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WHAT'S INSIDE

Lawmakers Look at 2008

Estimates of OTA reliance remain nebulous

by Deborah D. McAdams

WASHINGTON

As lawmakers consider ending analog television in 2008, the biggest question in the debate remains—who cares?

No one knows just how many people will lose TV service when analog transmitters are powered down. Estimates range from 13 percent-and-shrinking to the combined populations of Texas, Michigan, Massachusetts, Mississippi, Nebraska, New Mexico, Oregon, Tennessee and Wyoming.

Lyle Banks, CEO of Banks Broadcasting, said most people don't understand the implications of the analog shutdown.

"I don't think people have one clue whatsoever," he said. "The majority of people don't know that at some point, the analog service as they know it will go away and they'll have to make significant expenditures."

Broadcasters have been criticized as a group for not doing enough to educate the public about digital television and the impending analog shutdown. Banks said his stations—KNIN-TV in Boise, Idaho and KWCV-TV in Wichita, Kan.—are taking a "proactive" approach by encouraging people "to go digital." However, the KNIN "Ask the Engineer" Web site suggests that Boise viewers have a low interest in being educated about television in general:

Q: My picture is black.

A: Don't take this the wrong way. The answer to this one most of the time is that your TV is unplugged.

Cable penetration in the Boise market is one of the lowest in the nation at 40 percent, Banks said.

"You've got a lot of people who are going to be disenfranchised," he said.

Bray Cary, president and CEO of West Virginia Media Holdings in Charleston, W.V., said there is

2008, PAGE 22

Life in a Small Market

Post NAB road tour heads west

by Craig Johnston

SEATTLE

During this bicentennial year of the Lewis and Clark expedition, a motorcoach packed with broadcast equipment, traveling some of the same routes the famous explorers did, bringing the state-of-the-art digital broadcasting savvy to some of the smallest television markets in the country.

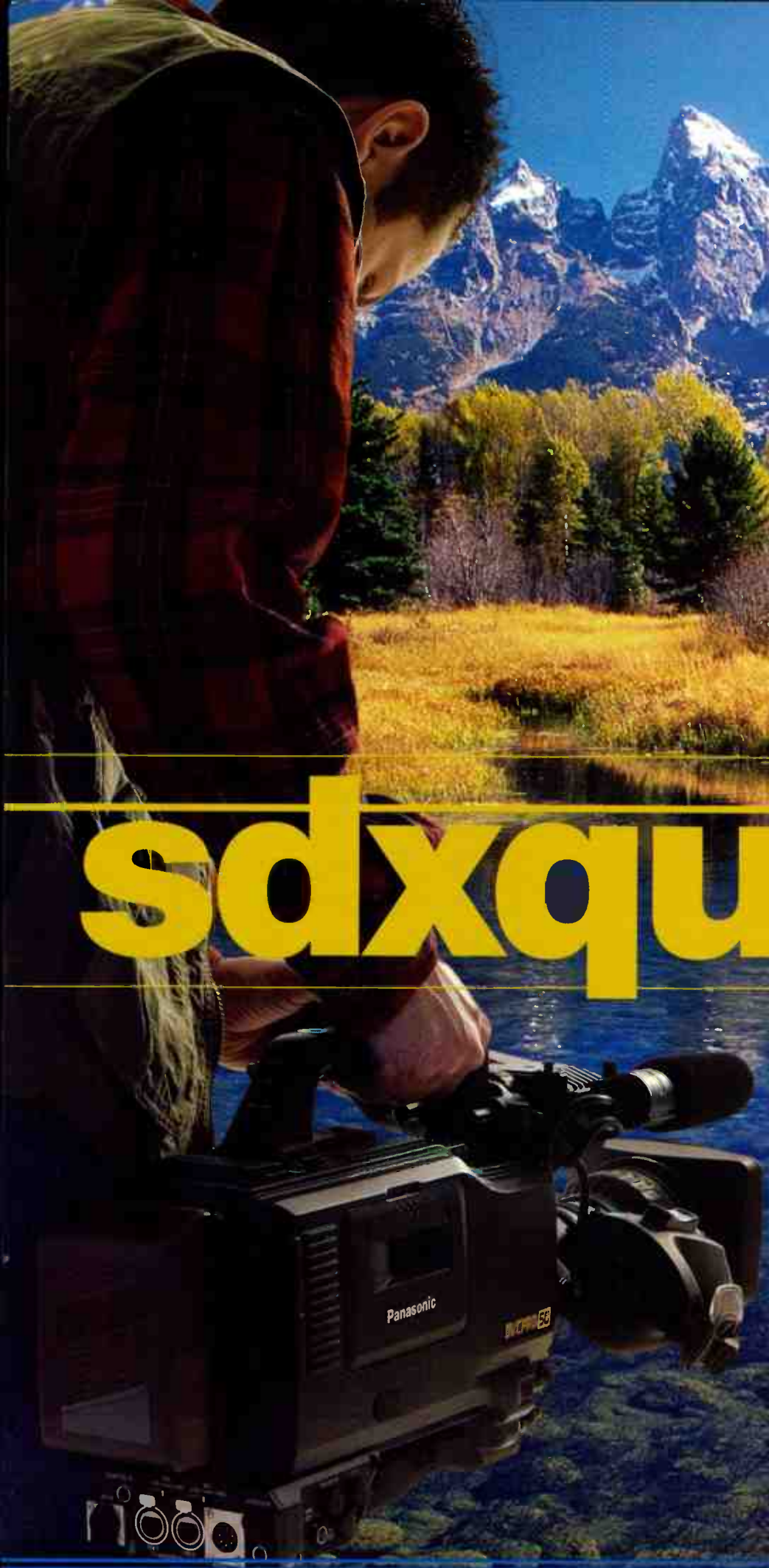
Departing from Seattle in early May, the Advanced Broadcast Solutions Technology Tour 2005 headed east to Spokane, then into the heart of Montana, with stops at Missoula, Billings and Bozeman. It hit Idaho stations in Twin Falls and Boise, Washington stations in Tri-Cities, Yakima and Tacoma, then to Oregon stations in Medford, Eugene and Portland.

"The whole purpose was to help the broadcasters we visited create better product, more efficiently, at a lesser cost to them," said Advanced Broadcast Solutions founder, Mark Siegel.

"I think it's a great idea," said Lee Wagner, general manager of KMVT in Twin Falls, Idaho, designated market area No.

LIFE, PAGE 14

sdxquisite



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IN THIS ISSUE

P.12
Nano-TV

P.46
Who still uses an antenna?

P.50
Transmission

NEWS

FEATURES

P.26
25 years of technology at CNN

BUYERS GUIDE

EQUIPMENT

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NAME:
Jay Ankeney

COLUMN:
Focus on Editing

It was 20 years ago today…
In June 1985, this column began its journey with an extended metaphor: "The tall stranger smiled. 'I'm only in it for the entropy,' he said as he rode off into the horizon."…Page 36

NAME:
Mario Orazio

COLUMN:
The Masked Engineer

You might not have noticed that it's tough to rate the image quality of a block of wood. The same applies to Panasonic's new AG-HVX200 camcorder. Okay, what I'm really talking about here is religious faith. …Page 38

NAME:
Charles W. Rhodes

COLUMN:
Digital TV

I recently attended and participated in the annual meeting of the National Translator Association, which is composed of TV translator operators. You might be surprised at their number. I believe about 130 attendees came this year. …Page 48

FROM THE EDITOR

Broadcasters and Wireless

There was a lot of talk about broadcasting and wireless/mobile devices at NAB2005. Now I know what you're saying; yes, broadcasting was one of the original "wireless" technologies, but when the public thinks of wireless these days, they're thinking of that most popular of accoutrements: the cell phone.

Currently, several of the major wireless companies are providing video content to their subscribers to view on cell phones and PDAs. But these are proprietary services based on their own cellular technology. Broadcast networks are providing some of the content for these services, but that's as far as we go right now. How do American broadcasters get in on the current craze?

They can't, and that's why I felt there was such a disconnect at NAB between what some of the vendors were pitching and the reality of the American broadcast industry. Most of the solutions provided were based on the DVB-H standard, which is fine for European broadcasters (where cell phone use is even higher than that in the U.S.). For U.S. broadcasters to adapt the DVB-H standard for this purpose, they would have to acquire new spectrum, which would be prohibitively expensive as well as speculative.

E-VSB is currently the only solution provided for U.S. broadcasters, but most broadcasters (and even the ATSC) acknowledge that it is years away (if ever) from providing the robustness required for such a service; not to mention that it would have to be backward-compatible with current DTV receivers and the current tower system for NTSC/ATSC would not work; a distributed transmission system would be required.

Another important factor to consider is how to get customers to pay for the content; current technologies don't allow for that in the traditional broadcast scenario.

It wasn't too long ago that the industry was still debating the merits of cell phone TV (we've been longtime skeptics). However, video over cell phone has proven to be a popular service, just within the past 12 months, and the fact that companies such as Crown Castle and Qualcomm are investing millions on new networks proves the market is growing. But whether broadcasters will be part of that growth remains to be seen.

Tom Butts
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LETTERS

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

New EU Directives Spell Big Trouble for Broadcasters

Dear Editor:

The European Union has proposed new directives that could be disastrous for American broadcasters. The proposals are:

RoHS (Restriction of Hazardous Substances), which bans lead, mercury, cadmium and hexavalent chromium, and two flame retardants from most electrical/electronic products by July 2006.

WEEE (Waste Electronic and Electric Equipment), which requires collection and imposes near-term recycling/recovery of end-of-life products by manufacturers.

RoHS requires that lead-based solder must be replaced with "no-lead" solders, despite much scientific evidence that lead in electronics poses little or no threat to human or environmental health. Unfortunately, all "no-lead" solders require much higher process temperatures, but yield inferior connections. The result is lower-reliability connections, as well as of components subjected to higher heat. These drawbacks, both higher manufacturing costs and reduced product reliability, will be borne by customers! Beyond the dubious science on which these 'eco-mandates' rest, there are also troubling political issues:

Human and capital resources are being diverted from more urgent problems, like essential technology development, to environmental concerns of undemonstrated urgency. More urgent health threats, such as shortages of clean water or influenza pandemics, are neglected. The cost will be to the environment and human health—global prosperity will necessarily be reduced.

RoHs/WEEE compliance imposes massive administrative demands on manufacturers, often at the expense of deferring product development. And, regardless of your nationality, the EU seeks to impose its rules worldwide—without effective input from those of us outside the EU. WEEE even dictates what must be done with products, even if removed from the EU!

They are based largely on fallacy. WEEE, the recycling mandate, arose from fears of looming resource scarcity. But as the late Julian Simon documented, the long-term trend (over decades and centuries) in all commodity prices has been steadily downward, while supplies (through new discoveries and greater efficiency) have consistently climbed upwards.

They rely on some of mankind's most inefficient institutions—government and politics—for their operation. But much more efficient and fair operating mechanisms exist for prioritizing and providing the needs these directives address. From the widest perspective, the entire RoHS/WEEE debate is about authority—who shall wield it and how.

A few recommendations: First, a delay (or phased transition) to implement both RoHS and WEEE, providing more time to develop and adopt substitute materials and processes. Second, grant a temporary "Last Time Buy" exemption to save existing designs and avoid much of the very waste at issue. Third, revise the MCV (Maximum Concentration Values) basis to a more sensible whole-component (or even whole-unit) basis. This would still immediately achieve most of the elimination of banned substances, yet avoid excessive verification costs and scrapping existing parts. Fourth, allow the sequestration of electronic waste until cost-effective recycling technologies emerge—to avoid incurring much higher present processing costs.

I also suggest that these government-imposed remedies must involve the effective participation of all affected parties—not issued as fiat, informed mainly by a narrow range of interests. That's not asking too much for laws that so greatly impact all of us!

"Democratic" political processes are much preferable to open warfare or other overt violence for resolving difficult problems. But politics still involves considerable conflict, resulting in tremendous resource consumption by all "sides"—and resources used in political struggles are wasted, not available for mitigating the real problems at hand!

Will Wohler
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Students Get Schooled in XDCAM

PARK RIDGE, N.J.

Students at Washington State University are learning the ins and outs of the Sony XDCAM Professional Disc system.

The XDCAM is being used to produce "Face to Face," a community affairs show provided by the university.

The in-camera editing capabilities help crews review thumbnails of footage on the camcorder's LCD screen for on-the-fly editing.

The post team for "Face to Face" uses the discs to immediately access scenes according to time-code breaks which saves time.

Marvin Marcelo, assistant professor at the university said he considers the XDCAM a good educational tool because it gives students a chance to use traditional A/V production tools combined with an IT-based workflow—similar to many commercial broadcast organizations.

Students have been using the optical-disc technology since February, according to Marcelo, and those using the system are becoming more efficient in the edit suites because they no longer having to scroll through the entire tape to find footage, Marcelo said.

Optical-disc

Optical-Disc

France Trials French Open in HD

PARIS

The French Open tennis championship last month gave French broadcasters an opportunity to test HDTV transmissions in anticipation of the eventual launch of HD services in the country.

The France 2/France 3 Haute Définition project included participation from France subsidiary Globecast, Eutelsat, Sony and the Fédération Française de Tennis and was designed to demonstrate the viability of all the links in the HD production chain. Globecast simultaneously provided fiber connectivity of the uncompressed HD images from the French Open to France Televisions' headquarters as well as to a showroom at Globecast's Paris headquarters and the HD Forum in neighboring Boulogne. The live feed was then transmitted on a Eutelsat satellite via an experimental channel set up by the HD Forum, an association of manufacturers, publishers, broadcasters, producers and distributors to promote HD in France. The trial involved the transmission of all semifinal matches live from the Phillipe Chatrier central court. The equipment used included a production truck and six Sony HD cameras, as well as a multichannel surround sound recorder.

Sports

Sports

Beware of Higher Backhaul Costs

ORLANDO, FLA.

Revenues generated by HD backhaul and distribution are expected to grow 680 percent by 2010, according to a forecast by research firm Northern Sky Research.

The firm looked at commercial satellite leases specifically for high-definition broadcasting, which now generates a worldwide total of $47.6 million. The current growth trajectory suggests that figure will reach $323.8 million in five years.

The Northern Sky report made the relatively safe prediction that HD broadcasting soon would ramp up and increase the demand for satellite capacity. It noted that North America would be the busiest market, given the number of HD channels already in the atmosphere.

The increase in traffic is expected to break what Northern Sky referred to as a "stalemate in lease capacity prices due to excess capacity."

Satellite

Satellite

Time Warner Makes Nice with SBC

SAN ANTONIO, LITTLETON, COLO.

Time Warner Telecom will continue to provide "special access and other 'last-mile' network services" to SBC and AT&T through 2010 under the terms of a new extended service agreement.

The deal is effective upon completion of the SBC and AT&T merger.

The deal is particularly significant for Time Warner because, according to the Rocky Mountain News, AT&T's last-mile leases generate about 8 percent of revenues for Time Warner Telecom.

The original local-access agreement between AT&T and Time Warner Telecom was struck on Jan. 1, 2001.

The new commercial agreement simply extends the current contract between Time Warner Telecom and AT&T in the post-merger environment through Dec. 31, 2010. The merger is expected to be completed by early 2006.

In a separate agreement, SBC will provide Time Warner Telecom with similar last-mile network services in SBC territory for five years, effective June 2, 2005.

Telecom

Telecom

Hitachi Beefs Up Skinny TV Line

SAN DIEGO

Even as smaller analog TVs continue to outsell all other types of television sets, Hitachi is going after a bigger piece of the plasma and LCD flat-panel market.

The American division of Hitachi added seven product lines to its flat-panel offering. The series includes 42- and 55-inch plasma HDTVs, a line of LCD flat-panel HDTVs with 26-, 32- and 37-inch displays and a 42-inch enhanced-definition plasma model.

The plasmas feature a Alternate Lighting of Surfaces panel that "minimizes the barriers between pixels to deliver more than one million pixels in the 42-inch screen size," according to the company. Hitachi said the technology matches "line for line with the viewable center 1,024 lines of the 1080i HDTV system, reproducing finer details than any plasma in its class."

The gas and phosphor formulation was also tweaked to deliver a 10 percent brighter picture and a 60,000-hour useful-life rating, according to the company.

Hitachi said the sets also feature "HDTV and NTSC tuners," The sets are, however, CableCard compatible, meaning they must include an ATSC tuner by law.

According to the Consumer Electronics Association, about 18 percent of the televisions shipped to dealers in 2005 will have screens 36 inches and larger; 39 percent will have screens 24- to 35-inches; and 43 percent will be smaller than 24 inches.

HDTV

HDTV

HJ21ex7.5B
21x EFP

HJ22ex7.6B
22x Tele

HJ11ex4.7B
11x Wide

HJ40x10B/HJ40x14B
Portable Long/Tele
(w/Image Stabilizer)

HJ17ex7.7B
17x EFP

HJ17ex7.6B
17x Standard

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Philips Unveils New HDTV ASIC

TAIPEI, TAIWAN

Philips Electronics and software maker Mediabolic have introduced a new digital media adaptor reference design that combines the Philips Nexperia PNX1500 with Mediabolic middleware.

The design is distinguished by its ability to be integrated into television sets and its HD video output and interactive capabilities, according to Philips. The user interface will allow folks to check weather, cruise eBay or order a Netflix DVD from the TV screen.

The design, priced at $5,000 will be available to manufacturers in July.

Philips says the Nexperia PNX1500 supports MPEG-2, MPEG-4, DivX, H.264 and Windows Media Video; SD-to-HD up-conversion with advanced de-interlacing, "and integrates an LCD controller and advanced graphics engine." These features allow the new digital media adaptor to be extended for DVR capability and wireless connectivity.

Technology

Germany Taps Tandberg for HDTV

SOUTHHAMPTON, U.K.

A German television provider will be using the Tandberg Television AVC video encoding and distribution system for a new HDTV operation.

Premier AG will launch its first HD service in November via the DPC Digital Playout Center in Unterfoehring, Germany, where the AVC system is installed.

The playout center—owned by SES Astra—will deploy a Tandberg Television HD video headend with statistical multiplexing and Tandberg EN5990 HD MPEG-4 AVC encoders.

The Munich-based pay-TV operator will transmit HDTV content on three dedicated channels for sports, films and documentaries.

SHM Broadcast GMBH, the German business partner of Tandberg Television, is providing the system and support for the integration.

HDTV

Belo Goes for FlipFactory

DALLAS

Belo Corp. Television Group is tossing the tape in favor of FlipFactory TrafficManager from Telestream.

FlipFactory TrafficManager is now deployed to 12 of the 19 Belo stations around the country. The remaining stations are expected to adopt the technology by the end of 2006.

Belo went with FlipFactory because the stations are receiving a growing number of commercials on digital catch servers, according to Telestream of Nevada City, Calif. This was great for delivery to the stations, but internal processes remained manual, i.e., dubbing, maintaining tape machines, and re-ingesting content onto broadcast servers.

"We were looking for a way to get everything off tape efficiently and to correlate all our incoming content into one location," said Reed Wilson, engineering project manager for Belo.

TrafficManager is also being used to "streamline transfer of Pathfire-delivered syndication content" at most Belo stations, according to Telestream.

Belo also has standardized on the Sundance Digital Titan multichannel automation system and the Grass Valley 3500 Series Profile SD and HD media servers.

Workflow

Martin Announces Chief Choices

WASHINGTON

FCC Chairman Kevin J. Martin announced that he will appoint Donna Gregg as chief of the Media Bureau. Deborah Klein, who was serving as acting chief, will continue as deputy chief.

Klein took over after the departure of Ken Ferree, who left when Michael Powell stepped down from the top spot in March. Roy Stewart will become senior deputy chief of the bureau, having most recently served as chief of the Office of Broadcast License Policy.

In her career, Gregg has served as vice president of Legal and Regulatory Affairs and general counsel for the Corp. for Public Broadcasting, and as a partner at Wiley Rein & Fielding, a Washington, D.C., law firm specializing in telecommunications. She was a senior lecturing fellow in telecom law and policy at the Duke University School of Law and a member of the board of directors of the North American Broadcasters Association. She launched her legal career as a staff attorney in the commission's former Cable Television Bureau.

Stewart is a 40-year veteran of the FCC who started in the former broadcast bureau. Klein joined the FCC in 1994 after serving as an attorney with the Federal Trade Commission Bureau of Competition.

FCC-mail

WASHINGTON

The FCC Consumer and Government Affairs Bureau announced a new e-mail service to deliver "customized information about the FCC's actions and related developments in telecommunications and other communications services," according to an agency release.

The Consumer Information Registry allows subscribers to select from a list of almost 40 topics, including Broadcast TV, Digital TV/HDTV, Satellite TV, Broadband Deployment and, if that doesn't cover queries, "Other." Opt-in begins with registry at *http://www.fcc.gov/cgb/contacts*.

Federal Frequency

BIA Sees Strong TV Growth

CHANTILLY, VA.

TV ad revenue growth was strong in 30 percent of TV markets between 2000 and 2004, according to estimates released by BIA Financial Network.

While overall station revenues increased only 3 percent during the period, 65 markets logged an increase of 10 percent. Contributing factors included increased populations, strong economic growth and the 2004 elections.

In terms of dollars, the Los Angeles market logged the largest increase at $110,800,000; Philadelphia, Pa., was next with $77,500,000 and Dallas-Ft. Worth followed with an increase of $75,700,000.

The following markets represent the strongest growth (in percentage gain):

- Lima, Ohio 74%
- Laredo, Texas 60.9%
- Rapid City, SD 45.6%
- La Crosse-Eau Claire, Wis. 40.2%
- Palm Springs, Calif. 39.1%
- Wausau-Rhinelander, Wis. 35.1%
- Sioux Falls-Mitchell, SD 33.2%
- Reno, Nev. 32.9%
- Ft. Myers-Naples, Fla. 31.9%
- Waco-Temple-Bryan, Texas 31.6%

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Professional Services

Mobile Video Technologies Emerge

Crown Castle, Qualcomm tout competing transmission schemes

by Claudia Kienzle

HAMILTON, N.J.

Next time you're stuck in traffic or waiting for the kids at soccer practice might be the perfect time to watch a little TV—on your cell phone.

Today, a few mobile TV services deliver multiple channels of live TV or video clips via cellular networks to the tiny screens of cell phones, portable PCs, Blackberrys, and other handheld devices that display video at 10 to 20 fps. But the number of mobile TV networks is expanding, and quality is advancing toward full-motion video.

Right now, there are service providers, like MobiTV, which targets 1.3 billion cellular phone users via Cingular Wireless and Sprint PCS Vision, packaging ABC News Now and NBC Mobile, (which the networks produce specifically for the mobile TV market); along with Fox Sports, Discovery, MSNBC, C-SPAN, and more than two dozen other channels. And cellular provider Verizon Wireless offers its own mobile TV service called VCast, sending clips on demand to handheld devices.

But, current mobile TV services all send video over the same cellular networks that are already congested from carrying voice and data, which means that watching videos can interfere with the primary purpose of the cell phone: to make and receive calls.

To provide a more efficient mobile TV service, two companies—Crown Castle and Qualcomm—are launching dedicated mobile TV networks using the broadcast model, sending signals OTA from transmitters to cell phones with built-in mobile TV tuners. While these next-generation handsets are not yet on the market, Siemens, Nokia and Samsung have prototypes that have enabled mobile video demonstrations at NAB 2005, and other shows.

"Successful electronic news divisions are going to have to find ways to reach consumers at the times and places that are most convenient for them," said Julie Summersgill, spokesperson for ABC News in New York. "Right now, consumers spend a few minutes checking the day's top news stories, which run on their wireless devices at about 10 fps. But, in the next 18 months, we expect the viewing experience to improve and wireless audiences to grow."

Folks watch the DVB-H demonstration at the NAB2005 Microsoft booth, which featured an Axcera UHF transmitter and a variety of handheld devices using Dibcom receivers.

ABC News Now is a live 24/7 news channel which leverages the global resources of ABC News to produce live breaking news coverage of events, hosted by co-anchors Gigi Stone and Hari Sreenivasan; as well as repurposed stories from ABC's "Good Morning America," "Nightline," and "World News Tonight with Peter Jennings." Summersgill said ABC News is interested in talking to any mobile TV providers that want to carry its service.

TV SNACKING

Leveraging its 10,000 cellular tower sites nationwide, Crown Castle Mobile Media, in Southpointe, Pa., plans to roll out its dedicated digital network for full-motion, multichannel mobile TV by the end of 2005. The company licensed 5 MHz of vacant bandwidth in the 1.67 GHz spectrum from the FCC, and will base its service on the DVB-H (Digital Video Broadcasting-Handheld) mobile TV standard.

In a statement to investors dated April 15, 2005, Crown Castle explained its choice of DVB-H.

"To support the increasing consumer appetite for mobile TV without sacrificing battery life or voice call availability, DVB-H uses 'time slicing,' which transmits content in bursts, allowing the handset to 'sleep' in between bursts. Existing prototype handsets already support watch time of over four hours. Assuming that users will 'snack' on 15 to 20 minutes of programming to catch up on news, sports, and weather, the battery life enabled by DVB-H will deliver support for voice usage and TV viewing throughout the day."

Michael Ramke, vice president business development for Crown Castle Mobile Media, in Houston, Texas, told TV Technology, "We have several retail opportunities, including wholesaling through wireless operators... as well as selling direct to consumers. We are flexible in terms of branding, and will work with our retail partners to find the most effective means to maximize the customer experience."

By 2009, he said, analysts predict there could be between 4.3 million and 14 million mobile TV subscribers in the United States, generating annual revenues from $700 million to $2.3 billion, assuming average revenue per user of almost $14.

SFNs MAKE TV GO 'ROUND

Thales and Axcera have been contracted by Crown Castle to provide satellite receive dishes, satellite and GPS receivers, and Single Frequency Network-compatible DVB-H transmitters (including Axcera's Innovator LX Series), starting with the first test market in Pittsburgh.

Pittsburgh offers diverse geographical attributes, including urban, suburban, rural, hilly, and forested areas, ideal for testing mobile reception.

"SFNs enable service providers to position multiple transmitters throughout a metropolitan area, blanketing that coverage area with a robust signal," said Richard Schwartz, director of marketing and product management for Axcera, in Pittsburgh, Pa. "For Crown Castle's operation, many low-power transmitters will be tuned to the same frequency," from 1,670 to 1,675 MHz in the L-Band, "and operate in perfect synch using SFN technology."

Crown Castle will distribute its signal—including video content compressed as VC1 (based on Windows Media 9) and SFN timing information—via SES Americom satellites, he said. Satellite receivers at the transmitter sites will feed the content stream to the transmitters, which will use the SFN timing information, originated at the Crown Castle network operations center in Pittsburgh, with a GPS reference ensuring transmitters remain synchronized.

GO WITH THE FLO

In October 2006, Qualcomm will begin a nationwide mobile TV service based upon its proprietary platform called MediaFLO—for Forward Link Only modulation—that is a competing technology to DVB-H. Qualcomm, which has invested $800 million in MediaFLO, will broadcast OTA to handheld devices on UHF Channel 55 nationwide, but the service will appear to consumers to be coming from wireless operators.

Qualcomm developed FLO because every mobile TV platform the company saw was designed for a different purpose

MOBILE, PAGE 12

Mobile TV: The ATSC Viewpoint

WASHINGTON

Broadcasters in other parts of the world can look to DVB-H as the solution to their DTV cell phone applications, but what about ATSC and mobile wireless in the U.S.?

"As technology advances, ATSC DTV will be receivable in mobile and pedestrian (handheld) environments," said ATSC President Mark Richer.

"The technology is going to evolve and ATSC will support pedestrian and mobile applications. While it won't happen overnight, we have some building blocks that should help us to get there."

"One of the ATSC building blocks is E-VSB, which may play a role in mobile TV because it lowers the receiver carrier to noise threshold. There's also the work we are doing on distributed transmission systems—the ability to build out SFNs using ATSC, because the industry will need to deploy network architectures that provide signal coverage everywhere that they want to offer service." Richer also cites the rapid advances in receiver technology as moving ATSC to the day it can support mobile and pedestrian TV applications.

While he indicated that there are companies working on strategies for using the ATSC standard as a platform for mobile TV, Richer could not give a timetable for this development.

"It's going to take us a while longer to get there," he said. "That's because the original design focus for the ATSC DTV Standard was to maximize the number of bits through the channel to allow broadcasters to provide HDTV and high-quality multiple DTV services."

Richer believes that the industry will be receptive to a mobile TV solution using ATSC. With millions of ATSC receivers being sold every year, it's critically important that the mobile strategy for existing broadcasters be backward-compatible with deployed receivers. "It is unlikely that there will be a dominant world standard for mobile TV," says Richer. "There are many competitive technologies being used around the world, including T-DMB [Digital Multimedia Broadcast]. I just came back from Korea, and T-DMB is being deployed widely there. Qualcomm's MediaFLO is another interesting competing platform. "Many of the service providers today are non-traditional broadcasters. But I believe that there will be opportunities for traditional broadcasters. They could eventually allow their local content—news, weather, and sports—to be carried by mobile service providers or as the technology develops, they might decide to use some of their 6 MHz bandwidth for providing their own mobile services."

Claudia Kienzle

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Motorola Seeks to Grow Flat Panels

New nanotube process could lower production, consumer costs

by John Merli

WASHINGTON

It's the type of cutting-edge technology that Motorola hopes will grow on both manufacturers and consumers. Motorola Labs is currently talking with potential strategic partners in Asia and Europe about licensing its recently unveiled carbon nanotube technology (CNT), which it contends will eventually revolutionize the flat-panel display industry.

The Motorola NED prototype nanotube processor

"Nano" means anything miniscule, and originates from the Greek word "nanos" which means dwarf. Nanotechnology is at the heart of a science that is so miniaturized that virtually none of its wondrous effects can be seen without an electron microscope. This highly precise and specialized technology has direct implications for a number of industries today other than television, especially in the medical field.

Motorola Labs is currently demonstrating to interested parties a 5-inch color video prototype using CNT technology that is barely 1 inch thick—a width that Motorola says can be sustained for displays up to 42 inches diagonally, possibly larger. (The nanotube-growth layer itself is only a fraction of an inch deep.)

This newest and, most flat-panel analysts agree, revolutionary, nanotechnology being furthered by Motorola Labs entails a growth process which eliminates the need for "organic paste" to secure nanotubes directly onto glass. Pasting was an earlier process used by such major flat-screen manufacturers as Samsung and others.

GROW YOUR OWN

Motorola says carbon nanotubes can now be grown directly onto a substrate such as a cathode, using a special catalyst.

Vida Ilderem, director of the Center of Excellence for Embedded Systems and Physical Sciences Research at Motorola Labs, said the new technology will result in large flat-panel displays that will offer better video quality, longer life—and perhaps the paramount reason for conducting research and development on this Star Wars-like approach to flat panels—lower manufacturing costs and, therefore, potentially lower price points for consumers.

"Up until now, a paste mixture, an organic binder almost like toothpaste, had to be used for this process," Ilderem said. "But when we grow them directly onto the glass, it's a much better, more efficient process."

While some key elements of her lab's new process remains in the proprietary realm, she said, eliminating the pasting process for the nanotubes will result in faster response times, more detailed video on the entire display screen, and better viewing angles for what is more specifically known as "nano emissive display."

The NED direct growth-on-glass process itself, she said, is regulated by a "chemical vapor deposition process" that is designed to meet or exceed the display characteristics of CRT displays, yet would cost less to produce. The process includes the actual manipulation of material at the molecular level.

"Manufacturing costs should be much lower than LCD or other display technologies because we have much less processing steps to complete, and the design rules are larger," Ilderem said.

She called it a "significant milestone" to grow the prototype screen size up to five inches in the lab this way.

SEEKING PARTNERS

Larger prototypes will be grown once a licensing partner, or partners, takes on the manufacturing end of the process.

Barry Young, vice president and CFO for DisplaySearch, a display analysis firm, estimated that the manufacturing cost for a 42-inch CNT flat panel could be less than $400. Young said this new method of growing nanotubes directly onto glass is destined to give other flat-screen technologies a run for their money.

He said the problem with the earlier nanotube methods involved the use of the paste, which caused electrons to be distributed unequally. He also points out that the new and improved CNT technology, despite its cutting-edge aspects, still uses standard CRT phosphors that emit light when irradiated with particles of electromagnetic radiation, which typically produce vivid colors and that already have a long track record of reliability.

But that's the technical side of the equation, Young said.

"The next stage is actually proving that it can be manufactured and marketed efficiently in a very competitive environment amid other technologies."

In late May, Motorola provided details of its latest technology at the Society for Information Display International Symposium in Boston, in private meetings with undisclosed potential licensing partners.

Specifically, the 5-inch NED operational video display from Motorola Labs is a sectional prototype of a 42-inch, 16:9 flat panel, 1,280-by-720-pixel display, with full color at the HD level using CRT phosphors, high-quality brightness, and display characteristics that the lab says will meet or exceed CRT sets in response time, wide-viewing angles, and "wide operation temperature."

The nanotube layer itself has a thickness of only 3.3 millimeters (about one-eighth of an inch) and includes display-drive electronics that would be about equal in manufacturing costs to LCD displays, but would be noticeably less expensive to produce than plasma-addressed products.

Motorola's experience in nanotechnology began 15 years ago, and today it holds 160 patents related to nanotube and flat-panel technology. Once Motorola's manufacturing partners enter the picture, it could be a minimum of two years before actual CNT flat-screen displays would be available to consumers. ■

Mobile

CONTINUED FROM PAGE 10

said Rob Chandhok, vice president of engineering and market development for Qualcomm in San Diego.

"DVB-H is no exception—the cost of being compatible with a fixed terrestrial standard is simply too much. FLO's performance is so much better that it significantly changes the business case for mobile video. If it didn't, we would have used some existing air interface.

"With FLO, we concentrated on delivering a high-quality user experience, with 30 fps QVGA video and fast channel switching times. Without this quality, the mobile TV experience won't be attractive to the broad consumer base," said Chandhok.

"We're unique in this market as we are the only company awarded orders from both Qualcomm and Crown Castle," said Richard Fiore, senior vice president of sales and marketing for Thales Broadcast and Multimedia, in Southwick, Mass.

"Our SmartCast Mobility platform is an end-to-end solution that's leading the mobile TV market since it is tailored to DVB-H and encompasses our expertise in RF, digital modulation, IP streaming, and MPEG multimedia; all key technologies that relate to sending video to mobile. And we have also modified our transmission solution for FLO, working closely with Qualcomm engineers. We have invested considerable R&D into mobile TV platforms because we see a huge opportunity."

Dave Glidden, director of TV products and services for Harris Broadcast Communications division said, "Harris is positioned to support major mobile video platforms, including Qualcomm's MediaFLO. We're modifying our Apex exciter to accommodate Qualcomm's modulation waveform; as well as integrating DVB-H into a modified DAB transmitter for Crown Castle.

"Mobile TV networks will operate much like traditional broadcasters, utilizing our DVB-H compliant Atlas DTV660 transmitter; DVB-H compatible Synchrony SFN adapter; as well as our full line of modulation, encoding, content management, automation, media asset management, and network management systems," Glidden said. Harris also supplied transmitters for DVB-H trials for NTL in Oxford, England and Telstra/Bridge Networks, in Sydney, Australia.

James Fontaine, president and CEO of Microtune, in Plano, Texas noted that the European mobile TV market broadcasts in the UHF band at 470 to 890 MHz, while the U.S. market uses the L-Band at 1,670 to 1,675 MHz.

"Our new Microtune MT2260 single-chip tuner is the first one capable of supporting both U.S. and European mobile TV networks, and manufacturers can build handsets for both markets using the same tuner."

The Microtune Mobile MicroTuner MT2260 is a dual-band, ultra-low power solution that leverages Microtune patented RF silicon technology and ClearTune integrated filter technology, reducing interference from a mobile phone transmitter, a major source of picture disruption. (The Microtune RF TV tuner has already proven itself in European digital video applications, such as in-car TV, cable modems, PCTV, and set top boxes. Microtune has shipped 15 million single-chip TV tuners since 1999.)

The 6-by-6 mm MT2260 consumes approximately 20 mW of power in "viewing" mode, "with reliable reception even in moving vehicles," said Albert Taddiken, COO at Microtune. "Our MT2260 tuner enables manufacture of cellular phones in a low-cost, low-power format, which is critical to the successful roll-out of phones that leverage new mobile TV networks." ■

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Life

CONTINUED FROM PAGE 1

191. "A small market station like we are typically doesn't go to NAB on a regular basis, and doesn't take many people when it does."

This tour "gave us an opportunity to see a range of equipment and options that we normally would not be exposed to other than through trade journal advertising," he said. "We were able to get five or six of our operations and production people involved to see what's out there. It's a great education tool."

The bus spent an hour-and-a-half at each station, with a half-hour between to drive from one to the next.

EXPOSURE TO NEW GEAR

One of the most popular pieces of equipment on the bus was the Triveni StreamScope, with which engineers could determine whether their digital signal complied with FCC standards. They were also shown how Wohler audio monitoring equipment could check audio, and how Streambox video transport equipment could IP encode a video stream and examine the quality of such a stream.

"We talked about Evertz's fiber solutions, and how we could use their VistaLINK to monitor the health of the fiber system or the fiber network," said Siegel. "We also had Nucomm's new offering, their portable ChannelMaster TX1 microwave unit."

"Marshall Electronics was there, we had some of their LCD displays," he said. "And MicroFirst, an automation vendor, controlled an Omneon server for content."

Siegel is an evangelist for broadcasters using technology for generating additional revenue streams. "They have this wonderful gift called digital bandwidth that many of them don't know how to generate revenue off of using multiple digital channels."

He cited the examples of the Las Vegas Fire Department using a local TV station's digital spectrum to send building floor-plans to laptops carried in first-responder fire trucks, and the Los Angeles school district which is also using a local station's digital spectrum to move content and data.

"We showed a Triveni Digital SkyScraper, used to insert ancillary data channels," Siege said. "We also showed them Scopus encoders, which were very cost effective SD encoders so they could add additional SD streams to their digital channel. Also a Logic Innovations multiplexer to show them how they could better utilize their digital bandwidth."

In the smallest market the road show visited, DMA No. 194 in Bozeman, Siegel described a unique need he discovered.

"We were at KZBK, a Cordillera Communications station, sitting with the general manager, news director and chief engineer. The biggest thing in their market is wildfires, and when their news people go into these hot spots they have no way of getting the information back," he said.

He noted that at a wildfire location, there's frequently no access for a satellite truck, and no line-of-sight for microwave.

"We started to talk about delivering audio and video content over IP through a sat-phone. So here we are in a very small market, talking about very heavy-duty technology."

Cordillera has stations across Montana, in Billings, Bozeman, Butte, Great Falls, Helena, Kalispell and Missoula. Matching them city-by-city is another state broadcast group, Max Media Montana.

"For the folks who did not make it to NAB, some of the technology they've seen out there in his traveling road bus was fabulous," said Max Media Chief Engineer Mike Warner. "It gave them a lot of insight into a lot of this, maybe a little different outlook on some of this digital technology as far as the direction it's headed."

Siegel called the tour a "bidirectional exchange of information where they share their needs and we solve them, and we also share opportunities where they may be able to do things a little differently.

"We get to bring information about what other people are doing in other parts of the country as we travel around, and what we've collected, having been in this industry for 20 years."

He gives some high marks to the smaller stations.

"Believe me, some of these small market stations are doing a helluva lot better than some of the larger stations as far as providing services and solutions and content and information to their customers. And they're much more efficient."

The road show clocked 3,800 miles, just a shade under what Lewis and Clark traveled from St. Louis to the Pacific Ocean. Another is scheduled early in the summer, and Siegel said he plans even more in the future. ■

"A small market station like we are typically doesn't go to NAB on a regular basis, and doesn't take many people when it does."

— Lee Wagner,

KMVT in Twin Falls, Idaho, DMA No. 191

KTMF-TV in Missoula, Mont., was one of several stops for the Advanced Broadcast Solutions Technology tour bus.

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Broadcasters Consider Fiber Diet

Transmission over the glass strand gains acceptance

by Mary C. Gruszka

NEW YORK

"Ten years ago, fiber was a hard sell, but now more people are accepting fiber."

That's how Joe Commare, vice president of marketing and international sales for Telecast Fiber Systems summed up the state of the fiber business for broadcasting.

Fiber cable and connectors have become more reliable, robust, and dust tolerant, making them more attractive for mobile and event productions.

Several recent examples include doing "Austin City Limits" concerts from five stages, the inauguration of the governor of Utah in Salt Lake City and Carnavale coverage by TV Globo in Saõ Paulo—all using Network Electronics gear—and a variety of campus events like the recent performance of a comedy troupe at the University of Arkansas, which used Telecast Fiber equipment.

Today, there are optical transmitters and receivers for just about any type of electrical signal—digital or analog video and audio, intercom, serial control, Ethernet, GPI/GPO control, and telephone interfaces. And for HD, fiber allows the signal to go farther than copper.

There are certain advantages to fiber.

"Fiber is more spy-proof. It's harder to tap into," said Cameron Francis, CEO of Network Electronics, U.S. "Copper is easier to splice into and see what's going on."

Because fiber doesn't conduct electricity unlike copper, it can withstand lightning strikes and can provide isolation between different systems to eliminate ground loops. Also, "with fiber, we can guarantee that the signal is going in only one direction," Francis said. "Some customers want assurance that nothing is coming back up the line."

Yet with all these advantages, fiber tends to be more expensive than copper.

"We were talking to a customer who had a large project. They wanted to take fiber to 30 different studios, but go only 300 to 500 feet. They could still do it cheaper electrically over coax," Francis said.

THE RIGHT QUESTIONS

This stresses the importance of good planning and asking the right questions when considering installing fiber.

Is the facility new or an existing one?

"It's easier if the facility is new as you can put in whatever fiber you want," Francis said. "We recommend putting in more than you need. The more fiber you have available, the less multiplexing you'll need, and the less it will cost."

Multiplexing increases equipment costs and system complexity. Multiplexers have some inherent loss, so a more powerful laser may be required, also adding to the cost.

Commare suggested putting in three times the amount of fiber one might consider necessary.

If existing fiber is in place, then it should be tested, Francis said.

"You may not know how old or in what condition the fiber may be," he said. "You may need to measure the capacity of the fiber and the signal loss throughout the fiber. You can get the answers you need, but it is more complicated."

Another issue is who controls the fiber.

"It's easier and better if the customer has full control of the fiber," Francis said. "It gets tricky when you work with a third party. If a customer is going between cities, they may lease fiber from a provider like a telecom, which may dictate what equipment to use."

Producers for the popular PBS show "Austin City Limits" used DWDM multiplexing to transmit signals among five concert stages for its annual outdoor concerts.

Then there is the matter of what type of fiber to install. Two of the types used in broadcasting applications are single mode and multimode.

"About 85 percent of the time, we see single-mode fiber used by our broadcast customers," Francis said.

Commare said "for HD, it has to be single mode."

Single mode is made up of a single strand of fiber and is narrower than multimode, but has a higher bandwidth and less signal attenuation.

"Single mode can be used for longer distances with a greater number of signals multiplexed on it," Francis said. However, it tends to cost more than multimode.

The laser light source used with single mode needs to be narrow (spectrally speaking), with common wavelengths of 1,310 or 1,550 nanometers.

"Try to get away from 1,550 nm, since this is more bend intolerant," Commare said.

The next consideration is what Francis refers to as the grade of the lasers—wavelength division multiplexing, coarse wavelength division multiplexing and dense wavelength division multiplexing—aka WDM, CWDM and DWDM. Each of these methods uses a separate wavelength for each signal multiplexed onto the fiber, but the difference is in how many signals can be multiplexed, and the distance the signal can be carried.

WDM FOR BROADCAST

"With WDM, you can put up to two signals on a fiber and go short distances up to 1,000 meters," Francis said. "With CWDM, you can put in up to 16 signals and the range is 10 miles. And with DWDM we do up to 40 channels on a fiber and over a distance of 100 miles."

For broadcast applications, CWDM is the most common.

"CWDM technology has matured, it's gotten cheaper and people understand it better," Commare said. "CWDM technology is reliable with its 20 nm separation. DWDM is not used for broadcasters; it's not stable for remote operations."

And yet, for "Austin City Limits," DWDM was used, although Francis said they didn't have to do it that way.

Other considerations in planning a fiber installation is to identify all the signals—audio, video, intercom, control, data—and how many will be transported via fiber to how many locations and the distances involved.

Once distances are determined, signal loss can be calculated. Knowing the attenuation of all components, and the

"We recommend putting in more than you need. The more fiber you have available, the less multiplexing you'll need, and the less it will cost."

—Cameron Francis, Network Electronics

sensitivity of the receivers, the laser power required for the transmitters can be calculated.

Network Electronics makes a large lineup of cards for its flashlink fiber-optic system including transmitters, receivers, muliplexers and demultiplexers.

The flashlink CWDM system, for example, is based on frames containing four channels each plus one upgrade port for more channels. The four wavelengths are fixed and the wavelengths of the signal cards must correspond to the wavelengths of the optical filters, but the signal formats running on those wavelengths can be chosen to suit the signal transport needs.

Network Electronics also offers the GYDA system controller, a Linux-based Web server. "GYDA allows monitoring of the status of all the cards from a Web browser," Francis said. "A user can connect to the Web server via its IP address and see what is going on with all the signals."

At NAB2005, Telecast Fiber, which produced gear aimed at the OB market, introduced the Teleport CWDM multiplexer for up to eight digital signals.

"Teleport does the wavelength assignment, the user doesn't have to think about it," Commare said. "Just put a fiber in and Teleport figures out which wavelength it will transmit down the fiber."

According to Telecast Fiber, the Teleport assigns each incoming signal to a specific CWDM wavelength and sends it on to the CWDM mux. On the receive end, the signals are optically demultiplexed and distributed to corresponding receivers. Eight HD signals can be sent down two fibers.

Also new from Telecast Fiber is the Adder II series of audio multiplexers using the Natrix 1.5-Gbps bus architecture. "With Natrix you can add signals and drop them off along the line," Commare said. He compared it to a super highway where the 75 Mbps drops to interface boxes are the on/off ramps. ■

Fiber Aids TV Productions at the University of Arkansas

At the University of Arkansas in Fayetteville, the Department of Media Services in the Division of Continuing Education provides television coverage of events occurring on campus with its 40-foot, six-camera production truck and a satellite uplink truck.

In covering events, the department faced long cable runs from the production truck to the venues, so the crew turned to fiber.

"Before, we had to run a snake for audio and video returns, but fiber allowed a reduction in setup time by a considerable amount," said Gary Hodges, technical manager of SNG operations for the Department of Media Services. The university purchased six Telecast Fiber Systems Cobras, two Adder 322s, and two Viper II systems, all of which are installed on rolling racks.

The University of Arkansas setup includes six Telecast Fiber Cobras, two Adder 322s and two Viper II systems installed on rolling racks.

The Cobra units are installed inside the venue. Fiber runs from the truck to the Cobras, and triax is sent out from the Cobras to the cameras. Cobras also provide two-way camera control signals.

"Triax has a 1,500-foot limit, but the fiber system allows runs up to 3,000 feet," Hodges said.

The Adder 322s are used for 48 channels of audio from the venue to the truck, and 16 returns to the venue. Each of the two Viper II racks is configured for four composite analog video feeds, one SDI video, four stereo audio pairs, data and contact closures and an Ethernet card.

The Ethernet module allows the truck to be connected to the campus network.

The truck also has two Telecast Fiber RingNecks to feed telephone lines.

"This way, we can keep track of phone usage," Hodges said.

For the satellite truck, a Viper II system is also used to connect the university's fiber links to the major buildings on campus.

"We move signals on the fiber from where a conference is held to the garage where the truck is kept," Hodges said.

For the fiber system in general, Hodges said, "It's a very straightforward system. We've had zero problems."

Mary C. Gruszka

Graphics Advances Power HD Sports

New technologies facilitate HD graphics for sportscasters

by Robin Berger

LOS ANGELES

ESPN's graphics for Major League Baseball are truly dynamic, with the camera moving on the fly from one field position to another, depending upon the player's batting order and defensive role, accompanied by the requisite headshots and stats. And these are HD graphics.

Earlier, during the NCAA basketball playoffs in March, commentators like Dick Vitale were able to stand in front of a 50-inch touch screen showing the competition brackets to illustrate his commentary. One touch of the screen would trigger a zoom into a particular matchup, showing the game, team logos and score. Games in progress would also note the time remaining—again, in HD.

Hollywood-based Reality Check Studio created both.

According to Reality Check cofounder, Kory Jones, what made the two above-cited gems possible was technology provided by graphics software from Vizrt and the Quadro FX 4000 video card made by Nvidia.

"The new Nvidia cards are so powerful that we're doing things now that we couldn't do on an Onyx six to seven years ago" in SD, Jones said.

And the Vizrt Viz|Engine, the core of all its real-time graphical solutions, completely changed the creative process.

In the past, animation would have gone from a 3D animator to a "render farm," where it would have been composited and laid off to tape, which would have been played back, he explained. Obviously, on-air sports programming does not provide time to do that. Viz|Engine notably automated the process.

"There's really nothing that compares to what Vizrt is doing right now as far as being able to take all of those steps, crunch them down to one, fill in variables from a database in a template—like player head shots, names, team logos and colors—and play that 3D animation back in HD on-air," Jones said.

Jones is even more optimistic about the upcoming Version 3.0 of Viz|Engine that he's testing.

"It gives you the ability to script and program right within the graphics application," he said. Vizrt "actually took our [NCAA bracket] scene and rebuilt it in 3.0, and it took about a tenth of the time."

As for a 3.0 rendition of the baseball lineups, he said, "we'd have more opportunity to change the animation dynamically."

Jones is also impressed by the Vizrt Viz|FX. "The Viz|FX product is a camera solution that allows a director to see CG characters in a real environment in real time," Jones said.

It also allows the user to pre-visualize a digital set on green screen in real time. Both aspects cut down on time and worry.

"Your margin of error is much less because you're actually getting a preview of what the final composite is going to look like," he said. "And Viz|FX allows you to phase in the motion data from the camera—you're 90 to 95 percent of the way there with your motion tracking."

Launched at NAB2005, Viz|Trio NV supports all SD and HD formats, and features a 3D authoring system with access to true 3D objects and animations and Viz|Engine for rendering.

On top of this, he said, is the close-to-incalculable time saved doing reshoots.

"There's a comfort factor in knowing you have what you need," he said.

Other NAB2005 technologies that are high on his list include products by Black Magic Design and Apple Computer.

"I was impressed at what Apple does—I think motion application is going to be very good," said Jones. "We've invested in a number of products—from the XRAID to the Xserve," the one-rack computer that controls the XRAID. "It's still kind of early for the Xsan technology—but its working well in our editing department."

Meanwhile, Reality Check Studio has already acquired 10 Black Magic Design DeckLink capture cards over the past six months. The cards enable the studio to convert SDI signals to the DVI variety required by inexpensive ($400-$500) LCD screen monitors. The alternative would be to spend $5,000 a pop for hi-def monitors.

"Black Magic has a lot of innovative new stuff coming out for the conversion from SD to HD," Jones said.

STATE OF HD GRAPHICS

Industrywide, true, native HD graphics account for about 10 percent of all sports graphics, according to Jones' calculations. Neither Jones nor the tech providers who serve TV clientele noted a hockey stick jump in HD interest this year.

"In 2003, 99 percent of our HD sales went to Asia; 2004 the picture was different, with demand increasing also in the U.S.," said Steinar Søreide, head of research and development for Vizrt. "Since then, it's been a steadily increasing demand in the U.S. and worldwide."

Caren Anhder, director of the Pinnacle Systems product management on-air graphics division sees an increase in the use of HD graphics in U.S. sporting events.

"For the bulk of last year, the large majority of broadcasters were still using standard-def equipment and upconverting," she said. "Now, we're starting to see the main sports broadcasters finalizing plans for regular broadcasts" versus just premium events.

Pinnacle and VertigoXmedia, a Montreal-based developer of graphics automation technology, plan to further prod sportscasters toward HD.

Pinnacle introduced a hybrid system, which can switch between SD and HD, and a set of tools to manage them, said Anhder.

David Wilkins, president of VertigoXmedia said his company would unveil the Xmedia suite this summer. It will enable one box, the VertigoXG, to simultaneously broadcast in SD and HD. ■

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eTITLE Spells Out ROI

Multilanguage system consolidates back-office subtitling functions

by Farah Jifri

LONDON

Taking subtitling one step further is what eTITLE is all about. Shown for the first time as a technology demonstration at this year's NAB, eTITLE from TMR Digital is the result of a two-year research program, a 140 million Euro grant from the European Commission (EC), and cooperation among a consortium of partners. It is currently in beta with European broadcasters as well as subtitling companies.

Aimed at allowing broadcasters and content owners to improve return on investment, eTITLE brings together state-of-the-art language technologies to support translation and subtitle generation. At the heart of the system lies accurate timecode linkage and automated content-based metadata, which enables cross-platform localization and delivery of content. eTITLE also offers interface design, integrating machine transcription, translation, sentence compression and image processing within a secure online environment and a single digital workflow.

In its current state, eTITLE works with transcriptions in English, Spanish, Catalan and Czech, allowing two-way translations between English and Spanish, English and Catalan, Spanish and Catalan, and English and Czech. There are plans to expand this to include additional languages in future.

NOT A SUBTITLER

What makes eTITLE different from the numerous subtitling products already on the market is that it is not trying to do away with subtitlers, according to Neil Lane, managing director of TMR Digital, a London-based post production facility.

"We are not looking to be a subtitling company, or take jobs away from subtitlers," he said. "What we are looking to do is take the back-office process and put it online. Our system will make the process up to the last mile more efficient and cost-effective. Subtitlers will still do the finishing.

"About three years ago, we bought Clipstream and then we came across an asset management system from Dremedia that was based on voice recognition, which we ended up reselling. We thought that the idea of linking up speech-to-text and video clips was one that would work, and that there was a market for."

"By 2012, 80 percent of programs will need to have subtitling and that's the reason for eTITLE."

—Neil Lane, TMR

With partners such as MTV Networks Europe, Czech DVD subtitling company LS Productions, the Technology and Linguistic Department at the University of Barcelona and Catalonian broadcaster Televisio de Catalunya, TMR applied for and received an e-content grant from the EC to fund the project. The grants are earmarked for services and business models that allow European media owners to exploit their content internationally through multilingual and cross-platform localization.

One of these partners, Televisio de Catalunya, brings its long-time experience in technology development for television to the table. Pere Fabregas Freixa of TVC explained that for hearing-impaired people in particular, the broadcaster has developed specialist applications for subtitle generation that sit alongside other subtitle applications.

Lane said there are speech-to-text systems, voice recognition systems and subtitling systems, "but there is nothing that brings all of this together in one product; and nothing that does it all online. There are some desktop, license-based products out there, but this is very restrictive. With eTITLE, we would do the back-office processing and send back an ETL—our own eTITLE language—file that resides on an eTITLE Web server."

By speeding up back-office processing, translation and compression, subtitlers are allowed more time to carry out their craft—the finishing. So the system takes voice recognition, voice-overs or text input and provides translation, compression and text placement.

For example, English script can be inserted and translated into Spanish within a news environment, taking live feeds and producing subtitling for them. Alternatively, it can be used for archival purposes—which is how MTV Networks Europe is looking to use eTITLE.

eTITLE is aimed at improving the automation and expansion of the European subtitling market. The software allows for more cost-effective and faster processing, making bulk subtitling accessible to broadcasters regardless of size.

Neil Lane, managing director of TMR Digital

"Being a Catalan TV channel, broadcasting in Catalan, the implications of it was obvious," Fabregas Freixa said. "The integration of different processes in one complete package is very useful for several subtitling applications, from news, film and TV, to DVD production. Because it supports the complete subtitling process, it is going to save a good proportion of man-hours by automating parts of the subtitle generation, placement and delivery operation."

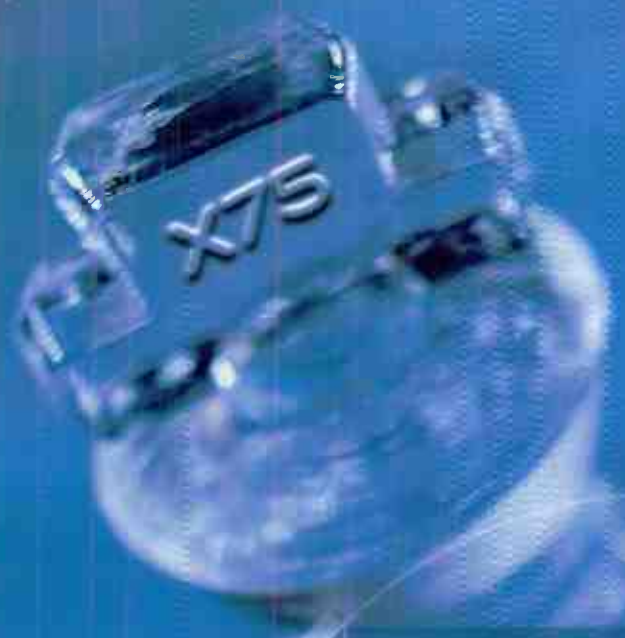
The bulk subtitling capability is something that will become increasingly useful to broadcasters due in part to the regulatory frameworks that have been put in place in both Europe and the United States. Additionally, considering that around 80 percent of programming is in English, the scale of assets broadcasters are sitting on could potentially be converted into additional revenues.

"By 2012, 80 percent of programs will need to have subtitling and that's the reason for eTITLE," Lane said. "It allows broadcasters to fulfil this requirement. With eTITLE, they can double or triple the volume of subtitling and still reduce the cost base.

"A large global broadcaster can use the system to its advantage regardless of where in the world the subtitling needs arise. So for the Latin American market, they could produce Spanish or Portuguese subtitles using inputs in English. MTV for example could produce, in a single pass, the titles for the U.K., Spain and Latin American markets."

eTITLE will ship in 2005 with a beta version set to be shown at IBC later in the year. In the meantime, companies are being sought carry out beta trials with the product. ■

[King of Processors]



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2008

CONTINUED FROM PAGE 1

"zero awareness" that the government intends to shut off over-the-air analog television. WVMH consists of four stations in West Virginia.

"It's the same issue facing the industry since the inception of the concept," Cary said. "There's going to be a point in time where they're going to turn off a bunch of television sets. It is the congressional delegation that has to have the nerve to tell their constituents they're not going to get television. The issue is, can they find a way through that? In rural and poor areas, that's going to be a bigger challenge."

While constituents remain largely uninformed, debate ensues on a draft bill in the House calling for analog TV signals to end Dec. 31, 2008. At a telecom subcommittee hearing on the bill in late May, it was evident that disagreement on set-top subsidies and broadcast flag enforcement would have to be settled before a floor vote.

The one thing most lawmakers agreed on was establishing a deadline, and while House Commerce Committee Chairman Joe Barton said 2008 was "probably frozen," his counterpart in the Senate, Sen. Ted Stevens (R-Alaska), hadn't signed off on it.

The House draft also addressed consumer education, digital channel selection, digital must-carry and a tuner requirement. (See "Digital Television Transition Act of 2005") The deadline legislation is expected to be attached to a budget bill scheduled for completion by September.

COUNT VON COUNT

Over the course of the last year, members of Congress have heard divergent tallies for over-the-air TV reliance.

The Consumer Electronics Association, representing the gizmo makers who want to fill the analog broadcast spectrum with subscription services, says only 13 percent of U.S. households rely exclusively on free OTA television.

That number will diminish as more people buy sets with digital tuners, the CEA contends. There are roughly 3.2 million digital tuner devices on the market now; that number will be around 86 million by 2008, according to CEA estimates. (CEA numbers reflect shipments to dealers—not consumer adoption.)

The CEA came up with 13 percent via the typical method of subtracting cable and DBS subscriber numbers from the total number of TV households in the country, allowing for a 3 percent overlap.

The folks at KCSM in San Mateo, Calif., did similar math before embarking on their own analog shutdown in 2004. Cable and DBS penetration in the San Francisco market—KCSM's coverage area—was 89 percent, so OTA reliance was pegged around 11 percent. It was more. When KCSM powered down the analog transmitter on May 24, 2004, the station lost 38 percent of its audience.

"We lost the lease on the analog transmitter site. We had to do something. Shutting down the transmitter was the way to go," said Michelle Muller, director of technology at KCSM, a public station licensed to the San Mateo County Community College District.

The station didn't rely solely on pay subscriber numbers. Members were polled, and everyone taking telecourses was asked how they received the channel. It was not over the air, Muller said.

"So when we found out those two primary constituencies didn't really rely on us for over the air, we thought it wouldn't have a huge impact," she said.

KCSM proceeded to tell viewers. For two months, about five times a day, the station rotated four, 60-second spots telling people what was going to happen. Members were informed in the monthly guide, information was posted on the KCSM Web site, and a smattering of newspaper articles appeared. Then on May 15, the station stopped all programming and ran a billboard saying KCSM was going off the air on Channel 60, its analog assignment. It listed a phone number for people to find out how to get the digital channel.

"That was the week the floodgates opened," Muller said. "It was really intense for about a month."

The phones at KCSM rang constantly. Everyone at the station had to be trained how to deal with the calls. People were sent to consumer electronics stores for digital receivers. The only problem was, there weren't any to be had.

"We thought we'd done research on set-top boxes that were available at retailers in the Bay Area," Muller said. "We didn't have any official correspondence with retailers, but we had our engineering people go talk to the salespeople."

Muller said one big-box retailer called the station and said "stop sending people to us because we don't have anything."

One year later, the station has not fully recovered its audience, although another PBS station that invoked must-carry in the San Francisco market may also be a contributing factor, Muller said. The station nonetheless continues to hear from viewers who are still looking for the station.

SUBSIDY STICKING POINT

The DTV draft bill making its way around Congress includes a viewer education clause, but if KSCM is any indication, a significant number of people simply won't be educated, and many will be inconsolable. Many Democrats, such as Reps. Elliot Engel from New York and Rick Boucher of Virginia, are convinced that without a set-top converter subsidy program, analog shutdown will be a political disaster. Yet the more lawmakers discuss a set-top subsidy program, the more it becomes clear that it would be wildly complicated.

Congress would have to nail down who's eligible, how to find those people, what agency administers the program, how much the administrative cost would be and how to pay for all of it, said Mark Goldstein, director of physical infrastructure issues at the Government Accountability Office.

At the subcommittee hearing, Goldstein submitted a report that looked at existing subsidy programs to evaluate administrative costs. In one case, the price for mailing vouchers to approximately 1.5 million households was estimated to be about $552,000.

Current estimates of households receiving television exclusively over the air range from 13 million to 21 million. Based on the GAO example, administrative costs for sending vouchers to OTA households would range from $4.8 million to $7.7 million.

The GAO also looked at tracking the OTA contingent using cable and satellite subscriber lists, but concluded it would be a daunting task. Cable companies told the GAO that under current law, the government would need a court order to obtain subscriber lists. Cable officials also told the GAO that subscriber lists constantly change, and that churn in some systems is as high as 10 percent.

After taking such complications into account, Rep. John Dingell (D-Mich.) wondered if there would be any money left to buy set-top converters. ■

Digital Television Transition Act of 2005

Among specifics in the House DTV draft bill:

- The FCC would have to issue a report and order by Dec. 31, 2006 on final digital channel assignments, and complete reconsiderations by July 31, 2007. Congress would have to be updated every six months starting Feb. 1, 2006 on international coordination issues.
- The deadline for putting digital tuners all TV sets (with screens 13 inches and larger) would be moved up to July 1, 2006. The current deadline is one year later.
- Manufacturers would have to label analog-only sets.
- Cable operators would have to carry the primary digital video signals of must-carry broadcasters, and they would have the option of converting it at headends for analog subscribers. However, MSOs who downconvert one signal would have to do the same for all must-carry stations in a market, at least until the end of 2013, when the FCC would be empowered to end the requirement.

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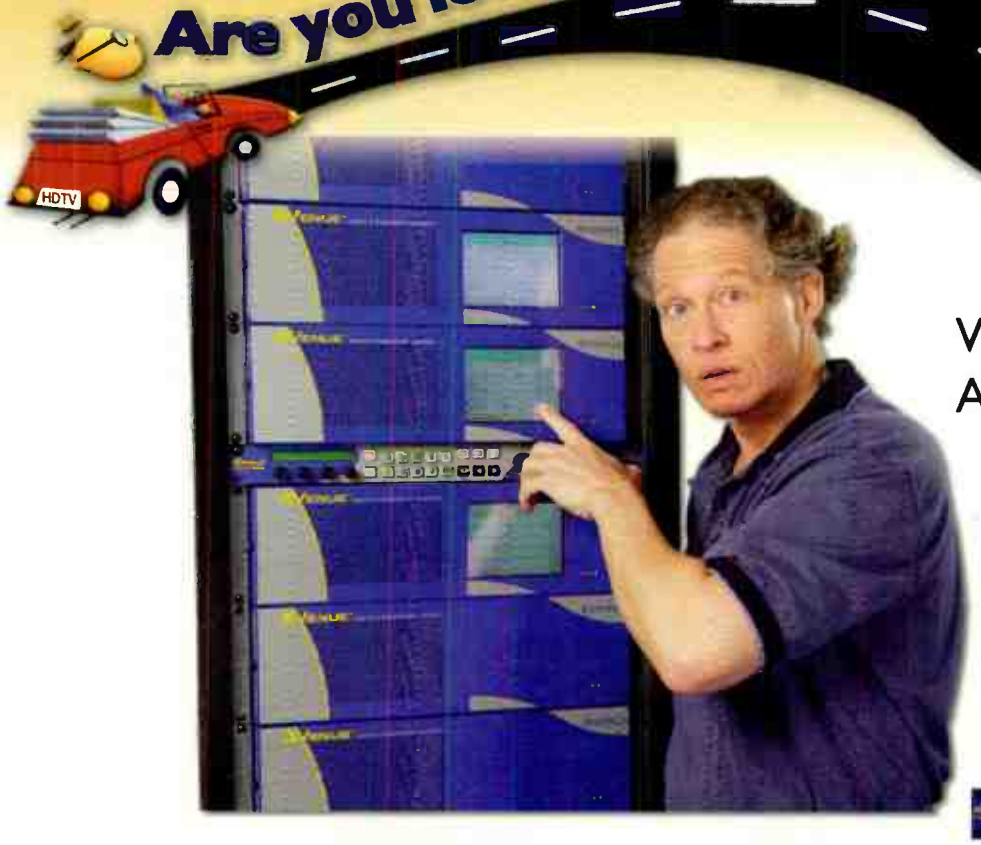

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NBA Entertainment Consolidates on SGI

League adopts data management technology to access assets on a variety of media

by Craig Johnston

SEATTLE

When the clock ticks down on the final game of the NBA finals and the Lawrence O'Brien trophy is awarded for 2005, the league's in-house NBA Entertainment video facility in New York City will make a major leap forward with a new storage system from SGI.

The upgrade is designed to make workflow sense as the NBA delivers video highlights of its games to ever more platforms, like cell phones and the Internet. And with the coming of 100Mbps high-definition video, it makes dollars and cents sense as well.

When the installation is completed in time for the league's tip-off next fall, NBA Entertainment will have three tiers of storage designed to house game footage, some going back as far as the late 1940s.

Careful logging of those thousands of hours of basketball games has allowed NBA editors to find any specific shot in those archives. The new storage system will allow editors to access the plays much more quickly.

"If you're trying to manage hundreds of terabytes of storage, you want to keep the things you use most often right next to you on fast fiberchannel disks," said Greg Estes, SGI vice president of corporate marketing.

"Things you don't use all that often, maybe once a month, you push those out to slower, less expensive SATA disks, and then things you just need to have around but who knows when you'll need it, you push that out to tape."

Hardware-wise, this breaks down to a 8 TB SGI InfiniteStorage NAS 2000 solution for the disk storage and a StorageTek SL8500 tape library.

It may seem intuitively obvious that the most recent game material should be the most immediately available to the editors, but that's not always true. Rather, video material that is most frequently used needs to be the most easily available.

DATA MIGRATION

An SGI program call the Data Migration Facility allows the material to automatically be moved among the various storage media depending on its frequency of use.

"Data Migration Facility is really the key piece that will help us set up rules and analyze what's on the SAN, and by those rules move it back onto tape storage," said Steve Hellmuth, senior vice president of technology and operations at NBA Entertainment.

The StorageTek tape library sports six tape transports and a pair of robot arms. It sits on a 4-by-6 foot footprint and can hold up to 3,000 LTO3 datatapes, though the NBA will start by licensing 1,500.

Once the new system is installed, the organization will begin a dual process Hellmuth describes as burning the candle at both ends.

"Beginning with next season, we will digitize our games as they come into our facility in real time, onto the SAN, and then as they are used or not used, according to certain rules, back onto the tape robot," he said.

"The other end of the candle is the stuff we need to preserve long term, whose life cycle has run out," he said. Material on aging videotape will be ingested onto LTO3 tape. The NBA currently has material on Sony Beta tape, BetaSP, DigiBeta, HDVCAM, HDCAM, and HDCAM SR as well as super-16 film (shot before high-resolution video was available).

The savings enjoyed by putting material to the datatape rather than videotape is significant. Hellmuth estimated the cost of LTO3 storage at $7 per hour of SD material versus $16 for videotape. For 100Mbps HD material, he placed the datatape costs at $14 per hour versus $80 for videotape.

NBA Entertainment plans to go live this fall with a combined disk/datatape facility from SGI and StorageTek.

Once the video material is on datatape, "you have the monstrous process improvement of being able to access it digitally and instantaneously, and you have the ability to make a dupe in a matter of seconds that will go into the side of a mountain," Hellmuth said.

A key component necessary to the move to datatape was SGI software in its DMF system that allows partial file restoration. The NBA typically stores an entire game—approximately three hours of video—as a file.

"That was our biggest hurdle with the whole project," said Keith Horstman director of NBA Entertainment IT. "Most of the stuff editors want is roughly 24 seconds, it's a play," like a Kobe jumper.

He said DMF can pull and restore just the needed clip from the three-hour file. "A lot of other products would take the whole file, then strip it out, which would take a long time to move it as well as cut it out. With DMF we're looking at an upper limit off of tape to pull the 24 seconds out."

Horstman noted that the storage component of the facility is a final touch.

"We started this project five years ago by putting islands out there in our editing world, the logging system, the editing applications, which is Pinnacle," he said.

As the next NBA season begins, NBA Entertainment will use the upgraded facility to serve its current set of obligations, including its NBA TV channel, video on demand, cell phone packages and the Internet. But the NBA and SGI are looking at new technology for future services.

"We're trying to look at the next level of stats on the way-out kind of scenario, and that would involve, in addition to what we do now, player tracking," Hellmuth said.

This would not only give game broadcasters an instant diagram of a play to help explain the game, but could be used by videogame developers.

Hellmuth said he's seen the recent video game console introductions, and he's impressed.

"There's a level of realism that's coming, and we want to make sure the attributes of our game, the real attributes of our players and what they do are built into their games," he said. "This technology works, and we're talking to SGI about essentially making it affordable and portable. We're at the phase now where the 'first-and-ten' was when it took a whole mobile unit to do a line. We've got to get the cost down to make it reasonable." ■

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CNN Reflects 25 Years of Technology

Cable news net anticipates high-definition future

by Frank Beacham

In the summer of 1980, a handful of this generation's most successful entrepreneurs made heavy bets on the future. As they saw it, the stars of communications technology had aligned and the time was ripe for change.

While a young software whiz named Bill Gates busily helped IBM write the operating system for its new personal computer, a brash Southern broadcaster, Ted Turner, decided to reinvent the news business.

On June 1, 1980, Turner introduced CNN, the first 24-hour news network. It changed the world, growing into a global information service that's now available to more than 1.5 billion people in 212 countries via 15 cable and satellite television networks and eight Web sites.

CNN also ignited a renaissance in newsgathering and production. When the network was conceived, the era of 16mm film had just ended.

Videotape-based electronic newsgathering systems were gradually replacing film, and a network of communications satellites was replacing microwave lives shots.

Simultaneously, the news business was in the midst of a text transition that moved words from the typewriter to the computer screen. As CNN approached launch, the electronic newsroom—with its ability to share stories at multiple locations—was coming of age.

The electronic newsroom led other media entrepreneurs at the time to experiment with the first videotex systems—predecessors to today's news Web sites.

SO LONG, SELECTRIC

Many reporters came into the new era kicking and screaming, clinging to their typewriters while being forced to learn the arcane commands of a new kind of software called the "word processor."

As CNN geared up in 1980, The Columbus Dispatch was the first newspaper to go online. CompuServe, a premier pre-Web online service, also began working with the 11 Associated Press newspapers to bring news to the computer desktop.

Top to bottom: A CNN crew sets up a live shot of the launch of the Space Shuttle Columbia in 1981; Bernard Shaw and Mary Alice Williams covering the 1980 Democratic National Convention; (l to r) anchors Dave Walker and Lois Hart visit with Ted Turner.

"We're looking at HD for news. We're trying to pick the right data rates and formats, but we haven't locked in anything yet."

—Gordon Castle, CNN

News executives were nervously reacting to an explosion of change, much of it being generated by the technology gold rush in California's Silicon Valley. They could have no idea that the events that began on their watch would help redefine newsgathering for the next millennium.

It was the year that Hewlett-Packard built its first personal computer, while two Steves—Jobs and Wozniak—took their tiny computer company public.

Nearby, Novell Data Systems—another recent startup—announced that it was developing software for something called a "local area network;" Sony introduced a revolutionary 3.5-inch floppy disk, and Radio Shack released the TRS-80 videotex home computer for $399.

As history would reveal, all of these developments would soon collide, having an impact on electronic media that continues today.

"The advancement of computers has had a huge impact on news, leading to video servers, low-resolution browsing, media management and file-based cameras in the field," said Gordon Castle, senior vice president of technology at CNN. "It's all an extension of IT technology into the broadcasting space."

CNN first went on the air using bulky 25-pound video cameras tied to separate 3/4-inch video recorders. Over time, its archives have evolved with the technologies of the day with accumulated recordings on 3/4-inch cassettes, Type-C one-inch, Betacam SP, Digital Betacam, Betacam SX, DVCAM and DV formats.

"Equipment has now gotten lighter and smaller," Castle said. "It used to take a ton of gear and people to do a live shot on location. Now, we do it with a camera, a laptop, and a satellite phone that can all fit in a backpack."

Of course, it's Internet connectivity that's behind the current news revolution.

"Once you've got an IP connection on a network, we can move an image," Castle said. "The barriers are falling."

Citing the recent tsunami in the Indian Ocean, Castle noted that the first few days of news coverage was enabled by satellite phones.

"The technology had a huge impact in that story," he said.

Though video quality still suffers with live delivery due to bandwidth constraints, Castle said non real-time store-and-forward transmissions are much

CNN, PAGE 32

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Vendors Tout Tapeless Camera Benefits

Take your pick: disc, flash memory or hard drive

by Craig Johnston

SEATTLE

Up until a couple of years ago, there was only one tapeless camcorder product, the Ikegami/Avid Editcam. In its earliest iterations, it was a little too heavy and had a way-out price for its hard-drive recording media.

The Ikegami EditCam DNS-33W Fieldpak

A few NABs ago we saw prototypes of the Sony blue-ray laser optical disc camcorders and Panasonic's solid-state memory camcorders. The Editcam had slimmed its weight and price, and another competitor, nNovia, joined the fray with its own hard-drive field recording system.

Today, those hard-drive systems from Ikegami and nNovia, the Sony XDCAM optical disc systems and Panasonic P2 solid-state memory systems are all bringing back news footage in television markets around the world.

Not surprisingly, each acquisition system vendor touts its own products as the best field acquisition tool out there. **TV Technology** asked purveyors of each of the three field acquisition technologies to make their best case.

HARD DRIVE ACQUISITION

Ikegami Editcam Product Specialist José Rosado pointed to hard drive technology being well established in television stations.

"The broadcast industry is familiar with and comfortable with recording images onto hard drives at this point. They've been using them for years for frame stores and nonlinear editing, graphics recorders, composite and component recorders."

Larry Aubry, president of nNovia, noted that hard drives are not a specialty item.

"The drives are practically a commodity, they're a known, proven technology and they're reliable and economical," he said.

The physical hard drives in both the Editcam and nNovia systems can be replaced with store-bought hard drives, allowing users to shop for price and to enjoy the fruits of the so-far endless drive capacity increases known as Moore's Law.

Both drive systems are also format agnostic, allowing the customers to record a variety of different formats to the same drive.

At NAB2005, Hitachi introduced a camcorder outfitted with the nNovia drive system. Emilio Aleman, the company's product manager for broadcast & professional products, said he asks customers, "Why go to an intermediate storage device, such as a P2 card or blue laser disc when the final destination for the audio and video is a hard disc anyway?"

"We sell the base and all the interfaces for the PCs and the network attached storage systems, so it's a one-step process," he said.

Editcam drives can similarly integrate to nonlinear editors.

"As soon as you plug the field pack into the SAT adapter on the Avid, hours of media are available for editing immediately," Rosado said. "It's not a transfer process, you have immediate access within about 20 seconds to all your media because the system looks at the field pack as though it's another media drive."

Aubry touted the cost of hard drives, which have a long reusable life, versus videotape with its short life,

"In order to get the quality up you go through a case of tape pretty quickly, so by the time you buy a case of tape you could buy a hard drive," he said.

SOLID-STATE MEMORY

Phil Livingston, Panasonic vice president of technical liaisons, said as the company visits customers throughout the world, they don't find anybody who doesn't think solid-state memory will one day be the acquisition media of choice.

"We will follow the example of digital

still cameras," he said, pointing to the reusable nature of the solid-state media, even though it's relatively expensive compared to a roll of film. "The parallel's pretty obvious. We in the television acquisition industry could benefit from the same benefits that have come to digital still cameras.

"The reticence we find from potential users is 'Aren't you, Panasonic, premature? Is the world really ready for this? Is technology ready for this?'"

Livingston said it's important to observe that not only is technology changing at a rapid rate, but also that the rate of change itself is speeding up.

"If you don't make a pretty substantial leap forward in the adoption of technology, you will rapidly find you have made almost no improvement in the technology, particularly as it relates to the business payoff and return on investment.

"The broadcast industry is familiar with and comfortable with recording images onto hard drives at this point."

—José Rosado, Ikegami

"If you look at something like the blue-laser-based disc system from Sony, it much more replicates replacement of tape media with an optical disc media. So I still have a physical media I move around, it's a good deal more expensive than tape."

An editor with NY1 news channel ingests material from a Panasonic P2 card.

Livingston also made the point that the nature of the solid-state memory media will discourage TV news reporters and producers from rat holing field acquisition media as they have done with field tapes.

"Smaller stations are much more concerned about spending thousands of dollars on tape and having it just evaporate," he said.

He predicted these stations would continue to experience high recording media expense budgets with optical discs.

He also compared the fast data transfer speed of P2 to the slower transfer speed of the optical discs, and the limitations it puts on editing directly from the disc media.

"You can't edit directly from the disc in anything more than assembling clips. You can put a package together, but you can't really do traditional news-style editing or complex post production editing from the disc."

OPTICAL DISC MEDIA

"Everybody wants to go tapeless," said Sony marketing manager of the XDCAM product line, Wayne Zuchowski. "They're trying to find the most efficient, economical way to do that.

"From Sony's perspective, optical disc is the way to go because of the media. It's reusable, removable as well as affordable. So really the media is the linchpin with the XDCAM system."

On the affordability front, Zuchowski pointed to the high price of both hard drives and solid-state media as compared with optical discs. "The optical disc is 23.3 GB with a street price of roughly $30," versus hundreds or thousands of dollars for hard drive and solid-state media for the same capacity.

The whole idea and design behind optical disc is from acquisition to archive," he said. "You can shoot on that disc, then edit from it and put it right into archive."

He compared that to material shot in the field on both hard drive and solid-state media. Because of the cost of both types of media, content will have to be transferred to other media for archive.

"So that's another step that you're bringing into the whole process," he said, "and obviously another cost and manpower to do that."

Zuchowski said the affordability of XDCAM media versus hard drive or solid-state media also yields a workflow advantage in the field because no one's worried about an inexpensive piece of media. A busy XDCAM news photographer can finish one assignment, hand that $30 disc to a producer and load another for the next assignment.

Another beauty of the XDCAM is that "it's basically a plug-and-play operation with your current infrastructure," Zuchowski said. "If you want to use it right now, right along with your tape operation, you can do that. If you want to use it as a regular tape VTR, you can do that now, while enjoying the benefits of nonlinear acquisition.

"Then later on down the road, when you want to migrate to a more IT network environment to take full advantage of a nonlinear workflow operation, you can do that at your own pace to meet any budgetary or operation need," he said. ■

Users Laud Peripherals of HD Lenses

Emerging models are coming out with more 'super features'

by Craig Johnston

SEATTLE

When camera makers began supplying high-definition cameras, video camera lens makers were challenged to ramp up lens quality to handle both the increased resolution of the imagers, and the edges of the lenses where the new 16:9 format pushed the picture.

Those initial challenges have been met and each lens maker has a full range of products in both field and box-style configurations. A new wave has come to HD lenses that might be called "super-features."

PRECISION FOCUS ASSIST

Because of HD's increased resolution and the fact it is often viewed on larger screens, crisp focus becomes more critical. Fujinon has delivered its Precision Focus Assist to aid video cameramen in holding crisp focus.

Miles Shozuya of Fujinon Western Regional Sales, far right, helps two unidentified crew members adjust the Fujinon XA101x8.9BESM HD zoom with Precision Focus Assist at the Kentucky Derby.

Andrew (Wojo) Lottridge, a sports television freelancer specializing in long lens work, used Precision Focus Assist on this year's ABC coverage of the Kentucky Derby.

Before testing it early in the derby week, he was skeptical.

"The first thing I asked was 'How do I turn the thing off?' because being a camera guy, nothing is faster than me doing focus on it."

But after days of testing, Lottridge became comfortable with the device.

"For the isolation type of shot, it was fine. If you set the focus window and keep whatever you're trying to maintain focus on in there, it follows focus fairly well," he said.

He cautions that Precision Focus Assist focuses on whatever is closest to the camera in the focus window.

"If you're panning along and say you had something closer to you than the horses on the other side of the track, it will try to adjust for that."

Lottridge's assignment for the derby was to isolate on the favorite, Bellamy Road, from start to finish.

"I was confident enough with it at that point that we just left it on precision focus, and ran it through the race," he said.

His results were prefect, even if Bellamy Road finished seventh.

Lottridge said he sees an immediate application for Precision Focus Assist for golf coverage.

"You have some times when you've got one guy who's putting right away, he gets there and it's a very quick putt. You're going to the next guy and the director wants a tight face shot," he said.

He's also anxious to try it at the upcoming Winter Olympics for the skating competition.

VISION III

Vision III partnered with Thales Angenieux to take on the challenge of delivering 3D images to the film or video screen without the need for viewing glasses. The device, the V3, sits between a standard HD or film camera and a standard HD or cine lens.

Thales Angenieux partnered with Vision III to launch the V3 3D imaging system at NAB2005.

Director of Photography Richard Rutkowski has shot several projects with V3.

"Because it has to work in motion, you have to design the photography around including motion as part of the visual plan," he said.

"You can basically increase and decrease the amount of effect, and you make those choices on a per-shot basis," he said. "For instance if the camera is in motion but it's going to come to a stop, you have to actually plan in slowing down and stopping the effect almost at the same time that you stop the dolly or Steadicam."

Rutkowski said the reason camera motion is needed has to do with how V3 fools the brain into seeing depth.

"In human vision, we're used to deep background being fixed relative to the foreground."

He used the example of a playing card being held at arm's length and a background 50 feet away.

"You move your head around and what you see is the playing card in motion and the background almost fixed you your field of view. The Vision III system does something quite different. Instead of the playing card being in motion, because the playing card is at the point of convergence, it is still and the background's in motion."

By putting the camera itself in motion, "the eye says 'oh no, the background is fixed.' It's the foreground that I'm able to see more of, and then it reconstructs it as depth."

DRIVE FROM CANON

As Canon changed its portable zoom motors from analog to digital control, it saw an opportunity to add a range of customizable features now called Enhanced Digital Technology, or "eDrive."

James Mathers, owner of Migrant Filmworkers and the president of the Digital Cinema Society, bought a Canon eDrive lens for his Panasonic VariCam, which he rents out and uses.

"I'm sure that it has many features that I'm not even aware of, but that's kind of a nice thing, you can either use them or not use them as you see fit," he said.

James Mathers, owner of Migrant Filmworkers and president of the Digital Cinema Society offers the Canon eDrive to his Varicam customers.

"One thing that I've found that's very valuable is that you can electronically set a lens stop, and that's really helpful if you're zooming out and you don't want to get too wide and shoot off the set. You can set it to stop at a certain spot. It's easy to do, it's quick to do, and very reliable."

Some other features include Shuttle Shot, which allows the operator to push a button and snap-zoom to a memorized point, having the lens snap-zoom return to the original shot when the button is released.

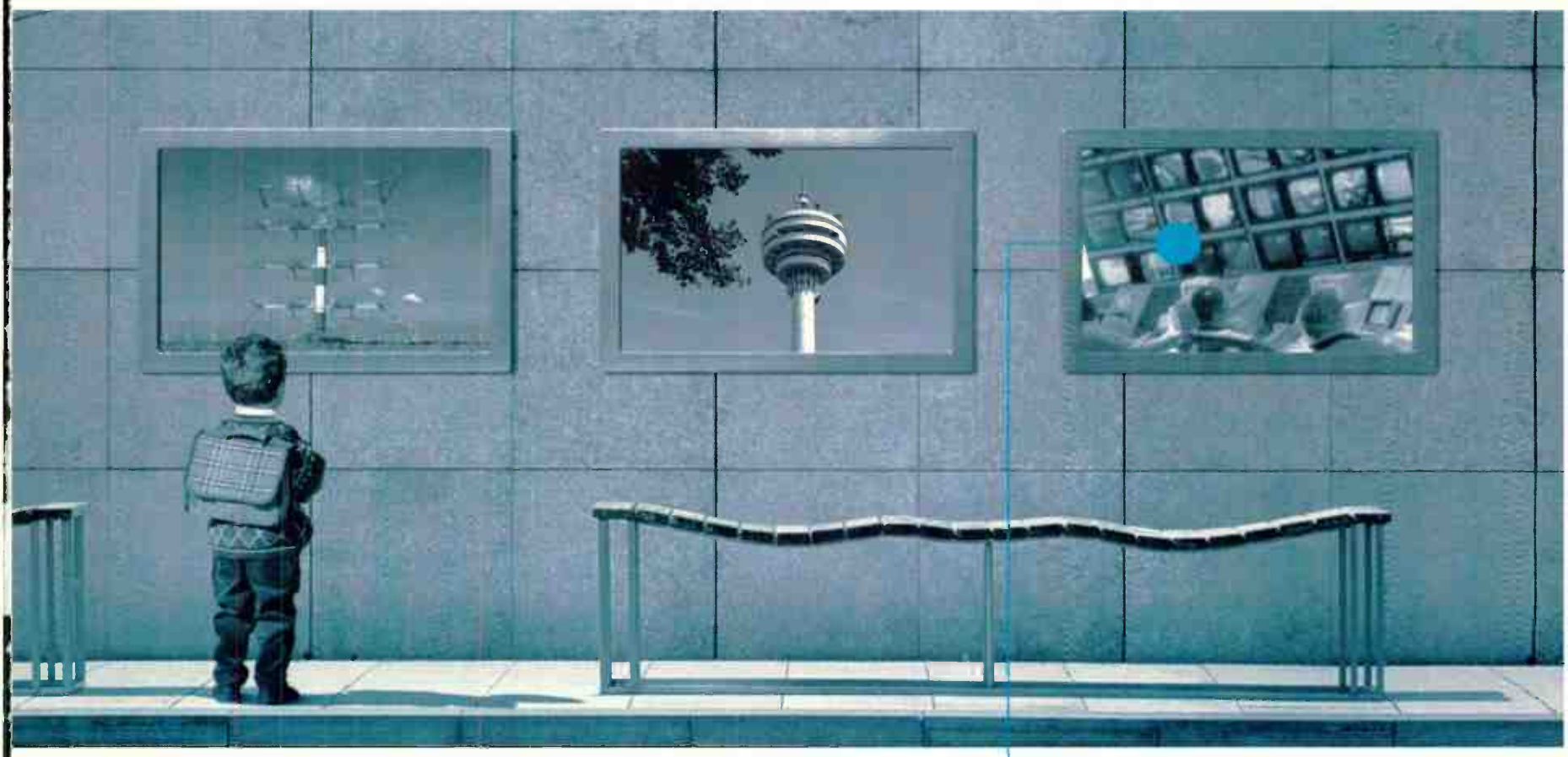
Frame Preset allows the lens to memorize a shot. When a button is pushed, it zooms to that frame. And Speed Preset memorizes the speed that the zoom moves to that preset shot.

Mathers feels eDrive is a real advantage for renting the camera.

"A renter may say 'Oh, the lens is too wide.' I can't afford to have lenses of every flavor for every person,' so I say 'great, set the lens stop and it will be only as wide as you want.' So that was a big help." ■

UHF broadcasting doesn't get any better than this

THALES



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Nielsen Delays LPM Deployment

Broadcasters lack confidence in reliability of data

by Tom Butts

NEW YORK

Bowing to pressure from broadcasters concerned about the reliability of its Local People Meter (LPM) service, Nielsen Media Research postponed the rollout of the advanced ratings technology in Washington, D.C. and Philadelphia until June 30.

The action came after more than a dozen media companies had asked Nielsen to postpone the deployment until the LPM service was verified by the Media Ratings Council, a federal government agency tasked with overseeing the media research industry. So far, only Boston and San Francisco have been accredited by the MRC for using the Nielsen LPM service. Chicago, Los Angeles and New York have received partial accreditation.

Representing 16 broadcast groups including Gannett Broadcasting, Post-Newsweek, NBC-Universal, Fox, CBS and Belo, Tribune Broadcasting President Patrick J. Mullen, in a letter to Nielsen President Susan Whiting, indicated concerns that the LPM service would undercount certain demographics.

"In meetings called to discuss our experiences in markets where LPM service has been launched and diary/set meter measurement has been scrapped, you have acknowledged that problems exist and have led to significant underreporting of discrete audience segments in some cases," Mullen wrote. "You promised to address these failures, but we have yet to see improvement. Both the size of your measured sample and the incidence of Nielsen viewers not responding at all (fault rates) have fallen well below Nielsen's own standards in many cases."

Mullen told Whiting that while the broadcast groups "enthusiastically" support the use of new technology to improve audience measurement, the technology must have a proven record of reliability before further deployment.

Nielsen said its delay would allow the ratings organization to compare demographic data from the May measurement period, adding that it believes its clients need more time to understand the impact that the technology change will have on their businesses.

MEASURING VOD

Despite the LPM deployment delay, Nielsen announced earlier that it plans to add VOD ratings to its menu of TV measurement methods.

The Nielsen active/passive meter—a tool that detects codes in broadcast signals that are delivered to TVs—will collect the VOD data, but the company assures the public that the data collected about the viewing habits of a household will be separated by the household's street address, and only the ZIP Code will pinpoint where the viewing takes place.

According to several reports, the ubiquitous ratings group will begin this new plan in the beginning of Q2 2006; by February, the active/passive meters will be installed in households that have VOD; Nielsen estimates that 25 percent of U.S. TV households have access to VOD. ■

CNN

CONTINUED FROM PAGE 26

improved with fewer noticeable picture defects.

"Laptops allow the reporter to write stories, edit video and do live shots—all from the same computer," Castle said. "This has enabled our people to have more creative control in the field. People closer to the story have a greater impact on production."

As for the future, Castle sees videophones getting better as bandwidth improves. Even consumer cell phones will play a newsgathering role as the wireless carriers add capacity, he said.

CNN's major bureaus will begin to feel a greater impact of computing power later this year as they begin online connections to the network's digital archive. So far, the archive—part of the world's largest digital asset management project—has been in a "preservation mode" to digitize the most important or endangered video masters.

STRAIGHT TO THE FILE

Later this year, when CNN's Atlanta and New York production facilities connect to the archive, the network will take another step away from its videotape heritage to a tapeless, file-based future.

"It will mean that new material coming in will no longer generate videotape," Castle said. "It will go directly as files between the production and archive system."

Indeed, file-based technology is the future of a news production operation whose programming must transcend passive television to embrace multiple platforms and viewer interactivity.

"We will continue to roll out file-based technology until all the bureaus eventually use it," Castle said. "Network access will have an increasingly important role as we move toward serving multiple platforms."

Castle noted two pending technology issues on his agenda. One is a transition to high-definition newsgathering, which he said CNN would eventually undertake though he declined to predict when the transition might occur.

"We're looking at HD for news," he said. "We're trying to pick the right data rates and formats, but we haven't locked in anything yet."

The issue of sound, whether to offer digital stereo or surround sound, is still unresolved for HD news, he conceded.

Finally, Castle wants to bring more visual power to the tools used by electronic journalists.

"We want to be more visual and user-friendly," he said, noting that today's tools are still too text-heavy.

The Internet is playing an increasing role in news coverage and that demands better visual presentation of news.

"The CNN of the future needs more multimedia tools in the journalistic environment," he said. ■

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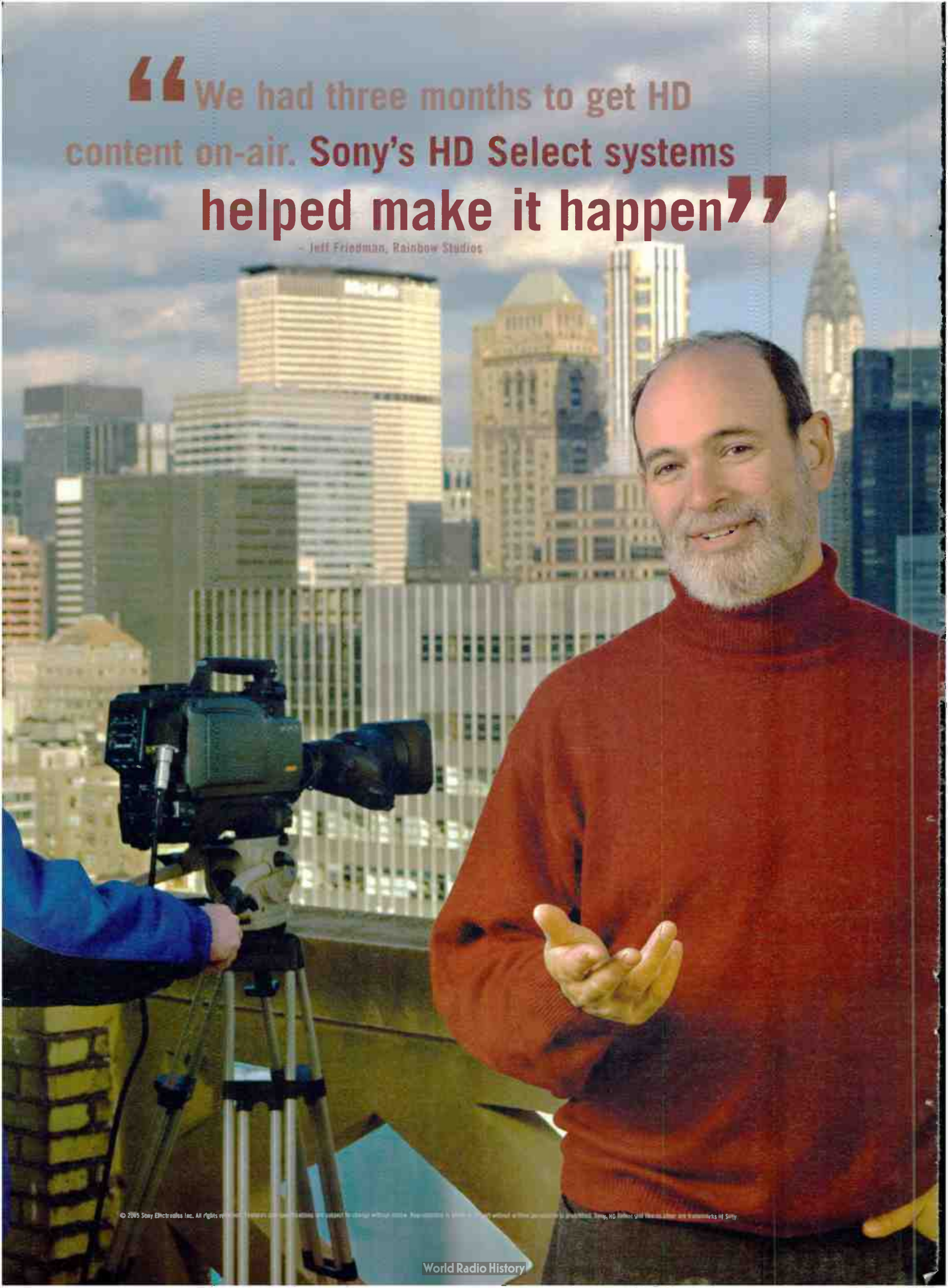

SONY

HDelivered.

When Rainbow Studios, a part of Cablevision, needed high definition in a hurry, they turned to Sony HD Select™ systems. Jeff Friedman, VP of Technical Operations explains, "Not only did Sony work with us to meet our delivery schedule; but they insisted on sending their people in here to commission the studio cameras and the switcher. One of the great things was that our engineers worked hands-on with their guys, and our questions were answered right from the source."

"We send our ENG cameras all over the planet — for everything from fashion in Paris to extreme sports in Tibet and Madagascar," Friedman declares. "When you have cameras falling down mountains, you depend on service after the sale. Our maintenance contracts with Sony have been fabulous. We drop a camera off and two days later it's delivered back to my door. That really helps keep our customers satisfied."

If your own HD challenges extend beyond the box, go with a total HD solution from the company totally qualified to provide it. An HD Select system from Sony.

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FOCUS ON EDITING

Jay Ankeney

The View from the Horizon

It was 20 years ago today…

In June 1985, this column began its journey with an extended metaphor: "The tall stranger smiled. 'I'm only in it for the entropy,' he said as he rode off into the horizon."

My intent, of course, was to make a positive point with a negative example. It continued:

"The stranger was a realist dealing with the world as he saw it: a world constantly dissolving into chaos, eternally tending toward disorder, following the physicist's principle of 'entropy.' Only a few did not follow the stranger. Those rare visionaries knew that the world around us is a series of perceptions, that no fact has meaning devoid of its context, and that to the creative mind, the existing order of reality is only clay to the potter's hands. These select visionaries are called editors."

Since then, this column has ridden a two-railed track with the goal of using the privilege of this podium to expand the discussion of how my fellow editors can best pursue their craft and their careers to their own satisfaction. The first rail of that track has been to update us all on evolving technologies, and I hope you have noticed that my reviews of new edit systems have always been from the perspective of actual users under real-world conditions, not just the claims of the manufacturers contained in press releases.

The second and perhaps more important rail has been to further the concept that the art of editing, much like music composition, poetry, or classical painting, is empowered with aesthetic principles. Along those lines, we have dissected editing accomplishments ranging from major feature films to Super Bowl ads, acknowledging along the way that the actual "editing" seen on the screen may be the result of a single talented console commander or the collaboration between a whole production team. Lincoln, after all, wrote alone; the King James Bible was produced by a committee. Yet both reflect the same erudite mastery of literary communication.

AN EDITING ODYSSEY

Take the example of the cut identified somewhat whimsically in the December 1999 "Focus on Editing" column as "The Best Edit of the 20th Century"—the famous "bone-to-spaceship" cut from Stanley Kubrick's "2001: A Space Odyssey." In one smashing juxtaposition of images the viewer is transported across the eons of humankind's technological history from early hunter-gatherer to starship voyager.

But was this cut crafted by the author of the original book, Arthur C. Clark, by the credited film editor, Ray Lovejoy, or the auteur instinct of filmmaker Stanley Kubrick? For those of us trying to master this craft, the bottom line is recognizing that it works. The question is, why?

We all know that our brains construct an illusion of continuity out of rapidly flickering pictures thanks to a phenomenon called the "persistence of vision," which lets the receptors in our retina retain one image for about one-tenth of a second before receiving the next. If the flicker exceeds this limit, we see movement. If it slows down, we perceive strobing that eventually grinds to a still.

But it is less appreciated that our brains also incorporate a principle called the "suppression of vision" that bridges the gaps between successive images if their input quality falls below a certain threshold of comprehensibility. Try watching a person's eyes and you will see that they dart from one object to another, often blinking during the transition. Yet our brain comprehends a constant vision stream because it discards the interrupting swish pan of rapid eye movement or the momentary darkness of a blink to internally construct a coherent impression of the world around it.

What we call editing builds on this principle by asking the audience to accept a sequence of kaleidoscopic images and mentally reconstruct them into a perception of continuous reality. Therefore, editing is an fundamentally conceptual process, relying on the brain's inherent determination to create continuity out of the scatter-shot images it receives.

To optimize this art form's creative power, there are three great tools at an editor's command: context, contrast, and rhythm. "Context" refers to the principle that nothing has meaning in isolation. If you cut from a close-up of a woman's face to a scene of battlefield horror, and then cut from that same woman's gaze to a shot of a baby sleeping, the different impression created by those two edits is easily illustrated. The woman's original expression may be unchanged, but the viewer's appreciation of it is radically different.

Editing is a fundamentally conceptual process, relying on the brain's inherent determination to create continuity out of the scatter-shot images it receives.

Contrast takes this perception to another level. Consider that if every face looked exactly the same to everyone, there would be no contrast at all—and no sense of identity. In fact, it is the recognition of a difference between images—the contrast—that permits us to understand the boundaries between objects and concepts.

Our third tool, rhythm, adds a temporal component to the toolset. In editing, this can be expressed as the pace with which different ideas, whether video or audio, are presented to the audience.

These ideas have often been expressed in the formula B+C=A, where the contrast of the shots being banged together, B and C create the desired reaction—A—in the audience's mind. On a larger scale, this can also be seen as the context the audience brings to the experience (B), being brought into contrast with the artificial reality the editor is trying to create (C) to generate a desired impression in the viewer's mind (A).

So, what makes a good edit? As pro-

HORIZON, PAGE 38

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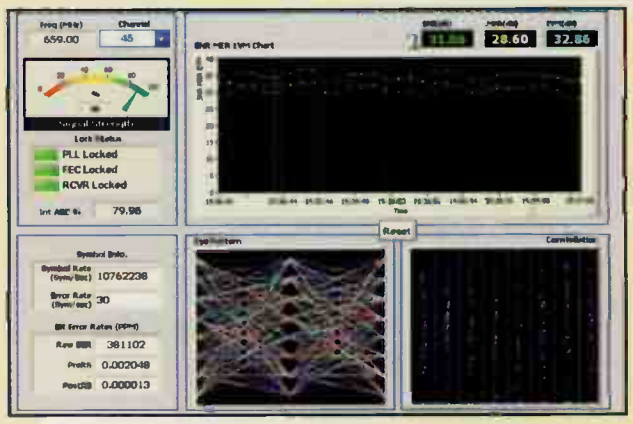

Hardware

A single rack unit controller, the **msi-4400** Analyzer receives and processes the 8vsb signal using a Windows-based PC. Front panel indicators show the status of alarms, and confirm RF level and signal strength. External connections for alarms, and transport stream in LVDS, SMPTE 310M and DVB-ASI formats are all accessible from the rear panel.

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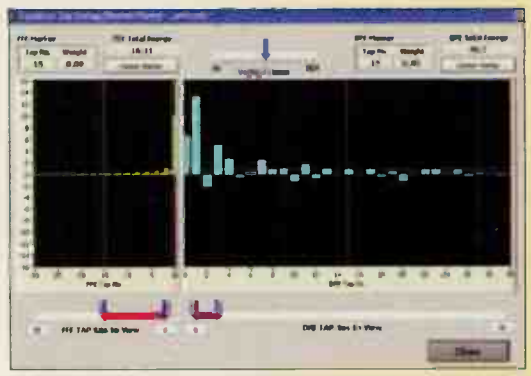

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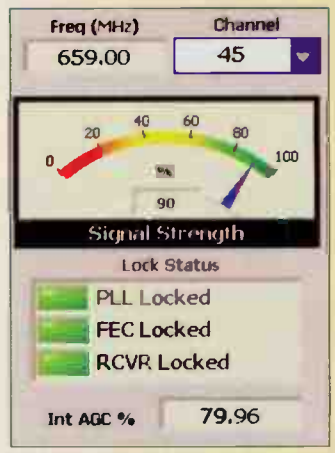
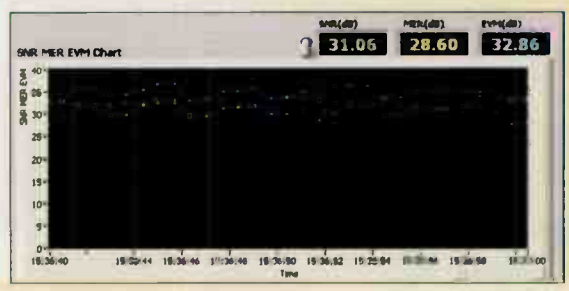


The **msi-4400** Analyzer is covered by MSI's three-year warranty.

Introductory price: $9860

✓Comprehensive



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THE MASKED ENGINEER | Mario Orazio

Blind Faith at NAB2005

You might not have noticed that it's tough to rate the image quality of a block of wood. The same applies to Panasonic's new AG-HVX200 camcorder. Okay, what I'm really talking about here is religious faith.

Way, way back a long time ago, I wrote about another block of wood, one with a power cord attached. It didn't start out as a block of wood. Originally it was a digital alarm clock sold by Radio Shack for a few bucks.

Then a manufacturer called Tice bought the clock and "treated" it (irradiated it?) in such a way that, when it was plugged in, not only would it still be a digital alarm clock, but it would also make all the electrons in the house "coherent." It wouldn't do that at once, mind you. Forget that telegraph messages crossed the Atlantic Ocean instantly back in the 19th century. The Tice clock would take several minutes to "cohere" household electrons. And, if someone else had a Tice clock plugged in nearby, well then its electrons might fight the others.

Assuming all went well, those happy little coherent electrons would increase audio and video fidelity. Pictures became sharper, with richer colors. The sound space increased. Or so, anyhow, in similar words, said Tice and those who shelled out big bucks for the clocks.

Their only problem was that the clocks still looked like ordinary Radio Shack clocks. Perchance a skeptic even bought an untreated clock and convinced Tice

Horizon

CONTINUED FROM PAGE 36

posed way back in 1985, it's like mustard on a pickle. You have to try it to find out. Subjective perception is the only arbiter, just as even the most earnest analysis of the immaculate structure of the first movement in Beethoven's Fifth Symphony cannot convince the uninitiated that those repeated five notes are the foundation of a masterpiece unless they experience it. But if an edit does work, it is because the editor's trinity behind it has induced the viewer's brain to accept the convention of two or more images being integrated into a developing, coherent concept of an accepted representation of reality.

This column has often dipped into the well of silent cinema to illustrate such principles, because that was the era in which they were developed. Too often, modern editors ignore that heritage, but I'd suggest that some day, our current media may seem equally anachronistic.

Let me predict that not too many decades hence, our form of film and video production will collectively be referred to as the era of the "twodees," and probably discounted with equal indifference. The multidimensional holographic system adopted by that time will still involve visual elements created with an intentional perspective that was directed during production. But the communication achieved by the sequence in which those images are presented will even then be determined by the principles of context, contrast and rhythm that today we call editing.

So as we watch that tall stranger ride off toward the horizon, it is reassuring to realize there will always be new horizons for editors to conquer.

Over the years, several readers have been good enough to remember a statement from the first "Focus on Editing" column, and that is the credo with which I'd like to launch the next decade.

"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."

We are, after all, editors. ■

Jay Ankeney is a freelance 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.

believers that it, too, was making the sounds and pictures better. That would never do. It would be worship of a false god. Sacrilege!

So Tice changed from clocks to blocks of wood with power cords attached. No one else was selling blocks of wood with power cords attached, and the "treatment" seemed to work about as well on a block of wood as on a digital alarm clock. You could pay a bundle for your block of wood, secure in the knowledge that no one else could just go to Radio Shack and buy the same thing for less. Phew!

BLOCKS 'O WOOD

I thought a lot about those blocks of wood at the NAB show this year. First I thought about them at Sony's grand ecumenical gesture.

There have been two HDTV religions for a while. There's the CBS religion, which says that 1080 is the only true HDTV, and there's the ABC/ESPN and Fox religion, which says that progressive scanning is the only true HDTV. Others may abide by one or the other HDTVs, but they ain't as fundamentalist about it. Those true believers, though, wouldn't accept pictures converted from one to the other. They're as religious as the Tice block-of-wood buyers.

Sony tried to proselytize the progressive camp by showing them conversions from 1080i cameras. "See," they said. "It looks just as good." Those worshipping progressive didn't switch churches. So Thomson, which stayed out of the religious wars by offering cameras that could switch between 1080 line and progressive, stole a big chunk of camera business from Sony.

Production trucks sometimes work for CBS and sometimes for ABC. With Thomson's (er, Grass Valley's) cameras, they could do both without fear of offending either religion.

So, at NAB, Sony introduced cameras that are both 1080 and progressive. Fox is using them to shoot an HD show on a CBS stage. The network executives praised each other. There is hope for peace in the Middle East!

Then I thought of the wood block with the power cord at the Digital Parallax Scanner (DPS) demo at Vision Imaging III (V3). Their Web site says they've won awards from several industry fish wraps, including this one. Indeed they have.

The DPS is an extra iris placed between lens and camera. The iris moves. I don't just mean it opens and closes. It moves. The hole in the center moves around, continuously.

There is a sound scientific basis for a changing perspective offering depth info. So the V3 rep pointed at a screen and said, "Look! It's 3D." I looked. I saw a flat picture with a strangely jittery background. I guess I'm just a nonbeliever.

That brings me to the purest examples of blind faith. I saw them at Panasonicland (I can't really call it a "booth," can I?). The company announced many orders for its AG-HVX200 HD camcorder. And why not? It's little. It doesn't cost a whole heck of a lot. It's got slots for two P2 cards (which, in the 8K version of the cards, will cost almost as much as the camera and record a whopping 17 minutes of HD). It's even got a DV tape drive, too.

That is to say, it looks like it's got P2 card slots and all that other stuff. For all I know, what Panasonic showed was just a very pretty block of wood. That's okay. Sony's HDV camcorder was effectively a wood block at NAB2004, and its HD XDCAM camcorder was a wood block this year.

Panasonic is a rock-solid company, and I ain't got a shred of a scintilla of doubt that it can make the recorder part of the camcorder work fine. There is just one thing about that little portmanteau "camcorder." It's the "cam" part.

Ask though I might, the best I could learn was that it would have 1/3-inch chips and a Leica lens. Hey, I like a Leica as much as the next imaginary masked engineer, but I'd surely like-a to know a little more about the camera part of the camcorder before plunking down a few bags of shekels to buy it. For instance, if the chips are HD, they're getting dangerously close to the diffraction limit for resolution. On the other hand (where I've still got five fingers), if they're not, then what's the point?

One report said Panasonic was still designing the camera part. But that didn't stop the orders from pouring in.

My hat's off. What a touching display of blind faith. ■

Mario Orazio is the pseudonym of a well-known television engineer who wishes to remain anonymous. E-mail him at Mario_Orazio@imaspub.com.

PRODUCTION MANAGER — Craig Johnston

One Solution Does Not Fit All

There are disclaimers on the EPA average mileage stickers on cars that read "Your mileage may vary." My guess is that's because the places you drive may have more (or fewer) hills than the agency's test route, or that your driving technique might be worse (or better) than that of its test driver.

For the same kinds of reasons, there ought to be a disclaimer from people selling approaches for the transition from an analog to an IT infrastructure. It should say something like "one solution doesn't fit all."

I'm going to use some space this month to pass along some advice given to me by NBA Entertainment, the league-owned operation that produces NBA TV as well as delivers basketball-related material through such channels as video-on-demand, cell phones and the Internet.

NBA Commissioner David Stern charged the NBA with becoming the technology leader in sports. With this in mind, NBA Entertainment built a plant it refers to as the most efficient digital production and distribution facility in sports. Rather than a video house, it is what I think of as an IT facility that happens to move audio and video around.

I've done a pair of stories about NBA Entertainment over the past six months, and in talking with the company's IT and technology people, I've come to understand that you have to have a lot of things in order before you start thinking about equipment.

"You have to approach this as an IT project," said NBA Entertainment senior vice president of technology and operations, Steve Hellmuth. "You've got to have your databases right and your logging information right before you jump into this."

"The way you have to approach this is say 'how does my organization and my process work in my shop? How should my databases be organized? What is my logging information going to be? How is my digital archive going to relate to my physical archive?"

Hellmuth has described his facility as "data-driven," where careful logging of games as they are played gives an accurate location of every basketball shot as well as information about its distance,

SBE REPORT — David Otey

2-GHz Conversion Underway

Imagine the DTV conversion, only with someone else paying the cost. That is the comparison sometimes used to frame the discussion of the 2 GHz relocation.

By now, readers should be aware that the 2 GHz broadcast auxiliary service (BAS) band widely used for ENG is being reduced from 120 MHz of total bandwidth to 85 MHz, using a new plan that keeps the number of channels at seven but reduces the bandwidth of each from 17 MHz to 12 MHz.

What should also be well known, given the publicity, is that Nextel Communications has been charged by the FCC with clearing the reallocated 35 MHz (currently Channels A1 and A2), by fronting the cost of converting the entire broadcasting industry's 2 GHz infrastructure from analog to digital. What Nextel gets in return is credit toward the nearly $5 billion valuation of the spectrum it will receive, which includes a slice of Channel A1.

An amazing amount of work has been done since this writer first detailed the broad outlines of Nextel's involvement in TV Technology last September. The FCC order, adopted last August, was finally published in November and became law Jan. 22, 2005. Nextel filed its response Feb. 7, agreeing to take on the daunting task of relocating (or replacing in most cases) decades worth of TV microwave infrastructure by September 2007. Nextel has fielded seven teams of project managers, business managers and broadcast engineers who are even now fanning out by region, holding marketwide kickoff meetings and knocking on the doors of general managers and engineering directors to talk turkey about station microwave facilities. After 10 years (counting from the FCC Notice of Proposed Rulemaking issued in 1995), it is hard to believe but true—this is really happening.

SBE'S INVOLVEMENT

And what of SBE's involvement? Building on the society's history of promoting local frequency coordination, we are playing to our strengths by facilitating communication among the parties. In most cases, local SBE-affiliated volunteer frequency coordinators are Nextel's first point of contact in a market.

The question no one can answer definitively at this time is how it will work when everyone has converted to the new channel spacing.

As the staff member charged with supporting those volunteers—and as SBE's liaison with the Nextel relocation group—I have had the opportunity to sit in on eight market kickoff meetings, from New York to Los Angeles and from Chicago to Orlando. Three main themes are evident from those meetings.

Theme No. 1 is the healthy skepticism of well-informed, detail-oriented broadcast engineers. Anyone worth his or

2 GHZ, PAGE 43

type of shot and its entertainment value via the timecode. The archive covers nearly 250,000 games, going back to the late 1940s.

"The mistake most broadcasters make is they try to run a DMM [Distributed Multimedia] project in parallel with the installation of the equipment and the gear," he said.

"You've got to have your databases right and your logging information right before you jump into this."

—Steve Hellmuth, NBA Entertainment

"If you try to run a DMM process in parallel with your editing and your physical hardware, the hardware guys will always outstrip the software guys. In essence, what I'm saying is you have to give your software guys and your database process a head start."

The final hardware piece for NBA's facility will be the digital storage system, which will be installed in time for the 2005-06 basketball season. Storage will then exist on three levels: disk-based storage for immediate access, robotically accessible LTO3 datatapes containing complete game video, and shelved LTO3 tapes for the least used material.

"We started this project five years ago by putting islands out there in our editing world, the logging system, and the editing applications," said Director of NBA Entertainment IT Keith Horstman. The last step "is really just integrating the islands together," and having logging data communicate with storage.

NBA Entertainment is certainly a specialized facility, with its own set of goals and challenges. I think when any facility looks at itself, it will discover it, too, is specialized, with its own set of goal and challenges.

The big challenge I foresee is migrating to a data-driven environment from one based on the physical location of physical media.

While many facilities have a database to help locate a specific story on a specific tape, there's usually a backup in the form of a printed or handwritten list of stories on the tape cassette itself or in the box. Ultimately, these backups are going to disappear and users of the facility will have to rely on the database alone.

This is no small step. Going forward, it relies on real staff discipline to input descriptive data and ensure each day's material can be located in the future. Thankfully, newsroom computers can demand such information as the video moves from the assignment, acquisition, editing, airing and archiving processes.

It is working backwards, descriptively logging archive material as it moves to some kind of digital storage, perhaps datatape, where time, effort and money will be involved. And if there's no commitment to that, you might want to save your money on storage hardware because it ain't a'gonna work without that database.

Recently I was talking with a longtime friend with a Fortune 100 manufacturing company that does a lot of video. I asked about asset management and he told me the company used it for still photographs but not for video.

Why not, I asked?

It's too much trouble and too expensive to do all the logging, he told me. It's cheaper to just hire a crew and go shoot something again if we can't find it.

Unfortunately, a news department can't ask somebody to burn their building down again, so you've got to keep archives and establish a way of navigating through them. ■

Craig Johnston is a Seattle-based Internet and multimedia producer with an extensive background in broadcast. He can be reached at craig@craigjohnston.com.

AUDIO BY DESIGN — Mary Gruszka

Audio Interconnections Make a Difference

Keeping an audio system (or any electronic system) free of noise and hum requires at least these three important and interrelated factors: a good grounding system, well-designed equipment, and proper interconnections.

Grounding is whole topic unto itself, but one design goal of a good technical ground system should be the minimization of shield currents carried on interconnect cables.

Well-designed audio equipment should not have any pin-1 problems. Any cable shield current should not be allowed to enter the equipment chassis and find its way onto the circuit board's ground.

Good interconnections are equally important, as is the choice of cable.

Even if the pin-1 problem is solved, there can still be gremlins lurking about. Under the wrong circumstances, cable shield currents can induce noise into the signal wires.

A common type of extensively used audio cable is composed of a twisted pair of signal wires surrounded by an aluminum foil shield plus a copper drain wire. This type of cable is fairly easy to install, but it happens to be the worst for shield current induced noise (SCIN).

The drain wire is the culprit. Any shield current present (up to a frequency limit of around 5 MHz, according to research done by Jim Brown), will flow mainly in the drain wire due to its lower resistance compared to the foil shield.

However, the drain wire is not wrapped uniformly around the signal conductors, and that's the problem. The drain wire is wrapped at the same rate as the signal pair and is closer to one of the wires. That means more noise will be induced in the signal wire closest to the drain wire.

In other words, the shield current causes a differential voltage to be produced on the signal pair, and that voltage noise is superimposed on the signal itself.

The type of noise that finds its way to cable shields can originate from any number of sources, such as motors, dimmers and RF interference. SCIN tends to increase with frequency in a fairly linear fashion.

Are there any audio cables that are less susceptible to SCIN? Yes, cables with uniform shields.

Brown evaluated and compared the SCIN performance of a variety of audio cables, including foil/drain, foil/braid, braid and braid/drain shields at frequencies up to 30 MHz. He found that, in general, "the braid shields were superior below about 15 MHz, the foil shields were superior above 30 MHz, and a foil/braid shield was effective throughout the RF spectrum."

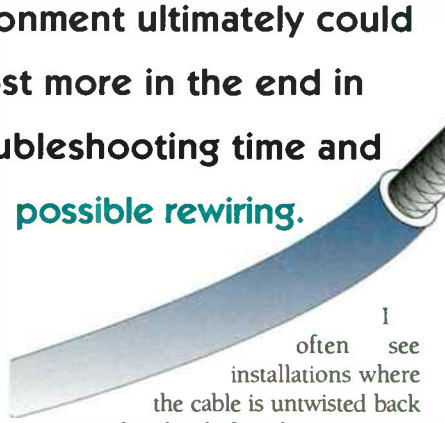
Foil/drain shielded cables performed the worst.

These results point out that braid and foil shields have different characteristics when it comes to shielding. While both are effective against electrical interference, braided shields are not as effective as solid conductors for magnetic shielding, especially at higher frequencies when the braid holes become large compared to the wavelength.

But at lower frequencies of magnetic interference, both types of shields are ineffective because of the relative thinness of the shields compared to wavelengths at these frequencies.

What really prevents magnetic interference is the twist in the cable. The more twists per inch (or other unit of length) and the more uniform the twists, the better. This is important to remember as cables are stripped and prepped. The twist should remain up to and as close to the point of connection as possible.

To just blindly wire with the usual foil/drain wire cable without understanding the environment ultimately could cost more in the end in troubleshooting time and possible rewiring.



I often see installations where the cable is untwisted back several inches before the connection point. That is not good installation practice, however easier it may be to dress the cables. These are the sections of the cable that are most vulnerable to magnetically induced hum. And here is also the place where the cable may be nearest to a power supply and power transformer—something to watch out for.

Twisted cable is also effective for RF rejection, another point in its favor—but back to shields A twisted-pair cable with a combined foil-and-braid shield would be ideal, but not easy to find.

Braided shielded cable has fallen out of favor for installers because it generally takes more work to wire. And some have been reluctant to use it because of its magnetic shielding properties at higher frequencies. However, its superior performance in reducing the more dominant SCIN could easily outweigh these factors when foil/drain wire-shielded cables just don't work.

Manufacturers should also be aware of the role SCIN plays in systems and provide RF filtering at audio inputs to eliminate a good portion of this noise. Despite marketing claims (probably moreso on the consumer side), bandwidths from DC to light are not needed in audio gear. A roll-off of around 100 kHz or so should be sufficient for good phase response in most equipment.

Systems designers need to consider SCIN and the environment in which the cabling will be installed. Some questions to ask: Is the system located in a place with high RF energy (like near a transmitter or in a major metropolitan area), or near a subway substation? What kind of staging and lighting equipment will be used? What about motors used in the building—HVAC, elevators, etc.? All of these and more could be sources of interference. What kind of ground system is present or being planned? To just blindly wire with the usual foil/drain wire cable without understanding the environment ultimately could cost more in the end in troubleshooting time and possible rewiring.

Some consultants refuse to spec foil/drain wire shielded cable anymore because of the SCIN problem. Some integrators may balk at the use of braided shielded cable because of the potential increased labor costs. Systems design is a balancing act. Designers need to be aware of the potential problems and the likelihood of occurrence, and weigh such factors as the cost of cable, wiring and installation against the cost of commissioning, debugging, and maintenance.

For systems already installed that have annoying noises and hums, start by identifying and correcting all pin-1 problems. Then if noise problems persist, look next for SCIN. Note what type of cable is used, and try a braided-shielded cable to see if the problems go away. If magnetic interference is suspected, check how the cable is prepped at the connection end. Take a systematic approach, correcting one layer of problems at a time.

References for this article include papers written by Jim Brown and Neil Muncy (AES preprints and journals available at www.aes.org) and the book "Noise Reduction Techniques in Electronic Systems," by Henry W. Ott. ■

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COUNT ON IT — André V. Mendes

From Tape to Files: A Daunting Task Indeed

Large mission-critical software deployment efforts are often compared to the task of changing engines on a jetliner during a flight.

After spending five years working on the replacement of the PBS traffic and scheduling system, the general consensus here is that it actually goes way beyond the jetliner analogy. In the next three installments of this column, I will try to impart some of the trials and tribulations associated with this enormous effort, which is finally coming to its conclusion.

As we move from a tape-based environment to what essentially is a file-driven digital media workflow, our transformation is more akin to going from ocean-liner trips to Star Trek-type teleportation than a mere in-flight engine change. But let's begin at the beginning.

As with any other such process, we went through a detailed requirements phase. We painstakingly examined every aspect of our operation, identifying all the pathways through which programs arrived at PBS, and all the tasks necessary to finally put those programs on the air. It quickly became obvious that there was no such thing as a standard

TAPE, PAGE 45

2-GHz

CONTINUED FROM PAGE 40

her little green screwdriver in this business has learned to filter the grandiose plans of others through a mental sieve calibrated to catch those innocuous-sounding "gotchas" that add cost and delay to a project. In a kickoff meeting, this comes out in questions like these:

Q: Will a new dual-band radio allow me to use reduced-deviation FM analog in the narrow 2 GHz channels but still support full deviation when switched to 7 or 13 GHz?

A: Several manufacturers are demonstrating radios with just such a capability.

Q: Can I be compensated for new equipment needed to overcome new problems like audio latency?

A: For most items, yes. Do the research and be prepared to explain the need.

Q: My station has fixed links in the 2 GHz band as well as ENG operations; how do I coordinate moving both types of systems to the new band plan simultaneously?

A: Nextel has a broadcast engineer dedicated to this problem who will work with your station and your local frequency coordinator to devise the best solution.

DOLLARS & SENSE

Theme No. 2 emerges when such technical questions give way to questions about the process: How do we get paid? What do I include when I inventory my current equipment? When will I see someone from Nextel again? As they answer questions of this type, the Nextel project managers demonstrate commitment and understanding for the importance of the process.

If broadcasters were collectively leery of the notion that MSS startups would actually relocate incumbent users, those doubts were probably fueled by the apparent lack of an orderly process as much as concerns about funding. In Nextel, broadcasters have not only a funding source, but a project management team that knows a thing or two about building out infrastructure while keeping the traffic flowing.

Nextel has a strong incentive to manage closely the progress of each market since it cannot operate its new spectrum until BAS licensee relocation is complete in any given market. Participants in the kickoff meetings often seem surprised at the work they are asked to do until Nextel reminds them they'll be compensated.

Theme No. 3 is more forward-looking in its scope. Engineers want to know how the digital future of ENG is going to look and feel. What problems will they be heroes for solving with the new technology? At least as important, what missed or dropped live shots will a news director politely (ahem) call to their attention? How much retraining will be needed?

Early adopters of digital ENG technology can answer some of those questions. After all, COFDM products have been making inroads in the marketplace for several years. Another important consideration is that analog operation will still be a choice even in the narrowed channels, although at a certain cost to video and audio quality. But the question no one can answer definitively at this time is how it will work when everyone has converted to the new channel spacing.

In a sense, the answer should be known to anyone familiar with erecting a tower. True, that tower has never stood before. But the engineering data indicates that each section added will be capable of supporting the remaining ones to come. As engineers, we learn to trust the data. But as human beings, we will all breathe a little easier after the first market cuts over to the new channel plan, which is expected to happen before year-end.

Market-specific status updates can be found at the relocation Web site, *www.2ghzrelocation.com*. ■

David P. Otey, CSTE, is frequency coordination director and BAS transition project manager for the Society of Broadcast Engineers.

INSIDE BROADBAND

Will Workman

Are You Versed in U-Verse?

They claim it's the largest private infrastructure investment in history: $65 billion.

That's the amount the cable industry says it spent on plant upgrades between 1996 and 2002. In the wake of the Telecommunications Act of 1996, which cleared the regulatory environment and spurred competition, cable operators laid down some fat, 750 Mhz broadband pipes as a basis for offering a range of convergence services—digital video, high-speed data and IP telephony.

Several dynamics spurred this movement. Direct satellite providers were making inroads with customers who jumped at the chance to escape cable's horrendous customer service. DSL presented a competitive threat with high-speed data, and the dizzying conglomeration of cable operators merged into a handful of bemuscled behemoths, with Comcast swallowing AT&T, which had swallowed TCI.

Give credit to the cable guys. They built the infrastructure, taking on enormous debt just before the Internet bubble burst and cast all their stocks into the doldrums. That they've persevered, if not prospered, attests to the faith of their investors, the spells woven by their digital-dream offerings and the inelasticity of demand for cable TV. (Consumers complain about ever-increasing cable rates, but since cable ops cleaned up their service rep, they've significantly reduced churn.)

In allowing cable to compete on telco turf, the regulatory scheme was also supposed to encourage the proverbial level playing field. For the past 10 years, though, the regional phone companies have been hors de combat. Other than some marginally successful alliances pairing DSL with satellite, they hemmed and hawed about fiber-to-the-home (FTH) and other solutions as being too costly, the regulatory environment too cloudy and (implicitly) the competition too commanding.

Expect a barrage of hype, not all of it unfounded, about cheap phone service, interactive gaming, video file-swapping and wireless wizardry.

While they frittered, cable operators began launching telephony, and absurdly low-cost IP-based phone service became a reality.

Telco inaction is about to change, beginning this year.

ENTER U-VERSE

SBC Communications fired the first salvo in January, when it announced it would launch an Internet-based TV service later this year. Dubbed U-verse, the $4 billion initiative will deliver VDSL (very high bit-rate digital subscriber line) access of 20-25 Mbps, voice calls and, for the first time, hundreds of digital TV channels—the first true telco "triple play."

SBC is benefiting from its $6 billion Project Pronto initiative of five years ago that involved laying down the fiber plant (how much of that $6 billion is now part of this $4 billion is cloudy, but billions are still billions). SBC is also spending $400 million on Microsoft's IPTV software to fuel U-verse, allowing customers to watch the shows through their PCs, cell phones and handhelds, as well as program their DVRs with cell phones.

SBC has set ambitious goals—18 million homes reached in three years. Pricing is still not public, but many analysts say it will have to be competitive with cable and satellite offerings.

Hard on SBC's heels is Verizon, which is leapfrogging the SBC technology by running fiber-optic lines into neighborhood nodes and then trucking those signals to the home over the old copper wire network. Verizon will run fiber directly to the home at a hefty price tag of $800 million this year to support its pure fiber-optic network service, Fios. It aims to reach 2 million homes with a triple play of voice, video and high-speed data, with base speeds of 5 Mbps.

Qwest and Bellsouth are also in the hunt, ensuring that the wall between the cable and phone industries is on the verge of collapse.

The telcos are benefiting from a number of technology advances, particularly new video compression schemes and Windows Media. That Microsoft itself has invested $20 billion in its video business in recent years only gives the telcos another resource to tap.

COMPETITIVE FALLOUT

This will have visible repercussions on the cable side of the equation. Expect to see faster rollouts of IP telephony service. And numerous operators, including Comcast and Cox, have been increasing the speed of their basic cable modem packages, as well as bundling digital cable, telephony and cable modem offerings with lower overall pricing.

Competition will also inject new life into the development of digital media control within the home, as well as the content coming in. Already the evolution of the old set-top box has been accelerating with the inclusion of DVR functionality, HDTV and home theater support, and interconnectivity with other digital devices. Expect a barrage of hype, not all of it unfounded, about cheap phone service, interactive gaming, video file-swapping and wireless wizardry.

For consumers all this competition could very well add up to a wider array of attractively priced options, plus the relief of paying just one bill—a personal kvetch of mine for years.

There are still some speed bumps ahead for the new juggernauts. With all that digital video flowing over IP in the home, Hollywood's bound to get jittery. And any number of technological bottlenecks could choke the telcos' broadband flow predictions.

In the meantime, brace yourself for a nonstop onslaught of consumer ads. If you thought cable versus satellite was clogging the airwaves, the telco pitch will add nauseam.

At least we'll all have more channels to watch them on. ■

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Tape

CONTINUED FROM PAGE 42

process. Our entire workflow, not unlike what I heard from my colleagues at other network-level broadcasters, was composed of an interminable sequence of one-off exceptions that only by the grace of immensely dedicated people throughout all levels of the enterprise came together as an on-air schedule with a minimum of discrepancies.

In addition, as we embraced the possibilities of digital multicasting and explored high-definition distribution, what had been an intricate ballet of complex distribution rights issues, invariably late content, tape-driven technical impairments and last-minute additions or modifications became a constant struggle to ensure error-free performance across a burgeoning number of schedules.

Now it would be easy to see this as an indictment of the people or the organizations involved in all aspects of this process, but what all of us in broadcasting have experienced is the initial quake and the substantial number of severe aftershocks associated with the migration to digital environments after a very long stint in a world dominated by tape. As our systems and workflows evolved throughout the years, they became more and more complex to accommodate all the new business requirements without having the luxury to stop, re-examine and optimize our processes.

TIME TO START DIGGING

So it was time to start digging out.

As part of this requirements analysis phase, it became obvious that we needed to think not only about accommodating our ongoing business requirements, but also how to handle all the issues associated with a brave new media world with myriad distribution methodologies, even more complex rights management and "fly-by-wire" metadata-driven business processes.

Supply chain management became an imperative and, as you can easily imagine, this was a process that did not easily lend itself to the disciplined rigors necessary in a manufacturing environment. We continually unearthed variations on the processing methods across series, episodes, near-live and live programs. Just when we thought that we had found the last iteration, along came yet another nuance that necessitated another trajectory correction.

Eventually, it was time to move to the next phase. Armed with an encyclical of our requirements, it was time to do a market analysis and find out if there was a product that, off-the-shelf, could fulfill a substantial percentage of our requirements. One of the rules-of-thumb in software systems procurement and development is that if you need to customize more than 30 to 35 percent of an existing software package, you are probably better off writing one from scratch.

This phenomenon is caused by the triple-headed monster of the initial costs and risks associated with a large number of customizations, the typical maintenance costs charged by large software vendors and above all, the future costs associated with upgrading customizations whenever the underlying package goes through another release cycle.

Much to our chagrin, after scouring the market and looking at packages from U. S., European and Middle Eastern manufacturers, we came (at the time) to the unassailable conclusion that if we wanted to satisfy the majority of our business requirements, we would have to develop this system.

And so began a four-year odyssey of iterative divide-and-conquer development cycles that little by little chipped away at our requirements while allowing us to continue to fly the plane toward its final destination.

To summarize, we had taken off, we knew our destination, we knew that the plane we had was not going to get us there, and we knew would have to create one ourselves. So it was time to decide which part of the aircraft to remodel first. We settled on the gasoline intake systems, and I will tell you about that in the next installment.

Count on IT! ■

Andre V. Mendes is the Chief Technology Integration Officer for PBS.

Photo: Steve Jordan

BIG PICTURE **Frank Beacham**

Antenna Myths: Who's Really Watching Free TV?

Reports from Capitol Hill say the toughest unresolved issue in legislating a hard deadline for the end of analog TV is what to do about the "disenfranchised."

That, folks, is the fancy word being used to describe the voters who might get upset if forced to upgrade their TV set for digital reception. Members of Congress cower in fear that a posse of vengeful constituents who miss an episode of "The Apprentice" might send them a pink slip during the next election.

The topic is relevant only because the great DTV myth-making machine—in its mission to maintain an endless "DTV transition"—is now concerned about the potential effects of what might be called "sudden analog withdrawal syndrome."

Frustrated legislators, anxious to get the whole transition charade behind them, have shifted their concerns from the interests of the broadcasters to the welfare of their constituents. Stoked by the horror stories of broadcast lobbyists, they are fearful that thousands of TV-deprived voters are going to unleash a backlash on their district offices.

The key question—in an era of multichannel pay television—is just how many people will really care when analog television is shut down?

The key question—in an era of multichannel pay television—is just how many people will really care when analog television is shut down? As with most DTV issues, getting a straight, unbiased answer has been almost impossible. Now, however, we are finally getting some hard data.

The number crunchers at the Consumer Electronics Association have produced the most detailed statistics to date on the impact of the analog shutdown. If correct, the CEA's numbers indicate all the concern in Congress about "the disenfranchished" may just be much ado about nothing.

"The fact is that the percentage of American homes relying only on an over-the-air signal is low and shrinking. While the vast majority of Americans receive local and network feeds via cable and satellite (and soon via telephone line, cellular, wireless broadband and the Internet), relatively few rely exclusively on a free over-the-air antenna signal," said Gary Shapiro, president and CEO of the CEA.

"If there is any doubt about this," Shapiro added, "consider the total lack of public outcry over the recent announcement that 'Monday Night Football' will be soon available only to satellite and cable households!"

The CEA reports that of the nearly 110 million American homes with at least one TV set, 68 percent receive a cable signal and 22 percent receive a DBS signal. The

research shows that roughly three percent receive both cable and DBS. In total, 87 percent of American homes have access to cable or satellite (and thus network and local feeds).

This means that if analog broadcasting was turned off today, less than 13 percent of 110 million TV households would not have access to a broadcast signal through cable or satellite, (though they could start subscribing).

It should be noted, said Shapiro, that the 13 percent figure is shrinking every year. Cable and satellite penetration continues to grow about one to two percentage points annually. Recent data shows an even greater increase, as much as 3.6 percent annually.

Moreover, Shapiro observed, new services such as Verizon's fiber-optic network, which will offer NBC's programming feed, will have an even greater effect in coming months.

"By the time of the actual cutoff—combining present adoption trends for cable and satellite and forecasts for uptake of recently announced TV services from telcos like Verizon and SBC, as well as the change in purchasing likely to occur with a hard cutoff date—the number of American homes which would be cut off from any broadcast signal would be significantly less than 13 percent," Shapiro said.

Another finding: Most people who have no pay TV service at home are without it by choice, not because they can't afford it. Nearly six of 10 surveyed told CEA researchers that television is not a high priority in their lives. Fewer than 30 percent indicated that insufficient funds play a role in their decisions not to subscribe to television.

Frequently cited at Congressional hearings are the unconnected analog TV sets in households that subscribe to satellite or cable TV.

"Broadcasters would have you believe that these sets are used extensively with antennas for watching over-the-air analog signals," Shapiro noted.

The CEA found otherwise. "More often the disconnected TVs are shunted to a less-used room and hooked up with a DVD, VCR or video game player. Indeed, our research shows these sets are used at least half the time for one of many alternate uses," Shapiro said.

"As cable companies no longer have a monthly charge for additional outlets, this issue is irrelevant for the 68 percent of cable homes," he continued. "In any event, with the analog cutoff, these homes will not be disenfranchised, rather, they will simply purchase a D-to-A converter to continue receiving a broadcast signal, assuming they choose to do so."

THOSE AFFECTED

That said, the CEA did find that a small portion of the population will be adversely affected by the analog cutoff and will need access to low-cost converters.

"However, given the rapid growth of alternative forms of media delivery, a government effort to ensure that every American has some type of service after the analog cutoff will not be as widespread a challenge as some people believe," Shapiro said.

In an earlier broadcast era, when radio was king and home receivers were far more expensive than the mass-manufactured electronics of today, station owners often gave away receivers to listeners who couldn't afford to buy a radio.

One wonders why, if any over-the-air viewers have difficulty affording a basic signal converter— the broadcasters couldn't do the same thing again. It was good business then and it would be good business now. ■

Frank Beacham is a New York City-based writer and producer.

DIGITAL TV

Charles W. Rhodes

Not Everything is 'Lost in Translation'

I recently attended and participated in the annual meeting of the National Translator Association, which is composed of TV translator operators. You might be surprised at their number. I believe about 130 attendees came this year.

I was curious about how many were readers of TV Technology, so I asked. I was pleased to see a show of hands of about 75 percent or more.

Then I asked when the first HDTV transmitter went into operation. Some of my readers will recall that the BBC began regularly scheduled television service on its 405-line, 25 fps all-electronic TV system in 1936.

An engineer with a decided British accent raised his hand, and with his first words, I knew he knew—and he did. For those of you who suspected this was a trick question, you were right. The 405-line TV system remained in operation in the United Kingdom from 1936 to 1987. In 1936, it was indeed HDTV with 405 lines per frame, as the only other system under development in England was a mechanically scanned 240-line system developed by John Logie Baird.

TRANSLATORS DATED

TV translators go back to about 1950. Some say they first appeared without the blessings of Washington, D.C., in eastern Washington State, Idaho and Montana. Some were the first on-channel boosters, carrying KXLY, Channel 4, Spokane, Wash. into sparsely populated valleys.

In any event, TV translators sprung into existence as fast as the word spread that they could bring television to shadowed valleys. They became so popular that the FCC created order out of the chaos, establishing Part 74 of its telecommunication rules. TV translator systems now provide millions of viewers with a free over-the-air television service in the United States and Canada. Keith Larson, now chief engineer of the FCC Media Bureau, wrote Part 74.

Nearly all these systems receive TV signals at mountaintop sites where there is a direct line-of-sight path from the broadcast transmitter to the translator's receiving antenna. The received signals are translated to another channel and retransmitted to the viewers. Many of these are owned and operated by county governments.

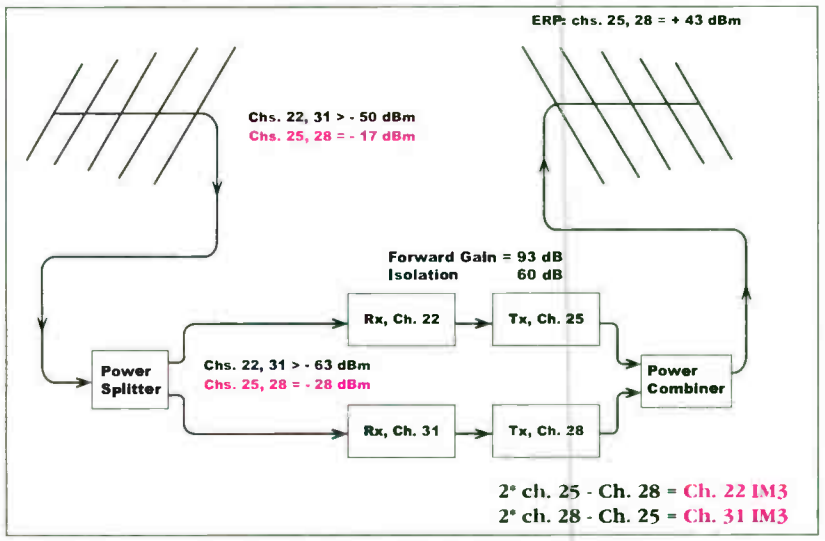


Fig. 1 Two-channel DTV translator using off-air received signals

DIGITAL TRANSLATION

The hot topic at the NTA meeting this year was clearly the transition to digital television. In my book, it all began when Paul Burkholder, communications director of the Humboldt County, Nev., translator system, presented his "Report on HDTV Field Tests, Phase One, November 1999—May 2000," before the NTA in Medford, Ore., in May 2000. Paul built a DTV translator system and tried it out in 1999. I regard his report as a milestone in the history of DTV. He carefully documented that it worked!

At that same meeting, Sam Zboroski reported on his field-strength measurements in the hilly terrain near Pittsburgh, Pa. Initially, Sam thought an on-channel repeater would not work, but he reported that his measurements suggested such a device would work. That was a great relief to me, as my own paper was a tutorial on why on-channel repeaters could be used with 8-VSB modulated DTV signals to provide coverage in terrain-shielded areas. I was reporting the results of an experiment carried out by the Advanced Television Technical Center, which built and tested an on-channel DTV repeater in West Virginia. That too worked.

This year, Keith Larson and Bruce Franca of the FCC briefed NTA members on both the technical and administrative aspects of the new DTV translator rules. Applications will soon be accepted for DTV translators.

IM3

My presentation this year concerned IM3 (third-order intermodulation) as the primary interference mechanism behind DTV-into-DTV interference, for adjacent channel and taboo channel interference. Briefly, I noted that it takes two (or more) undesired signals on certain pairs of channels to generate IM3, and that some of this will fall into a third channel, which may be the desired DTV channel.

Fig. 1 shows a DTV translator receiving off-air DTV signals from Channels 22 and 31. These signals may be about –50 dBm at a mountaintop site as far as 100 miles from the broadcast transmitter. They will suffer attenuation in the downlead of 7 dB and another 4 dB of loss in the two-way signal splitter. The DTV signals will be at -63 dBm at the input to the two DTV receivers. At that signal level, the RF amplifier will be at maximum gain to give the best possible SNR (signal-to-noise ratio) power at the mixer, where most receiver-generated noise is produced.

Fig. 1 also shows that these incoming signals are being translated to Channels 25 and 28. A small part of the signals being retransmitted will find their way back into the receive antenna. These signals may be at –28 dBm at the input to the receivers. They will be amplified by the RF amplifier and be much stronger at the mixer input, perhaps –14 dBm, which will overload the mixer with the result that IM3 will be produced by the channel pair 25 and 28. Some of these IM3 fall into the desired Channels 22 and 31. Now this IM3 increases the noise under the desired DTV signal. As we all know, these receivers cannot decode the 8-VSB signal unless the SNR is greater than 15.2 dB in theory—and much higher in practice—to deal with signal fading and phase noise.

So Fig. 1 demonstrates how a poor selection of retransmit channels can threaten translator failure.

The rule of thumb is that where the

desired signal is on Channel n, pairs of retransmit channels of the form:

n-2K, n-K and n+K, n+2K should not be chosen.

K is a small integer. Thus:
2(n-1) – (n-2) = n = 2(n+1) – (n+2)
2(n-2) – (n-4) = n = 2(n+2) – (n+4)
2(n-3) – (n-6) = n = 2 (n+3) – (n+6)
2(n-K) – (n-2K) = n – 2(n+K) – (n+2K)

As a practical matter, K may be as high as 4 and cause IM3 to be generated in the receiver. Above K = 4, in my opinion, a well-designed receiver should reject one or both undesired signals, thus preventing the production of IM3 in the receiver front-end.

There is a special case where both n channels are being received off-air at the translator site. Channels n-1 and n+1 should not be used for retransmission.

In this case, experiments have shown that strong IM3 will be produced in Channel n. So if the translator is to receive on Channel n, neither n+1 nor n-1 should be used for retransmission. If the incoming signal is on Channel n, it should not be retransmitted on either n+1 or n-1 if the translator also uses the other adjacent channel as a retransmit channel for any purpose. Many translators use a group of odd- or even-numbered channels such as 20, 22, 24, 26 and 28. That would be a bad practice with DTV.

DTx

OK, I've reviewed what I presented to the translator engineers and their consultants. How does this relate to broadcasters? As you may know, the FCC has placed the ATSC proposal for Distributed Transmission (multiple DTV transmitters per broadcaster) on its fast track for adoption. I believe that many broadcasters interested in using multiple DTV transmitters expect to feed them from a primary transmitter over-the-air. That would be cheaper and faster than using fiber-optic or point-to-multipoint microwave relays. Look again at Fig. 1. The undesired signals (in red) being picked up by the receive antenna on Channels 25 and 28 may overload the receiver.

Of course, the solution is to put a bandpass filter ahead of the off-air receiver. This bandpass filter must be flat over the entire desired channel (n) within 0.5 dB, and it must not produce group envelope delay distortion of any frequency within Channel n. That means it cannot provide much attenuation of signals on Channels n+1 or n-1.

I think a well-designed filter can provide 25 dB of attenuation for n+/- 2, 3, 4 and above. Broadcasters will have no control over the channels in use in their communities, so they must engineer around them. Of course, this may be impossible in the case of first adjacent channels, because those undesired signals cannot be attenuated adequately without seriously degrading the desired signal on Channel n by group envelope delay distortion in the bandpass filter.

It appears that before May 2006, a number of DTV translators will be in operation in the United States. The first step—receiving a DTV signal at the translator site and converting it into an NTSC signal for retransmission on another channel—has been achieved by a number of translator operators. They report that the public is thrilled with the resulting benefits. This is probably most evident where multiple translators were previously employed, as was often the case in the western United States and Canada.

I've heard of five repeaters in cascade. I can imagine that the video quality over multiple analog translators would leave something to be desired. With DTV, the signal can be error-corrected at the translator so what viewers get is of extremely high quality, even if it has to be home-delivered in analog form a while longer.

Oh yes, another hot topic at the NTA was the date by which all NTSC terrestrial broadcasting will end. I don't know, and no one else knows either. Time will tell. ■

Charlie Rhodes is a consultant in the field of television broadcast technologies and planning. He can be reached via e-mail at charlesrhodes@worldnet.att.net.

USER REPORT

Acrodyne Eases Transmission Transition

by Ed Bok
Chief Engineer
WWAZ-TV

FDND DU LAC, WIS.

WWAZ-TV was originally signed on as a temporary 35 kW facility with the call sign WMMF in December 2000. Once on-air, the station, owned by Pappas Telecasting, needed to build the full-power facility required by its construction permit. Because the station had an analog channel assignment of 68, we had to construct a facility of nearly 5 MW to maximize the station's coverage. We considered several transmitters, but we especially focused on the newer depressed collector IOT designs.

We decided to purchase the Acrodyne Quantum QDCN-4 in April 2004, just before the NAB convention. The comparative energy savings promised by the e2v ESCIOT depressed collector technology, along with the proven track record of the Quantum design convinced Pappas management to make this choice for the new facility.

Project management for the installation began on the floor at NAB2004. Jeff Powis and Mark Bricker from Acrodyne got the project moving and Dale Scherbring, vice president and director of engineering for Pappas Telecasting also brought his experience in facility design to the project. Scherbring's requirements for the layout of the equipment emphasized simplicity and common sense.

The Acrodyne Quantum transmitter at the WWAZ-TV site in an example of a clean, clutter-free installation.

CONSTRUCTING, CONFIGURING

The traditional configuration of an Acrodyne four-tube transmitter, for instance, placed the exciter between the second and third amplifier cabinets. Scherbring requested that the exciter be moved to one end to provide easier access to the rear of the exciter cabinet. Additionally, the locations of the deionized (DI) pump stands and the water distribution system were altered to maximize the separation between water and electricity, and the layout of the RF system was modified to make it easier to install and maintain.

Scherbring also requested a separate "water-only" cable tray to carry the DI hoses between the pump stands and the transmitter and mandated that all plumbing and conduit runs be placed overhead.

Construction of the transmitter building and the new 500-foot tower was delayed in early 2004 as persistent rain fell throughout May and into the first half of June. This caused concern because the construction permit deadline was in mid-October. To speed up the timeline, delivery of the transmitter was taken in early August, while the building was still under construction.

The installation occurred in several phases. The first phase began as a two-man crew, led by Howard Ford, set the major pieces in about a week. Ford remained at the site to finish the installation of the RF system and plumb the water systems. When the physical installation was complete, Carl Devitt, an Acrodyne field engineer, arrived to begin the cabling and electronic system setup.

DeVitt was eventually joined by another Acrodyne field engineer, Stu Boughton. The two worked together to finalize the installation, with Boughton remaining to do the final proofs. Finally, with just less than a week remaining before the expiration of the construction permit, Acrodyne pronounced the project complete and turned control over to the Pappas engineers. The transmitter went on the air at full power just nine weeks from when it came off the trucks.

In the months following the installation, Acrodyne has continued to provide excellent technical support for the transmitter. During the first seven months of operation, two of the ESCIOT tubes required replacement, as did one of the high-voltage beam supplies and some other minor parts. In each case, Acrodyne lost no time getting the parts to the site and installed. Acrodyne also initiated a couple of design modifications and has retrofitted the WWAZ transmitter in the field to incorporate the upgrades.

Transmitter control is accomplished by combining a computer operating proprietary Acrodyne software on a Linux platform, and PLC controllers in each amplifier. All in all, it has been a very successful installation. ■

Ed Bok is the chief engineer for WWAZ-TV and can be reached at ebok@wwaztv.com. *The opinions expressed above are the author's alone.*

For more information, contact Acrodyne at 410-568-2105 or visit www.acrodyne.com.

BUYERS BRIEFS

The ESCIOT5130W by **e2V Technologies** is an EEV depressed collector plug-in IOT amplifier for UHF. Available for analog and digital broadcasts, the amplifier features a fully-assembled input and output cavity system and as a digital amplifier, has output power of up of 35 kW. Its frequency range is 470 to 810 Mhz (Bands IV and V) in a single tube and circuit.

The amplifier also has an electromagnetically focused electron beam which is density bunched using a rugged grid driven by an RF cavity. The ESCIOT beam power varies with the instantaneous output power.

For more information, contact e2V Technologies at 914-592-6050 or visit *www.e2v.com*.

The **KTech Telecommunications** Xtreme-1000E 8VSB digital translator is used for the reception of 8-VSB RF signal and demodulation into baseband signals. It updates major and minor channel numbers and remodulates the baseband signal into an 8-VSB 44 MHz IF signal. Optionally, an RF upconversion is available to upconvert the 44 MHz signal into an 8-VSB RF signal.

The digital translator offers 8-VSB off-air input, 8-VSB demodulation to baseband transport stream, agile RF input channel frequency and fixed linear pre-correction that can be downloaded by users.

For more information, contact KTech Telecommunications at 818-773-0333 or visit *www.ktechtelecom.com*.

The **Altronic Research** 6700D series air cooled RF coaxial load resistors feature advanced tuning techniques to offer a DC path load from DC to in excess of 1 GHz with stable and low VSWR.

The 6700D Series of load resistors include model 6705D with a power rating of 5kW continuous duty, model 6710D with 10kW power rating and model 6715D with a 15kW rating.

For more information, contact Altronic Research at 870-449-4093 or toll free, 1-800-482-5623 (U.S.), or visit *www.altronic.com*.

Radio Frequency Systems (RFS) features arange of commutating line and balanced combiners for Bands III, IV and V depending on the number of channels to be combined and required isolation between channels.

The company's CC Series of commutating line combiners is ideally suited where wide channel spacings are used (minimum two channel spacing). Up to eight channels can be combined into one antenna system.

The CA, CW Series of balanced combiners feature balanced, constant impedance and are suitable for adjacent and non-adjacent channel TV combining. Three, four, five and six pole bandpass filters are available using coaxial and waveguide technology. Invar temperature compensation, field proven power ratings, compact size and expansion capability make these units ideal for DTV applications.

For more information, contact Radio Frequency Systems at 203-630-3311 or visit *www.rfsworld.com*.

The DVB-T modulator by **Digital Multimedia Technologies** (DMT) provides solid-state VHF and UHF transmitters for both analog and digital service, with power ratings up to 25 kW and starting as low as 1 W.

For more information contact DMT at 856-423-0010 or visit *www.dmtonline.us*.

USER REPORT

WNEO Saves with the L-3 CEA

by Jim Baltes
Chief Engineer
WNEO/WEAO-TV

KENT, OHIO

I began working at WNEO and WEAO in 1981 as the transmitter supervisor, and then in 1996 I moved into the role of chief engineer. In all that time, perhaps the most challenging project for us has been the transition to digital, which we started planning for in 1997, finally going to air with our digital signal in September 2003 on WNEO.

With an engineering staff of just two—Engineer Rick Patterson and me—we knew that it would be a challenge to build the digital operation, and more work to run it. So we had to be certain that the equipment we chose was straightforward to operate, easy to maintain and rock-solid reliable. Our other concern was expense—the cost of the equipment and the cost of running it; because adding the fee for power for an additional transmitter is a significant operational expense.

We chose the Thales DCX Paragon transmitter for digital transmission, in part because of the reputation of its products and for its support. Also critical in the decision was the use of the multistaged depressed collector IOT and the constant efficiency amplifier tube from L-3 in the transmitter. The initial reports on potential power savings were in the area of 50 percent, which is quite dramatic.

The transmitter we installed consisted of an exciter cabinet, a control cabinet and two high-power amplifier cabinets each with an L-3 CEA tube. By running the two HPA cabinets in parallel, we're able to do maintenance on one cabinet without having to go off the air.

The transmitter and L-3 CEA tube went live Sept. 6, 2003, and I can't say that everything has been perfect, but it's been just about as near to perfect as it could be.

We had one potential problem early on, but the Thales and L-3 service people detected it and dealt with it before anything could go wrong. The Thales support person realized that the performance of one of the tubes didn't appear to be quite as good as it should have been, so he contacted L-3. That company had people on the scene the very next day. They swapped out the tubes and re-tuned the new ones at no charge. That was in December 2003, and the transmitter and tubes have been running constantly and without any issues since then.

The L-3 CEA tube—an MSDC IOT—is shown here in the Thales DCX Paragon transmitter at WNEO-TV.

The other thing I like about the transmitter is that it is a very straightforward design that is simple to use. Too much equipment is over-designed and complicated to operate when it doesn't really need to be. When you want to make a simple adjustment, you don't want to have to wade through a multilayered, complex menu system.

So, to sum up, the combination of the Thales DCX Paragon transmitter with the L-3 CEA tube has helped us meet the operational objectives for our digital transmission operation. The system presents an overall good design for easy operation and solid reliability. Both companies have exceeded my expectations for responsiveness and support, and the power efficiency that we get with the CEA tube has really contributed to our operation's bottom line. ■

Jim Baltes is chief engineer for PBS affiliate stations WNEO and WEAO. The opinions expressed above are the author's alone.

For more information, contact L-3 Communications at 623-445-7000 or visit www.l-3com.com.

USER REPORT

LPB Goes Digital with Axcera

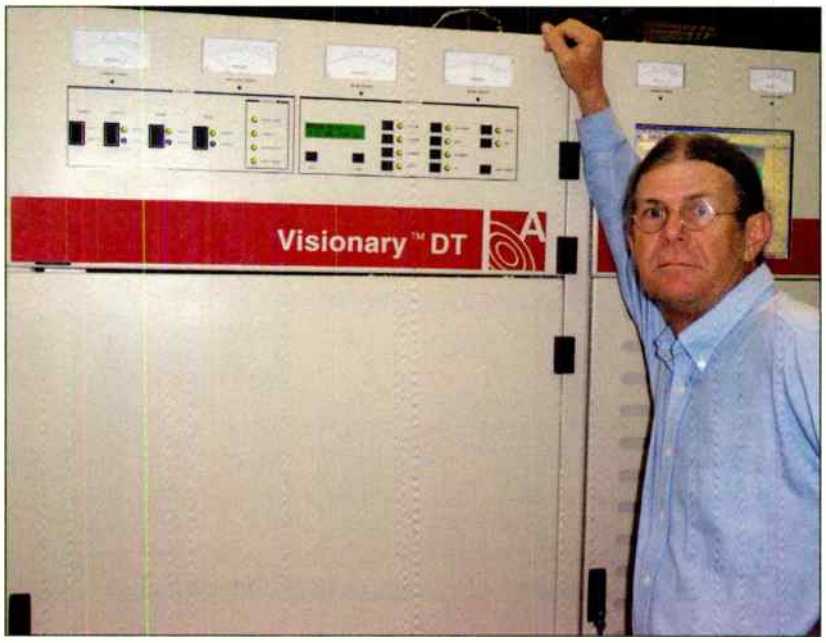
by Frank Kleinpeter
Director of Engineering
Louisiana Educational Television Authority

BATON ROUGE, LA.

As the director of engineering for Louisiana Public Broadcast, a statewide PBS network serving seven markets, I helped build the first digital television station in the state that went on the air 25 years (to the minute) after the network's first analog station went on the air. Since then the Louisiana Educational Television Authority has grown to cover all major markets in the state and has had many "firsts" in its history. One of which is that LPB was the first television network to deliver programming to its stations using a compressed digital signal via satellite.

That first digital television station mentioned above was a DT834A 1 kW DTV transmitter provided by a company called ITS, which is now Axcera.

I was familiar with ITS from an analog exciter retrofit project a few years earlier. Mike Rosso, now the Axcera vice president of sales, gave us a presentation about digital television that alleviated the fears we had derived from the tales of other vendors. The plan was to start digital broadcasting with the 1 kW equipment and replace it later with 200 kW ERP maximized power equipment. The DT834A was installed, and LPB's transition to digital was underway.



Frank Kleinpeter, director of engineering for the Louisiana Educational Television Authority, stands in front of the Axcera HP30SDO Visionary DT MSDC IOT Transmitter.

As the digital transition for the LPB network progressed, we acquired a second transmitter—an Innovator DT full-power solid-state unit. We wanted to simplify the process of parts interchange for the network as a whole.

The wideband ability of the Innovator LDMOS amplifiers made swaps from one channel to another very easy. The adaptive feedback system of the exciter was getting good reviews from other PBS engineers, and the fact that there were no proprietary parts in the transmitter made the decision easy. The transmitter was delivered, installed and has had no major problems. Since then, the network has acquired several more Axcera transmitters.

The network's last transmitter purchase was intended to replace the DT834A in the Baton Rouge market with a full-power unit. I had been following the development of a new high efficiency IOT amplifier technology called "multistage depressed collector." This allows substantially lower power consumption, providing significant cost-savings over the life of the transmitter. For this reason, LPB maximized its power by replacing the DT834A with the first Axcera 30 kW Visionary DT series UHF transmitter to be equipped with the new L3 constant efficiency amplifier 130 MSDC IOT.

We had a couple of small issues in the first few weeks, as you might expect with a new design, but the Axcera customer service team took care of the issues the same day. Since then, there have been no problems. It's the engineering behind the Axcera products that led me to them in the first place.

Louisiana Public Broadcasting has completed its digital transition and is now operating seven Axcera transmitters. They are looking forward to many years of trouble free service, and many more firsts. ■

Frank Kleinpeter is the director of engineering at the Louisiana Educational Television Authority and can be reached at fkleinpeter@lpb.org. The opinions expressed are the author's alone.

For more information, contact Axcera at 800-215-2614 or visit www.axcerca.com.

USER REPORT

Thales Upgrades WGBH for Higher Efficiency

by Dave St. Onge
Chief Engineer
WGBH-TV

BOSTON

Being a broadcaster in the northeast, we closely watch our monthly electrical bills, especially since we pay 8 cents per kW hour on average. So when Thales Broadcast proposed to replace our existing three-tube IOT transmitter with a two-tube DCX Paragon using multistage depressed collector IOT technology and save more than $61,000 annually, we listened.

We worked closely with Thales on the upfront planning. Upon reviewing the existing DTV system, Thales determined that we were able to reuse the RF system, cooling system and DTV exciters, making the upgrade particularly cost-effective. The new high-power amplifiers incorporate L3 constant efficiency amplifier, oil-cooled MSDC-IOT technology. The DCX Paragon, which is operating at 36 kW transmitter power output provides substantial savings in operational expenses through its higher efficiency (56 percent), even at our power output.

Thales incorporates a dual-loop cooling system for the CEA. The primary loop, which circulates coolant through the tube's collectors, uses synthetic oil. Oil cooling adapts well to the MSDC-IOT because it acts as a coolant and dielectric, allowing a simple one-piece coolant jacket over all stages of the IOT's collector. The oil also acts as a preservative for the collector elements, eliminating any possibility of corrosion or elec-

THALES, PAGE 60

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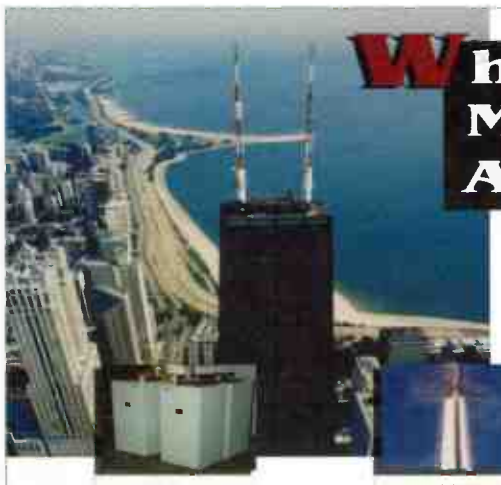

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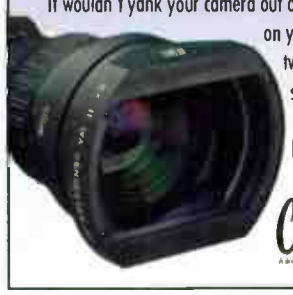

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USER REPORT

CPI/Eimac Tubes Go the Extra Mile

by Gary Schroder
Chief Engineer
WDRB/WFTE-TV

LOUISVILLE, KY

As chief engineer at WDRB/WFTE-TV, I've had the opportunity to purchase the gear that we use at various television stations.

Approximately 15 years ago, we began using a transmitter by Thales Broadcast, which was then known as Comark.

The initial installation and turn-on date of Fox affiliate WDRB's 240 kW transmitter was Jan. 31, 1990. All of the tube sockets were equipped with the K1 Klystrode IOTs manufactured by CPI/ Eimac, (then known as Varian/Eimac).

At the time of the installation, there were only three types of tubes to choose from—the very inefficient klystron, the MSDC klystron or the CPI/Eimac Klystrode IOT. We chose the Klystrode because of its efficiency and the reputation Varian Eimac had in the tube-manufacturing business. After overcoming some of the initial problems with these tubes, we received and installed a Klystrode that we are still using today.

INSTALLATION

Serial No. 192-HFH was initially installed in the V1 slot. A mere 78,222 hours later (nearly nine years), we found that it was dropping off in emission and only producing 80-percent power. We ordered and installed a new tube in the V1 slot and stored 192-HFH in our barn for about a year.

We then started having problems with the aural tube, which prompted us to get "Old Faithful" out of the barn and fire it up within the aural slot. It is still working with an additional 31,940 hours, for a grand total of 110,162 hours. That's nearly 12.5 years of service from a tube that typically only lasts four to six years! If this isn't the world's record for most hours and years on a K1 Klystrode socket, I'll bet it's close!

Gary Schroder stands with the tubes provided by CPI/Eimac for the 15-year-old WDRB 240 kW transmitter from Thales Broadcast.

CPI/Eimac still provides tubes for the 15-year-old WDRB 240 kW Thales (Comark) transmitter.

These tubes are pretty resilient to just about anything. These days it means a lot to have continued support so many years out. ■

Gary Schroder is the chief engineer of WDRB (a Fox affiliate) in Louisville, Ky. and WFTE TV (a UPN Affiliate) in Salem, Ind. and can be reached at gschroder @fox41.com. *The opinions expressed above are the author's alone.*

For more information, contact CPI/Eimac at 800-414-8823 or visit www.cpii.com.

USER REPORT

Belo Boosts KTFT Coverage with Harris

by Wayne Kube
Engineering Project Manager
KTFT-TV

TWIN FALLS, IDAHO

Belo station KTFT-TV is located in an isolated area of Idaho and receives its signal via a microwave intercity relay from the KTVB-TV studios in Boise, 115 miles away. The signal is fed with a separate program stream, allowing KTFT to insert different commercials and promos as opposed to repurposing a complete replication of the KTVB NBC feed. KTFT is able to evolve beyond the boundaries of a basic satellite station and better serve its local audience.

KTFT went on the air seven years ago with a tube transmitter that covered the city of Twin Falls, Idaho. The population has since expanded into areas beyond the original signal's reach, leaving cable and satellite subscribers the only local recipients of NBC programming. To serve the over-the-air needs of the growing Twin Falls region, Belo, which owns 19 television stations, purchased a Harris Atlas Analogue 10 kW solid-state UHF transmitter for KTFT.

Since launching the Atlas Analogue in August 2004, the station has increased its power output to 150 kW ERP at a height of 100 meters, compared to the previous output of 8 kW ERP directional at 60 meters. The transmitter was part of a larger upgrade that also included a taller tower and an omni-directional antenna, effectively covering the entire Twin Falls viewing area.

The Harris Atlas Analogue 10 kW solid-state UHF transmitter at KTFT-TV.

ANALOG & DIGITAL IN ONE

Belo purchased an analog transmitter instead of immediately upgrading to digital because KTFT is an analog-only, low-power station with no digital allotment. The station will remain analog until the FCC determines NTSC analog transmission can disappear altogether, and will then flash-cut to DTV operation.

The Atlas Analogue is capable of analog and digital transmission, which eliminates the need to purchase a new digital transmitter when the FCC assigns our digital allotment. A simple field upgrade will convert the station to digital in about one day.

The Atlas Analogue is well built and expertly designed. The exciter provides a cleaner, higher quality picture and a crisp audio output—both immediately noticeable to the home viewer. Superior digital pre-correction technology within the exciter is responsible for many of these improvements.

The solid-state architecture was a primary factor in our selection. Many competitive analog transmitters in the 10 kW range are tube-based. The recurring costs of tube replacement are eliminated with the solid-state design. The 10 kW model also features eight parallel power amplification modules to safeguard our on-air product. Automatic gain control within each amplifier module keeps the transmitter operating at maximum authorized power during varying ambient temperature conditions.

KTFT's Atlas Analogue is installed in an off-site transmitter facility north of Twin Falls near the town of Jerome, Idaho.

CONTROL & MONITORING

Transmitter control and monitoring is enhanced with the Atlas Analogue. The amount of metering functions far exceeds our previous model. These functions include forward and reflected power, driver power, and various front-panel diagnostics. The station's engineering staff can diagnose performance issues down to the module level from the transmitter's front panel. The transmitter is also outfitted with a Harris eCDi enhanced Web-based transmitter remote control system.

The Atlas Analogue frequency agile design will also be valuable for the station's digital future because KTFT will likely be able to keep its current channel assignment in digital. However, a new channel assignment that remains within certain UHF spectrum bands will require minimal changes to the transmitter. Beyond upgrading the exciter and transmitter software, the Atlas Analogue's broadband PA modules cover all UHF channels and will require no adjustments. Along with the excellent 24/7 support that Harris always provides, we expect that the Atlas Analogue has a bright future at KTFT. ■

Wayne Kube is the engineering project manager at KTFT-TV and can be reached via e-mail at wkube@belo.com. *The opinions expressed above are the author's alone.*

For more information, contact Harris at 513-459-3400 or visit www.broadcast.harris.com.

PRODUCTS & SERVICES SHOWCASE

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.

ANTENNAS

MANUFACTURER	MODEL	SHARED/ SINGLE CHAN.	WINDLOAD CHARACT.	PATTERN DISBURSEMENT	COMPUTER, SCALE MODELING	FEATURES	TYPICAL CONSTRUCTION TIME	PRICE
Antenna Concepts 530-621-2015 *www.antennaconcepts.com*	Champion/ Champion II ATC	Single or adjacent channel	Based on EIA 222-F	Multiple pattern options	Computer modeling available	Single input, reliable; no power divider	Depends on input power; 12 to 18 weeks	Call for pricing
Dielectric Comm. 207-655-4555 *www.dielectric.com*	TUV Dualband	Shared UHF and VHF	Equal to comparable models	UHF: Omni or directional VHF: Omni-	Computer/scale modeling or full-scale modeling avail.	Combine VHF/UHF in one antenna; full ERP; uses pylon technology	180 days	Varies based on specs
ERI Inc. 812-925-6000 wwww.eriinc.com	ALP Series	Single or adjacent channel UHF	Low windload sidemount design	Multiple azimuth pattern options	Available	Light weight, low windload, design w/ high power handling	2-4 weeks	Call for pricing
Jampro Antennas 916-383-1177 *www.jampro.com*	JHUD-UHF Panel & Prostar Slot	Multichannel, broadband	Low load radome, low load side-mount	Multiple pattern options	Computer modeling and full scale range testing	High power handling, broadband, light weight low wind load	4-8 weeks	Call for pricing
Kathrein-Scala 541-779-6500 *www.kathrein-scala.com*	SL-8 Paraslot	Single or multichannel versions	Dependent on channel of operation	Omnidirectional	Patterns are available for download from Web site in 19 formats	High-performance slot array	3-4 weeks	$2,950-$4,150
Micro Communications 800-545-0608 *www.mcibroadcast.com*	Broadband UHF & VHF	Multichannel	Optional fiber-glass radome for less windload	Omni-low ripple	Available	High power multi-channel capacity; low ripple pattern	12-16 weeks	Depends on system configuration
Propagation Systems (PSI) 814-472-5540 *www.psibroadcast.com*	Digital Slot and Panel Antennas	Digital/analog multichannel operation	Low wind-load side and top mount design	Multiple pattern options	Modeling available for custom patterns	Digital/analog mode operation, low windload, value priced	2-8 weeks	Call for pricing
Radio Freq. Systems (RFS) 203-630-3311 *www.rfsworld.com*	PHP UHF Panel Series and RD Slot Cavities Series	Multichannel	Minimum, based on configuration	Standard and/ or custom	Tower simulation effects on coverage pattern	Multichannel; high power; excellent coverage	8 weeks	Call for pricing
SWR 814-472-5436 *www.swr-rf.com*	Clarion	Single channel UHF	6,280 - 2,880-lbs. omnidirectional	Omnidirectional/ cardioid	N/A	Top or sidemount: radome optional	N/A	Call for pricing

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The Nx8200 line of air-cooled transmitters by **Rohde and Schwarz** are available in two models—R&S NH/NV8200 for UHF and R&S NM/NW8200 for VHF. The units include exciter, power amplifier, transmitter control unit and transmitter rack with cooling system.

The transmitter line is part of a common platform for the company's sound and TV transmitters, with identical components including the transmitter control unit and the bus system for internal and external communications. Additionally, the standardized interfaces make it easy to integrate the transmitters into a network management system.

For more information, contact Rohde and Schwarz at 888-837-8772 or visit *www.rohde-schwarz.com*.

The **Thales Components** TH792 single-stage depressed-collector tube was recently qualified by some transmitter manufacturers for use in their systems. The simpler demands of a single-stage depressed collector means that the tube and transmitter are less expensive than its multistage counterpart, while still offering enhanced efficiency from a standard IOT.

For more information, contact Thales Components at 973 812-9050 or visit *www.thalescomponents-us.com*.

Richland Towers provides facilities and services for television and radio broadcasters worldwide.

Services include tower project planning, tower facility and management, transmitter site development, tenant facility integration, DTV, NTSC and FM facility upgrades, RF coverage enhancement analysis and DTV interference analysis.

The company leases space on the communication towers that it designs, builds and manages.

Sites are currently being developed in Charleston, S.C., Columbus, Ga., Indianapolis and Los Angeles/Mt. Wilson, Calif.

For more information, contact Richland Towers at 813-286-4140 or visit *www.richlandtowers.com*.

Broadcast transmission consulting provider **s2one** installs and maintains Harris digital transmitters and IOTs, including the Sigma, Platinum, Diamond and Ranger models.

The company also has a number of mission critical parts and test equipment on hand for emergency repairs and IOT service.

Recently, S2one has developed an advanced airborne pattern measurement technique to offer its customers detailed information about its broadcast antenna systems. Using s2one's aircraft, these aerial surveys use a differential GPS position measurement technique using a high performance receiver, GPSS roll steering, high sample rates for greater detail and a calibrated receive antenna for accuracy.

For more information, contact S2one at 800-270-7050 or visit *www.s2one.com*.

The **Larcan** Magnum line of UHF DTV transmitters provides a lot of solid-state power in a relatively compact space. The Magnum is available in a variety of power ratings, topping out at 20 kW.

Features include a 100 percent solid-

state UHF transmitter broadband amplifier—that requires no tuning adjustments—customizable cooling system and extensive monitoring and diagnostics.

Additionally, the transmitters have an output frequency of 470-860 MHz and 30 dB signal-to-noise output.

For more information, contact Larcan at 905-564-9222 or visit *www.larcan.com*.

The RGFLEX range of braided cables from **Radio Frequency Systems** (RFS) are now being marketed globally.

RGFLEX is targeted at providing interconnection between low-power RF equipment—such as radio based station components, cameras for security systems, DTV systems and more. The range comprises three series of cables—the "RG," "RGC," and "RF" series—which differ in the construction of the inner and outer conductors (combinations of coppersteel or barb copper wire, tinned or bare copper braid), dielectric medium, (solid or foam polyethylene), and jack material (PVC or polyethylene). Available with impedances of 50 or 75 ohms, in diameters up to 1/2 inch, the RGFLEX range is optimized for use between 1 MHz and 2400 MHz.

For more information, contact RFS at 203-630-3311 or visit *www.rfsworld.com*.

Solid-state transmitters by **Superior Broadcast Products** feature a simple, reliable design and offer a high degree of redundancy. Multiple RF output devices operating in parallel eliminate the single final output tube.

Advanced combining techniques enable the transmitter/translator to stay on the air even if an output device fails. In models that have multiple visual and/or aural amplifiers, an entire module may be removed, serviced or repaired in the field.

The transmitters also feature 25 W to 6,000 W, solid-state modular construction, integral isolator protection, automatic loss of sync shut down and overload protection with LED warnings.

For more information, contact Superior Broadcast Products at 972-473-2577 or visit *www.superiorbroadcastproducts.com*.

The rack-mounted 250 W UHF television filter by **Electronics Research** (ERI) is a 19-inch RF system. The filter features exceptional return loss (0.7 dB typical) and improved harmonic performance, which sometimes eliminates the need for a separate harmonic filter. The UHF filter is available in six, seven and eight section configurations.

For more information, contact Electronics Research at 812-925-6000 or visit *www.eriinc.com*.

Thales

CONTINUED FROM PAGE 53

trolysis that can be associated with water-cooled MSDC-IOTs.

A liquid-to-liquid heat exchanger in the rear of each HPA allows the secondary loop to use standard water/glycol cooling external to the cabinet. The dual-loop cooling is perfect for WGBH since we wanted to use as much of the existing infrastructure as possible.

While achievable energy savings from MSDC-IOT technology was a substantial reason to upgrade our transmitter, we also get the additional benefit of a lower cost of ownership. This is achieved through higher reliability with Thales Soft Arc Technology, eliminating the thyratron crowbar circuit. The Soft Arc Technology uses an electronic solid-state switch on the AC mains of the beam power supply. This switch safely removes the AC mains to the beam supply in less than 8 milliseconds when triggered by a fault sensed on any of the five high-voltage lines. Along with an appropriately designed beam supply, this technology allows the system to pass the most stringent requirements for the wire test of all tube manufacturers.

PURPOSED-DESIGNED HPA

Another aspect of lower cost of ownership results from a purpose-designed HPA cabinet, with particular attention paid to serviceability, an important point for our engineering department. Thales designed standard HVAC filters into the product, making them readily available and economical. The user interface and control panel is very straightforward—another plus. Finally, since MSDC-IOTs can use up to five different high voltages, each HPA incorporates both a voltage and current sensor on every HV line. A HV isolate/connect plug system is also included, which tremendously aids troubleshooting.

Dave St. Onge, chief engineer and Jane Pikor, director of engineering and operations for WGBH-TV with the Thales DCX Paragon MSDC-IOT DTV transmitter.

Considering that WGBH is a traditional VHF broadcaster, we were excited to implement this groundbreaking technology because of the significant power savings it can provide. We have always had an excellent relationship with Thales with our prior DTV UHF transmitter and we are looking forward to years of dependable service with our new DCX Paragon transmitter. ■

Dave St. Onge is the chief engineer, WGBH and can be reached at w1hw@wgbh.org. *The opinions expressed above are the author's alone.*

For more information contact Thales Broadcast at 413-569-0116 or visit www.thales-bm.com.

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Medea 100 GIG IDE Raid array, please contact Geoff Parr, 805-681-0416 x.22 or gparr@glendon.org.

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Leader LV-5100D SDI waveform/vector, $11500; Leader LV-5100D SDI waveform/vector, $3995; Videotek TVM-821D SDI waveform/vector, $3995; Tektronix WFM601M SDI waveform, $5500; Tektronix WFM601 SDI waveform, $3990; Tektronix 1731D PAL SDI vectorscope, $2000; Tektronix 764 digital audio monitor, $2000; Tektronix 760A audio monitor, $1000. 818-788-4700 or www.tvprogear.com.

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34-35	Sony Broadcast & Professional	www.sony.com
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32	Triveni Digital	www.trivenidigital.com
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Business News

Autocue Purchased by Venture Cap Firm

LONDON

Root Capital, a London-based venture capital firm in the technology sector, has purchased Autocue, a U.K.-based developer of teleprompting technology.

Simon Philips, partner of Root Capital and the new Autocue chairman, said he is delighted to invest in the future of Autocue and is excited about the prospects for the business. He said there are no plans for cutbacks and the company will continue to use the Autocue name. Financial terms of the deal were not disclosed.

The Autocue newsroom Q series product line includes QLog, which records frame accurate MPEG output to a disk-based recorder system, QTicker and QScore, which allow insertion of crawling stock prices or sports scores, QVote, an integrated election system that automates and manages election data and QAudio a scripting and audio playout system for the radio news environment.

Autocue clients include the BBC, Bloomberg and MTV Europe among others. ■

Radyne Completes Deal, Changes Name

PHOENIX

Radyne ComStream has completed the acquisition of Xicom Technology, a provider of satellite and microwave power amplifier produces and RF technologies.

After final adjustments, Phoenix-based Radyne paid $37.7 million in cash, 219,708 shares of stock and assumed $5.1 million in debt at the closing. Xicom will still function as a Radyne subsidiary in Santa Clara, Calif.

The acquisition will round out the company's offering of satellite modems and broadcast encoders.

Radyne designs, manufactures, sells, integrates and installs products, systems and software used for transmission and reception of data and video of satellite, microwave, troposcatter and cable communication networks.

Xicom ended its first fiscal quarter, ending Oct. 31, 2004 with more than $44 million in annual sales.

Three years of financial information for Xicom will be available within 75 days of the completion of the acquisition, according to Radyne.

Radyne also announced that it is changing its name from Radyne Comstream to simply, Radyne Corp. The name change was part of a strategy to simplify product branding.

Each brand will maintain its own product research and development, manufacturing and customer service, according to the company.

The manufacturing and sales of satellite and microwave communications equipment will fall under the Radyne name; marketing of broadcast encoders and decoders will fall under the Tiernan brand; and sales of high-power amplifiers uander the recently acquired Xicom brand.

"Our streamlined brand approach reflects the strong identity that each of our brands has in the market place," said Bob Fitting, CEO of Radyne. ■

Scientific-Atlanta, Gemstar End Fight

LAWRENCEVILLE, GA., LOS ANGELES

Scientific-Atlanta and Gemstar-TV have resolved outstanding litigation and inked a deal that will allow both companies to cross-license intellectual property assets.

According to the deal, both companies will have access to each other's interactive program guide patents. The companies also entered into a porting agreement where Scientific-Atlanta will assist Gemstar-TV Guide to port Gemstar IPGs onto the Scientific-Atlanta Explorer set-top platform.

The cost to Scientific-Atlanta is estimated to be $30 to $50 million during the company's fourth fiscal quarter in 2005, related to the settlement. ■

WIN-LOSE RATIO

TOP ADVANCERS BROADCAST STOCKS
(May 20 - June 3)

Nexstar + 12.02 %
Paxson + 11.94%

TOP DECLINERS BROADCAST STOCKS
(May 20 - June 3)

Gray - 4.93%
Liberty - 4.34%

TOP ADVANCERS TV STOCKS
(May 20 - June 3)

LSI Logic + 23.05%
Belden + 9.61%

TOP DECLINERS TV STOCKS
(May 20 - June 3)

Harmonic - 8.90%
SeaChange - 7.53%

To have your company listed, contact Deborah McAdams at dmcadams@imaspub.com.

TV Tech STOCKS as of June 3

Company Name	52-Week Range	May 20	June 3	% Change
Avid	40.90 - 68.35	53.52	55.88	4.41%
Belden	16.02 - 24.59	19.04	20.87	9.61%
Ciprico	3.15 - 4.90	4.24	4.35	2.59%
Harmonic	4.86 - 12.40	6.29	5.73	-8.90%
Harris	21.60 - 35	29.97	28.83	-3.80%
Leitch	6.72 - 11.20	9.17	9.1	-0.76%
LSI Logic	4.01 - 8.17	6.16	7.58	23.05%
Pinnacle	3.25 - 7.50	5.49	5.71	4.01%
Sci. Atlanta	24.61 - 36.06	33.06	34.5	4.36%
SeaChange	7.29 - 19.75	8.1	7.49	-7.53%
Tektronix	20.97 - 35.00	22.38	22.96	2.59%

Broadcast STOCKS as of June 3

Company Name	52-Week Range	May 20	June 3	% Change
Acme	3.30 - 7.74	3.84	4.01	4.43%
Belo	18.00 - 29.31	24.08	24.67	2.45%
Emmis	15.29 - 21.85	17.85	18.27	2.35%
Entravision	6.85 - 9.11	7.5	7.25	-3.33%
Fisher	45.02 - 52.60	50.25	50.53	0.56%
Gray	11.20 - 15.74	12.16	11.56	-4.93%
Hearst Argyle	22.57 - 26.48	24.95	24.78	-0.68%
Nexstar	4.52 - 11.75	4.99	5.59	12.02%
Lin TV	14.34 - 22.55	14.9	14.72	-1.21%
Paxson	0.48 - 3.81	0.67	0.75	11.94%
Sinclair	6.12 - 11.05	8.49	8.62	1.53%
Liberty	34.32 - 47.85	37.58	35.95	-4.34%
Univision	25.00 - 35.22	26.69	27.19	1.87%
Young	4.95 - 14.30	5.44	5.25	-3.49%
Tribune	35.66 - 48.97	36.57	36.12	-1.23%
Meredith	44.51 - 55.94	47.5	49.01	3.18%
EW Scripps	44.73 - 54.52	51.17	51.27	0.20%

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