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VOLUME 22, NO. 13 • JULY 7, 2004

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Tuner Time

FCC phase-in begins

by Deborah D. McAdams

WASHINGTON

This is the first article in a two-part series about over-the-air digital television reception technology, which is being added to TV sets in accordance with the FCC's tuner mandate, and plug-and-play order.

Ever since the government rubber-stamped 8-VSB as the digital television transmission standard in 1997, questions about its receivability plagued broadcasters.

Now, the true test is nigh. The first phase of the FCC's order requiring new TVs to include off-air DTV tuners kicked in July 1, and cable-ready sets, which must also include the tuners, are

already appearing in electronics showrooms. The intention is that new, digital-reception capable sets eventually will supplant old analog sets in the market.

"We've always said, if you can't receive this indoors with a simple antenna, it ain't gonna work," said Nat Ostroff, vice president of New Technology at Sinclair Broadcast Group.

So tenacious was Sinclair's criticism of 8-VSB receivability that it became the stuff of industry folklore. In the meantime, a handful of engineers quietly applied their intellects to 8-VSB reception—commonly referred to as ATSC, named for the Advanced Television Systems Committee, from whence the standard came.

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TU Returns to the Titanic

Page 14



Ken Marshall 147 ©

Planning for Disaster

Broadcasters grapple with security

by John Merli

WASHINGTON

Round 2 of the Media Security and Reliability Council (MSRC II) began last month when the group held its first meeting since the FCC rechartered the consortium of broadcasters, manufacturers and government officials for an additional two years.

The meeting began and ended with a number of vague but omi-

nous observations.

"I don't want to fuel the rumor mill, but it is important that we have a high sense of urgency to all this," Hearst-Argyle Television CEO David Barrett said in opening remarks in a meeting that lasted only about 45 minutes.

Barrett, who gave no further details regarding the rumors to which he alluded, was appointed to chair the council in March by FCC Chairman Michael Powell.

The 41-member council met at FCC headquarters, preceding a public forum co-sponsored by the Department of Homeland Security (DHS), where some panel members expressed continuing frustration with federal officials who appeared to make contradictory statements regarding homeland security that often lack specificity but not urgency. Panel moderator Sam Donaldson of ABC News underscored a situation that occurred in late May, when Attorney General John

Ashcroft and Homeland Security Secretary Tom Ridge appeared to have been competing for attention over jurisdiction of security-warning protocol, as well as the severity of the warnings.

"Clearly," Donaldson said to panelist Susan Neely, DHS public affairs assistant secretary, "the government did not speak with one voice ... which can present a real problem for us, the media, who have to report on all this."

While not responding directly to the question of overlapping jurisdictions, Neely said effective homeland security also includes what the media does not report—such as erroneous

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CONTRIBUTING WRITERS

NAME:
Karl Paulsen

COLUMN:
Media Server Technology



In the process of planning for a system that will manage media assets, it becomes extremely important to quantify, qualify and clarify what the MAM, DAM or DRM system is to accomplish. When quantifying how well a system is expected to perform, ... Page 25

NAME:
Jerry Whitaker

COLUMN:
ATSC Outlook



The ATSC has published two new Candidate Standards documenting enhancements to the AC-3 digital audio compression standard and specifying its use in digital television. This is a major step toward using advanced audio coding for a wide variety of applications. Enhanced AC-3 will provide ... Page 28

NAME:
Randy Hoffner

COLUMN:
Technology Corner



We have recently taken a look at some of the older and the newer ways television pictures are shown, considering both direct-view displays and projection displays. It is fair to say that one of the strong trends in the television display business is the increasing ... Page 30

The staff can be contacted at the phone extensions listed or via e-mail using first initial, last name @imaspub.com

Publisher: Eric Trabb

732-845-0004

Associate Publisher:

Marlene Lane

ext. 128

Editor:

Tom Butts

ext. 122

News Editor:

Dorah McAdams

ext. 177

Technology Editor:

Bob Kovacs

ext. 150

Associate Editor:

Lauren Evoy

ext. 149

News Correspondents: Frank Beacham, Art Daudelin, Claudia Kienzie, William T. Hayes, Naina Narayana Chernoff, John Meril, Mary Gruszka, Craig Johnston and Susan Ashworth.

Production Director:

Annette Linn

ext. 125

Publication Coordinator:

Carolina Schierholz

ext. 106

Ad Traffic Manager:

Kathy Jackson

ext. 134

Classifieds/Product Showcase Coordinator

Milagros Castañeda

ext. 109

Ad Coordinator:

Caroline Freeland

ext. 153

Circulation Manager:

Kwentin Keenan

ext. 108

President/CEO:

Stevan B. Dana

ext. 110

Vice President/
Group Publisher:

Carmel King

ext. 157

COO/Edit. Dir.:

Marlene Lane

ext. 128

Chief Financial Officer:

Chuck Inderrieden

ext. 165



FROM THE EDITOR

Progress on the Tuner Front

Four years ago, at the height of the debate (some would say "war") over the 8-VSB transmission standard, Sinclair's Nat Ostroff told Zenith, among others, that broadcasters didn't "trust" manufacturers and accused the consumer electronics industry of manufacturing gear with "unacceptable flaws."

What a difference four years makes.

After the battle over the VSB vs. COFDM effectively ended when the FCC reiterated its approval in 2001 of the VSB standard, manufacturers set about working on improving receivers, (and ATSC, as well initiated work on enhancing the VSB standard). Now we're seeing the fruits of those labors. The initial results are encouraging, with some caveats.

I knew things had really changed when I sat down with Mr. Ostroff at NAB and he told me that Zenith's fifth generation DTV receivers may have finally "solved the indoor antenna reception problem." This was before the company put out a press release last month detailing tests it had conducted in Baltimore at sites that had previously failed to pick up signals.

Ostroff made it clear to me that his battle was never with Zenith, which owns the patent to VSB technology, but rather with the con-

sumer electronics industry as a whole, and in particular with the CEA, which he has not let off the hook. In fact, he thinks Sinclair should be given some credit for improving the technology. "I think our efforts helped accelerate the development of bringing a viable over the air receiver to the market," Ostroff said. "It forced people to act."

It will be later this year before the new Zenith chips reach the consumer marketplace, but the development of the improved technology comes at a crucial time in the DTV transition. By the time you read this, the first phase of the mandatory DTV tuner act will be in effect and, although the impact of the mandate will take some time to realize (how many owners of 36-inch-plus DTV sets do you know who use antennas to watch broadcast DTV?), the mandate marks one of the first true tests of consumer acceptance of over-the-air DTV. Unfortunately consumers' experience with over-the-air DTV up until now have been well documented in the trade press and are now being picked up by the general press.

In a hard-hitting article on broadcast DTV in The New York Times last month, viewers vented their frustration over trying to receive reliable DTV signals. One consultant even warned DTV cus-

tomers to "steer clear" of broadcast DTV after grudgingly acknowledging that the technology was improving. The article cited the usual culprits that we're all familiar with: complex, software-based set-tops and low power digital signals, among other things. The accusations have been repeated many times in these pages: No one entity in this industry is completely blameless for the problems in the transition.

Nevertheless, the improvements in the receiving chips are an important and encouraging development in this transition. In addition, the ATSC's recent approval of voluntary guidelines for DTV receivers gives the industry much-needed guidance in which to develop next generation technology. The next big hurdle will come when broadcasters increase their signal power. It's the classic Catch-22 for the industry; the expense of running dual transmission systems is taxing broadcasters' budgets and many claim that it's not financially prudent to broadcast at maximum power with so few digital broadcast viewers. But that could change with the increasing presence of DTV tuners on the market.

Tom Butts
Editor

tbutts@imaspub.com

LETTERS

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

Those Pesky Consumers

Dear Editor:

I recently read your May 5th editorial "The TV Set in the Bedroom." While I'm not really clear on what point you were trying to make, you sounded like you wanted to say, "...the main problem in the broadcasting industry is those pesky consumers and end-users."

Granted those (analog) TV sets in the bedroom just may be holding up reallocation of that chunk of spectrum, but here's the problem that you, the DTV manufacturers and the Washington lobbyists have: those consumers have a legitimate claim to owning that spectrum. Put another way, does the phrase, "...licensed in the public interest" ring a bell? I'd love to see a show of hands from DTV vendors that have had the thought, "If these stupid consumers would just realize that HDTV is better for them and throw away their SDTV sets, every-

thing would be just fine; we could sell our boxes and everyone's stock portfolio would go back to where it should be."

I'll once again state the dirty, ugly little secret of the HDTV situation that is the bane of the vendors: most consumers can't afford HDTV right now. So the only hope for the vendors is to do an end-run and get the government to force HDTV upon the consumers. After all, the government always knows what's best for the consumer anyway, right? In a twist of the old classic movie, Fahrenheit 451, perhaps the government could have teams come to consumers' houses and search for what would be illegal analog TV sets. Bet the vendors would like that.

Best regards and keep up the great work,

Charles Farr
Virginia Beach, Va

TV Technology (ISSN: 0887-1701) is published semi-monthly by IMAS Publishing (USA) Inc. 5827 Columbia Pike, Third Floor, Falls Church VA 22041. Phone: 703-998-7600. FAX: 703-998-2966. The international edition is published monthly along with the month's second domestic edition. Periodicals postage paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send address changes to TV Technology, P.O. Box 1214, Falls Church VA 22041. Copyright 2004 by IMAS Publishing (USA) Inc. All rights reserved. For reprints contact the author and TV Technology.

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HD in 35mm Introduced

WOODLAND HILLS, CALIF.

Panavision recently announced a new camera for electronic cinematography called Genesis, which uses a Super 35mm imaging sensor for compatibility with film lenses and production techniques. Panavision and Sony jointly developed this high-definition camera.

Designed to be about the same size and weight as a Panavision 35mm film camera, Genesis can be docked to a Sony SRW-1 HDCAM-SR recorder for portability. The CCD imaging sensor works in true RGB at a resolution of 12.4 megapixels, and the camera has two 4:4:4 HD-SDI outputs and a 4:2:2 HD-SDI monitor output.

"Digital moviemaking is a reality," said Bob Beitcher, president and CEO

of Panavision. "We felt that we should design a digital camera that makes sense to filmmakers."

Development of Genesis was kept secret by Sony and Panavision, where the project was known as NGC for "next-generation camera." The Super 35mm CCD is based on the Dalsa Origin sensor, which was originally developed for medical imaging devices, and the camera permits variable speed recording up to 50 fps.

One of the requirements for the Genesis was that it have the same depth-of-field as a traditional film camera. In addition, Panavision designed it to use all of the company's popular 35mm film lenses, including its Primo line of prime and zoom lenses.



Panavision Genesis

Technology

Remote AquaCam Propels HD

LOS ANGELES

Underwater cinematographer Pete Romano recently dipped his toes in HD. The underwater cinematographer and president of Hydroflex Inc., has shot with film for the past 30 years. Now he's developed the company's new HD Remote AquaCam to help move film shooters into submerged HD video production.

Romano cited issues such as vignetting—when part of the image is cut off from the frame—as a reason for moving to the HD AquaCam.

"My roots are so deep in film, but I also know there is a changing climate," said Romano, whose DP credits include "The Life Aquatic," "Waterworld," "Pearl Harbor" and "The Italian Job."

The 74-pound HD AquaCam has a watertight housing designed to accommodate several professional cameras, including Sony's HDW-950, F950 and F900 and Panasonic's 24p Varicam. It incorporates a Fujinon HA13x4.5 wide-angle HDTV cine style lens with Preston iris, focus and zoom hand unit

controls for the camera.

"The HA13x4.5 is the widest lens out there, and with this special housing, we're able to take full advantage of that," Romano said.

The HD Remote AquaCam was



Pete Romano uses the Aquacam for a hi-def underwater fashion shoot.

designed to mount on HydroFlex's underwater pan-and-tilt remote head, but because of its elliptical shape, the AquaCam can also be handled and moved through the water easily.

The AquaCam has remote camera and lens controls, allowing shooters to get closer to the subject, and resulting in a clearer shot of the subject. All iris, focus and zoom functions are controlled with the Preston hand unit, which is operated at the surface.

High Definition



FCC GRANTS DTV EXTENSIONS

Although more than 1,000 commercial TV stations have begun DTV broadcasting, some stations still can't meet the construction deadlines. Last month, the FCC considered 35 requests for a third extension of construction deadlines, which require the attention of the full commission.

Four requests were from satellite TV stations, which are full-power operations authorized to retransmit all or part of the programming of a parent station. Since the FCC has deferred the DTV construction deadlines for satellite TV stations pending the outcome of the DTV periodic review proceeding, the commission gave these stations relief from the deadline. The FCC is considering allowing satellite TV stations to "flash-cut" to DTV at the end of the transition.

For 29 other stations granted extensions, a variety of explanations were given to justify the extension. One station's construction was delayed due to problems obtaining a lease for antenna space on New York's Empire State Building after the Sept. 11 terrorist attack. WFUT-DT, Newark N. J., has obtained an STA to operate from an alternate site and is working to install equipment there.

Four stations—KOLN-DT, WAWD-DT, WJHG-DT and KXLA-DT—were granted extensions due to documented problems with tower construction or technical problems with their antennas.

Eleven stations are either awaiting FCC action on construction permit modifications or channel changes, or received authorizations recently and have had insufficient time to complete construction. The commission found that the stations had taken the necessary steps to complete the commission proceeding, but were unable to do so prior

to their DTV construction deadline and were entitled to extensions. Fourteen stations were granted extensions due to construction being delayed because of financial difficulty.

According to the FCC, two stations—WBHQ-DT in Sumter, S.C., and WCOV-DT, Montgomery, Ala.—provided little support for their third extension requests. Although the stations asserted that there was a delay in construction, the commission was unimpressed with the support the stations offered to back up their claims.

WBHQ and WCOV were denied requests for unqualified extensions and required to report within 30 days upon release of the FCC Order on the steps they intend to take to complete construction, and the approximate date expected to reach each construction milestone. The stations also have to submit reports detailing construction progress after 60 days and justify any delay in meeting the milestones.

The commission went on record stating that TV stations giving the appearance of dragging their feet with respect to beginning DTV transmission will be placed in a remedial program, with a greater burden to demonstrate the reason for failing to complete their DTV construction. If the affected stations have not completed construction within six months, the FCC said it would issue a "Notice of Apparent Liability" unless the stations can demonstrate that the reasons for non-compliance are "extraordinary and compelling."

Although the FCC did not state that licenses would be revoked, it clearly is interested in turning up the heat on broadcasters deemed to be tardy with their digital transmissions.

Approximately 185 commercial television stations in the U.S.—out of a total of nearly 1,200—are not yet broadcasting a digital signal.

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Sony Cracks the 4K Barrier

New digital projector is the first to meet DCI specification

by Jay Ankeney

HOLLYWOOD

A major milestone in the progress of digital cinema was reached last month when Sony Electronics Inc. gave its first public demonstration of a true 4K digital cinema projector, the SRX-R110, at the Digital Cinema Laboratory in Hollywood.

"We want to help the motion picture industry make the move to digital cinema by following the guidelines

and specifications set forth by the Digital Cinema Initiative," said Tom Mykietyn, director of content creation for Sony Electronics.

"One threshold the studios have specified is 4K, or 4,096- by 2,160-pixel digital projection resolution, which will be vastly superior to what a consumer would be able to achieve in their own home theater. This demonstration at the Digital Cinema Lab proves we have finally accomplished that goal," he said.

When the Digital Cinema Initiative released DCI Technical Specifications

Version 3.0 last November, the bar for digital projection was raised to a hierarchical architecture approach, with the goal of making a practical 4K resolution delivery system that would also be compatible with existing 2K projectors.

THE HOLY GRAIL

A 4K delivery system is the image resolution level that the DCI members, including Disney, Fox, MGM, Paramount, Sony Pictures Entertainment, Universal and Warner Bros. Studios believe will provide a picture quality that will at least

equal—if not exceed—the resolution of 35mm film prints. Several companies, including JVC with its own DILA technology, have been giving 4K projection demonstrations at trade shows during the past year, but Sony is the first to do a public exhibition of a working model to the Hollywood production community.

"A 4K projector has long been considered the holy grail of digital cinema," said John Scarcella, president of Sony Electronics' Broadcast and Production Systems Division. "This

SONY, PAGE 21

Disaster

CONTINUED FROM PAGE 1

information in a rush to be first on the air—and is vastly helped by broadcasters who do their homework.

"Last November, some white powder shows up in an envelope in the Washington suburbs and the initial tests are positive for anthrax," Neely said. "But having gone through this before, a lot of us already knew that this often shows up as a 'false positive,' which thankfully and wisely was included in how this [incident] was widely reported by the media. We all do a reasonably good job of alerting the public that there could be a threat out there, but reporting the field tests alone may not be conclusive. And it turns out that [in this instance] it is a false positive. So the public is told there could be a threat out there, but not to worry about it needlessly."

EDITORIAL CONTEXT

Powell, for his part, said he believed the tangible act of providing information, alone, is a useful service.

"Giving out information itself is part of the solution. The mere [relaying] of facts... to people serves a worthy purpose."

Playing devil's advocate, Donaldson asked Powell if the media should simply consider passing on homeland security information to the public verbatim, as it is disseminated by government sources? Powell quickly said no.

"I think editorial context here matters significantly," he said.

The MSRC issued a series of "best practices" in December 2003 for electronic media to adopt in dealing with an array of emergency scenarios, ranging from dirty bombs and other terrorist acts to the upheaval wreaked on local communities from

weather disasters. The situations would require fundamentally different reactions from media and government. For example, a bio-terror attack typically would unfold gradually, rather than come as a single cataclysmic event; a chemical or radiological attack could require the public to seek adequate shelter in place rather than attempt to evacuate the danger zone. The Best Practices, among other things, cautions media outlets to be fully prepared for anything that may affect their respective markets in the foreseeable future.

"The key objective now is to have a disaster plan in place, and to rehearse it," Barrett told those attending the June gathering.

Rehearsal is a key to any successful plan, the MSRC has said repeatedly since it was first chartered by the FCC following the events of Sept. 11, 2001. But so far, the warning is falling on deaf ears within the broadcast industry. Barrett said only 17 percent of TV stations and a miniscule 7 percent of radio outlets have actually conducted rehearsals of their own plans. Cable appears to be doing much better, according to MSRC findings, with a 58-percent plan rehearsal rate. Powell has said in past meetings that a plan that is not rehearsed is not yet a plan at all.

RTNDF WORKSHOPS

But some help may be on the way to nearly a dozen major markets in the months ahead, according to MSRC II member Barbara Cochran, head of the Radio-Television News Directors Association (RTNDA). She told the council her group's educational foundation (RTNDF) will conduct 10 workshops starting this month—featuring simulated incidents tailored to each market that will call upon local media, government officials and experts to work in tandem. The fictional scenarios could include chemical, biological, nuclear

or radiological events. The workshops will use the resources of the DHS and the National Academies, with some input from MSRC II.

"Too often, emergency planners leave media out of their planning,

DHS about what it calls "critical infrastructure." The direct submission is to ensure that it will not be disclosed to the general public.

"RTNDA's concern is that government is sweeping vast amounts of



At the FCC public forum on homeland security: (l-r) moderator Sam Donaldson, ABC News; meteorologist Topper Shutt, WUSA-TV, Washington, D.C.; Steve Souder, director of Montgomery County, Md., 9/11 Emergency Communications Center; Susan Neely, DHS assistant secretary for public affairs; David Barrett, CEO, Hearst-Argyle Television; anchor Leon Harris, WJLA-TV, Washington, D.C.; FCC Chairman Michael Powell; and FCC Commissioner Jonathan Adelstein.

when, in fact, the public turns to the media for information in an emergency," Cochran said later. "A good and timely flow of information from public health and safety officials to the media can prevent the spread of panic and keep a crisis from turning into a catastrophe."

At press time, the workshops were scheduled for this month in Chicago, in Portland, Ore., in August; Kansas City in September; Philadelphia in October; Miami in December; Austin in January; Atlanta in March; San Francisco in April; Denver in June; and Boston in July 2005. (Check www.rtna.org for specific dates.)

The RTNDA did not mention at the MSRC meeting that it is calling on the DHS to revise some rules mandated by the Homeland Security Act, which encourage people to submit sensitive information directly to

public safety and security information behind a curtain of secrecy and it will be much more difficult for the public to hold government and businesses accountable," Cochran said.

Similar to Barrett's opening, Powell chose to end the MSRC II meeting with a vague hint of urgency as he noted the second half of 2004—a time frame that includes two political national conventions, Fourth of July celebrations on the Washington Mall and elsewhere, the Summer Olympics in Athens, and the pending presidential campaign and general election in November, among other high-profile events.

"Things are progressing, but they are always too slow. When I look out over this year, I am certainly hopeful, but I plan for the worst," Powell said. "I see some major events that could be trouble." ■



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Field Editing Heats Up

More options mean greater benefits for journalists

by Linda Romanello

NEW YORK

The market for laptop editing has accelerated considerably over the past few years, and companies such as Apple, Sony, Pinnacle, Avid, Thomson and Panasonic have all helped fuel the engine.

Ranging from HD to compatibility with Sony's XDCAM and Panasonic's P2, manufacturers are now delivering more efficient laptop editing systems with greater benefits.

"One of our customers is a journalist who works for CNN," says Avid's David Schleifer, director of broadcast and workgroups. "He was out in a truck in Syria, editing his report on Xpress DV [as the truck was in motion, driving over the rough terrain]. While he was feeding his story back to the studio via satellite, his van was rocking."

Avid actually offers several laptop editing systems. According to Schleifer, "one size does not fit all. Each segment of the market needs that custom fit to get the job done. Xpress DV can be used in a broadcast environment, but it is geared more toward the DV professional. NewsCutter XP is the tool that most journalists rely on. For instance, we focused on the importance of a laptop system that would be able to connect easily into the asset management system being used back in the newsroom."

NewsCutter XP includes effects, audio editing, titling, DV25/DV50 and 30, 40 and 50 Mbps IMX editing, a FireWire interface, and an option for Avid Mojo or Adrenaline for acceleration and HD capabilities.

To extend the HD capabilities of its DNA product line further, Avid introduced DNxHD at NAB2004. Avid products, including NewsCutter XP

and Xpress Pro, now include the 10-bit HD encoding technology that enables collaborative HD post production with the same storage bandwidth and capacity requirements as SD files.

MORE POWER

Eric Dufosse, director of product management and marketing for servers and digital news production for Thomson Grass Valley, recognizes the increasing need to have HD ability on a laptop, but also points out that one of the reasons why that's an option today is because the laptops themselves have become more powerful. He also stresses other factors ultimately led to the laptop's growing role in broadcasting, including FireWire interfaces, the migration of hardware-assisted workstations to software-only applications, more features, lower cost, higher storage capacity, easier format conversion, and simplified connectivity and compatibility to newsroom systems.

Thomson's NewsEdit LT features 2D effects, titling and speed. While Dufosse said, "the LT is the fastest laptop editing solution on the market," he

integration with Apple's Final Cut Pro software and joint technology agreement with Telestream's MAPone newsgathering application for WiFi transmission. MAPone supports low-data-rate wireless or wired transmissions. It compresses the files so that journalists and producers can edit stories in the field and file them cost-effectively via phone line or Internet access point.

MOBILE HD EDITING

Apple has positioned itself well as a provider of professional mobile-editing systems. The company offers powerful laptops, such as the high-end Titanium in the PowerBook series, as well as a professional editing system with Final Cut Pro.

"One of the great advantages of Final Cut," said Richard Kerris, senior director of professional applications marketing for Apple, "is that it can

going to talk about HD, but to actually deliver a codec at the very core of Final Cut Pro that enables HD to be used as any other resolution is used."

Final Cut Pro HD delivers the ability to capture, edit and output broadcast-quality HD video over a FireWire cable, without any additional hardware.

Panasonic has also joined Apple in delivering HD to mobile editing. Along with the announcement of Final Cut Pro HD, Apple and Panasonic jointly announced that they would offer HD over FireWire capabilities to mobile editing with Panasonic's AJ-HD1200A HD production VTR. Offering a FireWire interface and Apple's FCP HD professional video editing software, the system enables mass adoption of HD resolution images on PowerBooks.

Sony has a cost-effective solution for the laptop with Vegas 5 software, from its Sony Pictures Digital Networks division. The latest version offers increased functionality, more specialized features and an extensive audio upgrade. With advanced, real-time scalable production for SD, HD,

EDITING, PAGE 16



Journalists at Kanaal 3 in Belgium shoot their own stories using DV cameras, then edit them using Avid Xpress DV software.



Screenshot of Pinnacle Liquid

also described how partnerships with companies such as Apple and Telestream have helped increase the laptop's flexibility.

Thomson announced at NAB2004 its

work across platforms—laptop or desktop—and resolutions, making it a flexible option. At NAB this year, we announced Final Cut Pro HD, a bold statement that not only says we're

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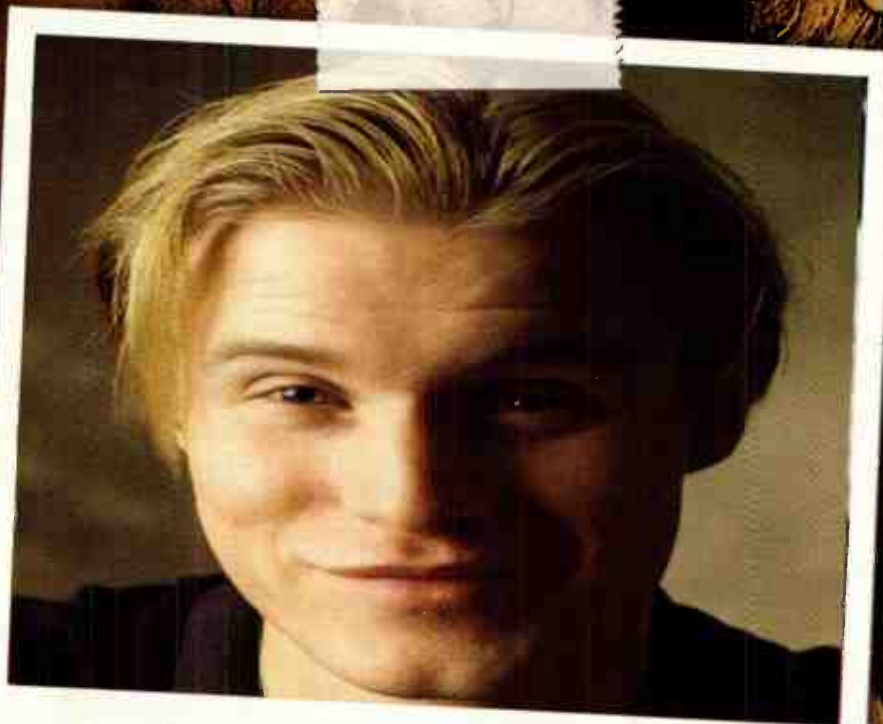
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HARRIS

Industry Sees HD Graphics Taking Over

Vendors prepare for a shift away from upconversion

by Claudia Kienzie

PARK RIDGE, N.J.

Until now, broadcasters have upconverted standard-definition graphics to high definition because the relatively small HDTV audience did not justify the expense of native HD graphics systems. But, at NAB2004, vendors like Chyron and Pinnacle introduced next-generation HD graphics systems that will enable broadcasters to maintain their high production values, cost effectively.

MOVIN' ON UP

"The issue today is one of 'no compromises,' said Caren Anhder, director of product marketing for Pinnacle's Graphics and Content Delivery division in Rochelle Park, N.J. "Major networks are quickly adopting HDTV for their primetime shows and live sports events. While there were only four HD trucks on the road in previous years, today there are nearly two dozen, largely in response to growing demand for native HD production by major networks. I believe that this time next year, most graphics for HDTV sports will be produced in native HD."

Pinnacle's Deko graphics systems are widely used by CBS Sports, ESPN, Turner Sports, NBC Sports, and USA Sports.

The Deko3000 HD offers real-time performance; internal clip playback with key matte, a "FastAction" keyboard with macro keys for push-button to air, and full effects capabilities, such as shimmers and glows.

"In talking to our customers, we recognized that many were concerned with the workflow inefficiencies of having to create graphics for both 16:9 and 4:3 aspect ratios," Anhder said. "But Deko3000 HD provides tools to address this challenge. It maximizes HD's widescreen without any aesthetic compromises."

RE-INVENTING THE CG

Chyron, which is widely credited with inventing character generators, introduced next-generation products at NAB, including the HyperX multifunction CG platform. The latest Duet model, HyperX uses a high-speed bus architecture with an advanced 3D rendering engine to create stunning, real-time HD graphics. HyperX may be coupled with Clyps-HD, Chyron's new HD graphics clip server.

"ESPN and Fox have mandated that trucks move to Duet. It will be a slow migration, but the trend is underway," said Rich Hajdu, vice president, sales and marketing for Chyron Corp. in

Melville, N.Y. HyperX serves as a replacement for the Chyron iNFiNiT, which dominated the CG landscape for more than a decade.

"Unlike the iNFiNiT, where software and hardware were embedded together, Duet products are 'de-coupled' from Lyric, our real-time content creation software," Hajdu said. "This

way of the incredible HD picture. We want to display meaningful information to the fans in an organic manner, [within the video, enabling] the HD picture to stay on the field and on game action," he said.

For ABC's "Monday Night Football" and ESPN's "Sunday Night Football," Sportvision's 1st and 10

"3Designer is ideal for dynamic environments like news and sports, where last-minute changes and quick graphic updates are essential," Shina said. "And rather than being limited to just 2D graphics, 3Designer accomplishes complex 3D graphics, transitions, and animations, as well as changes on the fly, by harnessing the processing power of its Orad's DVG-10 Graphics Computer.

"Many broadcasters are quite satisfied with simply upconverting SD graphics to HD, Shina said. "However, there is already a noticeable growing demand and interest in native HD graphics, including sophisticated 3D, for real-time applications."

CLARITY IN SPORTS

"Broadcasters want SD and HD capability in a single box rather than on separate, dedicated systems, and they want their HD graphics systems to have the same features and flexibility—CG clips, stills and audio—as their SD systems," said Rick Balabuck, director of sales for Los Angeles-based Pixel Power Inc.

Pixel Power's Clarity2 SD/HD system is capable of real-time display of any combination of stillstore images, CG pages with animated text and graphics, externally generated flipbook animations, plus live video inserts, tickers, rolls and crawls.

A dual-channel Clarity2 system is used by Madison Square Garden in New York for displays on its HD JumboTron. HDNet, a 24-hour HDTV cable network, uses a Clarity2 for HD sports graphics but primarily in post



Screen shot of the Pinnacle Deko 3000 HD motion editor

gives everyone flexibility to create their content offline with Lyric, then run them with any Duet."

Lyric converts between SD and HD; and 4:3 and 16:9; and supports more than 25 image file formats.

Chyron also introduced the low-cost C-Mix HD graphics mixer, which enables four video and key pairs plus a video background layer, such as SD animations, clips, stills, and other effects not easily reproduced in native HD, to be simultaneously upconverted to HD.

National Mobile Television (NMT) purchased 10 Chyron Duet LEX Systems configured with the C-Mix option.

According to Jerry Gepner, president of Torrance, Calif.-based NMT, "The combination graphics device and clip player with Internet access could bring more compelling graphics to live productions by providing real-time stats updating, and better 3D animation.

MOVING HD GRAPHICS

Jeff Jonas, senior vice president of Business Development and Production for Sportvision in Chicago, Ill., said that the greatest challenge in doing HD sports graphics is getting rid of clutter on the top of the screen.

"While broadcasters have traditionally placed graphics over the SD picture, the trend in HD sports graphics is to get graphics out of the

and Virtual Rush and Pass Charts produce HD graphics right on the field of play. Also, Sportvision's virtual starting line-ups, half-time stats, and virtual shot charts were produced in HD for the NBA's Western Conference Finals for TNT.

Up until recently, according to Kobi Shina, director of sales for Orad Hi-Tec Systems, Inc., an Israeli-based developer of virtual sets and graphic systems, "the primary focus of the networks has been on building their end-to-end infrastructure for HD. Now that most of the pieces of the puzzle are in place, the interest in graphics is increasing."

Orad's 3Designer authoring and creation software allows users of Orad's Cyber-Graphics live 3D graphics system to create their own 2D or 3D templates without having to employ popular 3D animation packages like Softimage and Maya. 3Designer provides real-time graphics for SD and HD, has an intuitive user interface and works with systems such as iNews and ENPS via MOS and TCP/IP protocols.



Chyron HyperX combined with C-Mix

production for openings and promotional pieces.

While many broadcasters are still upconverting their graphics to HD for live sports, Balabuck said the trend is moving toward generating native HD graphics in the near future. ■

FCC Broadcast DTV Tuner Phase-in Timetable

Based on the FCC's DTV Tuner Phase-In Act adopted last summer, televisions and other electronic devices equipped with over-the-air analog reception technology must also be equipped with ATSC receivers, according to the timetable below.

Televisions equipped with cable plug-and-play cards, arriving in stores now, must also have ATSC reception.

- **July 1, 2004:**
50 percent of TVs 36 inches and above.
- **July 1, 2005:**
100 percent of TVs 36 inches and above;
50 percent of TVs 25-to-35 inches.
- **July 1, 2006:**
100 percent of TVs 25 inches and above.
- **July 1, 2007:**
100 percent of TVs 13 inches and above;
All other devices that receive broadcast television signals.

SOURCE: FCC 02-230

Tuner

CONTINUED FROM PAGE 1

Sinclair called for the FCC to define DTV receiver performance standards, but the commission declined. At press time, the ATSC membership was voting on voluntary performance guidelines, which were expected to pass. (See "ATSC Recommended Receiver Performance Guidelines" at right.)

Then last month, Sinclair blessed the latest ATSC reception technology from Zenith, an 8-VSB patent holder and subsidiary of LG Electronics.

To understand Sinclair's trajectory, it helps to know the basics of ATSC reception, a three-stage operation involving not just a tuner, but a demodulator and signal decoders as well. Only the third stage of the process has been nailed down with any consistency.

Ideally, the tuner grabs the desired channel and rejects the rest, but there is concern about how well current devices do the job. The problem lies not in the technology, but with economics and spectrum policy.

Digital tuners are similar to analog tuners, except in price, which is simply a function of volume. Having been fabricated for some 50 years, analog tuners run about \$3 to \$4 apiece, where a dig-

ital tuner may cost \$15 to \$20, according to Richard Lewis, chief technology officer at Zenith. Additionally, there are two types of digital tuners—single and double conversion.

"What we've seen industry-wide, is people moving away from double-conversion tuners," Lewis said. "They're better at rejecting unwanted signals, but they cost more than single-conversion tuners."

Tuner reliability may be further complicated if the FCC farms out unused TV frequencies, said Bob Rast, president of Linx Pro Electronics, a Palatine, Ill. firm recently purchased by Zurich-based Micronas.

"The more people putting out signals, the greater the risk for interference," said Rast, who's worked on ATSC demodulation for years.

Another problem for tuners involves the simulcasting.

"It's partly a transition issue," Rast said. "in which there's a digital low-power channel next to an analog channel. The analog channels are wiping out the digital channels. If you overpower the tuner, the IC can't fix it."

The IC is engineer shorthand for integrated circuit; in DTV reception, it refers to the demodulator.

The evolution of digital television demodulation will be examined in Part 2 of "Tuner Time" in the July 21 issue of TV Technology. ■

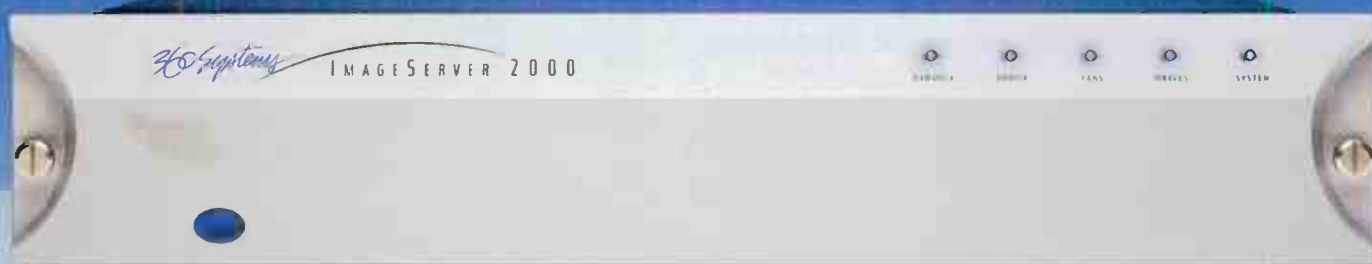
ATSC Recommended Receiver Performance Guidelines

The ATSC's receiver performance guidelines include numerous measurements:

- **Sensitivity:** A transport stream bit-error rate of no worse than 3×10^{-6} .
- **Multi-Signal Overload:** Accommodation of more than one undesired high-level received NTSC and ATSC signal.
- **Phase Noise:** Tolerance of phase noise levels at a threshold of visibility (TOV) of -80dBc/Hz at a 20kHz offset from signal source.
- **Selectivity:** Multiple thresholds for taboo, first-adjacent and co-channel rejection.
- **Burst Noise:** Tolerance of a noise burst of at least 165ms duration and a 10 Hz repetition rate without visible errors.
- **Multipath:** Multiple parameters
- **Smart Antenna Interface**

SOURCE: ATSC Working Draft, Recommended Practice: Receiver Performance Guidelines

The Right Stuff. The Right Price. 360 Systems' Image Server 2000



WHEN THE VIDEO SERVER SALES GUY COMES CALLING, it seems there's always an Elephant in the room: *You know* storage should cost less now than ever before, but truth is, 90's-era servers can't make the change.

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CNN Moves Uptown

Atlanta-based news icon goes digital

by Art Daudelin

NEW YORK

In a business defined by deadlines, successfully moving CNN's New York operation from Penn Plaza to the 250,000-square-foot headquarters in Manhattan's Time Warner Center may prove among its most significant achievements. The facility, which went live with CNN on April 19, had a long planning phase but a comparatively short time-to-air, said Gordon Castle, senior vice president of technology for CNN.

"We've been planning this since 1997, but we didn't hit the installation of the facility until last fall. In just a matter of months, we had to pull together a large and high-tech facility," he said.

TIME-OBSESSED

The challenging time frame meant that integrating the facility was very much a time-obsessed mission, said Keith Jackson, executive project director for the lead integrator, A.F. Associates of Northvale, N.J.

"It was still a construction site last October, and we were always just hours behind the Turner Construction guys," he said. "When they told us we had an area, we were in it, starting to install equipment and pulling cables."



CNN's studio in the new Time Warner Center, on New York's Columbus Circle.

Installing 2.8 million feet of copper cable and 1.5 million feet of fiber in the facility, designed by New York-based Kostow Greenwood Architects, required considerable human resources.

"No matter how many bodies you throw at the project, it's enormous," said Jackson, who had a staff of nearly 100 people.

From the outset, the goal was the deployment of a tapeless facility that would be ready for an HD future.

"We came pretty close to that totally tapeless environment," said Castle, allowing that tape is still used in the field.

To that end, the site boasts such HD-friendly equipment as the

Thomson Grass Valley Trinx 512 routers, Sony MVS-8000 series switchers, and Sony HDC 930 multi-format, multiframe rate cameras.

SHARED STORAGE

The Pinnacle Palladium Store 5000 shared storage system for Vortex became the heart of CNN's tapeless initiative. As configured at CNN, the system features 13 TB of mirrored storage in DV25 format. Currently, 49 Vortex I/O devices are in place, segregated as 29 ingest stations/encoders and 20 payouts.

"But that's a flexible number," said David Potter, project manager for the Pinnacle installation.

The mirrored approach is a vital

feature, Potter said.

"Ingested SDI video is simultaneously written to both cores," he said. "In the event that we lost a core through a cable or even a core failure, there is no background copying necessary. We continue in real-time streaming to the opposite core."

A Palladium status tool, a real-time status monitoring feature, ensures a constant, high-level view of the system.

Simultaneously, with the high-resolution ingesting, the

Vortex I/O encoder also writes low-resolution audio and video proxy with the same mirrored approach.

"This enables users at the desktop level to view material just five seconds after we begin ingesting it," he said.

Integrated into the Vortex news environment is Pinnacle's Liquid Blue multiformat editing system, which was previously used at Penn Plaza.

"We were still in the development stage with servers there, so we had Liquid Blues that went out to tape," said Jeff Polikoff, vice president of Broadcasting Information and Technology for CNN.

As a result, editors gained valuable training ahead of time before the

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migration to the Time Warner Center.

"It was basically just a matter of learning the Pinnacle server piece of the work," he said.

LOOK TO HAMLET

For media asset management, CNN turned to Stockholm-based Ardendo and its Digital Automated Recording Tool (DART) application, on the heels of a similar integration project Ardendo had done with Swedish Television (SVT).

"As a Web-based application, it allows anyone with log-in permissions inside our LAN from anywhere in the world to initiate a record on the system," Castle said.

The scalable system can ingest up to 29 simultaneous feeds and enable real-time status updates on all connected workstations, real-time mir-

data were becoming more commonplace terms within the broadcasting community," Castle said. "It also signified a move to a more complex set of systems."

As a result, the Technology Planning Group was developed with a charter to create and develop a long-range plan.

"We identified that this wasn't going to be a single vendor world,"

said Castle, who leads the group. "The resulting vision proved a foundation with a common infrastructure of middleware that allows for the integration of multiple pieces of technology, and allows for that technology to evolve over time without having to change everything it touches."

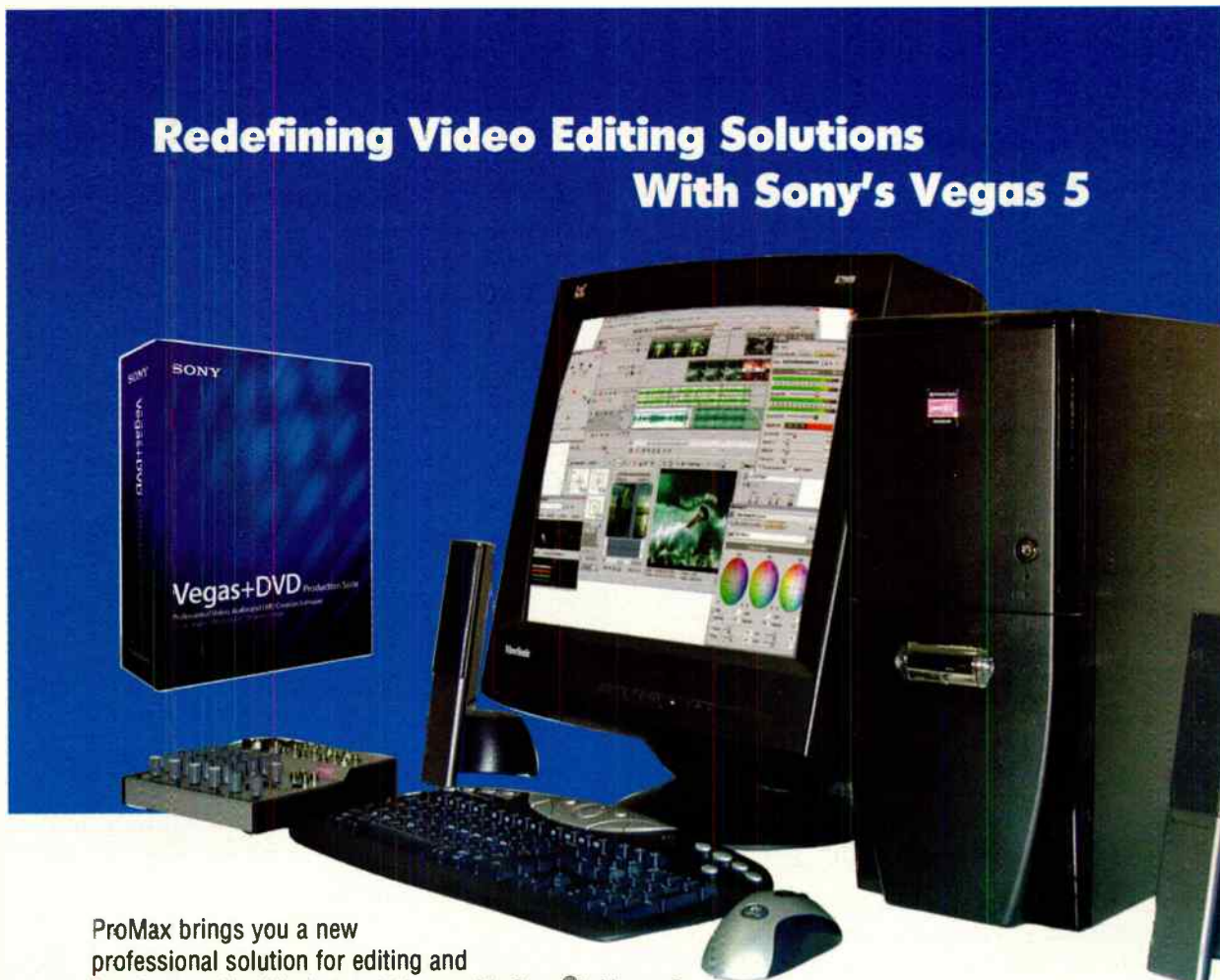
Much of the success of the CNN move uptown, Jackson said, can be

attributed to stellar efforts across the spectrum of participants.

"I don't know if it's luck or good planning—most probably a combination of both," he said, "but everything we did fired up perfectly. CNN, Pinnacle, and Forest Electric have all been extremely good. My experience is that it's been a very strong team effort that has made this successful." ■

"In just a matter of months, we had to pull together a large and high-tech facility."

**—Gordon Castle,
senior vice president,
technology for CNN**



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- Videomaker Magazine



INTEGRATED ENVIRONS

The new facility represents the largest implementation of CNN's Integrated Production Environment concept that also dates back to 1997. At that point, CNN launched new networks built on video servers.

"Issues such as compression formats, media management, and meta-



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Reagan Funeral Mobilizes Coverage

Video teams converge on Washington

by Bob Kovacs

WASHINGTON

President Ronald Reagan's recent state funeral drew news organizations large and small to cover an event the likes of which had not been seen here in more than 30 years.

Generating the television coverage meant the convergence of dozens of satellite and ENG trucks into the high-security of the nation's capital. Tailoring it for local stations helped personalize it for viewers around the country. Ali Gorman, a reporter for the Washington-based Medill News Service, prepared videotaped coverage of the funeral procession for TV station WDTV in Clarksburg, W. Va. Her report mixed video of the procession shot by chief photographer Ben Harper with clips of interest to WDTV's viewers.

"I have some sound bites on Reagan from [West Virginia] congressmen that I'll use in the report," Gorman said. "Using WUSA's Newspath feed, I'll send it to WDTV."

News vehicles were in town from stations within a day's drive of Washington, and side streets near the Capitol were a showroom for mobile-broadcast technology.

Network and international news services had to pull things together quickly, although Washington is well-wired for major broadcast events. The BBC had a reporter in front of the Capitol providing live coverage of the funeral procession, with connection services supplied by Al Levin in a microwave truck leased from Diversified Communications in Washington.

Levin used the truck for several international clients and provided bidirectional links using a complicated series of active relays to move the signals between the truck and an uplink center located on M Street in Washington. The international interest was such that Levin, the president of Diversified Communications, was kept hopping.

"We're doing feeds day and night, 24/7," he said.

Across a patch of grass from Levin's truck, BBC reporter Tom Carver ended a report in the ruddy late-day sun as freelance videographer Kevin Beyer broke down the gear and prepared for the next shot.

"We've got a lot of teams out here, but I think it's going pretty well," Carver said. ■

Clockwise from right: Al Levin, president of Diversified Communications, provided satellite feeds for several international clients, including the BBC; a few of the bevy of satellite trucks used to cover President Ronald Reagan's funeral procession; Ben Harper, chief photographer for Medill News Service, stands ready to cover the funeral procession; a camera operator records the procession from the back of a van.



Remembering Ed DiGiulio

by Craig Johnston

MALIBU, CALIF.

When I began shooting 16mm newsfilm in 1968, the gear was heavy and cumbersome. Ed DiGiulio, who died June 4, changed that.

Ed was one of the motion picture industry's most important and influential technological innovators and a multiple Academy Award winner. His camera-engineering prowess was well known in Hollywood, but he also became a hero to us local news shooters.

In '68, the Bach Auricon 16mm film-magnetic equipment we used was based on a design that must have gone back to World War II and before. We carried around 40 lbs. of equipment (60 with a battery light) on a jury-rigged shoulder mount that you might be able to run with.

But finally the Auricon patent ran out. Ed jumped in. His cameras were "CP-16s," named for his Cinema Products company.

In a quick succession of versions, he reduced the battery from a 20-lb. lunch-pail size to an insignificant weight cell-phone size. He replaced the cigar-box-sized amplifier/mixer in the camera body itself and built the camera itself out of lightweight materials. Then he introduced the reflex viewfinder CP-16R.

Now you had a camera you could use. You could run with it, quickly get it on and off a tripod, put it on the ground, carry it up a ladder. It was revolutionary!

Ed was like that, always listening to the shooters, identifying their

problems, building equipment to solve those problems. Under his wing, the Steadicam was designed and built.

My friend Susan Lewis, a 10-year employee, tells me Ed was wonderful to work for as well.

"Even when he had nearly 100 people working for him, not a day went by that he didn't go around and chat with each person working at

Cinema Products. He knew what everyone on the assembly line was doing. His door was always open—literally."

A lot of us will miss Ed DiGiulio. ■



Ed DiGiulio

Sony

CONTINUED FROM PAGE 8

is what the industry has been waiting for."

The SRX-R110 is a 10,000 ANSI lumen projector built around an SXRD (Silicon X-tal [crystal] Reflective Display) imaging device that is Sony's adaptation of LCOS (Liquid Crystal on Silicon) technology. The 4K projector puts out nearly four times the pixel count of conventional HD displays at a current contrast ratio of 1,300:1, ultimately to become 2,000:1 when the SRX-R110 ships to theaters by early next year.

SXRD TECHNOLOGY

With SXRD technology, pixels are set at a pitch of 8.5 micrometers from the center of one SXRD pixel to the center of the next with an inter-pixel gap of 0.35 micrometer. This removes the crosshatch pattern sometimes seen from digital projectors of lower resolution, even when the picture is projected onto a large screen.

A narrower pitch and thinner gap translate into a quicker refresh rate, which smoothes out the appearance of moving images. During the demonstration at the Digital Cinema Laboratory, a project of the Entertainment Technology Center at

USC (ETC), the images from the SRX-R110 were seen on a 39- by 20-foot screen with no visible pixelization at a normal viewing distance.

The 4K projection demonstration included images from the

Technicolor. Those images were scanned at 6K resolution on a Northlight scanner at 70mm Inc., an IMAX company, and resized to 4K resolution at EFILM in Hollywood. Sony also projected a sample set of 4K still images acquired from a

high-definition servers, and are focusing on the projection side."

In addition to digital cinema, the SRX-R110 projector is also suitable for a variety of large venue installations, including live events, simulations, auditorium staging or command-

and-control applications, since they are capable

of simultaneously displaying multiple high-definition images. In normal operation, the full 4,096 x 2,160 pixel image is typically projected onto a

single theatrical screen. In dual-screen

mode, two 1,920 x 1,080 images are projected and that resolution is maintained when four 1,920 x 1,080 images are projected in quad-screen mode, making the SRX-R110 suitable for simultaneous high-definition presentations.

The SRX-R110 4K projector is slated to sell for \$80,000 (plus \$15,000 for the lens) when released in January. Sony will also be releasing a 5,000-lumen SXRD projector, the SRX-R105, selling for \$60,000 and recommended for screen widths of up to 25 feet. ■

**"A 4K projector
has long been
considered the
holy grail of
digital cinema."**

—John Scarcella

of Sony Broadcast



SRX-R110

4K digital still camera.

"Some of the total system design that will enable practical digital cinema presentations to rival theatrical film delivery and projection depends on finalization of the DCI specifications, including the method of delivering the digital files to individual theaters," Mykietyn said. "Until then, we are supplying the projector from JPEG2000 compressed files generic off-the-shelf,

DCI/American Society of Cinematographers Standard Test Emulation (StEM) footage developed as a standard for testing digital cinema projection. Test footage can be downloaded in various resolutions from the DCI Web site, www.dci-movies.com.

OTHER USES

The Sony engineers also presented production footage shot on a 65mm Panavision film camera with Kodak 5218 stock, which was processed in



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DIGITAL JOURNAL

Bill Hayes

IPTV Among First to Install ACE

Understanding the driving forces behind PBS's new automation system

JOHNSTON, IOWA

This month's journal is the beginning of a series on a very important project that will be taking place at IPTV—the implementation of the PBS ACE system for master control.

I have been asked several times to explain to our board of directors the concept of the ACE system and how it fits in at IPTV. To understand the concept of ACE, it is helpful to know some of the underlying drivers that led to its creation.

Probably the primary driver for the creation of ACE is the planned migration of the PBS content-delivery system from video and audio to a file delivery system. Since the leases for the nine transponders used in the current satellite delivery expire in October 2006, and given the inherent inefficiencies in the system and the advances made in digital compression, rethinking the delivery model from a real-time audio/video delivery service to a nonreal-time file transfer service just made sense.

Unlike our commercial brethren, PBS is not a network that we join, but a service we purchase with dues. As such, the PBS member stations are a very independent group with a great deal of flexibility in determining when to air PBS-supplied content. Very little content from PBS is aired live from the feed; the majority is shuffled and aired when the local station determines it has the best potential audience. Much of the content will be aired multiple times during the course of a week. This can add a lot of complexity at both PBS and stations.

HYBRID DELIVERY

Thus, out of these factors and a few others, the next-generation interconnect system (NGIS) was born. NGIS takes advantage of the improved digital compression and IT-based technologies to create a hybrid delivery system that includes satellite- and terrestrial-based connections as well as local station edge servers with automation to request and store content. Since most PBS content is delivered weeks in advance of airing, this allows the network operations center to deliver content to the stations using whatever delivery method is appropriate, and to store the content on the local station edge server. If the station plans on airing the content multiple

times, the material is merely kept on the edge server and is available when needed. Content for the most part is fed once to all stations and managed locally on the edge server.

STREAMLINING

The next logical layer at the station level is ACE. Originally called the enhanced interconnect optimization project, or EIOP, the idea is essentially to transform the edge server from a PBS store-and-forward server to an all-station content playback server. Integrate this with automation and traffic systems for both local and network content and add a master control system and exception monitoring—now the local operation can be streamlined.



PBS headquarters in Alexandria, Va., the base of ACE.

I first heard about this concept on a conference call. I had been on the PBS engineering committee for about two months. I was at our transmitter site in Fort Dodge, sitting in an SUV in a cornfield, so my mind was pretty open to conceptualizing.

Because of budget constraints, IPTV had been unable to proceed with any of our planned DTV conversion at the studios. What I heard being described was exactly what we needed, and since we had been handcuffed financially, we did not have to deal with any thoughts of how we make this fit in our DTV structure. I offered to implement the system at IPTV as soon as it was available.

PERSONNEL REDUCTION

There has been unrest within the PBS station community over the ACE concept. Not that the concept itself is flawed, but how it will benefit stations has been called into question. One of the potential benefits, which has been overstated in my view, is the

potential for personnel reduction. In the initial concept and subsequent refinements, PBS presented the ACE as a potential walk-away master control operation. Using Miranda Probes and a backhaul from the station to PBS headquarters in Alexandria, Va., the PBS folks propose to take over monitoring master control from their NOC and dealing with problems by trouble ticketing from the NOC. The idea appears to be that the operator sitting in master control for an eight-hour shift would go away.

I haven't worked in a station since 1990 where the MC operator sat at the console and watched TV. In the real world, he or she is dubbing spots, pulling tapes, ingesting content, setting up satellite feeds and doing any

number of tasks that are still going to happen for some time to come.

So I don't see ACE reducing personnel. I do see it making the job of MC more manageable, especially in an environment like IPTV, where we will be multicasting to nine

transmitter sites throughout Iowa.

I briefly mentioned exception monitoring—I don't want to minimize that this is a very different concept than most broadcasters are used to, especially at the general manager level. From an engineering point of view, I'd say most stations have been forced to morph into exception monitoring.

We have all had our staffs reduced and are doing more with fewer people. As that change has happened, the people who are doing more have begun to operate on the assumption that if the alarm isn't ringing, then there's no problem. Therefore, on-air blackness typically won't set off any alarms unless it happens to be in the middle of a program and the GM happens to be watching and wants to know where in the ^%\$#^% the MC operator is.

Many stations are doing exception monitoring, but they are doing it without a net, and in some cases without the monitoring.

For exception monitoring to work, all the details have to be right on the

front-end; automated systems typically do not deal well with ambiguity. Metadata has to be correct from beginning to end. There have to be failover systems, backup paths and myriad intelligent forethought to deal with the truly unexpected failures. Sales that get put off until the last minute cannot be considered normal operation and therefore accommodated.

So for exception monitoring to work, it has to be embraced at all levels of the operation.

COCKPIT CONCEPT

In the Digital Journal in the July 26, 2000 issue of *TV Technology*, I described my concept of the digital master control using the cockpit concept of a modern jet aircraft. In the fly-by-wire world of high-performance jets, there are too many systems for a pilot or two pilots to effectively monitor and control. The control of the aircraft is therefore under the command of computers.

In jets, there are a couple of multi-function displays (MFDs) that automatically show critical operating parameters and switch to display alarm conditions and correction commands. In the majority of cases, the display is informational because the automation should have already made the appropriate corrective actions.

The idea is to ensure that the operation continues as smoothly as possible, while making sure that the operator knows about the problem.

This is one of the fundamental elements of the ACE system.

I had hoped to be able to offer more detail about the nuts and bolts of the implementation of ACE at IPTV. Unfortunately, since our preliminary meeting with PBS engineering, we have not seen a lot of information on progress. PBS of course was busy with preparation for the PBS engineering conference that took place just before NAB, and then NAB as well. We have put together a preliminary project schedule that will have us operational on the ACE system by Dec. 7, 2004.

Another element that has been added to the mix is that PBS is now evaluating incorporating an archive system into the ACE project. Although this is certainly an important component, we don't see this as anything that will slow down our implementation plans. ■

RF TECHNOLOGY

Doug Lung

RF@NAB: DTV Reception And Interference

At NAB2004, broadcast engineers were focusing on getting ready for the shutdown of analog TV. At past NAB conventions, the date was uncertain. Some engineers believed analog TV would never be shut down, and I don't think anyone thought the Dec. 31, 2006, date set by Congress and the FCC was realistic. The consensus at this year's NAB seemed to be analog TV broadcasting will end sometime in 2009 or 2010. This realization had broadcasters concerned about DTV reception and coverage issues, both before and after the transition. I'll look at some of the papers that focused on these issues this month. Most of them were not in the NAB2004 Broadcast Engineering Conference Proceedings and are based on notes I took during the sessions.

HANDLING CONGESTION

One major concern among broadcasters is how well current ATSC receivers perform in today's congested TV bands. Andy Bater reported on ATSC T3-S10's recommended practice for ATSC DTV tuners, which was sent to the full ATSC group in April. The recommended practice had not been posted on the ATSC Web site (www.atsc.org) when this column was written, but here are some highlights from Andy's paper.

Receivers should be able to handle signal inputs ranging from -83 dBm up to -8 dBm. The -83 dBm input is

based on the minimum signal level needed for DTV reception. The -8 dBm maximum level was determined by looking at the expected signal level from a UHF DTV station operating at the maximum power the FCC allows—1,000 kW—using an antenna

on adjacent channels, making receiver adjacent-channel rejection moot. Also, although there is a phase noise recommended practice for receivers, some DTV transmitters transmit signals with excessive phase noise, eating up much of the margin provided by the receiver.



Wayne Bretl of Zenith discussed the company's fifth-generation receiver performance.

with an elevation gain of 30. The elevation gain is inversely proportional to the elevation beamwidth of the antenna and thus affects the amount of signal hitting the ground close to the tower.

Andy Bater noted that transmitter performance can have an impact on DTV reception. Many NTSC transmitters put out excessive spurious signals

He emphasized the need for broadcasters to emit a clean signal.

When the original DTV planning factors were developed, it was assumed DTV tuners would utilize double conversion receivers. In practice, most are single conversion. Based on this, some of the UHF channel taboos eliminated for interference into DTV tuners may have to be reinstated.

William Meintel addressed this situation in his paper, *Computing Interference under Moderate and Strong Signal Conditions—Proposed Changes to the FCC TV Analysis Model*, which detailed problems with the initial planning factors and inappropriate use of the FCC Bulletin OET-69 and Longley-Rice for analyzing such things as analog transmitter site moves. OET-69 never considered aggregate interference from multiple stations. The desired-to-undesired ratio used in OET-69 assumed weak signal conditions. The antenna elevation patterns that stations actually use, especially LPTV stations, do not match those in the planning model. As Meintel pointed out in a previous NAB paper, the Longley-Rice model overpredicts signal strength under many conditions.

He recommended developing an improved methodology for predicting coverage and interference for use in repacking DTV channels when analog ends. Some of the improvements needed include moderate and strong signal desired-to-undesired (D/U) ratios, taboo channel D/U ratios for DTV and consideration of the aggregate of interfering signals. When looking at interference D/U ratio, the placement of the transmitters should be considered, as the weak signal D/U ratios can be relaxed by 10 to 15 dB for collocated transmitters.

Meintel's paper was not published in the proceedings and he rushed through the recommended D/U ratio slides too fast for me to catch them all. For taboo channel interference offset from the desired channel by 2 to 15 channels, he recommended D/U ratios of -20 dB in strong signal environments and -40 dB in moderate signal environments. In a weak signal environment, the ratios vary depending on the offset.

DTV RECEPTION, PAGE 24

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DTV Reception

CONTINUED FROM PAGE 23

Of course, the overprediction of signal level by Longley-Rice poses problems in determining what constitutes a strong, moderate or weak signal level. This problem could be addressed to some extent by including land-use clutter factors in the Longley-Rice calculations or development of a new propagation model.

MSTV PROPOSAL

Victor Tawil described the DTV repacking dilemma in his presentation at NAB. It now appears likely analog broadcasting will be shut down in 2009 or 2010. While this seems like a long time, a lot of work is required to move stations with out-of-core DTV channels back into the core, determine what channel stations with two in-core DTV channels want to keep after the transition and accommodate other channel changes stations may need to make to avoid interference and maintain coverage.

This is not a trivial problem. Tawil used the New York and Philadelphia markets as an example. These markets are close enough that channels cannot be shared between them without creating areas of interference that reduce coverage. There are 43 DTV licensees in the market and five UHF channels assigned for land-mobile use. After the transition, 49 channels will be available if low VHF is included. Tawil asked rhetorically, is there enough spectrum? He said "yes," but warned stations may not have the same service area. Can VHF be abandoned? Yes again, but this will also result in some service reduction.

Other issues have to be considered in repacking the channels, including the accuracy of the FCC database, coordinating DTV channels with Mexico and Canada, and the adequacy of the current interference model.

On May 13, MSTV sent the FCC a five-step process for repacking TV channels after analog broadcasting

ends. For details on the plan, check my article in the May 18 issue of my weekly RF Report e-mail newsletter (<http://www.tvtechnology.com/dlrf/issue.php?w=2004-05-18>).

NEXT-GENERATION RECEIVERS

Wayne Breil from Zenith and Victor Tawil presented an update on the performance of fifth-generation 8-VSB receiver chips in the paper, "Fifth Generation VSB Receiver Field Test Report." Some of these newer chips are able to take advantage of multiple echoes and provide reception, even when the uncorrected signal-to-noise ratio is less than 15.5 dB. Equalizer response has been extended and is now symmetrical, which should greatly

improve reception from distributed transmission networks or on-channel boosters, where multiple transmitters may be received at one location, leading to "pre-echoes" that older 8-VSB receivers had trouble handling. Fifth-generation receivers now initialize the equalizer based on channel impulse noise response, reducing acquisition time. The newer chips also have improved capability for handling reflections with higher Doppler rates, making them more suitable for portable and mobile use.

Tawil also presented the field-testing results of the fifth-generation receivers in Washington D.C. The D.C. sites were the same as those used in the testing of the Linx receiver technology reported at NAB2003. The test procedure was similar to the Linx testing—a dipole antenna mounted on a tripod

five feet above street level. The tests found that the fifth-generation receiver provided successful reception for 66 percent of the tests, intermittent reception for 21 percent of the tests and no reception in 14 percent of the tests. An error in transcribing the fractional percentages from the presentation or rounding to the nearest full percentage point resulted in the total of 101 percent.

See my July 9, 2003 RF Column (http://www.tvtechnology.com/features/On-RF/f_dl_rf_technology-07.09.03.shtml) for details on the Linx tests and procedures. In Washington D.C., the Linx prototype failed in 17.7 percent of the tests, provided intermittent reception in 22.3 percent of the tests and provided successful reception in 60 per-

cent of the tests, compared with failure rates of 62.6 and 63.6 percent for each of two reference receivers. The link for the Linx test report in my June 2003 column is no longer working. It is now available at <http://www.linxelectronics.com/pdf/04-08%20LINX%20NAB%20MSTV%20-%20MSTV.pdf>. Note that these tests were based on an older Linx prototype receiver and newer versions should be expected to provide better reception.

Tawil warned that the sites used for the testing were selected as worst case sites and cannot be used to determine service availability. Based on pictures of the sites in the Linx report you can see he isn't exaggerating!

Tawil warned that the sites used for the testing were selected as worst case sites and cannot be used to determine service availability. Based on pictures of the sites in the Linx report you can see he isn't exaggerating!

E-VSB UPDATE

Breil also reported that based on simulations, adding enhanced VSB (E-

VSB) packets to a DTV signal does not offer much improvement in the Brazil A echo ensemble with fourth- and fifth-generation VSB receivers. Adding E-VSB packets to the Brazil C ensemble provided improvement ranging from 20 to 25 percent on fourth-generation receivers, but minimal improvement on fifth-generation receivers. He concluded that recent receiver designs do not need much help from E-VSB—the main benefit is the 6 dB gain in SNR performance on the E-VSB signal itself. Unfortunately, I didn't see any over-the-air demonstrations of E-VSB at NAB this year.

Adding E-VSB packets does improve equalizer convergence, however. In the Brazil C echo ensemble, fifth-generation receiver equalizer convergence time with 5 percent enhanced packets improved from 230 to 83 milliseconds. For the Brazil E ensemble under the same conditions, convergence time improved from 500 to 220 milliseconds. Adding 7.5 to 15 percent enhanced packets improved Doppler performance in early fourth-generation hardware but was not needed with the new demodulators.

That's it for this month. Next month I'll look at some of the new transmission technology at NAB2004 and also give you an update on the performance of low-band VHF DTV. Many viewers and broadcasters responded to my last article with useful comments. One correction: Several CBS engineers alerted me that the CDBS information on WBBM-DT is out of date. The station is currently operating at 3.7 kW with a license application pending. Also, Jack Davis from KTXL-TV in Sacramento pointed out that KCRA replaced its circularly polarized antenna on Channel 3 with a conventional three-bay batwing antenna last summer. He noted the signal at his house increased by 8 dB when they went back to horizontal polarization.

Your comments and questions on any RF topic are always welcome. Drop me an e-mail at dlung@transmitter.com. Your question may become the basis for my next RF Technology column!

The new chips have improved capability for handling reflections with higher Doppler rates, for better portable and mobile use.

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MEDIA SERVER TECHNOLOGY Karl Paulsen

The Business Case for Asset Management

In the process of planning for a system that will manage media assets, it becomes extremely important to quantify, qualify and clarify what the MAM, DAM or DRM system is to accomplish. When quantifying how well a system is expected to perform, one must determine how the goals will attribute to its success. For the remainder of this discussion, focus will be placed on the nontechnical issues of selecting a MAM and DAM system—opening the eyes of potential purchasers and exploring what you should strive for, what to watch out for, and how to be successful in selecting systems. As a set of guidelines for specifying and selecting a MAM or DAM system, the prospective purchaser should consider the following steps.

Carefully define the scope of this digital integration project. Understand that to be successful, a DAM integration project must be of high value and well-bounded. Do not make the system too broad in scope so as to make it impractical to implement.

Establish a project leader that can effectively engage not only senior management (who sign the checks and provide the capital), but also the users. Both management and user must find true value or the system will be doomed to fail. Identifying the intended results is important or the plan may be considered wasteful.

Appreciate that a DAM system is not worth implementing unless the stakeholders understand the benefits to be achieved; senior management will want to see financial rewards and strategic value. Middle management will want to see operational improvements; satisfied users (or customers) and staff and other users will want greater productivity without serious additional effort.

Knowing that the front-end deployment of any new system is painfully time-consuming, the reward comes when the users let it be known "it was all well worth it." The end users, whether internal or external, will expect to see better service as a result of implementation. They get what they want, when they want it and without undue stress and strain on the balance of their needs or requirements.

Recognize that false expectations from promises that cannot be achieved will inhibit the end user's ideas and creativity. Evaluate and test the product before you buy it; thoroughly assess your requirements to determine what and how much you need. Avoid excessive customization; resist the temptation

to add special features unless you are replacing a system from which you are unsatisfied (and you knew where the shortfalls were). Customization always costs more, and until you know precisely what you can achieve from the new system, holding off on customized feature sets pending full testing and implementation of the base systems may save costs in the long run. If the selection process has been thorough, application-specific customization may not be a requirement.

KNOW THY USER

Strike an early internal balance between those who will use the system, and those who must maintain it. Get an unbiased view of the entire project; your IT department may lead the project, but they should not direct it. IT people should not force the creative users into a techno stronghold. Additionally, a business-led project may indeed ignore corporate IT needs, such as platform changes for performance, security issues, support and vendor qualifications. Engineering should support the needs of all the parties. Harmonize your internal project team into a working group that is respectful of each others' needs and you will be far more successful.

Define the system architecture for the departmental needs of the facility. Understand the scalability of the system and if it will meet both immediate needs and future extensions as well. For example, building a DAM system around only program-length material and ignoring other media objects, such as graphics or interstitials, will eventually paralyze the usefulness of the system. Not being able to index and link sub-components to master project files will deter fluidity.

Whenever possible, avoid architectures that employ proprietary standards because they may be fraught with long-term problems, unless you are certain the hardware and software vendors will remain stable for the useful life of the DAM asset. Upgrades and improvements for the hardware and software are expected, and routine, but be sure there is a clear migration path to future developments, and that the vaporization of one contributor will not lead to complete system implosion.

Match the facility workflow to the metadata collection processes. Simply ingesting media into the system and ignoring the crucial entry of as many metadata elements as are practical will signal an "end of life" flag from the onset. Metadata is a fact of life, so select

a product that is extensible and practical. Understand just how much effort is required for the complete and thorough ingest of all types of digital media.

IT people should not force the creative users into a techno stronghold.

Whether metadata is automatically tagged through scene detection and voice recognition, or manually entered by operators; if the time required to ingest material is limited from a workflow perspective to simple tagging of the house number and EOM/SOM, then

why bother with a DAM system in the first place?

GET UP TO SPEED

Provide essential training and documentation for a successful rollout and long-term implementation. As with any software product, if the users fail to embrace it because they weren't trained or allowed sufficient "get up to speed" time—the products will turn into shelfware. Development and enforcement of internal policies, the creation of a users' forum for tips and practices, and keeping the lines of communication open between the user and middle managers will lead to success.

In conclusion, coming full circle once again, management should have already defined what "success" means before the selection process is finalized. If the goals are not set and displayed, if the users and staff do not understand what is supposed to be achieved, and if the criteria for operations cannot be met, it will be impossible to reach success. A DAM or MAM system is not just about technology, it is about workflow—successful and improved workflow.

Karl Paulsen is vice president of engineering for AZCAR. Contact him at karl.paulsen@azcar.com.

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NET SOUP

Frank Beacham

Mobile Videophones Meet TV News

This year we've experienced the power of one of the most significant new developments in TV technology since the arrival of electronic newsgathering a quarter century ago. It arrived—not on the floor of NAB—but from a grim prison in Iraq called Abu Ghraib.

We all know what we saw, but it was the *how we saw it* part that has huge implications for the future of broadcast news. A new generation of digital imaging—both still photographs and motion video—coupled with wireless access to the Internet, is already making its mark on history.

Anyone with a digital camera, a Web site and the ability to stream images can now command global attention. The graphic video of the beheading of Nicholas Berg, an American in Iraq, was dramatically “broadcast” to the world via an al Qaeda-linked Web site. It became an instant global “TV channel” with view ratings through the roof!

INSTANT JOURNALISM

In the 1970s, the portable video camera usurped the 16mm film camera as the key tool of television journalists. In the past decade, cheap DV cameras transformed ENG once again.

Now we are entering the era of the mobile videophone, a technology so potentially powerful that anyone can become an instant journalist. Images can be revealed throughout the world in a matter of minutes.

The good news is that cheap digital cameras, combined with easy Internet access, has the potential to democratize the newsgathering process. What many of us had prematurely predicted would happen with the invention of the Sony

“Portapack” video system in the 1970s has finally come about.

Those whose job it is to keep secrets are rushing back to the drawing board. Donald Rumsfeld is one who comes to mind. In his testimony before congressional committees, the defense secretary said that the flood of pictures was now beyond the control of U.S. authorities.

“We’re functioning with peacetime constraints, with legal requirements, in a wartime situation in the Information Age, where people [carry] digital cameras and taking these unbelievable photographs and then passing them off, against the law, to the media, to our

the essence of good journalism?”

A broadcaster who has not missed this coming sea change in newsgathering technology is the BBC. Earlier this year, the “beeb” outfitted about 40 of its reporters with Nokia mobile videophones that enable them to e-mail still and motion video with audio back to news headquarters via GPRS.

The reporters are using the same Nokia 3650 phones found at many U.S. mobile phone stores. However, these phones have been outfitted with special software from Philips that allows the handsets to record up to 15 minutes of video. When finished, the reporter simply transmits the pictures to the BBC in London.

Both Philips and the BBC acknowledge the enormous potential of newsgathering using standard mobile phones. Journalists in the field covering breaking stories can now send video reports back from difficult or remote locations. Though the image resolution is low, the technology works well enough for breaking stories where time-to-air is paramount.

The enabling software developed by Philips for the BBC is part of the company’s multimedia platform for next-generation mobile phones. In fact, a main objective of Philips Software, an autonomous business group within Royal Philips Electronics, is to develop and market multimedia capability in a range of consumer products.

On its instant newsgathering technology, Cees Geel, director of marketing and sales director of Philips, said: “The BBC is well known for continually striving for the highest possible picture and sound quality...we are confident that experience gained from this

application will rapidly lead to further innovative developments.”

The BBC is betting the value of the news it breaks first using videophones will give it an edge over competitors. The news service has already scored scoops of breaking stories—one involving a Welsh bus accident—simply because a producer equipped with a Nokia phone got to the scene earlier than camera crews. During a recent trip to the U.K., President Bush even got a taste of the technology when his motorcade was followed through rural areas on mobile phones.

NEWS BY NOKIA

Nokia, the cellphone maker, certainly hasn’t missed the compelling idea of placing its wireless cameras in the hands of millions of would-be journalists. It has just upped the ante by introducing the Nokia 7610.

Shipping now in Europe, Africa and Asia-Pacific (but not the U.S.), this phone includes the ability to capture, print, edit, store and send still pictures and videos wirelessly via the Internet.

Using its integrated megapixel camera, the 7610 not only records video, but allows users to edit scenes and add special effects such as music, text, new colors or moving objects to the “movie.” It can also be used to e-mail images or transmit them via Bluetooth to computers, printers and—using the phone’s Kodak Pictures application—to a virtual photo album on the Web.

So far, the BBC is the only major news organization to publicly announce its use of mobile videophones for on-air reporting. Though they have been quiet, we can’t imagine that U.S. news operations are asleep at the wheel on this one.

No doubt that caution will change as the technology improves (and you can bet it will) and a few aggressive and enterprising young journalists start beating big news organizations at their own game.

Frank Beacham is a New York City-based writer. You can contact him through *TV Technology*.



Video shot on Nokia cellphones is now being broadcast.

surprise,” Rumsfeld lamented.

On the other hand, Rumsfeld admitted that he had not realized the seriousness of the abuse allegations in the prison until the pictures were released. Whether one believes that statement or not, isn’t the revelation of such conduct by operatives of the U.S. government

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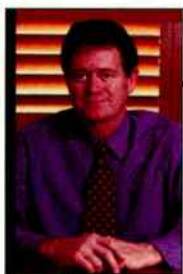
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ATSC OUTLOOK

Jerry Whitaker

Advanced Audio Coding Moves Forward

The ATSC has published two new Candidate Standards documenting enhancements to the AC-3 digital audio compression standard and specifying its use in digital television. This is a major step toward using advanced audio coding for a wide variety of applications.

Enhanced AC-3 will provide the industry with expanded audio capabilities that can be used for broadcast, cable, satellite and DVD applications. It is another example of the continuing efforts to evolve ATSC standards to respond to marketplace requirements.

ATSC first standardized the AC-3 digital audio system in November 1994. AC-3 (known in the marketplace as "Dolby Digital") is now widely used in digital television systems around the world. The enhancements to AC-3 (E-AC-3), which will

be marketed as "Dolby Digital Plus," are in two new documents:

CS/T3-613, which adds technical specifications to the ATSC Digital Audio Compression Standard (A/52) that can be used with a variety of media. The document details features that could be relevant to ATSC television systems, and also specifies features likely to be used in other (non-ATSC broadcast) applications. These features are being documented in A/52 because that standard is the fundamental source document for AC-3 and is relied upon by other (nonbroadcast) industries. Including additional features in the Enhanced AC-3 specification will enable its use in other applications, indirectly benefiting the ATSC digital television system.

CS/T3-614, which describes additions to the ATSC DTV Standard (A/53) that specify use of E-AC-3 in

the Enhanced VSB (E-VSB) robust transmission mode currently under development in ATSC. The E-VSB mode would allow broadcasters to trade off throughput for robustness. With an E-VSB transmission, some of the approximately 19.4 Mbps data is allocated to the robust mode and the rest is allocated to the normal 8-VSB mode. The robust mode symbol stream includes additional forward error correction bits to improve reception under weaker signal and stronger multipath (ghost) conditions.

Enhanced AC-3 was submitted to the ATSC for consideration by Dolby Laboratories in response to a Request for Information published in December 2002. E-AC-3 offers new coding tools that fundamentally improve performance, as well as new features that allow operation over a wider range of bit-rates and numbers of channels. Of great importance to the industry, E-AC-3 can be converted into AC-3 for playback compatibility on consumer's existing A/V decoders.

ABOUT E-AC-3

Enhanced AC-3 builds upon the current version of AC-3 specified in ATSC Standard A/52A. All decoders for the enhanced version will also decode all legacy A/52 AC-3 bitstreams. In addition, although the new enhanced audio format is not directly compatible with current A/52 decoders, it is feasible to perform a modest-complexity conversion into a compliant A/52 bitstream syntax, thus enabling backwards compatibility to legacy decoders that have S/PDIF bitstream inputs. This capability is critical to support the 20 million 5.1-channel Dolby Digital decoders now in the U.S. market. (There is already a large installed base of home theater systems incorporating multichannel sound, more than 30 percent of U.S. households according to a CEA survey in January 2003). This compatibility, in fact, was one of the key deciding factors on the part of ATSC contributors in selecting this system. Important technical capabilities of Enhanced AC-3 that relate directly to ATSC broadcast applications include:

Expanded data rate flexibility: E-AC-3 allows the number of blocks per sync frame and the number of compressed data bits per frame to be adjusted to achieve significantly more data rate flexibility than standard

AC-3, including a greater maximum theoretical data rate and finer data rate granularity.

Spectral extension: Enhanced AC-3 decoders support a new coding technique called *spectral extension*. Like channel coupling, spectral extension codes the highest frequency content of the signal more efficiently. Spectral extension recreates a signal's high-frequency spectrum from *side data* transmitted in the bitstream that characterizes the original signal, as well as from actual signal content from the lower-frequency portion of the signal. Because it may be desirable in some circumstances to use channel coupling for a midrange portion of the frequency spectrum and spectral extension for the higher-range portion of the frequency spectrum, spectral extension is fully compatible with channel coupling. Both tools can be enabled at the same time, for different portions of the frequency spectrum.

Transient pre-noise processing is an optional decoder tool that improves audible performance through the substitution of audio segments just before transients to reduce the duration of pre-noise distortions. This technique is called *time-scaling synthesis*, where synthesized PCM audio segments are used to eliminate the transient pre-noise, thereby improving the perceived quality of low bit-rate audio-coded transient material. To enable the decoder to efficiently perform transient pre-noise processing with no impact on decoding latency, transient location detection and time-scaling synthesis analysis is performed by the encoder and the information transmitted to the decoder. The encoder performs transient pre-noise processing for each full bandwidth audio channel and transmits "helper" information once per frame, only when necessary (for example, when transients are present that will benefit from the technique).

Adaptive hybrid transform processing: In 1995, the transform employed in A/52 AC-3—based on a modified discrete cosine transform (MDCT) length of 256 frequency samples—provided a reasonable tradeoff between audio coding gain and decoder implementation cost. With continuing advances in silicon manufacturing processes over the years, the integrated circuit complexity that constitutes a reasonable level has now increased. This increase in chip performance provides an opportunity to improve the coding gain of AC-3, and hence perceptual audio quality at a given bitrate, by increasing the length of the transform. This is accomplished through use of the Adaptive Hybrid Transform (AHT), which adds a second transform in cascade in order to generate a single transform with 1,536

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frequency samples.

Enhanced coupling. This is a new tool that improves the imaging properties of coupled signals by adding phase compensation to the amplitude-based processing of conventional coupling. Prior to downmixing the coupled channels to a single composite signal, the encoder derives both amplitude and additionally interchannel phase information on a sub-band basis for each channel. The phase information includes a decorrelation scale factor as a measure of the variation of the phase within a frame. This sidechain information is transmitted to the decoder once per frame. The decoder uses the information to recover the multiple output channels from the composite signal using a combination of both amplitude scaling and phase rotation. The result is an improvement in soundstage imaging over conventional coupling. This improvement allows the technique to be used at lower frequencies than conventional coupling, thus improving coding efficiency.

Additional features of E-AC-3 of particular interest to applications outside of DTV include:

Channel and program extensions: The enhanced AC-3 bitstream syntax allows for time-multiplexed *sub-streams* to be present in a single bitstream. With this capability, the enhanced AC-3 bitstream syntax enables a single program with greater than 5.1 channels, multiple programs of up to 5.1 channels or a mixture of programs with up to 5.1 channels and programs with greater than 5.1 channels to be carried in a single bitstream. These extra channels do not affect a two- or 5.1-channel decoder in ATSC broadcast applications.

Sample-rate processing: Additional metadata is reserved for applications that involve source material sampled at two times the nominal rate, such as 96 kHz and 88.2 kHz.

Mixing control processing: Additional metadata is reserved for applications that involve the mixing of two program streams. These applications require control of the mixing process and resultant dynamic range control metadata; this feature reserves data capacity to accomplish this task.

THE SPECS

The Enhanced-AC-3 Candidate Standard specifications can be found on the ATSC Web site, specifically:

CS/T3-613, which documents revisions to the ATSC Digital Audio Compression Standard (A/52) and can be used with a variety of media.

CS/T3-614, which describes additions to the ATSC DTV Standard (A/53) that specify use of E-AC-3 in the E-VSB robust mode currently under development in ATSC.

These new Candidate Standards

complement three previously published Candidate Standards relating to E-VSB:

CS/T3-608 and **CS/T3-609** document transport stream specifications for the use of advanced video codecs in the proposed E-VSB mode.

CS/T3-606 specifies changes in the ATSC PSIP Standard (A/65) for use with E-VSB.

The candidate standard stage recog-

nizes that a specification has reached a level of technical maturity that would benefit from implementation experience and technical feedback. After the candidate standard period ends, the document typically moves on to the next approval stage on its way to becoming an ATSC standard.

Candidate standards, along with all other ATSC standards, recommended practices, Implementation

Subcommittee findings and related informational documents, are available at no charge from the ATSC Web site, www.atsc.org.

Jerry Whitaker is VP of Standards Development for the ATSC. You can reach him at tvtech@imaspub.com. Background technical information for this article was contributed by Dolby Laboratories.

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TECHNOLOGY CORNER

Randy Hoffner

Lamps for Microdisplay Projection

We have recently taken a look at some of the older and the newer ways television pictures are shown, considering both direct-view displays and projection displays. It is fair to say that one of the strong trends in the television display business is the increasing proportion of projection displays being purchased.

Traditionally, television projector engines for home use, which until recent years constituted a relatively small niche market, were cathode-ray tube projectors. This circumstance itself served to limit the market for home projection displays because the inherent light output of the CRT projector tubes caused the projected images to be rather dim. Moreover, the light losses caused by a translucent display screen almost compelled them to be used in front-projection systems, which put the projection engine into

the viewing room.

The emergence of backlit, liquid crystal microdisplay-based projection engines has served to make these projection systems more practical for a home living room environment,



A UHP lamp emits broad-spectrum light suitable for projection.

enabling them to produce satisfyingly bright pictures. The LCD projection engine's high performance is in no

small part due to the use of the ultra-high-pressure (UHP) mercury lamp as a light source.

Large projectors, including both film projectors and DLP micromirror projectors used in cinema theaters, utilize xenon lamps. Xenon is one of the inert gases, known to early chemists as the "noble gases," whose electron orbital shells are filled with electrons, making them chemically inactive. They can, however, be excited into luminescence by passing an electrical current through them.

Xenon lamps, like mercury lamps, are arc lamps, in which an electrical current is used to strike an arc across a gap between electrodes in a gaseous medium. A form of xenon lamp is used for automobile headlights: we have all seen those cold, blue-looking, beaming headlights on expensive luxury cars. Xenon lamps have the advantage of emitting a broad spectrum of light with a color temperature near 6500K, the precise color temperature specified for the white point of professional video monitors. They have the disadvantage that their operation requires considerable control circuitry.

UHP lamps are also arc lamps, the arc being struck through an atmosphere of mercury vapor. They are, in fact, highly sophisticated fluorescent lights.

THE VAPORS

We recall from our discussion of plasma display panels that the plasma cells, which are tiny fluorescent lamps, operate by striking an arc that generates a plasma of mercury vapor. When mercury vapor is sufficiently excited that some of the outer electrons that normally orbit the mercury atoms are stripped of their associated atoms, an electrically and magnetically active cloud of mercury ions and free electrons is created. The energy exchange that occurs during this process of mercury atoms losing and regaining their orbital electrons in the plasma state—the absorption of electrical energy that causes the electrons to break free, and the re-emission of energy when the electrons rejoin their atoms—causes the plasma to emit ultraviolet light. Ultraviolet light is not visible to humans and, in fact, short wavelength or "hard" ultraviolet light is harmful, causing sunburn and eye damage. However, in a fluorescent lamp, the outer shell of the lamp is coated with phosphors that absorb ultraviolet light and re-emit this energy as visible light. One of the

physical principles at work here is that phosphors typically emit radiation at longer wavelengths than they absorb. This is a quantum mechanical phenomenon: an electron in orbit around a phosphor atom absorbs a quantum of energy in the form of a photon of ultraviolet light, raising its energy level to a discrete higher state. When the electron falls back to its initial energy level, it releases a quantum of energy in the form of a photon of visible light.

Ordinary fluorescent lamps operate with mercury at low-pressure levels, which causes the mercury plasma to emit a large percentage of its radiation in the short ultraviolet wavelengths, around 254 nanometers. This, in combination with the phosphors used, cause the low-pressure fluorescent lamp to emit much of its energy in the blue and green regions of the spectrum, and very little energy in the red region. Although this is highly efficient as a generator of illumination because the human visual system is highly sensitive to green light, it does not generate a desirable spectral content for image reproduction. Phosphors in low-pressure mercury lamps do not emit a wide spectrum of light. Rather, a given phosphor emits photons of a specific frequency, causing light output to be a rather thin spectral line. Light of the desired spectral content must be generated by mixing phosphors that will emit the required spectral lines.

Under higher pressure, mercury plasma emits a relatively higher percentage of its light in the longer wavelength ultraviolet region, at about 365 nanometers. This, combined with the proper phosphors, causes the lamp to emit more light in the red spectral region, which forms the basis for "color-corrected" fluorescent lamps.

UNDER PRESSURE

Fluorescent lamps typically operate at rather low pressures of a few atmospheres; UHP lamps operate at pressures above 200 atmospheres. The scuba divers reading this know well that an atmosphere, corresponding to standard atmospheric pressure at sea level, is about 14.7 pounds per square inch. 200 atmospheres is then about 3,000 pounds per square inch.

The extremely high lamp pressure is important to achieve the desired light output, because not only is more red light emitted at the higher pressure level (above 200 atmospheres, about 20 percent more red light is emitted than at 150 atmospheres), but also at such high pressures the nature of the emission spectrum is more continuous and less a combination of a few atomic spectral lines.

Fluorescent lamps operate on alternating current. While the operating voltage requirement for a small-arc UHP lamp is low, a much higher strik-

PROJECTION, PAGE 32



INSIDE AUDIO

Dave Moulton

Revenge of the Couch Potato

Our Story To Date. Alert readers may recall my recent concern with the variance in audio levels as experienced by us home viewers. In my last piece on this issue ("Metadata in the Home: A Case History," March 10), I discussed my own personal "couch potato" history.

If you recall, I told you I couldn't make the system work perfectly (the set-top box from Scientific Atlanta and my Bang & Olufsen Avant TV did not successfully communicate regarding the presence or absence of digital audio, requiring me to restart the TV any time I wished to enjoy digital, as opposed to analog, sound). I also noted that there was essentially no information about the Dolby metadata system available from either the set-top box manufacturer or the cable service provider, in this case Charter Communications.

These things, in and of themselves, are not an overwhelmingly big deal. They are annoying, and they

make it fundamentally impossible for me, as the end-user, to optimize my system.

In all fairness, the net effect is not all that bad—the analog sound isn't significantly worse than the digital sound, particularly in the face of the

out eventually and the long-promised capabilities will be there.

DOLBY'S LM100 METER

Through the good offices of Jeffrey Riedmiller of Dolby Labs, I was able to borrow a Dolby LM100 level

I took a lot of measurements of all the channels, analog and digital, using both RF mode and line mode.

overall broadcast audio quality (which is okay but not great), and the lack of information about metadata reduces the potential for the system to some degree, but does not render it totally useless. I have confidence that the technology will settle

meter to measure the actual *dialnorm* metadata values and LeqA levels of my particular installation, and have now collected a fair amount of additional information about the whole system. I spent several days channel surfing and getting a real feel for how

the TV audio system works in terms of levels, using the same measurement instrument recommended for all content producers and service providers.

I haven't yet begun to measure the differences in level between commercials and program material, so I won't go there today. However, I took a lot of measurements of all the channels, analog and digital, using both RF mode and line mode, and also observing the direct RF cable feed.

EARLIER MEASUREMENTS

This all follows some informal measurements I made about a year ago, where I simply took quick relative average level readings from all channels, and was appalled to discover that the range of observed levels was about 18 dB; the standard deviation was about 5 dB (this suggests that approximately one-third of the levels varied more than 5 dB from the average). These measurements correlate well with studies by Jeffrey Riedmiller and others at Dolby, as well as work by Michael Guthrie at Harmonic Inc.

Clearly, there was a problem a year ago. Sadly, there still is.

You all recall *dialnorm*, right? It's a metadata calibration value and is supposed to be set at the A-weighted

DIALNORM, PAGE 33



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LET THERE BE LIGHTING **Andy Ciddor**

Color Temperature: The Battle Rages On

There are a formidable variety of correction filters available to aid us in the battle of the color temperature. In their simplest applications, correction filters are intended to adjust the color temperature of full spectrum (black body) light sources to match shooting conditions and available light sources. Color Temperature Orange (CTO) filters shift the color temperature downwards and Color Temperature Blue (CTB) filters shift the color temperature upwards.

In theory, full CTB is intended to shift a standard 3200K incandescent studio lamp up to 5700K (the color of summer sunlight), while a full CTO is intended to shift 5700K daylight down to match 3200K incandescent lamps. In practice, no two brands of CTO and CTB filters are the same and are not always safely interchangeable.

Here is a test that you can perform in the privacy of your office. Take a piece of full CTO filter and a piece of full CTB filter, place one in front of the other (the order is unimportant) and look at a white surface through the combination. What you should see is the white surface, but at reduced brightness (the same effect as a neutral density filter).

What you probably also see is a color shift in the white surface due to the upwards and downwards color temperature corrections not being equal. The results of an in-depth survey (picking up the two swatch books laying within arm's reach on my desk) revealed that the filter book with the yellow cover produces a noticeably warm gray, while the one with the blue cover produces a slightly green gray. Doing this test between different brands of correction filter produces even more interesting evidence of color inconsistency.

THE VALUE OF MIRED

On closer examination, the specifications for the different brands of filter quote different correction factors, despite giving very similar descriptions of the filter's functions. Color correction factors are usually quoted in Mireds, a measurement system with long history in color photography. Mired is an acronym for Micro Reciprocal Degree, a measurement derived by dividing one million by the color temperature in Kelvin. For example 3200K is 313 mired ($1,000,000 \div 3200$) and 5700K is 175 mired ($1,000,000 \div 5700$). Therefore the filter needed to correct from studio incandescent to summer daylight is 137 mired and the reverse, from 5700K to 3200K, requires a -137

mired filter.

Mireds have proved really valuable for selecting correction filters. Although the color temperature shift produced by a filter is dependent on the color temperature of the light source it is correcting, the mired shift for that filter is always the same. The CTB correction from 3200K to 5700K produces a 2500K (-137 mired) shift, however the correction from 3600K (278 mired) to 6100K (164 mired) is also a 2500K shift, but its mired shift is -113, which equates to a Lee 3/4 CTB filter. One of the major benefits of using mireds is that you can add and subtract mired values to get the mired shift needed for a particular job. Surprisingly enough, a Cinegel 1/2 CTO correction (81 mireds) has the same effect as combining two Cinegel 1/4 CTO corrections (42 mired), and a Lee 3/4 CTB (-112 mired) is equal to combining a Lee 1/4 CTB (-35 mired) with a Lee 1/2 CTB (-78 mired).

If the notion of mireds is new or unclear, you can go to TV Technology's Web site (www.tvtechnology.com) and download an MS Excel spreadsheet that I prepared to go with this article. The spreadsheet will give you the chance to play with mired and color temperature values, and experiment with different filter and light source combinations.

In practice, there is rarely a circumstance where a single off-the-shelf filter will solve the mismatches between light sources. Our 5700K daylight reference point of northern hemisphere summer sunlight is almost never the actual color temperature that we need in our pictures. If our shot is not in

direct sunlight, or not in the middle of the day, or not in the summer time, then using a Readhead or a tungsten camera light for fill on a daytime shot, we usually require more correction than that offered by a single full CTB. A Double CTB (-260 mired or -274 mired, depending on where you shop) kicks your color temperature up into the 10,000K range.

NO STANDARD DAYLIGHT

On the other hand, if there is effectively no such thing as "standard daylight" outside a standards laboratory, how can we rely on an HMI or other Metal Halide "daylight" source to provide the appropriate fill in for our daylight shots? The answer of course is that we can't use "Metal Halide daylight" straight from the can: we have to spice it up a little to make it work.

Other than direct sunlight, which can range from 1500K at dawn/sunset to around 5000K in the middle of a summer's day, the majority of daytime light comes to us via reflections off clouds, the sky and everything else around us. The huge blue sky component of this reflected light can easily shift the color temperature up into the 10,000K to 16,000K region. This is what we are unconsciously adapted to seeing in a picture—a warmer key source of sunlight, filled in by much cooler sky light.

If we don't follow this pattern in our own lighting setups, we can produce a look that our audience will identify as artificial, even if they can't pinpoint the reason. The daylight fill that we add to a typical talking head shot should probably be at least a thousand or two

cooler than the prevailing key source. It may seem a little odd at first to be correcting daylight sources with daylight filters, but this is the mark of an enhanced, naturalistic picture.

When dealing with conversions (in either direction) between tungsten light and daylight, be very wary of relying on the labels on the lamps or filters. Just because it's labeled "Daylight" doesn't mean that it will do the job for you in all circumstances. Your eye, or better still a color monitor, will give you a good indication of whether or not you are within the right color-temperature ballpark.

Applying a layer of CTO over a window so that you can use tungsten light for an interior shot often results in the window looking way too blue. The chances are that the light coming through the window is well above the 5700K for which CTO is intended to correct. Try out a full CTO combined with a 1/4 CTO for a healthy 220+ mired conversion that will deal with 12,000K skylight. If the shot shows that you are looking through a window, be careful to leave the exterior looking just a little bluer than the interior, because that's what the audience expects to see.

Despite the numbers and the formulae, color temperature correction is much more of an art than a science. The numbers are a big help in looking for the right solutions. However they rarely provide you with answers that will look great, rather than merely adequate, in your pictures. Becoming an artist with color temperature correction firstly involves very careful observation of the way light behaves in the world. Next, grab a camera, a few lights and a selection of conversion filters and try some looks out for yourself. It's only then that you discover tricks like using uncorrected tungsten for fill in the last fleeting moments of a sunset.

Andy Ciddor has been involved in lighting for more than three decades as a practitioner, teacher and writer. You can reach him via e-mail c/o TV Technology.

Projection

CONTINUED FROM PAGE 30

ing voltage must be used to shock the mercury atoms into the luminescent plasma state when the lamp is first ignited.

To generate the very high luminance in the small beam of light required by a liquid crystal microdisplay, the lamp's arc must be quite short. Current UHP lamps have arc lengths of about one millimeter.

The largest factor contributing to the demise of such a lamp is the danger that the tungsten that has evaporated from the lamp's electrodes condenses on the cooler wall of the lamp's shell, reducing emission efficiency (or efficacy, as lamp engineers

would say) by blackening the walls of the arc tube. To prevent this from happening, an amount of oxygen and bromine is added to the lamp atmosphere. This causes the atoms of the tungsten vapor to react chemically with the oxygen and halogen to form oxybromides in the colder regions inside the lamp.

To give an idea of the parameters for a UHP projector lamp, we will look at an example of a 120 W Philips lamp for LCD projection:

Lamp current	2.0 A.
Lamp voltage	65 V.
Ignition voltage	5 kV.
Shell type	Borosilicate glass
Arc gap	1.0 mm
Luminous flux	7000 lumens

Color temp.	7600K
Rated life	6000 hours

Specifications in the Philips data sheet were obtained from Lamptech Co., U.K.

This is the current state of the art in projection lamps for liquid crystal displays. It is interesting to note that in addition to electronics, our examination of displays has involved the sciences of chemistry, physics and quantum mechanics.

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

Dialnorm

CONTINUED FROM PAGE 31

power-based average of dialog level (aka "dialogue LeqA"). The default setting that Dolby ships it with is -27 dBFS, and the level at which no attenuation occurs is -31 dBFS, the lowest level it can be set. The content producer is supposed to set it at the same level as the measured dialog level.

On the digital channels with dialogue where dialnorm is present, I measured dialog levels ranging from -40 dBFS LeqA to -17 dBFS LeqA.

Unfortunately, I measured only two dialnorm settings: -27 dBFS (the default, encountered on 75 percent of the channels measured) and -31 dBFS, the setting that defeats any static attenuation via metadata.

This is bad news indeed. Only three out of 28 measured channels were correctly set within a dB, and only 10 made it within ± 3 dB! Further, I suspect these were mostly due to dumb luck. Meanwhile, seven channels were more than 10 dB off! Seventy-five percent of the content producers aren't bothering to even set metadata values, and those that are setting it are setting it to a level where it is supposed to do nothing, which is to say they are in essence attempting to defeat the system! In fact, the system is defeating them, by miscalibrating their levels by the amount of the error.

As our visually-oriented friends might say—it ain't a pretty picture!

THE GOOD NEWS

It's not all bad, though. On the analog side of things, levels from my provider, Charter Communications,

have gotten significantly more consistent. A year ago the range of levels of the measured analog channels was 14 dB, and the standard deviation was about 3 dB. Today those level ranges have been reduced significantly, for a range of only 7 dB and a standard deviation of only 2



Dolby LM100

dB—much, much better! Not only that, but it is also good enough to be really acceptable! There's not much need for further improvement in this realm.

So, there's hope. A little attention to levels can actually make a significant improvement.

**All end-user systems don't work together
as the seamless transparent media delivery
package that Dolby rightly envisions.**

MAKING IT WORK

The system still isn't working, though. For it to work, *everybody* has to play and play by the rules. Right now, the content providers are not yet using dialnorm, which is to say that they are mis-using it.

Based on my experience and the letters I've received, the service providers and their vendors are not

telling their end-users what they are doing or what the end-users should do to optimize their systems. Further, all end-user systems don't work together as the seamless transparent media delivery package that Dolby rightly desires and envisions.

Efforts to contact my service

provider were unsuccessful (Charter Communications simply never picked up their phone when I called, leaving me to listen to "exciting" announcements for 25 minutes). At Scientific-Atlanta, I was able to speak to Jim Kiker and S-A's audio expert Dave Sedacca. They had enough to say

deliver better service, and (b) improve the quality and performance features of their set top boxes.

Finally, Bang & Olufsen noted that the company has encountered my digital-vs.-analog signal problem with some other set-top boxes and service providers and is working on a fix, taking the position that it is B&O's responsibility to make the TV talk to the set-top box because the company knows full well that the set-top box manufacturers are *not* going to adapt to Bang & Olufsen!

What we can take from this is that the people who supply the media to us may not necessarily be good at nor devoted to good end-user relations or communications, but they really *do* seem to know what they are doing, with considerable depth, thoughtful and technical expertise.

INFORMATION SHARING

Dolby needs to exert some influence here (in all fairness, the company already is working hard at it behind the scenes). Dolby needs to insist (a) that the content providers use the system correctly and (b) that the media vendors accurately and fully share with their end-user customers and each other what is going on. The company need to emphasize that the various players really need to *actually* do their parts in this quite elaborate production process.

The sooner the better, I hope.
Thanks for listening!

Dave Moulton is still trying to find his TV Guide. He suspects it may be gone for good. You can complain to him about anything at his Web site, www.moultonlabs.com.



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EQUIPMENT REVIEW

Equipment and product reviews from professionals in the video industry

CAPTURE/OUTPUT CARD

Aurora PipePro

by Michael Hanish

The latest additions to Aurora Video Systems' line of digital input/output cards, only for Macintosh OS X, continue the company's tradition of low-cost and high-quality: Pipe, PipeSDI, PipePRO and PipeHD.

This review focuses on the feature-rich, standard-definition PipePro PCI card, which has SDI video (with embedded audio) in and out, AES/SPDIF digital audio in (four channels) and out (six channels), composite, S-Video and component video out, genlock and RS-422 device control. The SDI BNC connectors are on the exterior backplate of the card; all other connectors are on a short breakout cable.

FEATURES

System requirements are seriously modern: OS X 10.3 "Panther" or later (the Pipe will not run with the classic operating system), G4 dual-processor at 800 MHz (or better) or a G5 at 1.6 GHz or better, 512 MB RAM (absolute minimum). Since the Pipe family serves as I/O for editing and compositing applications, such as Final Cut Pro or After Effects (or any other QuickTime-

based application), you must take into account the system requirements for those applications as well.

Storage requirements for video/audio capture range from 2 MBps, 8 GB per hour for offline 10:1 compression to 28 MBps, 100 GB per hour for full 1:1 10-bit uncompressed video.

Several interesting features of the Pipe hardware are controlled in a System Preference Pane, which is installed with the system software, including codecs. Desktop Output controls the extended desktop feature of the Pipe family, which gives you an additional configurable monitor that shows up in the Displays Preference Pane. The display signal is present at all the video outputs.

Aside from price-point, one of the strongest things going for the Aurora line is the quality of its codecs. The company provides two outstanding codecs: 8-bit Extreme Uncompressed and 10-bit Extreme Uncompressed. Both produce excellent images and are fully compatible with the Apple uncompressed codecs. They process internally in YUV color space, which is one of the clues to the excellent image, before rendering out to 4:2:2 RGB.

FAST FACTS

Application

Post production

Key Features

10-bit codec; analog and digital I/O

Price

\$799

Contact

Aurora

586-726-5320

www.auroravideosys.com

IN USE

I used the PipePro extensively to prepare a number of effects sections for a documentary. These sections required multiple layers of composites, speed changes and a lot of color correction, all tasks that are less than satisfactory when done with compressed video.

Not having an SDI-equipped deck, I brought one into my studio to capture the video elements for the compositing sections at the highest quality possible: 10-bit uncompressed. I then dropped them into an

(as well as analog audio), depending on the level of quality desired.

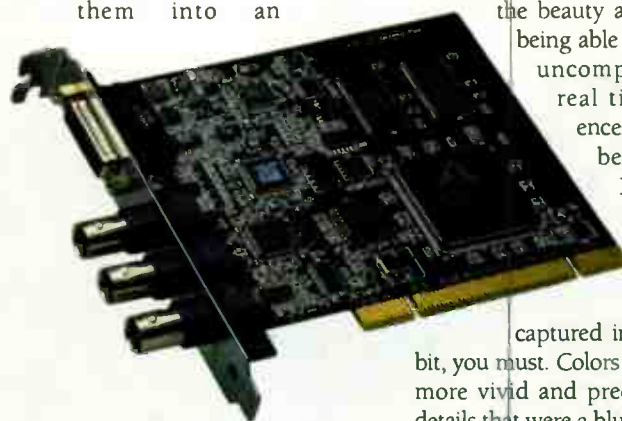
To see how a given frame or sequence looks on video, you drag the workspace (in FCP, the Canvas; in After Effects, the Comp window) to the video monitor, and all changes appear in real time, with accurate video colors. The only interruption to workflow when using the extended desktop is that you must restart the system to activate or de-activate it.

It is important to remember, when figuring out the most efficient workflow for a given project with any member of the Pipe family, that these cards provide input and output only, and that all the rest of the editing functions and transcoding are dependent on the power of the host CPU. These cards don't perform hardware compression, instead being optimized for highest quality input and output.

The PipePro could not have been easier to integrate into my project studio and workflow. Aurora provides very clear documentation on use and a comprehensive set of presets for Final Cut Pro to ensure that setup and operation are correct while working.

I can't say enough about the excellent quality of the PipePro's output and the beauty and satisfaction of being able to work in 10-bit uncompressed video in real time. The differences in image quality between 8-bit and 10-bit are breathtaking.

If you haven't compared the same footage captured in 8-bit versus 10-bit, you must. Colors and gradations are more vivid and precise, and shadow details that were a blur pop into focus.



The PipePro has SDI and analog audio and video inputs and outputs.

uncompressed 10-bit Final Cut Pro (FCP) timeline. The PipePro's machine control (RS-422) capability worked like a charm for this.

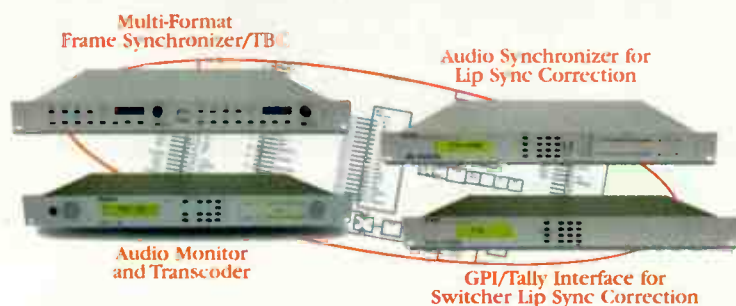
One of the really outstanding features of the PipePro is that all the analog video outputs are active all the time. This allows full-confidence monitoring while digitizing, through composite, S-Video or component outputs

SUMMARY

The PipePro is not the only card with its capabilities in the marketplace, but it is surely one of the most cost-effective. For a relatively modest investment, you may be able to greatly improve the quality of your output. ■

Michael Hanish runs Free Lunch, a video/audio/multimedia production house a few miles outside scenic Guilford, Vt. Contact him at mhanish@sover.net.

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EYE ON BATTERIES

Li-Ion Batteries Survive Regulations

by Bob Kovacs

Guns, explosives, knives and some chemicals are clearly hazardous material... but camcorder batteries?

In the wake of Sept. 11, the federal government passed laws and created regulations that tighten the definition of hazardous materials that can be shipped by air and even carried onboard an airplane. However, tightened regulation of lithium-ion batteries—a battery chemistry that is becoming popular in the television industry—was in the works prior to Sept. 11.

In the spring of 2001, a pallet of batteries that used one type of lithium chemistry was mishandled on the ground at Los Angeles International Airport. The pallet caught fire, which proved quite stubborn and resisted attempts to douse it. Although no one was hurt and the damage was minimal, the U.S. Department of Transportation decided to tighten regulations on batteries containing lithium, which are now covered under the United Nations Recommendations on the Transport of Dangerous Goods Model Regulations.

The new regulations took effect on Jan. 1, 2003, and qualifies any lithium-ion cell as a "Class 9 Hazardous Mater-

ial" if it contains more than 2 grams of lithium. A lithium-ion battery (made from multiple cells) can have no more than 8 grams of aggregate lithium content. The regulation also requires new packaging and labeling for lithium batteries, and states that batteries can be packed in carry-on baggage only if their terminals are protected against shorting.

It's worth taking a moment to note that no one has been hurt or injured by batteries containing lithium, and there are no reports of any aircraft damage due to lithium batteries, either before or after the new regulations. Also, this regulation is for air transport only—it has no effect on products shipped by surface transport.

MEETING THE CHALLENGE

Manufacturers of batteries for professional television products took note of these regulations and either confirmed that their products met the new regulations or reformulated the product to ensure compliance. Barry Rubin, general manager for IDX Technology said that his company has been making Li-Ion batteries for eight years and had been watching this development carefully.



The Anton/Bauer Dionic 90 is a 90 W-h Li-Ion battery.

"We were aware of this from day one," Rubin said, "and we had a proactive approach to meeting the new regulations."

The lithium content in a cell has a direct effect on the current capacity of the cell. In other words, the more lithium a cell contains, the more current it can deliver.

With this direct relationship in mind,

the ultimate regulation states that the maximum lithium content for a cell can be calculated by multiplying the amp-hour capacity of the cell by 0.3. In batteries that are made from multiple cells, the total lithium content for the battery is the amp-hour capacity of the cell sets times 0.3, multiplied by the number of cell sets. In the example of an IDX E-50 Endura battery, this is 3.3 A-h x 0.3g x 4 sets = 3.96g of lithium.

Using these calculations, batteries with a capacity of more than 14.4V/6.7 A-h (approximately 96 W-h) will usually exceed the 8g lithium limit. It turns out that IDX Li-Ion batteries already had lithium content low enough to meet the new specification and can be legally shipped on airplanes.

"I even have a declaration document that a customer can use when traveling with our batteries," Rubin said.

IDX has a solution for videographers who appreciate the lighter weight of Li-Ion batteries but need more power for on-camera lights and other accessories. The company's Endura battery line has an ingenious system that allows two batter-

BATTERIES, PAGE 39

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CAMCORDER

Sony DSR-PD170 Camcorder

by Bob Kovacs

I have previously reviewed Sony's smallest, 3-CCD professional camcorders, including the current DSR-PDX10. I found these to be perfectly competent models that could easily be mistaken for consumer camcorders, even as they shoot with three-chip quality and record in the professional DVCAM (25 Mbps) format.

So I wondered what the DSR-PD150 and its successor, the DSR-PD170, bring to the party. Sony kindly loaned me a DSR-PD170 to answer this question and I found it pretty quickly—but you'll have to read more to find out.

FEATURES

The Sony DSR-PD170 has a form factor that is somewhere between a consumer camcorder and a traditional shoulder-mounted camera. It has a handle on top like larger cameras and a 2.5-inch color flip-out viewfinder such as you would find on a consumer camcorder. In addition to this color monitor, there is an eyepiece monochrome viewfinder.

The three 1/3-inch CCDs in the unit are 380,000-pixel imagers that use Sony's Advanced HAD technology for better low-light performance. The permanently mounted lens has a 12:1 zoom ratio, and the DSR-PD170 comes with a 0.7x wide-angle adapter that screws onto the end of the main

FAST FACTS

Application

ENG and EFP

Key Features

DV and DVCAM camcorder; wide-angle adapter

Price

\$3,940

Contact

Sony
800-686-7669
www.sony.com/professional



The Sony DSR-PD170 comes with a 0.7x wide-angle lens adapter and a dual-input audio module with mic/line capability and XLR connectors.

lens.

On the right side of the lens is a two-position neutral-density filter, a switch for manual or auto focus and a selector for manual iris control. In manual mode, the iris has 24 settings. The back of the camcorder has switches for gain, white-balance and shutter speed, as well as a nifty rotary control for the many menu selections that the PD170 supports. Also on the back of the camcorder is the battery slot; the PD170 ships with a lithium-ion battery that supports about 60 minutes of shooting.

The DSR-PD170 can be set to record in either DV or DVCAM mode, both of which record at 25 Mbps. The DVCAM tape speed is faster, giving the

unit a record time of 40 minutes in DVCAM mode and 60 minutes in DV mode.

The unit has a progressive scan recording feature that saves 15 images per second at a higher resolution. This is interesting for doing some motion analysis work or for loading a fast series of pictures into a computer, but it is not the same as progressive scan recording of 24p or 30p images. The camera is switchable between 16:9 and 4:3 aspect ratios.

There is the usual fingertip rocker

to control the zoom lens, and the PD170 also has a small zoom switch and start/stop button on top of the camcorder's handle that let you easily shoot while holding the camera at low angles. At the front of the handle is a convenient audio connection point with two XLR connectors, either of which can be switched to mic or line level. These connectors also support phantom power at the flick of a switch.

The unit records digital stereo audio at three quality levels: 16-bit/48 kHz, 16-bit/44.1 kHz or 12-bit/32 kHz. Next to the audio connectors is a shock-mount for the supplied shotgun microphone.

Near the front of the camera are several I/O connectors, including S-Video, analog video, stereo audio and i.Link (IEEE-1394).

In addition to the wide-angle adapter, lithium-ion battery and shotgun mic, the DSR-PD170 comes with a power supply/charger, two lens hoods (one of which has a cute built-in lens cap), a remote control and an analog audio/video cable. The camera can shoot still images and record them onto an optional Memory Stick, which does not come with the PD170, so I did not test this feature.

IN USE

Anyone familiar with a professional or consumer camcorder can use the DSR-PD170 in seconds. It takes only about three seconds to fire up the PD170 (assuming a tape is loaded)—the camera does a creditable job of finding the correct exposure and white-balance if left in the auto mode.

SONY, PAGE 42

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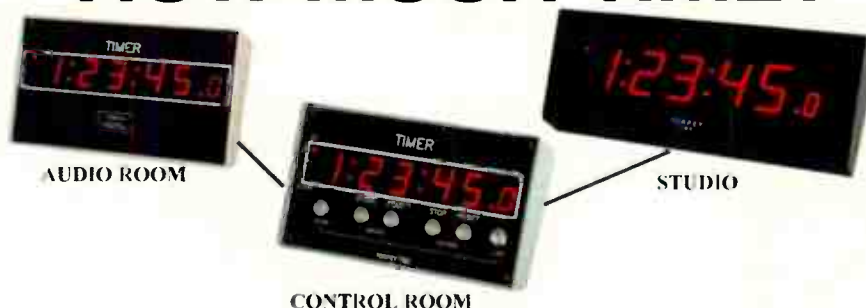


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LENS ADAPTER

Collinscraft Red-Eye

by Carl Mrozek

If you're among thousands of videographers whose daily bread-and-butter work is still framed conventionally in 4:3 but shot with a native 16:9 CCD camera, then you have a perspective problem: a wide-angle perspective problem.

That's due to the 20-percent loss in angle-of-view when converting a native 16:9 image to a 4:3 perspective. Unless you use a pricey broadcast lens with a built-in crossover converter that compensates for the loss in angle-of-view, you either have to live with a more limited perspective or use an external optical adapter to undo the damage.

It's well worth examining nonzoom-through adapters that are compact and inexpensive. Moreover, when one is added to a pro lens used with a native 4:3 camera, it transforms a standard lens into a bona fide wide-angle lens.

FEATURES

The Red-Eye, made by Collinscraft Canada and distributed by VFGadgets, is one such alternative. It resembles a large screw-on filter, such as a polarizer, and weighs less than 100 grams. Like screw-on filters, it threads directly onto the outer end of most professional video lenses with outer barrel dimensions of 58mm, 72mm, 77mm and 82mm. Once mounted, the diameter of the lens barrel is unchanged; hence, the Red-Eye can be used with the same sunshade or matte box that the normal lens uses.

The immediate payoff is impressive: a 30-percent increase in angle-of-view. For those using 16:9 cameras to shoot 4:3 imagery, this is a gain of 10 percent in angle-of-view. If, however, you're shooting 16:9 with a 16:9 camera, or 4:3 with a 4:3 camera, the net increased angle-of-view is 30 percent. This transforms a 16x8mm standard lens into a 16x5.6mm wide-angle lens... with the twist of a wrist!

The Red-Eye features an antireflective coating designed to increase light transmission, which optimizes image clarity, contrast and sharpness. The lens has a scratch resistant coating that improves water repellency. For added protection, each unit includes a padded leather pouch designed to be worn on a belt, for safety and quick access.

The Red-Eye is made with high-index, high-clarity durable glass and the lens housing is sturdy, lightweight anodized aluminum, painted red—thus the name “Red-Eye.” The threaded housing fits most standard pro lenses for cameras with 2/3-inch and 1/2-inch CCDs, and also fits some smaller camcorders such as the Sony DSR-PD150.

Although the Red-Eye may be screwed onto another screw-on filter, this increases the possibility of vignetting.

FAST FACTS

Application

EFP and ENG

Key Features

Wide-angle lens adapter

Price

Starts at \$285

Contact

VFGadgets

416-686-1452

www.vfgadgets.com

IN USE

The Red-Eye is one of those exceptional products that does exactly what it is designed to do, nothing more and nothing less. It can be mounted on a lens as quickly as a screw-on filter.

I tested the 82mm Red-Eye with Fujinon 19x8.7 and Canon 19x9mm “pro” series lenses. In both cases, I had to remove the lens’ sunshade before mounting the Red Eye, and then reattach it afterwards.

Once the Red Eye is mounted, the lens feels and looks as before except for the red ring around the outer element. However, the lens must be operated quite differently: no zooming and the focal range is extremely limited.

On the 19x9mm lens, I was only able to use the 9mm to 18mm portion of the focal range. Practically speaking, you probably want to set the lens at the widest end of its focal range. This simplifies focusing and is the primary purpose of using the Red-Eye—to widen your lens’ field-of-view.

Another thing that changes is that once your focal length is set (ideally at maximum width), the lens’ focus ring should be set to infinity. Focusing is then done with the lens’ back-focus or macro-focus button.

It is worth noting that in sunlight or other bright light at f16, everything is in focus, including dust on the Red-Eye. It is therefore recommended that you use the neutral density filters on your lens to reduce incoming light and open the aperture to f11 or more. This makes it possible to reach a point where virtually everything from a foot to infinity is in focus.

This also simplifies shooting in most situations and virtually eliminates the need to refocus when the situation

makes it difficult, if not impossible, to do so while shooting. Prime examples would be shooting with a Steadicam or with a jib.

I used it to tackle Steadicam-style shooting. I zoomed out to 8.7mm and focused the Red-Eye at infinity to track a wildlife researcher following wildlife in dense forest. This enabled me to stay close on his heels as he stomped through thick underbrush in search of an elusive forest feline.

The underbrush in the forest was too dense and hostile to permit using an external viewfinder/monitor without



Various versions of the Red-Eye will screw onto the end of a variety of professional camera lenses.

risking its ruin by spiny, spring-loaded low limbs and saplings encroaching on the sinuous forest trail.

For added focus insurance, I tried to maintain a little buffer between the lens and the biologist while staying close through the dense underbrush. With the help of a sunshade, I was able to incorporate the backlash of boughs into the tracking shot as the biologist charged through the dense thickets in his obsessive quest for one of North America’s most elusive animals, the Canadian Lynx.

To my surprise and satisfaction, this strategy worked better than expected, yielding mostly sharp and well-framed footage, from an “over-the biologist’s-shoulder” perspective. Framing was simplified by shooting in 16:9 with an Ikegami HL-45W.

This effectively transformed the Fujinon 19x8.7 lens into a 6mm lens, as I didn’t use the rest of its focal range. Using a sunshade afforded some protection from hostile branches and I didn’t detect any significant scratches on the Red-Eye’s outer element. When finished, I quickly removed the Red-Eye and carried it safely in its padded-leather pouch looped on my belt.

Another situation where the Red-Eye’s “bug-eyed” perspective came in handy was when I shot a jazz performance from the side of the stage. Initially, I had to move away from the stage and

include speaker stands and other rigging in the foreground.

With Red-Eye, I was able to shoot from the edge of the stage and get an intimate, yet wide shot of the band and some audience, sans rigging. The audio was noticeably cleaner too, and I got the scene I framed with my eyes rather than the cluttered compromise I initially framed without the benefit of Red-Eye.

An obvious benefit of Red-Eye is to be able to shoot more comfortably in cramped interiors, as I did in an apartment with the Canon 19x9 lens and

Sony DSR-570W camera. With Red-Eye, I was able to execute a 360 degree pan from the center of a small room, keeping everything in focus—as you would expect to accomplish with a pricey wide-angle lens fully zoomed out.

SUMMARY

Although its job description is quite finite, Red-Eye did deliver as advertised in a variety of situations. Some shooters might feel constrained using a nonzoom-through lens adapter but I found it refreshing—in part because it forced me to frame the best shot possible and concentrate on camera moves instead of optical movement.

It also got me out of tight spots in more ways than one and broadened my perspective about shooting in ways that wouldn’t be otherwise feasible without switching to a pricey wide-angle zoom lens. It effectively enabled me to go into the field with two lenses: a standard pro zoom lens with 2 X extender and a wide-angle lens carried in a tiny pouch on my belt.

In short, Red-Eye reinforced my favorite maxim of camera accessories: small is beautiful and inexpensive is better yet! For the money, Red-Eye is well worth adding to the kit bag of every pro who wants to be ready for anything, anytime—especially if you’re shooting a 4:3 world with a 16:9 camera. ■

Carl Mrozek operates Eagle Eye Media based in Buffalo, N.Y., specializing in wildlife and other outdoor subjects. His work appears regularly on the Discovery Channel, CBS, PBS and other networks. Contact him at eagleeye@localnet.com.

Batteries

CONTINUED FROM PAGE 35

ies to be "siamesed" together, doubling the power capacity at a weight that is still lower than batteries made using other chemistries.

Sony BP-L40/L40A, BP-L50/L50A and BP-IL75 batteries have less than 8g of lithium and are therefore meet the new regulations for airplane transport. A spokesman from Sony confirmed that the company's current Li-Ion product line meets the new regulations.

EYING THE REGULATIONS

Anton/Bauer has a line of Li-Ion batteries and also had its eye on the new regulations. "We introduced our Dionic 80 at NAB2002 as an 80 W-h battery," said Alex DeSorbo, president of Anton/Bauer. "It has since been upgraded to a 90 W-h battery, the Dionic 90."

DeSorbo said that both these batteries have less than the 8g limit and can therefore be packed in baggage without any special considerations. He also pointed out that Anton/Bauer has a larger Li-Ion battery for users who need the extra capacity.

"At NAB2003, we showed a Dionic 160 [160 W-h battery] for customers who understand the travel restrictions but who need the power," he said.

The batteries developed by Aspen Elec-



The IDX Endura Li-Ion product line has a V-mount that allows two batteries to be stacked together for greater power delivery and longer run time.

tronics are now part of the Anton/Bauer line under the name "Aspekt." This represents a different approach to handling battery capacity with its Nexus 50 (50 W-h) Li-Ion battery. Although the battery can be mounted to any type of camera mount with the Nexus battery adapter, it should only be used with an on-camera light when mounted with the Nexus Phantom Package. This package has a slot for a Nexus 50, as well as an on-board 8 W-h NiCad battery for automatic backup when the main battery runs out

of power.

The Nexus 50 contains less than 8g of lithium, so it meets the requirements of the recent regulations.

The new PAG L95 Li-Ion battery from PAG USA has a power capacity of 95 W-h and contains less than 8g of lithium. The L95 is available with either an Anton/Bauer- or PAGlok-mount and, like many other state-of-the-art batteries, has an on-board readout of its power and charge status. The company has adapters for Sony V-mount applications.

"The L95 easily meets the new regulation and should be no problem with air travel," said David Butler, national sales coordinator for PAG USA.

Although Frezzi does not have Li-Ion batteries in its published catalog, the company does supply customized Li-Ion batteries upon request. Jim Crawford, Frezzi's CEO, said that making sure Li-Ion batteries are correctly matched to a charger is critical to maintain good battery life and ensure safety.

"Charging and discharging a lithium battery at a rate that's too fast will cause the chemicals to breakdown and it could leak flammable organic material," Crawford said. He recommends NiMH or NiCad batteries for applications causing a heavy drain on the battery and where fast charging is required.

One final thought: Nobody is saying that Li-Ion batteries are dangerous in any way. A well-designed and properly manufactured Li-Ion battery has many advantages for ENG and EFP use, and is a perfectly safe and reliable product.

The recent regulations limit the amount of lithium in batteries that are packed as baggage, based on the possibility that very rough handling might cause a fire with certain battery chemistries, including Li-Ion. There has been no evidence that any Li-Ion battery used by television professionals caused a fire, either before or after the new regulations. ■

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by Geoff Poister

Ulead's DVD Workshop 2 provides a full range of tools for DVD creation, from capture to menu creation and compression. Ulead positioned this product to provide an assortment of professional features at a prosumer price-point.

To this end, some barriers have been broken. The software is designed to be easy to use, yet includes high-end features such as multiple audio tracks, subtitles, advanced compositing of images, real-time DV-to-MPEG-2 conversion on capture, and output-to-DVD, DLT (Digital Linear Tape) and DVD-9 for dual-layer disks.

FEATURES

Ulead has made a great effort to create a workflow design that is intuitive and efficient, abandoning the ubiquitous timeline used by most competitors in favor of a more visually efficient storyboard layout. An end-to-end application, the design provides video capture and encoding tools in addition to powerful menu creation. It runs on Windows 2000 or XP.

The interface has tabs—labeled Start, Capture, Edit, Menu and Finish—that guide you through the process. Clicking on each tab brings up a screen devoted to a discreet part of the production process, and looking at each of these is the best way to review the features.

The Start module is where you choose your destination format: DVD, VCD or SVCD.

The Capture mode allows you to capture video from a variety of sources that include DV tape, analog video and even a TV tuner. Still images can be captured from these sources as well. Video is input through IEEE-1394 (FireWire) or through a video capture card if using an analog source.

When using IEEE-1394, the Capture window immediately detects the source deck and provides device control. The video can be saved as an AVI file or an interesting variety of other formats,

FAST FACTS

Application

DVD design and burning

Key Features

Compression routines; editing capabilities; menu generation

Price

\$495

Contact

Ulead
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including MPEG-1, MPEG-2 and Windows Media. A unique feature is its ability to transcode DV or analog video to MPEG-2 or Windows Media in real time, a shortcut that can save many hours.

Switching to the Edit panel allows you to place assets into the project, and it is remarkably versatile in what it will accept. Unlike many DVD applications that accept only MPEG files, Ulead Workshop 2 imports AVI, QuickTime, WMV and MICROMV, lets you mix them all into the project, and automatically converts them at the end. Any imported MPEG files are not touched, so they maintain their original quality.

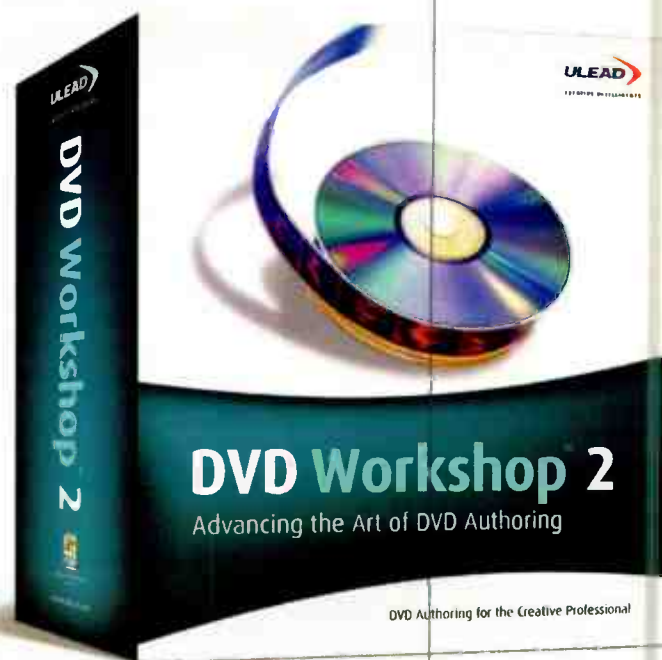
Audio can be imported directly from CDs, and material can be imported from noncopyrighted DVDs as well.

In Edit mode, the most useful features include the ability to trim, cut or join video clips and add up to eight audio tracks and 32 subtitle tracks.

Audio levels can be adjusted, as well as faded in and out. The subtitle tools allow extensive use of fonts, colors, backgrounds and shadows.

Ulead Workshop 2 comes with a library of video and still images and music selections for quick menu assembly. For those who create slide-shows,

enticing but highly efficient navigating tools. Each button has a playlist that can be changed to control the button's function. This allows you to create multiple sequences of movies, menus and chapter points without duplicating the original media on the DVD—a feature that saves valuable disk space.



Ulead DVD Workshop 2 has features that automate the creation of menus for DVDs, including animated icons.

100 transitions help smooth the process.

The Menu mode is really the heart of Workshop 2 and it elevates the process to an art form. Ulead definitely raised the bar here by providing the power to add and manipulate just about any image, text object or audio source.

The resulting menus, which are full of motion video, composited images, music and sound, are not only visually

Real-time preview is available throughout the process, guaranteeing that you will end up with what you planned before you burn a DVD. The menus display all motion and you can preview the action of all buttons to make sure they are correct.

In Finish mode, simply press play to test your menus and preview the entire project in real time. To preview faster,

ULEAD, PAGE 44

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Sony

CONTINUED FROM PAGE 36

Two things about the lens on the PD170 impressed me, particularly when compared with other small camcorders I've used from Sony and other manufacturers. The lens on the PD170 is the first to let me do a manual focus move with repeatable precision. In fact, I did quite a nice rack-focus between two different objects that worked well in a little sequence I shot.

The other nice thing about the lens on this camcorder is the beautiful chunk of glass that Sony supplies for the 0.7x wide-angle adapter. The big lens was distortion-free and made a noticeably wider shot when it was installed. It does add some weight, however.

I was less impressed by the new controls that Sony put on top of the handle for zoom and tape start/stop. The zoom control has two preset speeds that worked fine and presented no problem. But I always had to fumble to use the start/stop switch, causing shaking in the image during handheld shots. Since these top-of-the-handle controls are intended to be used for low-angle handheld shots, I felt that fumbling to find the switch defeated the purpose of what should be a convenient operation.

The 2.5-inch viewfinder that the PD170 shares with its predecessor, the

DSR-PD150, also disappointed me. It's a nice enough 2.5-inch viewfinder but this camcorder's little brother, the DSR-PDX10, has a 3.5-inch viewfinder that's a real beauty—it deserves to be on the PD170.

In addition to flipping out from the body of the camcorder, the 2.5-inch viewfinder can rotate to face an operator either behind or in front of the camera. Rotating it to face forward flips the image, so that someone standing in front of the camera will appear to be standing normally instead of upside down. This is really handy when shooting in "one-man-band" mode.

The DSR-PD170 does have Steady Shot, an effective shake reducer. Although Sony implies that there is a performance penalty with Steady Shot turned on, I did not see any difference in the quality of the images. The ability of this feature to reduce the shakiness of handheld shots is impressive; I recommend leaving it on all the time.

The most impressive thing about the DSR-PD170's image quality was its excellent low-light capability. I shot a very wide range of images in all kinds of lighting and was continually surprised at the natural, noise-free pictures that I got from available light that would sink a lesser product. Sony claims that improved low-light capability is one of the big improvements with the PD170, and I can vouch that it is a big improvement, indeed.

The contrast range of the images

was very good, too, enabling me to pull detail out of shadows where some other cameras in this same class just fade into dark noise. Performance in daylight was good as well, but you expect a camera to make good images in daylight. It's the low-light performance of this camcorder that really impressed me.

Real-world shooters will want a battery with longer run time than the one that ships with the PD170. Although the supplied battery is pleasantly lightweight, batteries with run times of several hours can pop into the slot with minimal extra load. A small LCD readout on the side of camcorder lists the status of the battery's charge and its remaining run time. Using an accessory such as a light or even a wireless mic receiver will pretty much require that you get a battery with greater capacity.

I used the PD170's wireless remote control very little but it does have certain advantages. For one thing, it is perfect for a stringer to control the camcorder while shooting a one-man standup report. The remote is small enough to fit in a jacket or pants pocket.

The supplied shotgun microphone and shock mount worked well and I heard very little mechanical noise when shooting with this mic. A more expensive shotgun mic will probably outperform the one that Sony supplies with the PD170 but it had good reach and sound quality for someone located

four to six feet in front of the lens.

I did all my shooting in the 4:3 aspect ratio and did not use the 16:9 feature except to confirm that it worked.

Loading footage from the PD170 into an editing system was a snap. Using an IEEE-1394 cable, I plugged the camcorder into my computer and immediately had control of the transport from within Adobe Premier Pro. Transferring/logging images and sound was glitch-free.

SUMMARY

The Sony DSR-PD170 has a number of things going for it, including an excellent wide-angle adapter, a manual focus control that actually lets you do focus effects, a wide range of manual iris control and switchable 16:9 and 4:3 operation. The biggest thing that the camera offers is its terrific capability in low light, which is exceptional in my experience with this class of camera.

This is a very good camera for TV news stringers, as well as government, educational and corporate video operations, particularly if you need to shoot in less-than-optimum lighting situations. Small, lightweight and easy to use, the DSR-PD170 has a boatload of useful features, makes professional-quality pictures and sound—and is at its best in marginal conditions. ■

Bob Kovacs is the technology editor of *TV Technology*.

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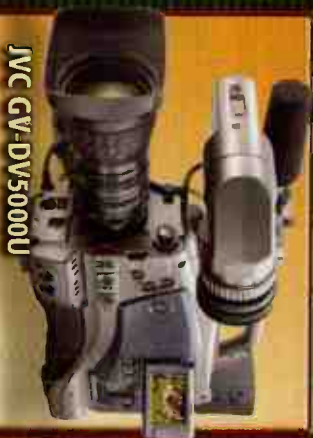
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- ☐ R. Broadcast Consultant
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- ☐ L. Corporate TV facility
- ☐ M. Medical TV facility
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- ☐ K. Other _____

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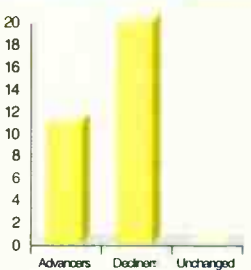
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TOP DECLINERS BROADCAST STOCKS (May 28-June 11)

Granite -13.04%
ACME -10.34%

TOP ADVANCERS TV TECH STOCKS (May 28-June 11)

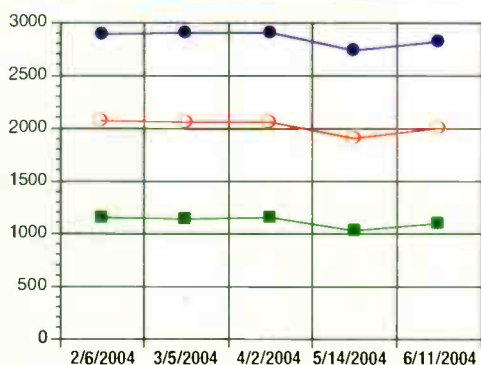
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Belden +3.08%

TOP DECLINERS TV TECH STOCKS (May 28-June 11)

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Parkervision -2.35%

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2064	2048	2057	1904	2000
2883	2898	2903	2736	2821

TV Tech STOCKS as of June 11

Company Name	52-Week Range	May 28	June 11	% Change
Avid	32.55 - 59.77	52.02	51.74	-0.54%
Belden	13.40 - 22.87	16.9	17.42	3.08%
Ciprico	4.42 - 7.21	4.61	4.59	-0.43%
Harmonic	3.18 - 13.75	6.39	6.58	2.97%
Harris	28.70 - 51.19	46.2	46.32	0.26%
Leitch	N/A	5.51	5.4	-2.00%
LSI Logic	6.20 - 12.90	8.2	7.86	-4.15%
Parkervision	4.00 - 12.30	5.53	5.4	-2.35%
Pinnacle	6.60 - 13.80	7.26	7.13	-1.79%
S-A	19.46 - 38.59	34.42	34.29	-0.38%
SeaChange	9.08 - 21.89	14.9	15.43	3.56%
Storage Tech	21.96 - 31.12	28.25	28.09	-0.57%
Tektronix	20.04 - 34.89	31.56	30.92	-2.03%

COMPANY FOCUS

Leitch Ends FY On a High Note

TORONTO

After a restructuring and an acquisition, Toronto-based Leitch finished up for the final quarter of fiscal 2003, but down overall for the year, both ending April 30, 2004.

Revenue for Q4 was up 10 percent over the previous period, ending at \$41.9 million. For fiscal 2003, however, revenues dropped 14 percent to \$154.6 million, from \$180 million in fiscal 2002.

Net loss for Q4 was \$21.7 million or 63 cents per share, compared to \$91.8 million or \$3.08 per share for last year.

Tim Thorsteinson, president and CEO of Leitch said that the company continues to gain momentum toward its goal of returning to profitability, having booked \$45 million in orders, finishing the fourth quarter with a strong backlog.

Video processing and distribution (VP&D) experienced a 14 percent revenue gain in Q4,

and servers generated a 36 percent increase. On a geographical basis, Q4 revenue from sales fell 16 percent in the United States but increased 71 percent in Europe. End-of-year revenues for the United States decreased 30 percent, but in Europe increased by 15 percent.

As part of the restructuring in Q4, Leitch recorded a \$9.6 million inventory charge and \$4.1 million in charges related to staff reductions in its manufacturing facilities. Leitch estimated that layoffs would save roughly \$5 million in annualized income. A total of 40 people were laid off in Q4, and another 30 were let go from the Toronto facility in May.

In May 2004, the video systems maker acquired Videotek, its first payment being approximately \$18 million, paid in cash. Leitch's financial results for Q4 and fiscal 2004 do not include the acquisition, which was announced at NAB2004.

—Lauren Evoy

Broadcast STOCKS as of June 11

Company Name	52-Week Range	May 28	June 11	% Change
Acme	6.50 - 10.21	7.74	6.94	-10.34%
Belo	21.62 - 29.90	29.42	28.83	-2.01%
Emmis	18.00 - 28.65	21.9	21.34	-2.56%
Entravision	7.68 - 11.88	8.1	8.39	3.58%
Fisher	44.40 - 52.50	50.59	49.47	-2.21%
Granite	1.06 - 3.70	1.15	1	-13.04%
Gray	10.55 - 16.22	14.09	14.1	0.07%
Hearst Argyle	22.08 - 29.25	26.15	25.78	-1.41%
Nexstar	9.99 - 14.50	11.69	10.75	-8.04%
Lin TV	19.78 - 27.49	22.7	22.04	-2.91%
Paxson	2.15 - 6.99	2.81	3.05	8.54%
Sinclair	9.63 - 15.43	11.08	10.96	-1.08%
Liberty	40.46 - 51.79	46.55	47.37	1.76%
Univision	28.26 - 40.05	32.55	33.17	1.90%
Young	14.00 - 25.54	14.32	14.17	-1.05%
Tribune	44.28 - 53.00	48.29	46.9	-2.88%
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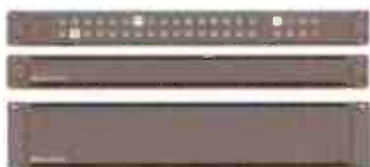
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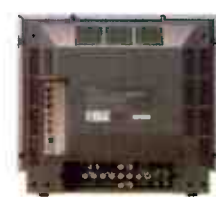
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