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Tower Fall Kills Three

Investigators suspect equipment as cause

by Deborah D. McAdams

OAKLAND, IOWA

The tall steel fraternity was rocked late last month when three of its own lost their lives at the base of a 1,500-foot TV tower in Iowa.

Leo Deters, 57, of Norwalk, Iowa; 27-year-old Jason Galles of Des Moines and 19-year-old Jon McWilliams of Cumming, Iowa died May 31 in an apparent fall from rope rigging on the KHIN tower located near Oakland, Iowa, according to the Pottawattamie County Sheriff Jeff Danker.

Equipment failure is suspected, he said, but no specifics had been determined a week after the incident.

"There is a break in the rope, but… when a fall like this occurs, those ropes can be cut by the guy wires. So we don't know if that's the

TOWER, PAGE 24

Sony, Panasonic Launch AVCHD

New hi-def standard could be an effective competitor to HDV

by Craig Johnston

SEATTLE

Several weeks after NAB2006 shut its doors, the Japanese offices of broadcast equipment powerhouses Panasonic and Sony announced a new video format: AVCHD. "AVC" stands for Advanced Video Coding. You know what "HD" stands for.

Why wait until after the big show to roll it out? AVCHD is aimed at consumer DVD camcorders. But given the capabilities the new format brings, it wouldn't be surprising to see it follow the pathway of the DV format, which was originally touted for consumer level video cameras, then ended up being adapted all the way to high-definition.

For now, comparisons with AVCHD can be made against HDV, the other consumer or prosumer grade HD video format, which rolled out just a few years ago.

HDV records to tape. AVCHD records to 8 cm (about 3 1/4-inch) red laser DVDs. (Panasonic, in a separate announcement, said it is also developing solid-state SD-memory products for AVCHD.)

HDV compresses to and records at 25 Mbps. AVCHD compresses to and records at 18 Mbps.

Both are long-GOP, meaning their compression stretches out over several frames

AVCHD, PAGE 14

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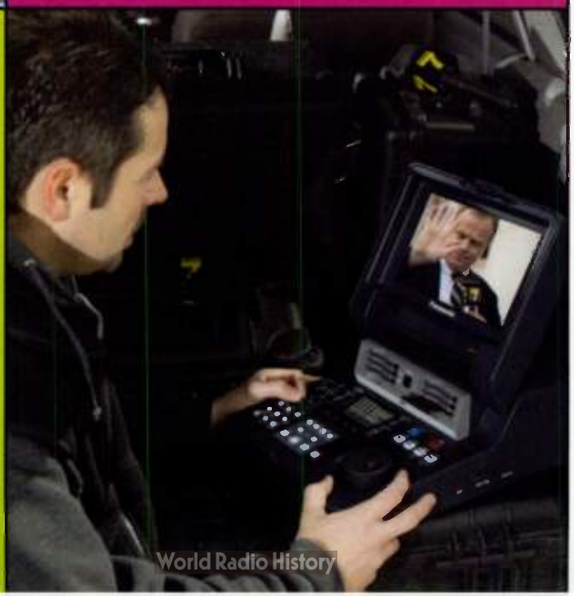

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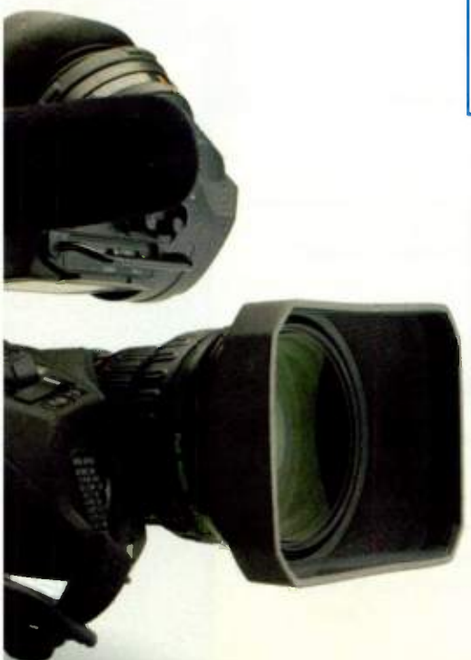

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AJ-HPM100
Mobile DVCPRO HD P2 Recorder
Fully equipped with a six-slot P2 drive, a 9" widescreen LCD monitor with built-in stereo speakers, a jog/shuttle dial and function buttons, and an SD card slot, it operates on either AC or DC power.

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Audio By Design

An Audio By Design reader named "Bro Duke" writes in about his microphone pet peeve: "their lack of internal filters, specifically to limit the popping of 'P's. One on occasion, I made a comment to our local Board of Supes at City Hall. Though my face was..." p. 34

Jay Ankeney

Focus on Editing

Do you remember the early days of mobile video editing? When Sony introduced their BVU line of high band 3/4-inch U-matic cassette format in th early 1980s, entrepreneurial editors would pack vans with bulky videocassette editing decks... p. 40

Charles W. Rhodes

Digital TV

On May 13, 2004, the FCC approved a Notice of Proposed Rulemaking to allow fallow TV channels in each community to be put to use by unlicensed operators. I coined the term "digital CB" to refer to devices and those using them in broadcast Channels... p. 46

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FROM THE EDITOR

Tower Safety

The recent tragedy in Iowa where three tower workers lost their lives is a sobering reminder to us all about the risks inherent in the tower industry.

Tower workers have often been described as a "rough-and-tumble crowd of risk-taking cowboys," but the industry is working hard to lessen risks for this group. According to Don Doty, vice president of Doty Moore Tower Services and chairman of the National Association of Tower Erectors, the association has taken numerous steps recently to promote industry safety, including initiating a national safety awareness ad campaign, commissioning a video that addresses safety concerns and providing weekly e-mail updates to member and non-member companies reminding them of safety concerns.

"I was shocked that our industry has had thirteen people involved in accidents and twelve have died at tower sites," Doty noted in the association's most recent online newsletter. "We know about these accidents, but we are not privy to more than a superficial understanding to what happened. Even so, we can pick up enough to know that mistakes were made and people's precious lives were lost. What these mistakes were can and should guide industry efforts to change what needs changing and address what can be done to stop the carnage."

The same day Doty posted these words on the NATE Web site—the day after the Iowa tower incident—another accident occurred in Georgia. In that tragedy, four military personnel lost their lives when their helicopter clipped the guy wires of a TV tower belonging to WFXL in Albany.

The emphasis on tower safety has never been more important as more and more companies join broadcasters in deploying new sticks to take advantage of the cellular/wireless revolution. Those newcomers should be aware of a fact noted by Bill Hayes, director of engineering for Iowa Public Television, and a long-time contributor to TV Technology: "It's a dangerous job because if you make a mistake, there aren't any small ones."

The Iowa accident claimed the life of Leo Deters, who ran the Deters Tower Service in Grimes, Iowa, along with two of his co-workers. Leo was an admired and respected veteran in the communications tower industry; TV Technology offers our condolences to all of the victim's families.

* * * *

Shortly after NAB, Sony and Panasonic—which have traditionally competed against each other—announced that they had collaborated on a new hi-def standard, AVCHD, targeting the consumer HD market. Years ago, when companies like Sony or Panasonic announced a new consumer video format, the professionals usually just passed it off with a shrug. But, with more and more broadcasters and other video professionals using HDV, and with the influx of more "citizen journalists" making their way into broadcast, the lines continue to blur between professional and consumer; AVCHD could make those lines even more indistinguishable. What are the implications of this new standard for our industry? Check out Craig Johnston's analysis on p. 1 for some clues.

Tom Butts
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LETTERS

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

The Customer You Don't Know

Dear Craig Johnston:

I just wanted to take a minute to thank you for writing the article on client relationships in your latest "Production Manager" column, ("What to Do When Your Job is On the Line," April 24).

I own and operate a satellite truck company near Portland, Oregon and I am constantly learning how important the client relationship is.

Your article focused on an upset client and what should be done to rebuild the relationship. I am most concerned about that one unhappy client that I may not know about.

The majority of my business comes from repeat customers, and while repeat business is a good indicator of a happy client I am always concerned about the one I worked with only once.

I have not received any complaints but that may not mean they'll call back. I always try to let the customer know that I appreciate their business.

David Garbutt
Ridgefield, Wash.

Patent Positions

Dear Editor:

I've read TV Technology for years and have learned a lot about the areas of the business adjacent to my own through reading it. You asked the question, "why file a patent for a technology you don't plan to use in your products?"("Somebody Has to Pay For It," May 10).

It's a good question with good answers. The first is that if you have it, no one can bar you from doing it, or attempt to charge you - in other words, if you don't, someone else will, so its a defensive move. Sometimes patents are filed and then turned into the public domain. Thereby, the patent filer ensures that anyone can use the approach without fear of being held hostage.

Network operators will file ideas and then provide a free license to vendors to build the products. Finally, in many cases, license fees are not paid for patents, but rather a barter systems is used known as cross-licensing. I'll give you a license to my list of patents if you'll give me a license to yours in exchange. The longer the list of interesting patents, the easier that exchange is.

There certainly is plenty of abuse of the patent law system, and most of how it really works is not well understood. It might make for an interesting educational article, well worth tearing out and putting in my folder of reference articles that has grown thick over the years. Thanks for the good work.

Louise Wasilewski
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HDTV: MAKING IT HAPPEN

Crash Takes Out Towers

DOERUN, GA.

Two TV towers came down as a result of a fatal helicopter crash near this small southern community.

Four soldiers died June 1 during a training mission when their aircraft went down after clipping the guy wires of TV tower belonging to WFXL in Albany.

In the aftermath of the crash, it was determined that the damage to the 1,000-foot structure was too extensive to be salvaged. Controlled Demolition of Phoenix, Md. was brought in to take down the WFXL tower, and hopefully spare an identical tower belonging sister station WALB situated only 150 feet away.

"They anticipated bringing ours down, they'd hoped not to bring WALB's down," said Deborah Owens, WFXL station manager.

But half-way into demolition, the WALB tower collapsed vertically upon itself. Controlled Demolition President Mark Loizeaux told WALB's Ben Roberts that the location guy wires could cause problems.

"If it kicks back, it may well bring down the Radian tower... next to it because the guy wires of the two towers are interlaced," he said.

WALB provided live coverage of the June 7 demolition, which included more than 20 seconds of dead air space as the station's news team witnessed their own TV tower crumble to the ground. Finally, Anchor Dawn Hobby said, "We're all a little stunned... we really did not expect to see both towers come down like that."

WFXL, the local Fox affiliate, and WALB, the NBC affiliate, are both owned by Raycom Media, although WFXL was pending purchase by Barrington Broadcasting when the towers came down. The effect on the status of the deal was not available at press time, nor was Raycom's recovery plan.

"We don't know the extent of the damage," Owens said. "The antennas were taken out. It didn't damage the transmitter building, but when RF line came down, it jerked the transmitter.

"We have no idea how long it will take, and we don't know whether or not one or two towers will be necessary."

In the meantime, both stations' analog signals are being generated from a temporary transmitter at WALB. The stations' digital transmission facilities are not co-located and remain online. Owens said WFXL was fibered to the main cable headends in the area, while 14 of the 35 outlying cable systems were able to pick up the low-power signal. DBS operations pick up the digital signal. All told, Owens estimated that about 80 percent of the WFXL audience was still getting the feed.

Officials were uncertain of the cause of the collision, and whether or not the Chinook helicopter was in trouble before it clipped the wires. The aircraft was reported to be en route from Hunter Army Airfield in Savannah to Fort Rucker, Ala., the home of an Army helicopter training school. A fifth crew member survived the crash. All five were members of the Army 160th Special Operations Aviation Regiment.

Towers

OpenTV and TWC Team Up

SAN FRANCISCO

OpenTV Corp. has signed a multiyear license agreement with Time Warner Cable to deploy the cable operator's digital navigator on the OpenTV platform.

Jim Chiddix, CEO, OpenTV

The company said the digital navigator will enhance existing program guides, facilitate cross-platform integrated services and get to market new product introductions on Time Warner Cable's Motorola set-top boxes. Financial terms of the deal were not disclosed; The Wall Street Journal reported it to be worth approximately $16 million.

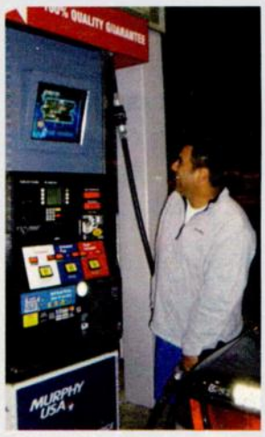
OpenTV said its software is integrated into more than 67 million set-top boxes around the world. This licensing agreement represents the first U.S. cable deployment of OpenTV's application, according to the company. The TWC launch is expected in late 2006.

"This deal marks a historic milestone for OpenTV and the culmination of many years of work," said Jim Chiddix, CEO of OpenTV, and formerly an executive at a Time Warner company. "Gaining a strong foothold in the U.S. cable market has long been a goal of OpenTV, and with an anchor customer like Time Warner Cable we now have a firm foundation from which to continue extending and enhancing our solutions and services as digital television moves ahead in the market."

IPG

High Test TV

DETROIT



The Gas Station TV network has tapped Delphi Display Systems to provide 20-inch HD LCD monitors to put on gas pumps.

The monitors will provide stereo sound along with full-motion HD video. The intention is to provide gasoline filling station customers with a home-like television experience while they're fueling their vehicles.

GSTV is an IP-based digital television network and will be providing ABC program content, as well as local news, AccuWeather forecasts and traffic information from ABC-owned television stations. GSTV is currently in operation at Murphy filing stations in Dallas.

By September, deployment of more than 100 additional outlets in Dallas, Houston and Atlanta is expected. The network plans to have installations at 400 stations in the top 10 U.S. markets by Jan. 1, 2007.

Distribution

President Signs Smut Bill

WASHINGTON

President Bush signed into law a bill raising fines for broadcast indecency on June 15.

"This legislation will make television and radio more family friendly by allowing the FCC to impose stiffer fines on broadcasters who air obscene or indecent programming," Bush said in a statement.

The Broadcast Decency Enforcement Act passed the House 379-25 following Senate approval. The legislation raises penalty for broadcast indecency from $32,500 to $325,000 for each individual violation, with a cap for $3 million.

The House originally passed a more stringent bill last year that raised fines to $500,000 and had a three-strikes license revocation provision. That bill, and a Senate version, remained lodged in the Senate Commerce Committee until last month, when Senate Majority Leader Bill Frist (R-Tenn.) brought the current bill to a floor vote by unanimous consent.

FCC Chairman Martin, who in March delivered the largest package of indecency fines in the history of the FCC, welcomed the legislation.

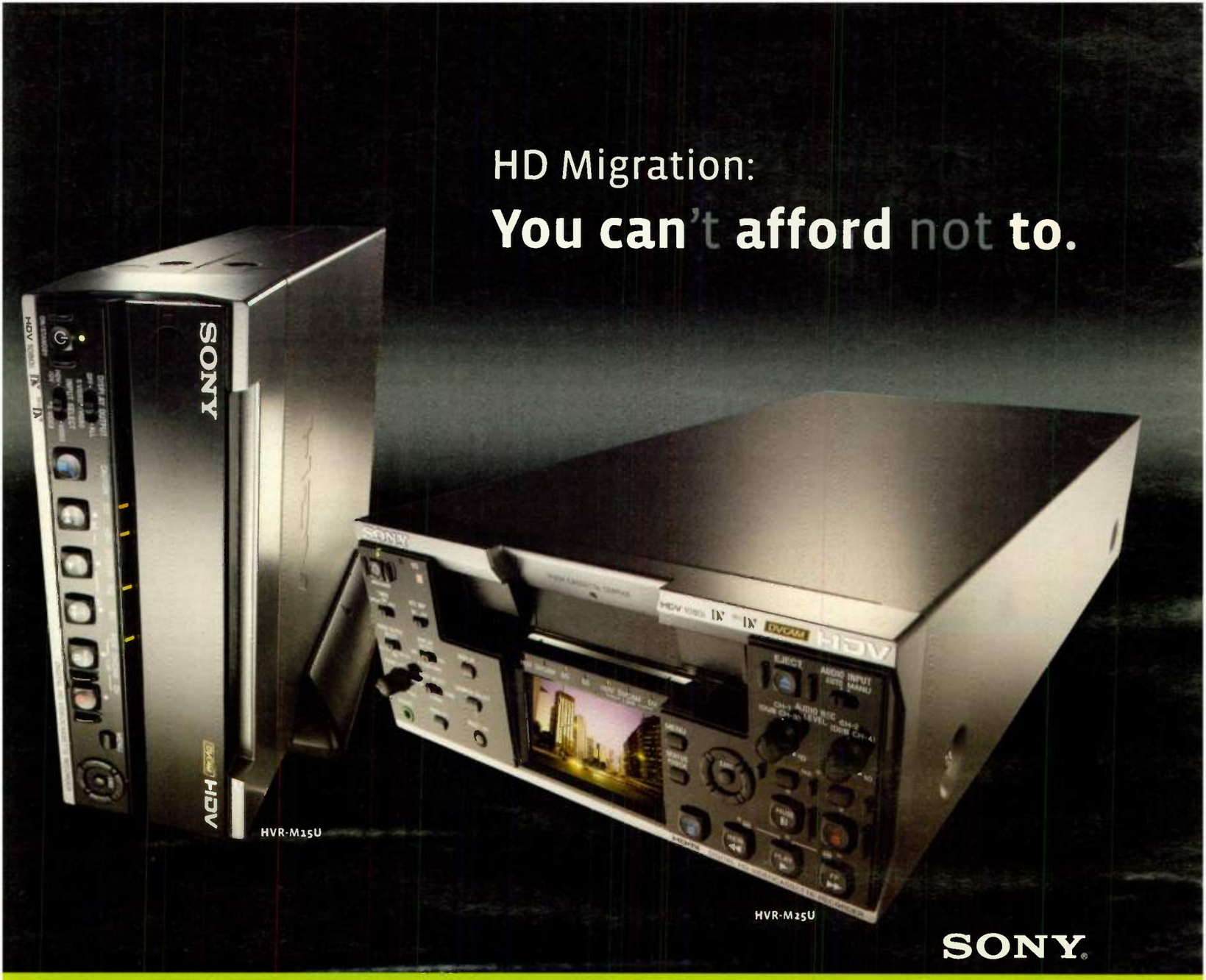
"The Broadcast Decency Enforcement Act gives the Commission more tools to enable parents to watch television and listen to radio as a family. In addition, I believe that concerns regarding content should be addressed in a comprehensive fashion by empowering parents to choose the programming that comes into their homes," Martin said in a statement.

A $550,000 fine against CBS for the 2004 Super Bowl breast cameo was included in the March order. More recently, the FCC denied a request by CBS to reconsider it.

Bear Stearns analysts said the Brownback bill was the lesser of two evils.

"Considering the intent of the original bill was a) increased fines, b) potential license revocation, c) a one-year delay of FCC's June 2, 2003 rules and d) expansion of indecency into cable networks, the outcome is not bad," a Bear Stearns research note stated. "The impact on the creative process, which will no doubt be altered by an increased fine regime, is unknown at this time. Expect a court challenge soon."

Federal Frequency



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THE NEW WAY OF BUSINESS℠

Efficiency Drives Wireless Camera Advances

Vendors cite greater bandwidth, better compression, BAS transition

by Claudia Kienzle

HAMILTON, N.J.

While the technology is relatively new, the market for wireless SD and HD camera systems appears to be poised for growth. One of the key drivers propelling interest in wireless SD/HD camera systems is the 2 GHz BAS (broadcast auxiliary services) transition, which involves a new channel plan that reduces 17 MHz channels to 12 MHz.

To use this narrower spectrum more efficiently, broadcasters need to migrate from analog to digital ENG/microwave gear.

Sprint Nextel, which will be benefiting from freed up channel space in the 2 GHz band, is offering "The Nextel Relocation Program," under which it has agreed to subsidize the capital expense of the digital ENG/microwave equipment broadcasters will now need. Manufacturers believe that sales of SD wireless camera systems could benefit from this transition, and pave the way for sales of HD wireless camera systems.

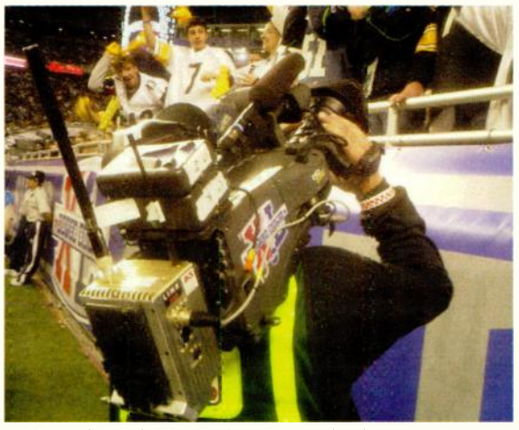
MARKET FORCES AT PLAY

"The pending BAS transition is creating unprecedented opportunities to acquire this technology. But it's only one of the factors propelling demand for wireless camera systems," said Michael Payne, vice president of marketing and business development for Microwave Radio Communications in Billerica, Mass.

"The new DTV environment has created an impetus for achieving greater bandwidth efficiency without compromising picture quality," Payne said. "In the same way that HD-ENG has been shifting from a luxury towards mainstream acceptance in just one year, we should see similar traction for digital wireless camera systems."

Another factor promoting interest in HD wireless camera systems is the advancement of the technology itself. Manufactured by U.K.-based Link Research, a pioneer in wireless camera systems, MRC's new Link HD digital HD wireless camera system offers very high picture quality that's MPEG encoded from 20 to 50 Mbps with a delay of only 40 to 50 milliseconds, or just under one frame. Currently, it can be configured for either SD or multistandard HD operation but Payne said by the end of this year, the product will be SD/HD switchable. MRC is the U.S. distributor for Link Research.

Since Link Research owns its own encoding technology, the company is in an enviable position in the development and manufacturing of digital wireless camera systems, or "camera radios."



ABC used a LinkHD Wireless Cameraback transmitter at Superbowl XL.

"Link Research has gone from a zero market share to becoming the market leader in just five years. This is because we're a software company that specializes in encoding, a key component within digital RF cameras, especially HD wireless camera systems," said Newlin Warden, director of marketing for Link Research, based in the U.S. office in Los Angeles.

"With wireless HD, the challenge is that broadcasters need to transmit their signals in channels that are shrinking from 17 MHz down to 12 MHz at the same time that they want to send enormous amounts of data," Warden said.

In developing its encoders, Link staked out the wireless 'contribution' space and this technology is now coming into great demand, he said.

Besides minimizing delay to less than a frame, the Link HD wireless system also supports remote camera control so telemetry data can be sent from the truck or studio enabling video operators to "paint" the cameras remotely.

WIRELESS TELEMETRY

"While camera operators can compose and focus the picture, they can't make adjustments to the colors and other picture attributes," Warden said. "The ability to send this telemetry via a wireless transmission to the remote cameras ensures that broadcasters can maintain their high production standards."

At Nucomm, in Hackettstown, N.J., John B. Payne IV, director of engineering said that while wireless camera systems have been used primarily for sports and special event coverage, there is a trend taking shape that promises more widespread use of wireless cameras systems.

"The Nextel relocation program will soon put wireless camera systems into the hands of those doing ENG. What is exciting is that broadcasters that have been broadcasting entirely in analog will now be able to bypass SD and go straight to a digital wireless camera system capable of HD," he said.

As part of the 2 GHz BAS relocation effort, Nucomm is working with broadcasters who wish to move directly to HD wireless camera systems by offering the CamPac 2 in a HD configuration, or an SD configuration upgradable to HD.

At NAB2006, Nucomm demonstrated its new CamPac 2 HD/SD wireless camera system with its Newscaster DR digital COFDM diversity HD/SD receiver, transmitting a 34 Mbps HD signal at up to a quarter-mile distance. Compared to last year's NAB demonstration, which topped out at 9 Mbps, at this year's NAB, four times the data rate was realized because of advancements in encoding technology, including the use of a dual carrier COFDM

WIRELESS, PAGE 12

BAS Transition Fuels New Wireless Sales

After years of waiting for broadcasters to replace their analog microwave gear with next-generation technology, Broadcast Microwave Services is finally seeing some action.

The primary reason business stalled was that broadcasters were financially challenged by the DTV transition, and the prospect of swapping their analog microwave gear with new equipment, like wireless digital cameras, was a low priority.

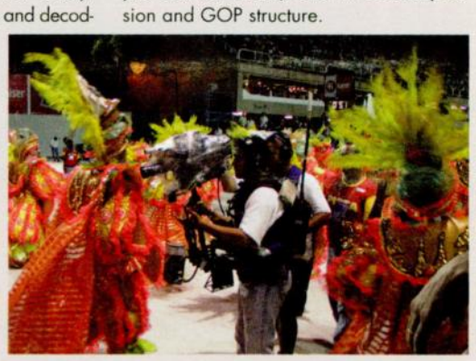
"This transition would probably still be dragging on were it not for the 2 GHz BAS relocation, and Sprint Nextel's need to clear the spectrum," said Rob Bauer, director of marketing and sales for BMS in Poway, Calif. "So, Nextel came in as a white knight and said they would fund this move and replace all the broadcasters' analog wireless microwave gear with digital gear."

While many stations may continue to feed analog signals into their new digital microwave gear until they have upgraded the rest of the supporting infrastructure, Bauer said that clearly there's some momentum now on the upgrade path to HD wireless systems.

Based on second generation digital COFDM technology, BMS' Coder product line includes the Carry-Coder II portable wireless transmitter, Carry DeCoder II, and the Truck-Coder II truck-mounted system and the Field-Coder II tripod-mounted portable transmitter for the 1.9-2.5 GHz or 2.33-2.7 GHz bands; and offers low delay, 4:2:0/4:2:2 MPEG-2 encoding and decoding, RF amplification, and COFDM modulation for non line-of-sight operation.

"The first units we will likely see go digital HD will be the airborne HD cameras that broadcasters use for weather, breaking news, and aerial beauty shots," said Bauer. The BMS Coder II product family includes the Heli-Coder II system, a digital airborne system mounted on an aerial vehicle for microwave downlinks with 10 W output for maximum distance.

Among the parameters that can be set up in advance are the channel, output parameters, modulation scheme (for example QAM or QPSK), and MPEG compression and GOP structure.



BMS Carry Coder II in use with a Steadicam on a backpack at Carnivale in Brazil

"Because TV crews are getting leaner, many broadcasters want to automate wherever possible. Our Truck-Coder II has up to 100 pre-sets that can be configured by the station's broadcast engineers prior to the crews taking the truck out. When they need to move from Location A to Location B, they can select the entire configuration for that site at the push of a button," said Tom Guidry, technical training manager.

BMS also recently added the TCII Media Router, which allows additional data to be transmitted as a background process during the live shot.

"The live shot gets priority, but the channel bandwidth is dynamically adjusted to allow secondary data, like a pre-edited B-roll package, to be sent using the spare bandwidth in the channel," Guidry said.

Claudia Kienzle

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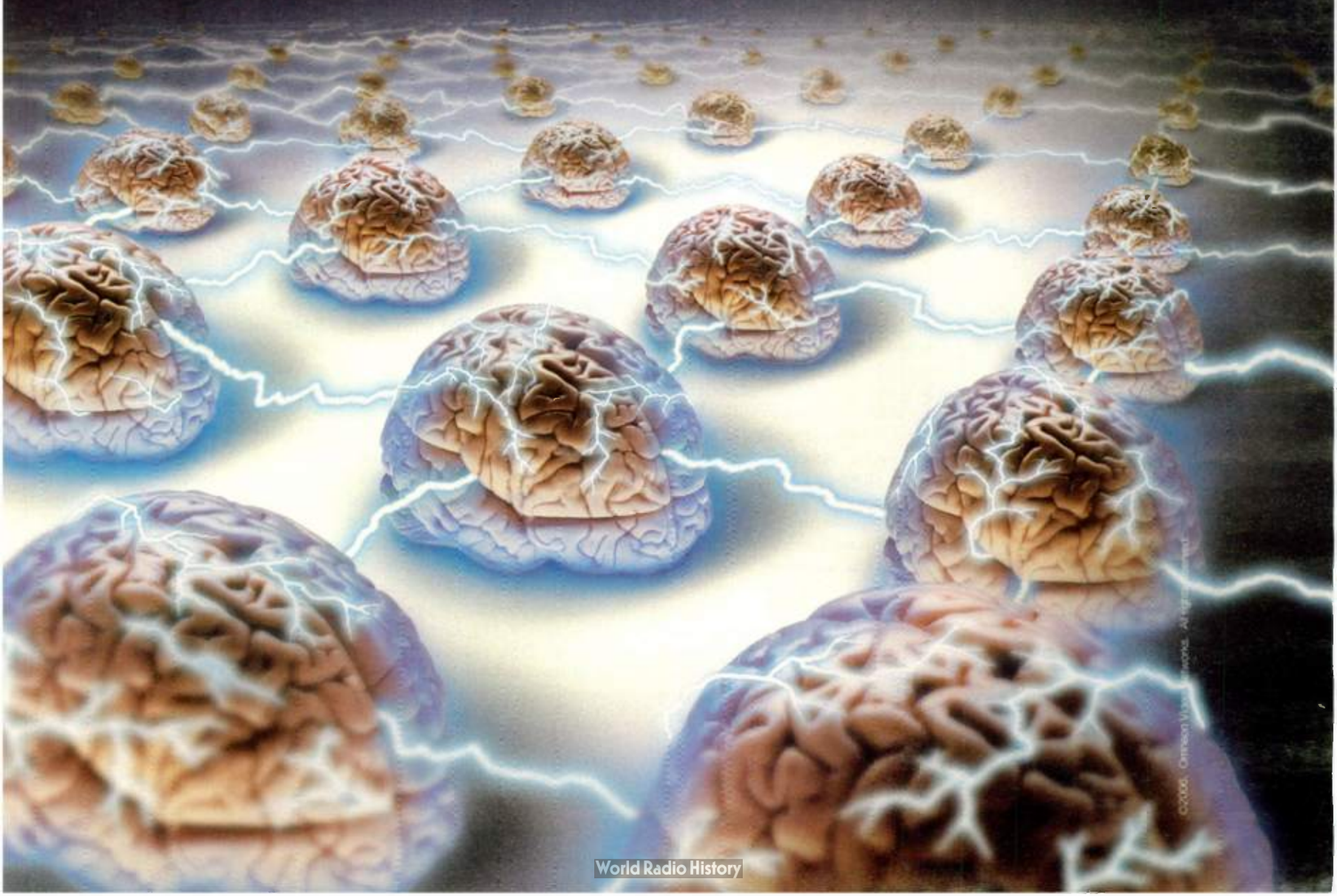

Broadcasters Catch Marathon Madness

Systems keep pace without breaking a sweat

by Claudia Kienzle

HAMILTON, N.J.

To capture the excitement of a special event, like The Academy Awards, or high-profile sporting events like the Super Bowl, NASCAR, or the Boston Marathon, broadcasters and production companies are finding that wireless camera systems offer unfettered access and mobility.

Since RF camera technology can be complex to deploy and operate, broadcast networks and their affiliates prefer to turn over the wireless camera aspects of their live broadcasts to companies that specialize in RF camera technology and production services—such as Broadcast Sports Technology, Total RF, and Aerial Video Systems.

One of the most challenging sporting events to cover using wireless cameras is a marathon because the duration of a race can exceed two hours and span more than 20 miles as it winds its way through an urban course.

THE '9/11' EFFECT

Total RF has extensive experience using wireless cameras to cover marathons, including the Boston Marathon in April, the New York City Marathon in November, and several Brazilian marathons televised by Brazil's TV Globo.

"It's not always advantageous to cover marathons using aerial shots from helicopters. Weather might be inclement, and after '9/11,' the public was uncomfortable with the prospect of having aircraft flying low over crowded stadiums and events," said Jim Malone, chief technology officer for RF Central, LLC, in Bensalem, Penn and manufacturer of "RF Extreme" wireless camera systems.

Prior to 9/11, Malone said a helicopter often flew over the race and relayed the analog signals from the wireless cameras below up to receive sites on nearby rooftops.

NO CHOPPERS

However, for the New York Marathon that was held shortly after 9/11, Malone said they eliminated the helicopter and had the wireless cameras transmit signals directly to receive sites on rooftops, eliminating the helicopter altogether. Cameras were positioned on vehicles at the head of the race which proceeded through the five boroughs of New York, ending in Central Park. The NYC Marathon was aired by NBC, as well as produced as a world pool feed.

In April 2006, Total RF was hired by Green Line and Live Nation events production companies to provide wireless cameras for the Boston Marathon which was televised by Boston stations WBZ-TV (CBS) and WCVB (ABC).

"For the Boston Marathon, we placed wireless receivers at various points along the 26-mile course, including the start and finish line, and the 5, 13, and 16 mile markers down-course," Malone said. "We also had five vehicles on the course, each of which had an SD camera and receiver on board to send the compressed MPEG-2 bitstream back to the production truck that was providing the SDTV pool feed for the major networks carrying the telecast."

Malone said the next challenge will be to cover a high-profile marathon using wireless HD camera systems, each transmitting a 20 Mbps compressed HD signal to the truck.

A Total RF motorcycle captures live close-up video at the 2005 Chicago Marathon.

"A five-camera race could mean a total data payload of 100 Mbps. We have links that can handle 50 Mbps now, and so productions will need to deploy two links, one from each collection point, back to the production truck, making it complicated," Malone said.

"For marathons in New York,

MARATHON, PAGE 21

Wireless

CONTINUED FROM PAGE 10

transmitter and diversity receive system that supports up to four channels, scalable up to 64. Multiple antennas and diversity receive technology compensate for multipath conditions for a much more robust HD signal and picture.

"We designed our new CamPac 2 to support multiband transmission. Users can quickly pull off the 2 GHz transmitter and replace it with a 7 GHz transmitter if it would be advantageous to open up a channel in that spectrum, especially during live broadcast of a special event," Payne said. In the near future, the software-based system will be able to be upgraded from MPEG-2 to H.264 AVC encoding via a software download, extending its service life.

RAPID ADVANCEMENTS

To underscore how rapidly wireless HD technology has been advancing, last year, RF Central was showing a prototype of its HD wireless camera system; whereas today, the company is offering a fully operating system.

"In the near future, we can expect additional standards changes, such as the adoption of MPEG-4 and H.264 AVC," said Jim Malone, chief technology officer for RF Central, LLC, in Bensalem, Penn. RF Central's sister company, Total RF, regularly provides HD wireless production services to the "Late Show with David Letterman" on CBS, and many programs on the NBC network.

"While buyers formerly planned for a 10-year service life for microwave transmission equipment, we're lucky to get two years now," Malone said. "Today's gear utilizes FPGAs [field programmable gate arrays], and these semiconductors give manufacturers flexibility to change the functionality by porting software into the radio without changing the hardware."

These circuits are changing very quickly, providing more processing power, running cooler in high temperatures, and drawing less battery power.

One interesting application for wireless HD and SD camera systems was demonstrated recently by Global Microwave Services in San Diego, Calif. The company mounted their "High Definition Messenger Transmitter" and an HD camera system onto a Flying-Cam UAV helicopter, then transmitted the HD video signal during the flight test to a multi-input diversity receive station located within the GMS facility.

STEADFAST STREAM

"The recorded video stream was steadfast during the entire flight," said Dennis Burman, senior marketing manager for GMS. "This opens up a lot of possibilities for the broadcast and motion picture industries because the pictures can be acquired and broadcast in real time without having to bring a plane or helicopter down continually to load and unload the camera."

The new GMS Configurable Messenger Link product line consists of the Configurable Messenger Transmitter, the Messenger Smart Receiver and the Messenger Antenna Array. The CMT transmitter can be configured for both SD-only and SD/HD operation through simple firmware uploads, with user-defined operating frequencies ranging from 1-7 GHz in selected bands. "The ongoing 2 GHz BAS relocation program is another application well-suited for GMS wireless broadcast systems," Burman said. "Sprint Nextel is offering to replace the broadcasters' analog FM gear with advanced SD/COFDM digital platforms, such as the CML, a transition necessary for the broadcaster to operate within the reduced bandwidth allocation of the new 2 GHz channel plan.

"However, the Nextel Relocation Program won't pay for broadcasters to move up to HD capability," Burman said. "Broadcasters would have to pay the price differential upfront if they wanted HD-enabled systems, or pay the price later through cumbersome HD hardware upgrades as necessary with other wireless systems."

But with the GMS CML system, Burman said they can start with an SD configuration now, and decide to upgrade to multiformat HD capability later without any required, imposing hardware upgrades. ■

ASTRO

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The SC-2055A supports HD-SDI Dual Link, HD-SDI, SD/D1-SDI, DVI, Analog (RGB/YPbPr/YcbCr) and composite video signals, depending on the modules the user has connected to the unit. For these interface options, the user is provided with 2 input slots and two output slots. With Astrodesign's I/P conversion technology, "SNaP" (Super Natural Motion Picture), jaggy diagonal lines usually resulting from interlaced video signals can be significantly improved without the omission of frames. The SC-2055A performs an exceptionally smooth conversion of the frame rates and resolution of the video signal as well as producing excellent scaling results. This unit also functions as a line doubler, converting interlaced signals into progressive signals. With its 3:2 and 2:2 pull down functions for film/CG imagery, the SC-2055 presents a very realistic feel / look to image conversion even when not in its original form, which is essential for large venue display systems. We have also included the amazing original animation search feature as well as image compensation. Additionally, it carries functions such as noise reduction and edge enhancement. This unit also supports outside reference synchronization through all the output modules.

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AVCHD

CONTINUED FROM PAGE 1

rather than each frame's compression being contained within the individual frame itself. (This has ramifications for editing, and generally means more rendering time.)

HDV is an MPEG-2 codec, while AVCHD is MPEG-4, Part 10, also known as H.264. (Sony's XDCAM format is MPEG-4, Part 2.)

Both can record at 1080i and 720p, though it is unlikely that all camcorders will be able to switch between the two.

Not to forget audio, AVCHD employs Dolby Digital or Linear PCM for an audio codec.

Nothing earth-shattering about the comparison between the two formats, so far. But then you get down to this line of the release: "The MPEG-4/H.264 codec is a promising technology which is over two times more efficient than MPEG-2 or MPEG-4 codec technologies."

While not singling out HDV in the release, the companies are saying that AVCHD is at least twice as efficient as HDV. At twice the efficiency, a simple math exercise would show that with its 18 Mbps encoding, AVCHD is 28 percent more efficient on the storage side, and that would still allow AVCHD to produce about a 70 percent increase in picture quality over HDV.

One key to the camcorder format is that it is designed for "red laser" 8cm DVDs, which are relatively cheap. The same size Blu-ray consumer data disks cost around $20 each. Both types of the new HD DVD players are expected to be able to playback AVCHD disks.

Sony and Panasonic also chose to use the MPEG-2 transport stream. Though it has nothing to do with the encoding, the MPEG-2 transport stream was chosen because modern digital TVs and set-top boxes already work with it.

PROS AND CONS-UMERS

Perusing Web postings about the new format, this writer found them generally impressed with AVCHD and predicting a quick demise of HDV. Among the comments were references to the fragility of DV-size tape as a recording media, and the problems with drop-out in an I-frame of the long-GOP encoding.

On the negative side, posters pointed out the one hour recording time of an HDV tape versus the approximately 20-minute recording time of the 8 cm red laser DVDs, and questioned the battery life of an AVCHD camcorder with its more computationally intensive encoding scheme.

Nonlinear editing vendors including Avid and Adobe are reported to be working to support AVCHD. To the extent they've developed technology to handle the long-GOP issues with HDV, that technology should be applicable to AVCHD's long-GOP as well.

At this writing, none of the other camcorder manufacturers **TV Technology** contacted have announced plans for an AVCHD camcorder, though the joint Sony and Panasonic announcement notes: "The two companies have started preparations for licensing to extensively promote the format throughout the industry."

One representative from Panasonic's professional division did weigh in his reservations over the use of AVCHD for professional video production.

"If you buy into our position that HDV is not at a level that a professional would want to shoot at, because of the amount of compression involved, then yes, I would say that this follows that same philosophy," said Phil Livingston, Panasonic's technical liaison.

Toward that end, Panasonic introduced an option for its new AJ-HPC2000 P2 HD camcorder to allow it to encode with the MPEG-4/H.264 codec, but at 50 Mbps. This places it on a par with the company's DVCPRO HD, encoding at 100 Mbps. (See accompanying story.) A Sony spokesman said the company currently has no plans to incorporate AVCHD technology into its professional video camcorder product line for broadcast and production.

So is AVCHD going to end up following DV's path to become a full-fledged professional video format? It's still early in the game.

"The reason this is all taking time to roll out is that for the H.264 compression standard, in relative terms, the ink is just getting dry," said Livingston. ■

Is Panasonic Deviating from DVCPRO?

SECAUCUS, NJ

At NAB2006, Panasonic announced the AJ-HPC2000, a multiformat 2/3-inch P2 HD camcorder with high-definition DVCPRO HD capability that is also backwards compatible with existing SD DVCPRO50, DVCPRO and DV-based products and systems.

Panasonic also said it will offer an optional plug-in professional H.264 compliant, "AVC-Intra" codec for the camcorder. This new AVC intraframe codec offers significantly better compression quality than older MPEG-2 codecs, providing DVCPRO HD 100 Mbps quality at half the bandwidth, or better quality at the same data rate.

Panasonic's AJ-HPC2000

However, the new codec is not backwards compatible with the DVCPRO HD codec. What would persuade Panasonic to leave the popular and profitable DVCPRO path?

According to Phil Livingston, Panasonic's technical liaison, if a new codec offered only a 10 or 20 percent improvement, "You'd say 'no thanks, I'm not interested. It's not enough gain in quality or enough savings in bitrate to derail the train.'

"But when you get to double, i.e. half the data rate or double the quality, now it's worth talking about bringing a new technology to market and suffering the difficulties of explaining why there are both."

Livingston doesn't expect the DVCPRO line to be gone any time soon.

"Understand... H.264 is just beginning to be supported by the nonlinear manufacturers—it's an emerging technology, where DVCPRO is well established and broadly supported. Everybody knows how to use it."

Craig Johnston

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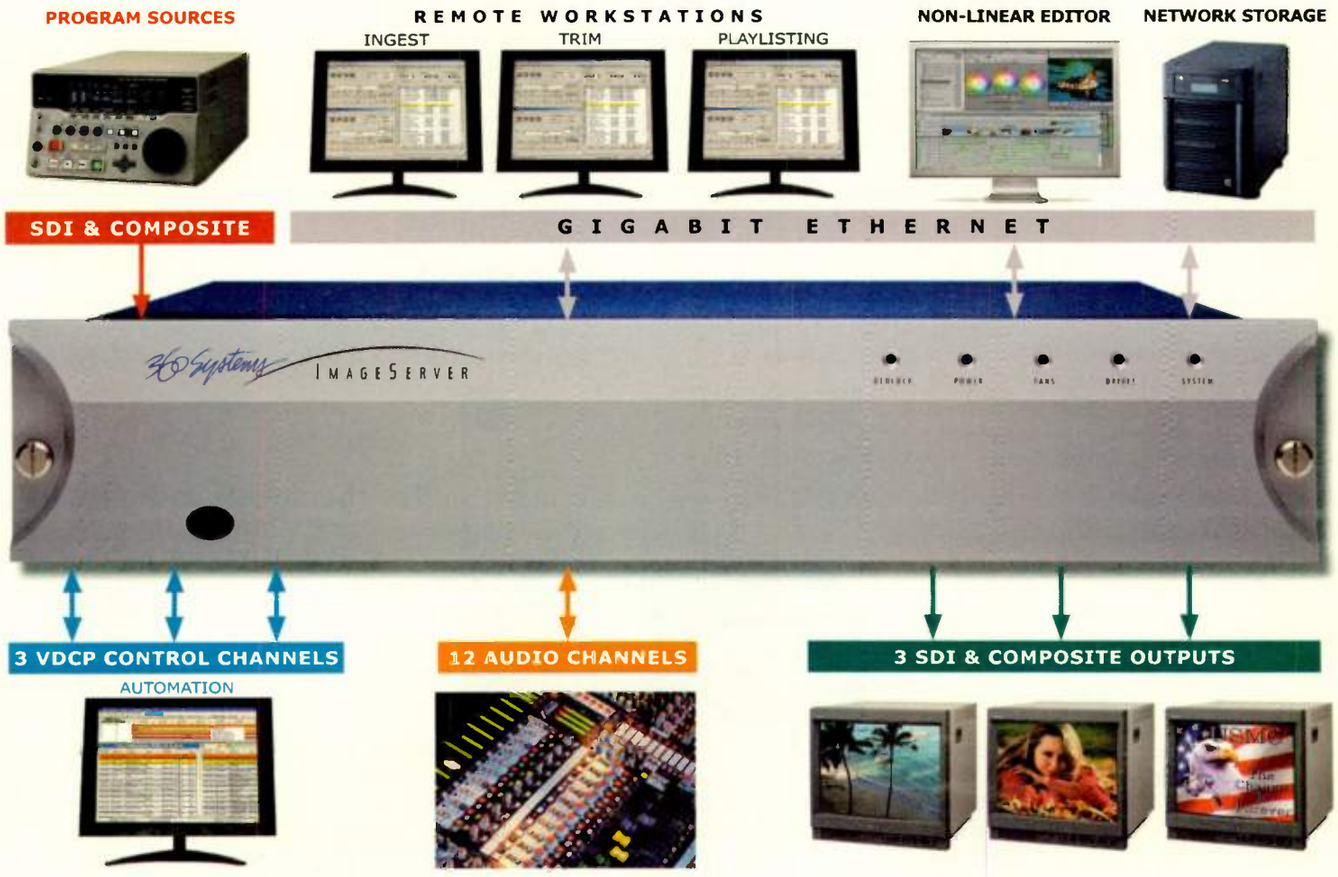

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C4-Sports Show Debuts in Vegas

Exhibits and sessions to focus on the future of sports business and production

by Melissa A. Sullivan

LAS VEGAS

C4-Sports, an event management and production company, is holding its first C4-Sports Electronic Media Show July 17-19 in Las Vegas.

The event—designed to bring together all aspects of the sports industry, including content production, distribution, archiving, business and technology—will be held in the South Upper Hall of the Las Vegas Convention Center, complete with exhibitors, attractions and an educational conference featuring seminars with industry experts. Mike "Coach K" Krzyzewski, head basketball coach at Duke University and Brian Bedol, president and CEO of CSTV will keynote the event.

Gene Sanders, general manager of C4-Sports, based in Hunt Valley, Md., said they looked at the mega tradeshows, like NAB and SuperComm, and decided to do an industry-specific show with technology for sports media.

"There are conferences out there that address sports from a talking head standpoint, but nothing out there that talks about sports and the industry of broadcast and next-generation delivery and also has demonstrations," Sanders said. "Our goal is to just be a resource for the sports industry to show them how the technology actually works, no matter what your budget—what solutions are available."

More than 1,000 sports professionals from college media centers and athletic departments to sports teams, and individual sports channels are expected to attend the show. One of the main draws includes an exhibitor floor where approximately 100 companies, including Avid, Sony and Harris will showcase their latest technologies, products and services for the sports broadcasting industry.

Rich Hajdu, vice president of graphics and post sales at Harris said the company will showcase three products—InfoCaster for digital signage; the Inscriber G series, a new live-to-air character generator, which debuted at NAB2006; and the Velocity HD nonlinear editing system.

Hajdu said Harris products have a presence in the major sports markets in Canada, as well as at schools in the United States. He said the show is an opportunity for Harris to help the company understand the market a lot better.

"We think it's a good venue to showcase our products, which are very cost effective, and range from lower cost entry level all the way into very high-end professional broadcast solutions. [The event] covers professional broadcasters, but it also covers sports teams and colleges and universities; all the people who might be users of our particular type equipment that we may not get to see," Hajdu said.

WHAT TO EXPECT

In addition to the exhibits, there will also be Exhibit Hall attractions, including general session speakers, "Studio One," a "Digital Media Theater" and "Stadiums/Facilities" showcase.

John Abel, senior vice president of marketing, membership and business development at the USTelecom Association will moderate "Introduction to Content & Delivery Fundamentals," focusing on alternative delivery mechanisms for sports content.

Abel said the panel will discuss 'the opportunities for the distribution of content, regardless of what kind of content it is, by things like IPTV, and what happens to the content as you move from say, large HDTV displays, down to much smaller displays like an iPod or handheld device of some sort. And what are the processes that one has to go through to index the content for an interactive experience, which is what IPTV connotes in terms of what it will do."

"Studio One" will be set up as an actual sports studio, so attendees can see the different types of technology options available. Also on the show floor is the "Digital Media Theater," where experts from Avid will give 15 to 20 minute "Speed Tips" on how to use its editing technology.

A "Stadiums/Facilities" area will address the design of sports complexes and how to incorporate technology into the new designs.

"It is not just about building walls and concession stands," Sanders said. "It's about how are you taking the content into the luxury boxes? How are you making the experience an interactive one with the fans using high-end or advanced seating technology that might have electronics or interactive capabilities as well as the scoreboards, and how is that going to be something that's going to partner with the broadcaster?"

A CONFERENCE WITHIN

Running concurrently with the exhibit, the Sports Media and Technology Conference, also presented by C4-Sports and produced by Future Media Concepts, will be held July 18 and 19. Designed for professionals involved in the creation, management or delivery of sports media, the more than 25 technical sessions and panel discussions will feature 30 speakers from companies including Microsoft, Dolby and Avid.

Conference sessions will cover a range of subjects, including podcasting, HD post production and encoding for mobile devices. Doug Towey, creative director for CBS Sports, Micha Riss, founder of Flying Machine and Ken Adelson, senior vice president of production operations and planning for NBA Entertainment will keynote the conference.

Adelson will discuss the challenge of preserving content and producing simultaneously, focusing on his work at the NBA to archive content accumulated over the years on different formats and distribute that material on multi-worldwide platforms.

The NBA has a real multipurpose mission. Adelson said to accomplish this, they have to figure out a way to take "hundreds of thousands" of hours of videotape and use digital technology to preserve these key assets.

Adelson, a 25-year industry veteran, said in a lot of ways, there is an informal community within the sports industry; however "a show like this, by formally bringing these groups together, takes it to another level and it helps guide it in a positive direction for bringing the different people in the industry together."

For more information on registering for the C4-Sports Electronic Media Show, visit *www.c4-sports.com*. ■

"Our goal is to be a resource for the sports industry to show them how the technology actually works."

— Gene Sanders, C4

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In Demand Turns Stern Around Fast

Now only on VOD, shock jock has new tools, new freedom

by Sanjay Talwani

NEW YORK

On broadcast radio and cable TV, Howard Stern pushed the boundaries of taste and decency. Now on Sirius satellite radio and iN Demand subscription TV, Stern is blazing a new commercial path, betting that viewers will pay a monthly fee for uncensored one-hour versions of his five-hour circus and its mocking interviews with strippers, porn stars, and other unfortunates.

That video product is edited and mixed and available on iN Demand's cable video-on-demand service just 36 hours after the radio show ends. Thanks to an innovative workflow furnished by New York integrator Tekserve and software that allows material to be edited even as it flows onto servers, producers have the one-hour program essentially built by the time the radio show itself actually ends.

"The TV show is basically just the radio show on TV, no holds barred," said Keith Koby, senior director of post production andengineering for iN Demand. "We're only showing the good parts."

Because it's offered only on VOD and satellite radio, those good parts now include sections of the program that would have been bleeped or blurred on the old show, on E!.. And for good measure, the new in-house editing facility is an investment that's rapidly paying for itself, Koby said.

Stern's radio show begins at 6 a.m. in the Sirius studios in midtown Manhattan. There, in a complete Grass Valley-based audio and video plant, producers shoot the show as if it were shown live, with the director cutting to one of 11 Ikegami HD cameras or a Sony HDV camera that rolls around the studio area interviewing guests and capturing the antics of Stern's staff and sidekicks. The camera complement includes three isos: one always on Stern, a second on the guest and a third for Stern's studio sidekicks, such as Robin Quivers (The straight woman, if there is such a thing, in the Stern act) or Artie.

(L to R) Doug Goodstein, executive producer; Mike Gange, supervising producer; Scott Depace, director, relax in the master control room of The Howard Stern Show.

Two separate HD signals—the director's line cut and Stern's iso—get routed to Evertz cards that encode the video to HDCam compression at 170 Mbps and pass it out as an SDTi signal. The two video streams each go then to a dedicated Verizon TV-1 line originally designed for uncompressed standard-definition at 270 Mbps; iN Demand is planning to upgrade its Evertz cards to new ones with JPEG 2000 compression that will use the full 270 Mbps capacity of the TV-1 line.

The show snakes downtown about three miles to iN Demand's facility in the lower West Village. Meanwhile uptown, four Panasonic AJ 1700 HD decks record the line cut and three isocams as back up and for occasional use in the show, should editors decide they need a shot of Artie that didn't get into the director's line cut.

Downtown, Evertz decode cards turn the signals into HD/SDI and Black Magic video routers send them where needed.

PictureReady!, by London-based Gallery Software, takes the HD/SDI signals as they hit the G5s and records them at DVCPro HD Panasonic compression into three separate files each: audio, video, and a QuickTime reference file that sits on top of the others.

"It points to those two files," Koby said. "So you can import that QuickTime reference movie into FinalCut and start editing while the video and a files continue to grow underneath. ... And the way that Apple has it set up, DVCPro HD is pretty fast."

THE GOOD STUFF

An editor comes in at about 7:30 or 8:30 a.m., when the show has already been on for a few hours. The editor scrubs through the QuickTime file for good material up to what was live just five seconds earlier.

"He's watching as it's written to the disk, basically," Koby said.

When good material comes along—a series of zingers by Stern, for example—the editor can drop it into the FinalCut timeline and can then add graphics or effects, B-roll, other footage, or the iso-shots of Stern or the others. Meanwhile, fresh material becomes available and the editor repeats the process; the main body of the television show is largely edited by the time the radio show is over.

The files are recorded on Apple's Xsan Fibre Channel storage system, and multiple editors can access the QuickTime movie for other purposes, such as promos for the various cable companies and other clips.

The tapes of the behind-the-scenes HDV footage and the second and third iso come downtown by low-tech bicycle messenger and are captured with CineForm's Connect HD and loaded up as DVCPRO HD, matching the other codecs.

For audio, the Sirius sound is converted from its 44.1 KHz sample rate to 48 KHz for television. Because the audio is already mixed by Sirius, it doesn't need a lot of work.

At about 3 p.m., an executive producer arrives to review the product. The program, HD up to that point, is then encoded for VOD in standard definition, as cable now has very little HD on VOD. That HD material will come in handy eventually, and any future transition to HD should be painless, Koby predicts.

The show runs about 50 minutes or an hour, compared with just 22 minutes on its former home at E!. Now longer and more hardcore, the program includes even more of the backroom footage and "staff antics," Koby said—without the censorship of language and female breasts that were the E! program's defining features. Because it's on VOD, the new program doesn't even have to conform to an exact length.

PITCHERS AND CATCHERS

The program goes over a private WAN connection to the Comcast Media Center in Denver, where it then goes by satellite to cable operators around the country in what Koby calls a "pitcher-catcher" arrangement. The pitcher in Denver puts header information and metadata on the MPEG-2 program, or "tar ball," includes signals to catchers around the country to open their mitts.

The cable operators populate their VOD servers by various means, which can take 12 hours from the time they catch the tar ball, in part because the system has to construct listings for the user interface and communicate with the set-top box and electronic program guide; in some systems, the listings are only updated every 12 hours, tightening the deadlines.

Koby got inspired to for the project, and bringing iN Demand's editing in-house, when he read a story on Apple's Web site about BBC's coverage of the Tour de France, using PictureReady! to record live feeds and edit clips with a fast turnaround.

He took the plan to Tekserve, a former Apple dealer that grew into a pro audio, video, and IT equipment dealer and post production integrator. Tekserve told him what he needed, got and installed the equipment, and now provides support including weekly checkups.

The facility went from idea to operation in less than a year. Stern began with Sirius Jan. 9, and the first next-day turnaround for VOD was March 15. ■

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Coping With Standards Conversion

Multiple challenges give rise to creative fixes

by Ken Freed

DENVER

Consumers today can see video on diverse devices from analog TV sets to plasma HDTV screens to computer screens to cellphones to iPods. For video producers, the goal is to create content that can be easily converted for each of these platforms. But the myriad formats create myriad challenges.

"A number of problems need to be resolved before we achieve the 'create once and play anywhere' model," said Brett Jenkins, vice president of engineering for Thales Broadcast and Multimedia in Southwick, Mass., recently acquired by Thomson Grass Valley. "Content creators usually produce for a particular format, such as HD in ATSC, so they don't want the aspect ratios changed, or they like the look of a particular frame rate, such as 30 frames per second. These are just some the barriers to creating content once that plays anywhere."

The chief technical barrier is generating video in sufficient quality in real time, said Jed Deame, vice president and general manager of the Teranex Division in Silicon Optix in Orlando Fla.

"Software encoders on platforms like the Macintosh and PC can do the best encoding because they encode the video in at least two passes, but they cannot handle the compression in real time like the hardware encoders," he said.

Michel Proulx, chief technical officer at Miranda Technologies

The challenge at low bit-rates is avoiding noise, he said. If a film or video was shot in low light or turns out grainy, for instance, how does the codec know not to encode all those little specs of noise? Teranex has developed noise reduction systems for mastering film to tape, and these are useful for iPod and IPTV encoding, "but it's not a perfect solution."

"Since Apple first launched the video iPod last November, we're seeing a serious shift in the industry culture. The pace of change over the past six months has been truly staggering."

—Michael Proulx, Miranda Technologies

"A fundamental issue is frame rate judder," said Steve Sherlock, director of technology and marketing for Brick House Video in Hampshire, U.K.. "Jumpy multiple edges are common when converting from 50 Hz to 60 Hz, from PAL to NTSC, and these problems persists when converting to other platforms.

Motion compensation is a solution, he said.

"Snell and Wilcox has shown how you can get far fewer artifacts than with linear standards conversion, yet a lot of work still needs to be done to get the clean video that would maker all customers happy on every platform."

ASPECT RATIO

Another traditional standards conversion issue that affects cross-platform repurposing is aspect ratio conversion, Sherlock said. Part of the problem is deciding how much of the 16:9 image stays in the 4:3 frame.

"How can you convert an HDTV image intended for a 43-inch plasma screen to play cleanly on a tiny mobile phone screen?" he asked.

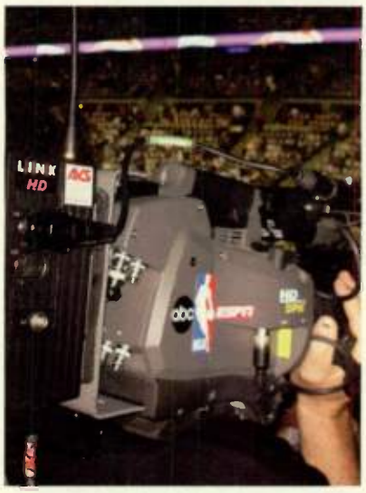
Michel Proulx, chief technical officer at Miranda Technologies in Montreal said, "you can't just downsize the logo

CONVERSION, PAGE 22

Marathon

CONTINUED FROM PAGE 12

Chicago, and Boston, we've appealed to the FCC to get additional channel space just for the weekend of the event, and we used equipment that's agile enough to make use of that additional channel space. This type of negotiation will be especially critical for HD telecasts."



A wireless camera from AVS outfitted with a Link digital wireless system

For the Los Angeles Marathon in March, AVS in Burbank brought in analog wireless camera gear for KNBC-TV (NBC affiliate) in Los Angeles. However, Randy Hermes, president of AVS said that next year, they will use Link digital wireless systems. They went with analog wireless gear this year because there wasn't enough digital equipment at the time to cover the entire race, while they did have a tried and true analog wireless camera solution.

"We used a Link digital system for a roving camera at the finish line. We chose Link because it offers a delay of only 40 milliseconds as well as camera control capability—both factors that are critical to wireless camera production," Hermes said. AVS used transmitters from MRC, BMS, Nucomm, and others on several motorcycle cameras and those signals were sent to helicopters which relayed them to a central receive site on a rooftop. From there it went via fiber optic cable to the TV truck.

AVS provided wireless HD camera production services to ABC/ESPN for live NBA Eastern Conference basketball games in Detroit, Mich.; and to TNT for NBA Western Conference play-offs in Phoenix and Dallas. And on June 6, AVS provided wireless camera systems for the "MTV Movie Awards," live from Sony Pictures Studios, in Culver City, Calif.

RACING TO WIRELESS HD

Broadcast Sports Technology in Odenton, Md., provides RF camera technology and production services to Fox and NBC for their NASCAR telecasts. BST also provides RF cameras to CBS, The Golf Channel, and ESPN for their golf telecasts, among other applications.

"Right now, 60 percent of our business stems from car racing. For NASCAR, we use RF camera systems on cameras and helicopters, and for the in-car cameras," said Peter Larsson, general manager for BST. "RF cameras are especially critical in the pit areas where it is dangerous and impossible to drag heavy cabling through crowded pit areas."

BST currently uses analog RF systems, and Larsson said that the biggest challenge is that the signal is very robust and directional antennas must remain pointed in the right direction all through transmission. However, there are also challenges with digital RF cameras.

"If you're shooting a talking head who is speaking into a wired mic, that audio source won't match the audio and video signal going through the microwave," Larsson said. "So you have to put a delay in that audio to match the delay going through the camera, and also adjust the IFB accordingly."

BST, which owns over 700 RF components, is using transmitters from Link, Nucomm, and MRC in combination with its own proprietary receivers (which are not for sale). But Larsson said they are planning to switch to Link HD wireless camera systems next year.

"The broadcasters' contracts are running out at the end of this year, and so when the next contracts kick in, that's when everyone will be interested in going to HD. It boils down to money," Larsson said.

While BST is currently using the 2.0, 2.3, and 1.4 GHz bands, Larsson said that when they finally go HD, they may need to apply to the FCC for additional channel space in the 7 GHz band to accommodate HD signals. ■

Conversion

CONTINUED FROM PAGE 20

graphics as part of downconverting the video. You need to separately reduce and simplify the graphics, then overlay these fresh images over the shrunken video."

Copyright issues also pose a barrier, he said.

"Specialty channels like Home & Garden and the Food Network often don't own the content they distribute, so they need to negotiate the rights to repurpose the content for multiple platforms."

Deame agreed that the biggest barrier to cross-platform repurposing is not technical but legal. "The studios and content providers have lacked business models and agreements that allow it to happen. We are seeing more content on Apple's iTunes Web site, and that says they are starting to come around."

Said Proulx, "It's not a technical breakthrough so much as an industry breakthrough. Since Apple first launched the video iPod last November, we're seeing a serious shift in the industry culture. The pace of change over the past six months has been truly staggering."

USERS SELECT DISPLAY

Jenkins confirmed that the industry is adapting quickly. For example, Thomson Grass Valley has written an application called "EyePhone" that is being used today by some of its customers to test and validate mobile media delivery systems using DVB-H and H-264 technologies.

Brett Jenkins, vice president of engineering for Thales Broadcast and Multimedia

"We won't see one format or one standard rule the world," Jenkins said. "It's hard to get everyone to agree on the same standard, and the trend is toward flexibility that allows multiple formats on multiple platforms, so these multiple formats must coexist."

Deame said the best hope lay in improved compression technology that can deliver enough quality at a small enough bit-rate. He noted that iPod video bit-rates need to get down to 600 kbps or lower. Compression based on the MPEG-4 Part 10 video teleconferencing standards supports a variable bit-rate more than MPEG-2. "This let's you cram as much as you can into the data stream, so even 700 kbps looks close to DVD quality."

AVC codecs can get down to 100 to 200 kbps and still have acceptable video quality for iPods and the handheld mobile devices with small screens. "Compression technology is the key," Deame said.

Deame is hesitant to say when software encoders will match hardware encoders for real-time quality. "I'd like to think it would be 12 to 18 months, but don't hold me to it."

"I see the biggest hope is the use of file-based formats for content distribution," said Jenkins. Instead of real-time satellite or cable distribution on an MPEG-2 transport stream, "we're seeing non-real time files being downloaded by the end user from the closest possible server using IP distribution technology. Even iPods are using file-based delivery of MPEG-3 or MPEG-4 content. That's a big paradigm shift," he said.

Proulx identified another vital trend. "Streaming video over the same technology used for wireless telephony is not practical because there's not enough bandwidth. An alternative is digital RF transmission, such as COFDM. We're already seeing this in Japan, where new phones have both types of receivers, microwave and RF, so video does not need to compete for bandwidth with voice and messaging."

To achieve the optimum viewer experience, content creators need to produce the content that supports various platforms, according to John Delay, director of strategic management for the Broadcast Communications division of Harris Corp. in Melbourne, Fla. "But it's not practical or affordable to produce a different version for every platform," he said.

Delay said better transcoding needs to be combined with better form manipulation, so the transcoder knows whether to show a close up of the character's face or the glass of wine in his hand or to intercut between the two.

Wavelet compression might be the answer here, Delay speculated.

"You take multiple slices of the image within each domain, so recoverable data is planted in each slice, and then you tell the transcoder how to pick and choose among those elements when reconstructing each frame. MPEG-4 supports object frameworks, and that may be where the opportunities await us, but the industry is not yet far enough along that someone has solved these problems," he said.

"When the industry feels enough pain from having to produce content more than once for multiple platforms," Delay said, "that's when we will demand that someone solve these problems. We already have a lot of pieces of the puzzle on the table. We just have to figure out how to put the pieces together." ■

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Tower

CONTINUED FROM PAGE 1

cause of the fall," Danker said.

The three men worked for Deters Tower Service in Grimes, a suburb of Des Moines. They were on a job to replace light bulbs when the accident occurred. A fourth man operating a winch on the ground was uninjured.

Danker said the Sheriff's Department is conducting a noncriminal investigation of the incident in cooperation with the Iowa Occupational Health and Safety Administration. At press time, investigators were working to locate someone to climb the tower and collect information.

"We have people with expertise who process crime scenes dealing with motor vehicles, but with this, we have to find people with knowledge who know what should be done, what should not be done; what is right and what is not right," Danker said.

"We want someone who is going to be impartial to go up, be able to see if there's damage to the tower, and whether the equipment is still up there, and just take photographs of what they find," he said.

The Deters crew was into the second day of replacing flash tubes and transformers when the accident happened, according to Bill Hayes, chief engineer for Iowa Public Television, which owns the tower. (Hayes is a longtime contributor to **TV Technology** magazine.) Hayes estimated the men fell from between 1,100 to 1,200 feet.

The crew was making its second ascent of the day, according to Sheriff Danker: "They'd been up the tower earlier in the day, they'd come down for lunch, and they were on their way up the tower again when this occurred."

Danker said the winch operator recalled that the crew was "going up, the line went slack, and he looked up and noticed them falling."

REPLACING TUBES

Replacing strobe light tubes is a fairly routine operation, said Craig Snyder, former chairman of the board of the National Association of Tower Erectors and principal of Sioux Falls Tower and Communications in Sioux Falls, Iowa.

"There's nothing unusual on how you would rig a tower to replace strobe lights" he said. "Each company probably has a little bit different procedure to do a job like that, but in general, you rig the tower with a winch or a hoist and install cable and ropes to hoist the equipment and personnel up and down."

The rigging procedure begins with a couple of guys climbing the tower with a rope and a block and tackle. The block and tackle is attached to the top of the tower near the base of the antenna. A cable winch is anchored to the ground near the tower. The rope is first used to pull the cable up through the block and tackle, and later as "tagline" to keep the cable, or load line, from whipping into the tower. The load line is counterbalanced by a "headache ball" that usually has a hook for hauling loads up the tower. It's not unusual for the crew to ride up and down on the load line.

At the KHIN tower site, rescue workers told the Omaha World-Herald, "the victims were laying on the ground with rope all around them." Hayes said the crew was using Kevlar rope for the rigging. Cable is preferable for heavier loads, but it carries the risk of being damaged by electrical arcs if it contacts the tower when the power is at full throttle. Occupational Health and Safety Administration rules do not prohibit crews from riding synthetic rope load lines.

Hayes recounted that witnesses at the scene said the headache ball separated from the load line, which became entangled in nearby guy wires at mid-level. There was no apparent structural damage to the tower, and no problems with arcing, he said.

"In our best estimation, they were riding up on the hoist ball, and somehow the ball detached or something went wrong with the rope," he said.

A TIGHT KNIT COMMUNITY

The Iowa fatalities brings the total number of communications tower-related deaths this year to 15, more than twice last year's total, according to the Wireless Estimator, an online forum for the wireless industry.

Every tower accident reverberates through the tight-knit community of climbers, but Leo Deters was an industry veteran whose death was met with incredulity.

Deters was considered by those who knew him as a careful individual in a business where high-risk behavior is the norm. The tower repair industry is known for attracting alpha personalities with little regard for danger who do things like ride guy wires to the ground. Few other businesses yield nicknames like "Death Action."

"I know Leo Deters, and his reputation is outstanding with regard to quality and safety and being meticulous in everything he did, and I think any customer you talk to of his would agree," Snyder said. "He always kept a small organization, and more often than not, he was the man in charge on the job site."

"Inherently, it's a dangerous job because if you make a mistake, there aren't any small ones."

—Bill Hayes, IPTV

Snyder said Deters started on tall towers in the mid-'70s, and they remained the mainstay of his business.

"He was a founding member of NATE, and an advocate for tower safety," he said.

Snyder, himself a tower climber for 22 years, also knew Galles, who worked for Sioux Falls Tower before moving to Des Moines.

"Everyone here knew Jason," he said. "He was a sharp kid, and very good at his job."

Bill Carlson, who runs Tower Systems out of Watertown, S.D., climbed his first tower in 1958. He said he'd known Deters for years.

"He had a very good safety record. He had good equipment. I was totally shocked. I do not know what happened, and I don't expect to know it.

"He was a gentleman and a good man. Period."

IPTV owns or leases 18 towers, including a couple of 2,000-footers. Another 1,500-footer is going up near Mason City. Hayes said Deters had been on IPTV's towers 32 times in the last three years.

"I know he's been on every tower we have. He's probably been on every tower in Iowa and the surrounding states," he said. "These guys are tremendously safe. This is not a cowboy operation. These guys are good... inherently, it's a dangerous job because if you make a mistake, there aren't any small ones. Leo didn't take any unnecessary risks or do anything unsafe."

Mary Bryant, administrator for the Iowa Occupational Safety and Health Administration, said Deters Tower never had any serious violations, but it was cited for "other-than-serious-violations" in 1997. Such violations—like not having Material Safety Data Sheets for all harmful substances—are those unlikely to cause serious harm or death. A subsequent inspection in 1998 yielded no violations.

Bryant said IOSHA would not release any details about the tower fatalities for two or three months, when the investigation was expected to be completed. ■

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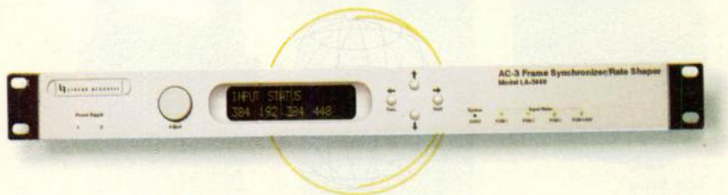

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Interactive TV Merits Red Button Gathering

Attendees at iTV confab examine U.K.'s success with technology

by Craig Johnston

SEATTLE

The oddly-named two-day Red Button '06 Conference opened in mid-May to a room of around 100 in a downtown Seattle hotel. Billed as "The Event Triggering Interactive Television for the New Generation," it could be just another false sighting of iTV on the horizon, or the beginnings of the next NAB.

The Red Button, as those steeped in iTV know, is the button on the remote that a viewer pushes to enter the interactive realm. And while iTV has been "coming soon" for many years in the U.S., it's been up and running in Europe for quite a while.

One of the keys to iTV's acceptance in the U.K., is the fact that two-thirds of U.K. homes have access to DTV, said Melanie Jappy, senior producer for iTV at BBC Learning & Interactive. "The amount of interactive TV is still relatively small, but it's growing."

So what's changing in American TV that might rock U.S. iTV off high-center and get it moving?

"The telcos are rolling out their video services, and they need new service offerings to differentiate them from their competitors cable and satellite," said Sheri Glusker, director of media services at Microsoft TV. "Especially with IPTV they'll have a two-way broadband network to enable iTV."

John Burshek, chief research officer at The MindClick Group, estimated that "by 2009, 69 million homes—roughly half of U.S. TV households, will have access to interactive services."

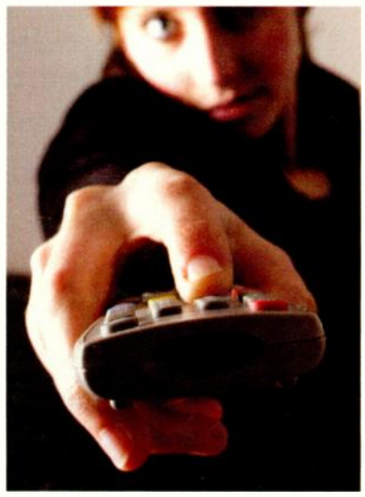
In her conference keynote, Glusker listed some iTV "low-hanging fruit," including the ability to personalize TV viewing and menus, video gaming and enhanced content.

BLACKBEARD CONNECTION

She played a brief sample from The Blackbeard Connection, a recent Dutch iTV game, played out over a month. It sent viewers on a treasure hunt that yielded the winner 50,000 euros.

Participants registered on a Web site that contained background material, stories, maps, diaries, photographs and movies. They could also watch short movies on the TV channel TMF, and received hints on their mobile, Web sites and advertisements in newspapers.

While the project just broke even for the producers, the event was such



a phenomenon that it's likely to be followed by more such programs.

The Blackbeard Connection seemed to click on five keys the BBC's Jappy gave for successful iTV programming: Having the audience share the experience of a big event; giving them a way to participate; allowing them to play, through games, puzzles or challenges; letting them explore more about themselves or the world; keeping them moving between multiple platforms

Burshek offered a couple of tips for those planning an iTV service. First, keep it simple.

"Ease of use is a key factor for determining trial and repeat of technologies," he said. "Ease-of-use needs to be upwards of 80 percent for widespread consumer adoption."

Second, he said, "technology problems, whether set-top box or lay-over programming, can severely limit participation. The technology must be seamless and flawless." ■

Microsoft Prepares iTV Kit

REDMOND, WA

Anticipating a widespread adoption of IPTV and demand for interactive programming, Microsoft plans to release its Content Developer's Kit in the next 12 months.

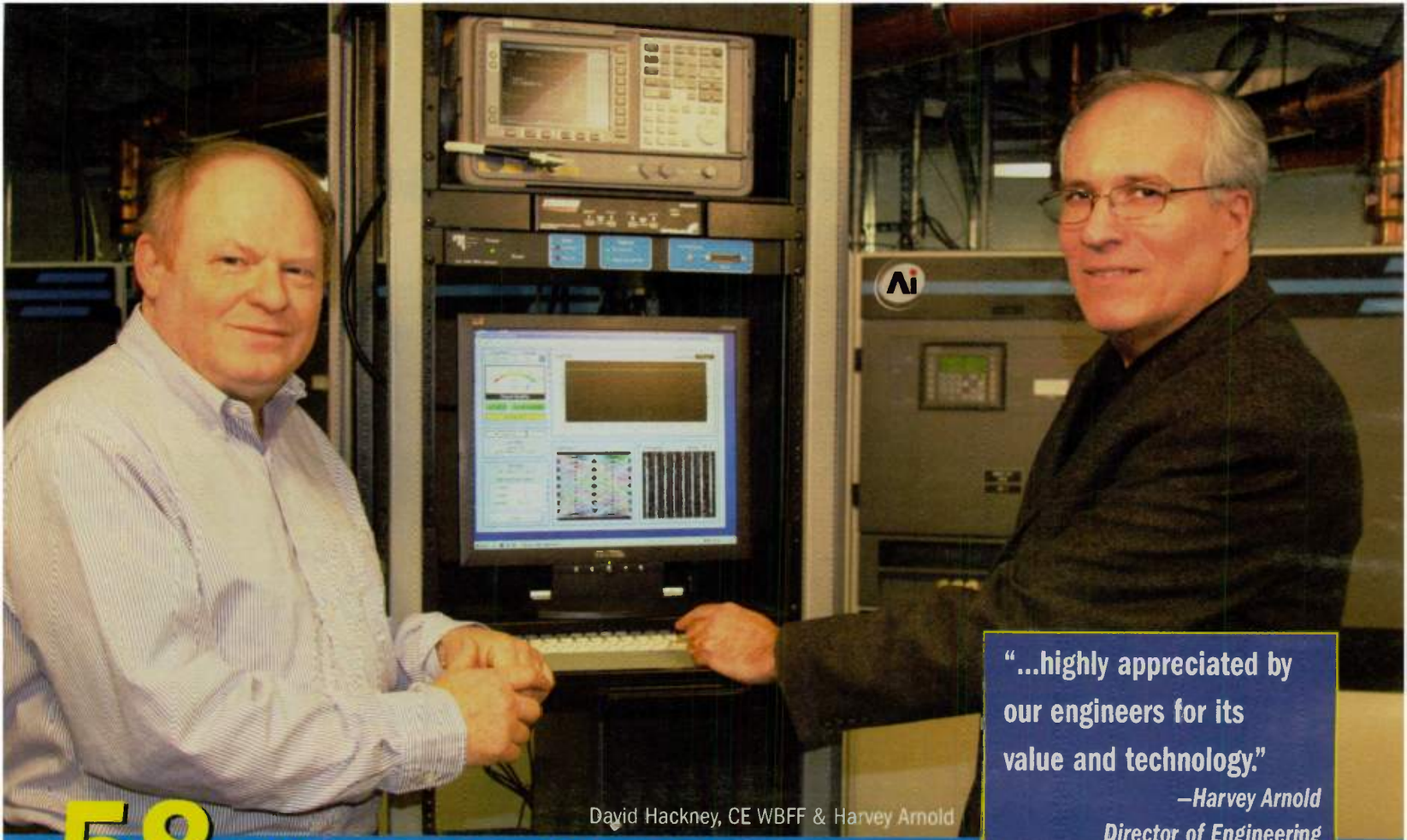
The CDK will be available via download and will be built on the company's Visual Studio 2005 Professional Edition platform. The CDK will include sample templates and a set-top box simulator to allow program developers to mimic the viewers' home experience.

Sheri Glusker, director of media services at Microsoft TV, said the iTV authoring software will require some familiarity with Microsoft's .NET technology, but as more people use the CDK there will be more templates. She also predicted there will be service bureaus, similar to boutique video production companies, to add interactivity to programs.

She pointed out a disadvantage potential producers of iTV face: relative to those in Europe or other parts of the world where iTV has been the norm for a number of years, U.S. producers have seen little or none of it and have no idea where to start.

"Content developers should pay attention to what's happening online," she said, noting the similarity in interaction on the Web and with iTV. "You might also have to make a trip to the U.K.," she said with a smile.

Craig Johnston



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The Evolving World of HD Lenses

New generation of cameras present new challenges

by John Sharaf

LOS ANGELES

When people first consider purchasing lenses to accompany their new high-definition cameras they are shocked at the price and wonder why it is so.

The fact is that professional HD cameras have imagers that require a much smaller "circle of confusion" for in-focus pictures. Therefore a superior quality lens is called for. With the newest generation of less expensive cameras coming along, the relative cost of the lenses versus the camera itself is greater than ever before, but the ultimate quality of these cameras depends more on the lenses than any other one factor.

VERSATILITY

The lens manufacturers are to be commended in their rapid deployment of superior products to accommodate the needs of the new high-definition cameras that have come to market. When compared to their standard definition equivalents the resolution and chromatic aberration characteristics are vastly superior.

This can be seen by a simple A-B comparison on a back-focus bull's-eye chart; the SD lenses exhibit noticeable color fringing whereas the HD lenses do not. As a result, I've taken to using my HD lenses on my SD cameras whenever I can, in an effort to produce the best possible picture. My sources at one lens manufacturer assure me that within a short time they will market only HD lenses, with ultimate quality and better prices, and this will benefit all video camera users.

In addition to traditional broadcast ENG and EFP type productions, HD lenses are also used for original photography for "film out" and exhibition on large cinema scenes. This is an application that really stresses the limits of the format. Imagine that the image that is originated on a 2/3-inch imager is ultimately blown up to a screen 40 feet tall.

If this is your application you must seriously consider the special cine-style zoom lenses and primes such as those made by Zeiss, known as "Digiprimes." There is no doubt that these lenses offer better resolution and contrast than conventional ENG lenses, but do cost a premium.

Recently Zeiss has added another zoom lens, the 17-112mm T1.9 to their line that also features the 6-24mm T1.9. These lenses match their primes in speed, sharpness and contrast; but will make the weak at heart faint at the cost. The presumption is that motion pictures have a larger budget than television production, so that these costs (either rental or purchase) can be amortized therein.

Canon, Fujinon and Thales Angenieux have also responded to the cinema communities' needs and have designed and built prime and zoom lenses that offer higher speed, longer focus turning range and more rugged construction than typical ENG lenses. Responding to input from film camera assistants, they have introduced larger, more readable markings that relate to witness marks at the cameras' "aperture," similar to those on film cameras to which they are familiar with. This makes their focusing more accurate and repeatable.

In addition, back-focus devices with internal illumination and targets help assistants quickly calibrate the lenses when changed so focus scales can be trusted in use.

Photo credit: Keith Sikora

Many operators will not be satisfied until they can use their conventional film lenses on HD cameras; this is primarily because of the shorter depth-of-field characteristics inherent in a larger imager (35 mm versus 2/3-inch). As a result, several of the traditional film camera suppliers, such as Panavision and Arriflex, have designed and implemented cameras with full-sized imagers that accommodate their own lenses.

RUGGED

The Panavision Genesis (in collaboration with Sony) and the Arriflex D20 are both gaining acceptance by feature filmmakers and others who make high-end commercials. Both Panavision and Arriflex have built custom lenses for these cameras and Hollywood DPs find great comfort in specifying focal lengths they are familiar with.

Because of the additional wear and tear on the cameras lens mounts, due to the increased interchanging of lenses (especially with primes) and the size and weight of many of these lenses and adapters, the camera manufacturers have strengthened and beefed-up their lens mounts when revising their camera designs.

This is true with both the latest model Panasonic Varicam H and the Sony F900R. In addition, many users make a point of using rod-supported matte boxes, rather than clip-on models to reduce the weight of the lens and accessories.

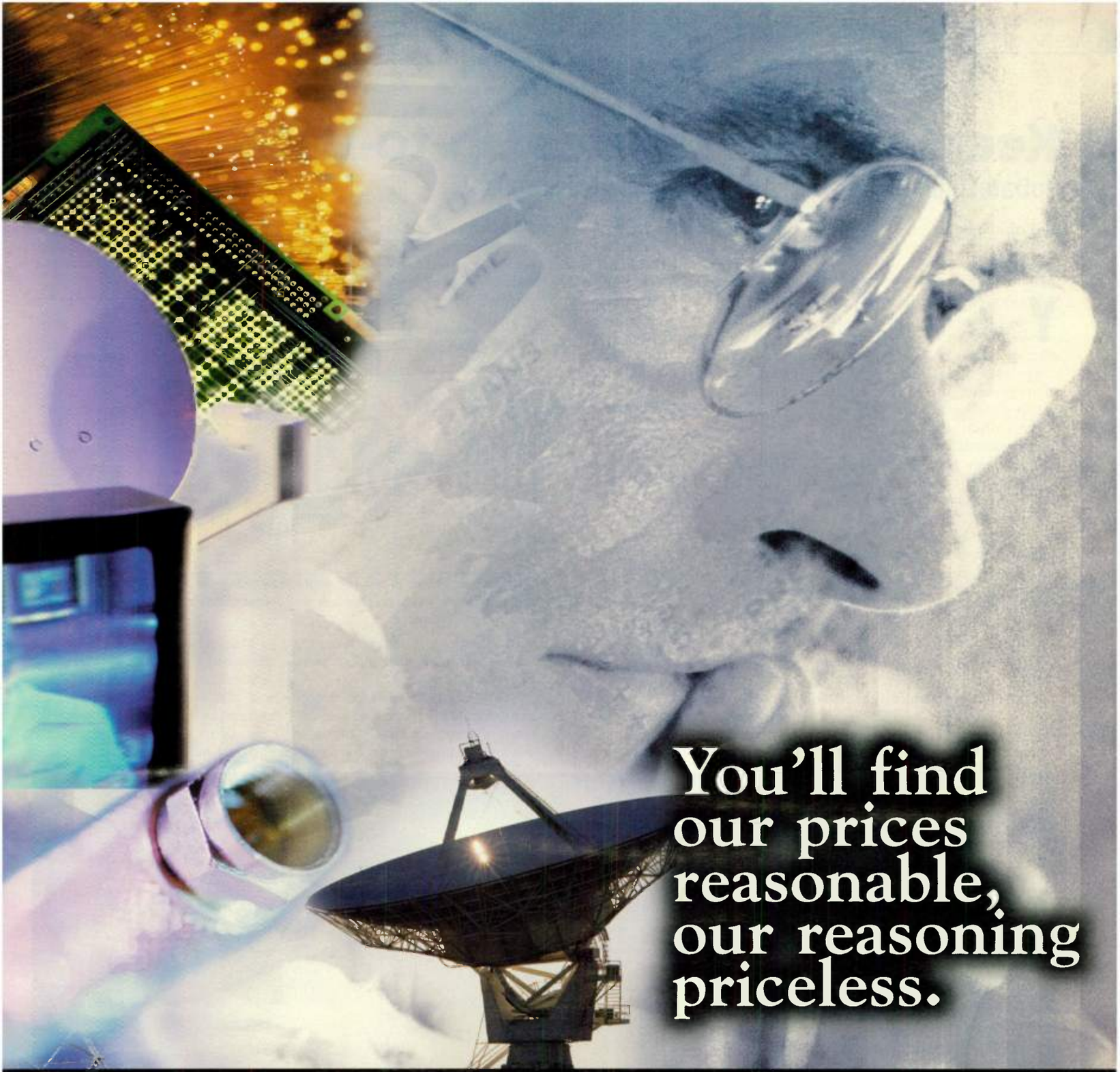
The rods also provide a method of mounting manual follow focus units which film camera assistants require; in addition the cine-style lenses often require focus, zoom and iris motors, especially when used on cranes, Hot heads or Steadicams, which can also be fixed to the rods.

Filtration is also a consideration with HD cameras; whereas many photographers used various diffusion and softening filters with their SD cameras, filter use with HD cameras is usually only half as strong, if at all.

This is because SD cameras were forced to use artificial sharpening, known as detail or contour because the image was inherently soft, whereas the HD cameras and recording formats are almost twice as sharp, both by virtue of the 1080 resolution or the 720 progressive formats.

Many photographers often favor a particular brand or even one particular lens because of its ability to reproduce color, its contrast characteristic, its ergonomics or even for some irrational or emotional reason. But the lenses' importance in realizing the photographers visualization can not be minimized, especially in this new high definition realm; and it's a safe bet that the lens that you buy to accompany your new HD camera may have a longer useful life than the camera itself. ■

John Sharaf is a cinematographer and lighting director in Los Angeles.



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Keeping Those Boxes Up-to-Date

UpDateLogic testing software to replace truck rolls

by Robin Berger

HOPKINTON, MASS.

Your typical TV set doesn't have an Internet connection to receive upgrades or fix bugs in a cost-effective manner. So unless you subscribe to a satellite service, any improvement or added feature requires, at best, a memory stick adjustment or an onsite technician. That scenario may change in 2007.

Hopkinton, Mass.-based UpdateLogic recently completed testing its automatic software update technology. The company intends to provide all of the necessary services and infrastructure required to test, package, schedule, and reliably deliver software patches and upgrades directly to digital television devices in the United States, and eventually all of North America.

This would let manufacturers "update their TV sets on a regular basis and fix any problems that may creep up," said CEO Tripp Blair.

"We're going to be able to add incremental functionality to these sets that are already deployed in the consumers' homes through servers," he said. "The end result will be a much cleaner user interface and more up-to-date set from a software perspective."

And, down the road, updated sets would likely support other consumer electronic components, like digital cameras and superior audio devices, he noted.

It would also present a new role for broadcasters.

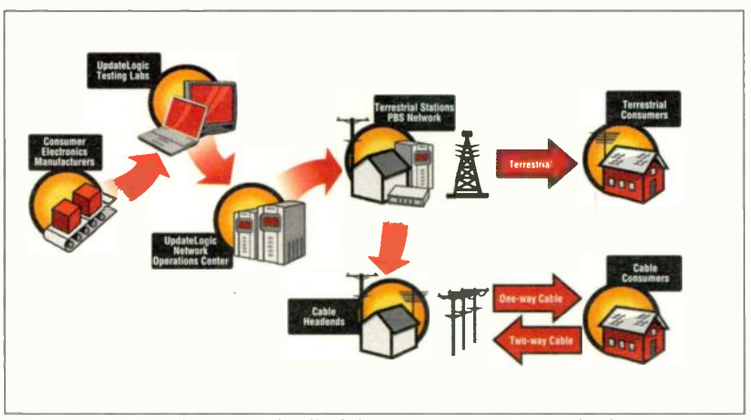
TRIALS

Field trials of UpdateTV—the core infrastructure behind UpdateLogic's software update delivery system—began on March 28, and were slated to last through June.

The trials took place at stations at PBS and at locations serviced by Comcast, Time Warner Cable, Cox Communications and Insight Communications. National Datacast, a PBS subsidiary specializing in wireless data broadcasting, provided the data carriage across its network to the digital televisions. UpdateTV simply rode existing PBS station signals in much the same way as customers like TVGuide and MovieBeam do.

Sony, Samsung, Hitachi and Sharp ported UpdateTV's tools and source code to one or more of their platforms via a software development kit to test the solution in Boston, Indianapolis, Denver and San Diego.

"They had to take that source code and integrate it into their set and validate the integration through the use of our tools and our network for distributing the software update," said Co-Founder and Operations Vice President Scott Pirdy. "I think the field trials have gone very well."



UpDateLogic intends to provide all of the necessary services and infrastructure required to test, package, schedule, and deliver software patches and upgrades directly to DTV devices.

Blair echoed the conclusion that the solution was validated for both terrestrial and cable reception.

"There were no errors detected that prevent us from moving forward," he said. Barring any contrary results in the final month of testing, the com-

pany expects to move on to certification. "We believe that most of these manufacturers will include our agent in some portion of their product line in 2007—those sets are being designed now," Blair said.

THE PROCESS

Formerly known as Broadcast Data Corp., the three-year old company announced its name change to UpdateLogic in March. Less than a week later, it received $4 million in venture capital to fund the official launch of the product, which is based on the ATSC A/97 standard for Software Download Data Service.

"Early on, we looked at a proprietary method for updating these devices," Pirdy said. "But shortly thereafter some of the CE manufacturers approached the ATSC organization and requested a standardized method. At that point, we migrated over to the adoption of [its] standard. Steve Hastings, one of the other founders here, was in that standards group."

In January 2004, the ATSC formally welcomed UpdateLogic to its T3/S13 subcommittee. The A/97 standard was approved that November, the same month UpdateLogic released UpdateTV 1.0.

"We were doing development and testing from the network side," while other contributors were developing technology from the receiver side, Pirdy said.

The company's data distribution network centrally manages firmware delivery to consumer electronics devices in standby mode. Blair estimated downloads at about five to 25 minutes, "depending upon the amount of software in a particular set."

UpdateLogic's data insertion servers receive packaged updates using a secure, encrypted channel over the Internet. The UpdateLogic servers format this data, insert it into terrestrial, cable, and satellite broadcast streams, monitor broadcast transmissions, and capture broadcast "receipts" for customer validation and auditing purposes.

The company demo-ed its latest iteration at CES 2006 and at NAB2006's DTV Hot Spot. It is expected to make an appearance at CableLabs' Summer Conference in Keystone, Colo., Aug. 6-9.

THE MARKET

UpdateLogic's first target market consists of DTV set manufacturers.

"There's not one that we haven't had lengthy conversations with at some point in the evaluation of the technology," Pirdy said, who noted that, in addition to the four active trial participants, both Mitsubishi and Panasonic showed interest, and were evaluating its software development kit.

Blair estimated the incremental cost at "the low single digit dollar range" per TV set—about 2.5 percent of the cost he associated with a memory stick alternative.

Dave Arland, a spokesman for former TV manufacturer Thomson, believes tight profit margins for consumer electronics would narrow this market further to makers of TV sets selling for $3,000 or more—and possibly set-top boxes with more advanced features. Thomson sold its TV manufacturing business in 2004.

Thomson and LG Zenith were selected by MSTV last October to build prototypes for the subsidized, low-cost DTV converter box mandated by Congress for eligible households in the wake of 2009's slated shutdown of analog signals. Prototypes will continue to be delivered through the summer. The National Telecommunications Information Administration will issue requests for comment towards the end of the summer.

Although the Request for Quotation addressed an upgrade mechanism (Section 5.1.2), it did not require one. Neither Thomson nor LG Zenith has included A/97 technology in the over-the-air broadcast set-top box. ■

THE MASKED ENGINEER | Mario Orazio

Next-Gen Monitoring: You Just Late And See

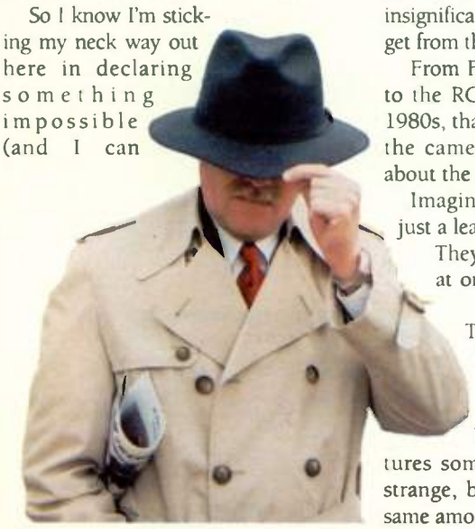
You might not have noticed that the first part of Sherlock Holmes's explanation to Dr. Watson gets ignored. Yes, this month's rant is on next-generation control room monitoring.

The great detective told his sidekick that when the impossible was eliminated, whatever remained, no matter how improbable, was it. Fair enough. But what happens when you can't eliminate the impossible?

Yes, I know, the history of TV technology is littered with supposedly impossible stuff that just turned out to be possible. Let's see. There was narrowband FM, which was impossible until Ampex used it in the first videotape recorder to get sold.

And methinks there was an NAB convention not too long ago (in a geological timescale sense) at which digital TV broadcasting was declared impossible on account of it requiring a channel at least 50 MHz wide.

So I know I'm sticking my neck way out here in declaring something impossible (and I can almost figure out a way around it if money is no object), but I've got the second law of thermodynamics burned into my last remaining neuron. I'll state it this way: Time doesn't go backwards. And I'd say that's a big problem for control room monitoring.



"But, Mario, there are thousands of control rooms today."

CRT BE GONE

Indeed there are. And, for the most part, they're using CRT-based monitors. That's the problem. No one wants to make them anymore.

You can go back before Philo Farnsworth to the first plans for CRT-based TV. There was a camera tube with an electron beam in it and a picture tube with an electron beam in it and synchronized deflection circuitry to make sure that the camera beam and the picture beam did everything at the exact same time, not counting the insignificant delay it took the signals to get from the camera to the display.

From Farnsworth in the late 1920s to the RCA CCD-1 sometime in the 1980s, that was TV. What happened at the camera happened on screen at about the same time.

Imaging chips screwed things up just a least-significant bit.

They took in the whole picture at once and then squirted it out a scanning line at a time. That led to the rubber-table-leg effect (pan a chip camera rapidly back and forth past a table leg, if you don't know what I mean). So pictures sometimes looked a wee mite strange, but at least they looked the same amount of strange to everyone.

Then came LCDs and plasma TVs and DLPs and who knows what else. So a handful of viewers got washed-out pictures and strange colors and motion artifacts and low-brightness contouring or error-dispersion dots and other stuff like that there.

That wasn't a problem. Folks using those displays knew what they were getting into. And then those new display technologies got better. That's when the big problems began.

Let me rave for a second about the role of the CRT in TV monitoring. The NTSC color primaries were based on the phosphors in an early RCA picture tube. It ain't around anymore, and neither is NTSC green (except in those pesky old FCC regulations).

When you get to come to the NAB show more years than some of the floor walkers have been alive, you start to notice some changes. Ampex used to have one of the largest exhibits; now they've got one of the smallest. There ain't any RCA exhibit anymore (just an RCA TV in the DTV Hot Spot). No Gates, no CEI, no Vital, and no Conrac.

HDTV color primaries come from ITU-R Rec. 709. Those are based on older stuff eventually traceable to something called SMPTE C. The "C" stood for Conrac, the standard for control room monitoring for ages.

Now, then, back when LCDs couldn't match the colors of CRTs, there wasn't any big problem. If you needed to use an LCD for some reason, well, you knew you were making compromises. But now some folks, like Cine-tal and eCinema Systems, are making LCDs that do come awfully close to CRT colors.

If you want to stick one of those in front of your favorite "colorist," be my guest. But don't put it in my control room.

There's more to monitoring than color. Viewing angles ain't there yet, but I figure they will be someday, so that ain't my "impossible" part. There are some interlace and motion artifacts, and there are folks working on fixing those, too.

SLEEPER CELLS

No, the part I've got a problem with is latency—not how long it takes a liquid-crystal cell to switch from black to white and back, but how long it takes before that white or black (or gray or more saturated color) first appears. This hit me at the NAB show.

I wandered into the control room of the big mobile unit parked in Sonyland. The main monitors were CRTs. The camera monitors were LCDs, methinks, with maybe some vertically oriented plasmas along the sides, with someone's display controller breaking those up into smaller pictures.

They were playing something into most of the monitors. On the CRTs, it was in perfect lip-sync. On the LCDs, it looked like audio was leading just a wee bit. On the plasmas, there was no doubt that the audio was advanced.

It makes sense. Aside from whatever the plasma displays do on their own, the display controller takes some time to scale and arrange the different signals.

De-interlacing takes time. Picture-size change? More time. Color look-up tables? Add some more. Yes, I believe that someday, someone is going to be able to make an LCD or plasma look just like a CRT, but I ain't convinced it's going to happen without some fixed amount of delay.

You can delay the audio to match and delay the video to monitors that are faster so they all match the slowest, but, then when the director yells "Take," is that going to be six frames late? Too bad time marches on. ■

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

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AUDIO BY DESIGN **Mary C. Gruszka**

What to Do About Microphone Pet Peeves

An Audio By Design reader named "Bro Duke," writes in about his microphone pet peeve, "their lack of internal filters. Specifically, to limit the popping of 'Ps.' On one occasion, I made a comment to our local Board Of Supes at city hall. Though my face was a full 12 inches away from the microphone, every time I uttered a 'P,' I could hear it pop loudly in the PA speakers."

What could be done to improve the situation here? Although the mic in question was not named, from the description, it seems to exhibit the proximity effect, where the lower frequencies are boosted more and more as the talker moves closer and closer to the mic. So those plosive sounds get over-emphasized.

We can assume from this information that this microphone has directional pickup characteristics, maybe cardioid or super-cardioid, since omnidirectional microphones aren't prone to the proximity effect.

So one solution could be changing the mic to an omni with similar sensitivity characteristics. But that may not be appropriate in this acoustic space. Municipal meeting rooms are often reverberant and noisy (noise from people attending the meetings and from such things as air handlers, for example). If that's the case here, then a directional mic could indeed be what is needed. But not all directional mics are constructed the same.

To obtain a directional polar pattern, sound needs to enter the space behind the diaphragm, in addition to impinging on the front, to create acoustic cancellations within the mic. The magnitude of the cancellations depends on the arrival angle of the sound source.

Typically, directional mics are made with a slot or a number of slots along the side of the mic. Mics with only one slot tend to have the greatest proximity effect. You may have to stand three feet from the mic before the low frequency response starts to flatten out and those "Ps" stop popping.

Our fearless reader Bro Duke also observed more "P" popping on the local news on a TV station in a major market: "Their news anchor has been popping Ps intermittently for about a year now."

SWITCH MICS

Perhaps the mic in question is of this construction. A solution would be to change it out for a mic with multiple slots along the side. These slots are usually tuned, with slots tuned to the higher frequency slots closer to the front (and the diaphragm), and the ones tuned to the lower frequency ones towards the rear. With this type of construction, proximity effect is reduced, and in some microphone designs, nearly eliminated, and you would be able to stand 12 inches or less from the mic without producing over-emphasized explosives.

Another way that mic manufacturers help out with the low frequency response is by providing a switchable bass roll-off filter in the mic. If the mic will be used at a distance where the proximity effect is evident, then switching in the filter to reduce the lower frequencies can often help. Some mics come with filters with a selection of cut-off frequencies.

We don't know if our mic in question has such a filter, but if it does, try switching it in. Also check if the mic

mixer used in this system has an equalizer, or even a simple low cut filter, in the channel to reduce the level of the low frequencies.

Our fearless reader Bro Duke also observed more "P" popping on the local news on a TV station in a major market: "Their news anchor has been popping Ps intermittently for about a year now."

Could it be they are using a directional lavalier? Does it have a bass rolloff filter and is it switched in? Or can it be equalized at the audio mixer? Can the lav be positioned differently, maybe a little farther away from the newscaster's mouth?

Also, in this case, an omni lav might be the better choice. Most local newscasts originate from a studio and hopefully this particular studio has fairly good acoustics and low noise. And chances are there isn't a studio audience, so sound reinforcement (and obtaining enough gain before feedback), shouldn't be an issue.

This brings up the importance of having a variety of mics at your disposal to use as the situation requires. In addition to the different characteristics discussed previously, mics come in all price ranges, with quality to match.

Microphones need to stand up to some rough handling, especially those intended for handheld use, for fieldwork or for sound reinforcement. In general dynamic microphones tend to be more rugged than condensers, can operate over a wider range of temperatures and humidity, and they don't have to be powered. That's why they are often used in ENG applications.

SHOCK ABSORPTION

But that's only part of the story. How the diaphragm element is mounted in the microphone housing and how the housing is constructed are a couple of factors that will determine how resistant the mic is to shock and vibration, handling and wind noise, and hum and buzz.

Better quality mics tend to incorporate such things as a shock mount for the diaphragm and the internal elements, a tough metal grill windscreen, a multilayered windscreen, a wind filter for side openings, a hum-bucking coil and a steel housing. In addition, accessories often include an external shock mount that screws onto a mic stand through which the microphone is placed, and an external wind screen.

Condenser mics have some advantages of their own. They typically have higher outputs due to their internal electronics, have a smoother and extended frequency response, and better transient response compared with dynamics. Look for a low-noise mic especially if you are trying to capture low level sounds, like for a nature program. But be aware that some condenser mics have been known to exhibit the pin-1 problem and also could not be used in high RF environments.

Modern lavalier mics tend to be condensers and the better ones are designed to minimize clothing, handling, and cable noise. Some are even resistant to perspiration, moisture, and salts.

In general, dynamic mics can respond to higher sound pressure levels without distorting compared with condensers, although there are some condensers designed specifically for high sound levels.

Condensers with their higher output levels can overload the mic input channel on a mixer. For that reason, condensers often are equipped with a switchable attenuator, with one or more attenuation settings.

It would be well worth the time to review microphone specifications and user guides, and to gain an understanding of the various characteristics of different mics and their applications. Try them out before you make your final decision and try to buy the best quality you can afford. And then have fun working and experimenting with them on your projects. ■

Mary C. Gruszka is a systems design engineer, project manager, consultant and writer based in the New York metro area. She can be reached via TV Technology.

SBE UPDATE | Barry Thomas

SBE Schedules Strategic Planning Session

The broadcasting industry has seen a huge number of changes during the last 20 years; many of those changes are based in technology and, therefore, affect broadcast engineers. Broadcast engineering specifically has had to both learn about and educate the industry as technology has vastly shifted the way we all do business.

The Society of Broadcast Engineers was formed to support and promote broadcast engineering and has helped build the careers of thousands of engineers working today. The Society has dedicated itself to offering tools and resources to promote broadcast engineers and provide the means to measure their skills.

SBE has also become a significant voice for technical issues to the FCC and the industry at large. The Society has built education and training programs to help engineers build their skills and teach the next generation of broadcast technical professionals. With the massive changes not only in technology but also to the industry landscape, SBE is positioned to represent and support broadcast engineers as no other organization can.

LISTENING LOCALLY

Looking forward, the Society must evaluate the way to continue its mission and reflect the massive changes we all face. One way SBE communicates to its membership is through our dedicated chapter liaison members who are assigned to local chapters.

Information gathered by these chapter liaisons is disbursed during the regular SBE board of directors or executive committee meetings. Decisions are made during those meetings to steer the organization, but they are a part of a huge workload which includes the operating business of the Society.

Sometimes the Society must step back and take a more fundamental approach to the question and meet specifically to discuss the future and plot its course. SBE occasionally schedules dedicated strategic planning meetings to do this. The last one, held three years ago, resulted in significant improvements in member communication and services. These meetings are critical in focusing the energy of the organization toward specific goals.

Looking forward, the Society must evaluate the way to continue its mission and reflect the massive changes we all face.

IMMEDIATE RESPONSE

The SBE executive committee has approved a plan to schedule a strategic planning meeting July 8 in Kansas City, Mo. The following day, the SBE executive committee will meet and can act immediately on information gleaned from the strategic planning. A trained facilitator will lead the session and will be instrumental in offering unbiased guidance for the discussions and help the attendees recognize and articulate the Society's needs and build consensus on the best ways to chart SBE's course.

SBE welcomes input and participation from the entire membership to get the greatest number and quality of perspectives. SBE has invited representatives of each chapter to attend and even encourages non-members to support these representatives with insights and recommendations to bring to the meeting. Some questions SBE expects to address will be:

- What are SBE's most important/least important functions?
- What services should the SBE provide? What services should the SBE discontinue?
- What role does/should SBE play in the broadcast industry?
- What can SBE do to increase the value of membership and certification?
- What is the skill set of the current broadcast engineer?
- What skills are needed but are lacking?
- What will the future broadcast engineer be like? What will the future broadcast engineer need to know?
- What can SBE do to increase awareness and interest in broadcast engineering?
- What can SBE do to attract more participation from members at the local and national levels?
- How can the SBE National Office better support and work with local chapters?

These questions are a sample of many expected for the meeting, but is by no means a comprehensive list. Before the meeting, the sstrategic planning committee, national board of directors and executive committee will refine the questions to the most important issues and use the strategic planning meeting to gain answers and even recommend action steps.

A portion of the executive committee meeting the following day will be dedicated to addressing the most obvious results of the strategic planning session and assigning committee activities to further the goals set forward in the meeting.

A complete, written report will be prepared by the facilitator and will be presented to the SBE board at the fall national meeting in Verona, N.Y. The full SBE board of directors will turn those results into actions!

The SBE national office is encouraging every local SBE chapter to dedicate a meeting or initiate a membership discussion regarding the industry's future and SBE's role in it. Any broadcast engineer is urged to attend and actively participate in the discussions.

The results of such a meeting should be questions, suggestions and recommendations that apply to the chapter as well as the national organization that can be brought to the summer strategic planning meeting. If a representative from the chapter cannot attend, SBE urges engineers to make those results and opinions known to its SBE local chapter liaison or any SBE Board member. Chapter liaison assignments can be found on the SBE Web site at *www.sbe.org/Brd_Chap_Liaisons.php*.

For more information on the strategic planning meeting, please visit the SBE Web site at *www.sbe.org*. ■

Barry Thomas, CPBE, CBNT, is SBE treasurer and strategic planning committee chair.

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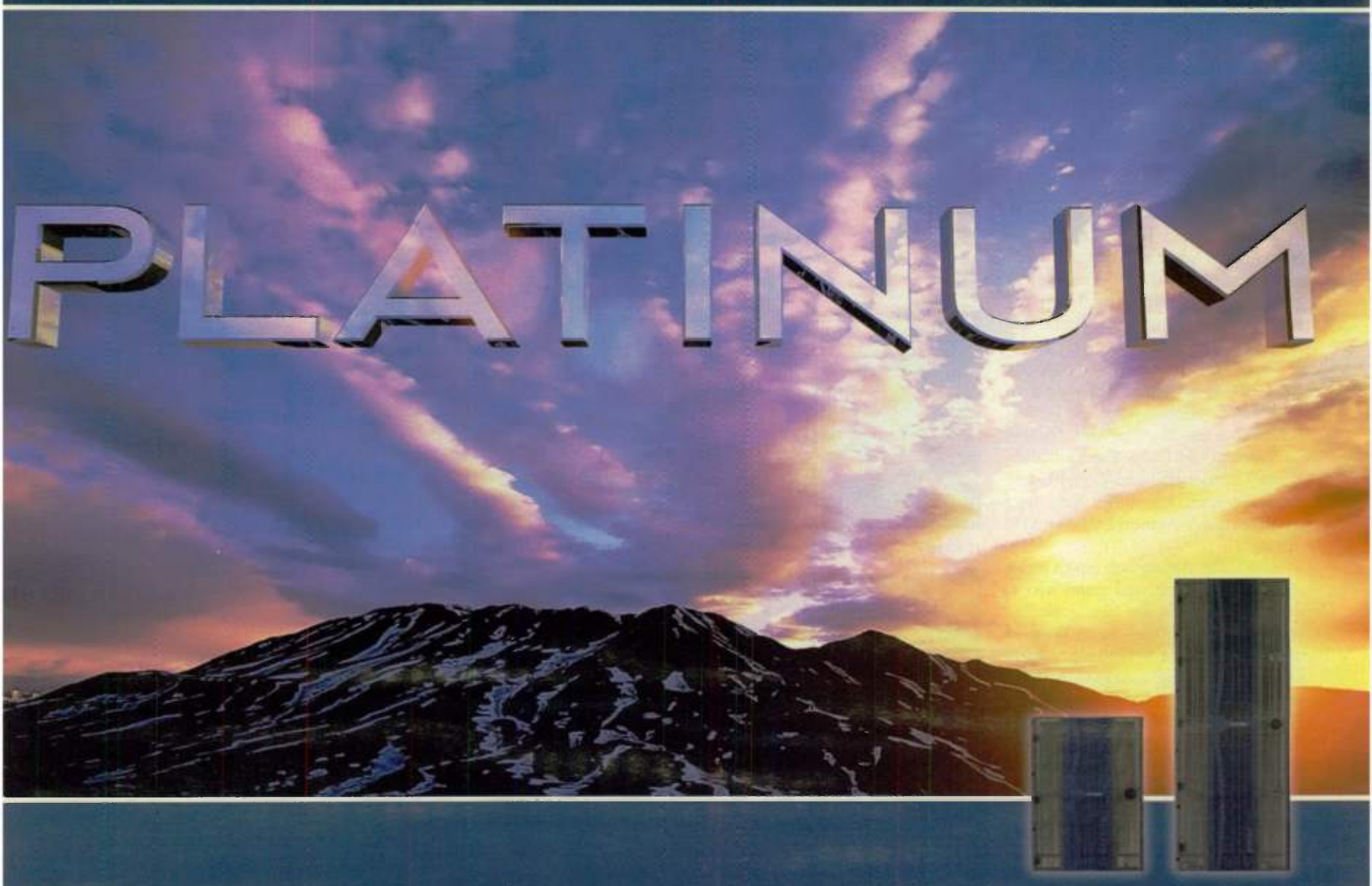

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THE BIG PICTURE — Frank Beacham

Remembering a Beloved Television Clown

It was in 1998 that I wrote in this column of the death of a childhood hero, Buffalo Bob Smith, the man who once signed on the NBC television network each day with the Howdy Doody Show.

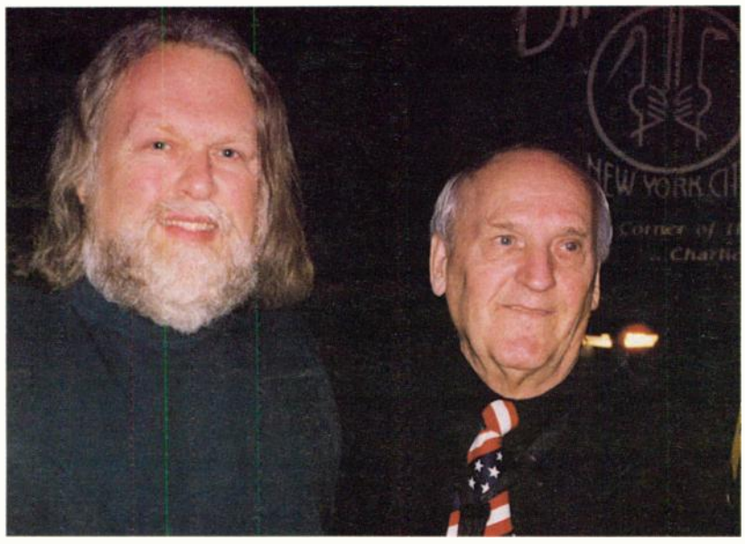
As a young kid, I scared my mother by sitting inches away from the television set staring at the NBC test pattern each afternoon waiting for 5:30 p.m., the designated moment that Buffalo Bob would ask "Hey kids, what time is it?"

Of course, it was Howdy Doody time. Time to enter the world of Doodyville—a place inhabited by colorful characters like Clarabell, Phineas T. Bluster, Dilly Dally, The Flubadub, Chief Thunderthud and Corny Cobb. And who could ever forget Judy Tyler as Princess Summer-Fall-Winter-Spring?

As a child, Buffalo Bob Smith was a mentor, confidante, and grand adventurer. Never once did I imagine that one day in the future—as an adult—I would take a turn behind the camera to bring his image to television audiences. Yet, through fate, it happened.

And, yes, Buffalo Bob Smith was just as charming as I remembered him from childhood. He allowed me to hold and work the strings of the original Howdy Doody puppet, a moment I will never forget. The experience was—as was television itself in those early days—pure magic.

My 1998 column on Buffalo Bob drew an e-mail from Wyn Walshe, a New York City-area musician who just happened to know a very good friend of Buffalo Bob—Clarabell. Wyn invited me to meet the horn-honking, seltzer-squirting clown.



(L to R) Frank Beacham with Lew Anderson at Birdland in New York in late 1998.

(L to R) Frank Beacham, Howdy Doody and Buffalo Bob in Bob's apartment in Ft. Lauderdale, Fla., November 1983.

CLOWN AS MAN

As it happens when we grow older, the fantasies we have as kids quickly evaporate. Clarabell, of course, no longer lived in Doodyville. He didn't wear a clown suit all the time, and, in reality, he wasn't mute. No horns were needed to communicate; he spoke like a normal person.

When the facade was removed, Clarabell was Lew Anderson, an accomplished music arranger and orchestra leader, who—in recent years—conducted his big band each Friday evening at Birdland in New York City.

In the late 1940s, Lew was a vocalist and arranger with the Honey Dreamers. The Chicago-based singing group, having appeared on the Steve Allen and Ed Sullivan television shows, did a guest spot on an NBC music special hosted by Bob Smith. During the gig, Anderson befriended the producer of the special, who also just happened to produce the Howdy show.

Coincidentally, a search was on for a new Clarabell. Bob Keeshan, who became "Captain Kangaroo," had been the first clown, followed by Bobby Nicholson, who quit but later returned to play Doodyville charactor J. Cornelius Cobb.

One day, in an NBC hallway, Lew was approached by the producer with some questions.

"Can you act?"

Lew responded, "no."

"Can you dance?"

Again, Lew said, "no."

"Can you juggle or do magic?"

"No."

"Well, what can you do?"

Lew answered, "nothing."

"Perfect," the producer replied, "just what we want!"

The rest is television history. Lew Anderson was Clarabell from 1954 to 1960, postponing a successful musical career for those years to become the most famous clown in America. Of the three men to play the role, Lew was the "best" Clarabell, Buffalo Bob would later write in his memoirs.

Before I go further, you may wonder why am I writing another column about the Howdy Doody show. Because on May 14, I am sad to report, Lew Anderson died at the age of 84. Though he may not have been a household name, Lew was a giant in the lore of early television and a figure who had a huge impact on my generation of post-World War II baby boomers.

When I met Lew after a show at Birdland, I told him a story. In 1955, when I was a first grader, I went with a group of kids to see Clarabell "in person" at WFBC-TV (now WYFF), the NBC affiliate in Greenville, S.C.

ONE OF THOSE BRATS

Our group got a bit carried away at the sight of Clarabell in the flesh, screaming and losing control. We mobbed our hero, pulling at his clown suit and finally causing him to do an emergency retreat inside the station. Later, he reappeared—at a safe distance—waving from a rooftop balcony of the station.

"Were you one of those little brats?," Lew asked incredulously, acknowledging that he remembered the incident well. It was, he said, his first public appearance as Clarabell and he wondered at the time what he

REMEMBERING, PAGE 45

Beyond Balance

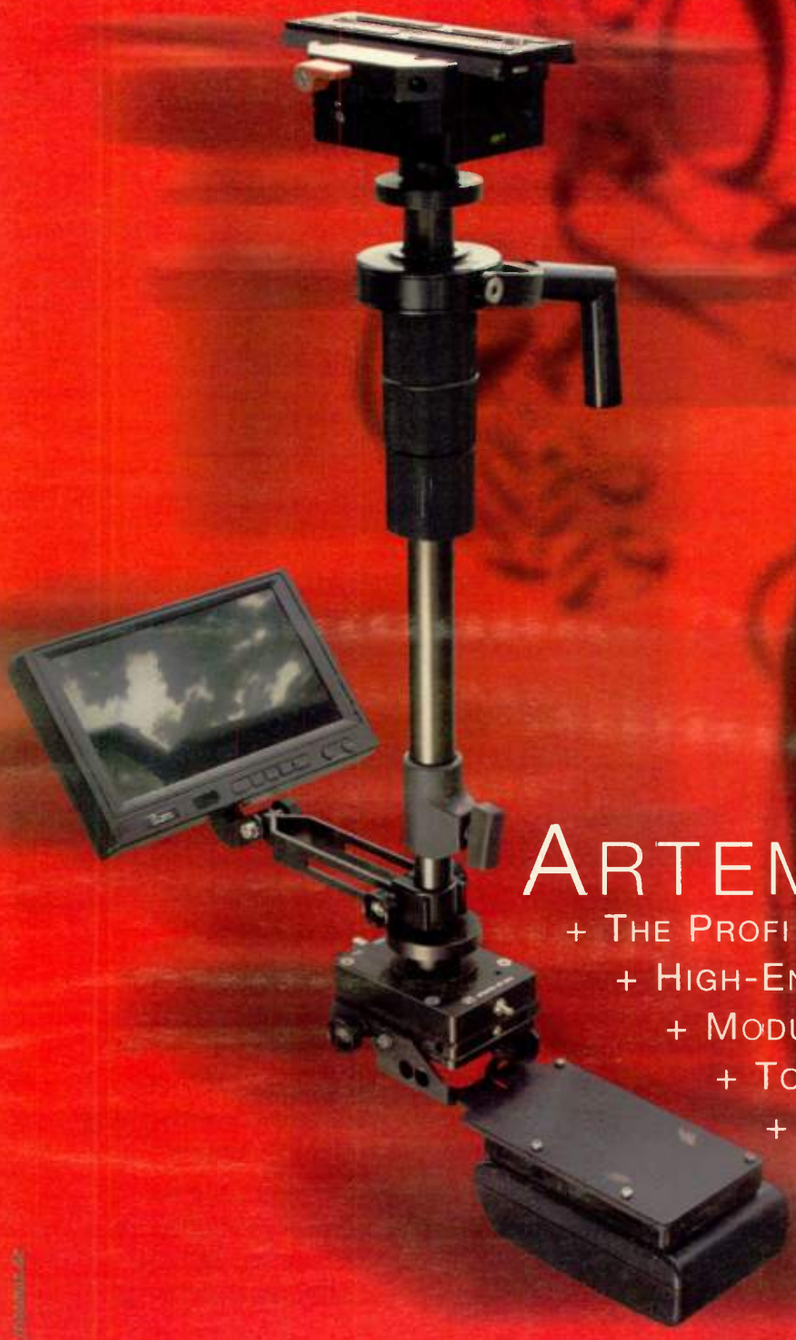
Side-to-side module

Gimbal

Lower sled module

Cordura vest

Spring arm



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FOCUS ON EDITING **Jay Ankeney**

The Power and Speed of Laptop Editing Increases

Do you remember the early days of mobile video editing? When Sony introduced their BVU line of high band 3/4-inch U-matic cassette format in the early 1980s, entrepreneurial editors would pack vans with bulky videocassette editing decks, switchers and mixers and somehow shoehorn in some patch panels so they could drive up to a client's back door and, if enough power was available for the necessary air conditioning, offer editing services on location.

We've come a long way since then. Software-based digital NLEs have severed the reliance on hot-and-costly hardware, and the remarkable developments in laptop computers mean that whole shows can be cut in HD on battery power anywhere in the world an editor can flip up an LCD screen.

When Apple rolled out their new 17-inch MacBook Pro laptop in April, many editors took notice. Built around an Intel dual-core processor, Apple's advertising claimed it delivered "desktop performance in a notebook."

Considering that the comparison is a moving target since desktop systems are also getting more muscle, at NAB2006, visitors to the Apple Pavilion saw the MacBook Pro running Final Cut Pro 5.1 software up to five times faster than on a PowerBook G4. So the question looms—how much power do we need if we want to work outside of a permanent edit bay?

2K COMPOSITING

"We were even doing 2K compositing with Shake on that laptop all in software," said Richard Townhill, senior manager pro video applications marketing at Apple Computer. "Using an AJA Video outboard Io breakout box, we also demonstrated that the MacBook Pro could cut with two streams of uncompressed SD in real time."

How much power do we need if we want to work outside of a permanent edit bay?

AJA Video's Io box, co-engineered with Apple back starting in the days of Final Cut Pro 4, is the only device on the market that can provide 10-bit uncompressed standard-def I/O over FireWire for FCP.

Rick Rashby, director of sales and marketing for AJA Video, said. "We are seeing ENG in news vans and remote film productions increasingly use our Io box with laptop systems. But we do recommend the proper outboard storage like the G-RAID FireWire 800 storage from G-Tech. That will give you a bullet-proof portable system you could even use in front of clients."

WINDOWS USERS

Apple has also presented a technology preview of editing 24p material and native support for Sony's XDCAM HD, Townhill said.

"The processor speed on a MacBook Pro is so fast we can decode these complex codecs fairly easily," he said. "But where working on a laptop gets problematic is when you want to work with higher bitrate formats such as the 100 Mbps DVCPRO HD, because of the difficulty in moving the information off the disk. If you want to move into uncompressed HD, you really need an Apple desktop system."

That may hold true for the Apple world, but Windows users have been provided a portable alternative from the bleeding edge wizards at 1 Beyond who have a hard time accept-

ing conventional limits.

About six years ago, one of 1 Beyond's customers showed up in their workshop with a desktop tower editing system in a mobile case on wheels just to get a memory upgrade. Terry Cullen, CEO and founder of 1 Beyond, realized the limitations of the laptops then available was hindering practical portable editing because laptops of the day were geared mostly toward spreadsheets, word processing and Internet access. Sophisticated video applications were simply beyond their reach without major compromises.

"Microsoft Office-style applications really don't require nearly as much power as video processing," Cullen says. "But the marketing tool of hyping the maximum gigahertz numbers on CPU's like the Mobile Pentium 4 used in laptops masked the real speed processors were working at since, due to power and heat considerations, they would usually only use a fraction of their potential."

That worked to the disadvantage of portable NLEs, since an application designed for a 3 GHz processing speed really needed all of that rated speed for software-based editing. So 1 Beyond began building laptops with desktop chips, for example using real Pentium 4 processors instead of the Mobile Pentium 4 design.

VROOM, VROOM

The latest result is the 1 Beyond 3817 HD laptop. With a 17-inch screen displaying 1920 X 1200, the 3817 HD features a true 3.8 GHz Intel Pentium 4 processor with hyperthreading technology, a 800 MHz front side bus, HD-capable DVI output and a NVIDIA GeForce Go 7800 GTX PCI-Express 16X video card. Its dual 80 GB SATA hard drives with hardware raid 0 yields a total of 160 GB of storage with 50 to 60 MBps data throughput, making the 3817 HD a configuration for Windows-based editing software that can rival many desktop systems.

"Our 3817 HD is the fastest possible laptop computer for Windows you can buy today," Cullen said. "Other companies could put together something like it, but few have our background in video."

The company has taken this system "one step beyond" for mobile editing by producing their exclusive portable tape-less direct-to-disk Avid Media Composer Adrenaline HD system using the 1 Beyond 3817 HD laptop. Instead of reducing the 1920 resolution of full HD to the 1,440 pixels recorded by most portable linear tape or optical-disc systems, 1 Beyond's Avid Media Composer Adrenaline uses the Avid DNxHD-220 codec to record the full 1920 X 1080 resolution to disk.

The HD camera's HD-SDI output goes directly into the Avid Adrenaline HD system and then gets recorded onto the disks in the 3817 HD. With additional removeable disks, 1 Beyond's portable Avid Adrenaline HD system lets you shoot unlimited high definition in the field using laptop technology.

Video quality has always expanded as the performance of edit systems grows. 10 years ago, DV was the rage. Now it's compressed HD. Not long from now, native 2K will be considered the acceptable resolution. Of course, desktop systems still are considerably less expensive, making you pay a premium for the pleasure of portability. But as laptop capabilities continue to escalate editors can realistically ask themselves, "are we there yet"? After all since editors deal in the real world of practical possibilities, how fast is fast enough? ■

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

PRODUCTION MANAGER Craig Johnston

Reacting Quickly To Correct a Mistake

Bill Gates was on Donny Deutsch's CNBC "The Big Idea" show recently, and I was interested in Gates' answer to Deutsch's question about what kind of mistakes he's made.

Gates didn't talk about any one mistake; he said Microsoft had made many, especially in the early years. But, he said, that they had reacted quickly, corrected course, and learned from them.

I've found television is ripe for big mistakes. And unlike a lot of other businesses where you might catch it and sweep the evidence under the rug as far as the public is concerned, a lot of television's mistakes happen right there, on-air, with thousands or millions of people watching.

While some happen in an instant (the Super Bowl wardrobe malfunction comes to mind), others can be long and painful. Hopefully, all that time will give you a chance to react.

I remember one such case while doing a televised spacebridge in the '80s, a two-way satellite hook-up with the United States and the former Soviet Union.

On the American end, we'd hired interpreters from the United Nations to translate the incoming Russian language into English, one for the Russian host, one for male speakers and one for female speakers.

In the selection process, no one caught the fact that one of the interpreters was a specialist in English-to-Russian, but not the other way around. We'd done some rehearsing, but not with the Russian speakers. We were barely underway when we found out her translations were killing us.

When we got into the first pre-recorded package, I walked into the interpreters' booth and said we were having mic problems, that we'd have to have the male speaker interpret everybody but the Russian host. During the balance of the two-hour spacebridge, we never got around to fixing the mic problem.

It probably wasn't the best idea to lie, but we did need to make a change in a hurry. It saved the show.

Just as a complete rehearsal, with Russian speakers coming over the line, would have alerted us to the interpreter problem, rehearsals are usually lifesavers. But like in that spacebridge, it's sometimes hard to get all the elements in place for a full rehearsal.

Take a team sporting event. Rarely do the teams' pre-game warm-ups really duplicate game action. Before a football game, an offense doesn't run against a defense. Before a basketball game, they do a shoot-around but they don't run up and down the court. Baseball, bless them, comes as close to real game action as any with batting and fielding practice.

So it holds true for producing sports, and probably for producing anything else as well, to put your most experienced operator in the key position.

In football, you may be able to shoot around the high end-zone position, and you can relegate the handheld on the field to shooting player and fan reaction, but if you can't count on the high 50-yard line camera, you're not going to be able to show much of a game.

Put your real pro on the 50. If you get into the game and find the high-50 camera operator can't follow the action, figure out some way to make a switch.

Personnel problems aren't always with the operators. Producers and their assistants can also need changing.

In my experience, local stations don't do much full-blown golf coverage, and so it can be hard to figure out what kind of person can best fill some of the specialized golf production positions.

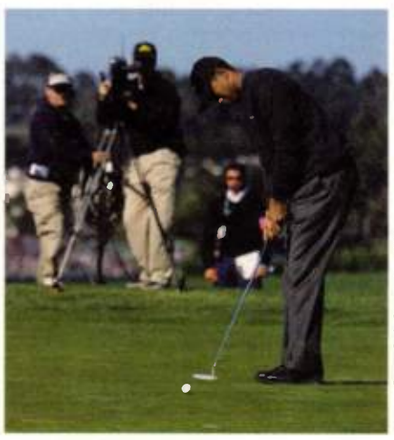

Photo: Craig Blankenhorn/CBS

We did two tournaments, and it was a steep learning curve.

Golf is so spread out that there's no one shot the producer and director can look at and know basically what's going on. Instead, they rely on a communication system with spotters on tees and greens, and at the mid-way point on long holes.

These spotters relay which golfer is about to hit to an assistant producer in the truck. That AP keeps track of it all on a cardboard grid. The producer can look at the grid to see where the golfers are, and the AP answers "Where the h#*^ is Woodside?" questions.

Since a golf production is a television show, we thought we ought to have a television guy who knew something about golf in that AP position. Though we did some sort of a rehearsal during a preliminary round, we didn't realize how lost that AP was going to get until we were on the air.

We had to do something, so we finally squeezed a golfer with a headset in next to him. The two of them got us through Saturday's coverage. On Sunday, we had the golfer do the whole job. It went a lot smoother.

Bill Gates advice about reacting quickly to mistakes seems to me to make a lot of sense in the television world as it does to Microsoft. ■

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

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INSIDE BROADBAND — Will Workman

Legislators Split On Net Neutrality

The eail exhortation came from none other than eBay CEO Meg Whitman.

"Send a message to your representatives in Congress before it's too late," she implored, adding that cable and telco broadband gatekeepers are using their "enormous political muscle to dramatically change the Internet."

I felt honored. At least until I read that eBay sent over a million such e-mails.

They mark the latest salvo in the debate over network neutrality, a principle of equal Internet access supporters. Without this enshrined into law, supporters argue, network operators will tier service, cut sweetheart deals, and generally grant anyone with money access to a faster lane—something they now have the technological capability to do.

With telecommunications reform legislation on the congressional agenda, eBay and other content providers have found numerous Free-the-Internet allies fanning public support, ranging from recording artists the Dixie Chicks and Moby to Internet pioneers Vint Cerf and Tim Berners-Lee.

In the other corner, weighing in with a whopping, 900-pound gorilla-sized lobbying clout, are AT&T, Verizon, and cable operators, joined reluctantly by hardware providers such as Cisco and Qualcomm. They have a powerful argument, as well, on their side: they invested billions of dollars into the broadband infrastructure, and have the right to make it profitable—as long as they don't "block, impair or degrade" access for users or content providers.

Net neutrality backers won a significant victory in the House May 25, when seven House Judiciary Committee Republicans crossed party lines to endorse a bill requiring broadband providers to operate networks in a "nondiscriminatory" manner.

My own representative, James Sensenbrenner (R-Wisc.), who heads the committee, decried the lack of broadband market competition, giving providers a "clear incentive... to leverage dominant market power over the broadband bottleneck to preselect, favor or prioritize Internet content."

Ah, but this is politics, in a political season.

Several committee members admitted they mainly supported the bill to prevent encroachment by the rival House Energy and Commerce Committee, which oversees the FCC.

That committee last month approved an overlapping bill that notably did not include any written directive on net neutrality, but instead would give the FCC "exclusive authority" over investigations of net neutrality violations.

No one will admit, of course, that ceding jurisdiction to the Energy and Commerce Committee would deprive Judiciary Committee members, Democrats and Republicans alike, a convenient popular stump as well as critical campaign contributions.

One Republican, Lamar Smith of Texas, made a convincing point in opposing the bill: Congress should "leave these decisions to the courts to work out on a case-by-case basis under the antitrust law."

But because it's political season, Congress is getting involved, at least for now. In all, six different House and Senate bills dealing directly or indirectly with net neutrality are at different stages of approval, possibly becoming part of a major telecommunications reform bill that will likely not pass until next year at the earliest.

Smith's concern carries weight because politics and a written net neutrality mandate will likely oversimplify, and enshrine into law, what is in reality a highly complex issue.

Because the Internet has become perhaps the most potent public sphere, it compellingly evokes principles dating back to the early days of TV and radio.

Are Verizon and Comcast the modern-day equivalent of "public trustees" of public information thoroughfares? Should they grant equal access to both content providers and users?

Or are they private companies offering a generally public resource in a competitive marketplace?

The problem is that broadband providers operate under both scenarios.

PREFERENTIAL DEALS

Imagine yourself running one of these companies. You are beholden to shareholders, and attempting to differentiate your brand from competitors. Why shouldn't you be allowed to work out preferential deals with content providers, say with Google Video, whereby Google gets a faster stream and cross-promotion?

After all, this is merely the mirror of service tiering on the user side, under which bandwidth hogs must pay more for faster access. As long as no legal sites are blocked and there's no deliberate service impairment, how are you enslaving the Internet?

With the onset of video streaming and video delivery, such bandwidth calculations are taking on a much more serious tone than previously, rendering operators' concerns even more convincing.

As a user, it's easy to see how companies could abuse their clout. Why should I be driven to subscribe to a particular video service when the one I want to use hasn't paid off my provider (and likely passed the cost on to me), resulting in Chinese water torture every time I try to download?

The single most important factor in lessening these valid, populist concerns is competition. If Congress and the FCC were really serious about encouraging broadband-over-powerline, WiFi, and other competing access technologies—the jury is still out on this issue—it would be much, much more difficult to abuse consumers or content providers.

I'd like to hope that rational, moral argument will carry the day on this issue, that a balance can somehow be struck between the two poles which encourages content and technological development, lowers barriers to access, and ensures operator profitability. Such a balance, I feel, can only be struck by case-by-case judicial review coupled with critical FCC oversight.

Until next year, when reason might prevail, take exhortations from both sides with equal quantities of salt. ■

Will Workman is a former editor of telco industry publications Cable World and MediaView. He is now working on his PhD in mass communications. He can be reached care of TV Technology.

Remembering

CONTINUED FROM PAGE 38

had gotten himself into.

Ironically, it was Howdy and Clarabell's effect on my generation that created the circumstances in which I personally met these performers. In November, 1983 an article appeared in TV Guide titled "Howdy Doody: the First Hippie."

In a tongue-in-cheek way, the article suggested Howdy was responsible for the rebellious 1960s. Clarabell, some argued, encouraged my generation to defy authority because—in an act of disrespect—he often squirted "the man" with seltzer water.

Photo by Frank Beacham

Clarabell the clown in the summer of 1987 on a soundstage in Los Angeles during the 40th birthday special.

Most thought the idea was great fun. But as the story was picked up by other media, it was taken seriously by many, causing an annoyed Buffalo Bob Smith to refute the "charges" on national television.

A Miami-based production company I operated at the time was summoned to Buffalo Bob's home in Ft. Lauderdale to record his response for TV's "Entertainment Tonight." I've forgotten Buffalo Bob's comments that day, but I could never forget the man.

In 1987, after I had moved to Los Angeles, I was invited to sit in the Peanut Gallery during the taping of a television special to celebrate Howdy's 40th birthday.

Buffalo Bob, then 70, and Lew, 65, joined the 40-year-old Howdy to entertain a new Peanut Gallery made up of mostly adult fans of the old show. The original Howdy, Phineas T. Bluster, and Dilly Dally puppets were operated from an industrial cherrypicker suspended high above the studio sets.

Joining Lew as Clarabell, the actors who played Corny Cobb and Chief Thunderthud were also back. As I watched these characters come back to life, it was like opening old attic trunk of toys undisturbed since childhood.

These performers, in their silly costumes, helped define American television. Good storytelling with strong characters through a powerful new technological medium in a time of innocence—all the ingredients were there.

They combined to make Howdy Doody the powerful phenomenon that it was for 2,343 episodes over 13 years. As children of the '50s, Howdy, Buffalo Bob, Clarabell impacted our lives in ways we still don't fully understand.

Who, among Howdy Doody fans, could forget Lew Anderson's final regular television appearance when the long-running show ended in 1960? His lips trembling and tears in his eyes, Clarabell did something he'd never done before. He spoke. His final words: "Goodbye, kids."

Goodbye, Lew. And thanks for the memories.

(At a memorial for Lew Anderson May 22, two trumpet players from his band performed. "His clown suit, his two horns, and even Howdy were there... very moving," wrote Wyn Walshe. Another memorial will be held June 23 at Birdland in New York City.) ■

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

DIGITAL TV | Charles W. Rhodes

Can Broadcasting Survive Unlicensed Devices?

On May 13, 2004, the FCC approved a Notice of Proposed Rulemaking to allow fallow TV channels in each community to be put to use by unlicensed operators. I coined the term "digital CB" to refer to devices and those using them in broadcast Channels 4-36 and 38–51. I use this term because it appears that history is about to repeat itself.

I recall the introduction of the present analog CB band, around 27 MHz, and the clever new jargon it generated, such as "10-4 good buddy." I also recall the immediate popularity of the 27 MHz CB band and the terrible congestion that followed. My own 40-channel CB is now a museum piece in my collection of antique radios.

Recently, I discussed the digital CB band using the new terminology the FCC rulemaking created—"white channels."

One reader wrote me seeking clarification of this new terminology. He got it right, it means an empty channel (locally) like an empty or unwritten piece of paper.

This proposed sharing has received a lot of attention by broadcasters concerned about interference to their brand new revenue channel come Feb. 18, 2009.

I've even heard that some CATV engineers are concerned over the possibility of direct pickup of such nonbroadcast signals by the cables in their systems, and especially the coax within subscriber's homes. There are of course no white channels on a CATV system, every bit of spectrum is in use on most CATV systems. If there are to be white channels in the broadcast spectrum, then broadcast channels may in contrast be black. I've found this to be a useful terminology.

Would first adjacent channels to broadcast channels be black or white?

Many of my readers will be able to anticipate my view, they cannot be white they are inherently black. I believe everyone now knows that ACI (adjacent channel interference) between digital signals is due to IM_3 (third-order intermodulation) products from one channel as noise within adjacent channels. IM_3 translates the signal from any channel to both adjacent channels.

Recently, I discussed the digital CB band using the new terminology the FCC rulemaking created—"white channels." One reader wrote me seeking clarification of this new terminology.

As these digital signals look like and act like noise, their energy translated into the other channel increases the noise floor (decreases the S/N+I) of the other signal and may cause reception to be erratic or to outright collapse.

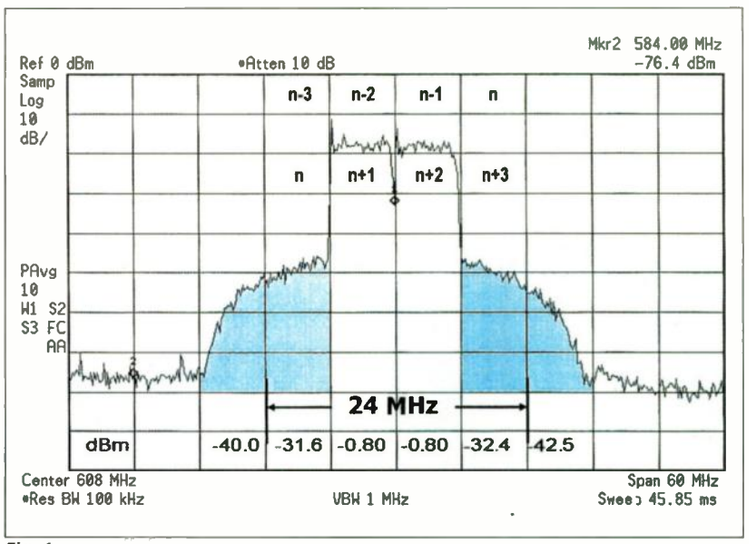


Fig. 1

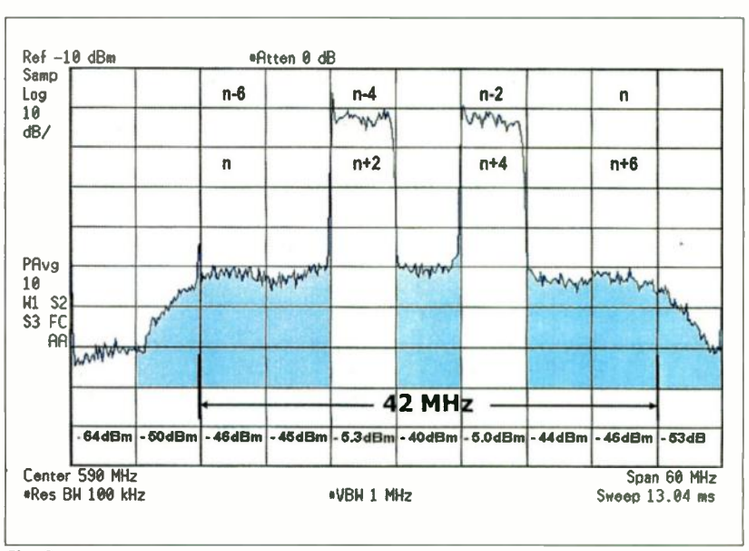


Fig. 2

These IM products are generated in the receiver's front-end, usually by overloading the mixer. Receivers with smart wideband RF automatic gain control will automatically reduce the gain of the RF amplifier when strong signals on adjacent channels are detected.

Reducing the RF amplifier gain by 10 dB will reduce IM_3 products by 30 dB. So if the receiver is in a moderate signal area and has a good antenna, the mixer will generate very little IM_3 because it is not being overloaded.

But near the edge of a station's noise-limited coverage reducing the RF amplifier gain will also decrease the signal-to-noise ratio. That doesn't matter if it never gets down to about 16 dB, the threshold for DTV reception. I believe there would always be some loss of viewers where adjacent channel signals are deployed, even with the best of receivers.

Not all receivers have or will have the best of tuners and the best of high gain directional antennas. Some of those rooftop antennas are decades old, corroded, bent, broken you name it they are worn out and

most folks won't replace them. That is the way it is!

But how can a 1 W transmitter cause much mayhem?

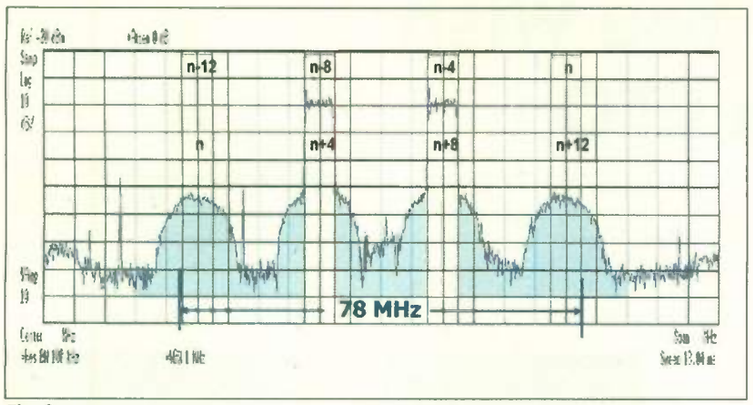


Fig. 3

Consider the receiver near the station's edge of coverage; two miles from this viewer's home a 1 W transmitter goes on the air on a channel adjacent to the desired DTV channel. At two miles, the field strength is 71 dB uV/m etc. The field strength at edge of coverage is 41 dB uV/m. The signal will overload the mixer in many receivers generating IM_3, which results in co-channel noise and the S/N+I sinks.

This problem is not confined to the fringe area. In suburbia (where I happen to reside), there is a base station at the high-tension power line tower 500 feet from me. As the field strength doubles when the path distance is halved, at 250 feet, the undesired signal field strength increases 6 dB to 77 dB µV/m, at 250 feet to 83 dBµV/m and to 89 dB µV/m at 125 feet, (that is next door). Such strong signals can generate IM_3, which may jam a moderate signal over suburbia.

Base stations will be really troublesome as they operate continuously, or nearly so. But I've got neighbors, and while they might go on-air sporadically and for a short transmission, my TV set too, would behave sporadically. Enough said about ACI from unlicensed transmitters in the broadcast band.

First adjacent channels to DTV channels cannot be considered white channels.

IEEE 802.22

I have talked with the chairman of the IEEE 802.22 group that is working on devising effective protocols for wireless communications over white channels within the broadcast spectrum. These folks also understand that first adjacent channels to DTV channels cannot be considered white channels. My readers should have already reached the same conclusion. While there are several hundred DTV allotments involving a first adjacent channel, the transmitters are cosited (less than 8 km apart). Some really carry cositing to its ultimate state, using the same transmitting antenna so the field strength of both signals are about the same throughout their coverage area.

What about white channels that are not adjacent to broadcast channels?

Here, the story at VHF is quite different from UHF. There are few white channels in the VHF part of the broadcast spectrum other than first adjacent channels. Most of the white channels are in the UHF band—Channels 14-36 and 38-51 after Feb. 17, 2009.

Those white channels are largely UHF Taboo channels such as n±2, 3, 4 and 5 which are taboos because at UHF there is little RF selectivity to reject undesired signals on those channels so they do not reach and thereby overload the mixer. That was true in 1952 and I believe it remains true today.

As today's receivers are tuned electronically by varactor diodes, the Q of the tracking filters now being made is poorer, so their bandwidth is larger than when variable condensers were universally used. I believe that track-

SURVIVE, PAGE 49

COUNT ON IT | André V. Mendes

Be Careful What You Wish For if it's Being a CTO

In my last column, I told you of a young man asking for pointers on becoming a chief technology officer and some of my thoughts on the challenges. A lot of those things I mentioned in the previous column are industry agnostic. You are just as likely to find them in a nationwide, established fast food franchise as in a newly hatched nanotechnology startup.

But nowadays, nowhere are those challenges greater than in the media environment. I can't think of a single largescale industry that has ever undergone the need for such massive technological transformation, in such a short period of time and with such high stakes on the table.

NO REST FOR THE CTO

You only have to step back a little to realize that the combination of legislative mandates, market place realities, consumer appetites and the inexorable march of IT based technologies are wreaking havoc with previously established business models, legacy workflows, old alliances and outmoded workplace fiefdoms. And squarely in the middle of this maelstrom sits the modern media CTO.

From an external standpoint, gone are the days where one could hold that type of position and leisurely sit back and analyze industry trends, competitor's choices, vendors and product options only to end up buying the new model from the company that had served one well in the past. Gone are the days of making small incremental changes to your plant as the industry finally made the decision between 8-VSB and COFDM.

Today's reality has broadcast vendors being acquired at a dizzying pace as companies formulate their attempts at vertical integration. It is as if everybody realized at once that the majority of these functions now run on commodity X86 hardware and that the magic is in the software layers and the overall enterprise application integration.

And with that come new possibilities, but also the destruction of previously close alliances. Companies that formerly showed up as partners in responses to RFPs must now realign into coopetitors in the new landscape. And the CTO has to adapt to these new vendor marketplace realities.

Internally, the same holds true. All of the low hanging fruit projects are gone, and the new, large scale integration projects invariably mash together the tectonic plates that once only grinded along their common edges. The byproduct of all of this seismic activity is a blurring and occasionally the complete disappearance, of what were, previously, very well delineated responsibility lines. But all of that comes at a price.

In the past, you might have had to negotiate a small temblor caused by personality conflicts along the fiefdom edges. These borders skirmishes were often inconsequential and rarely appeared on the senior management radar scopes.

OPERATION EARTHQUAKE

Today, the profound organizational changes necessitated by these new, entirely file-based, digital workflows engender the organizational equivalent of a major tectonic shift. Invariably, much like when a new mountain range is created, these changes are accompanied by major disruption to the existing landscape.

The old border skirmishes are now full fledged diplomatic incidents that not only show in the radar scopes but often generate their own full scale re-alignment exercises. It almost appears as if every broadcasting company has its very own, intentionally inflicted but very much needed, San Andreas Fault.

Often, the modern media CTO is the change agent that initiates or at least facilitates all or a large portion of this creative destruction. I would go further and postulate that it is the obligation of the modern media CTO to perform this function. But, with that charter, comes a heavy burden of uncertainty, internal struggle, powerlessness and acrimony.

So as you sit back and think about career goals and objectives you would do well to understand the different skill sets necessary to deal with the chief technology officer role in a modern media organization.

The ability to successfully deal with ambiguity, uncertainty and the fast shifting sands of both the external marketplace and the internal corporate environments represent a sea change from the relative determinism of yesterday's technological deployments.

Count on IT. ■

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

Often, the modern media CTO is the change agent that initiates or at least facilitates all or a large portion of this creative destruction.

Survive

CONTINUED FROM PAGE 47

ing filters may soon be history, just like tuning condensers.

The tuner-on-an-chip doesn't seem to offer room for inductors. Such tuners-on-a-chip could be subject to interference due to mixer overloading by strong undesired signals on two white channels.

When signals on certain pairs of channels do reach the mixer and overload it, some of the IM_3 products generated fall in the desired channel n. These channel pairs are in the form:

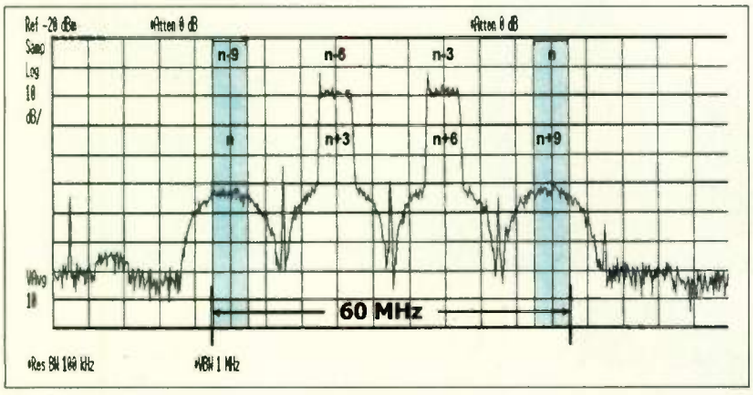


Fig. 4

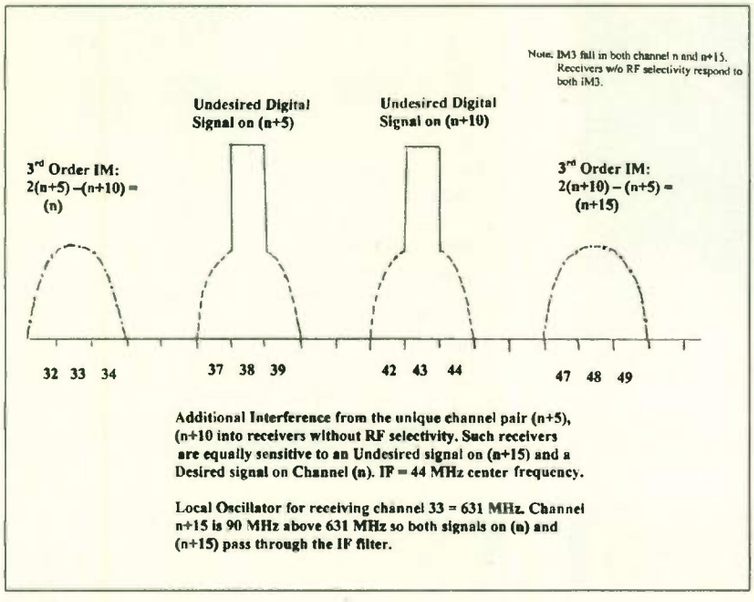


Fig. 5

n-2K, n-K and n+K, n+2K, where K is an integer.

It can be shown that any channel pair of this form will produce IM_3 in channel n and another channel on n ±3K. A very interesting situation arises for K=5, which gives rise to image channel interference generated within the tuner. We will get back to that.

In more concrete form we have:

n–2, n–1 = n = n+1, n+2

In this case, there will also be noise in channels n-3 and n+3.

This is shown in Fig. 1. (K=1)

The noise floor in channels n and n-3 or n+3 are raised by some 30 dB by the IM_3 products generated in an overloaded amplifier on my test bench.

In Fig. 2 (K=2), undesired signals on n+2, n+4 for example produce strong IM_3 in channels n, n+1, n+3, and n+5. Note the spreading out of the noise power spectrum as K increases. This figure can also represent the case of undesired signals on channels n–1 and n+1. Note the build up of noise in channel n due to sideband splatter IM_3 from both undesired channels n±1.

In Fig. 3 (K+3), undesired signals on n+3, n+6, for example, generate an 18 MHz wide IM_3 spectra three channels wide centered on channels n and n+9.

In Fig. 4 (K=4), undesired signals on channels n+4, n+8, for example, produce IM_3 centered on channels n and n+12 but leave noise-free channels n+2, n+6 and n+10. Above K=3, there will be noise-free channels in the spectrum of channel pairs.

In Fig. 5 (K=5), we see more and wider holes in the spectrum of this channel pair n+5, n+10. Note the IM_3 three channels wide, centered on channels n and n+15. Channel n is of course the desired channel. Channel n+15 is the image taboo channel.

As the figure explains, the image taboo is due to the choice of intermediate frequency—44 MHz in North America since 1982, when the UHF taboos arrived from the FCC with the rules for UHF television broadcasting.

What would happen in a DTV receiver without any RF selectivity to reject undesired signals n+5 and n+10 is that the IM_3 in channel n+15 will be heterodyned with the local oscillator which is 44 MHz below n+15 to the IF. The desired signal plus the IM_3 in Channel n will also be heterodyned to the intermediate frequency. Now the total noise doubles, reducing the signal-to-noise ratio another 3 dB.

DEFINING THE LIMITS

All this leads us to an informed conclusion:

Channel pairs as shown above are not suitable for use in a community with DTV Channel n because receivers may not have RF selectivity and the FCC cannot set performance standards for consumer electronic appliances.

Broadcasters might propose to the FCC that white channels be so defined that in the same community as a DTV station on Channel n, only one of the channel pairs of the form n-K, n-2K, n+K, n+2K... where K is a small integer, be allowed to be used as a white channel.

This would avoid the interference which will otherwise result from overloading of some DTV receiver tuners. On the positive side, such a rule would allow a large number of white channels in many communities, even under worst conditions with regard to tuner RF selectivity and overload characteristics.

In the case of n–1 and n+1, they should not be allowed to be used as white channels. It is particularly important that the n+5, n+10 channel pair are never used as white channels because of the image interference problem cited above.

So, if there are to be some white channels lets not simply let every unused channel in our Digital spectrum be automatically considered as white. ■

Charlie Rhodes is a consultant in the field of television broadcast technologies and planning. He can be reached via e-mail at cwr@bootit.com.

PRODUCTS & SERVICES SHOWCASE

PRODUCTS & SERVICES SHOWCASE

USER REPORT

KAKE-DT Maximizes with Harris PowerCD

by Larry E. Means
Engineering Supervisor
KAKE-TV

WICHITA, KAN.

KAKE-TV, a Gray Television Group Inc. station and an ABC affiliate, broadcasts on analog channel 10 and digital channel 21. Like many stations, we initially installed a low power transmitter to begin digital operations, with plans to maximize before the July 1, 2005 deadline. To make this transition, we sought a highly reliable transmitter using the latest MSDC IOT design. We were also looking for solid performance and ease of operation, along with intuitive monitoring and control systems. The Harris two-tube PowerCD transmitter met these requirements.

As a VHF station that began operations in the mid-1950s, along with the high power UHF transmitter, KAKE needed tower and building modifications, antenna and transmission line replacement.

Space was at a premium with the existing analog and low power digital transmitters and associated RF plumbing. We required detailed plans to meet the very short time frame in which we had to launch full-power digital transmissions.

Harris provided on-site engineering assistance from the start. We soon developed a working AutoCAD layout of the whole transmitter backroom. The plans detailed PowerCD transmitter cabinet positions, RF plumbing, mask filter mounting, patch panel and combiner locations, along with the associated power regulation equipment. This information proved invaluable as our July deadline approached.

The PowerCD transmitter arrived in mid-June and was in the final floor position within hours. The transmitter consists of the driver/IPA; high power amplifier and associated cooling system; and the 480 V power supply/controller cabinet. This layout is duplicated for the second IOT tube. The beam power supplies, a pump module and heat exchangers are located outside the building.

KAKE-TV's Larry Means with one of the Harris transmitter GUI displays

READY IN NINE DAYS

KAKE-TV engineers worked with Harris personnel and local electricians to assemble the transmitter, including RF lines and the cooling system plumbing. Tubes were installed and tuned, followed by transmitter testing and FCC proof of performance. Everything was completed within nine days and it went on the air on June 30. DTV average transmitter power output is 47.4 kW, with an ERP of 850 kW.

The high overall efficiency of thePowerCD transmitter keeps monthly operating costs low. Our VHF transmitter electrical power expenses during peak summertime periods ranged between $4,000 to $5,000 per month. We estimated these would easily double with the addition of the second transmitter.

However, we have been pleasantly surprised. Monthly increases have been more in the range of $2,500 to $3,000 dollars per month. The UHF power consumption closely matches that of our solid-state VHF transmitter operating at approximately 40 kW peak visual output.

GREAT SYSTEM EFFICIENCY

The operating efficiency of the IOT tubes is in the 53-to-55-percent range. The Harris FCC Proof shows the overall transmitter system efficiency at around 50 percent, keeping our operating costs well below original projections.

The Harris PowerCD transmitter has certainly met our highest expectations. As a longtime VHF transmitter user, I had reservations about working with IOTs, but found tube removal, installation, tuning and cavity adjustments to be straightforward.

The Harris Apex digital exciter is a real jewel. It features on-screen status, plus control and performance monitoring. Linear and nonlinear correction modes provide outstanding EVM (error vector magnitude) performance, and digital signal-to-noise, and channel shoulder response. The exciter is very forgiving of errors caused by tube mistuning or other linear distortions. It consistently provides correction to produce good digital signal-to-noise and EVM figures, and has no problem meeting or exceeding FCC DTV mask filter requirements.

GREAT GUI DISPLAYS

One of the first things that you notice about the transmitter is the GUI displays. The PowerCD has three such displays for the driver and HPA control cabinets. These touch-screen control panels are running the Harris eCDi program, which allows the display of all transmitter operating status and metering information, and also functions as individual transmitter unit control panels.

The Web GUI provides control and monitoring through a standard web browser. This eCDi system is a transmitter engineer's dream. It can access and present all status, metering, fault

HARRIS, PAGE 54

COMPANY PROFILE

Axcera: A Reputation for Quality and Service

by James E. O'Neal

Axcera is a classic example of an American success story. The company was established in 1982 by three former RCA engineers and a single niche-market product, and in just a bit over 20 years later is now a leader in the television transmitter industry.

Starting operations as the ITS Corp., the company became known as Axcera in 2001.

One of Axcera's first products was a retrofit exciter for older RCA transmitters. Another was a microwave Multipoint Distribution System (MDS) transmitter, as that market began to emerge in the 1980s.

According to Richard Schwartz, director of marketing and product management, at Axcera, the television exciter product paved the way for Axcera to enter the burgeoning low-power television market.

"We started with a 100 watt unit and this grew into a 1 kilowatt transmitter," said Schwartz. "We supplied most of the national accounts—Trinity Broadcasting, the Home Shopping Network and others—as LPTV took off."

By the late 1980s the company rolled out its first 10 kW transmitter, MDS morphed into MMDS and the stage was set for Axcera to become a major player in the world of television transmission, MMDS and broadband wireless.

INDUSTRY FIRSTS

Axcera prides itself on a number of industry "firsts" including the world's first solid state MDS transmitter, the first high-power solid-state UHF transmitter, the first television modulator with continuously adaptive linear and non-linear pre-correction and many others. Since its inception, Axcera has always been on the cutting edge of technology and has had an "ear to the ground" to sense new directions the industry might be taking. The company has tracked the DTV conversion from its inception with new product introductions to pave the way for broadcasters making the switch. Axcera is also ready for what appears to be the next phase in the evolution of television broadcasting.

"Axcera is focused on technologies for the growing mobile media industry, such as DVB-H and MediaFLO," said David Neff,

Axcera's headquarters in Lawrence, Pa.

President and CEO of Axcera. "Axcera is a leading supplier of complete mobile media systems and is currently participating in several large mobile media trials worldwide. Axcera looks eagerly to the future."

Throughout its 24-year history, Axcera has continued to expand its product lines. This move has better positioned Axcera to offer the most comprehensive line of television transmitter equipment and systems than any other manufacturer, as well as to be able to provide a complete package of broadband wireless/MMDS technology. The company also offers an array of services, including system planning, design and integratio, as well as customer training and even proof-of-performance measurements.

Throughout the evolution of Axcera, two important principles were never overlooked or compromised. Ever since the first product rolled off of Axcera's loading dock, turning out quality products and meeting the needs of customers have been at the top of the list for Axcera.

Today, the company maintains a staff of 150 employees dedicated to serving the needs of its customers. As Axcera was founded by broadcast engineers, the importance of helping its customers maintain a 24/7 operational status was not something that had to be learned or acquired. When something does break during the wee small hours, customers don't have to talk to a machine and hope for the best. The company maintains a 24-hour customer hotline, with a real person available to offer technical assistance

AXCERA, PAGE 54

AXCERA
103 Freedom Drive
Lawrence, Pa. 15055

Tel: 800-215-2614
Fax: 724-873-8105

www.axcera.com

Harris

CONTINUED FROM PAGE 52

logs and transmitter performance monitoring, as well as provide complete transmitter control.

It also sends e-mail notification of faults and warnings. We're working on dialup and Ethernet connections between our transmitter site and various monitoring points for remote access to eCDi.

Harris service engineers have been first rate, starting with the project and design teams in Mason, to the field service guys from Quincy. They've been available to address issues, problems and modifications. Service makes a difference. The Harris is a well-designed transmitter with good people behind it.

Larry E. Means is the engineering supervisor at KAKE-TV. The opinions expressed are those of the author alone. He may be contacted at larry.means@kake.com.

For additional information, contact Harris Corp. at 800-442-7747 or visit www.harris.com.

Axcera

CONTINUED FROM PAGE 53

and to make sure that replacement parts and assemblies are expedited to that customer's site. The company's proximity to the Pittsburgh International Airport ensures fast delivery.

Another factor in being able to promptly serve its customers is that all of Axcera's products are designed and built in the United States. The company knows what's going on with its products at every step, as everything is done under one roof, including the warehousing of a very complete inventory of replacement parts, modules and assemblies.

"Our people are passionate about serving our customers and making them happy that they made the decision to purchase from Axcera," said Neff. "It is our mission to grow the business through delighted customers spreading the word about the performance and reliability of our technically advanced products." ■

PRODUCTS & SERVICES SHOWCASE

USER REPORT

WKNO Moves Into DTV With Dielectric

by Russ Abernathy
Director of Television and Technology
WKNO

MEMPHIS, TENN.

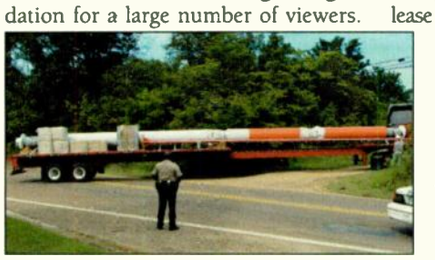
WKNO uses the power of noncommercial public broadcasting to provide the Mid-South with quality educational and cultural programs that inform, entertain and inspire. This year, we're celebrating our 50th anniversary as an important public resource.

Because of the vital role we play in our community, WKNO recently set out to retrofit our facility for digitally broadcasting our programming in SD and HD. Our goal was both to meet DTV deadlines set by the FCC and to provide our audience with the best viewing experience possible.

Obviously, one of the key pieces of equipment needed for this transition was a DTV antenna. Almost all of the antennas that were available when we started our search were designed to be mounted to the side of a tower. While this could prove to be effective in some sites, the location of our particular transmission facility made a side-mounted antenna unacceptable.

COMBO V/U RADIATORS

Our transmission site is in the geographic center of our marketplace. It's at one of the highest points in our area, and a great location for transmission. However, being right in the middle of our audience meant that if we used a side-mounted antenna, the tower itself would become a source of signal degradation for a large number of viewers.



The New Dielectric antenna arrives at the WKNO transmitter site.

We turned our attention to Dielectric Communication's new TUV Dualband series antennas, which combines both VHF and UHF radiators into a single antenna that mounts on the top of our tower. The dual-channel capabilities allow broadcasters like WKNO to add DTV service without taking up additional space or adding excessive weight to the tower.

In the TUV antennas, VHF and UHF signals share the same outer conductor, but the UHF slots are electrically isolated from the VHF portion of the antenna by a separate coaxial feed system. This allows VHF and UHF to share the same transmission aperture without interfering with each other. By replacing our existing antenna with the TUV, we could immediately begin analog/digital simulcasting.

From the start, it was obvious that working with Dielectric was the right decision. Any project like this is a serious undertaking with lots of opportunities for problems to arise.

Not only did we need to maintain our analog signal throughout this transition, we lease tower space to several FMs that had to stay operational. The great service we received from Dielectric ensured that all broadcasts continued uninterrupted.

Even before installation began, Jon Clark, our Dielectric sales representative, helped to work out a lot of details not considered initially. For example, the new TUV antenna was approximately 75 feet shorter than our existing antenna. Dielectric's foresight allowed us to install an extension pole that eliminated the cost of repainting our tower to match the new height. It was this attention to detail by our Dielectric project manager that made the installation go smoothly. We were very impressed with the emphasis on safety, quality, communication and professionalism that Dielectric demonstrated.

The cost of the antenna was significant, but in countless ways, we came out ahead. A side-mounted model would have cost substantially less, but the antenna and transmission line would have added considerable weight and additional windloading to our tower. With a side-mounted antenna, we faced not only the possibility of poor reception for some viewers, but also some costly structural work to enable the tower to accommodate the new load.

PATHWAY TO THE FUTURE

Another advantage we've realized is a clear and simple pathway to the future of digital broadcasting. We don't know yet which frequency will be assigned to us post-transition, but whether it's ch. 10 (our existing analog channel) or ch. 29 (our new digital channel), we're covered, without further expense or having to swap out antennas.

Constructing new digital facilities while continuing to operate an analog station from the same tower can be a recipe for disaster. I know of at least two cases where stations trying this suffered complete tower collapses. However, in our case, the tremendous dedication on Dielectric's part ensured a successful transition.

The antenna is a solid performer in all respects. It's already proven to be very reliable, and has eliminated icing problems experienced with our previous top-mount.

During the winter, we did have a failure in one side of the shared line splitter, but Dielectric demonstrated that our choice of antenna suppliers was the correct one. They were on site with an engineer and tower crew within 24 hours and we were quickly back to normal operation.

With the passage of time, it's clear to us that Dielectric's products are truly high quality and their service is most professional.

Russ Abernathy has worked in broadcast television for more than 35 years, much of it in engineering and project management. He can be reached at wknopi@wkno.org.

For additional information, contact Dielectric at 800-341-9678 or visit www.dielectric.com.

BUYERS BRIEFS

The K2 Digital Klystrode IOT Family TV transmitting tubes from the **Eimac Division of CPI** are suitable for 8-VSB and COFDM and are available with peak power outputs from 110 kW to more than 130 kW.

These inductive output tubes feature gains of 21 dB minimun, with a single tube type and circuit providing coverage from 470 MHz to 860 MHz. All ceramic material utilized in the tube's construction is aluminum oxide, so there is no potential danger from beryllium oxide. The tubes offer long life and high reliability with a dispenser type cathode and pyrolytic grid structure. The tubes can be operated in AB mode, with very low average beam current, to achieve energy cost savings.

For additional information, contact the Eimac Division of CPI at 800-414-8823 or visit www.cpii.com/eimac.

The TVT Series from **BEXT Inc.** are tube transmitters for VHF television service. They are available in power output ratings from 6 kW to 30 kW and are available for use in all global television standards. The transmitters use a single tube and modular construction, and are tunable to any VHF channel. They feature an oversized cooling system and are fully protected from power line phase loss, excessive VSWR, RF mismatch, incorrect adjustment or operation, overload and short circuits and loss of video signal. The series is available for transmitter or translator use and provide sequential soft-start turn-on circuitry.

For additional information, contact BEXT Inc. at 619-239-8462 or visit www.bext.com.

USER REPORT

Acrodyne: The Right Choice at WKBN-TV

by Thomas A. Zocolo
Chief Engineer
WKBN-TV/WKBN-DT,
WYFX-LP/ WFXI-CA

YOUNGSTOWN, OHIO

Our main station, full power CBS affiliate WKBN-TV, has been a leader here since it went on-air back in January 1953. When it was time to go digital, we encountered delays and complications, first with Canadian interference issues and then with tower modifications. We were behind schedule, behind in the market and quickly running out of time on our CP extension.

Once we made our way over those hurdles, there remained one last challenge—we needed a new digital transmitter. It had to be solid. It had to be reliable. And it had to be on a fast track to installation and air. We were used to doing things right and operating with the big-name transmitters and I had started researching products from a couple of manufacturers with whom I was familiar.

Thomas A. Zocolo and the new Acrodyne 60 kW transmitter.

URGED TO TRY IT

One day while talking on the phone with our corporate CFO, he asked me if I had looked into Acrodyne as a possibility. He told me that one of the other stations in our group had made a great deal with Acrodyne and saved a lot of money on their transmitter purchase.

I told him that I would look into Acrodyne, but I was skeptical. I had not heard a lot about this transmitter manufacturer. However, I decided to remain open minded so I could give them a fair evaluation. For my application, I needed 49 kW out of the filter, so I specified a two-tube system using standard E2V IOTs that could deliver 60 kW out of the filter. The Acrodyne Quantum QXD2 was the perfect match.

From the very first conversation with the Acrodyne sales engineer, my experience with them has been first rate. Over the next few weeks, I asked for, and received all of the support information that I could use. From supplying basic floor plan scenarios and RF system layouts to detailed electrical contractor bid request specifications, Acrodyne made planning my project easy.

I was able to talk with all levels of engineering and project management personnel and I always felt that everyone at Acrodyne had a true team spirit in supporting their customers.

The final decision in purchasing a transmitter is not an easy one. It is not often that you make a single purchase for more than half a million dollars. There are many factors to consider and no chances for a do-over. The support and openness of everyone at Acrodyne was important, but I don't want to leave out the fact that this is a solid transmitter. After all, it's the transmitter that keeps you on the air and not the good intentions of the manufacturer.

CLOCKWORK SCHEDULE

Once the transmitter was ordered and a delivery timeline was established, things proceeded like clockwork. The transmitter shipped on time, the mechanical installation was completed on schedule and the final assembly, turn-on and testing was done on schedule. I was very impressed with the installers. They put things together with such pride it seemed as if the installation was going to be theirs to maintain for years.

Thomas A. Zocolo is the chief engineer for WKBN-TV/WKBN-DT, a full power CBS affiliate and WYFX-LP/WFXI-CA, a low power Fox affiliate. He has led the operations of the two stations for the past six years. He may be reached at tzocolo@wkbn.com.

For additional information, contact Acrodyne Industries Inc. at 888-311-0859 or visit www.acrodyne.com.

USER REPORT

LARCAN Extends DTV's Reach

by Phil Titus
Director of Engineering
KUED/KUEN

SALT LAKE CITY

When I signed on as the director of engineering for KUED and KUEN at the University of Utah, I was sure that I was in for an easy ride. After all, I had 20 years in broadcasting (15 of them with PBS station KVIE in Sacramento), and knew my way around a broadcast plant. There sure wasn't any way that the high definition TV movement could take hold before I retired. What could go wrong?

TRANSLATOR EDUCATION

Well, among the many things that I learned I didn't know about after taking the job was about these strange things called translators. However, with the job I had inherited the best set of translator engineers (and mentors) in the nation. They were always on hand to snowshoe into mountains at night to ensure that our viewers had television. Our DMA, by the way, is one of the largest in the nation. It covers the entire state of Utah (roughly 105,000 square miles), as well as geographically associated portions of neighboring states. Mountain ranges of over 11,000 feet above sea level, hundreds of miles of dirt access roads, and winters well below freezing leave us largely unprotected and inaccessible during the fall, winter and spring months.

Phil Titus appears with three generations of Larcan translators.

Adverse conditions like these require a level of reliability that LARCAN has proven it can deliver.

Since the early days of translator use, LARCAN has been providing equipment and technical expertise to help stations such as ours reach their audiences.

When it came time to think about DTV for translators, there was a huge void of knowledge and equipment available. While everyone else was trying to figure out how to make DTV transmitters work, our crew was working on how to get that DTV signal into rural areas. LARCAN supplied more than $100,000 worth of translators, test equipment and engineering resources to assist us.

DTV PARTNER

The University of Utah and LARCAN have been partners for quite some time when it comes to testing and implementing DTV systems. Versatile, older LARCAN translators have been modified to handle DTV. Newer XLS units that are in use for analog now have been flash cut and we are anxiously awaiting the deployment of LARCAN's new MXi series.

We have plans to put DTV companion transmitters in place for nearly all of our translators (over 80 in Utah alone) and the new MXi series is frequency agile, and able to cover the entire TV band.

Over the years, we have had an ongoing relationship with LARCAN. Its factory service response has been positive and instantaneous. The company has shown a personal interest in what we are doing to reach the rural population in our state and has worked with us to develop some rather innovative solutions to what have seemed to be impossible problems. When it came time to replace our full power analog transmitter for KUEN about five years ago, we also turned to LARCAN.

LARCAN has been a trusted friend and partner since the early days of television and into the future of digital transmission.

Phil Titus is a 30-year veteran in television broadcasting. He may be contacted at ptitus@kued.org.

For additional information, contact LARCAN at 905-564-9222 or visit www.larcan.com.

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USER REPORT

WDSE Going Strong With DCX Paragon

by Rex Greenwell
Director of Engineering and Operations
WDSE-TV/DT

DULUTH, MINN.

When WDSE-TV prepared to go digital, we put a lot of thought into the most cost-effective way to do so. We needed a transmission system that was reliable, energy efficient and that would serve our needs for many years into the future.

As a non-profit PBS station, low cost of ownership is extremely important to us. Often it is easier to obtain capital funding for a new purchase, like a digital television transmitter, than it is to come up with cash to pay monthly bills. As such, we were very interested in what was then a new technology, energy-saving transmission system.

SHOPPED AROUND

We made an exhaustive comparison before deciding to install a DCX Paragon transmitter from Thales Broadcast & Multimedia (TBM, recently acquired by Thomson and part of the Grass Valley business).

The transmitter includes two Emmy-winning Adapt exciters and the L-3 Communications Constant Efficiency Amplifier IOT, employing unique oil-cooled, multistage depressed collector IOT technology, with the highest energy efficiency rating available today. We became the very first station in the country to put MSDC technology into on-air operation.

We like the fact that the TBM DCX Paragon allows us to be flexible with our available spectrum and offer a valuable multicasting service for our viewers. During the day we broadcast four standard-definition digital channels.

Rex Greenwall with WDSE TVIDT's new Thales Broadcast & Multimedia DCX Paragon transmitter.

During the primetime hours we multicast three SD channels and one 720p high-definition channel. We feel that using the 720p gives us more available bandwidth for multicasting, while providing a superb high-definition viewing experience.

WDSE is a community licensee that serves the Duluth market. We're a VHF station in analog and a UHF in digital. The Paragon has allowed us to reach our allotted coverage area in DTV with few problems. We're running at 700 kW ERP, which has enabled us to establish a reliable service that our audience relies on.

Most of our viewers watch our digital signal off-air, received with some type of home antenna, so the transmitter we use has to reach these people or we can't be seen.

We installed the two-tube DCX Paragon transmitter in the winter of 2003. The system uses MSDC technology and allows us an exceptional efficiency advantage over a standard IOT transmitter. This has resulted in a savings in our power bills that totals $38,000 per year.

Those savings paid back the difference in cost between the DCX Paragon and that of a conventional transmitter in just a couple of years. We project that at the end of the transmitter's 20-year life span, we will have saved the purchase cost of the transmitter.

CROWBAR ELIMINATED

We also like the fact that the Paragon is protected against system downtime with TBM's Soft Arc Technology, which essentially eliminates the problematic crowbar and thyratron circuitry found in other transmitter designs. This provides further operational cost savings. Soft Arc increases the reliability of the Paragon over that of any other IOT transmitter significantly, and does so by providing superior protection against tube failure. The result is superior protection by removing high voltage in less than 8 milliseconds.

An intuitive user interface and control panel on the Paragon's HPAs help make the transmitter easy to service by providing fast access to IOT operating parameters and fault diagnosis.

This, coupled with an isolation/connect plug system, can help maintenance personnel resolve potential problems even before an off-air outage occurs We also like the fact that easily obtainable standard size HVAC air filters are used.

SUPPORT EXCELLENT

Working with the TBM support staff during transmitter installation and receiving their on-going support for the past three years has been an excellent experience. No on else has more experience with the MSDC IOT technology than TBM and L-3. In fact, since our transmitter went on the air, TBM has sold more than 70 new energy efficient MSDC amplifiers.

WDSE is a station that has relied on sound technology decisions to get it through the digital transition and to make the most of our allotted digital spectrum. With the Paragon, we have a transmitter that can help us grow in our market and offer new services to our viewing public.

Multicasting allows us to achieve our goals of providing new ways to bring thought-provoking entertainment and life-long learning experiences to the largest audience possible. Strategies may change over time, but we're counting on the DCX Paragon transmitter to stay with us every step of the way.

Rex Greenwell has been the director of engineering and operations at WDSE for the past 26 years. Prior to that, he worked as an engineer for the Nebraska ETV Network for five years. He may be contacted at engineer@wdse.org.

For additional information, contact Grass Valley at 800-547-8949 or visit www.thomsongrassvalley.com.

BUYERS BRIEFS

The –LC line of TV transmitters from **DMT USA** is designed for both analog and digital broadcast service and utilize LDMOS solid state technology. The transmitters feature "hot swappable" modules, allowing replacement without interruption to on-air service. The –LC transmitters provide operation over the entire UHF frequency band and are available in 20 kW analog and 2.4 kW digital power outputs.

Separate power supplies are provided in each power module to exploit the advantages of modular architecture. They are liquid cooled to minimize the heat load and noise level presented to the transmitter room or building.

For additional information, contact DMT USA at 856-423-0010 or visit www.dmtonline.us.

The 6700D series of Omegaline RF coaxial load devices from **Altronic Research Inc.** is designed for DTV transmitter applications. The 6705D load is rated at 5 kW in continuous operation and the 6715D can accommodate 15 kW continuously. Operating impedance is 50 ohms.

The units have a frequency operating range of from DC to more than 1 GHz. VSWR is specified at 1.10:1 throughout the frequency range. The stock input connector for the 5 kW model is a 1-5/8-inch EIA fitting. The 15 kW load device is supplied with a 3-1/8-inch or 4-1/16-inch EIA fitting. Other fittings are available.

For additional information, contact Altronic Research, Inc. at 800-482-5623 or visit www.altronic.com.

The ESCIOT is the **e2v technologies inc.** tradename for its high efficiency inductive output tube. ESCIOT technology is available in both three and five stage water-cooled devices, as well as in five stage oil-cooled models. The e2v ESCIOT (energy saving collector inductive output tube) devices are combinations of e2v's plug-in IOT and depressed collector klystron technologies and can provide up to 60 percent operating efficiencies in UHF television transmission service. Tubes are available to cover both analog and digital transmitter requirements and are available in a variety of output power ratings from 22 kW to 135 kW.

For additional information, contact e2v technologies inc. at 800-342-5338 or visit www.e2vtechnologies.com.

The VSB-ENC-200 TV modulator from **KTech Telecommunications** transforms an MPEG-2 stream into an 8-VSB signal. The unit provides a 44 MHz IF signal output at –14 dBm and also provides this signal to a front panel IF output test point at –20 dB. The VSB-ENC-200 complies with ATSC A53 specifications for 8-VSB modulation for terrestrial broadcasting.

The unit features an LCD display for setup and adjustment purposes. The unit is self-contained and does not require an external computer for setup. Optional linear and non-linear pre-correctors are available.

For additional information, contact KTech Tellecommunications Inc. at 818-773-0333 or visit www.ktechtelecom.com.

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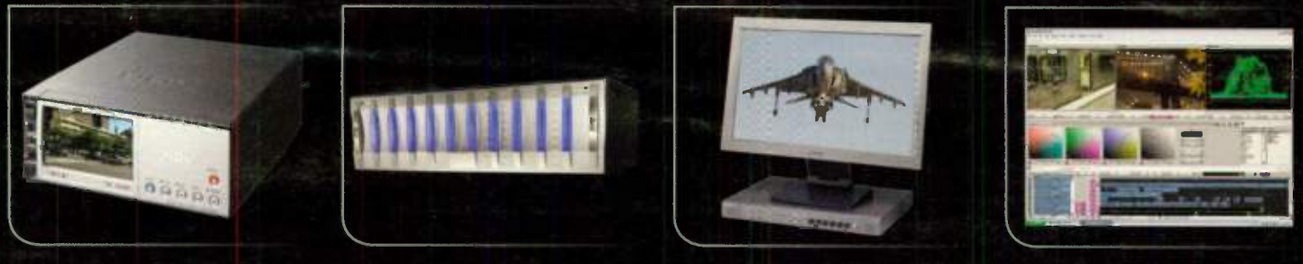

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USER REPORT

Jampro Antenna Helps AETN Cover State

by Gary Schultz
Director of Engineering
Arkansas Educational Television Network

CONWAY, ARK.

I have been director of engineering for the Arkansas Educational Television Network for 18 years. Recently we commissioned a new digital TV station, KETZ-DT, broadcasting with a Jampro JHD-HV2 2/4-8R antenna.

AETN has been on air for 40 years, starting back in 1966 with one station in Little Rock, KETS. In 1976, we expanded with three more transmitters, KAFT in Fayetteville, KTEJ in Jonesboro and KETG in Arkadelphia.

In 1980, we expanded again with a fifth transmitter, KEMV in Mountain View, covering the north central part of the state. We began digital broadcast service two years ago, signing on with four program streams.

As the statewide PBS outlet, we were trying to cover the entire state, but there was a large area in the extreme southeastern part of Arkansas not being served. This is a rather sparsely populated area, mostly involved in agricultural and forest products, but extremely important to our statewide educational mission.

We initiated the new transmitter project about 10 years ago, beginning with an application for state and federal funding, preliminary engineering plans and an FCC application. We obtained a construction permit valid for three years.

A bird's eye view of AETN's new Jampro ch. 12 antenna mounted at the 1,738-foot level of a leased tower in Huttig, Ark.

However, securing funding for the transmitter and identifying tower space took up so much of our time, we only got KETZ-DT on the air in mid-May of this year, less than a month before the CP expired.

KETZ is licensed to El Dorado, but our transmitter and tower are located in Huttig, Arkansas, just a few miles from the Louisiana border. There, we leased space on a 2,000-foot commercial tower and mounted the Jampro two-layer, eight-panel VHF antenna at 1,738 feet, transmitting directionally on ch. 12 at 7 kW ERP.

As we are a state agency, Arkansas procurement processes governed the purchase of the antenna, which involved going out for open bidding.

Of course, AETN specified exactly what we wanted in a directional VHF digital antenna to meet the CP requirements. Jampro came in with the winning bid, meeting all our specifications. We made the final decision, judging Jampro as having the lowest priced and best qualified antenna system for our needs, and placed the order.

This was my first experience working with Jampro and it has been a good one.

RIGHT ON SCHEDULE

Because we were approaching our CP expiration date, Jampro built the antenna in a very tight time frame and tested it on their range in California before shipping it to the Huttig site. Right on schedule, they delivered a turnkey antenna and transmission line package including 2,000 feet of three-inch Andrew Heliax transmission line, complete with all the brackets and parts necessary to mount everything on the tower.

We brought in Radian Communications from Oakville, Ontario to do the rigging. It's amazing how fast it went up—less than a week! After it was mounted, Jampro sent their technician to our site. He checked things with a network analyzer and verified that everything was fine.

When we put power into the Jampro there was an excellent VSWR, and everything was perfect. Now we are reaching all or part of eight counties in southeast Arkansas, plus, as a bonus, at least four counties in Louisiana. The directionality that we specified protects the CBS DTV affiliate in Little Rock that's also on ch. 12. The job took some time, but we did it right and are pleased with the outcome.

Gary Schultz has 30 years experience as a broadcast engineer. He began his career at CBS in New York, worked at RCA in Camden, N.J. and also for independent television station WPHL in Philadelphia before joining the Arkansas Educational Television Network. He may be reached at gschultz@aetn.org.

For additional information, contact Jampro at 916-383-1177 or visit www.Jampro.com.

Transmission

L-3 Communications Electron Devices Division

1035 Westminster Drive
Williamsport, Pa. 17701

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

KEY FEATURES

- **High efficiency UHF operation**
- **Unmatched customer service record**
- **Best pricing and the longest warranty in the industry**
- **Replacement tube packages for all popular transmitters**

USER	Ray Felckowski Manager of RF Systems WNED-TV 716-845-7000	Ed Kennedy Director of Engineering WETA-TV 703-998-2027	Dave Smith Chief Engineer WQHS-TV 440-888-0061	Michael Wall Vice President of Technology KVIE 916-614-3570
WHAT L-3 PRODUCTS ARE YOU USING?	MSCDCIOT	IOTs	Input cavaties and 480L IOTs	MSDC CEA IOTs
HOW ARE THEY USED?	In our Thales Paragon transmitter	In our analog and digital transmitters	In our Itelco 110 kW transmitters	In our two Thales Paragon transmitt
DID THEY REPLACE ANOTHER BRAND?	No	Yes	No	No
HOW LONG HAVE YOU BEEN USING THEM?	For three years	Analog, almost five years; digital, three	Originals with transmitters in 2001	One is 34 months old; the other 9.
WHAT DO YOU LIKE MOST ABOUT THEM?	Trouble-free operation	Reliability; better performance	Reliability and efficiency	Cost of ownership & no crowbar cir
WHAT DO YOU LIKE THE LEAST?	Nothing	They're somewhat prone to arcing.	Difficult to change	Having to work with 38 kV
HAVE YOU HAD ANY PROBLEMS WITH THE PRODUCTS?	No problems at all	A couple of input cavity issues. These were quickly resolved by L-3.	None reported	Cavity arcing due to fine dust proble our transmitter. L-3 replaced the cav with a new style; no more problems
HOW WOULD YOU RATE THE MANUFACTURER'S SERVICE/SUPPORT?	Can't say; haven't had to call on them yet.	Excellent, period.	Excellent. They've even delivered tubes and cavities on site by car with just a day's notice. They ensure that we're always on the air.	Excellent. This is a new technology a we're all learning. L-3 has been a pa instructor and has offered immediat phone and on-site support.
WHAT WAS THE DECIDING FACTOR FOR YOUR PURCHASE?	The MSDCIOT concept—high efficiency and stable operation	Price, tube specs, product support and the service ethic of L-3	I was not involved in the purchse.	Cost of ownership. The savings in ut power has more than paid for the sn additional cost of the tubes.

...formation, contact L-3 Communications at 570-326-3561 or visit www.l-3com.com/edd.

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TV Technology's Equipment Exchange provides a FREE listing service for all broadcast and pro-video end users. Brokers, dealers, manufacturers and other organizations who sell used equipment on an occasional basis can participate in the Equipment Exchange on a PAID basis. All free listings run at the discretion of the publisher. Call 1-703-998-7600 for details. Submit your free listings on your letterhead and state the make, model number, a brief description, sale price and complete contact information and mail it to: TV Technology, PO Box 1214, Falls Church VA 22041

AUDIO PRODUCTION

Want to Sell

Bittree & ADC Audio and Video Patch Panels from $250; 45RU racks from $450; Graham-Patten D/ESAM 230 audio mixer, $6500; Mackie 1604 VLZ Pro, new, too low to quote; Mackie 1604 VLZ used, $550; Mackie 24-4, BO; Tascam M-2600 MK II 16-Channel Mixer, $1,750; Digidesign 888, $650; Sony PCM7040 DAT, $3,990; Panasonic SV-3700 DAT, $200; Panasonic SV-3800 DAT, $300; Wohler Amp 1-A, $325; Wohler AMP-1A-VTR, $550; Wohler AMP-1AP, $325; Wohler Amp-1APF, $325; Wohler AMP-1APS, $325; Wohler MSH-8AL Audio Level Meter, $700; Wohler VMQ-4, $500; Audio Monitor Neumann U87 Ai Studio Microphone, $1495; AKG C 414 B ULS Microphone, $950. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

AUTOMATION EQUIPMENT

Want to Sell

Complete working NTSC SDI master control, three rack control room includes Nverzion automation, 2.4 TB archive server, two360 Systems IS-2000s, 8A+8D X 8A+8D Utah 400/64 router, Ensemble Designs glue ware, 4 patch bays, BSS CG, JVC monitor, Wohler, Videotek sync gen and Vid/Aud analyzer. MAP console includes two Viewsonic flat TVs, Videotek WFM, Mackie board and powered speakers. Ingest station in half-rack has BVW-75, DSR-1500A, J-30, JVC monitor, Videotek WFM, Wohler. Also, three APC UPS-2200s, manuals, spares. Assembled 9/5 and ran three months flawlessly. System is cuts-only plus CG, add your favorite branding This fully redundant turn-key system is ready for years of demanding 24/7 service. More info and photos: http://localtvnet.com/mc or email dbissett@localtvnet.com.

CAMERAS

Want to Sell

JVC GY-DV500, Canon 13X lens, 172 drum hrs, shot gun mic, tripod plate, manual, Sony NP-220 chrgr, professional Vega wireless mic, xmtr, rcve & mic plug-in, $2650; Sony UVW-100B BetaCam SP camcorder, mint cond, 140 original drum hrs, Canon J12x10BKRSM 12X bdct lens & Sony LO-32BMT lens adapter, tripod plate, original box & manual, $4000; Sony PD-170 professional DVCam camera, batt, chrgr/AC pwr sply, .7 Sony wide angle lens, Century Optics .55 wide angle lens, Century Optics fish eye lens, Anvil hard case, used only 5 times, under warr, $2600; Sony DXC-637 2/3" chip camera, DSR-1 DVCam deck, Canon J15.9x5.5 lens. $4000. 808-955-3399.

Panasonic DVX100A incl camera, lens shade/cap, 3 batts, chrgr, pwr sply, $2200; Century Precision .7X wide angle converter for DVX100A, $500. Alex, 727-595-6050.

Sony DXC930 color video camera, $2995; Sony DXC990 color video camera, $3995; Listec studio prompter, call; Miller 50 fluid heads & wooden sticks, call; Cartoni Beta w/2 stage aluminum sticks, $1700; Glidecam Steadicam Rig, call; Matthews Doorway dolly, call; Trovato Chameleon dolly, call; Mole Richardson Baby Solarspots, Tweenies & Midget solarspots, call; Autro MB Cyc lights, various, call; Strand stage lighting, call. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

CAMERA ACCESSORIES

Want to Sell

Miller 30 Tripod II legs only, 2 stage legs only, floor spreader, black, arm, gd cond, $650; Miller 30 Tripod II, 30 lbs head capacity, 2 stage legs, floor spreader, black, arm, gd cond, $1800. 808-955-3399.

CAREERS

EDITING EQUIPMENT

Want to Sell

Avid Adrenaline, $15500; Avid Symphony Version 3.5 on IBM Intellistation, $12500; Avid MC 9000 on Mac G4, $10500. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

AVID Express hardware/software turnkey system w/computer, 3D real-time system, 21" Sony monitor, Mac, 177Gigs SCCI hard drives, holds over 10 hrs of video, complete hardware & software, all manuals/boxes, etc, $4300; Casablanca AvioDV, version 1.8, incl PIP, ProPac, Effects & Fonts, Christmas effects software, keyboard & mouse y/c adapter, original box, manuals & training tapes, $1000; Sony DFS-300 video switcher, 3D board, 4 inputs, color correction, xlnt cond, $2500; JVC RMG-870 A/B roll dynamic tracking edit cntrlr, side key pad, xlnt cond, original box, $1000. 808-955-3399.

LENS REPAIRS

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

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Want to Sell

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MONITORS

Want to Sell

Sony PVM-20M4U, $1750; Sony PVM-14M2U, $1095; Sony PVM14L2, $1295; Sony PVM8042Q, $500; Sony PVM8041Q, $400; JVC TM H1750CG 17" color monitor, B-stock, $640; JVC TM H1950CG 19" color monitor, B-stock, $925; JVC DT-V1710CGU 17" HDTV monitor, B-stock, $1890. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

SIGNAL PROCESSING

Want to Sell

Leitch DPS 575 digital processing, $4495; Leitch FR-684 Dual PS 2RU Frame, $295; Leitch FR-884 Dual PS 2RU Frame, $295; Leitch Mix-7001 Multi-function digital frame, $400; Leitch 6804 Mounting Frame w/Pwr sply, $250; Leitch SPG-2602N Pulse Gen, $1,250; Sony BVX-D10/BVR-11, $3,990; Leitch DPS-295 Component TBC, $1,800. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

STATIONS

Want to Sell

Class A TV Station for sale in Muskegon, MI, turnkey operation, on air for sixteen years, owner retiring, for more information go to http://hometown.aol.com/wmkg/index.html, $750,000. 231-733-4040.

SWITCHERS

Want to Sell

GVG 2200 switcherw/Krystal effects, $27000; Videotek RS-12DVA SDI Routing Switcher, $600; Miranda Digipath 16x16 SDI Router (w/remote panel), $3,500; GVG Ten X, $600; Kramer 5X4 A/V Switchers, new, $475. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

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Tektronix WFM601i SDI Waveform, $4500; Tektronix WFM601 SDI Waveform, $3500; Tektronix 1755 wfm/vec, $2750; Tektronix 1755A wfm/vec, $2950; Tektronix 1765 NTSC/Pal wfm/vec, $3450; Tektronix 1710B, $1000; Tektronix 764 Digital Audio Monitor, $1000; Videotek TVM-821D, $3295; Videotek VTM-200, $3195. 818-246-7100 or 212-564-9933or www.tvprogear.com.

TRANSMITTERS/ EXCITERS

Want to Sell

TRANSMITTERS-Used TV transmitters from Harris, Acrodyne, RCA, Emcee, TTC. Antennas, microwave, feedline, etc. See transmitterwarehouse.com or call 954-792-7207.

ITC-830 UHF xmtr, 1kW solid state, TV chnl 28, xlnt cond, $7000, if interested contact Gerald Heyn, WBUP-TV, Marquett, MI 49855, 906-225-5700 or jer@gwinnwireless.com.

VIDEO PRODUCTION EQUIPMENT

Want to Sell

Sony VPL-900 resolution SXGA1280 x 1024, very good picture, compatible NTSC, PAL, SECAM, NTSC, 4.43, PAL-M system, wireless remote cntrl, manual, mint, $1600; EPSON Powerlite 51C, xlnt cond, used 8 times, $1000. 808-955-3399.

VTRs/VCRs/ RECORDING MEDIA

Want to Sell

JVC BR-HD50U HDV/DV VTR, 12 hrs, mint in box, $2450; Sony VO-9800 3/4SP 30 hrs on new head, multi-pin dub cable, xlnt cond, $1000; Pioneer PRV-9000 professional DVD rcdr w/remote cntrl, $500; JVC BRS-800 S-VHS, $300. 808-955-3399.

Sony DVW-A500 digital Betacam rcdr, xlnt cosmetic & operational cond, incl 505 card, serial number 17,865, approx 3500 drum hrs, 90 day complete warranty on all parts & labor, does not incl shpg, $32000 + shpg. Contact info@customicrosystemsinc.com.

Sony UVW-1800 BetacamSP, $3950; Sony PVW-2800 BetacamSP, $4750; Sony PVW-2650 Betacam SP, $1990; Sony PVW-2600 Betacam SP, $1950; Sony BVW-70, $4750; Panasonic AJ-SD93 DVCPRO 50, lw hrs, $5495; Sony DSR-2000, $9500; Sony VO 9850 w/timecode, $1200; Sony VO 9800, $1000. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

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STS is expanding our operations. We are currently accepting resumes for KU satellite truck operators and HD techs. C-Band, ENG, and HD encoder experience a big plus. Must have excellent driving record and references. Job requires flexible 24/7 on-call schedule, which includes nights/weekends, overtime and travel. Must work well under pressure and tight deadlines. (We are also accepting resumes for freelance SNG, freelance C-Band, freelance HD techs, and future full-time C-Band operator positions.)

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No phone calls please. Check out our website: stslivetv.com.

POSITIONS WANTED

Station manager wanted for Muskegon, MI TV station, salary negotiable. 231-733-4040.

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.

REFERENCE GUIDE

MANUFACTURER	MODEL	SHARED/ SINGLE CHAN.	POWER LIMIT	PATTERNS AVAILABLE	COMPUTER, SCALE MODELING	FEATURES	TYPICAL CONSTRUCTION TIME
Antenna Concepts Inc. 530-621-2015 *www.antennaconcepts.com*	Champion	Single channel	Variable	Multiple pattern options	Computer modeling available	Single input; DC grounded; lightning protection	12-18 weeks
Dielectric Comm. 207-655-4555 *www.dielectric.com*	TUV Dualband	Shared UHF and VHF	Input power levels support full ERP for VHF and UHF	UHF: Omni or directional VHF: Omni	Computer/scale modeling or full-scale modeling available	Combine VHF/UHF in one antenna; full ERP; uses pylon technology	180 days
Electronic Research Inc. 812-925-6000 wwww.eriinc.com	TRASAR	Single or adjacent channel UHF, single channel VHF	100 kW	Multiple azimuth and elevation patterns	Available	IP67 rated, pressurized, high power, top or side mounted	16 weeks
Jampro Antennas 916-383-1177 *www.jampro.com*	JHUD-UHF Panel & Prostar Slot	Multichannel, broadband	All power levels available	Multiple pattern options	Computer modeling and full scale range testing	High power handling, broadband, light weight low wind load	4-8 weeks
Kathrein Inc., Scala Div. 541-779-6500 *www.kathrein-scala.com*	771 304 Superturnstile	Broadband 470-860 MHz	4 kW DTV	Omnidirectional	Patterns are available for download online 19 formats	Full UHF band. Specify DT and NF Full fiberglass radome	6-10 weeks
Micro Communications 800-545-0608 *www.mcibroadcast.com*	UHF-955000 Series; VHF-954000 Series	Multichannel UHF-470 to 860 MHz; VHF-174 to 216 MHz	Input power based on customer requirements	Multiple pattern options; custom patterns	Available	High power multi-channel capacity; low ripple pattern; top side and leg mounting	12-16 weeks
Propagation Systems (PSI) 814-472-5540 *www.psibroadcast.com*	Digital Slot and Panel Antennas	Digital/analog multichannel operation	Up to 120 kW	Multiple pattern options	Modeling available for custom patterns	Digital/analog mode operation, low wind load, value priced	2-8 weeks
Radio Freq. Systems (RFS) 203-630-3311 *www.rfsworld.com*	PHP UHF Panel Series and RD Slot Cavities Series	Multichannel	160 kW	Standard and/ or custom	Tower simulation effects on coverage pattern	Multichannel; high power; excellent coverage	8-10 weeks

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wwg@imaschina.com

Gannett to Buy Tribune's WATL-TV

ATLANTA

Gannett is purchasing WATL-TV, Channel 36 in Atlanta, from, Tribune for $180 million. Gannett said it will continue to own and operate NBC affiliate WXIA-TV, also in Atlanta.

The transaction will close upon regulatory approval.

WATL is currently a WB Network affiliate, but expected to join Fox's MyNetworkTV when the new News Corp.-owned network launches in September.

Tribune Chairman and CEO Dennis FitzSimons said the deal was part of a stock repurchase strategy it revealed in May. The company said it would acquire up to 75 million shares of its common stock, sell about $500 million in assets, and reduce operating expenses by $200 million over the next two years.

Tribune, which operates 26 television stations including Superstation WGN and Chicago's WGN-AM, acquired a minority stake in WATL in 1995 and obtained full ownership of the station in 2000 as part of its acquisition of Qwest Broadcasting.

The WATL purchase will be the third television duopoly for Gannett. It also has a pair of television stations in Jacksonville, Fla. and Denver.

Belden CDT to Close Two U.S. Plants

ST. LOUIS

Belden CDT Inc. plans to close two of its cable manufacturing plants in the U.S. and open a new manufacturing facility near Nogales, Mexico. The move is intended to cut operating costs, according to the company.

Belden CDT will begin phasing out production during the third quarter of 2006 at its Tompkinsville, Ky., and Fort Mill, S.C., plants. The Tompkinsville plant manufactures coaxial cable; the Fort Mill plant manufactures twisted-pair data cable.

Employment will be reduced at both plants beginning in the third quarter of 2006 and continuing until the plants are closed in late 2007. There are 200 employees at Tompkinsville and 115 at Fort Mill.

The company expects to recognize up to $2 million in second-quarter asset impairment charges and accelerated depreciation costs due to the closings. It also expects to record severance charges totaling $3.6 million over several quarters related to the closures, beginning in the third quarter of 2006 and continuing through 2007.

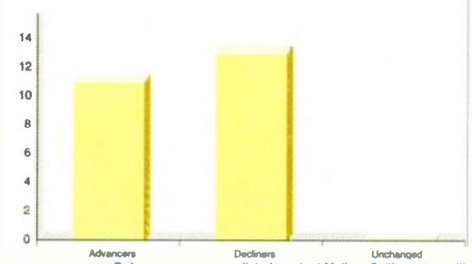
The company said it plans to outsource a portion of the production and move the majority of the production to the new facility in Nogales.

Stroup said the company anticipates its capital investment in the new facility to be about $30 million, and plans to have it operating in the third quarter of 2007.

When completed, Stroup said the changes among Belden CDT's North American manufacturing facilities are expected to contribute savings of approximately $12 million per year, beginning late in 2007.

The new Nogales plant will be the company's third manufacturing location in Mexico. The company currently operates two manufacturing sites in Mexico, one in Nogales and one in Tijuana.

WIN-LOSE RATIO



TOP ADVANCERS BROADCAST STOCKS
(Mar 26 - June 9)

Tribune	+14.59%
Young	+13.10%

TOP DECLINERS BROADCAST STOCKS
(Mar 26 - June 9)

Gray	-9.83%
Lin TV	-3.49%

TOP ADVANCERS TV TECH STOCKS
(Mar 26 - June 9)

Ciprico	+5.72%
SeaChange	+5.49%

TOP DECLINERS TV TECH STOCKS
(Mar 26 - June 9)

LSI Logic	-11.58%
Harmonic	-6.01%

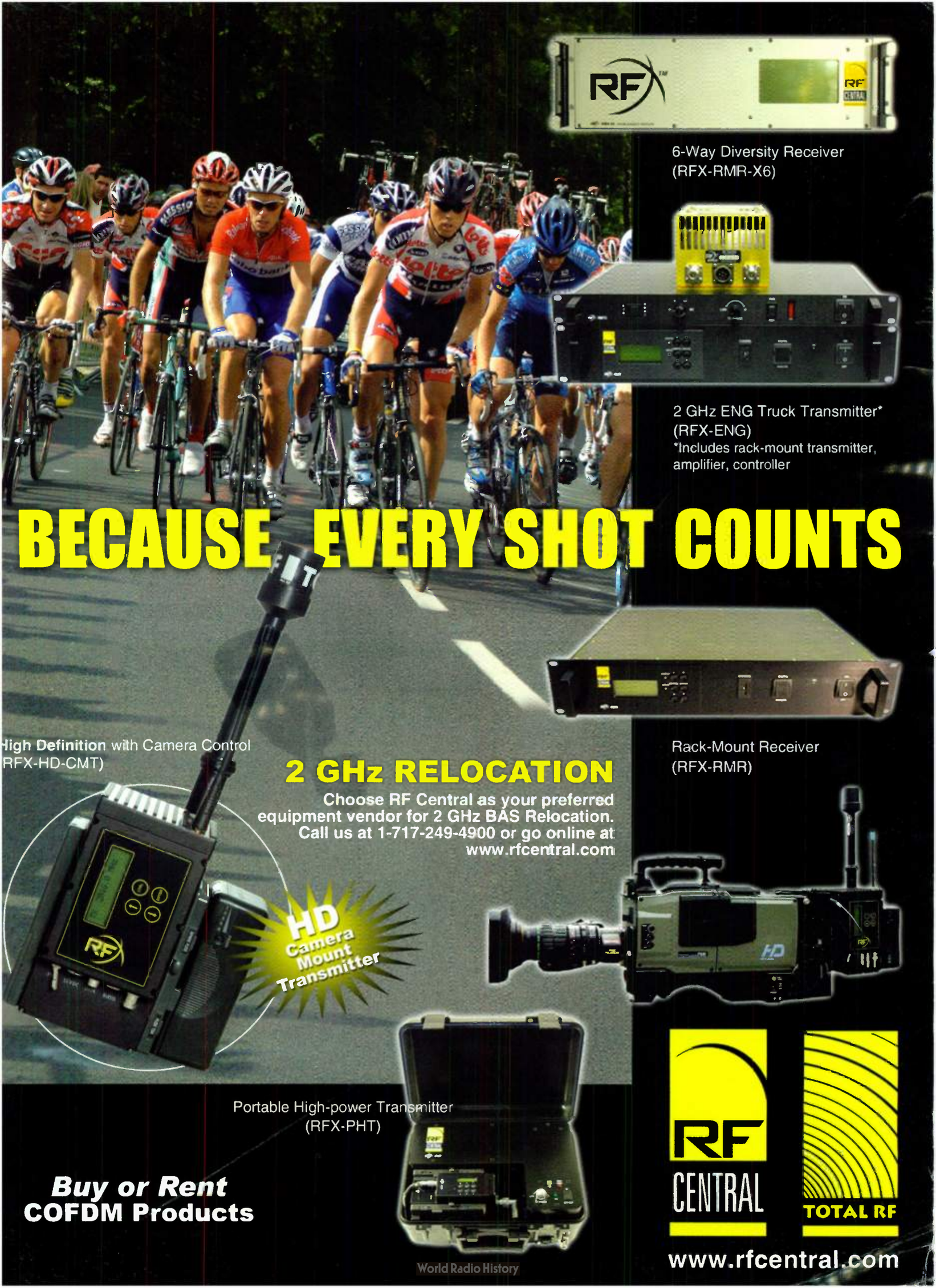
To have your company listed, contact Melissa Sullivan at msullivan@imaspub.com.

TV Tech Stocks as of June 9

Company Name	52-Week Range	May 26	June 9	% Change
Avid	35.78 - 61.39	39.09	37.35	-4.45%
Belden	18.65 - 33.55	31.30	30.46	-2.68%
Ciprico	3.70 - 6.84	5.77	6.10	5.72%
Harmonic	4.08 - 6.95	4.49	4.22	-6.01%
Harris	30.56 - 49.78	41.72	39.74	-4.75%
LSI Logic	7.60 - 11.81	10.10	8.93	-11.58%
Scopus	4.80 - 8.35	5.57	5.65	1.44%
SeaChange	5.07 - 9.89	6.19	6.53	5.49%
Tektronix	22.46 - 36.89	31.36	31.21	-0.48%

Broadcast Stocks as of June 9

Company Name	52-Week Range	May 26	June 9	% Change
Acme	3.50 - 5.43	4.80	5.25	9.38%
Belo	16.13 - 24.96	17.16	16.99	-0.99%
Entravision	6.80 - 9.50	7.91	8.02	1.39%
Fisher	41.43 - 50.00	43.00	42.65	-0.81%
Gray	6.21 - 13.59	6.92	6.24	-9.83%
Hearst Argyle	21.85 - 26.34	22.48	22.13	-1.56%
Nexstar	3.93 - 6.37	5.15	5.21	1.17%
Lin TV	8.30 - 15.49	9.18	8.86	-3.49%
Paxson	0.37 - 1.15	0.83	0.90	8.43%
Sinclair	7.18 - 10.07	8.45	8.42	-0.36%
Univision	23.52 - 36.67	36.09	35.03	-2.94%
Young	1.70 - 5.58	3.13	3.54	13.10%
Tribune	27.09 - 39.56	27.89	31.96	14.59%
Meredith	46.50 - 56.83	49.89	50.00	0.22%
EW Scripps	43.21 - 51.19	46.47	46.81	0.73%



THIS IS NOT AN AUDIO CONSOLE.

Audio Control

D-9

IT'S A DIGITAL CONTROL SURFACE

THE D-9 interfaces to WHEATSTONE's router-based BRIDGE MIXING SYSTEM—a digital network that lets multiple control surfaces share common audio resources, accessing signals and sending mixes throughout your facility.

Production

OTHER SURFACES can share common audio resources

Studio 2

I/O CONNECTIONS can be at point-of-use and accessed by any control surface

DEDICATED DSPs and controls, redundant automatic failover CPUs, mix engines and power supplies are all integral to the system. Components interconnect via CAT5 or fiberoptic cables for single-wire system integration.

A traditional intuitive surface layout gets your operators up and running FAST—even in full 5.1 surround mode.

TRUE RELIABLE mixing power; ease and clarity of operation—take ADVANTAGE of the WHEATSTONE BRIDGE Network System!

CENTRAL FRAME can control a 1024 x 1024 mixing based router

Engineering

Engineering

Talk to your **STATION ROUTER** bi-directionally for smooth integration

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