about sleep, meals, and bathroom breaks, age-reversal treatments were considered too expensive a mechanism to deal with senility and death.

A breeding pair of technically competent humans is, therefore, being sought. Benefits include all the programming you'd ever care to watch. To apply, just think of the job—now.

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Photo: Steve Jordan

THE BIG PICTURE

Frank Beacham

DVD: A Simple, Elegant Idea

In the early 1990s, the Media Lab at the Massachusetts Institute of Technology was knee-deep in research on digital television. The lab's wildly brilliant professors and students put television technology under a microscope and frequently questioned—in a highly public manner—the status quo of a very conservative industry.

America's broadcasters hated it.

I can't count the number of times after witnessing a compelling demo at the Media Lab that a broadcasting executive would pull me aside and warn that the lab's founder, Nicholas Negroponte, was a "loose cannon" whose radical ideas were beyond reality. The lab, I was told, was full of academics who just didn't understand the real world of the broadcasting business.

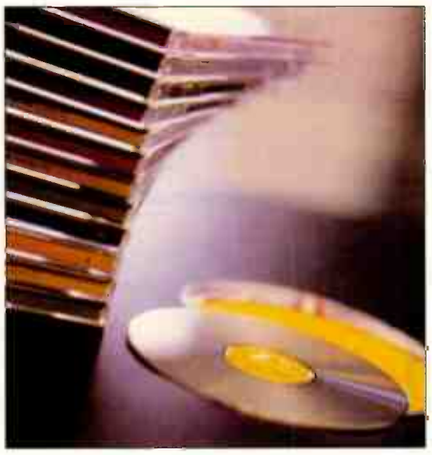
A day I'll never forget was my first interview with Andy Lippman, an early digital television guru and now senior research scientist at the lab. I sat in his office on a swivel chair, holding a tape recorder, as he circled the room giving me a rapid-fire introductory lecture in Digital TV 101. I got dizzy as I swirled in a continuous circle, trying to keep up with his frenetic pace.

THE 'PAPERBACK MOVIE'

It took months to absorb what he told me in that single day, but the memento he gave me stands as a blunt reminder of how the DTV transition is actually playing out. As I left, he tossed my way a 3M digital data compact disc with the following label: "Paperback Movies 1, Electronic Publishing Group, MIT Media Lab."

It's what we call a "paperback movie." Hang on to it, he suggested. The confused look on my face demanded further explanation.

"The whole idea of paperback movies is that you distribute the movie on a medium so inexpensive that you fundamentally only sell the license to view it," Lippman explained. "Like a paperback book, it's so cheap you would never go to the trouble or the expense of copying it."



The movie on the disc is protected with encryption. "The advantage of encryption is it allows you not to care what happens to the disc," he continued. "It can be a giveaway."

Of course, what I was given that day was an early prototype of a DVD, a technology that would become not only the most successful commercial deployment of digital television, but the most popular consumer electronics product launch in history.

EVERYMAN'S DIGITAL TV

While broadcasters still struggle to make something of digital television, Andy Lippman and Nicholas Negroponte have moved on to work on the technologies of the next 20 years. Looking back, we can thank those "loose cannons" for what is a simple, elegant idea—a kind of everyman's digital television that caught the imagination of the masses.

It is difficult to comprehend how much, in only six years, the invention of the DVD has changed consumer television technology. More than 17 million DVD players were sold in 2002 alone, the most units ever since its introduction to the market in 1997. Shipments of stand-alone DVD players in 2003 now total nearly 9 million units—an increase of 21 percent over 2002. The Consumer Electronics Association (CEA), the group that tracks the numbers, reports that sales continue to soar each month.

The latest sales figures suggest that DVD is now having a major effect on TV set configurations. During July, factory-to-dealer sales of TV/DVD combinations increased by 84 percent to nearly 97,000 units. Stand-alone DVD player sales reached nearly a million units for the month.

Another significant DVD fact is that more than two out of five (42 percent) home computer owners now have DVD drives. One in 10 of these have the capability to write DVDs. Interestingly, the CEA has found that consumers are showing widespread acceptance of DVD writer technology. This number is expected to climb rapidly as DVD prices continue to decline and more users discover they can make digital video productions of high technical quality with bundled software and inexpensive camcorders.

HOME VIDEO MARKET

DVD is also having a huge impact on the home video market. The New York Times reported this summer that home video sales accounted for more than 58 percent of Hollywood's income last year, more than twice as much as box-office revenues. Sales of DVDs to consumers are the biggest, most profitable and fastest-growing component of that revenue.

DVD sales and rentals are "becoming, in a lot of ways, the primary market in determining whether to 'green light' a movie or not," Chris McGurk, vice chairman of Metro-Goldwyn-Mayer Inc., told the Times.

Selling, rather than renting, DVDs is the most profitable scenario for content creators. A studio may net about a $12 profit from the $20 price of a DVD. However, motion picture studios make about $5 on the sale of a $10 theater ticket and may make only pennies from a video rental.

DVD technology offers a major new direct-to-home conduit around cable, satellite and broadcast outlets. New methods of distribution are rapidly emerging. Independent filmmakers are now finding national distribution in subscription DVD movie clubs, television producers are able to generate income from series by packaging them in box sets for direct sale, and small-scale niche video producers can distribute DVDs on-demand through new duplication methods that emulate print-on-demand publishing.

"Paperback TV"—a simple, elegant, low-cost way to distribute digital television without a huge investment and complex delivery infrastructure. Gosh, those crazy academics might have been right after all!

Frank Beacham is a New York City-based writer and media producer. E-mail: frank@beacham.com.

DIGITAL TV

Charles W. Rhodes

The 'L' and 'T' of Digital Terrestrial Broadcasting

Everyone knows that the NTSC terrestrial TV broadcasting service is based on the FCC F(50,50) Propagation Plots that give the field strength versus distance for a given Effective Radiated Power (ERP) and Height Above Average Terrain (HAAT). In effect for more than half a century, the field strength is given in dB above 1 microvolt/meter for the best 50 percent of locations for 50 percent of the time.

This planning technique obviously worked and is pretty well followed by broadcasters overseas for their own analog terrestrial TV broadcasting systems. One reason this was so successful is the gradual degradation of picture quality as the SNR decreases with distance. Now comes digital terrestrial TV broadcasting(DTTV). Every DTTV system has in common the well-known "cliff effect," where reception fails below a certain threshold SNR, and above which, reception is "picture perfect," regardless of the received SNR. In the deliberations leading to the planning factor for our DTTV service there was much discussion over how to deal with this "cliff effect." Surely such a service would not be acceptable to the public if at the edge of coverage, it worked at the best 50 percent of locations (the "L" factor) and for only 50 percent of the time (the "T" factor). They settled for the same L factor (50 percent) at the edge of coverage and changed the T factor to 90 percent of the time. You won't find any F(50,90) propagation curves in the FCC Rules, but you can readily determine your F(50,90) distance and compare it with your NTSC Grade B contour:

1. From the appropriate F(50,10) curve, at the distance of interest, subtract the corresponding F(50,50).
2. Then subtract this difference from the F(50,50) value at that distance. This difference is F(50,90).
3. F(50,10) is higher than F(50,50) by the amount that F(50,90) is below F(50,50).

If your station broadcasts NTSC and DTV in the UHF band, your F(50,90) contour may lie somewhat outside your Grade B NTSC contour. If your station broadcasts NTSC in the VHF band, and your DTV channel is in the UHF band, your F(50,90) contour is probably somewhat inside your Grade B NTSC contour. Suddenly, your F(50,90) contour has momentous implications for your business. It is a matter of replication.

POWER PENALTY

No one could possibly imagine how a service could be commercially successful if it works only 90 percent of the time, but that was the decision taken by the broadcast industry and used by the FCC. Signal propagation is not deterministic, but probabilistic—it can only be expressed statistically. For example, as either the L or T factor increases, there is a penalty in terms of the radiated power required. Statistically speaking, an infinite radiated power would not guarantee 100 percent coverage, even though you can closely approach 100 percent, given enough power and that is what this column deals with quantitatively this month.

I recently became interested in the L and T of DTTV upon learning that a bill has been introduced in Congress, which—if passed—would order the FCC to mandate that all DTTV broadcasts be at such power that DTTV coverage would match that of NTSC at its Grade A contour on a certain date. That is simple enough(instead of 64 dBu at the Grade B contour, the goal posts would be "teleported" to the Grade A contour, perhaps 10 miles closer to the transmitter. But, there's a caveat: The Grade A contour is supposed to have a 70 percent location factor, not 50 percent. So it has a 10 dB higher field strength to support this 70 percent location factor and a 90 percent time factor.

What if this legislation were to pass in its present form? The interpretation could be that the F(70,90) Propagation Plots need to be devised (simple enough). But what if it turns out that the installed DTV transmitters cannot radiate enough average power to produce that much field strength at the NTSC Grade A contour of the associated NTSC station? If higher power would be required than is installed, such power increases for higher L factors than 50 percent would concern broadcasters. This column will explain how different L and/or T factors can be taken into account by broadcasters.

The field strength required for an increase in L and/or T relative to F(50,50) is:

$$F(L,T) = F(50,50) + k(L)*\rho L + k(T)*\rho T$$

The value of both k(L) and k(T) is given in Fig. 6-20 of Blair Benson's "Television Engineering Handbook." I cannot publish this figure so some salient data is given here:

70% k(L) and k(T) = -0.55
90% k(L) and k(T) = -1.28
95% k(L) and k(T) = -1.68
98% k(L) and k(T) = -2.08
99% K(L) and K(T) = -2.30

For other L or T values, consult Fig. 6-20, which also gives two simple formulas:

$$\rho L = 4.74 \log f - 1.45$$

(where f is the frequency at mid-channel in MHz) (2)

and

$$\rho T = \frac{F(50,10) - F(50,50)}{1.282} \quad (3)$$

Rho T depends on the difference between F(50,10) and F(50,50) for your particular channel, which varies with the distance in question(the greater the distance, the greater the spread between F(50,10), and

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L and T

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F(50,90) and hence rho T but not rho L. Rho L is strictly a function of frequency.

Table 1 gives the field strength of a channel 45 DTV transmitter; ERP=30 dBK, HAAT=1,000 feet, for various distances 15 to 65 miles for F(50,10), F(50,50), F(50,90), F(50,95), F(50,98) and (50,99). The left side of Table 1 deals with F(50,10) and F(50,50) from the FCC rules and their difference, which is going to be used to compute field strength at various (L) values other than 50 percent using equation (2). The right side of Table 1 gives the field strength predicted at each distance for a range of T factors from 50 percent to 99 percent. Table 1 is for a 50 percent L factor.

DTV COVERAGE DISTANCE

In order to correct the field strength for any T factor other than a 50 percent L factor, calculate just the F(50,90) field strength for various distances and you will have zeroed in on your DTV coverage distance. The FCC criteria is 41 dBu, which is based on certain idealized conditions. There is little field measurement data that confirms these ideal conditions exist; much more data suggests that the realistic value is at least 10 dB higher. The distance at which your DTV ERP gives 41 dBu may correspond to your NTSC Grade B contour; this is called replication. If your F(50,90) contour for a 51 dBu field strength lies near your Grade A coverage, then within your NTSC Grade A contour, a passive, directional, rooftop antenna whose directivity meets the FCC criteria for DTV should give reliable reception. Outside of your NTSC Grade A area, you will probably need a Low Noise Pre-amplifier designed for DTV to get reliable DTV reception. The phrase "Designed for DTV" means that its noise figure is less than 5 dB in my opinion, because for DTV, it must work in much weaker fields to capture DTV signals.

Table 1 provides a model from which you can devise a table for your DTV channel's F(50,10) and F(50,50) versus distance. Table 1 shows how the field strength decreases as you seek higher time factors. Don't panic when you see how low the field strength is at 50 miles for a 99 percent time factor, for example. Perhaps population density approaches zero 35 miles from your transmitter. The station model used here will give reliable reception to nearly 45 miles where its field strength falls to 50 dBu, which I consider marginal for DTV unless the viewers employ Low Noise Pre-amplifiers at their rooftop directional antennas.

Table 2 deals with Location factors of 70 percent and 90 percent. For example, for 70 percent of the locations k(L)=-0.55 multiply this by rho L for your DTV frequency to get the reduction in field strength for this higher criteria of locations served. This reduction in field strength should be applied to the figure you got from Table 1. For example, Table 1 gives 50.0 dBu for the best 50 percent of locations 99 percent of the time. Let's assume that I am right that 50 dBu is the minimum usable DTV field strength. At 45 miles, only 50 percent of locations will have reception with a passive rooftop antenna, but with a well-designed Low Noise Pre-amplifier for DTV, we may lower this to below 43 dBu. In that case, we have 7 dB more margin with which to reach a larger number of viewers that 50 percent at that distance. For example, we have 7 dB and are on Channel 45; nearly 70 percent of locations require 6.6 dB more field strength, which means they'll have 7 dB, so our station will serve more than 70 percent of the viewers at 45 miles. If your sales folks believe that this additional population to be served is significant, they will want to promote the use of LNA in such communities. Conversely, if there are few people out there, nothing is to be gained. It is a matter of where the population is (isn't it?) and each station has a different problem with DTV coverage.

To my knowledge there has been no experimental verification that T factors above 90 percent are as given in the literature; perhaps it didn't matter until now. The possibility of realizing T>90 percent while NTSC is also being broadcast is limited by co-channel and/or adjacent channel interference constraints.

Table 1: Field Strength vs Time Factors for a hypothetical DTV station on channel 45, ERP = 30 dBK, HAAT = 1000 feet.

				k(T)				
				- 1.28	- 1.68	- 2.08	- 2.30	
Dx	F(50,10)	F(50,50)	diff.	ρt				
					F(50,90)	F(50,95)	F(50,98)	F(50,99)
15	95.9	95.2	-0.7	-0.50	94.6	94.4	94.2	94.1 dBu
20	90.3	89.1	-1.2	-0.94	87.9	87.5	87.1	86.9
25	85.4	83.5	-1.9	-1.48	81.6	81.0	80.4	80.1
30	80.8	78.0	-2.8	-2.18	75.2	74.3	73.5	73.0
35	76.4	72.6	-3.8	-2.96	68.8	67.6	66.4	65.8
40	72.4	67.3	-5.1	-3.98	62.2	60.6	59.0	58.1
45	69.3	62.4	-6.9	-5.38	55.5	53.4	51.2	50.0
50	66.7	58.3	-8.4	-6.55	49.9	47.3	44.7	43.2
55	64.2	54.8	-9.4	-7.33	45.4	42.5	39.6	37.9
60	62.0	51.7	-10.3	-8.03	41.4	38.2	35.0	33.2
65	60.0	48.8	-11.2	-8.74	37.6	34.2	30.6	28.7

(1) ρ = rho
(2) The Field Strength values given in this Table will be exceeded by the % time shown in each column at the best 50% of locations.
(3) For other L factors, see Table 2 which allows conversion of data from Table 1 to 70% or 95% L factors.

Table 2:k(L)* r(L) for VHF & UHF Channels

Channels	ρ(L) 70%	ρ(L) 70%	* k(L) 90%
2	6.9	- 3.8 dB	- 8.8 dB
4	7.2	- 4.0 dB	- 9.2 dB
6	8.0	- 4.4 dB	-10.2 dB
7 - 13	9.4	- 5.2 dB	- 12 dB
	-/+ 0.2	-/+ 0.2 dB	-/+0.2 dB
14	11.2	- 6 dB	- 14.3 dB
38	11.8	- 6.5 dB	- 15 dB
64		12.2-14.3 dB	- 15.7 dB

I want to acknowledge the help of Bob Plonka, formerly with Harris Broadcast, for explaining, how these L&T calculations are to be done. For the background on how the Grade A and Grade B contours came to be, see "Understanding Television's Grade A and Grade B Service Contours" by R.A. Connor, IEEE Transactions On Broadcasting, V. 47, No. 3, 2001. You might also read "DTV Coverage and Service Prediction, Measurement, and Performance Indices" in the same publication, by O. Bendov, J.F.X. Browne, C.W. Rhodes, Yiyan Wu and P. Bouchard. We will be presenting an update at the IEEE Fall Broadcast Symposium in Washington, D.C. on Oct. 19. I hope to see you there.

Charles Rhodes is a consultant in the field of television broadcast technologies and planning. His career includes work for Philips Laboratories, Scientific-Atlanta, Tektronix and the ATTC. In addition, he is a SMPTE and IEEE fellow, and was awarded the David Sarnoff Gold Medal by SMPTE. He can be reached via e-mail at charleswrhodes@worldnet.att.net.

SBE REPORT

Clay Freinwald

Broadcasters Get AMBER Alert Help

For television broadcasters, the Emergency Alert System (EAS)—and especially AMBER Alert messages—present a number of challenges. The problem is that the EAS "Header Codes" (the data burst portion of the EAS message) do not contain the type of specific information necessary for a station to fully participate in the recovery effort. The specifics are usually contained in the "Voice-Portion" of the EAS message, and that is only transmitted once.

TV broadcasters who participate in broadcasting AMBER Alert information need more than the rather sketchy information in data bursts that will enable them to provide meaningful and helpful information in their crawls. What is needed is a means of distributing this additional information as well as the ability to handle pictures.

A pilot project to provide a one-stop AMBER Alert information portal is being developed and could be in operation by September or early October.

The Washington State Emergency Communications Committee (SECC), which I also chair, has been searching for a method to distribute information about AMBER Alerts to stations since it began to develop the Washington state AMBER Alert program in November 2001.

PILOT PROJECT

A pilot project to provide a one-stop AMBER Alert information portal is being developed and could be in operation by September or early October. The AMBER Alert Web Portal will allow broadcasters and the public to access information about AMBER Alerts, including detailed information that cannot be transmitted in the AMBER Alert EAS message, as well as photographs of the victims and their abductors.

Endorsed by the National Center for Missing and Exploited Children, the strategic partnership to develop the project was created by the Washington State Dept. of Information Services, the Washington State Patrol, the state's Emergency Management Division, the Washington State Department of Transportation, the Washington State Association of Broadcasters, the Washington Association of Sheriffs and Police Chiefs and E2C (Engaging & Empowering

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SBE Report

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Citizenship)/Earth 911.

The AMBER Alert Web Portal is far more than just a Web page where broadcasters and the public can find information about an AMBER Alert. First, it will not replace the EAS-based AMBER Alert activations, but will enhance the current plan by allowing local law enforcement in cities and states to post up-to-date information about an abducted child to a single AMBER Alert Web Portal.

The instant a law enforcement agency posts information about an AMBER Alert to the Web Portal, the Portal will "push" that information out to any person who has subscribed to receive it (there is no cost to subscribe). Law enforcement personnel, broadcasters and citizens will have the option to choose to be notified of alerts and status updates via e-mail, fax, text-enabled cell phone or other Web service notification methods such as paging or personal digital assistant (PDA).

Broadcasters will no longer need to call the law enforcement agency periodically to receive updated information or cancellation notices. That information will be pushed to those who subscribe, notifying them that there is an update, cancellation or other new information. They can then go to the Web Portal site to see the details of the update.

The portal will use a geographic information system to provide map-based search capabilities and convey location-based information to the public. Information on the portal can be displayed in visual, text or audio format, for both local and extended areas.

This information can then be used by participating TV stations for updating their crawls or as the basis for more extensive coverage of the event.

SUCCESSFUL TESTING

The AMBER Alert Web Portal Pilot Project has undergone two highly successful tests.

The initial test of the AMBER Alert Web Portal, which took place May 29, 2003, was an unqualified success. When the Alerts were posted, the Web Portal's software automatically notified pagers that each test participant had been given, as well as text-enabled cellphones of participants that had been programmed into the system. E-mail notifications of the AMBER Alert were received on the computer workstations at each participant's desk. The system worked as expected, and many additional features were suggested to the design team for incorporation into the AMBER Alert Web Portal for the second test.

The second test, on July 7, included more states. In this test, two different AMBER Alert scenarios were developed, and information relating to those two test incidents was relayed as though they were real alerts. Local law enforcement departments in different Washington state counties were presented with a fact situation detailing a child abduction. Each agency then worked with its emergency management agency to send a test EAS message (off-air) that indicated to stations that a test was in progress. Following the EAS message, the various law enforcement agencies posted the information about their respective incidents to the Web Portal. The Web Portal then pushed out notification of the incidents and the information to subscribers via e-mail, pager, text-enabled cellphone and PDAs. This notification prompted subscribers to check the Web Portal to access further information, including the EAS message script and photos of the victim and the alleged abductor. Subscribers were notified of subsequent updates of the information from each local law enforcement agency as the Web Portal pushed that new information or notices of the updates to them.

Photo: California Highway Patrol

An electronic highway sign displays an AMBER Alert in California.

In the engineering tradition, the AMBER Portal project is indeed a "technical solution" to a problem.

Further refinement of the AMBER Alert Web Portal is ongoing and plans are being finalized to put the Portal into general use. State agencies and state broadcasters associations from around the country have expressed interest in becoming a participant in the AMBER Alert Web Portal.

As you can see, there is a lot of behind-the-scenes work being done to enhance the AMBER Alert program and to provide television broadcasters with the information necessary to hopefully raise the recovery success level even higher. To take advantage of this enhancement, those stations that are manned for the AMBER Portal will require new procedures beyond having their EAS decoder automatically load a small CG (character generator) that can automatically insert the crawl. For those that are unattended, perhaps hardware and software solutions will follow that will enable automatic updates of your AMBER crawl to include the data that is going to be available on the Portal.

The work of the Society of Broadcast Engineers in the area of EAS is never without challenges as well. In the engineering tradition, the AMBER Portal project is indeed a "technical solution" to a problem. I am fortunate to not only chair the SBE EAS Committee, but also the Washington State SECC, and am able to participate, at close range, in finding solutions to these issues with the goal of making EAS better for all. You are welcome to join. If you have a thought or a question, drop me a note at *k7cr@wolfenet.com*

If you are interested in subscribing for AMBER Alert information when the system becomes operational, go to *www.kids911.org* click on the subscription button and fill out the information.

Clay Freinwald is the EAS committee chair for the Society of Broadcast Engineers.

USER REPORT

Fujinon Goes Beyond Reality

by Ken Waddell
Facilities Manager
Beyond Our Reality

NEW YORK

Beyond Our Reality is a production company that provides a wide range of services, from standard- and high-definition nonlinear editing to fully equipped production crews. Our projects vary widely, from producing commercials, feature films and music videos, to shooting ENG style for newsgathering and television series projects.

With a client list that includes MTV, VH1, Nickelodeon, Showtime, Lifetime, ABC, CBS, NBC, HBO, The Sundance Channel and IFC, among others, we're focused on bringing our clients the best possible audio and video footage.

That's why we selected two Fujinon HA22x7.8 HD telephoto ENG-style and one HA13x4.5 HD super-wide-angle lens to go with our Sony HDW-F900 HDTV cameras. Although HD has not yet taken off with consumers, my clients want the best images they can get and the ENG-style lenses from Fujinon really enable us to capture the essence of a quality production. Even if the footage I'm shooting will eventually be downconverted to SD for final distribution, the HD picture is still that much cleaner when we start the editing process.

We've used the Fujinon HD lenses on everything from a McDonald's and Volkswagen commercials to reality-based TV shows like the infamous (but never aired) "Liza & David" show for VH1. All shared an interest in capturing the highest quality at the front end.

Ken Waddell uses a Sony HD camcorder and a Fujinon lens to shoot a McDonald's commercial.

POTENTIAL OF HD

Beyond Our Reality has been in business for 13 years and began shooting in HD in early 1998 because even then we saw the potential that HD had to offer. We're still one of the few companies in New York that shoots ENG-style HD projects. For us, HD provides high production value without the cost and hassle of 35mm film.

When shooting on the street, which we do quite often, the compact size and low weight of the camera/lens combination are critical to our success. Fujinon lenses, when compared to others in the same category, offer a better picture, greater focal length and more speed. Plus, product support is never an issue with Fujinon.

The Fujinon HA22x7.8 HD lens has a great zoom range that enables us to get creative in shooting. Using the 2x extender on this telephoto lens allows us to shoot our subjects at a reasonable distance. And HD images really shine in close-ups.

The main thing, however, is that the lens is very lightweight yet fully featured to give us a range of shooting options. The images look so good that I've had clients ask us to use the new Fujinon lens on an analog Betacam camera because they (and we) believe it makes the analog picture sharper and appear more in focus.

I think anyone shooting video these days should be considering HD, simply for the shelf-life it gives to a project. The demand for HD programs is increasing almost daily, now that a number of cable and TV networks have committed to broadcasting it to people's homes.

As long as you use a high-quality camera and invest in a good lens, like those we have from Fujinon, clients will clearly see the difference it brings to their video productions and your business will benefit immensely. ■

Ken Waddell is the facilities manager for Beyond Our Reality, a New York-based production company. He can be reached at ken@beyondourreality.com. *The opinions expressed above are the author's alone.*

For more information, please contact Fujinon at 973-633-5600 or visit www.fujinon.com.

USER REPORT

Canon Captures Long Shots for WCVB

by John Premack
Chief Photographer
WCVB-TV

BOSTON

Among the many decisions made as we planned a stationwide format changeover last year was a switch to Canon's top-of-the-line ENG/EFP lenses.

Our criteria were relatively simple; the new lenses must be able to cover both formats (4:3 and 16:9) supported by our new Ikegami DV-7 cameras, shoot wide enough to make "wide-eye" adapters unnecessary yet have enough reach to pull in a close-up of Manny Ramirez fielding a ball off Fenway Park's green monster, as well as be as weather-resistant as possible. In other words, we wanted the longest, widest, lightest, fastest all-weather lens we could find.

Canon's J21ax7.8B IRSD fit the bill almost perfectly. Although slightly longer and heavier than the lenses we were retiring along with our aging Betacams, the new lenses quickly endeared themselves to our videographers. Their field-of-view is wider than any of us have ever experienced without the inconvenience and added weight of a wide-angle adapter or the necessity of removing the lens in the field and installing a shorter-range wide-angle zoom.

We also quickly became used to the pleasures of internal focusing—including lens hoods and filters that don't rotate as you focus—and Canon's knurled rubber grip that allows silky smooth focus changes, even when wearing heavy winter gloves.

MODERN CONVENIENCES

Our new lenses also introduced us to the convenience of modern lens electronics. A simple touch of a button snap zooms the lens to full telephoto to check focus and snaps back to the original framing upon release.

Another button allows the videographer to initiate a programmed zoom with preset speed and ending focal length. This is a wonderful asset when shooting stills; however, a heavy-duty pan head is necessary to minimize the effect of shifting fingers and pressing a lens-top button while rolling.

Maximum zoom speed when using the conventional lens-top rocker switch is easily adjusted via a small knob on the zoom housing. Dialing the speed way back and pressing the rocker all the way down is another way to achieve a smooth zoom at a consistent speed.

The built-in 2x extender, which doubles the maximum focal length to 328mm—a tad longer than our old lenses allowed—makes this lens more than capable of capturing those out-of-reach action shots that won't wait while the camera is moved closer.

CROSSOVER ADAPTER

The extender shares space with the crossover adapter in a somewhat ungainly housing near the rear of the lens. The crossover adapter is a second set of switchable optics that must be engaged to provide full wide-angle coverage when the lens is used in 4:3 mode. The crossover optics add weight, bulk, cost and complexity, the unavoidable tradeoff for equipping ourselves with dual-format cameras.

The crossover/extender housing also turned out to be part of a particularly vexing problem. The Ikegami camera's filter knob and the Canon's macro focusing lever were only millimeters apart, inviting unwitting engagement of the macro. A further consequence of this conflict was that the macro lever could not be readily operated, making those off-the-shoulder close-ups that some of our shooters are so fond of virtually impossible.

Their field of view is wider than any of us have ever experienced without the inconvenience of a wide-angle adapter.

PROBLEM SOLVED

To its everlasting credit (and my complete amazement), Canon, after listening to our complaints and consulting its factory engineers, told us a complete redesign of the crossover/extender was being undertaken and promised to replace the problem lenses. Sure enough, a shipment of 22 replacement lenses arrived a few months later. Problem solved!

Our new lenses are a joy to use. They are easy to macro-focus on-the-fly, with sharp images and virtually trouble-free electronics. We are pleased with their performance as well as the unparalleled support we received from Canon. ■

The Canon J21ax7.8B IRSD lens has a maximum focal length of 328mm when using the 2x extender.

John Premack is chief photographer at Hearst-Argyle's flagship station, WCVB-TV. He can be reached at jpremack@hearst.com. The opinions expressed above are the author's alone.

For more information, contact Canon at 201-816-2900 or visit www.canonbroadcast.com.

USER REPORT

Ikegami Makes News at WMUR

by Stefan Hadl
Director of Engineering
WMUR

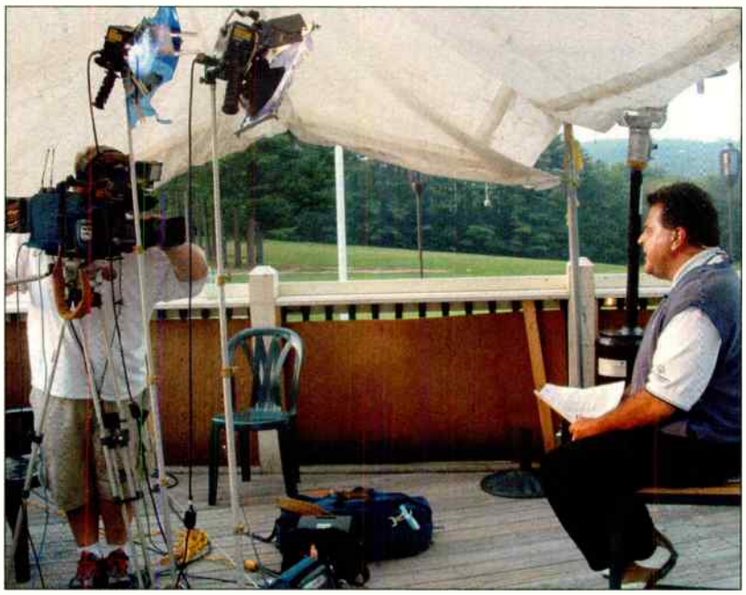
MANCHESTER, N.H.

WMUR is a local news-oriented television station that takes pride in knowing New Hampshire and delivering informative quality newscasts to the entire state.

An ABC affiliate, WMUR broadcasts on Channel 9 (NTSC) and Channel 59 (DTV). We also broadcast on three low power channels in New Hampshire's North Country and the station is part of the large Boston market, which is rated number eight in the country.

We decided to look at new ENG cameras because we're changing tape formats for news acquisition. The change to DVCAM prompted us to look at Ikegami's HL-DV7AW ENG camera.

Our sister station, WCVB, went with a similar camera last year and to date has had no complaints about its performance. I also have worked with the Ikegami HL-V77 cameras at KCRA and again had no issues about selecting an Ikegami camera. We decided on the Ikegami HL-DV7AW, which were delivered in May.



WMUR Sports Director Charlie Sherman (r) is the on-camera talent for a New England Patriots pre-game show, with Phil Tetreault at the camera's controls.

MANY FEATURES

Some of our favorite camera features include the ability to record external video (a feature added just this year), iLink (IEEE-1394) output, 4:3 and 16:9 aspect ratio capabilities, onboard wireless microphone receiver housing, low-light capabilities, P.Func feature (which is a user-programmable on/off switch for a user-defined camera function) and auto hue detect function. Both the P. Func and the auto hue detect were standouts for the videographers. Finally the overall rugged construction of the camera chassis was a big plus—in my opinion, this camera was built for the rigors of news.

Thus far, the ruggedness of the camera and its operational performance have proved to be a good fit. The videographers find the camera easy to use, and the camera's features and capabilities improve the overall quality of video footage.

Shortly after the cameras were deployed in the field, the chief videographer informed me that he saw a notable improvement in overall video quality when comparing archive footage and newly shot video footage. He also stated the images seem to have greater color saturation, making the overall images more crisp and vibrant. All the videographers seem to be very happy with the camera's abilities and functions.

Although the service and support has been tested very little since purchasing the cameras, the few questions we have had were addressed in a timely and professional manner.

We recently held a one-day training session with Ikegami on the camera and its features, which proved beneficial to both the videographers and engineers.

We timed the training to take place after having the cameras in the field for a month, this in itself being a testament to the cameras' ease-of-use. We wanted to give videographers and engineers time to accumulate questions and perhaps bring up important issues.

No issues were noted and all the user questions were answered with ease. The Ikegami employees who conducted the training were very knowledgeable about the technology and using the cameras.

The decision to go with the Ikegami HL-DV7AW camera has proved to be a good choice. I am very pleased with all the features, abilities and overall video quality it has brought to WMUR.

I feel confident that this camera, with its abilities such as iLink connectivity, will serve WMUR into the future. ■

Stefan Hadl is the director of engineering for WMUR-TV and has been worked in the industry for nearly 20 years, including an eight-year stint in the Air Force. He can be reached at shadl@hearst.com. *The opinions expressed above are the author's alone.*

For more information, contact Ikegami at 201-368-9171 or visit www.ikegami.com.

USER REPORT

Angenieux Gets the Shot for LPB

by Stephen Roppolo
Production Engineering Manager
Louisiana Public Broadcasting

BATON ROUGE, LA.

We recently acquired two new Thales Angenieux 26x7.8 AIF Tele Super Zoom Lenses and the production crews at Louisiana Public Broadcasting (LPB) enjoy the added range provided by these lenses.

Our camera crews are constantly on the run producing a weekly news and public affairs program with three to four in-depth field segments. In addition, LPB produces a variety of nationally distributed programs, from popular cooking shows to award-winning documentaries such as "Louisiana: A History" and "Frame After Frame: The Images of Herman Leonard," both of which aired nationally on PBS.

All these programs are shot using Thales Angenieux lenses. In addition to the two new 26x lenses we recently purchased, we also have four 14x8s, a 15x8.3, a 12x5.3 and a 10x5.3 HD lens.

We use Thales Angenieux lenses because of the performance and quality. We have had many camera operators come through LPB over the years that have experience using other manufacturers' lenses; everyone has consistently been very impressed with our Thales Angenieux lenses.

Angenieux has a great track record at LPB. Its lenses have proved to withstand the rigors of real-world, everyday use. When it came time to select new glass for our Documentary Production Unit, the choice was never really an issue. The question we faced was which model Thales Angenieux lens would we acquire.

We had other manufacturers demo their lenses for us, but none matched the look of Thales Angenieux's 12x5.3 Super Wide Zoom. Moreover, none of the other lenses held up as well at the widest end of the focal range in terms of distortion and bowing.

The new 26x7.8 AIF Tele Super Zoom Lenses we just received does it all. Though not quite as wide as Thales Angenieux's 12x5.3 lens, its coverage at the short end is great. For those times when auto iris is unavoidable, the smooth response of the servo is remarkable.

From left to right: Kevin Gautreaux, Christina Melton and Keith Crews work on a production for LPB.

The 26x7.8 AIF lens has a maximum focal length of 406mm when using a 2x extender. The quality of the lens' optics is ideal for our high-resolution digital cameras. The lens also has helpful digital features including a variety of zoom modes and focus servo controls, iris priority to minimize ramping, anti-breathing to maintain a constant field of view when focusing and Angenieux's Assisted Interna Focus mechanism.

After serving LPB for the past 14 years, our Thales Angenieux lenses speak for themselves, and we look forward to many years of use with our new 26x7.8 AIF Tele Super Zoom Lenses. ■

Stephen Roppolo is the production engineering manager for Louisiana Public Broadcasting. He can be reached at sroppolo@lpb.org. The opinions expressed above are the author's alone.

For more information, contact Thales Angenieux at 973-812-3858 or visit www.angenieux.com.

USER REPORT

Stasis Connects Power to Camcorders

by **Michael Forrester**
Owner
Forrester Media

ATLANTA

I've shot video of hurricanes, tropical storms and tornadoes for The Weather Channel, CNN and The Travel Channel, to name a few. A storm chaser's most important attributes are agility, a steady hand and a lot of stamina.

A new mini-DV camera can help with agility but steady shots and long, reliable battery runtime have actually become more difficult with handheld cameras than they were with shoulder-mounted cameras. Not anymore.

Michael Forrester captures video of a looming tornado using an Anton/Bauer Stasis to balance and support the camcorder. Power for the camcorder is supplied by the battery mounted on the back of the Stasis.

During 18 days of chasing tornados in the Midwest in June 2003, I had an opportunity to field-test the first new Anton/Bauer Stasis camera power support system with my JVC GY-DV300U, and the Stasis proved to be a winner.

The product provides two functions for small camcorders: camera support and a means of connecting standard camera batteries to the camcorder. With the Stasis, a single Anton/Bauer HyTRON 50 powered my camera for half a day. The HyTRON 120 powered the camera all day.

The Stasis has an internal DC-to-DC converter to deliver the proper 7.2 V to the camera, while also powering standard 12 V accessories such as a camera-mounted light and wireless mic. This makes my mini-DV camera a more professional platform and I never worry about running out of battery power. Even when using my Ultralight on-camera light, the HyTron 50 battery lasted nearly two hours.

GREAT PLATFORM

The Stasis is a great platform that allows me to work the controls of my camcorder more easily, even while shooting. And I found the HyTRON 50 was a perfectly sized counterweight for the DV300U.

I had previously used the DV300 mounted directly to my tripod and didn't like the feel. The camera alone was too light for the head. When mounted to my tripod, the Stasis with camera and battery (plus mic and light) added just enough weight to allow smooth tilts and pans. Mounted on my monopod it becomes a great rig for shots that require a higher lens angle than handheld, such as when shooting storms or other objects higher in the sky.

QUICK SETUP

With Stasis, I can travel light, quickly set up and extend my battery runtime, all while making my camera easier to operate. The unit folds down into a very compact package that found a spot even in my most crowded gear bag.

While at NAB2003, I asked the Anton/Bauer people what they had for batteries for mini-DV cameras. What the company showed me was unexpected and after using the Stasis, I realize that a power solution isn't necessarily just a battery solution. Stasis solved my battery problem, made shooting easier and a long day of shooting less tiresome.

SMALLER AND LIGHTER

It helps that the entire package is still smaller and lighter than a traditionally sized camcorder, even when I have a powerful battery attached. There are plenty of times when I need to move fast to get the shot and the Stasis lets me work lighter, while maintaining the stability and comfort I need.

After carrying a Betacam on my shoulder the past 10 years, the Anton/Bauer Stasis coupled to my mini-DV camcorder is a welcome change. I can't imagine chasing another storm without it. ■

Michael Forrester is the owner of Forrester Media in Atlanta. He can be reached at michael@forrester-media.com.

For additional information, contact Anton/Bauer at 203-929-1100 or visit www.antonbauer.com.

USER REPORT

Panasonic HD, SD Cameras Get the Look

by Lee Dashiell
Owner and Cinematographer
Osprey Production Group

CHARLESTON, S.C.

As DP and owner of Osprey Production Group, a full-service production company, I've produced a variety of imaging and marketing programs for fashionable resorts in and out of the country, as well as productions for the Golf, Discovery, History and National Geographic channels. These clients demand the most impressive image quality possible.

A year ago I considered film, with its richness and warmth, the only option to achieve this goal. Then I had the opportunity to demo the Panasonic VariCam HD cinema camera.

Truly impressed by the demo, I thought it might be a practical camera for an upcoming shoot, a well-budgeted commercial project with a number of interviews. Right off the bat I was able to offer the client a $12,000 decrease in the overall budget by deducting the costs of film stock, processing and transfer. As a company, we were able to eliminate all those costs without affecting our profit and the client jumped at the chance to save money while maintaining quality.

On the first day of shooting, we noticed huge advantages with the VariCam. The client enjoyed the peace-of-mind that comes from immediate playback in full resolution, color and sound. More important to me as a DP, the picture was absolutely jaw-dropping.

GATHERING CROWD

I started to see a number of seasoned crew members gathered around the HD monitor in disbelief. How could an image like this come from something that looks like a simple video camera? We realized we were onto something: If we could provide this type of imaging to our clients at a reduced rate and with the ease of shooting on HD, we'd have something new to pitch and the opportunity to increase our business.

Since then, we've rented the camera from W.H. Platts here in Charleston for several projects, including a national commercial campaign for The Rover, a self-powered, remote-controlled golf club caddie that allows you to walk the golf course without the strain of carrying clubs or using a pull cart.

Because there was so much freedom in the amount of footage we shot, we were able to plan for and shoot a four-minute demo as well as a 60-second commercial spot. The final cut had a very high-class, elegant feel, and the client—who had historically shot on film—was delighted.

TENNIS TOURNAMENT

Our second VariCam project was creating commercial and promotional pieces for the Family Circle Cup tennis tournament. We've done this same project for the last several years, always on 16mm film. We were confident we could provide a wider range of footage by shooting on the VariCam instead and we were right.

We shot six hours of gorgeous footage of the top female tennis players in the world versus the customary 78 minutes of film. Again, the client was elated by the result.

By using the VariCam for these projects (and others), we've been able to see the camera's strengths firsthand. For instance, the camera's lighting range is phenomenal. During one Family Circle Cup function we were put in a situation where lighting was sparse, to put it mildly. The function was held outside at night and in a tent, and the strings of Christmas lights were great for ambience but seemed terrible for shooting. Setting up lights to cover the entire event was out of the question and we wanted candid shots that would not be spoiled by distracting lights.

Lee Dashiell finds that the Panasonic SDX900 camcorder makes beautiful pictures in available light and the footage mixes well with video shot using the Panasonic VariCam HD camcorder.

SHOOTING STARS

At one point I was standing next to tennis star Anna Kournikova with a chance for a great candid shot. I was pretty certain the shot wouldn't be usable due to lack of light, but I went ahead and took it. Back at the office I was shocked by the result—a beautiful, perfectly lit shot of the celebrated player interacting happily with one of the tournament's sponsors. I don't think I've come anywhere close to exceeding the limits of the camera and doubt that I ever will.

Very recently, we've added a second Panasonic camera to our toolkit, the AJ-SDX900 dual-mode DVCPRO Cinema camcorder, which allows us to shoot high-quality DVCPRO50 in native 16:9 24P standard-definition video with 4:2:2 color sampling. We've purchased the AJ-SDX900, along with the AJ-SD950 DVCPRO50 deck.

We intend to purchase a VariCam in 2004, but in the meantime we see the SDX900 as the next SD standard and an ideal transition to HD production.

SIMILAR TO VARICAM

So far we've found the SDX900 to be very similar to the VariCam, with the obvious difference being SD resolution. You can't over- or under-crank the SDX900 like the VariCam, but the 24P and Cine Gamma setup is nearly identical.

We've needed to buy new video cameras for more than two years now and believed the SDX900 was the logical choice. The SDX900 does so much, it's like having six cameras in one. It shoots in DVCPRO25 and DVCPRO50, 4:3 or 16:9, 24P, 30P and 60i, as well as any combination of the group. And the image quality approaches that of HD, making it a natural second camera when shooting in HD. The quality of the DVCPRO50 format has really proved itself; the pictures we get are excellent.

Even with my passion for the VariCam, the SDX900 may be the camera for us to use for the time being. I still get the beauty of the 24P Cine Gamma setup in either 4:3 or 16:9, and can still post with our current NLE. ■

Lee Dashiell is the owner of Osprey Production Group. He can be reached at info@ospreyproduction.com.

For more information, contact Panasonic at 201-348-5300 or visit www.panasonic.com/broadcast.

REFERENCE GUIDE

The Reference Guide is a selected sampling of current products. Specifications and prices are supplied by the manufacturer and are subject to change without notice.

BATTERIES

MANUFACTURER	MODEL	CHEMISTRY	TYPE OF MOUNT	VOLTAGE AND CAPACITY	WEIGHT AND SIZE	RECOMMENDED CHARGER	TEMP. RANGE	SPECIAL FEATURES	PRICE
Anton/Bauer 973-427-4949 *www.antonbauer.com*	HyTRON 120	NiMH	Snap-on	14.4 V, 120 W-h;	5.3x4.5x3.75 inches; 5.5 pounds	Any Anton/Bauer InterActive or Titan charger	-20C to +60C	Real-time display; 175 W max. power draw; three year warranty	Call for quote
Aspen Electronics 866-615-1690 *www.aspenelectronics.com*	Nexus 50	Li-Ion	NP or V-mount	14.4 V, 50 W-h;	3.5x6.5x1.5 inches; 1.1 pounds	Nexus 2 or Nexus 4 chargers	-20C to +60C	Optional "Phantom" accessory; powers camera and light of capacity remaining	Contact Aspen or dealer
Frezzi Energy Systems 973-427-4949 *www.frezzi.com*	BP-14MHEG	NiMH	3-button Anton/Bauer or Sony V-mount	14.4 V, 9 AH; 130 W	5.5x4.4x3.1 inches; 5.5 pounds	Frezzi M-series	-10C to +40C	Rebuildable; energy gauge showing percentage of capacity remaining	$595
IDX Technology 310-891-2800 *www.idx.tv*	Endura E-80	Li-Ion	IDX V-mount	14.4 V, 5.7 A; 82 Ah	3.4x5.6x1.97 inches; 1.62 pounds	Endura VL-2Plus; Endura VL-4; Endura VL-4S	-20C to +50C	Two batteries stack together; Five LED load-capacity status display; Dig. Oata Protocol	$495
PAG 818-760-8265 *www.pagusa.com*	NMH 100	NiMH	PAG Lok mount	13.2 V, 7.2 Ah; 100 W	208x126x44mm; 2.2 kg	Any PAG charger	-10C to +40C	Pushbutton time/power gauge	$497
Sony 973-427-4949 *www.sony.com/professional*	BPM100	NiMH	Sony	14.4 V, 98 W-h	Size N/A; Weight: 1,540g	Sony BCM50	N/A	Original equipment for many Sony cameras and VCRs	$630

COMPANY PROFILE

Yes—Grass Valley Makes Cameras

by Bob Kovacs

I'm still getting used to the fact that Grass Valley, one of the best-known manufacturers of television production equipment, now builds cameras.

Of course, the path that the company took to placing its name on the sides of video cameras was not straight and direct, happening only after the Nevada City, Calif.-based Grass Valley Group was acquired by Thomson Broadcast in 2002. Thomson, which previously acquired Philips Broadcast and its highly regarded line of television cameras, decided to market cameras and many other broadcast-related products under the Grass Valley brand.

GRASS VALLEY
400 Providence Mine Road
Nevada City, Calif. 95959

Tel: 800-547-8949
Fax: 530-478-3755

www.thomsongrassvalley.com

The Grass Valley television cameras sold today came from both Philips and Thomson, and most now bear the familiar "LDK" designation used for many years on Philips cameras.

"Our factory in Breda, The Netherlands, has a long history in the camera business, dating back to the 1960s," said Jeff Rosica, vice president of strategic marketing and business development for Thomson Broadcast and Media Solutions.

Over the years, the various companies that are now part of Thomson Broadcast were responsible for many advances in video camera technology.

"Some of [the company's] innovations were the use of prism blocks inside cameras, the triax transmission scheme and Plumbicon tubes," Rosica said.

One of the first successful portable cameras was the Philips PCP-90 and the company is still fondly remembered for its pioneering work with the LDK line of color TV cameras in the 1960s.

COMBINED BACKGROUND

Today, the company has the combined expertise of both Philips and Thomson broadcast-quality camera technology, which are now marketed under the Grass Valley brand.

"[Philips] really was an innovator in camera technology and there is a lot of experience there," Rosica said. "Thomson has its own camera lineage dating back many decades and its technology for DSPs and ASICs for cameras was top-notch."

Manufacturing for the two product lines has now been merged into a single factory in The Netherlands.

The product line consists of the Grass Valley LDK-1707, LDK-500, LDK-300, LDK-5000 and LDK-6000. For filmmaking, the company is now shipping its acclaimed Viper digital cinematography camera. (The company announced the new LDK-300 and LDK-500 cameras at the recent IBC in Amsterdam.)

The LDK-1707 is a three-CCD camera that comes standard with digital triax capability. The all-digital camera comes in several different versions,

GRASS VALLEY, PAGE 73

USER REPORT

Lowel Does More With Less

by David Dellaria
Producer/Videographer

SAN FRANCISCO

No doubt you've heard the popular phrase, "less is more." A good example of this is a product that is simple, functional and sturdy, as it often outlasts and outperforms products with lots of bells and whistles.

Lighting technology is a perfect example. Today's location shoots demand higher production values, yet require the production team to work faster and more efficiently to achieve more with less.

Something that gets the job done for me is the Rifa-lite from Lowel Light. The Rifa-lite is a self-contained softbox lighting fixture that folds out like an umbrella with its internal bulb running straight up the middle. All that's required is to attach one of several diffusion panels and add varying degrees of grids for spill control in tight spaces, and you are up and running.

Fluorescent lights have become popular with EFP crews and they produce a lot of light for the power they consume. Without a doubt, Lowel's Caselite has made a difference in how I light a scene.

Using fluorescent lights makes the talent happier, as they no longer find the room temperatures racing into the 80-degree range while you struggle to find more power circuits and extension cords.

The Caselite can use bulbs that are daylight- or tungsten-balanced, and changing them in the field is quick and easy. The Caselite comes with a stand that fits inside its case, along with room for gels, spare bulbs and grid.

FLATTERING CHOICE

For standard two-camera interviews, combining Rifa-lites with a Caselite has proved to be a flattering choice. I usually create a soft fill from the Rifa while adding a stronger key source from Caselite, adjusting the Caselite's reversible barndoor panels to reflect or deflect light as needed.

Photo: David Dellaria/CBS News

Lowel lights illuminate CBS Anchor Dan Rather(l) during an interview with a prison inmate.

Surprisingly, my first setup using this combination involved an interview with Shaquille O'Neal of the L.A. Lakers. Towering above my C-stands, Shaq took his seat as we adjusted our lights to get that softer look. Using a paint box and vectorscope, another advantage became evident: our camera's tolerance of this mix of tungsten-halogen and tungsten-fluorescent lighting.

Additionally, I find fluorescent lights incredibly helpful as a more even and complete source for backlights on subjects. Lowel has improved its original design to let the Caselite be flown overhead more easily than previous models.

My old 150-pound Fresnel kit sits lonely in my garage. My back is appreciates the lower-weight Lowel lights and this is a very good example of "less is more." ■

David Dellaria is an Emmy award winning free-lance producer and videographer from the San Francisco area. He frequently shoots for a variety of reality and news TV programs, including extensive work with CBS News. David can be reached at oceanblu+u2c@aol.com.

For more information, contact Lowel Light at 718-921-0600 or visit www.lowel.com.

Location Lights

K5600 Inc.

10434 Burbank Blvd.
North Hollywood, Calif. 91601

The following is a compilation of opinions solicited from users of the month's featured product, as well as general specifications and other pertinent information.

KEY FEATURES

- Low-wattage, high-brightness HMI lighting
- Daylight balanced
- Variety of accessories, lenses, filters and diffusers available
- Models available from 200 W to 1,200 W

USER	John Kessler Kessler Freelance Services 703-685-4999	Ira Raider Raider Productions 610-793-3000	Steve Stanford ABC 305-934-2437	Tony Zumbado Zumbado Production 954-385-0570
WHAT MODEL(S) DO YOU HAVE?	Joker Bug 400, 200	Joker Bug 800, 400, 200	Joker Bug 400, 200; Blackjack	Joker Bug 800
HOW IS IT USED?	EFP, ENG and documentary	Documentary and commercials	News magazine	EFP and ENG
HAS IT PERFORMED AS EXPECTED?	Better than expected	Above expectations	Better than expected	Better than expected
WHAT FEATURES DO YOU LIKE THE MOST?	Durability; design; quality of light; size	Versatile, compact, big light output; light tubes	Quick setup; versatile; Blackjack is focusable	Durability; light power; compact; multivoltage
WHAT FEATURES DO YOU LIKE THE LEAST?	None	None	None	Lens frame is a little fragile
HOW LONG HAS IT BEEN IN SERVICE?	Up to six years	Up to seven years	More than five years	Three years
HAVE YOU HAD ANY EXCESSIVE MAINTENANCE PROBLEMS?	No	No	No	No
HOW WOULD YOU RATE THE MANUFACTURER'S SERVICE/SUPPORT?	Best ever	Superb	Fine	Excellent
WHERE WAS THE EQUIPMENT OBTAINED?	Dealer & manufacturer	Dealer	Manufacturer	Manufacturer
WHAT WAS THE DECIDING FACTOR FOR YOUR PURCHASE?	Works in bad weather; experience with company	Performance versus price	Quality; rugged; transport well	Ruggedness; day-light balanced; powerful

For more information, contact K5600 at 818-762-5756 or visit www.k5600.com.

BUYERS BRIEFS

IDX Endura batteries fit directly onto cameras that have built-in, wedge style V-mounts. They also are adaptable to Anton/Bauer Gold Mount systems and may affix directly to other cameras by adding an IDX V-Mount plate. IDX Endura batteries offer Digi-View, a feature that displays accurate battery capacity in the viewfinder.

For more information, contact IDX at 310-891-2800 or visit *www.idx.tv*.

Digital System RTI/Time batteries from PAG take into account the changes of load that occur during use and the operating conditions to provide a run-time calculation. PAG digital batteries incorporate internal storage of information including number of charge cycles and other essential data.

For more information, contact PAG at 818-760-8285 or visit *www.pagusa.com*.

Sachtler's Reporter 75H on-camera light has a low-profile detachable base and a cable that remains plugged into the camera or battery bracket. The R75H is double-hinged for maximum positioning flexibility, and friction can be adjusted without tools.

For more information, contact Sachtler at 516-867-4900 or visit *www.sachtler.com*.

Cool-Lux offers the SL3000, an on-camera softlight that converts to a broadlight using a rotating housing and removable reflector. The SL3000 has a 16:9 format light-beam footprint and lamps that have an estimated usage life of 1,000 hours.

For more information, contact Cool-Lux at 805-482-4820 or visit *www.cool-lux.com*.

Focus Enhancements brings direct-to-edit disk-recording performance to the camcorder with its FireStore FS-3 and DR-DV5000. Both models use a FireWire connection and mount directly onto full-size DV camcorders for live disk recording.

For more information, contact Focus Enhancements at 408-866-8300 or visit *www.focusinfo.com*.

PRODUCTS & SERVICES SHOWCASE

USER REPORT

Frezzi Powers Mirage Productions

by Brian R. Ochrym
President and DP
Mirage Productions Inc.

NEW YORK

Mirage Productions is a 10-year-old, award-winning, script-to-post production company that specializes in producing and shooting programs for the broadcast, entertainment, fashion, corporate, government and medical industries.

Some of the network shows we're currently shooting include "American Idol," "Fame," "Ambush Makeover," "A Dating Story" and many others. We have five full-time crews consisting of nearly 20 people and have at least four ENG crews out in the field on any given day.

The explosion of the reality-programming genre has really put our crews to the test, since every situation is different and they have to move quickly and fit into some tight spots to get the right shots. We only use the latest, state-of-the-art Sony cameras such as the DVW-790, BVW-600ws, HD-950 and have lately done several HD 24P shoots for a variety of broadcast clients.

For the past two years, Mirage has been using the Frezzi BP-14MHEG, 130 Watt-hour (W-h) brick batteries to power all our cameras. In addition, we have been using Frezzi camera lights with soft boxes for years to solve various lighting situations.

We first saw the Frezzi BP-14 at NAB2001. We were using different batteries at the time and the Frezzi rep told us that the BP-14 would outlast two to three of our current batteries.

This appealed to us since it is extremely important for our crews to travel as light as possible. After testing the battery in the field, we were sold. About two years ago, we did a massive upgrade to the Frezzi BP-14MHEG, 130 W-h batteries, purchasing 30 of them and replacing all our old brick batteries. We find that two Frezzi BP-14s can replace five of the old 65 A-h batteries.

LIGHT POWER

In addition, we use two of the Frezzi bricks to power a Frezzi 200-W HMI light, an unusual sight in this business. The Frezzi batteries connect to all snaplock and Sony brackets, and the BP-14MHEG model that we use also includes a power gauge. Not only has the Frezzi battery made our crews happy but our clients are in constant disbelief that one battery can last that long.

LONG-LASTING POWER

Our camera people are thrilled. They no longer have to take more than one battery to a shoot or worry that they might lose power in the middle of a shoot. As a result, the difference in the weight that the camera crews carry is like night and day.

With the Frezzi BP-14 batteries, we can power our Sony Digital Beta, HD and Beta SP cameras and our on-camera Frezzi lights for hours on end. In fact, we have found that on occasion we get as many as three shoots on each battery without recharging them.

We are extremely pleased with the results that we have gotten with this battery and our crews are much more nimble as a result. ■

Brian Ochrym shows off his Frezzi BP-14MHEG battery. On top of the camera is a Frezzi intensity-controlled Mini-Fill light.

Brian R. Ochrym is the president and director of photography for Mirage Productions Inc. He can be reached at bochrym@mirageproductions.com.

For more information, contact Frezzi Energy Systems at 973-427-1160 or visit www.frezzi.com.

USER REPORT

JVC Works at the 'Cutting Edge'

by Ron and Anna Winship
Producers
Cutting Edge—A Talk Show

NEWPORT BEACH, CALIF.

"Cutting Edge—A Talk Show" is a Web-based news program offering in-depth interviews with key political and entertainment personalities.

We have one of the few sites dubbed "Free Media" by Bill O'Reilly, since we are not constrained by either star newscasters or corporate advertisers. We put news in context with extensive interviews and include a tremendous amount of background information and detail.

And it's gaining popularity. So much so that our list of interviews grows more impressive week by week, including the likes of Casper Weinberger, Wayne LaPierre, Sydney Pollack and John McTiernan, as well as our coverage of events such as town hall meetings with President George W. Bush and First Lady Laura Bush.

GUERILLA SHOOTING

Because we do a lot of "guerilla-type" shooting where we need to move on a moment's notice, we picked up JVC's GY-DV300U camcorder. It's a small DV camera that allows us to quickly get to a location, set up and start shooting. And although it can be tough to find a camera that's good for this kind of journalism, this one fits the bill.

I was most impressed when we were in a bind and had to use the GY-DV300U for a studio shoot—the clarity was surprisingly good! So now we had a camera that we could literally use anywhere.

For any professional on the go, this unit offers what I call superb "luggability." In our industry, you run into loads of crews that need to lug huge cameras around all day. Not us. We don't have to carry a 70-pound backpack of equipment.

JUST ADD A TRIPOD

With the GY-DV300U, the only additional piece of equipment we need to worry about is the tripod. In fact, I can't begin to tell you how many crews told us they're envious of our compact camera.

In addition, the camera provides terrific ambient sound—another important feature since many times we don't know what type of situation we'll find. There have been many occasions when we've arrived to cover a press conference or town hall meeting, plugged in the audio distribution amp and wound up with a bad connection.

By effectively capturing ambient sound, the GY-DV300U lets us make up for disasters like these without blinking an eye. Basically, it's never failed us in what we've asked it to do.

Best of all, we haven't even utilized all of its potential yet. For example, we haven't even tapped into the camcorder's streaming capabilities. But we have several international shoots planned for later this year, and we plan to utilize that feature so we can be live on the Web.

Every situation is different. But even in the most unpredictable field environment, the JVC GY-DV300U delivers. ■

Ron and Anna Winship are producers for "Cutting Edge—A Talk Show." They can be reached at cuttingedgetalk@aol.com. *The opinions expressed above are the authors' alone.*

For more information, contact JVC at 800-526-5308 or visit www.jvc.com/pro.

The Professional's Source


JVC GV DV5000U


Anton Bauer Quad Charger


ARRI SoftBank D1 Kit


Panasonic AG-DVC200


Shure UC Wireless System


Sony DSR-1500A

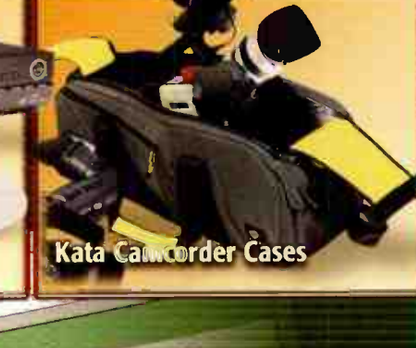

Fujinon A20X Video Lens


Leader S5870 Monitor


Miller Head
Sachtler Pedestal Tripod


Cool-Lux LK2333 Softlight Kit III


Panasonic DMR-T3040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ANTENNAS/ TOWERS/CABLES

Want to Sell

Scala Paraslot 8 on chnl 24 or 26, $3500 + shpg. 518-686-0975.

AUDIO PRODUCTION

Want to Sell

(2) SennheiserMKE2 lavalier mics w/TA5F connectors for Lectrosonics, $150/ea; Sony ECM-50 w/4-pin Lemo connector, windscreen, original case, $50; Sony ECM-50 w/no connector, just wires, windscreen, original case, $35. 818-597-8855 or soundmixer@prodigy.net.

(2) Sentry 100A speakers, $150/BO; Symetrix 628 digital processor, Valley People dynamite, $300/BO; Shure FP-42, $425/BO; ORBON 622A, one-chnl EQ, $100/BO; Neumann U87i, EA87 Elastic Suspension & Wind, $1300; Sony MPX-2900 21x4 audio mixer, $1000/BO. 203-322-3000.

Mackie 1402 VLZ pro audio mixer, $400; Shure M267 audio mixer (2), $150/ea. 714-847-6131 or mike@videofrontier.com.

PortaBrace AO-2U audio organizer bag & AH-2H harness, blue, almost new cond, $275/both. Nick, 206-465-8813 or nick@fatfrogproaudio.com.

Videotek ADA-16 1-input, 6-output, audio DA, like new, $75; Sigma ADA 210 10-output stereo audio distribution amp, mint w/manual, $225; Sigma ADA 110 10-output mono audio distribution amp w/manual, $125. A Ross, 425-775-8853.

DOD SP460H (3) stereo headphone amplifiers, 1 input, 6 outputs w/individual level cntrls & 1 master cntrl, $75/BO. M Schulze, 619-698-4336.

CAMERAS

Want to Sell

NEC NC-120 3-CCD camera, new, $400; Sony DXC-M7 camera w/Fuji 15x1 lens, $1000; Sony BVP-90 camera w/BVV-5 Beta SP, 770 hrs, no lens, $8500. 714-847-6131 or mike@videofrontier.com.

Sony DXC D30, PVV3 back, Canon 18x9, $10500. 818-788-6969.

Sony DXC-537 w/CA-537 camera adapter, Canon J13x9B4 (2X) IRSII, $1800. 203-322-3000.

TV TECHNOLOGY .COM

Sony DXC 537, xlnt cond, in & out, all manuals & box, case, just serviced by Sony tech, $1450/BO. M Schulze, 619-698-4336.

Sony BVP70IS camera head/Sony BVV-5, Sony 8045Q monitor w/PortaBrace, camera plate, manuals, original pkg, retiring from business, BO. Paul, 612-581-1717.

CAMERA ACCESSORIES

Want to Sell

Canon J8x6B3KRS wide angle lens, IKE mount, no extender, great cond, $2750. Alex, 727-595-6050.

Microforce zoom cntrl, Oppenheimer Pivot Pan Handle, Canon cable, like new, $2000. Alex, 727-595-6050.

Miller tripod w/Miller DS-20 fluid head, new, $800; Miller tripod w/Miller 20 fluid head, older, $600; Canon RE-350 video visualizer, $600; Sony CMA-8, AC-500 pwr splys (8), $250/ea; Sony BC-410 batt chrgr, $250; Sony BC-1WB batt chrgr, $100; Sony DC-520 NP1 batt case (2), $125/ea; Leader LVM-5863A port waveform & color monitor, $350. 714-847-6131 or mike@videofrontier.com.

Panasonic WV-CA10 interconnect cable for Panasonic cameras, new in box, $10; RCA TCI 460/4 video security switcher, alarms if any of up to 4 cameras detects motion, xlnt cond, $50. A Ross, 425-775-8853.

Vinten Vision SD-12 tripod head & Sachler single extension tripod legs w/floor spreader, $2500. Alex, 727-595-6050.

COMPUTERS

Want to Sell

Formac Devideon Super Drive DVD & CD burner, must sell, new in box, BO.B Diaz, 718-979-1462 or bdiazvideo@aol.com.

Monitors (WTS) Cont.

DIGITAL EFFECTS

Want to Sell

Abacus A-42 still store w/tape drive, $1500/BO; Abacus A-52 DVE, single chnl, $1000/BO; Abacus A-53D-DVE, single chnl, key chnl, $2000/BO; Abacus A-72 CG, 2 chnls, $2000/BO. 203-322-3000.

EDITING EQUIPMENT

Want to Sell

ESE 261 SMPTE LTC gen w/manual, mint cond, $100; Horita VLT-50 reads VITC & translates into LTC time code, mint cond, $75. A Ross, 425-775-8853.

Sony RM-450 edit cntrlr, $800; Panasonic AG-650 edit cntrlr, $250; Sony SVRM-100 remote cntrl, $200; Amiga 2000 computer w/Video Toaster & Flyer cards, $350; Videonics TitleMaker TM-2000 & TM-3000 CGs, $250 & $375; Hotronic AP41 TBC, JVC KM-F250 TBC and others avail, $400/ea; Panasonic AG-F700 time code gen/reader for 7650/7750, $250. 714-847-6131 or mike@videofrontier.com.

Symphony Vers 4.8, new, Mac & PC avail, $49900; Avid MC9000XL Vers 11, $35000; Avid Express Deluxe Vers 5.0, $10500; complete Final Cut 4 systems w/Xserve & XRaid, call for details. 818-788-6969.

EDUCATION

LENS REPAIRS

Focus Optics. Service and repair of broadcast video lens. Fujinon, Canon, Nikon, Angenieux, etc. **We have the fastest turnaround in the country.** We also repair lens that have bad inpact damage. **Call Stuart at 800-234-lens or www.focusoptics.com.**

LIGHTING

Want to Sell

1K Baby Fresnels w/barndoors (2), $175/ea. Alex, 727-595-6050.

Manufactuer selling off HMI and fluorescent production fixtures from demo stock. HMI's $1200-$2700.00, and Fluorescent $500-$650.00. Please call 303-530-3222 or e-mail inquiry to info@bron-kobold-usa.com.

MICROWAVE/STL

Want to Sell

M/A-COM 2 GHz, 7 GHz, 13 GHz and 23 GHz, broadcast-quality radios in-stock. Excellent for STLs. Refurbished, repaired, retuned, tested and warranted. Save thousands of dollars over new radios. Antennas and waveguide also available. 100% Customer satisfaction. Massachusetts Microwave (978) 635-1556. www.massmicrowave.com.

MISCELLANEOUS

Want to Sell

Wired Media Press board YUV, Wired Stream card, Wired for DVD board, $2000; Astarte DVE Pro software, $250; Pioneer S201 Pro DVD burner, $2500; (15) 3.9G authoring disks, $165; 22G firewire drive, $75; 20G firewire drive, $50; will sell as pkg or individ. Stuart, 561-215-5209 or wtmk@earthlink.net.

MONITORS

Want to Sell

Sony BVM 20G1U w/cntrl panel & SDI, $3950; Sony 20M4U NTSC hi-res monitor, $1750; Sony PVM 1353 14" color monitor, $600; Sony PVM 8044Q 8" AC/DC monitor, $750; Barco CVM 3051 & CVM 2051, BO. 818-788-6969.

Sony BVM-1910, $800; PVM1944Q, $300; BVM-8021, $100; Panasonic WV-5200 triple B&W, $75. 203-322-3000.

MOVIE PRODUCTION EQUIPMENT

Want to Sell

Sony PVM 1380 13" color monitor, $100. Alex, 727-595-6050.

SIGNAL PROCESSING

Want to Sell

I.Den IVT-7 digital TBC, xlnt cond, $350 + domestic shpg. Clay, 785-550-5758 or claykavc@aol.com.

TAX DEDUCTIBLE EQUIPMENT

A non-profit 501c3 Christian Ministry seeks tax deductible donations of working professional grade audio/video cameras, tripods, lights, mics, monitors, soundboards, TBCs, switchers, editing & other equip for pre/post production, also need xmtrs, translators, transmission lines & antennas to be used in our Youth Media Ministry Training program, all donations receive a tax deductible receipt & God's blessings for their donations. Minister Dr. R. Hodges, 916-721-3285 or info@lwcr.org.

TRANSMITTERS/ EXCITERS

Want to Sell

TRANSMITTERS-Used TV transmitters from Harris, Acrodyne, RCA, Emcee, TTC. Antennas, transmission line, etc. Visit transmitterwarehouse.com and click "used equipment".

TUBES

Want to Sell

VIDEO PRODUCTION EQUIPMENT

Want to Sell

BVU-920 slo-mo PB 3/4" SP, internal TC reader, TBC w/2 levels of NR, frame/field freeze, $2500; BVU-950 3/4" SP rcd/edit deck, TBC w/2 levels of NR, frame/field freeze, ops & maintenance manuals incl w/both decks, $2000; Ampex ADO-100 real-time DVE unit w/3D perspective & Digimatte, Ethernet & all remote coax cables incld, $2500; Amiga Video Toaster Flyer non-linear edit system w/36GB video storage, 4 GB audio storage, Exabyte tape backup unit, $3000. A McPeek, 800-332-6121.

VTRs/VCRs/RECORDING MEDIA

Want to Sell

Sony VO-9850SP rcdr/editor, xlnt cond, $1200. 614-882-2228.

Want to Buy

Panasonic AG-1950 VHS rcdr, Boy Scouts need to purchase, need price & condition. 518-374-2013.

EMPLOYMENT

HELP WANTED

Director of Technical Operations: WXIX-TV in Cincinnati, OH (a Raycom Media station) is looking for a Director of Technical Operations. Seeking an experienced, hands-on technical and studio operations manager to oversee day-to-day technical and production operations at this fast-paced, news oriented station. This dept head position has responsibility and authority over all studio operations, technical maintenance, master control, building maintenance and information systems (includes hiring, training and evaluating departmental personnel). Also responsible for departmental operating and station capital budgets. Candidate must have a minimum of 10 years experience with background in News, microwave, transmitter, studio production operations and information system planning. Must have excellent communication skills and a proven ability to work well with others under pressure. Send resume to: WXIX-TV Atten: General Manager 19 Broadcast Plaza 635 W. Seventh St. Cincinnati, OH 45203 or email jlong@fox19.com EOE-M/F/D/V.

News Fleet Engineer: Primary responsibilities include day-to-day management of maintenance for our entire news fleet. Successful candidate will have a solid television news management or engineering background and possess keen organizational skills. Candidate will keep inventory of all maintenance and equipment in vans, and will implement preventive maintenance and accountability programs. Knowledge and experience with ENG electronics is necessary. Driver's license in good standing is required. Hours may include early morning and weekends. Please send resume and cover letter to Brian C. Smith, Director of News Engineering & Technology, WPVI-TV, 4100 City Avenue, Suite 850, Philadelphia, PA 19131. EOE.

ELECTRONICS ENGINEER (Irvine, CA) Position responsible for planning, developing, and testing digital electronic video and audio broadcasting and telecommunications components, products and digital television delivery systems for the purpose of customer presentations, system integration and training. Responsibilities include capturing customers technical requirements for writing proposals on end-to-end digital video/audio delivery system and network design for System Management, CA insertion and system monitoring, allowing for possibility of broadcasting and cable head-end; evaluating products after client approval and purchase of systems; coordinating electrical engineering activities related to design/development, and procurement and calibration of instruments, equipment and control devices for testing, technical configuration and system integration; conferring with technical personnel to resolve product/system malfunctions; performing customer operational training, including multiplexors, decoders, encoders, modulators, descramblers, TSM's, device controllers, digital broadcast system managers, DSNG and ENG equipment, and other products in the digital broadcast arena. Associate's or Bachelor's degree or foreign degree equivalent in Electronics Engineering or Electronics Engineering Technology, and a minimum of 4 years of electronics engineering experience in the video broadcast industry required. This experience must include 3 years working with MPEG-2/DVB systems, including design, installation/configuration and testing of end-to-end digital video delivery systems such as: Direct-to-Home Television delivery systems, Cable Head-Ends and Cable Regional Head-Ends, Television Station and Telecom Television delivery systems. Must be proficient in ATSC systems and the following DVB and ATSC systems options: conditional access, high definition encoding, standard definition encoding, statistical multiplexing, DSNG, ENG, PSIP tables, PSIP regenerations and download, PSI/SI tables, PSI/SI regenerations and download, and PSI/Editor programs. Please send resume to E. Manning (Ref:EE) TANDBERG Television, Inc. 12633 Challenger Parkway, Suite 250, Orlando, FL 32826 (FL)

VP Engineering Direct and manage the technical stability of the station, and manage and maintain operations of all technical equipment, including News, Production, Transmission facilities, and master control. Supervise and motivate engineering staff and establish departmental objectives and priorities. Develop and implement current and long-range technical operation plans, and prepare departmental expense and capital budgets. Ensure station's technical compliance with all government regulations and industry standards. Minimum five to seven years broadcast engineering management experience required. Extensive working knowledge of all broadcast systems a must. Thorough understanding of digital technology, and significant technical expertise in the planning, implementation and maintenance of television station facilities, including RF facilities. Position requires a strong leader with the ability to motivate and cultivate technical staff. Excellent communication and organization skills required. Degree in Engineering preferred. Qualified candidates, send résumé and cover letter to: Human Resources@TVT WFXT Fox 25, 25 Fox Drive, P.O. Box 9125, Dedham, MA 02027. For immediate consideration, fax your resume to 781-467-7212, or e-mail in MS-Word format only to www.fox25hr@hotmail.com. No Phone Calls Please. EOE/M/F/D/V

PINNACLE DEKO OPERATOR: ABC7, the number one station in Los Angeles, is seeking a PINNACLE DEKO operator for this fast-paced, news-oriented station. Ideal candidate will be highly motivated, able to interact effectively with a highly energized news team, have a keen eye for detail, and be able to multi-task. Solid background using a Pinnacle Deko in a news environment is essential. Experience with Quantel Picturebox and Deko under newsroom system control is important. Please send resume to: ABC7 Los Angeles, Attn: Human Resources, Dept/TV, 500 Circle Seven Drive, Glendale, CA 91201. Please indicate Dept/TV when submitting via e-mail: KABC-TV.RESUMES@ABC.COM Equal Opportunity Employer.

Grass Valley

CONTINUED FROM PAGE 64

including a unit that uses FIT CCDs and is 16:9/4:3 switchable. There is even an option for a removable optical block that can be located up to 100 meters from the electronics.

DIGITAL PIXEL MANAGEMENT

The middle of the company's camera lineup is well-represented by the LDK-300 DPM. Using digital pixel management (that's where the DPM comes from), this camera has 12-bit A/D conversion, 22-bit internal digital processing and a design that supports triax and dockable DVCPRO50 recorders. The DPM feature of the LDK-300 makes for transparent switching between 16:9 and 4:3 and the camera does not need a lens with a crossover adapter to change aspect ratios.

The Grass Valley LDK-150DPM uses digital picture management for 16:9/4:3 switchability.

At the high end of the Grass Valley camera line is the LDK-6000, which has three 9.2-megapixel CCDs to provide native resolution for all HD formats. The camera also features 12-bit A/D conversion, 22-bit internal digital processing and the TriaxHD system that allows the camera to be used up to 1,000 meters from the CCU.

"We had some great success with our HD cameras, including [recent sales to] National Mobile Television, NEP, Colorado Studios and New Century Productions," Rosica said. "This year's Academy Awards show was shot using our new LDK-6000 HD."

According to Rosica, major networks such as ABC, ESPN and CBS are using Grass Valley LDK-6000 cameras for many of their HD productions, which are often downconverted to standard-definition for broadcast.

There are more things coming from Grass Valley in its camera line, including 14-bit A/D conversion for cleaner video with fewer artifacts than the now-standard 12-bit conversion. The new LDK-500 camera has this 14-bit A/D conversion.

Although the camera brand is now known as "Grass Valley," there will continue to be a few more cameras coming off the production line bearing the Thomson name during this transition, Rosica said. ■

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59	Aspen Electronics	www.aspenelectronics.com
42	ATI	www.atiguys.com
5	Avid Technology	www.avid.com
75	Axcera	www.axcera.com
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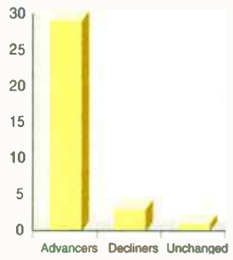
TV TECH STOCK INDEX

WIN-LOSE RATIO



To have your company listed, contact Sanjay Talwani at stalwani@imaspub.com.

TOP ADVANCERS BROADCAST STOCKS
(Aug. 8-Aug. 22)

Sinclair	+15.27%
Emmis	+11.26%

TOP DECLINERS BROADCAST STOCKS
(Aug. 8-Aug. 22)

Gray	-1.01%

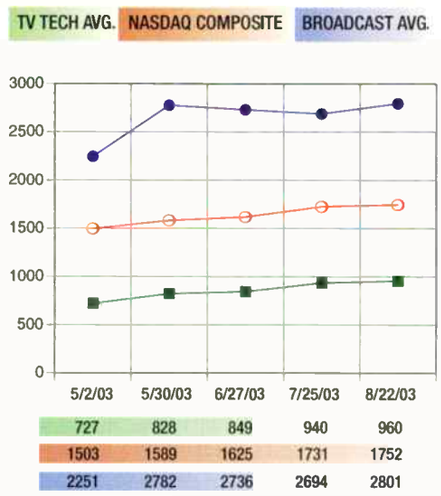
TOP ADVANCERS TV TECH STOCKS
(Aug. 8-Aug. 22)

LSI Logic	+30.61%
S-A	+15.48%

TOP DECLINERS TV TECH STOCKS
(Aug. 8-Aug. 22)

ParkerVision	-12.16%
Ciprico	-4.17%

TV TECH TREND



727	828	849	940	960
1503	1589	1625	1731	1752
2251	2782	2736	2694	2801

TV Tech STOCKS as of Aug. 22

Company Name	52-Week Range	Aug. 8	Aug. 22	% Change
Avid	8.26 - 50.42	43.95	48.59	10.56%
Belden	10.50 - 19.30	15.9	18.34	15.35%
Ciprico	2.75 - 6.81	5.52	5.29	-4.17%
Harmonic	1.01 - 5.43	3.33	3.73	1.20%
Harris	24.09 - 34.85	30.27	32.55	7.53%
Leitch	2.00 - 6.83	3.45	3.45	0.00%
LSI Logic	3.78 - 11.88	8.69	11.35	30.61%
Media 100	0.35 - 1.70	1.1	1.12	1.82%
ParkerVision	4.08 - 16.43	7.4	6.5	-12.16%
Pinnacle	7.50 - 14.95	7.7	8.26	7.27%
S-A	10.10 - 33.35	28.23	32.6	15.48%
SeaChange	4.50 - 11.84	9.65	10.01	3.73%
Storage Tech	9.66 - 27.63	24.48	25	2.12%
Tektronix	14.64 - 28.26	20.1	22.62	12.54%

Broadcast STOCKS as of Aug. 22

Company Name	52-Week Range	Aug. 8	Aug. 22	% Change
Acme	5.35 - 8.65	7.73	7.93	2.59%
Belo	18.72 - 24.41	21.97	23.07	5.00%
Emmis	14.25 - 24.86	18.91	21.04	11.26%
Entravision	5.20 - 13.60	9.28	9.82	5.82%
Fisher	39.50 - 58.17	47.28	49.72	5.16%
Granite	1.30 - 3.70	2.84	2.99	5.28%
Gray	7.95 - 14.90	12.93	12.8	-1.01%
Hearst Argyle	19.50 - 28.48	23.35	25.16	7.75%
Hispanic Broadcast	16.60 - 31.55	27.86	30.39	9.08%
Lin TV	19.45 - 26.55	20.92	22.58	7.93%
Paxson	1.91 - 6.99	4.07	4.53	1.13%
Sinclair	7.68 - 14.97	9.76	11.25	15.27%
Liberty	32.10 - 45.30	41.55	42.96	3.39%
Univision	19.97 - 37.71	32.96	36.3	10.13%
Young	6.50 - 25.54	22.49	24.69	9.78%
Tribune	38.93 - 50.24	46.05	46.17	0.26%
Meredith	36.91 - 48.30	46.03	47.66	3.54%
EW Scripps	65.13 - 90.65	83.23	85.22	2.39%

COMPANY FOCUS

Leitch Posts Q1 Loss

TORONTO

Leitch Technology Corp. appears to be staunching its losses, posting a a net loss of $5.1 million, or 17 cents a share, in its first quarter of fiscal 2004 compared to $91.8 million, or $3.08 a share in the previous quarter. Results in both quarters were affected by one-time charges related to technology acquisition and downsizing.

As previously announced, revenues for the quarter, which ended July 31, came in at $37.5 million—down two percent from last quarter and 20 percent from a year ago.

Leitch has variously blamed its struggles on the war in Iraq, the sluggish economy and the weak U.S. dollar, among other factors. the company announced last May that it would cut recurring expenses by 5-10 percent, which helped the company shrink losses between this quarter and the last.

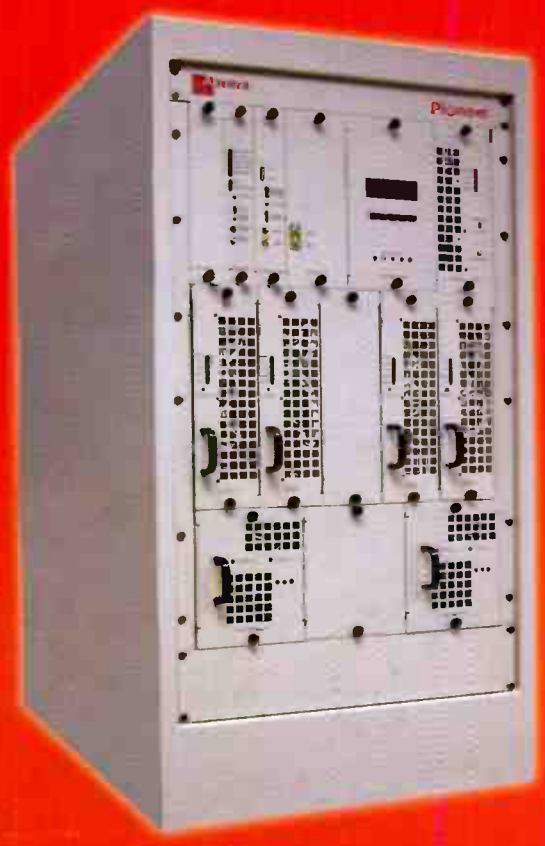
"I am pleased to see that, although some of the reductions are temporary, our expenses are down significantly for the quarter," said Stan Kabala, interim chief executive officer who took the position of CEO after Margaret Craig resigned in July. "When our revenue flow improves, the results of these expense reductions will be evident on the bottom line."

Orders for the quarter improved to $45 million, up from $41 million in the previous quarter, but slightly lower than the $46 million last year. The company reported a gross margin of $17.2 million or 46 percent of revenue, versus $17.6 million or 46 percent in the prior quarter and $24.8 million or 53 percent of revenue last year.

Leitch ended the quarter with $15.1 million in cash, down from $18.6 million at the close of fiscal 2003. A $20 million stock sale by the company was scheduled to close Aug. 29. Leitch stated that it carries no debt, but is in discussions with bankers to put a new debt facility in place by the close of Q2.

Deborah McAdams

Eliminating obstacles for today's broadcaster



Introducing the Pioneer

When we asked broadcasters what they want in a transmitter, one theme continually resurfaced - broadband. A broadband transmitter allows group owners to minimize spare parts stock and adds simplicity for stations planning to move DTV channels to current analog frequencies, or community broadcasters relocating to core channels. Introducing the **Pioneer** and **Pioneer DT**, meeting the needs of today's broadcaster like no other solution on the market. The modular LDMOS amplifiers cover the entire UHF band with no retuning, allowing simple channel changes and minimizing spare parts stock. And all Pioneer and Pioneer DT transmitters can be upgraded to high power with nearly 100% reuse. For over 20 years, the best-engineered transmitters have come from Axcera - *The RF Experts*.

Axcessing the new *era* of digital communications

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WHEATSTONE D-9

DIGITAL AUDIO MIXING CONSOLE

IN 1993 WHEATSTONE began manufacturing the D-500 digital audio mixing console for the radio broadcast industry, and after 10 years of experience in the field it was only natural we would apply this digital technology base to the surround television market.

The new WHEATSTONE D-9 DIGITAL AUDIO CONSOLE, despite its small footprint (25 inches front-to-back), is FULLY loaded with all the functions and control capability needed by most television broadcast facilities. With integrated routing, multiple outputs, surround sound, sub-groups, DCM masters, full monitor functions and powerful communication circuits, the D-9 offers a wealth of operational choices for the most demanding of live television applications.

Wheatstone Corporation

600 Industrial Drive, New Bern, North Carolina, USA 28562
www.wheatstone.com / sales@wheatstone.com

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