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WHAT'S INSIDE

Must-Not Carry

Digital signals orphaned

by Deborah D. McAdams

WASHINGTON

The FCC washed its hands of must-carry last month—again. After seven years, a court order and nearly 1,300 filings, the FCC reiterated that the current statute covers only one video signal.

The broadcast lobby locked and loaded. "NAB will be working to overturn today's anti-consumer FCC decision in both the courts and in Congress. We look forward to the fight, because consumers deserve more," said National Associatino of Broadcasters President and CEO Eddie Fritts right after the ruling.

Both multicast and dual digital must-carry were considered in the same order, and both

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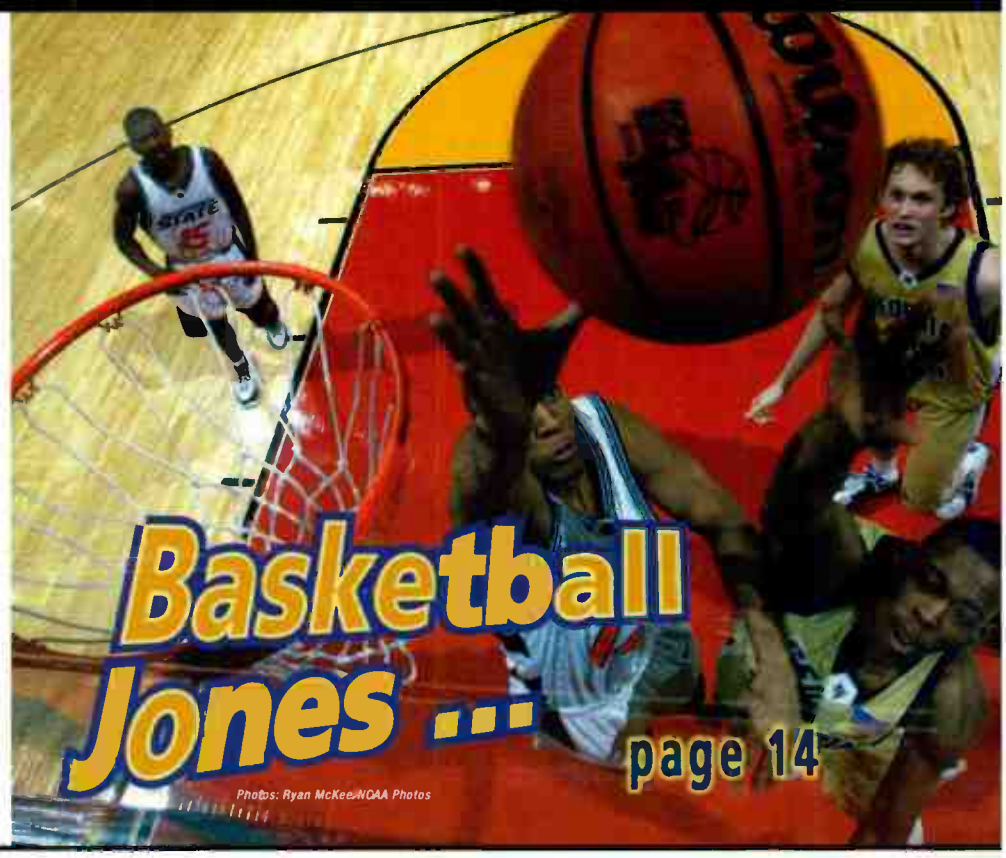

Microsoft Tries Again

Verizon, SBC deals revive software giant's inroads into TV

by Craig Johnston

REDMOND, WASH.

Microsoft TV scored the latest in a series of successful sales in snaring the software contract for Verizon's telco-TV rollout, dubbed FiOS TV, scheduled for sometime late this year. This follows a similar sale to SBC for its telco-TV project last year, Comcast and a growing list of customers worldwide.

"Verizon's got a really unique infrastructure," said Ed Graczyk, director of marketing and communications for the Microsoft TV division. "[Bringing fiber into the home,] they're using some elements of what some people would consider a cable delivery environment for TV, and other elements that are IPTV related."

"The Microsoft TV platform not only provides us with advanced digital TV capabilities that are designed to serve the millions of Verizon subscribers we ultimately expect will choose FiOS TV," stated Verizon president of retail markets group Bob Ingalls, "but it gives us virtually unlimited potential to evolve our interactive services into the most seamlessly integrated offering in the industry."

Graczyk cited the overall Microsoft company product line as a key to this integrated offering.

"Because Microsoft TV is part of a bigger set of solutions that Microsoft as a company provides, it helps these network operators deliver their services beyond just the television screen." He listed Windows computers, Pocket PCs and mobile phones, set-top boxes, and gaming consoles to which Verizon could deliver integrated suites of communication, information and entertainment services.

Not wanting to give competitors a chance to ape its new system before it rolls out, Verizon officials declined to detail for **TV Technology** the actual feature-set they will be offering. But a show-and-tell by SBC during the Bill Gates keynote at CES 2005 in January provided a sneak peek.

One was a Major League Baseball application, where one game could be viewed live full-screen, with three other games appearing live, stacked in small boxes along the left hand side

MICROSOFT, PAGE 10

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NAME:
Doug Lung

COLUMN:
RF Technology

In 30 months, all 2-GHz broadcast equipment will be upgraded to digital technology and will be operating under a new band plan that keeps the same number of channels but reduces their width to 12 MHz. Furthermore this change ... p. 25

NAME:
Dave Moulton

COLUMN:
Inside Audio

I thought I was done with this series about audio basics. However, reader Eric Smith wrote in and asked if I would write about matching signal levels between equipment and sources, and not just mic/line levels, but something ... p. 32

NAME:
Harlan Neugeboren

COLUMN:
Newsroom Tech

As I walked through last year's NAB show floor, I was overwhelmed by the number of server and nonlinear edit systems. It seemed that everyone had these products. I say products, although there were many vendors like Avid, Grass ... p. 38

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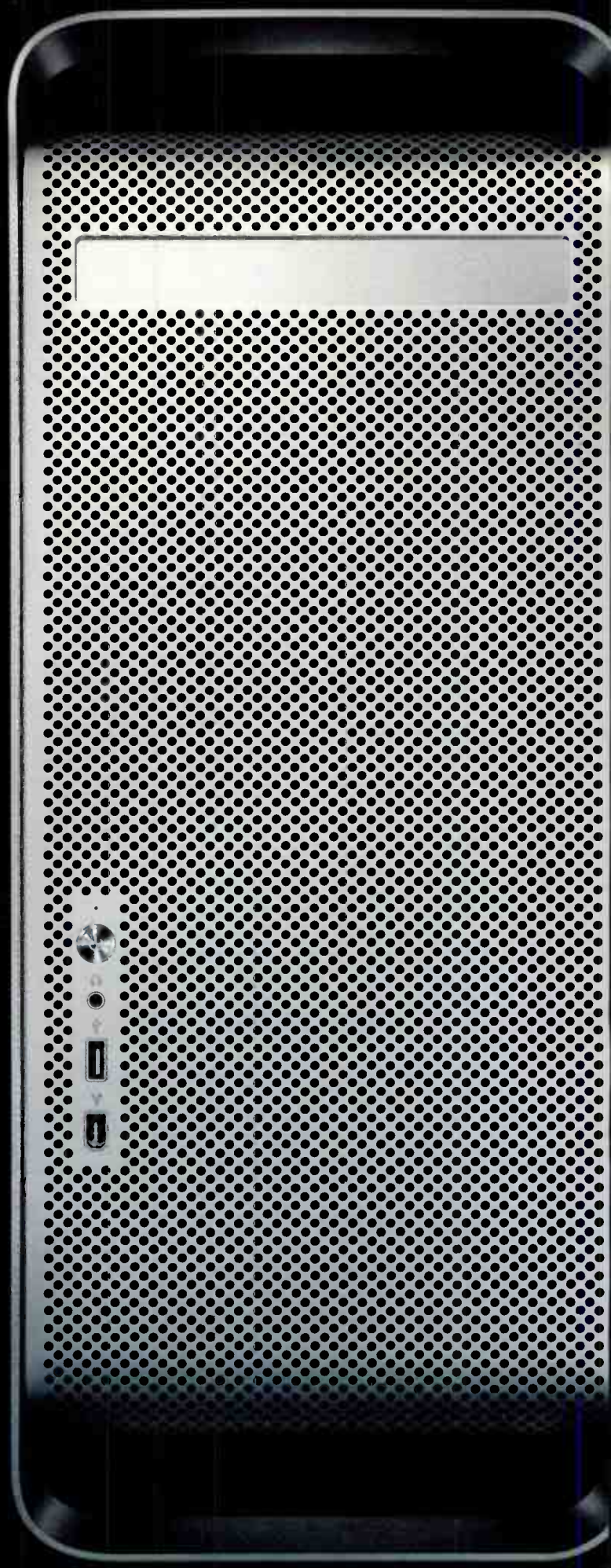

animation techniques, flexible title animation, dynamic particle effects and seamless integration with Final Cut Pro HD and interactivity that feel like a dedicated system. All for just $299. Motion. Real-time motion graphics redefined.

FROM THE EDITOR

A Place in the Digital Sun

One week before the FCC handed down its decision denying multicast must-carry to broadcasters, ABC announced it was pulling the plug on its "ABC News Now" DTV 24-hour news channel.

The irony wasn't lost; the news channel wasn't making any money and had very few viewers. Multicasting hasn't made much, if any money for broadcasters because so few of them are doing it. The majority of the 500 or so multicast channels are broadcast by public broadcasters, and the few commercial broadcasters that do multicast, run, among other things, weather radar channels.

Yet, it was against this backdrop that broadcasters went to the FCC and demanded multicast must-carry. They're going to have to do better than that. The commission looked at what existed and listened to the promises of public interest and localism from the broadcast industry and still said no.

In this age of blogs, cell phones, low-power FM and low-cost production, the ability to disseminate news and information isn't in the hands of a few broadcasters anymore, yet the broadcast license still means something. Does requiring a cable operator to carry the broadcasters' primary digital signal fulfill the public interest requirements? And as Commissioner Adelstein noted during the vote, when will the federal government more accurately define the "public interest obligations" of broadcasters in the DTV age?

The NAB is ready to unload the full power of its lobbyists on Capitol Hill, hoping for a quicker and more complete resolution on digital must-carry from the politicians. The lobbying comes amid a rapidly changing technological landscape that includes the entry of phone companies into the video market, an expected rewrite of the telecom rules and a changing of the guard at NAB. Broadcasters are not looking to redefine their role in the technology future—they just want to secure their competitive position—but forces beyond their control could do it for them.

Tom Butts
Editor
tbutts@imaspub.com

Erratum:

In the Jan. 19 issue, the story "COFDM Portability, HD Pushing ENG Digital Growth" contained the following errors:

- BMS was incorrectly referred to as "BMC" in a photo caption;
- John Leahy's name was incorrectly spelled as "John Leary."

LETTERS

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

Who Will Lose?

Dear Editor:

Regarding the article on BPL by John Merli, ("BPL gains Regulatory Momentum," Dec. 8, 2004). I found the article to be informative about a "new way" to distribute broadband to the masses over unshielded power lines. Can you imagine the RF noise this will generate?

The Manassas Public Utilities Director, Allen Todd acknowledged that Manassas did not launch BPL to fill any void. Hmmmm, I wonder if there was a profit motive involved? The electric utilities have everything to gain and nothing to lose! The real loser will not only be ham radio, but I suspect, AM radio as well.

Don Mosley
KD4QIG
Birmingham, Ala.

The Good, The Bad and the Digital

Dear Randy Hoffner:

I really liked your 20-year anniversary column ("Twenty Years of TV Technology," Feb. 2). As one who has been in the biz much longer than those 20 years I too have seen these changes as well as many others.

I must comment on two things in those 20 years that I feel are very significant: one good and one bad.

The good one is use of digital compression if used judiciously. It allows far more material to be saved/transmitted etc in limited bandwidth; as long as it is not overused to perceived image degradation by the viewer it is an "economic boon." It allows quantity of material to be distributed through existing pipes that was considered impossible years ago. Existing spectrum can be far better utilized as can cable and satellite facilities.

The bad thing that has come with digital is the seeming inability to keep video and audio in sync. With the many diverse activities both in production and transmission, some end results are horrific (and with all of the different segments involved in the delivery it is very difficult to fix responsibility and in fact sometimes these errors become cumulative). The causes are known, (simplistically noted as "latency"), but the fixes seem to be much more elusive. As one involved in production, I would be thrown out of a screening room if I ever presented an end product with lips and sound mismatched as we see regularly on our TV sets. I and others have discussed this issue but our cries seem to fall on deaf ears (pun specifically intended). Hopefully sponsors and producers eventually will get upset enough and they will speak with their dollars to insure a fix for this problem.

Alan Lapides
Los Angeles

Soldiernet

Dear Editor:

James Wither's story ("Did Howard Hughes Invent VOD?" Feb. 2) brought back memories of bicycling film and tape in the pre-FedEx era. During those same years, and a little earlier, I also worked for small-town stations (some of which happened to be placed in major markets). One of my regular tasks was to respond when Kaiser Ind. corporate headquarters in Oakland, Calif. wanted a program moved quickly among our company's five UHF stations in the late 1960s.

I would take the shipping cases to the airport and offer a cash "gift" to soldiers or sailors who were in line for flights to the cities we cared about. The assumption was that they could use an extra $20 to help out while on leave in return for carrying one or two boxes of 16mm film or 2-inch tape. I would then call the other station to have someone meet the soldier at their end.

It always worked and got the show there fast. Imagine if you tried that today!

William Murray
Chicago

TV TECHNOLOGY

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Looking into the Future

Tech Retreat attendees debate analog shut-off, standards

by Tom Butts

PALM SPRINGS, CALIF.

More than 200 attendees packed the Ranchos Las Palmas Marriott in Palm Springs in late January for the 11th annual Tech Retreat, a symposium sponsored by the Hollywood Post Alliance that draws an impressive list of media technology decision-makers.

Hot topics included the DTV transition and emerging compression standards and their role in the broadcast, digital cinema and consumer electronics worlds.

SOONER THAN WE THINK

Broadcasters provided updates on their HDTV efforts and debated the issue of the 2006 analog shut-off date. Bob Seidel, vice president, engineering and technology for CBS network, announced that beginning in the 2005 season, the network will accept what it calls "single-format delivery," delivering HD content originating from both the NTSC network and the digital network.

Despite the industry consensus that analog will not be terminated next year, some broadcast officials warned that the federal government may be more serious about its intentions to keep to the DTV transition schedule after all.

"I always said that [the shut-off] would be later than 2006, but a number of events are occurring in Washington that are beginning to make me a little nervous," Seidel said, referring to several discussions the network has had with the General Accounting Office and its inquiries with broadcasters over the effects of a 2006 analog shut-off.

"We believe [the inquiries] are a precursor to what's going to happen in the commerce committee and telecom subcommittee," Seidel said. "If we're not careful, we could find ourselves at 2006 before we know it."

Speaking on the Broadcasters Panel at the Tech Retreat were (left to right), Jerry Butler, PBS, Glenn Reitmeier, NBC Universal, Mark Aitken, Sinclair, Hal Protter, The WB and Jim DeFilippis, Fox.

EMERGING FORMATS

The pros and cons of emerging compression formats were examined, with some manufacturers warning of the perils of introducing new formats in the consumer marketplace.

"We need to complete the analog-to-digital transition before we begin a digital-to-digital conversion in broadcasting," said Adam Goldberg, director, television standards and policy development, Sharp Laboratories of America. "The most important thing in terms of the transition from digital-to-digital is to not pick many new codecs, but rather to pick one."

David Price, vice president of business development for Harmonic, argued that more codecs in the marketplace provide competition that drives down prices and advances technology. He predicted that the two emerging formats—AVC and VC-1—will split the market, 70-30. "I just don't know which one will prevail," he said.

Brad Hunt, chief technology officer for the Motion Picture Association of America, provided an update on the July 1, 2005 deadline for implementing the broadcast flag, noting the lack of flag-compliant products displayed at CES2005. ■

FCC

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were shot down, 4-1 and 5-0 respectively.

Individual broadcasters, up to their eyeballs in channel selection, were mum on the topic. Some said the ruling would affect their long-term multicasting plans, but most were reluctant to comment because, as one noted, "these are the people who renew our licenses."

Privately, several broadcasters have confided doubts about predicating a business model on must-carry; it was more often viewed as a transitory element for getting new digital services off the ground. As it is, stations across the country are looking at spending an additional $360,000 or so a year to transmit a second signal few households will receive.

Phil Lombardo, president of Citidel Communications, said many small- to mid-market stations would go under without some relief from the expense of running two transmitters.

Currently, stations are allowed to run digital transmitters at less than full power, but that easement comes to an end July 1 for the top four stations in the top 100 markets; and July 1, 2006 for the rest.

Additionally, there's no guarantee that stations can turn off their analog transmitter before a congressionally mandated date, even they may want to. The FCC turned down such a request from KJLA-TV in Ventura, Calif.

KJLA maintained that only .25 of 1 percent of its audience received the station's analog signal over the air, and that it should therefore be allowed to turn it off. The station's analog signal is broadcast from a transmitter east of Ventura; its digital stick is on Mt. Wilson, some 60 miles closer to the heart of Los Angeles.

The FCC Media Bureau responded that .25 of 1 percent of the Los Angeles DMA represented a significant enough number of people to refuse the request, particularly since KJLA does Spanish-language programming. (The Los Angeles DMA comprises 5.4 million TV households, 1.7 million of which are Hispanic, according to Nielsen Media Research figures.)

"You have shown only that the private interests of the station will [be] served, namely, its ability to save money from its analog operation," FCC Media Bureau Chief Ken Ferree wrote in his denial of KJLA's request.

KJLA and other stations that wind up in similar predicaments will have to rely on Congress to set an analog shut-off deadline, which it intends to do this year. Rep. Fred Upton, (R-Mich.), head of the House telecom subcommittee, announced the first DTV hearing of the year just before press time. The hearing, entitled "The Role of Technology in Achieving a Hard Deadline for the DTV Transition" was scheduled for Feb. 17.

Congress could still redefine must-carry, so the war may be far from over. NAB has been all over Capitol Hill in recent weeks, educating lawmakers about spectrum. Several wrote letters to FCC Chairman Michael Powell before the FCC ruling, urging a more broadcaster-friendly approach.

"We believe a ruling required anything less than full carriage of a broadcaster's 6 MHz of spectrum would severely hinder small and independent broadcasters from competing in the marketplace and threaten a diversity of ownership and programming," read one letter signed by 12 legislators.

In the end, Powell was unmoved. He was a commissioner the first time must-carry was defined, and he remained adamant that it pertained to one audio/video signal.

"The Supreme Court upheld the must-carry statute only by a slim 5-4 margin," he said, referring to the court's 1997 ruling on must-carry that applied to analog television. "I believe reading the statute now as expansively as broadcasters urge would likely wither before a First Amendment challenge," he said.

Must-carry survived the Supreme Court challenge in 1997 because it was seen as something that helped preserve free over-the-air television, and that it promoted dissemination of information from a multiplicity of sources. The two Democratic FCC commissioners, who have long called for well-defined public-interest obligations for DTV, said such parameters may have saved multicast must-carry.

"I have consistently maintained that it would be premature to decide multicast carriage without assurance that each programming stream would indeed serve its local community through the imposition of concrete and meaningful public interest requirements," Commissioner Jonathan Adelstein said.

Commissioner Michael Copps concurred.

"I believe that a properly-crafted must-carry decision would be a boon to localism, diversity and competition," he said.

However, it was only the maverick Republican commissioner, Kevin Martin, who dissented on multicast must-carry.

"The Commission made a policy judgment that the benefits of this programming were outweighed by the burden on cable operators. I disagree. I think the public would benefit more from more free programming," he said, noting that video compression technologies would continue to mitigate the bandwidth demand of multicast carriage.

Powell responded that the commission would be on "weak ground" if it expanded must-carry without more legislative support from Capitol Hill.

Robert Sachs, president and CEO of the National Cable and Telecommunications Association, said the vote was "clearly a major victory" for cable. He also said the door remained open for commercial broadcasters to negotiate carriage deals the likes of which the NCTA did with the Association for Public Television Stations. Under that arrangement, public stations get carriage of up to four of their multicast signals.

The APTS/NCTA deal was cited by several commissioners as a fine example of how things ought to be done, but APTS chief John Lawson, nonetheless lamented the denial of expanded must-carry.

"While we are pleased to have secured digital multicast cable carriage for public television stations, we also consider it essential that local stations' digital signals be carried on direct broadcast satellite services, as well emerging platforms," he said.

The satellite lobby was predictably happy with the ruling. ■

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Moving to Automated Closed Captioning

Foolproof dialogue text accuracy via voice recognition software still years away, if ever

by John Merli

FALLS CHURCH, VA.

As the number of digital channels continues to grow, along with new FCC rules now in effect for PSIP-TSID, it's a safe bet that captioning and subtitling will play an increasingly important role in the digital era. And although the FCC will require all new nonexempt programming to be closed-captioned by next year, teletexting is no longer only for the hearing-impaired.

Instant messaging... e-mail... DVD multiple-language subtitles... cell text messages... live captioning in sports bars, health clubs and offices... Suddenly, scrolling text on screens of all sizes is everywhere. Closed captioning (providing script, music, sound effects and dialogue in crawling text) and its textual cousin, subtitles (noncrawling text burned into the video to translate spoken dialogue into another language) are finally coming into their own.

Two of today's biggest challenges for hardware/software makers are handling live programming and making closed captioning more cost-effective for local broadcasters. There's a growing demand by television networks in Europe (where "captioning" and "subtitles" are terms often used synonymously) and North America for live captioning, which increasingly translates into the use of speech recognition software.

John Boulton, business manager for Subtitling at London-based SysMedia, said the traditional model for captioning involved stenographers such as court reporters. "These are highly trained people, very skilled, and quite expensive. But speech recognition software has now reached the level of quality and accuracy where you can use someone of a much more junior grade. Captioning increasingly involves less personal skills to produce it," Boulton told TV Technology.

A screen image of software from the WGBH Media Access Group that allows viewers to manipulate the appearance of their closed captioning.

THE HUMAN ELEMENT

Out-of-the box speech recognition software today provides an accuracy level of about 80 percent or better, according to Boulton. "But if you think about it, that means one in every five words is wrong. That's still too high and you can't make sense out of it." When foreign words are entered into the primary language being captioned—such as the names of Iraqi officials, he said—speech recognition software still has a way to go, unless atypical words are added to the software's "vocabulary" beforehand, which is not always possible with live speech.

Bob Henson, president of Link Electronics in Cape Giradeau, Mo., thinks it will be awhile before the human element of live captioning is eliminated completely. Link offers a rack-mounted CC digital/analog encoder-decoder (PDA-895) and a similar portable unit (PDA-896). "People have been working on voice recognition for many years," Henson said. "I think just for the novice, these [software] systems should meet the FCC requirements. For the purist, you need human help. It's a mistake to treat the hard-of-hearing like secondhand cousins by not translating or spelling all the words correctly. But the software keeps getting better."

Others say even a speech-recognition accuracy rate approaching 99 percent can still be distracting because it means an obvious text mistake or two is popping up at least once a minute. "We're not yet to the point where we can pump live audio in and get totally accurate text coming out, but we're getting there," said SysMedia's Boulton. For recorded programs, which still represent the majority of closed-caption projects, caption accuracy levels are virtually 100 percent because there's usually adequate time for post production, including scrutiny of confusing speech.

SysMedia deployed its first WinCAPS captioning system to TV2 in Denmark for last year's live coverage of a royal wedding in Copenhagen. The same system continues to be used for captioning the Danish broadcaster's evening newscasts. Another relatively new software module, the Windows-based RenderStation from TM Systems of Los Angeles, is geared to DVD captioning and subtitling. It permits multiple-screen resolutions and text options for NTSC, ATSC and PAL, as well as both 4:3 and 16:9 aspect ratios.

ATSC estimates there are nearly 29 million Americans with some form of hearing impairment, which is about 10 percent of the U.S. population. But as anyone can attest who has been to a sports bar or health club lately, closed captioning is not used solely by the hearing-impaired anymore. Boulton said research, too, suggests more and more consumers are using closed captioning out of convenience or good manners, rather than physical necessity.

In early February, new FCC rules governing PSIP-TSID (transmission signal ID) took effect that, in part, also affects NSTC and ATSC closed captioning. Now "dynamic PSIP" (incorporating new data to comply with changing schedules, etc.) must include both EIA608 and EIA708 captioning—with correct-data service descriptors allowing end-to-end captions, and placed in both EIT (event information tables) and PMT (program map tables).

Also, by Jan. 1, 2006, the commission will require all new nonexempt broadcast programs to contain the closed-captioning option. (So-called "static PSIP" does not comply with new FCC regulations.) Several companies, including Triveni Digital of Princeton Junction, N.J., are providing toll-free PSIP Help Lines for broadcasters in the months ahead. (Triveni prompts callers to leave voicemail questions at 1-866-874-8364 and promises rapid responses.)

ON THE NET

Larry Goldberg, director of WGBH Media Access Group, which holds several patents on captioning devices, said a lot of exciting caption features are starting to pop up on the Internet, too, especially in the fast-growing broadband sector where TV and movie clip video are promi-

CLOSED CAPTION, PAGE 16

Microsoft

CONTINUED FROM PAGE 1

of the screen. Viewers can switch the various games to the main screen with the remote, as well as access player and team statistics and so forth.

Graczyk said that designing applications such as this is simplified because there is no additional hardware required for each of the picture-in-picture boxes needed. "We're able to do all of that on a regular television set with a regular TV set-top box, because that tuning functionality is done in software and in the network."

Another SBC demo at CES allowed a traveling subscriber to receive a reminder of an upcoming program on his cell phone. The reminder allowed the subscriber to view a 30-second promo on the handset.

Deciding he would like to see the show, but knowing he wouldn't be home in time to view it live, with the push of a button on the cell phone he could instruct the system's DVR to record it for him.

DESTINATION, IP

Back in the home, the Microsoft TV software also allows the cable system viewing menu to display live video from each of the channel offerings as the subscriber scrolls through them, which would allow them to quickly switch to (or avoid) a fight on the Jerry Springer show.

The hardware portion of Verizon's set-top box is built by Motorola, and comes with a remote. But unlike a standard cable box, it sits as a partner on the home network, which allows the viewer to access music, video and other files on desktop PCs and other computers on that network.

Microsoft TV allows viewers to watch sporting events at a variety of camera angles.

As Verizon's example proves, there's no standard system for delivering video to the home. "The infrastructure that Verizon's rolling out this year is very similar to where the cable companies are trying to get to as part of their next generation network architecture network," said Graczyk.

"On the other hand, you've got companies like SBC that are using a different approach. They're not doing fiber to the premises. [In] most of their deployments they're doing fiber to the node, and they've decided to take a pure IPTV approach from the start."

But Graczyk see them all heading to an IP solution in the end. "I think if you talk with Verizon, or look at some of their public statements, IPTV is the long-term bet. But given just kind of the uniqueness of their environment, they've chosen this as the first step."

"Some other companies have chosen another first step, but they're all going in the same direction." ■

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Bringing the Dailies Home

Up close and personal at the Sundance Film Fest

by Jay Ankeney

PARK CITY, UTAH

Not everyone can join the 30,000 international visitors attending the Sundance Film Festival up in the snows of Park City, Utah. But this year every night from Jan. 24 to Jan. 29, cable viewers could tune in to the Sundance Channel at 9 p.m. to see a half-hour magazine show called "Festival Dailies," hosted by actor and comedian Jay Mohr covering the on-screen and behind-the-scenes activities at the indie film fest.

In addition to providing a showcase for independent filmmaking talent, this year's "Festival Dailies" show also demonstrated the viability of new post-production technologies from Apple Computer, including the latest version of Final Cut Pro editing software on PowerMac G5 workstations sharing DV footage over Xsan, Apple's new enterprise-class Fibre Channel Storage Area Network file system.

"We wanted to give viewers the opportunity to see what goes on at the festival firsthand," said Philip Hack, a freelance TV veteran who served as line producer for the Sundance Channel on the show along with Robert Katz and Jerry Kupfer. "Our crews covered the local color as well as the celebrities that glitter in the Park City landscape, and I'm glad to say we were also able to profile all 32 entries in the feature film competition to give viewers some insight into their background."

A Final Cut Pro editor prepares footage for "Festival Dailies," aired on the Sundance Channel during the Sundance Film Festival.

Six field crews shooting 24p DV on Panasonic DVX100A camcorders covered stories ranging from profiling Hollywood wannabes freezing in long ticket lines to on-the-street interviews with visitors from more than 27 countries, many attracted by this year's inaugural World Cinema Competition. Four Ikegami studio broadcast cameras were used to shoot in-studio interviews with many of the filmmakers premiering their dramatic and documentary works in the Independent Feature Film Competition.

WORKGROUP COLLABORATION

Then the "Festival Dailies" show was put together at the Sundance Channel Studio, a temporary television production facility built almost exclusively around equipment loaned by Apple. Its post-production complement featured 11 dual 2.5 GHz PowerMac G5 workstations, each running Apple's Production Suite software that includes Final Cut Pro HD, Motion and DVD Studio Pro 3, all sharing the same DV material over Xsan. The Xsan consists of two 5.6 TB Xserve RAIDs, two dual 2.3 GHz Xserve G5s, two Qlogic Sanbox 5200 switches, a gigabit Ethernet switch, and 2 GBps glass fiber and copper connecting all the equipment.

"The 'Festival Dailies' production gave us a great opportunity to prove the workgroup collaboration made possible by Final Cut Pro on Xsan at a cost level affordable by independents," said Kirk Paulsen, Apple's senior director of pro applications marketing. "The whole configuration was set up in a day and a half, and the smoothness with which everything worked together removes price and technology as a barrier to this kind of production."

To ingest the DV onto Xsan storage, the Sundance Channel Studio incorporated AJA Video's Io 10-bit uncompressed FireWire interfaces that had been co-developed with Apple. "This was a major notch in our belt," said Ted

DAILIES, PAGE 19

Multitasking on the Small Screen

Viewers see multiple feeds on one channel with DirecTV's new Mix Channel

by Susan Ashworth

EL SEGUNDO, CALIF.

Want to find out what's on TV quickly, without picking up a TV guide or turning to that scrolling program guide on Channel 3?

DirecTV is betting that millions of viewers will answer "yes," and in January, introduced a new set of interactive television services designed to give multitasking a whole new meaning.

Known as the DirecTV Mix Channels, these new interactive services allow viewers to watch up to six channels on one screen. Displayed in a Brady Bunch-like fashion—with each channel taking up a small square portion of a television screen—the Mix Channels include three types of programming: news, sports and children's shows. On the Sports Mix Channel, for example, viewers will see six small screens showing ESPN, ESPN 2, the NFL Network, the Golf Channel, the Speed Channel and the Outdoor Life Network, all at the same time on the same screen.

"[These features] give customers yet another way to customize their television viewing experience," said Eric Shanks, senior vice president of Advanced Services and Content for DirecTV.

"When we first pitched the idea to focus groups, it tested extremely well—people found it useful and easy to use," said Shanks, who had some real world insight on how viable this new program might be. His news-focused father was visiting, searching in vain for news channels on his son's television set. "How much easier would it be if all the channels were on one screen?" he asked his father. The idea grew from there.

DirecTV customers with interactive-enabled receivers can hear audio as well as select a program while watching a Mix Channel. Customers with non-interactive boxes are only able to use the Mix Channel as a program guide.

READY TO SCORE

The company plans to expand its Mix lineup this fall with an NFL Sunday Ticket Mix Channel on which viewers can see all current NFL games on one screen. One key feature: When a team is set to score, a red box will light up around a channel alerting viewers to tune in more closely.

At its Los Angeles broadcast studios, two studios are dedicated to the Mix Channel lineup, using equipment that includes a Miranda Kaleido-K2 multiimage display processor, a Leitch DDR for background playout, an Avid iNEWS newsroom management system, Thomson Grass Valley Kayak switcher and a Sundance Digital automation solution.

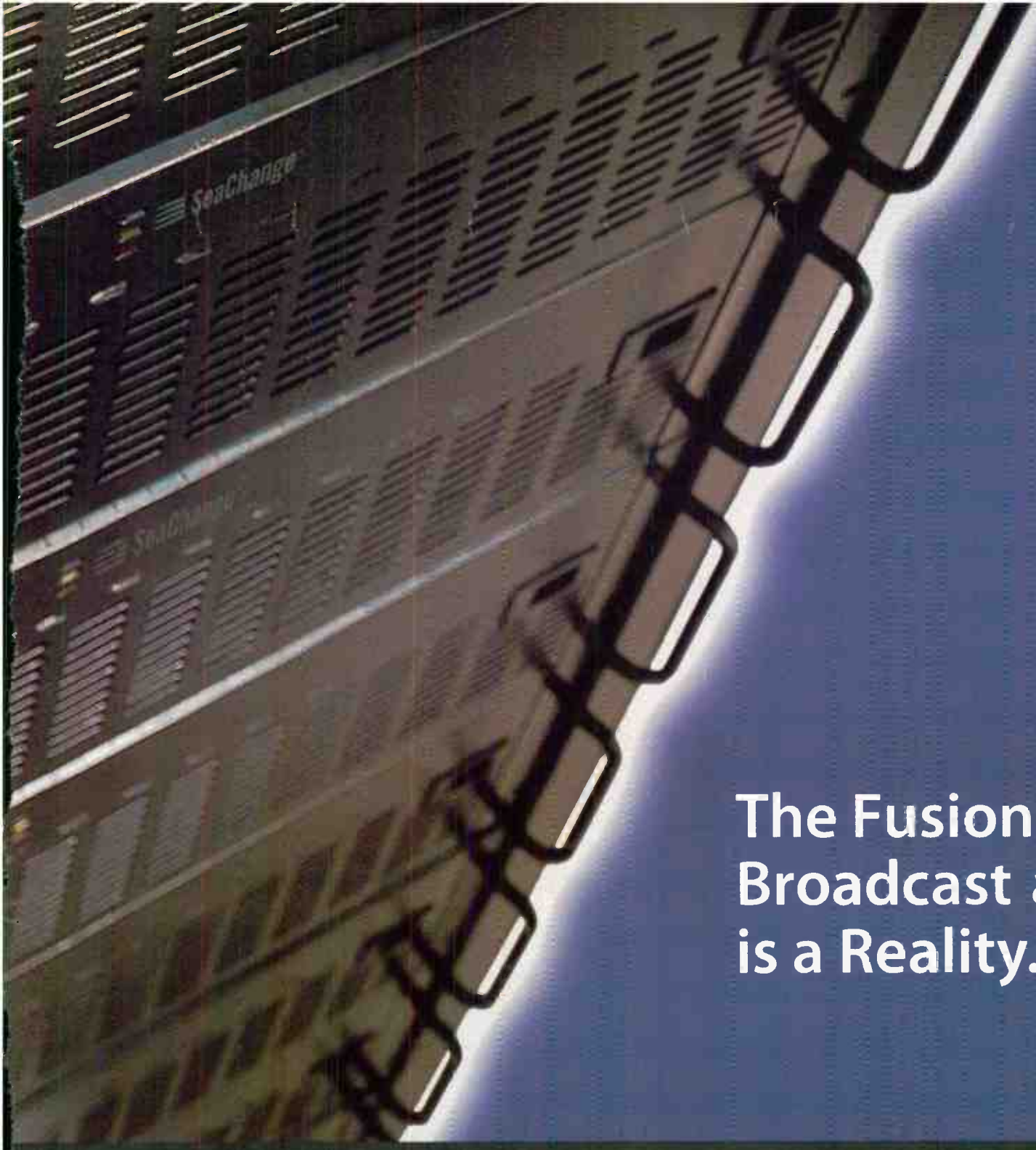
Is SpongeBob on yet? With DirecTV's Mix Channels, viewers get a peek at six mini channels on one screen from three genre: news, sports and children's shows.

DirecTV has other interactive ideas in the pipeline as well. In February the company planned to launch the DirecTV Active channel, which will offer weather forecasts, financial updates, daily horoscopes, pay-per-view programs, and for those feeling lucky, winning lottery numbers.

At year's end, DirecTV plans to launch its Home Media Center, which allows subscribers to access video, photos and music from a television set anywhere around the house via a main central server unit. The system will support standard and high-definition signals, the company said.

These releases are part of DirecTV's long-term strategy to boost interest in interactive and nontraditional viewing services, and continue the approach taken by other broadcasters, including BSkyB and EchoStar, the latter of which offered interactive set-top capabilities for viewers during the 2004 Olympic Games. DirecTV began deploying interactive-enabled receivers in April 2004.

DirecTV also has its eye on the mobile entertainment market and recently introduced the Total Choice Mobile system designed for viewing while on the road. The package provides access to more than 125 channels of video and audio programming, the company said. ■



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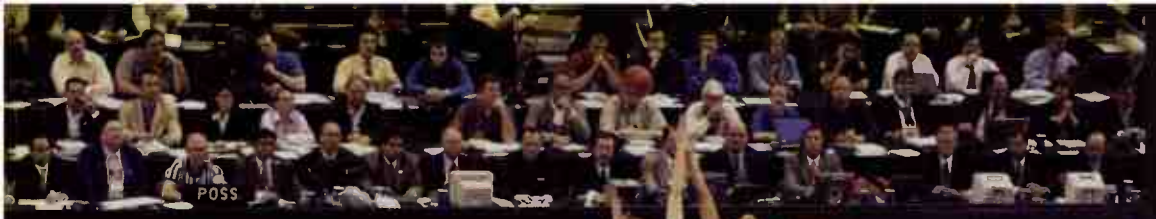


Photo: Brett Wilhelm/NCAA Photos

NCAA Bla Tourney Co and

by Robin Berger

LOS ANGELES

CBS broadcast the last five NCAA basketball tournaments in high definition—but this year the network's going to be a lot more aggressive. Ken Aagard, senior vice president, Operations for CBS Sports, provided this assessment, noting there would be an HD game every single day—four the first week in March, then all games in the second weekend, plus The Final Four and Championship matches. And, for the second year in a row, Harris Communications will sponsor the networks' coverage of 39 games in hi-def and 5.1 audio, up from 12 in 2004.

NEP SuperShooters, New Century Productions and Corplex will supply the HD trucks (National Mobile Television will supply a standard definition truck for Round 1).

BACK TO BASICS

The increase in HD fare will turn the already tricky situation of covering a very fast-paced, multi-game event into an even more high-wire proposition. So CBS has pared down to basics, getting rid of, for instance, SkyCam coverage, which is not optimal on a scoreboard-dissected court.

"You really can't follow the action because it's always in front of your primary cameras," said Aagard. "So it ends up just being something that you use to get some movement of the crowd, and you can do that with a jib."

But CBS has upgraded its super slow motion cameras to the Thomson LDK 6200 high definition model (standard definition LDK23s from Philips were used last year). The cameras are outfitted with Canon HD lenses ranging from the telephoto XJ86X13.5BIE-D to the HJ11ex4.7BIRSE wide-angle for handheld cameras, and may include the Compact Studio XJ22X7.3BIE-D model. The last, introduced at NAB2004, is "one quarter of the size of a standard studio lens and one third the weight," said Gordon Tubbs, assistant director, broadcast and communications for Canon.

Ikegami's HDL-20 is the new "Behind the Backboard" robotic camera, replacing the standard model used last year. It uses a wide angle (4.8 lens) from Fujinon, said James Warden, CEO of Robo-Vision, which is providing the rig.

CBS will continue to use the eight-channel, 5.1 audio setup (Dolby E encoder and decoder) that it has had for more than 18 months.

Unfortunately, getting the upgraded audio signal distributed is still a problem.

"One of the biggest problems we face in our business is proper distribution of our digital audio," said Aagaard. "Headends are upgrading their own equipment at their own pace under their own capital plan for their own reasons—and the training of the people that operate this equipment is really way behind."

Graphics will get a new look, thanks to in-house software.

"We're hoping to implement something similar to the GameTrax used in CBS NFL games that include real-time scores and players statistics," said Mike Bird, graphics manager for CBS Sports.

ANYTIME, ANYWHERE

And the network is pushing broadband. On Jan. 27, CBS Sports, NCAA and College Sports Television (CSTV), a pay-TV and online college sports network, announced a deal that lets Internet users watch every playoff game.

"Anybody who's sitting at a computer will have access to watch full coverage from 56 NCAA Tournament games," said Sean McManus, president of CBS Sports. "All the games that are not being seen in your market will be

Photo: Brett Wilhelm/NCAA Photos

kets verage

CBS, WRAL expand HD online access to March Madness

available on your computer. There will be archival footage available, and there will be streaming video of interviews, pre- and post-game conferences and video highlights."

McManus would not comment on the financial arrangement with CSTV other than to say it was a combination of a guarantee and a revenue share. Elsewhere, reports claimed that CSTV will pay CBS a little more than $3 million for the two-year deal, plus the revenue-sharing component.

The fee for the "March Madness On Demand" online service is $19.95 (though there was an early sign-up special at half that price) and can be accessed at *http://cbs.sportsline.com*, *www.cstv.com* and *www.ncaasports.com*.

One of the less-mentioned possible perks may be the ability to see more than one game at once.

"It's a little bit early to say specifically what the interface is going to look like," said CSTV president Brian Bedol, "but it will provide the ability to follow multiple games at the same time."

CSTV, Akamai and a third partner were testing the capability of hosting a split-screen option, according to Bedol.

"It's our goal to do it," Bedol said. "We're only going to do it if we're comfortable that we have enough lead time to do it right."

The viewer will also be able to click, scroll and/or toggle back and forth between stats, game action and chat. There also will be three aspects to the video; a free highlights player (most likely a skinned Windows Media Player); more extensive highlights behind a registration wall and longer-form video for subscribers. But the view is tied to a PC.

"For this year the on-demand will not be going to a cell phone," he said.

CELL PHONE UPDATES

On March 14, WRAL-Raleigh, N.C. planned to debut an NCAA Tournament score update option on its News Over Wireless (NOW) service. Customers with Sprint PCS Vision mobile phones have dialed into NOW since last December.

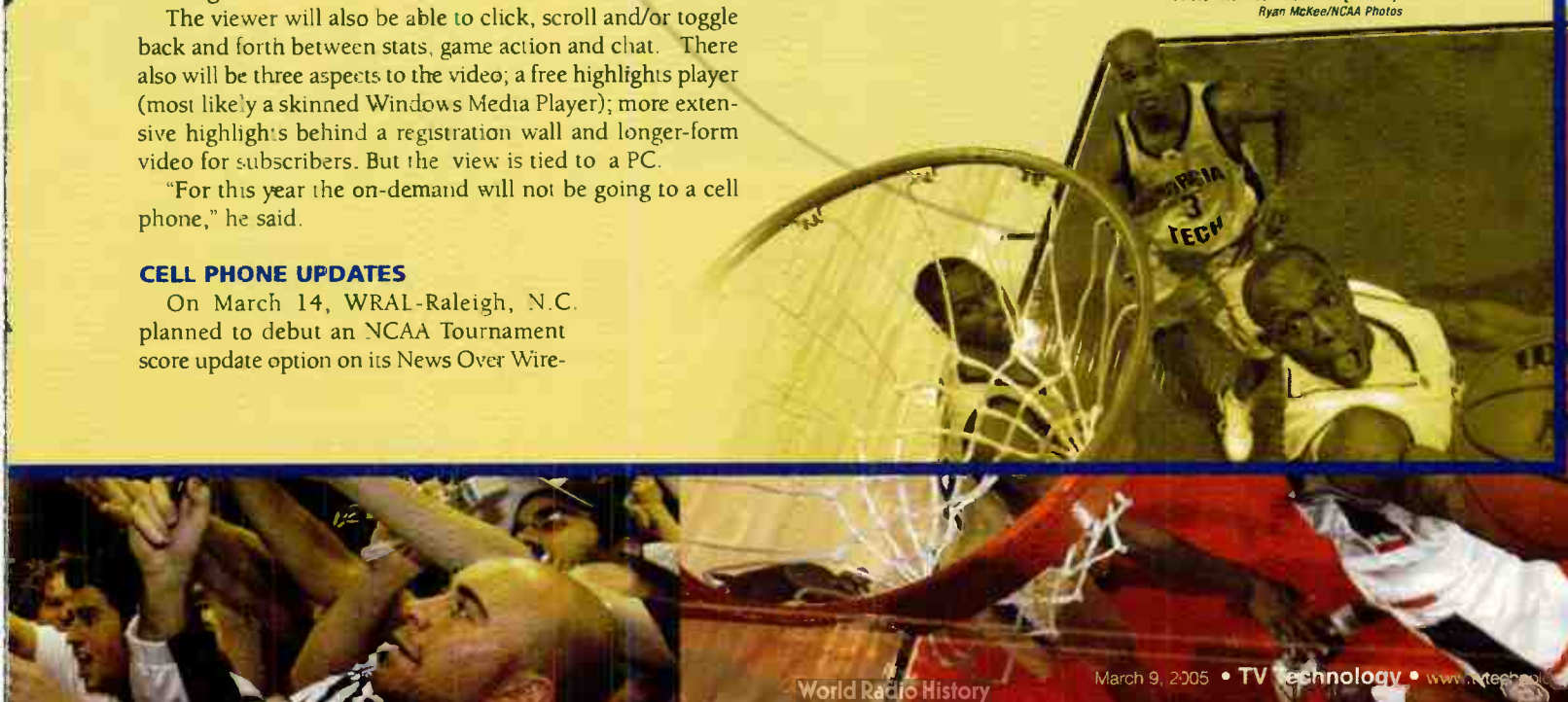
For $3.99 a month, they can also download up-to-the-minute news stories, pictures, traffic camera images, weather forecasts, Doppler radar, and severe weather warnings to their mobile phones. Designed by WRAL's sister company, DTV Plus, with wireless application expertise from Air2Web, the template- and menu-driven app is designed for use on J2ME-enabled devices.

> **"Anybody who's sitting at a computer will have access to watch full coverage from 56 NCAA Tournament games."**
>
> —Sean McManus, CBS Sports

"We view this as WRAL's third screen," said Sam Matheny, DTV's vice president and general manager.

WRAL declined to discuss revenues from the service other than to state that it gets a percentage of the subscription fee, and that by late January, it got "hundreds of downloads." ■

Unless otherwise indicated all photos by: Ryan McKee/NCAA Photos



Mixing at the Speed of Sound

Today's studio audio consoles offer broadcasters a sound solution

by Claudia Kienzle

HAMILTON, N.J.

Live television is one of the most challenging and unforgiving environments for mixing live audio. So vendors of studio audio consoles stress how intuitive and ergonomic their systems are, and how quickly they enable operators to respond to changing audio demands.

Also, while most live productions are still stereo or mono, they say that 5.1-channel surround sound is gaining momentum. Because of this, many next-generation studio audio consoles have been designed to support 5.1-channel surround sound so that this capability will be ready to go when broadcasters decide to upgrade their production audio.

OPERATIONAL FLEXIBILITY

"In live broadcasting, last minute production changes are the norm. How quickly a console allows operators to facilitate these 'curveballs' may determine how much time can be spent actually fine-tuning the sound," said Dave McClure, product and technical specialist, in the New York office of Palo Alto, Calif.-based Euphonix, Inc. "With Euphonix, the necessary distractions of production changes are minimized, and operators spend more time mixing."

Euphonix offers two broadcast consoles: Max Air and System 5 (or S5), both designed to be configured on-the-fly in any format up to 7.1-channel surround sound. Max Air features 96 audio channels with an extremely compact control surface, ideal where control room space is at a premium. The S5 console features an interactive control surface with eight parameter knobs per fader strip. And while it uses the same audio processing core as Max Air, it can be scaled up to 310 audio channels.

"Euphonix consoles allow operators to make on-the-fly configuration changes to create new sub-mixes in seconds," said James Tunnicliffe, Euphonix product and technical specialist. "If production calls for an additional stereo mix, the operator simply selects two output busses and puts them into stereo mode." The console also facilitates different mixing styles rather than dictating a single approach.

NECN uses Wheatstone's D9 audio console.

Copenhagen-based Primevision, one of Europe's largest providers of OB trucks, uses the Studer Vista 8 in its new HD30.com vehicle.

Attesting to this flexibility, Jim Toten, director of engineering and technology for Hollywood-based Tribune Studios recounted an incident on "The Sharon Osbourne Show."

"Wynonna Judd was appearing with her band: They were requesting 40 inputs over and above the show feed, [already at 48 mic preamps], and Euphonix was able to supply a set of 24 additional preamps and 16 additional channels of faders... in about 30 minutes," said Toten. Tribune Studios, a division of Tribune Broadcasting, has twin Euphonix Max Air 5.1-channel surround-capable digital audio consoles used for live-to-tape production sound on shows like the recently cancelled "The Sharon Osbourne Show," "Family Feud" and "Style Court."

The Euphonix Max Air console was recently installed at WTMJ-TV (NBC) in Milwaukee, Wis. and KQED-TV (PBS) and KRON-TV, in San Francisco, Calif. for use in live local news production. With its Max Air Broadcast Tour Truck, Euphonix brings a 96-channel Max Air, set up to simulate a local TV station's digital audio control room, right to the television station to give broadcasters a hands-on demo.

RELIABLE FOR TV

U.K.-based Calrec Audio Ltd produces a wide range of audio consoles designed specifically for live broadcasting, including the Alpha (96 stereo channels), Sigma (48 stereo channels), and Zeta (32 stereo channels), all 100 series.

Closed Caption

CONTINUED FROM PAGE 10

nently featured.

One of the group's new products is CaptionKeeper—a software program that automatically converts TV closed-captioning data into Web streaming formats. Goldberg said it takes Line 21 captioned data as input and creates simultaneous outputs for both live and archived presentations viewable in the readily accessible RealPlayer, Windows Media Player and QuickTime formats.

"The new hardware coming out now can also let the user choose the shape, style and appearance of captions on their TV screen," Goldberg said, similar to manipulating fonts, text sizes and layouts in Word and other popular computer programs.

For broadcasting, replacing caption hardware with cost-effective software solutions will be of primary importance for years to come, according to Dr. Dilip Som, president of CPC Co. of Rockville, Md. "Software caption encoders and subtitle character generators perform all the functions of the hardware, plus save users money since the software costs significantly less than the hardware used to," Som said, with typical savings of about $500-$1,000 on a system.

And hard disks are rapidly replacing tape for timecoding and formatting. "Nonlinear editors have been around for years, but many facilities still use tape-based captioning and subtitling systems. Nonlinear timecoding and formatting save time, and are simply more efficient," said Som.■

Fifty percent of units sold are installed in OB vehicles, according to John Gluck, Calrecs sales and marketing director. Calrec features, like speed, low power consumption, low heat generation, and compact size make them well-suited to mobile video vehicles.

"The Alpha 100 desk is a perfect fit for the space previously occupied by a Calrec S Series analog desk we installed in 1996," said George Hoover, general manager of mobile units for NEP, which recently purchased a Calrec Alpha 100 all-digital console for its SS24 HD truck. "In fact, we found we could actually reduce some of the cabling and patch field requirements due to the Alpha 100's inherent routing matrix. We wanted to maintain the Calrec user interface, superior sonic quality, and rock-solid reliability, while taking advantage of the system's control features."

"Mixing audio for live broadcast is incredibly pressured and mistakes are unacceptable," Gluck said. "In Calrec consoles, reliability in live broadcast is a key feature. Controls, settings, and levels must be easily located, highly visible, and intuitive." The Alpha 100's control systems are proprietary and independent of the onboard PC, accounting for a boot-up time of less than 20 seconds, and a console reset of less than 15 seconds, with no loss of audio. Calrec consoles do not share any signal processing resources, reserving full processing for EQ, filters, dynamics, auxes, direct and buss outputs.

"The biggest challenge of mixing audio in a live application is the ability to react with lightning speed to producers' demands and instant changes."
—Jamie Dunn, Studer

The Alpha 100 digital board was used by four mobile production operators—Dome Productions (Canada), Game Creek (New Hampshire), New Century Productions (Pennsylvania) and Trio Video (Illinois) to supply audio for Major League Baseball games, including the World Series—for Fox Sports.

WHAT ABOUT 5.1?

With regard to 5.1 channel surround sound, Gluck said, "[Surround sound] is beginning to gain momentum, though not too much real surround production is being done worldwide compared with stereo or even mono. All Calrec digital consoles have full 5.1 panning, routing and monitoring. The provision of surround channels has been [addressed] in the system architecture and will be released during 2005."

At Comcast SportsNet, a regional sports cable network in Philadelphia, a Solid State Logic (SSL) C100 digital broadcast console is used to handle 5.1 surround mixes for telecasts of Philadelphia 76ers (NBA), Flyers (NHL), and Phillies (MLB) games.

"With the C100, we can easily create the multiple 5.1 mixes we need, with the added benefit of SSL's superior stereo/mono fold down algorithm that yields a great stereo and mono version of a mix automatically," said Mike Giacalone, digital audio consulting engineer for Comcast SportsNet.

According to Niall Feldman, director of product marketing for UK-based SSL, "With the C100, arena and crowd mics can be placed on a dedicated fader layer, and controlled as a single entity from group faders. Multiple 5.1 program busses provide the capability to do both domestic and international mixes in surround from the same console."

MIXING, PAGE 18

Mixing

CONTINUED FROM PAGE 17

Brad Harrison, sales engineer for Wheatstone Corp. in New Bern, N.C. said, "While there is a definite trend toward using 5.1 audio in local station production, it is by no means a stampede at this point. Many stations still produce their local newscasts in mono… and the most you will hear produced in 5.1 surround is music beds and intro's, primarily for ambiance."

Eventully, "as operators become comfortable with new 5.1 surround tools, this will change," Harrison said. All Wheatstone D-9 and D-5.1 digital television consoles have the inherent ability to mix in 5.1 as well as pass 5.1 through. The Wheatstone "Bridge" router allows signals to be defined as mono, stereo, or 5.1, and brought up to a single fader on the control surface.

"Wheatstone's D-9 and D-5.1 are ideal for live news because they have control surfaces with a dedicated control topology so operators can react instantly to live events without resorting to scroll through menus or touchscreens to perform basic functions," Harrison said.

Newton, Mass.-based New England Cable News (NECN) is using the Wheatstone D9 console to produce original programming for its regional cable news network.

"Election Nights used to be major exercises in patching and sub-switching feeds," said Adam Mitchell, NECN's studio operations crew chief. "Now we can call up our sources as we need them and quickly assign a custom mix minus." Because the D9 is equipped and programmed to provide rapid access to a variety of live sources, NECN audio operators can quickly configure the D9 32-fader desktop with customizable setup files for its 13 hours of daily live news programming, plus breaking news events.

"The biggest challenge of mixing audio in a live application is the ability to react with lightning speed to producers' demands and instant changes," said Jamie Dunn, sales director for Studer Professional Audio GmbH, in Regensdorf, Switzerland.

The intuitive Vista 8 console from Studer, which uses patented Vistonics technology, combines a graphical interface with physical switches and knobs mounted onto TFT screens allowing users to control parameters while getting clear graphical feedback to what they are doing.

Vista 8 provides 5.1 monitoring and panning, with optional 7.1 surround sound and Dolby EX monitoring. Vista 8 also has a unique Virtual Surround Panning algorithm that allows users to pan not only with amplitude but combinations of phase, level and frequency for a more realistic sound.

Dunn said, "Freeing the engineer's mind from worrying about console operation allows more thought to be placed on the essentials of the job at hand—the audio quality."

In keeping with that philosophy, Nashville-based Harrison by GLW recently introduced Trion, a flexible digital audio console sporting a sleek, ergonomic design. For broadcast, Trion allows operators easy set-up, access and monitoring. "Leveraging Harrison's latest Generation-3 control surface and IKIS Platform, with an integrated Linux and USB architecture, Trion offers high- performance in a compact package," said Gary Thielman, advanced product manager. On Trion, controls and assignments for each channel are fully accessible as traditional, vertically arranged strips or, in an enhanced version, expanded across eight channels for an intuitive, knob-per-function control, anywhere on the console.

"This powerful feature, together with dynamic profiling—calling any channel or set of channels to any fader strip or set of fader strips—allows a single Trion to share and support remote control panels in applications where distributed control is desired," Thielman said. Also, Trion systems internally generate Harrison's exclusive Pre-View Display (waveform with history) from any audio source, without need for a digital audio workstation. ■

DIGITAL JOURNAL

Bill Hayes

Linear HD Editing: The Line Starts Here

Don't discard those linear editors yet

AMES, IOWA

I thought I'd start this journal out preaching a little heresy and talk about linear editing and HD. We are constantly bombarded by statements that digital is better. Digital is faster. Digital makes things easier. I generally hear these statements from the same people that use Moore's law to extrapolate how the cost and speed of digital technology will be cheaper and faster in just 18 months. Gordon Moore's original paper (*ftp://download.intel.com/research/silicon/moorespaper.pdf*) was published in 1965, and it focused on the trend for increasing numbers of transistors on silicon. In addition to being a brilliant look ahead at a very new industry, it was also one of the catalysts for Intel's departure from being a memory chip manufacturer to focusing on microprocessor production. The commoditization of memory meant lots of competition and low profits.

IPTV's linear editing suite

LIFE IS ANALOG

So, is digital better? The answer is, "It depends." If we face the fact that life is analog, then we have to accept that when we create a digital sample, we are losing data. No matter how fast the sample rate or how many bits are in the sample, there is always a gap in time and resolution between samples. So in the purest sense, digital is a compromise in quality by its nature. On the other hand, if the compromise is imperceptible, then the sample can be copied and manipulated over and over with no further degradation. That certainly is better than what happens in the analog world when we try to manipulate our samples. So I would postulate that digital and, for that manner, analog are by their natures neither good nor bad. The question then becomes, are they appropriate? Are they the right tools for the job?

Early in my television career, I was working for a small TV station in Honolulu. While installing a microwave antenna at our transmitter site, a coworker of mine who had been in the Navy asked me to hand him the "crescent hammer." After laughing for a few moments, he explained that on a Navy ship, virtually every tool becomes a hammer at some point in its use and when you're trying to get the job done, you use the tools at hand. Now, the crescent wrench may work but it may not be the appropriate tool for the job.

Let's look at digital nonlinear editing as an example. IPTV has a number of nonlinear editors. We have an Avid DS/HD and a Final Cut Pro HD. We also have three Avid SD systems and a Final Cut SD system. The beauty of nonlinear editing in the digital domain is that the editor can instantly jump to any point without having to scan through all the material. This is a great feature, but to get to that point, all the material that is

Is digital better?

The answer is,

"It depends."

LINEAR HD, PAGE 20

Dailies

CONTINUED FROM PAGE 12

Schilowitz, worldwide product manager for desktop video engines at AJA, based in Grass Valley, Calif. "It demonstrated how AJA Video's desktop products are making inroads into the high-end broadcast arena as a serious contender regardless of price-point."

"This was one of the largest operations ever attempted using Apple's post-production technology, all sharing media simultaneously," said Jessica Gleason, post production manager at the Sundance Channel. "It was big for Apple and big for us, and it all worked great."

The success of the "Festival Dailies" broadcasts served to enhance the branding identity of the Sundance Film Festival, both inside and outside the film industry. "We wanted to convey the festival experience to our viewers," said Laura Michalchyshyn, executive vice president for programming and marketing at The Sundance Channel. "Although we have covered the Sundance Film Festival ceremonies in the past, we felt this year's approach to 'Festival Dailies' would let people appreciate the feeling of being right on the ground amidst all the buzz as the film fest celebrations were still going on."

The Sundance Film Festival is a major program of the Sundance Institute founded by Robert Redford. Many of the short films and excerpts from the features seen at this year's celebration of independent filmmaking can be viewed on the Web at the "Sundance Online Film Festival" (*www.sundance.org.*), which will be streaming until June 20. ■

Linear HD

CONTINUED FROM PAGE 19

being accessed must be digitized, and this process takes time and space. The material still has to be scanned to find the segments that are going to be used. In most cases, this means that virtually every piece of material that was shot ends up being scanned, even if we know it's not going to be used because it is inconvenient to stop the ingest process unless, of course, the material was pre-scanned, which takes time.

I am not crusading against nonlinear editing; I am trying to prevent the "crescent hammer" syndrome from being applied. There are times when either for sake of expediency or personal choice that a linear editor might be preferred. IPTV continues to run a linear editing suite but, because we have started producing virtually all our local content in HD, it gets very little use. We have actually been at a crossroads of sorts trying to decide if we should even look at linear as we continue our DTV transition at the studios. Our linear suite is based on a Grass Valley 141 editor, GVG 110 switcher and a fairly typical assortment of tools. When we first looked into HD editing, our initial plan was to convert this suite to HD while maintaining its current analog/SD functionality. I made a trip up to Milwaukee Public Television to take a look at a linear suite they had online that used their Sony editor and a Snell and Wilcox switcher/effects system. By using the configuration options in the Sony editor, they were able to switch between the two operations fairly easily. An added advantage was that the editors were very familiar with the operation of the linear editing system so there was very little in the way of a learning curve. On comparing their Sony editor with our GVG, we realized we could essentially do the same type of operation and begin creating local HD content immediately. Unfortunately, this was also about the time that the bottom fell out of the economy and money became tight so we were forced to put the project on hold.

SOMEWHERE IN THE MIDDLE

Recently we began working on converting our studio to HD. We have had on-site demonstrations of HD cameras, graphics and production switchers. The most recent switcher we've looked at is the Sony 8000 HD model. It can be configured with up to four full function M/E banks. If you've looked at switchers in the digital era, you realize that what is incorporated in a new M/E bank will include multiple levels of keying, stillstores, DVE and such. Given that we're looking at replacing an analog system based on the GVG 250 switcher, one could argue that a single M/E 8000 or the like could replace our 250 and still supply added capabilities. Of course technical directors always want one more M/E and the demos always involve a fully loaded model—so somewhere in the middle is what we probably need. But while talking with the Sony reps about the switcher they mentioned that the same frame could have multiple control panels and that individual M/Es could be assigned, so I started thinking about the linear suite again. I mentioned the availability of control via the GVG 141 editor for a linear suite and was pleased to find out that not only can it be accomplished, but that a software editing package is available for the 8000 that integrates editing and machine control.

This really added an interesting spin to our thinking. Despite the fact that IPTV produces a great deal of local content, much of the time our online production room sits idle. The same is now true of our linear suite because of its inability to work with HD. It appears that with a little advanced planning and workflow analysis, we may be able to convert both our online production and linear editing facilities to HD and meet the needs of all segments of our production community. ■

Bill Hayes is the director of engineering for Iowa Public Television. He can be reached via TV Technology.

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The Art of Fiber

SMPTE, VidTrans present advanced technologies in Atlanta

by Andrew Morris

ATLANTA

Video compression technology and the wired world that plans to deliver it were the main topics of discussion at a joint conference sponsored by the Society of Motion Picture and Television Engineers (SMPTE) and VidTrans in Atlanta last month. The event marked a partnership between two annual popular events: SMPTE's Advanced Motion Imaging conference and VidTrans.

Sponsored by the Video Service Forum (VSF), the VidTrans conference concentrates on the technologies and providers of video transport services. Members include common carriers and manufacturers of transport equipment.

"VSF is a trade association for service providers, manufacturers and users that are working in the video delivery space," said Brad Gilmer, executive director of the Video Services Forum. VidTrans allows VSF "to get together these different constituencies to present papers and have exhibitions and demonstrations of the kind of work that we're doing in the video carrier space.

"This year is the first time we've done a joint conference with the Society of Motion Picture and Television Engineers. I think it's been very positive. You get the television engineers who are being asked more and more to deal with IP and the transport of video across IP networks. They get exposure to the carrier and video transport people and experts in that area. Then you've got the people who work in the video transport business who may not be as familiar with the broader questions of content distribution and origination of content. Those are the kinds of things that SMPTE is squarely in the middle of."

Ed Hobson, president of SMPTE, said, "The guys from VidTrans approached us and they had seen some of the things we do at SMPTE and wanted to get some of the good content for their folks as well."

BATTLE FOR SUPREMECY

Highlights of the conference included half-day sessions on compression, video transport metrics, video-over-IP and the management and protection of digital content. Themes of the convention include the reawakening in Europe to HDTV and the issues and difficulties involved with the delivery of video-over-IP networks. Additional topics included AVC, VC-1, triple play, forward error correction and Pro-MPEG COP-3.

The battle for supremacy in the next generation of video coding between AVC (also known as MPEG-4 Part 10 and H.264) and VC-1 (the forthcoming SMPTE standardization of Microsoft's Windows Media 9 video codec) was front and center at the conference. Both advanced video codecs claim approximately twice the bit-rate efficiency of MPEG-2.

Triple play refers to the delivery of voice, video and data to the home. The emphasis on this conference was the delivery of those services over IP networks.

In July 2004, the Pro-MPEG Forum issued two of its Code of Practice No. 3 (COP-3), which covers the transmission of Professional MPEG-2 Transport Streams over IP Networks. Among other things, this code of practice specifies methods of implementing forward error correction (FEC). At the conference, a number of vendors participated in a demonstration of interoperability of the COP-3 FEC scheme.

Jeffrey Jensen of Tut Systems offered a paper discussing the methodology of COP-3 FEC protection and explained why it is a "viable method for video-enabling a data network.

"Adding COP-3 appliances at the network edge may be faster and more economical than re-engineering the network core," Jensen said.

Charles Granzhorn and Beau Williamson of Cisco System offered presentations on the basics of transporting video over IP networks. The encapsulation of an MPEG-2 transport stream in IP was discussed, as well as the implementation of QoS (Quality of Service) and methods of securing IP networks.

COMING ATTRACTIONS

Included in a presentation on VC-1 from S. Srinivasan of Microsoft were descriptions of the VC-1 transform, VC-1 filtering techniques and the use of entropy coding. "We believe VC-1 is comparable in quality to AVC," Srinivasan said.

In a discussion on AVC, Paul Hansil of Modulus Video pointed out that AVC is currently an established standard.

"It's a complete standard," said Hansil. "There is no licensing or voting to bother about."

Hansil described AVC Fidelity Rate Extensions (FREXt) that allow for the 8 x 8 transform and 4:2:2 coding that are critical to HD production. Hansil also pointed out that AVC is compatible with MPEG-2 transport streams.

Pierre Costa of SBC Labs described the mammoth effort that SBC is making to deliver video to the home over an xDSL architecture. The multibillion-dollar "Lightspeed" project plans to deliver between 300 and 350 standard-definition channels and 100 to 150 high-definition channels to the home over IP networks. ■

HD, D-Cinema on SMPTE Docket

Ed Hobson became President of SMPTE on January 1, 2005. Andy Morris talked with Ed on the state of SMPTE during the joint SMPTE/VidTrans conference.

Ed Hobson

TV Technology: What is SMPTE's mission?

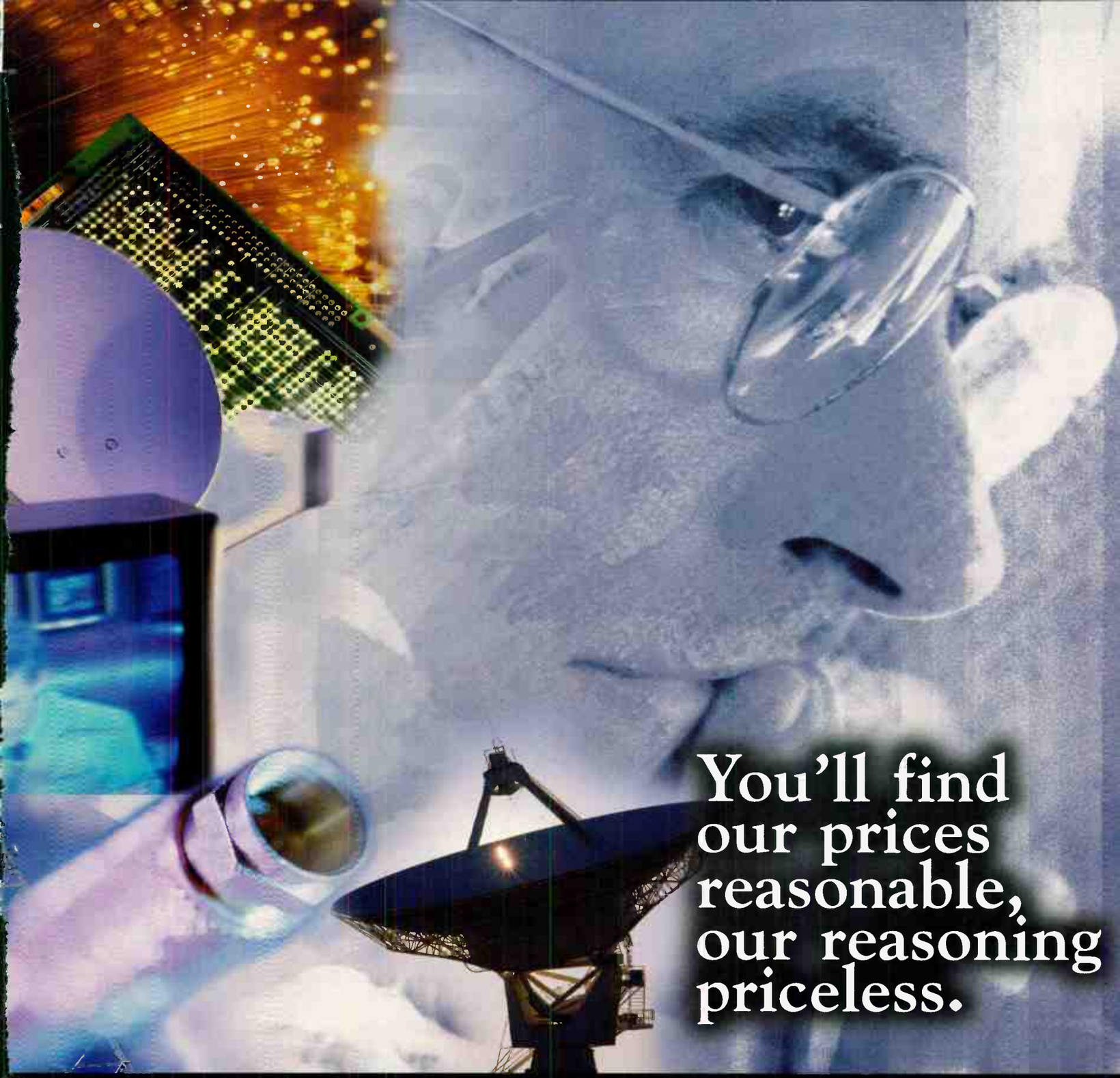
Hobson: Our main mission is the creation, dissemination and education of our members around standards in motion imaging. New standards that we are working on are the digital cinema standards and the VC-1 compression standard.

We try to educate our members via the journal and the Web site and through local section meetings all around the world. There are other activities. SMPTE is very pleased to be doing a tutorial on Digital Cinema during the first day of this year's NAB convention. This has not yet been confirmed but for IBC, SMPTE is working with IEEE on a full day tutorial on HD. HD is reawakening in Europe and part of our goal is to help folks who have been away from HD.

We're also seeing renewed interest in our student sections. This includes sections in New York, Napa Valley Community College and Stonehill College in Massachusetts. The future, of course, comes from the students.

TV Technology: How is attendance at this year's conference?

Hobson: Great. It's fabulous. We have over 200 attendees. We have a nice mix of exhibitors, manufacturers and transport providers. This is a combined deal because VidTrans always had the support of the exhibitors. We hadn't been doing exhibits at our winter conference for a number of years. It's working out very nicely. We've sold out.



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LET THERE BE LIGHTING

Andy Ciddor

DMX Dialogue: The Device That Answers Back

When the notion of a control standard finally jelled in the minds of lighting equipment manufacturers, the gates opened on a golden age of lighting control that lasted nearly two decades. Gone were the days when connecting a lighting console to a dimmer rack entailed matching up the control voltage, polarity, connector type and possibly the communication protocol. Any DMX512 console can communicate with any DMX512 dimmer, effects device or moving light. Today, there is a reasonable expectation that if you follow a few basic rules, everything will work together straight out of the box.

DMX512

When the DMX512 data communication standard was developed by the U.S. Institute for Theater Technology in the mid-'80s, computing power was still very expensive. Lighting consoles may have been powered by a microprocessor or two, but such advanced technology was generally not wasted on dimmers. With this in mind, the group devising DMX512 crafted it to work well in dimmers with little processing or data-storage capacity. The DMX specification was slightly amended in 1990 to tighten up timing.

In conventional data networks, devices talk to one another. In a DMX512 system, there is only one transmitting device—either a console, a rigger's remote or a DMX tester. All other DMX devices are receivers only.

Error checking is used in most communications networks to establish that data is getting through to where it's needed without getting corrupted. This usually requires processing by receiving devices to verify the data and then either send a brief confirmation reply or make a request to resend any missing or damaged data.

Fleenor Design DMX coffeepot

To simplify receiver design, DMX512 designers approached the integrity problem differently. In the mid-'80s, the only devices that were connected to lighting consoles were dimmers, and the only devices connected to dimmers were luminaires with incandescent lamps. The idea behind DMX512 is that if you resend the data often enough, any occasional missing or incorrect data will only result in a dimmer briefly going to the wrong level.

As the filament of an incandescent lamp has substantial thermal inertia, an occasional and brief wrong level will have little, if any, effect on light output. In addition, DMX512 requires that if a datastream disappears entirely, a dimmer must continue to output its last received level for at least one second. In practice, most dimmers on the market indefinitely hold their output at the last received level.

OTHER APPLICATIONS

On the other hand, motor-driven devices such as color scrollers, moving lights and chain motors do not take kindly to missing or slightly mangled level information, often responding in spasmodic and ungainly ways. This problem is generally addressed by taking great care with cabling and by using DMX distribution and isolation systems to ensure that the data gets through unharmed. An alternative approach is to encapsulate a DMX512 stream inside another data protocol that transparently handles missing or damaged data, and outputs perfect DMX. This is an underpublicized feature of most DMX-over-Ethernet systems.

With the benefit of clear hindsight, there has been much lament that DMX512 is only a one-way data path.

Dimmers long have been capable of reporting their state of health and load status, but no standard existed for transporting data back to the console or monitoring system. Some equipment manufacturers used the second data pair in a DMX512 cable to carry this information, although there is no standard format for transmission and therefore no compatibility between brands (or even models) of dimmers.

The configuration and maintenance of moving lights, with their multiplicity of features and possible failure modes, and their lusty appetites for DMX512 data, would be greatly simplified by two-way data exchange. This was a driving force behind the decision to develop a bidirectional data protocol that could coexist with DMX512.

The Remote Device Management (RDM) Task Group at ESTA (Entertainment Services & Technology Association) has been working for the last few years to develop a standard that will eventually be known as "BSR E1.20, Entertainment Technology—Remote Device Management over USITT DMX512." The aim of RDM is to conduct a conversation between a host controller and any RDM-capable devices on a DMX512 network.

Although there is a second data pair in any fully compliant DMX512 cable, the standard did not define a use for these wires. In the meantime, the pair has been omitted from some installations and used for other purposes by equipment manufacturers. To make matters worse, despite the DMX512 standard specifying a 5-pin connector, some equipment is fitted with a 3-pin connector.

The RDM Task Group could find no safe path through the miasma that is the "spare" DMX512 data pair, instead choosing to share the primary data pair with the main datastream of 512 channel-level slots. Not only does the RDM network specification have to deal with RDM-capable devices—each communicating bidirectionally with the controller—it also has to define how this can be done without compromising the performance of any standard DMX512 devices on the network.

This is primarily achieved through the use of an expansion capability built into the original DMX512 standard but not widely used before now. Each 512-slot DMX packet is prefaced with a single byte of identifying data known as the start code. Every one of the 40-odd packets of level information sent every second over a DMX512 network starts with a byte set to zero, the start code for normal level information. All

DMX, PAGE 34

RF TECHNOLOGY

Doug Lung

Going to Digital ENG: 30 Months and Counting

In 30 months, all 2-GHz broadcast equipment will be upgraded to digital technology and will be operating under a new band plan that keeps the same number of channels but reduces their width to 12 MHz. Furthermore, this change will be paid for by Nextel as part of its agreement with the FCC to give up 700 MHz and 800 MHz spectrum in exchange for 10 MHz of new spectrum at 1.9 GHz, 5 MHz from what used to be broadcast auxiliary service Channel 1. I've covered the FCC side in my RF Report e-mail newsletter, and Nextel has discussed it in broadcaster meetings.

Implementing the plan will require the cooperation of broadcasters, Nextel, equipment vendors and installation crews. Nextel plans to commence relocation in groups of seven markets every two-and-a-half to three weeks. This will require careful scheduling of manufacturer production schedules, tower crews and equipment installers.

Now that Nextel has accepted the FCC plan, broadcasters need to do their part to make sure they don't hold up the conversion. The first step is to form a local committee to handle the local transition. Each SBE chapter will have a Nextel-employed regional broadcast engineer assigned to help it. At your station level, identify who will represent the station in negotiation with Nextel.

PLAYING BALL

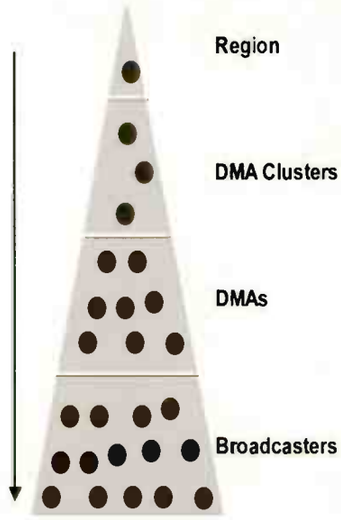
While this is likely to be the technical operations manager or chief engineer, people from the news, accounting and legal departments and the station manager are likely to be involved. Nextel plans to discuss umbrella agreements with group owners to handle common issues at the corporate level while keeping nuts-and-bolts issues at the local level.

Nextel has agreed to cover the cost of converting ENG microwave radio equipment, ancillary equipment (such as MPEG encoders/decoders, LNAs and filters), talent-cueing equipment, control systems, multiband antennas and even backup equipment. The labor and administrative costs of changing out the equipment are also covered. Don't expect Nextel to cover the cost of omnidirectional antennas (which aren't a good idea anyway if spectrum efficiency is a concern), or upgrading receive sites to new quad-polarized antennas.

In early April, Nextel will have an inventory form online for stations to fill out to get reimbursed for digital equipment purchases. If you want to start earlier, Nextel can provide an Excel spreadsheet. Broadcasters can choose their own equipment, but Nextel has worked with microwave equipment manufacturers to come up with basic packages for the conversion. If your equipment selections include features beyond those included in the packages, expect to pay the difference in cost.

I recommend taking a systematic approach to determine what you will need to replace or upgrade. Look at the ENG trucks. If you bought equipment recently, it may only need a digital modulator and MPEG encoder to make the

1.9GHz Organization Hierarchy



switch. Don't forget to include an analog to serial digital converter if your truck is analog and the encoder only accepts SDI. Most antennas should work for digital operation. The exception would be ones with poor return-loss,

DIGITAL ENG, PAGE 28

TECHNOLOGY CORNER | Randy Hoffner

MPEG-4 Advanced Video Coding Emerges

At long last, HDTV is arriving in Europe, with a single HDTV DBS service already operating, and launches in the U.K., Germany, and France announced for the 2005-06 period. As might be expected, there are some differences between U.S. HDTV and European HDTV.

Perhaps the most obvious difference is that the scanning formats in Europe use frame rates based on 50 Hz, rather than 60 Hz.

Interestingly, we learned that Europe has HDTV scanning format wars in progress that bear striking similarity to the ones we had here in the United States, pitting 720p/50 against 1080i/25. (Only the frame rates are changed to protect the innocent.)

A second difference is that the European HDTV services announced to date are pay services, not free-to-air television. Delivery media will include terrestrial broadcast, cable and satellite.

A third major difference is that as of today, all HDTV services in Europe are expected to use MPEG-4, Part 10 Advanced Video Coding, rather than the MPEG-2 coding used for both HDTV and SDTV in the United States, and for standard-definition DTV services in Europe.

Euro1080, Europe's first satellite HDTV provider, plans to move to an MPEG-4 platform by this summer.

Using advanced coding is somewhat easier in Europe because each pay service requires its own set-top box, and the box can be made to be capable of decoding both MPEG-2 and MPEG-4.

CODING FLEXIBILITY

Using advanced coding is somewhat easier in Europe because each pay service requires its own set-top box, and the box can be made to be capable of decoding both MPEG-2 and MPEG-4.

The one satellite HDTV service operating today, Euro1080, currently uses MPEG-2 coding but will move to MPEG-4 in June 2005. In the United States, DirecTV has announced that it will ultimately broadcast all HDTV using MPEG-4 coding as well.

What is MPEG-4, and why is it better than MPEG-2? First, let's try to sort out the origins of this standard and its various aliases. The first MPEG compression technology toolkit, MPEG-1, was only applicable to progressively scanned, SD images.

The second generation, MPEG-2, added tools for interlaced pictures. A third generation, MPEG-3, was contemplated for HDTV images, but it was discovered in the early days of DTV development in the United States that the tools available in MPEG-2 were adequate to process HDTV images, and MPEG-3 was abandoned in favor of MPEG-4.

The MPEG-4 development process earlier produced MPEG-4, Part 2, which has for a time been used in such applications as cell phones and digital still cameras. When we see references to MPEG-4 in today's news, those references are to MPEG-4, Part 10, the most recently standardized MPEG technology toolkit.

In a joint effort by the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) and International Telecommunications Union (ITU), the MPEG-4 technology was developed by a group called the Joint Video Team, which is comprised of ISO/IEC JTC1/SC29/WG11, also known as the Moving Picture Experts Group or MPEG, and ITU-T SG16 Q.6, also known as the Video Coding Experts Group or VCEG.

The name that the ISO/IEC group originally used for this new compression technology was Advanced Video Coding (AVC), while the original ITU-T name for it was H.26L.

The ITU document standardizing the technology is "ITU-T Recommendation H.264, Advanced Video Coding for Generic Audiovisual Services–Coding of Moving Video," which was approved by ITU-T in 2003. The ISO/IEC document is "International Standard 14496-10 (MPEG-4 Part 10) Advanced Video Coding." It is typically referred to as H.264 AVC or MPEG-4, Part 10.

INCREASED EFFICIENCY

The title of the ITU-T recommendation references "generic audiovisual services," and this codec syntax is intended to be used in a variety of video transmission and storage applications, ranging from cell phones to HDTV.

Its principal advantage over MPEG-2 is its higher coding efficiency, which permits it to deliver video quality equivalent to MPEG-2 using half the data rate. This naturally makes it attractive to video distributors, because it permits them to maximize the number of services that may be contained in a given amount of bandwidth.

Some extensions—known as "Fidelity Range Extensions"—to the original standard were recently completed. These extensions facilitate

MPEG-4, PAGE 33

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Digital ENG

CONTINUED FROM PAGE 25

which likely had problems with analog as well.

The same can't be said for mast-mounted amplifiers. COFDM, with its high-peak-to-average ratio, requires a lower-distortion, more linear amplifier. With analog FM, a Class C amplifier was good enough. With some amplifiers, simply reducing the input power to them will allow them to function as linear amplifiers. This power reduction may be acceptable. If not, the amplifier will have to be replaced.

TALENT-CUEING

You may have noticed that talent-cueing was included in the costs eligible for reimbursement. If you haven't used a digital ENG system before, this may seem odd. Efficient video compression requires storing some video in a buffer, which adds delay to the video and, ideally, adds the same delay to the audio. Echoing the talent's voice back to them a second later is a very good way to make them stop talking. If your current cueing system does not have mix-minus, it will have to be modified and Nextel will cover the cost. Nextel won't, however, replace your audio console, although they may consider covering the cost of a mix-minus module. An outboard mix-minus system such the new Mod Sciences ProCeiver is okay.

Once the modifications to the trucks and cueing system are planned, examine ENG receive sites. To avoid the cost and degradation of demodulating and remodulating the baseband signal, many stations simply send the entire baseband or even IF signal back on the return link. These techniques probably won't work with a COFDM digital signal unless the microwave equipment is stable enough (phase and frequency) and includes an adaptive equalizer to remove distortion in the received signal. This means you will not only need to modify the trucks, but the receive sites as well.

ANALOG RETURN

Consider whether you want to keep an existing analog return link. In this case, the receive site will need an MPEG-2 decoder to convert the incoming digital signal to analog video and audio. This is probably the easiest approach, since digital ENG receivers include video and audio outputs, and this is the only option Nextel is willing to pay for.

In the future, you may want to vary the bit-rates to allow more than one truck or signal to share a channel. Maybe you want to do HDTV for some shots but not others. In these cases, it makes sense to send the entire digital stream back to the studio and deal with the decoding there, even if you have to pick up the cost of upgrading the return link to digital. The one exception is if the return link is at 2 GHz, Nextel will cover digital conversion on the same band, but not the extra cost of moving it to another band.

There is an item to consider that Nextel will cover. If you use a band-pass filter at the dish, it will have to be changed to match the new band-plan frequencies.

Studio modifications are likely to be minimal. Control systems are covered under Nextel's plan. Spend some time looking at what equipment manufacturers can offer. Some stations feel it is important to have the ability to switch back to narrow-band analog for difficult shots or to peak the antenna, although the COFDM users I've talked to say the technology works where analog won't.

The digital conversion and frequency clearing has to be completed in the next 30 months! Take time now to think through your station's ENG conversion. If you already have DENG trucks on the road, consider how operations could be improved with an all-digital system. Now's the time to make the change! ■

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!*

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INSIDE AUDIO — Dave Moulton

AV 107: The Basics of Audio Interconnections

I thought I was done with this series about audio basics. However, reader Eric Smith wrote in and asked if I would write about matching signal levels between equipment and sources, and not just mic/line levels, but something more in-depth.

So, once again, here we go. This is for those among us who don't know a lot about audio and are not quite sure we should ask. In any case, in audio, we have all these different devices that we need to hook together to form a working audio system. Hooking them together (patching) is one of those basic mundane tasks that we take for granted.

However, about 95 percent of the problems we have in audio comes from faulty patches, meaning either a) we've hooked it up wrong, b) one or more of our patchcords is faulty, or c) there is some basic signal incompatibility that we don't understand between devices.

For technical simplicity, devices that serve as sources or outputs of signals are called "gzoutas" (as in "It gzouta the green box") and devices that receive signals are called "gzintas" (as in "It gzinta the purple box").

About 95 percent of the problems we have in audio comes from faulty patches.

You got yer analog signal and you got yer digital signal. We'll talk about digital signals first, to get them out of the way.

DIGITAL SIGNALS

A digital signal is, of course, a high-frequency datastream of ones and zeroes (usually masquerading as positive and negative voltage pulses). It is generated in accordance with some formally established protocol in the gzouta. For the gzinta to recognize the signal, it must know and function in accord with the same protocol. As a general rule, digital signals either pass perfectly or they don't pass at all, except for one booby trap we'll talk about in a minute.

AES/EBU is the so-called "professional" digital audio standard. It is transmitted on a balanced line (see below) with XLR connectors. It carries a stereophonic (two-audio channel) signal. There are other details, such as making sure you're using a digital cable.

Sony/Philips Digital Interface or S/PDIF is the so-called "consumer" digital audio standard and is transmitted on an unbalanced coaxial line with RCA connectors (for instance, the yellow RCA-to-RCA video cables). S/PDIF is also stereo. Interestingly, the digital languages of AES/EBU and S/PDIF are the same, and it is generally possible to convert one to the other with an impedance matching transformer (Canare makes one—the BCJ-XJ-TRB).

Sometimes the S/PDIF signal is converted to an optical code for transmission via fiber-optic connector.

There are a slew of other digital formats you probably don't need to know about. However, you do need to know that all the gzoutas and gzintas have to be precisely synchronized for the digital system to work. This is usually no problem, but occasionally, synchronization won't be maintained (usually due to an operator error and related to one of many quirks about digital audio) and the audio will be contaminated by a string of annoying tics, clicks and pops. Watch out for this!

The analog signal is a voltage trace over time that mimics the pressure change

AUDIO, PAGE 38

ATSC UPDATE — Jerry Whitaker

DTV Receiver Performance Standards Recommended

A concerted, cross-industry effort has led the ATSC to publish DTV receiver performance guidelines. A/74, "Recommended Practice: Receiver Performance Guidelines," is the result of a collaboration of broadcasters, consumer electronics manufacturers, semiconductor manufacturers and other ATSC members.

This recommended practice provides performance guidelines for receiver sensitivity, multiple signal overload, phase noise, selectivity and multipath. The document also suggests the use of the antenna-control interface CEA-909 developed by the Consumer Electronics Association, which facilitates automatic control of antenna parameters.

Recommended Practice A/74 addresses the front-end portion of a DTV receiver. The performance guidelines in the document are intended to ensure reliable reception. Guidelines for interference rejection are based on the FCC planning factors that were used to analyze coverage and interference for the initial DTV channel allotments. Guidelines for sensitivity and multipath handling reflect field-testing undertaken by ATTC, MSTV, NAB and receiver manufacturers.

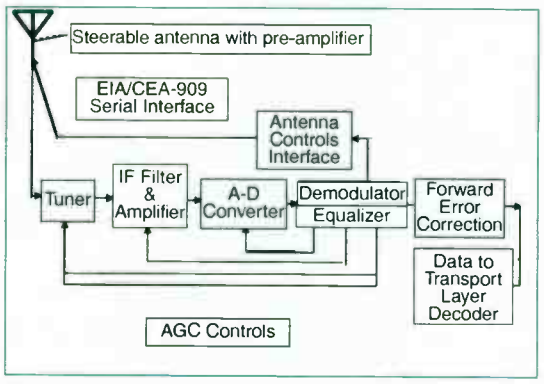

Fig. 1

As covered within A/74, the front-end includes all circuitry from the antenna through the process of forward error correction (FEC) that is associated with recovery and demodulation of the 8-VSB signal (see Fig. 1). The output of the receiver front-end is the input to the transport layer decoder.

The circuits contributing to meeting the A/74 guidelines include:

- Antenna and antenna control interface (CEA-909);
- Tuner, including RF amplifiers, associated filtering, and the local oscillator (or pair of local oscillators in the case of double conversion tuners), as well as mixers required to bring the incoming RF-channel frequency down to that of the intermediate frequency (IF) amplifier/filter;
- IF amplification (with automatic gain control) and filtering, including the major portion of pre-decoding gain, channel selectivity and at least a portion of the desired-channel band-shaping;
- Digital demodulation, including in-band interference rejection, multipath cancellation and signal recovery;
- FEC, wherein errors in the demodulated digital stream caused by transmission impairments are detected and corrected for incoming signals with signal-to-impairment ratios above a threshold. Packets with uncorrectable errors are flagged for possible mitigation in the video and audio decoders.

A/74 does not discuss optional means by which receivers might attempt to conceal or otherwise mitigate the visible or audible consequences of uncorrected bitstream errors. Although most receivers include circuits that accomplish some degree of error concealment, the results are subjective and not quantified as easily as the performance of the other circuits listed above.

The recommended performance guidelines are divided into four general categories:

- Sensitivity
- Selectivity
- Interference rejection
- Multipath handling

The various industry segments that comprise the broadcast-to-reception chain have positively responded to publication of A/74 and supporting bitstreams have been distributed to various organizations for testing and study. In addition, the ATSC Specialist Group on Receivers, T3/S10, continues to look for and document unique and interesting reception sites that may be useful in designing new receiving devices.

FOR MORE INFORMATION

Document A/74, as all ATSC Standards, Recommended Practices, and informational documents, can be downloaded free from the ATSC Web site at *http://www.atsc.org*. ■

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MPEG-4

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higher-fidelity video coding by supporting higher bit-depths, including 10-bit and 12-bit encoding, and higher color resolution using the sampling structures YUV 4:2:2 and YUV 4:4:4.

ISO14496-10/H.264, like previous MPEG standards, does not define a specific encoder and decoder. Instead, it defines the syntax of an encoded bitstream and describes the method of decoding that bitstream. The implementation is left to the developer.

The fundamental elements of the MPEG-4 coding process are the same as those of the earlier MPEG standards, which include prediction, transform, quantization and entropy coding. It has a number of new features that permit more efficient video coding than does MPEG-2. Let's look at some of the high points.

What is MPEG-4, and why is it better than MPEG-2?

Multiple reference picture motion compensation uses previously encoded pictures more flexibly than does MPEG-2. In MPEG-2, a P-frame can use only a single previously coded frame to predict the motion compensation values for an incoming picture, while a B-frame can use only the immediately previous P- or I-frame and the immediately subsequent P- or I-frame.

H.264 permits the use of up to 32 previously coded pictures, and it supports more flexibility in the selection of motion compensation block sizes and shapes, down to the use of a luma compensation block as small as 4-by-4 pixels. H.264 also supports quarter-sample motion compensation vector accuracy, as opposed to MPEG-2's half-sample accuracy.

These refinements permit more precise segmentation of moving areas within the image, and more precise description of movement. Further, in H.264, the motion-compensated prediction signal may be weighted and offset by the encoder, facilitating significantly improved performance in fades (by now we all know that fades can be problematic for MPEG-2).

DE-BLOCKING FILTER

Also, as we well know by now, block-based coding can generate blocking artifacts in the decoded pictures. In H.264, a de-blocking filter is brought within the motion-compensated prediction loop, so that this filtering may be used to predict an expanded number of pictures.

Switching slices, which permit a decoder to jump between bitstreams in order to smoothly change bit-rates or do stunt modes without requiring all streams to send an I-frame at the switch point (making the decoder's job easier at switch points), have been incorporated.

H.264 also uses advanced entropy coding methods.

To summarize, the principal new features of MPEG-4, Part 10, include enhanced motion prediction capabilities; the use of a small block-size, exact-match transform; adaptive in-loop deblocking filter; and enhanced entropy coding methods.

Many more refinements are incorporated into MPEG-4, which is the latest progressive step in MPEG video compression coding development. There is work ongoing in the ATSC to incorporate MPEG-4 into its standards. The folks in Europe waited long enough to delve into HDTV that they can use MPEG-4 virtually from the outset. ■

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DMX

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DMX512-compliant devices are required to check the start code and only respond if it is set to zero.

The proposed RDM standard requires its data packets begin with nonzero start codes that will be ignored by any standard DMX512 devices. However, some clever equipment designers, upon noticing that all lighting consoles sent out a zero start code, decided to simplify their devices by ignoring it. The very fact that this shortcut went largely unnoticed until recently is proof the trick worked. If you find that some of your DMX512 devices behave strangely when one of the new-generation RDM controllers is connected to your network, get out your DMX tester and try a few nonzero start codes on the suspect equipment.

The first part of the proposed RDM standard defines a method for the controller to discover and identify the devices on a network. This process takes up a fair amount of the available DMX512 bandwidth and is intended to be carried out at a time when the control console is not running a show. Besides, the information being collected during the discovery process is often used to configure the console and the rig before plotting.

The majority of the standard consists of definitions of the type and format of messages that can be exchanged between controllers and devices on a network. Messages from a controller consist of either requests for device parameters and status information, or instructions to set parameters on a device. Messages from a device consist of responses to status requests from a controller.

This offers the possibility of setting the controller to work to contact each of the devices in a rig, collecting its name, network address, DMX footprint and option settings. It can then allocate start addresses based on the information collected, and set up the console with the desired groups and palettes, all correctly identified. The lighting tech could be advised of devices with outdated firmware, which could then be updated over the RDM network. Daily pre-show status checks could be conducted, not only to test each piece of equipment for correct operating voltages, temperatures, fan speeds, etc., but also to identify the luminaires with lamp hours exceeding the preset value for allowable color temperature drift.

During production, RDM status information could be gathered a few times each minute from each device without serious impact on the main DMX512 producton stream. This could allow for pre-emptive maintenance of equipment drifting out of specification. Falling voltages, rising currents, rising temperatures, decreasing fluid consumption and falling light outputs could all be monitored via standard RDM status queries.

The proposed RDM standard is now well on its way through the process of adoption by the American National Standards Institute, having been through its second public comment period with very little adverse reaction. Devices running the current version of the proposed RDM standard were demonstrated at the PLASA show in London last September and at the LDI/ET show in Las Vegas last November. Among them was the RDM version of Doug Fleenor's DMX-controlled coffeepot. Almost every week, another RDM-capable device is released. These devices generally run the current version of the proposed standard but can be updated to run the final standard, once it is approved. It should come as no surprise that some of these devices can be upgraded via RDM.

At the very least, RDM will eliminate the tedious task of setting dipswitches and operating options on the devices in a lighting system. At its very best, RDM is going to have a very significant impact on the way we configure, program, maintain and operate lighting systems. ■

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INSIDE PRODUCTION **Walter Schoenknecht**

Going On-Location in a Post-9/11 Environment

I used to worry that I couldn't be in two places at once; now I find that I can't even be in one place at once.

Ever since the air transport system tightened security measures in the wake of the 2001 terrorist attacks, it's become incredibly difficult to pack up a video crew and run off at a moment's notice.

There's the endless baggage inspections, and if the entire crew emerges barefoot and beltless from the security checkpoint, how must the equipment be faring on the airport conveyor belts? Every single item in our location-pack looks like a weapon. The friendly skies have darkened, making it much harder for us to do our jobs.

In my corner of the production universe, the effects of these changes are significant. We now consider the idea of flying the crew to a location shoot pretty much impossible. One of us might take one case—the big Ikegami camera—and source everything else locally. For the most part, though, it's a solo trip for the producer/director and a call to a trusted local crew for the rest.

CRUISIN' FOR CREWS

We've met all kinds of people booking crew members across the country. We've had our uppity East Coast chauvinistic attitudes challenged in the process. We never expected to find talent like Mele Mason in Omaha, Neb., or Kurt Snider in Laguna Beach, Calif., nor did we expect the lowbrow characters we once found in Kansas City. It's a learning experience on a lot of levels.

Some of the best lessons learned by using local crews are the examples of sheer resourcefulness. One veteran film sound guy showed me two dozen ways to use Dr. Scholl's Moleskin foam for mounting wireless mic capsules. Rob O'Gorman wins the award for being best-prepared—moments after the snatch-and-run theft of his new camera in front of a posh Chicago hotel, he calmly reached back into the van and pulled out a spare. Yes, a spare camera.

It's good to know a native when traveling to distant cities, and our hired crews have become some our best travel friends. A stroll down any Portland, Ore., street with local producer Tom Shrader is like a walking tour with the mayor. Years of covering the Portland Rose Festival have made him familiar to, well, everyone in town, and he can tell you the story behind every restaurant, bridge, historic building and fireplug.

We've had flawless restaurant recommendations in cities everywhere, most often from the grips and prompter

If the entire crew emerges barefoot and beltless from the security checkpoint, how must the equipment be faring downstairs on the conveyor belts?

operators. U.K. shooter John Whatton's best culinary advice to me was, "Mind the Speckled Hen [ale]. It'll knock you on your arse."

Best of all is the chance to look at other folks' gadgetry and geegaws. We saw our first Leatherman tools on-location long ago. David Haylock from Image Devices showed us our first cell phone, a five-pounder that looked like a military radio. The late, great Don Hunt from Nashville, Tenn., tricked out a Rubbermaid office cart with hooks and bungees, brackets and wireways so that his net cart setup time was less than 90 seconds.

The Hardcastle brothers of St. Louis are masters of the unexpected accessory, with a collection of goodies and tools for every unforeseen situation. When you inventory some of these folks' location-packs, you begin to understand why the grip and studio supply houses have begun to look more like hardware stores—it's all about ingenuity.

The air travel crunch may have been hardest on the stringers, those fearless souls who serve at the networks' beck and call. After several travel nightmares, Bill Mumford and Jack Neu, a camera/sound team out of the Tampa, Fla. area, did an end-run around the problem. Mumford bought a new Ford F-250 diesel pickup and drove 5,000 miles in the first month for clients like the CBS series "48 Hours."

As it turned out, driving to Charleston, S.C., compared favorably with arriving at the airport hours early, loading out, parking, paying excess baggage fees, flying, claiming baggage, renting a vehicle and driving to the location. In their Super Stringer pickup, they alternate driving duty with naps in the fully reclined passenger seat, aka "the day bed."

Comfort, lifestyle and scheduling may be attractive side benefits to the team's drive-anywhere philosophy, but at its core lies money. Everyone knows that a crew can't get by with three bags apiece, let alone the new de facto limit of two. There's going to be some excess baggage every time you fly.

SKYWAY ROBBERY

Remember the old media rate of $25 per excess bag? Gone. In its place is a progressively more punitive scale of baggage penalties, often ranging from $50 to as much as $125 per bag. And that's if the cases aren't too heavy. New regulations have lowered the threshold from 70 to 50 pounds per bag. Worst of all, such expenses are usually picked up by the client who booked the shoot, and anticipated costs like these can kill a project before it starts.

The ultimate headache is the conspicuous absence of one's baggage at the destination. According to Neu, one airline's disgruntled baggage handlers have randomized baggage routing, hoping to make their point to management. Even the passable airlines consistently leave bags behind when schedules get tight.

"When we drive, we know we'll have all the gear when we get there," said Neu.

In the end, it's all about control. It is the desperate desire to try to regain control of the simplest aspect of running a business—the ability to show up for work. But we're a crafty bunch, hewn from hardy stock. Bested by terrorists, federal regulations and gargantuan airline corporations? Never. ■

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MEDIA SERVER TECHNOLOGY

Karl Paulsen

Home Media Server Concepts Evolve

Digital media servers are heading straight into the living room, thanks in part to the DVD evolution.

DVD hardware penetration went from 25 percent in 2002 to 75 percent today. Since its introduction about eight years ago, the DVD has now become the fastest new consumer electronics product in history. The Consumer Electronics Association believes the DVD will reach 88 percent market penetration in 2005.

ACCELERATED DEMAND

With this phenomenal growth curve comes an accelerated demand for storage media. One indicator is the sale of blank DVDs, which increased more than 210 percent in 2004 and is expected to overtake CDs in the not-too-distant future. The explosion in storage is a result of the growth of digital imaging products such as digital still cameras and camcorders.

Excluding cell-phone cameras, sales of digital imaging products have reached between 3 and 4 million units per year.

Managing all this personal digital media will be an ongoing topic. The home entertainment market continues to be affected by the more recent introduction of DVRs. In 2003, the number of DVD recorders sold compared to DVRs was about equal, with 550,000 DVD-R units and 519,000 DVR units sold In 2004, that ratio became 3-to-1, with 2.36 million DVRs versus 877,000 DVD-Rs. The CEA predicts twice as many DVRs will sell in 2005, compared to DVD players—which indicates consumers are becoming more familiar with the technologies and are poised to accept the concept that serving media in the home is ideal for meeting their own viewing preferences.

At this year's Consumer Electronics Show, the media server was identified as one of the top five technologies to watch in 2005.

Described as a "device or system that contains a hard-disk drive for storing digital media and may allow the distribution of those files to other devices located throughout the home," the digital media server has heretofore been available only as board-based components in a PC coupled with a very large, usually SCSI hard disk and a decent graphics card with a GUI, record scheduler and other applications.

With more than 52 percent of U.S households expected to have home networks by 2008, the server is poised to become an integral part of the home media center.

However, with that expectation come obstacles that still must be overcome, including product interconnectivity, bandwidth capacity, rights management and copy protection. Ultimately, once these issues are headed toward resolution, the media server marketplace is expected to grow rapidly.

Home media servers will be designed to serve all forms of media, such as digital images, home movies, audio, news and information, calendars, appointments, etc. With the content delivered via the Internet, cable, satellite and telcos, the media server may well become the single aggregator that harmonizes

Pictured at right is Valencia, Spain's Design of Systems on Silicon (DS2) DSS9010 chip, in a board that plugs into a regular wall socket and moves A/V content on a home network at 200 Mbps.

all forms of media into a single-entity platform.

Given that the server will provide both a repository and the means for distribution, play-out devices may be tailored to the user's personal environment. This will prompt manufacturers to develop a single universal playback device that can adapt based upon type of media. As for moving media, the features now found in DVRs will certainly be extended to independent displays and discrete play-out devices placed throughout the home and networked via a common user-enabled system.

DOWNLOAD TO OWN

For media retrieved from traditional content distribution channels—broadcast, cable, satellite or telco—it is conceivable that a server could integrate all this content to a single storage and play-out system. Depending upon the rights agreement, that media could be divided into two purchasing categories—download to rent and download to own. Activation would be enabled via a software application and controlled by the copy protection/usage rights selected at time of purchase. Serious efforts to deal with the issues of conditional access are ongoing, so when the media server applications are ready for widespread deployment, the control and rights issues will already be in place.

Concerns about transferring pre-recorded DVDs to a central media server remain a topic of discussion due, in part, to "copy-never" protection present on rented or purchased DVDs. Other than an analog duplication and redigitization, the only other solution already available is a DVD-jukebox that could be integrated into the home media server. Of course, personal digital media, such as home movies, digital pictures, etc., would have full rights and capabilities with the ownership designation set by the server administrator to any level—e.g., unlimited view, single view, copy once, copy-never, etc.

With more than 52 percent of U.S households expected to have home networks by 2008, the server is poised to become an integral part of the home media center.

Long term, the media server could ultimately change the delivery and playback model as future generations evolve. For example, cable customers now pay a monthly fee for a converter box that delivers 150 or more channels on a continuing basis. Options such as pay-per-view and video-on-demand are naturals for the media server.

Future implementations of home media servers may further change the cable and satellite models, whereby the consumer might purchase a period of time and have some or all the content cached directly to the media server. That content is then authorized for storage for a given number of days or views per media port. Additional fees for permanent private-use storage would allow consumers to build libraries accessible only over their existing home network. This concept might become more preferable than today's cable model, for which consumers spend the same dollars on 380 channels, most of which they cannot possibly watch.

The home media server concept could further extend the DTV capabilities in the local broadcast space. Content from the local broadcaster's DTV transmission could be cached to the media server, allowing features such as conditional access or time-shifting to more easily be integrated into the home. The copy protection for broadcast network programming already has a mechanism—the broadcast flag, which might also become the signaling control for prevention of sharing of programs in unauthorized ways.

Today, solutions for individual media server implementations are available to consumers, but building a full-feature media server remains a challenge. The task may exceed the complexities of hooking up a DVD, VHS, cable/satellite, over-the-air analog and digital television. Single-board solutions offer some of the features on one device, but to get full features across all services usually requires multiple cards or components.

Also absent is the control interface to exchange and display media across various devices. Multiple remote controls are typically required, along with even more creative logic to determine what can be recorded when and what can be watched later.

There is hope for the human control issues and expanded viewing experience. Whether via satellite, cable, IP-over-telephone-lines or fiber-to-the-home, the ability to capture and use media will certainly demand a more universal platform. One of those elements in the chain is most likely expected to be the home media server. ■

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NEWSROOM TECH | Harlan Neugeboren

Shifting to Server & Nonlinear Production

As I walked through last year's NAB show floor, I was overwhelmed by the number of server and nonlinear edit systems. It seemed that everyone had these products. I say products, although there were many vendors like Avid, Grass Valley, Apple, Quantel and Pinnacle demonstrating systems that ingest, edit and play-out.

As I mentioned in my previous article, I am not going to make an exhaustive analysis about the features of each system. Rather, I would like to point out the benefits of switching to server-based production and some of the hidden traps if you do not look at the workflow and implement servers properly. Lastly, I will discuss the benefits of switching sooner than later.

I'm sure that many of you have made the switch to server-based production and are wondering why you need to read this. It has to do more with the workflow and operating procedures than technology. The technology is important, but how you use the tools is equally, if not more important.

I recently attended a news technology conference and listened to what people were saying. Many of them still had not switched to server-based production and nonlinear editing. They told me that it was too expensive and they were waiting for things to shake out in the market.

CNBC moved to an IT-based newsroom in 2003.

There are many cost-effective solutions that are proven and reliable—Avid, Grass Valley, Leitch, Pinnacle and Quantel to name a few. These vendors offer server ingest, play-out and nonlinear editing from the same storage unit. The benefit here is that you get one-stop shopping and an integrated system. You may pay a little more but, as they say, you get what you pay for.

There are also other solutions from server vendors who have teamed up with edit system manufacturers like Apple and Omneon or Apple and Grass Valley. Final Cut Pro has become a very popular program in the news world, and many of the stories edited in Iraq are produced with Final Cut Pro.

I'm sure that there will be announcements at NAB2005 about other cost-effective solutions, demonstrating that the presence of commodity technology is increasing in broadcasting.

The benefit of switching now is that you get improved workflow, possible head-count reductions, increased story production and better-looking content. When Time Warner Cable installed desktop nonlinear editors at the journalists' and producers' workstations, they saw a 10-percent increase in the number of story versions that were produced.

There are a number of other areas that you need to look at before buying a server and nonlinear edit system. Most of this column applies to servers. I will cover editing in later articles.

METADATA

Metadata is probably one of the most misunderstood terms in our industry. To me, metadata is anything that describes the content that you are capturing. SMPTE and other organizations have created whole dictionaries of different types of metadata—title, location, photographer and episode, to name a few—that include standard and consistent categories for storing data.

The keyword is consistent. Whatever categories you use, make sure that they are used consistently. You should also review them to ensure that they match your current needs and include enough information so that when you search for something, you can find it.

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Whenever I've installed a server, within two months of putting it on air, we were having the out-of-space discussion.

Audio

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of the acoustic sound that generated it.

There are three common analog signal levels in use today:

- "professional line-level," aka +4 dBu;
- "consumer line-level," aka -8 dBu or -10 dBV;
- "mic level," typically –40 to –60 dBu (i.e. much softer than either line-level)

For the purposes of this article, you don't need to know what dBu or dBV means, except that it is an expression of amplitude and that positive numbers have greater amplitude. For example, +4 dBu is 12 dB greater than –8 dBu. It will sound significantly louder.

Professional interconnect cables are typically balanced lines with XLR connectors or tip/ring/sleeve phone plugs. Consumer interconnects are typically unbalanced with RCA plugs (occasionally tip/sleeve phone plugs). Mic cables are almost always balanced lines with XLR connectors.

If you send a consumer-level signal into a professional-level gzinta, the signal will be inexplicably soft but audible. If you send a professional-level signal into a consumer-gzinta, you will probably encounter distortion as the signal overloads the circuitry. A mic-level signal sent into either line-level gzinta will generally not be audible.

IMPEDANCE MATCHING

Impedance matching used to be a big deal, but it's no longer something to be concerned about. Most gzoutas have very low impedance, while most gzintas have very high impedance. It means that one gzouta can be split and sent to many gzintas without trouble.

The only places where this isn't generally true is with microphone signals and with some legacy gear. For microphones, the low-source impedance of the gzouta microphone is usually approximately matched by a somewhat greater impedance at the mic-input gzinta.

Regarding balanced and unbalanced lines, this is where it gets to be a little more fun, as well as confusing. For reasons we do not need to go into here, all devices in any given system will not necessarily have exactly the same definition of "zero volts" or "ground."

When two such devices are connected, it can present problems called "ground loops," which manifest themselves as hum or buzz and with amplitude related to the difference in "ground" or "zero volts" between the devices.

Balanced lines carry the audio on two wires independently of the ground (I'm skipping a lot here!). Usually, at both the gzouta and the gzinta, the audio isolation from ground is maintained. This means that hum and buzz cannot contaminate the audio signal.

Unbalanced lines carry the audio on the same lines as ground (again, I'm skipping a lot). As a result, hum and buzz can be easily generated where unbalanced lines are used. This is particularly true in large complex systems, or where gzoutas and gzintas are in different rooms or buildings.

Why do we use unbalanced lines at all? Because they are simple and cheap, and because in small systems, where ground or zero volts is the same everywhere, they work really well.

WHAT DOES IT MEAN?

If you have an audio problem, the first thing to check is the interconnections. Further, when you are patching together a system for the first time, it is important (some say absolutely essential!) to carefully review the specs provided for all gzoutas and gzintas and to spend the time, money and resources it takes to make sure you've connected them properly to begin with.

In general, avoid adapters for permanent installations. Instead, have custom cables cut to length and have the proper connectors properly terminated at each end. This may be beyond you. If it is, find or hire a tech person who knows how to do it. It will be far, far cheaper in the long run to do it well from the start. As I said at the top, 95 percent of audio troubles have to do with interconnections.

Thanks for listening. ■

Dave Moulton is definitely unbalanced, and he's been told his line is terrible. You can complain to him about anything at his Web site, www.moultonlabs.com.

Production

CONTINUED FROM PAGE 38

In the news production world, much of this information will come from your newsroom system. The MOS protocol has many object messages—object slug: slug name; object type: still, video, audio (to see more go to: *http://www.mosprotocol.com/mos_2_x.htm*).

You will need to work with your assignment desk and news managers to develop standards for metadata. You can get a lot of metadata from your assignment grid.

STORAGE SPACE

Before purchasing a server of whatever format, you must know your storage requirements. You need to calculate how much you shoot, edit and archive, as well as factor in the "I'll just save everything" element. Whenever I've installed a server, within two months of putting it on air, we were having the out-of-space discussion. When you have a server, people tend to save everything. This can be good, especially if you are planning to produce content for multiple programs or outlets.

Another thing to consider before you install a server system is how you will archive your work. Content storage options ranging from datatape to DVDs can create valuable archives for future stories and a potential source of revenue in selling your content.

One of the first things you need to do is look at how your media is cataloged and stored to determine what information you are capturing.

Having the right naming conventions and metadata is very important when setting up an archive. In addition, you should decide whether you will need to restore the whole clip or only part of it. You also should consider how you will view the contents of the archive. There are many ways to do this.

ASSET MANAGEMENT

This is probably the most confusing and misunderstood concept in our industry. Whole days could be spent exploring the intricacies of true asset management, but I'll be brief.

Assets include video, graphics, audio tracks, scripts, images, etc.; management is how you organize these assets and work with them. Asset management also includes workflow. You can create automated processes to manipulate the content you are ingesting. For example, if you are recording a show in the studio and you want a low-resolution copy for the Web, you can create a process (provided you have the right hardware) to make the copy based on the asset type.

You can also create automated processes for removing items from the server or moving them to the archive. For example, each Sunday night, you could remove all the ingested field material that wasn't used in an edit. There are many rules that you can create.

Some asset management systems have these workflow engines; others require external automation systems.

Many vendors can help you design a proper system. There are also many consultants who can do the same. The more planning and investigating you do, the more likely your project is to be successful.

The current format war between Sony and Panasonic for field acquisition has left many people wondering what to do. In addition, other technologies such as "DTE" from JVC allow you to record to a hard drive in the native file format of your nonlinear editor.

Many nonlinear edit vendors will support multiple file formats for editing, including the new consumer HD standard called HDV. What this means is that if you are unsure of what file format you are going to use for field acquisition, you can choose an editor that gives you the option to use multiple formats.

I'll explore more of the technical issues of servers and editors in my next article. ■

Harlan Neugeboren consults for senior management of media companies. He can be reached at harlan@harlann.com

PRODUCTS & SERVICES SHOWCASE

PRODUCTS & SERVICES SHOWCASE

USER REPORT

Telecast Speeds HD for Corplex

by Dave Greany
Vice President of Engineering and Remote Operations
Corplex

NORTHFIELD, ILL.

Corplex is in the business of remote broadcasting, with a fleet of three trucks that we rent out to networks for a wide range of events nationwide.

In July 2004, we acquired our Platinum HD truck, which was originally built in 2000 to televise "Monday Night Football" games. Although it has since been retired from MNF service, the NFL is still very much a part of the truck's service.

For the latest football season, we contracted with CBS Sports to provide the Platinum HD for its crew to use in televising "B-level" games, the lower-profile games that are generally of regional interest. A 53-foot triple-expanding high-definition unit, Platinum HD is equipped with 12 Ikegami HDK79-series HD cameras that use SMPTE fiber and hybrid optical fiber/wire interfaces.

While the cameras are top quality, football stadiums and other facilities aren't pre-wired with SMPTE cabling; stringing SMPTE cable at these installations would require a huge, time-consuming effort. It would also be risky, because if one of the bulky SMPTE cables were to be damaged during installation, it couldn't be repaired in the field.

ALREADY WIRED

Nearly every facility is already wired with triax cable, which has been the standard remote camera cable for years. Many have more recently been wired with single-mode fiber, which better supports the high-quality signals that are necessary in professional football broadcasts.

Fiber cabling is inexpensive and easy to use in the field. What we needed was a solution that would allow us to connect to existing fiber installations with our Ikegami SMPTE-hybrid cameras.

We found the answer in Telecast's SHED family of products. An acronym for SMPTE Hybrid Elimination Devices, SHED consists of two adapters that convert signals from hybrid wire/fiber cables with Lemo connectors to standard all-fiber cables and connectors. The adapters allow the camera and base station to communicate on two ordinary single-mode fibers while maintaining a pure optical path from camera head to mobile unit so that the video originated by our Ikegami cameras remains pristine.

Corplex's HD truck uses Telecast SHED camera systems.

The SHED units can also provide power to the cameras. We always have the ability to use local power from an AC supply or camera battery. However, it's nice to have the option of providing power through an HDX box, which is a powered version of the passive SHED adapters.

UP TO A KILOMETER

An HDX unit can power a camera using up to a kilometer of hybrid cable, deriving power through an AC mains source or, with two HDX boxes, from existing triaxial cable in the venue. Telecast will be adding a new feature to our SHED units that will allow us to turn off the HDX boxes remotely, giving us the ability to shut down cameras from the mobile unit.

That HDX remote shutdown feature is one that we requested from Telecast and the company responded quickly. Telecast's support has been wonderful and the SHED family continues to receive upgrades and enhancements.

In February, we used our Platinum HD truck with the SHED units at the International Auto Show in Chicago. This particular job would not have been feasible without the SHED/HDX and the Telecast Adder system. The Auto Show this year spanned both the north and south halls at Chicago's mammoth McCormick Place Convention Center and the only connectivity between the two halls was dark fiber.

At the mobile unit, we started with SMPTE fiber and DT-12s. We then transitioned to single-mode fiber with the SHED for our cameras and a Telecast Adder system for audio and communications.

In the north hall, we broke out with the HDX into an Ikegami Mongoose (which converts SMPTE to triax) and connected it to triax that we had run earlier in the month, which—if damaged—could be field repaired. Telecast's products make remote television possible in places where technical or budgetary limitations had previously prohibited.

We're thrilled with how Telecast's SHED adapters have eliminated a lot of time and energy that would have been required to use SMPTE hybrid cabling. Telecast's excellent customer support and willingness to continually improve upon its technologies has given us complete confidence in the company, and we look forward to using SHED and HDX units at our many and varied events to come. ■

Dave Greany is the vice president of engineering and remote operations for Corplex and can be reached at dave@corplex.tv. *The opinions expressed above are the author's alone.*

For more information, contact Telecast at 508-754-4858 or visit www.telecast-fiber.com.

USER REPORT

Will-Burt Gets News to KTIV

by Terry Hasebroock
Management Information Systems
KUSO-FM

NORFOLK, NEB.

I have been with KUSO-FM since its inception in May 2000. I'm involved in all technical aspects of remote broadcasting and editing, and I have worked in the industry for more than 30 years.

In addition to running a country-music radio station, we also do several remote TV news broadcasts each week for KTIV in Sioux City, Iowa. With our Hummer H2, we use a Marti radio for live radio remotes, and microwave gear and monitors for basic video capabilities. The mast on our truck was the most economical choice.

Prior to deciding on a Will-Burt mast system, we sought advice from KTIV. The station had been using Will-Burt masts and confirmed that the company had a solid reputation and a quality product.

KUSO's truck handles both mobile FM and TV with a Will-Burt mast.

A Will-Burt 7-42 pneumatic mast was installed in our truck in October. We chose the 42-foot mast because although the terrain is relatively flat, there are many tall trees and large buildings. The mast height was necessary.

This January, we placed a service call to Winemiller Communications about what we thought was a defective seal in the mast. Six days later, Will-Burt had a service technician at our station and exceeded our service expectations.

We have been very pleased with our Will-Burt mast and the company's response to our needs. We have an excellent relationship and would recommend Will-Burt masts to other stations. ■

Terry Hasebroock is responsible for management information systems at KUSO-FM. He can be reached at terry@us92.com. *The opinions expressed above are the author's alone.*

For more information, contact Will-Burt at 330-682-7015 or visit www.willburt.com.

ENG Trucks

Frontline Communications

12770 44th Street North
Clearwater, FL 33762

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

KEY FEATURES

- Vehicles with analog and digital equipment
- Four-wheel-drive trucks available
- Satellite and microwave facilities
- Live feed or remote production

USER	Randy Johnson Relay House 763-972-8008	Tom Heininger KTVK 602-207-3443	Chuck Seithel WVEN 407-774-2626	Dan Black Dan Black Studios 334-279-6036
WHAT MODEL(S) DO YOU HAVE?	NT7 (two) and NT8 (one)	Sprinter	Custom satellite truck	NT8
HOW IS IT USED?	Satellite uplinking of events	Multicrew ENG remotes	Live news and advertising remotes	Satellite uplinking of events
HAS IT PERFORMED AS EXPECTED?	Yes	Yes	Yes	Yes
WHAT FEATURES DO YOU LIKE THE MOST?	Built to my specifications	Spacious; extra rack space	Automatically finds satellites using BT system	Great for small productions; looks nice; sturdily built
WHAT FEATURES DO YOU LIKE THE LEAST?	None	Compressed air system is noisy	None	Want more "belly-box" space
HOW LONG HAS IT BEEN IN SERVICE?	Seven years	10 months	Six months	Six months
HAVE YOU HAD ANY EXCESSIVE MAINTENANCE PROBLEMS?	Occasional jack problems	No	Minor vehicle steering adjustment	No
HOW WOULD YOU RATE THE MANUFACTURER'S SERVICE/SUPPORT?	Excellent	A+	Excellent	Good
WHERE WAS THE EQUIPMENT OBTAINED?	Manufacturer	Manufacturer	Manufacturer	Manufacturer
WHAT WAS THE DECIDING FACTOR FOR YOUR PURCHASE?	I trust the company	Long experience with Frontline	Could use a non-technical operator	Price; impressed with Frontline

For more information, contact Frontline at 727-573-0400 or visit **www.frontlinecomm.com.**

USER REPORT

Golden Eagle Soars With Tandberg

by Bill Lee
Director of Engineering
KGEB/Golden Eagle Broadcasting

TULSA, OKLA.

Oral Roberts University is an interdenominational Christian liberal arts university and home to a rich broadcasting history. Oral Roberts Ministries oversees and maintains Golden Eagle Broadcasting and its flagship station, KGEB, from the university campus.

Although KGEB broadcasts on local analog and digital channels, Golden Eagle Broadcasting distributes programming nationally via satellite. In July, we converted our satellite uplink to digital; Tandberg Television provided the digital SNG encoders and modulators that comprise the heart of the system.

Satcom Resources, a satellite systems integrator, worked closely with us to evaluate our options. The proposal included a new digital video uplink with 1:1 redundancy, on-site survey and complete installation. In addition to equipment procurement, Satcom Resources handled the digital uplink installation and ensured the system worked as specified prior to its first uplink.

Golden Eagle Broadcasting provides a single-channel free-to-air feed over satellite and wanted an efficient and high-quality digital SNG encoder. We ultimately decided on Tandberg's Voyager E5714 DSNG encoders.

REDUCED COST

The Voyager E5714 provides the MPEG-2 compression needed to reduce our transponder costs. The transition to digital has lowered our monthly operational costs from six to five figures, which will pay back our investment in less than one year.

Two redundant Voyager E5714s are connected with a Newtec 70 MHz IF switch that automatically enables the backup encoder when required. The E5714 outputs 6 Mbps MPEG-2 video and audio that looks amazingly clear.

Internal pre-processing is responsible for eliminating artifacts from the bit stream prior to satellite uplink. A Tandberg TT1220 IRD provides confidence monitoring of the satellite return.

The Voyager E5714 is a 1RU device featuring a Web browser that lets us remotely monitor the performance of the internal QPSK modulator. This immediately decreased our costs and increased our operational efficiencies compared to our analog uplink, which required an external master control system to monitor amplifiers within the uplink.

A Tandberg TT4030 MPEG-2 stream analyzer was also purchased to monitor PSIP information and analyze jitter in and out of the ASI stream prior to reaching the uplink. An optional QPSK demodulator on the TT4030 allows ASI stream monitoring at the downlink. In addition, an ATSC option allows us to connect a SMPTE 310 output from an ATSC demodulator to monitor ATSC PSIP information.

Golden Eagle Broadcasting uses Tandberg encoders for distribution.

The E5714 also enables pass-through closed-captioning to comply with FCC mandates. Live captioning is added to composite video on line 21 and seamlessly transported through the encoder along with audio and video.

Setup and maintenance is simple. Initial configuration included the MPEG rate and IF bandwidth's center frequency. The E5714 supports four audio channels; since we only use two channels, we turned off the other two during configuration.

The analog to digital transition has brought an enormous cost reduction along with increased reliability to our satellite television service. Tandberg Television and Satcom Resources are directly responsible for our newfound efficiencies and improved broadcast quality. ■

Bill Lee is director of engineering for KGEB and Golden Eagle Broadcasting and can be reached at blee@oru.edu. The opinions expressed above are the author's alone.

For more information, contact Tandberg Television at 407-380-7055 or visit www.tandbergtv.com.

USER REPORT

BMS Extends Reach of KHON2

by Norris Tanigawa
News Operations Manager
KHON2

HONOLULU

Emmis Broadcasting Corp. owns and operates KHON2, which has been on the air in Honolulu since 1952.

The KHON2 news department does numerous live shots that often require extensive setups. Some of the "lives" that we wanted to do have proved impossible to set up due to physical logistics and safety concerns.

After some research, we realized that the BMS Carry-Coder wireless camera system would be a solution for many of the difficult situations we encounter. We currently have the BMS units installed in each of our live trucks.

The Carry-Coder provides us cable-free transmission for up to several blocks from our camera to the ENG truck. This enables the operator to park the ENG vehicle in safer and more convenient spots than previously possible.

In addition to saving valuable setup time, the elimination of cables to the camera is a major safety enhancement during live operations. We are also able to consider other live locations not formerly considered, such as from upper floors of buildings and other structures where dropping cables would be unfeasible.

Our Broadcast Microwave Services gear is used for practically every show every day. We are extremely satisfied with the product and its performance. ■

Norris Tanigawa is the news operations manager for KHON2 and has been with the station for more than 30 years. He can be reached at ntanigawa@khon.emmis.com. *The opinions expressed above are the author's alone.*

For more information, contact BMS at 858-391-3050 or visit www.bms-inc.com.

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An SES AMERICOM Broadcast Service

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SES AMERICOM
An SES GLOBAL Company

USER REPORT

Vista Uplinks With SES Americom

by Roy Liemer
President and Founder
Vista Satellite Communications

SUNRISE, FLA.

Staying one step ahead of the unpredictable worlds of broadcasting and video production is no easy day at the office.

However, delivering breaking news coverage, ensuring a CEO's live state-of-the-business address reaches every employee, brokering the bandwidth for HD and expanding the audience for some of the world's biggest events is our passion and the drive behind Vista Satellite Communications. Last year, we sold 23,000 hours of occasional use satellite space segment alone, for everything from red-carpet standups at award shows to on-the-scene hurricane coverage.

LARGEST OPERATOR

SES Americom is the largest satellite fleet operator in the North America and also a provider of domestic and international occasional broadcast services, including much needed C- and Ku-band capacity. SES Americom's recent acquisition of Verestar has sweetened the pot, enabling the company to expand on its portfolio of space, teleport and fiber solutions.

One of the crown jewels of the Verestar purchase has to be the Washington International Teleport (WIT). If you've been in this industry for long, you've used WIT to get terrestrial and satellite-based broadcasts in and out of the nation's capital. On February 13, WIT played an instrumental role in Vista's 16th consecutive international distribution of the Grammy Awards.

We took the Grammy's live feed straight from Staples Center in Los Angeles and broadcast it around the planet. The worldwide distribution and the nationwide affiliate live remotes came off like a smooth saxophone singing out some great jazz.

Although Vista's customers may see me as the front man, my one-stop performance depends on our professional staff and trusted partners. In the case of SES Americom, with much of its distribution platform 22,000 miles up in the sky, trust has been earned in a relationship that began 17 years ago in the early days of Vista.

In this industry, we're only as good as our last performance. Whether it's SD, HD, SNG, sports, business or special events in the United States and everywhere else, SES Americom is always on with the advanced solutions to meet our unique broadcast challenges anytime, anywhere. ■

Roy Liemer is president of Vista Satellite Communications and a 28-year veteran of the broadcasting industry. He can be reached at roy@vistasat.com.

For more information, contact SES Americom at 800-243-1995 or visit www.ses-americom.com.

BUYERS BRIEF

The RFX Clip-On from **RF Central** is a camera-mounted COFDM microwave transmitter that gives the camera operator mobility for distances up to 1/4 mile. No direct line of sight is needed between the Clip-On transmitter and receiver.

The system provides video and two audio channels, either mic- or line-level. It is frequency selectable to reduce the chance of interference with other microwave services.

For more information, contact RF Central at 717-249-4900 or visit www.rfcentral.com.

COMPANY PROFILE

MRC Puts 'Mobile' in Microwave

by Bob Kovacs

BILLERICA, MASS.

A lot has changed in the 42 years that Microwave Radio Communications (MRC) has been in existence.

Founded as a division of M/A-COM, the company has from the beginning served the broadcast market with microwave products for point-to-point signal transport. British manufacturer Vislink, which complements MRC's product line with an array of on-camera radios, now owns MRC.

In the early days of MRC, the company quickly established itself as a major supplier of microwave radios for mobile applications. One of the original MRC products was the 2T2 2 GHz analog ENG radio, which dates back to the mid-1980s. In the late 1980s, the MRC branched out to radios for fixed applications, such as studio-to-transmitter links (STLs) and regional networks.

MRC prepared for the advent of digital TV by developing its TwinStream system in 1998.

"TwinStream was designed specifically for the DTV rollout," said Tony Finizio, president of MRC. "It allows you to carry both an analog and digital signal in [a single] 25 MHz channel of a traditional STL."

By combining digital and analog signals into the single 25 MHz channel, a station with a TwinStream does not have to change its STL microwave license to add digital.

"We've had extremely good success with [TwinStream] during the DTV rollout," Finizio said. "It was a broad-based product that was accepted by all."

In addition to providing both digital and analog feeds to the transmitter location, the TwinStream also has a 1.5 Mbps (T-1) side-channel that can be used for control and communications. The product supports a variety of modulation schemes, including analog NTSC and PAL, as well as QPSK and 16QAM.

MRC has other fixed-link radio systems, including the Pro-Line for the 18 and 23 GHz bands, and the DAR series that can be supplied in 2 GHz to 23 GHz versions.

MOBILE BACKGROUND

Its original background in ENG and mobile applications has not been forgotten; MRC has a range of microwave products for gathering news and establishing temporary links.

CodeRunner is available in analog and digital versions, with the latter using COFDM modulation. CodeRunner also can be delivered for use on either the 2 GHz or 7 GHz bands.

"It's the most popular [microwave] product for ENG applications," Finizio said.

The Strata line from MRC is intended for portable applications that require a temporary link. Strata products are available in both analog and digital versions, with systems that work on the 2-, 5-, 7- and 13-GHz bands. The digital versions can be fed with an MPEG signal.

In addition to the company's radio products, MRC manufactures modems for carrying data, including ATSC data for digital television.

Although the TwinStream line has a limited international market, other MRC products do well overseas. Speaking of overseas, MRC' parent, Vislink, just acquired Link Research, including the latter's line of mobile and on-camera microwave radio products.

When it comes to knowing its customers, MRC has its eyes on the broadcast industry, even as it keeps it options open.

"I think we have the most complete line of radios for the broadcast industry," Finizio said. "Broadcasting is our core market but we recognize this technology is applicable to other markets." ■

USER REPORT

Scopus Scores for NBC in Athens

by Matthew Adams
Director of Technology
NBC Olympics

NEW YORK

Broadcasting the Olympics is a large and complex undertaking.

At NBC's transmission area in the Athens International Broadcast Center we terminated 28 of the network's own venue circuits, 40 additional feeds from different venues and a separate fiber network built to connect the satellite farm, the main stadium, and the gymnastics and swimming venues. We also established 12 main circuits going outbound and had seven coming back from the United States and additionally put up six circuits locally in Athens for coverage and closed-circuit viewing of U.S. broadcasts for production and executive viewing.

Scopus E-1000 SD encoders were used for all 12 NBC transmission circuits back to the United States. Each main transmission circuit had two signals on it, which we achieved with Scopus RTM-3300 multiplexers. In addition to these six circuits transmitted on three paths via satellite, we used four circuits multiplexed on a DS3 for terrestrial backup.

On the receive side, Scopus IRD-2800 4:2:2/4:2:0 receiver decoders were used at individual U.S. downlink sites for the six NBC networks: NBC, MSNBC, CNBC, USA Network, Bravo and Telemundo. We installed additional Scopus systems in Athens for confidence monitoring and return circuits. For these non-broadcast circuits, we used Scopus' E-900 encoders and IRD-2600 decoders.

The selection of compression equipment for complex events such as the Olympics has less to do with just the technology itself and more to do with its ease of use and stability. The bottom line is trust.

The beauty of the Scopus equipment was that you turned it on, it worked, it looked great, and it kept on working. Not once did we have a Scopus failure and in a show as complex as Athens, we could not afford to be chasing transmission failures.

EASY CONFIGURATION

Although we found that Scopus' solutions provided a good-looking

SCOPUS, PAGE 50

USER REPORT

AVS Soars With Link Research

by Randy Hermes
Founder and President
Aerial Video Systems

BURBANK, CALIF.

Aerial Video Systems is a specialist video company providing point-of-view cameras; helmet cameras and other miniaturized camera solutions, as well as providing aerial video services using our own airplane. We are geared towards high-end broadcast television customers and do a lot of live sports.

The greater part of our work, including our work with the plane, requires wireless camera systems and the changeover to digital wireless camera systems has been a big improvement. It means that we don't have to worry about aiming antennas and it gives the wireless camera systems much more mobility and flexibility than we could get with the analog systems.

More importantly, we get better picture quality and we do not require a direct line-of-sight transmission path.

Randy Hermes of Aerial Video Systems uses Link Research LinkXP systems to get wireless video from aircraft and other vehicles.

MAJOR EVENTS

Some of the biggest assignments where we used the Link Research LinkXP system have been major news events. We were there at the recent political conventions leading up to the presidential elections. The LinkXP systems also have been booked out to MTV for a long-term reality show.

I like the compactness and low latency of the LinkXP. When using the genlock feature in the receiver, we can nearly approach the delay of an analog system/frame synchronizer combination. Also important to us is the unit's has diversity reception.

UNIQUE THINGS

We plan on doing all sorts of unique things with the kit. We have a reputation for doing things that are "out-of-the-box," so people come to us with their "crazy" ideas; maybe they want to put a camera somewhere that sounds quite impossible but we'll find a way to do it. Challenges like this are what make the job fun, although tight deadlines sometimes obscure just how much fun we're having.

We rely on the LinkXP system completely and it works every time. It has really simplified the use of RF cameras in broadcasting and it has made it much easier to use them on live TV shows.

I also have to say that the support we've received from the team at Link has been great.

Looking ahead, we plan to do a lot more with the LinkXP. For example, the system is a natural for stadiums.

We are so happy with the performance of the Link Research systems we own, that we plan on adding three more systems to our inventory in the immediate future. ■

Randy Hermes is the founder and president of Aerial Video Systems, which provides aerial and other specialized videography. He can be reached at avsburbank@aol.com.

For more information, contact Link Research at 562-698-8560 or visit www.linkres. co.uk.

USER REPORT

Nucomm Cuts Through for NY1

by Gerry Gallagher
Field Operations Manager
New York One

NEW YORK

New York One News is Time Warner Cable's 24-hour local news channel. We cover the five boroughs of New York City and use our ENG capability daily to provide live coverage and quick turnaround of stories throughout the city.

When NY1 began operations in 1992, we had one Wolf Coach Benchmark 1 ENG van and a receive site at the Empire State Building using a manually steered receiver. Although this provided coverage from most locations, there were some exceptions and City Hall—a location we went to almost daily—was one of them.

Located at the intersection of Park Row and Broadway in lower Manhattan, City Hall presented a real challenge for analog microwave. We could establish a broadcast-quality signal from one corner for a reporter's stand-up but parking in a location that allowed us to wire the Mayor's briefing room for live events always left the ENG truck operators struggling to tune in.

To resolve this, we installed a steerable receiver across the Hudson River in Jersey City with a line-of-sight to City Hall. This worked well for several years, providing coverage of City Hall as well as adding to our coverage from Brooklyn, Staten Island and Manhattan's west side.

HIT BY THE BOOM

Unfortunately, the real estate boom of the late-1990s was not helpful to the ENG landscape. Our Jersey City receiver sat on top of a high-rise that was soon obscured by newer, taller buildings on both sides of the river. Even our Empire receive site was losing coverage from new buildings around the city.

Additionally, in the wake of the Sept. 11 tragedy, increased security at City Hall and One Police Plaza, as well as state and federal courts led to growing restrictions on ENG truck parking. This further reduced our newsgathering abilities.

When COFDM transmission became a practical reality, we began to

NUCOMM, PAGE 52

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

REFERENCE GUIDE

SATELLITE ENCODERS

MANUFACTURER	MODEL	OUTPUT FREQUENCY RANGE	MODULATION TYPE	VIDEO ENCODING FORMAT	TYPE OF INPUT	NUMBER OF A/V CHANNELS	FEATURES	SIZE & WEIGHT	PRICE
Link Research 562-698-8560 *www.linkres.co.uk*	L1000	65-75 MHz	DVB-T COFDM and DVB-S QPSK, 8PSK 16QAM	MPEG-2 4:2:2/4:2:0	SDI, NTSC and PAL	1 video, 2 analog or digital stereo audio pairs	Under 20W power, low delay, BISS-1/E	1 RU or small form 3 lbs.	Call for pricing
Radyne ComStream 858-458-1800 *www.radynecomstream.com*	HE4000	ASI, SMPTE-310M, G.703, 70/140 IF, L Band	QPSK, 8 PSK, 16QAM, DVB-S2	4:2:0 MP@ML, 4:2:2 P@ML, 4:2:0 MP@ML, 4:2:2 P@HL,	Composite PAL/NTSC, SDI, HD-SDI	Dolby AC3 2.0 Enc, Dolby AC3 & E pass-through	HD/SD simul-taneous enoding, front panel conf-idence monitors	2 RU 28 lbs.	Call for pricing
Scientific-Atlanta 770-236-5000 *www.sciatl.com*	Originator D9150	52-88 MHz; 104-176 MHz	QPSK, 8PSK, 16QAM DVB-compliant	4:2:0, 4:2:2	Analog, digital or both	1 video/4 mono audio or 2 stereo pairs audio	On-board audio and video mod.; optional C/A and scrambling	2 RU, 40 lbs.	Call for pricing
Scopus 609-987-8090 *www.scopusamericas.com*	E-1720	70-140 MHz	IF, 920-2150 MHz L-band output, L-band output for monitoring	4:2:2 MP@ML	4:2:2	MP@ML optional	SDI and composite analog inputs, up to 4 stereo/8 mono, analog	1 RU, 10 lbs.	Call for pricing
Tandberg Television 407-380-7055 *www.tandbergtv.com*	Voyager E5788 HD DSNG	50 - 180 MHz, L-band 950-1750 MHz	QPSK, upgradable to 8PSK/16QAM	4:2:0 MP@ML, 4:2:0 MP@HL, 4:2:2 MP@ML	SDI, HDSDI and analog CVBS, NTSC	1 video, 8 audio	HD or SD encoding, HD bit rates up to 90 Mbps, Dolby E pass-through	2 RU 26 lbs.	Call for pricing

Scopus

CONTINUED FROM PAGE 47

image, we were most impressed with its easy configuration and the availability of tech support if we encountered any problems. Scopus support staff was located in Athens and also at Rockefeller Center in New York for the month of the Games, but we had few problems.

We found that the small footprint of the Scopus equipment helped us in certain situations. All the gear fit easily into two small satellite vehicles we used in Athens and our crew was able to load the equipment without a lot of trouble even though we were working on tiny back streets with no parking whatsoever. We also appreciated that the products allowed us to use digital video with embedded audio.

NBC's coverage of the 2004 Olympic Games included more than 1,200 hours of programming, nearly three times the coverage we provided for the 2000 Games in Sydney, and by all accounts it was a success for the network. We were very pleased with the results.

Even as NBC's coverage of the Olympics continues to grow, we are committed to a high broadcast standard. Scopus offered out-of-the box solutions with the quality, reliability, flexibility and ease-of-use that allowed us to maintain that standard. ■

Matthew Adams is the director of technology for NBC Olympics and can be reached at matt.adams@nbcuni.com. *The opinions expressed above are the author's alone.*

For more information, contact Scopus Network Technologies at 609-987-8090 or visit www.scopus.net.

BUYERS BRIEFS

The CoaxLink coax camera control system from **Telemetrics** provides power and remote control capabilities at distances of more than 1,500 feet from the base station. The system works with a single coax cable and the camera coax adapter docks directly onto the camera.

For more information, contact Telemetrics at 201-848-9818 or visit www.telemetricsinc.com.

N Systems Inc. (NSI) offers a variety of products for the ENG industry, including its Silhouette and Stiletto dish antennas. Available for operation at 2 GHz, 7 GHz, 13 GHz and 15 GHz as well in single, dual and triple band versions, these antennas have several polarization options.

The Stiletto is a high-gain version of the Silhouette antenna and offers a 3 dB increase in gain over the Silhouette.

For more information, contact NSI at 410-964-8400 or visit www.nsystems.com.

Radyne ComStream's new DMD20 satellite modem includes IDR, IBS and DVB standards, and supports data rates up to 20 Mbps in a 1RU enclosure. Additional hardware options such as Turbo, interface expansion, high-stability and DC operation care available.

For more information, contact Radyne ComStream at 602-437-9620 or visit www.radn.com.

The Expedio from **Moseley Associates** offers digital modulation, with automatic selection of power and frequency. In digital mode, users can select MPEG rates between 4 and 32 Mbps, and 4, 16 and 64 QAM modulation.

The product also features a fractional N synthesizer for COFDM operation.

For more information, contact Moseley at 805-968-9621 or visit www.moseleysb.com.

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Nucomm

CONTINUED FROM PAGE 48

look into upgrading our ENG vans to digital transmitters. We were very excited by the possibilities of having more reliable coverage from more locations.

The obvious choice for our digital microwave provider was Nucomm. NY1's relationship with Nucomm began right after 9/11, when we needed to establish a point-to-point microwave link between the temporary Office of Emergency Management headquarters and our studio to cover the daily updates. The company provided us with an unprecedented level of hardware and engineering support, so when the time came to consider digital microwave, we naturally went with Nucomm.

FIRST ENDEAVOR

Our first endeavor was to add another receive site that was digital ready. Due to the cost of real estate, we decided to put the digital receiver on the roof of our facility at 75 9th Avenue in Manhattan. We installed a steerable Ellipse digital-ready receive antenna that feeds a Newscaster digital-ready analog receiver with a Newscoder RX1 demodulator/decoder.

With a building height of only 10 stories, it might not seem like an opportune location for a receiver. Despite having no line-of-site beyond a few city blocks, we can consistently receive feeds from City Hall, Times Square, Battery Park, the financial district and Manhattan's upper west side. In comparison, these areas had trouble establishing an analog signal with a receiver located on the 79th floor of the Empire State Building.

Due to this success, we are currently installing four sector antennas on the Time Warner Center at Columbus Circle that will feed four more Newscoder RX1's. Our expectation is that this will significantly increase our effective coverage area and video quality. ■

Gerry Gallagher is the field operations manager for New York One and can be reached at gerry.gallagher@ny1news.com. *The opinions expressed above are the author's alone.*

For more information, contact Nucomm at 908-852-3700 or visit www.nucomm.com.

BUYERS BRIEFS

The Camplex CP-301B universal camera adapter system consists of a lightweight camera adapter and rack-mountable control unit that provides for remote control of a camera over long distances. The CP-301B allows the use of lightweight, flexible coax instead of heavy multicore or expensive triax cables.

The system supplies bidirectional video and audio, including return video, IFB and intercom feeds over a single coax cable. An optional PDC-340B camera power adapter lets the Camplex system power the attached camera, viewfinder and lens using the same coax cable.

For more information, contact Camplex at 620-342-7743 or visit www.camplex.com.

The FSS-95F4T LNB fiber link L-band system from **DAWNco** uses a fiber optic transmitter attached directly to the dish-mounted LNB. With this system, there is no need for a long coaxial cable run between the LNB and fiber optic transmitters.

This fiber system connects a satellite antenna to its receiver over long distances without loss and it reduces the possibility of lightning damage. It can also provide high signal levels to feed many receivers without need for amplification.

For more information, contact DAWNco at 248-391-9200 or visit www.dawnco.com.

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ANTENNAS/TOWERS /CABLES

Want to Sell

Bogner B16U 1kW TV antenna, new in crate, chnl 41, BO. Nigel, 702-386-2844.

Bogner B16UO antenna on chnls 28 & 29, vgc, return loss tested good, $6500; Scala SL-8 on TV chnl 66, vgc, return loss tested good, $300; 8' grid dish, $200; 10' solid dish w/mount, $300. A Martin, 218-765-4321.

PSI 16-bay 2 kW antenna for chnl 27, omnidirectional pattern w/14.61 dB gain, horizontal polarization, xlnt cond, must sell, BO. 340-713-9927.

O'Connor 30B Fluid Head, gd cond, still smooth, no leaks, w/handle, $375. C Angelos, 831-393-9500.

EDITING EQUIPMENT

Want to Sell

Abekas DVEOUS 5100, mint cond, original owner, single twin chnl, has all options: color corrector, deep focus, framestore, 6 SDI (key/fill) inputs, manuals, Version 6.3.1 software, pictures avail, $19995/BO. John, 702-363-9289 or john@spectra-video.com.

Avid Symphony version 3.5 on IBM Intellistation, $24900. 818-788-4700 or www.tvprogear.com.

AUDIO PRODUCTION

Want to Sell

Mackie 1604 VLZ Pro, new, $849; Mackie 1604 VLZ, $625; Sony MXP-744, BO; Bittree & ADC audio & video patch panels from $400; Stantron 45RU racks from $450; Emcor Series 10 40RU racks from $450; Digidesign 888, $650; PSC Universal microphone pwr sply, $150. 818-788-4700 or www.tvprogear.com.

CAMERAS

Want to Sell

Canon XL1-S camera, $2100. Glen, 208-735-1970.

Panasonic AJ-D900WAP DVCPRO P camera, $10000; Panasonic AJ-D90 DVCPRO 50 dockable rcdr, $3995; Sony DXC-637 w/PVV-3 back, $6500. 818-788-4700 or www.tvprogear.com.

CAMERA ACCESSORIES

Want to Sell

Cartoni Beta head & single stage sticks, $1850; Sachtler Video 20 II w/ENG 2 CF legs, $4500. 818-788-4700 or www.tvprogear.com.

Cartoni heavy duty tripod floor spreader, like new, $250. Alex, 727-595-6050.

LENS REPAIRS

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

LIGHTING

Want to Sell

Arri 125 HMI Pocket Par Kit incl head, new lamp, AC Ballast, 25" header cable, lens set, barndoors, XXS Chimera, speed ring & Viking case, $2475. Alex, 727-595-6050.

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MISCELLANEOUS

Want to Sell

Stantron equipment racks w/wheels, $250/ea. Glen, 208-735-1970.

MONITORS

Want to Sell

Sony BVM20F1U w/SDI, only $3650 w/SDI; Sony PVM-20M4U, $1750; Sony PVM4B1U quad B&W monitors, $650; Sony BVM14F1U w/SDI, $2395; Sony PVM20L5, B-Stock, $2695; Sony PVM14L5, B-Stock, $1650; Sony BVM8045QD SDI field monitor, $1500. 818-788-4700 or www.tvprogear.com.

MOVIE PRODUCTION EQUIPMENT

Want to Buy

Bolex 16mm reflex cameras, Arriflex-SB, Arri-BL & Arri-SR cameras w/lenses; Auricon Bach 16mm cameras w/tripods; JK-Eng optical printers w/Super 8mm/16mm film gates; Photosonics Action-Master 500 w/magazine & PL-mount lenses; Xenon Arc 16mm projectors, Xenon Eiki-3500S, Eiki-EX4000P, Eiki-EX5500S & Elmo CX-350 projectors, Super 8mm projectors; Elmo GS1200 stereo std/Xenon; Beaulieu 708EL stereo std/Xenon; Fujica-Scope MX-70 dual 8mm projectors Super 8mm cameras; Nizo-6080; Canon 1014-XL-S Nizo 6080 & Bauer 715XL; Nagra R-R rcdrs; wanted 8mm films of old home movies on various subjects in Kodachrome & B&W & H-Square Esprit Engraving machine w/computer screen & keyboard by Hazeltine; I will accept malfunctioning equip for parts. Henry, 305-652-5062 or hdeans@msn.com.

SIGNAL PROCESSING

Want to Sell

Leitch DPS-235 bdct quality rackmount dual channel TBC featuring both composite & S-Video inputs & outputs, xlnt cond, $1249. D Sheehan, 702-301-6592.

Miranda Symphonie w/full compliment of audio & SDI cards, $6000; Leitch Mix-7001 multi-function digital frame, $500; Grass Valley Series 8900 Frames w/redundant power supply, $750; GVG 8501 video DA's, $175; GVG 8551 audio DA's, $150; GVG 8936 cards, $250; Sony BVX-10 component color corrector w/remote, $700; Sony BVX-D-10, $4500. 818-788-4700 or www.tvprogear.com.

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Want to Sell

Tektronix 1735 PAL waveform monitor, $1200; Tektronix 1720 & 1730 combo w/case, $1750; Tektronix 764 digital audio monitor, $2500; Tektronix 760A audio monitor, $1250. 818-788-4700 or www.tvprogear.com.

Tektronix rack mount for (2) 1720, 1730 or any other 1700 Series waveform or vector monitors, like new, $90; Tektronix 149A NTSC test signal gen, $350. A Martin, 218-765-4321.

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

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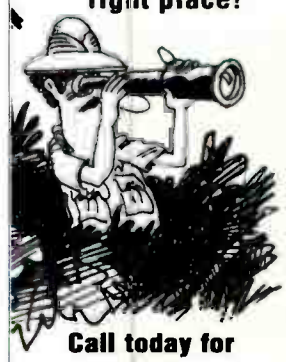

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Want to Sell

Grass Valley 200-2, fully loaded, $7000; Miranda Digipath 16x16 DV router w/remote panel, $4500; Panasonic WJ-220R 6x1 video switcher, $150; Sony DVS-V1201 12x1 SDI switcher, $1950; Leitch 4x4 MB routers, $175; GVG Ten X, $800; Kramer 5x4 A/V switchers, new, $475. 818-788-4700 or www.tvprogear.com.

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www.LowCostTeleprompters.com

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TV Technology's Equipment Exchange provides a FREE listing service for TV stations and studios only.
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❑ N. Gov. TV facility ❑ P. Edu. TV facility ❑ Q. Record. studio ❑ K. Other (specify) _____

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*Listings close every other Friday for the following month's issue. All listings are run for one issue only.

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VTRs/VCRs/ RECORDING MEDIA

Want to Sell

Sony BVH-1100 1" machine w/TBC, $500. Glen, 208-735-1970.

Sony UVW-1800, lw hrs $5500; Sony PVW-2800, $6000; Sony PVW-2800P, $6500; Sony BVW-70 from $6500; Sony BVW-75, $6500; Sony BVW-65, $2000; Sony BVW-60 from $2000; Sony DSR-2000, new, $11500; Sony DSR-1800 DVCAM rcdr, lw hrs, $8500; Sony DSR-1500A, new, $5250; Sony DSR-85 w/SDI, $8500; Sony DSR-45, new, $3995; Panasonic AJ-D950 DVCPRO 50 rcdr, new heads, $8500; Sony VO 9850 w/timecode, $1200; Sony VO 9800 w/timecode, $1200; Accom WSD Xtreme, $3500. 818-788-4700 or www.tvprogear.com.

Sony VO 7630 3/4" NTSC/PAL/SECAM; JVC BR6400TR VHS NTSC/PAL /SECAM, pefect cond, BO. jebner@globalvillageprod.com.

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CHIEF ENGINEER: NJ broadcaster seeks Chief Engineer with experience operating Master Control Automation systems, analog and digital transmitters, satellite technology and RF system. Must be proficient in computers, analog and digital video tape recorders, and digital audio/video systems for news production. Responsibilities include: supervising master control operators, maintenance/operation of TV transmitter & studio facilities. Requirement: min 2 years experience. Fax resume with salary requirement to: 973-852-0377 or email to jobs@wmbctv.com Attn: Chief Eng. EOE.

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Business News

Pinnacle Sells Team Sports Assets

Pinnacle Systems recently sold its Team Sports assets to XOS Technologies.

XOS Technologies develops performance analysis products for sports teams and with the purchase will continue to expand into the college and professional markets for all sports.

Pinnacle's Team Sports division is comprised of former coaches, players and general managers that manufacture sports-related media products.

The terms of the deal have not been disclosed, although Dan Aton, president and CEO, XOS Technologies—based in Sanford, Fla.—said that the company experienced a significant capital increase as a result of the deal.

There will be no immediate layoffs but Aton said that there is some staff overlap.

The goal for XOS Technologies is to expand the technology from the locker room out to the fans, making content available via streaming video on the Internet and to build upon coaches' analysis of games.

Ciprico Acquires Huge Systems

The Ciprico acquisition of data storage manufacturer Huge Systems is complete.

The deal included $1.3 million in cash and $300,000 in seller notes as well as contingent consideration based on the performance of the business over the next year. Sales, engineering and technical support groups will remain in the Aguora Hills, Calif. headquarters of Huge Systems. Huge has 14 employees.

Ciprico will continue to invest in the entry-level RAID technology that Huge has created in addition to its own line of performance-based RAID and DiMeda Network Attached Storage products.

"In just three years, Huge has grown at least 100 percent per year to become a leading supplier of entry-level data storage solutions for desktop video production based on its exclusive technology and extensive network of dealers across North America, Europe and the Pacific Rim," said James Hansen, president and CEO, Ciprico.

ATI Acquires Terayon Cable Modem IP

Markham, Ontario-based ATI Technologies is buying cable modem silicon technology from Terayon Communication Systems for $14 million in cash. ATI develops and manufactures 3D graphics technology and Mac and PCI cards; Santa Clara, Calif.-based Terayon specializes in digital video and home access technology for cable, satellite and broadcast markets.

As part of the deal, approximately 25 employees from the Terayon design team will work for ATI, which has shipped more than five million digital TV chips in 2004 to Sony, JVC, Panasonic, Thomson and other leading consumer electronic companies.

BDL-Autoscript Updates Name, Management

Teleprompting technology provider BDL-Autoscript has shortened its name to simply Autoscript and has added two new teleprompting specialists to its employee roster.

Brian Larter and Michael Accardi have joined Autoscript-based in London—as new managing director and president of the U.S. division, respectively. Larter kicked off his career at Autocue, where he worked in sales and rental. Twenty-year industry veteran Accardi most recently served as vice president of sales and operations for prompter system supplier QTV.

WIN-LOSE RATIO

TOP ADVANCERS BROADCAST STOCKS
(Jan. 21 - Feb. 4)

Gray	+ 7.93 %
Entravision	+ 6.10%

TOP DECLINERS BROADCAST STOCKS
(Jan. 21 - Feb. 4)

Paxson	- 27.22 %
Meredith	- 8.21%

TOP ADVANCERS TV STOCKS
(Jan. 21 - Feb. 4)

Harris	+ 13.72%
LSI Logic	+ 10.64%

TOP DECLINERS TV STOCKS
(Jan. 21 - Feb. 4)

Leitch	- 12.95%
SeaChange	- 11.62%

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

TV Tech STOCKS as of Feb. 4

Company Name	52-Week Range	Jan. 21	Feb. 4	% Change
Avid	38.43 - 65.04	59.44	64.75	8.93%
Ciprico	3.15 - 7.21	4	4.03	0.75%
Harmonic	4.86 - 13.75	10.98	11.39	3.73%
Harris	42.37 - 69.15	54.11	64.24	18.72%
Leitch	4.80 - 11.2	8.96	7.8	-12.95%
LSI Logic	4.01 - 11	5.45	6.03	10.64%
Pinnacle	3.25 - 9.91	4.47	4.27	-4.47%
Sci. Atlanta	24.61 - 36.50	29.3	31.06	6.01%
SeaChange	11.22 - 20.53	15.75	13.92	-11.62%
Tektronix	26.26 - 35.00	28.14	28.79	2.31%

Broadcast STOCKS as of Feb. 4

Company Name	52-Week Range	Jan. 21	Feb. 4	% Change
Acme	5.50 - 10.21	5.71	5.92	3.68%
Belo	18.00 - 29.90	23.67	23.2	-1.99%
Emmis	17.30 - 27.92	17.6	17.18	-2.39%
Entravision	6.85 - 11.14	7.54	8	6.10%
Fisher	45.02 - 52.50	49.4	50	1.21%
Gray	11.20 - 16.19	13.88	14.98	7.93%
Hearst Argyle	22.57 - 27.93	25.53	25.49	-0.16%
Nexstar	6.54 - 14.10	8.85	8.59	-2.94%
Lin TV	17.41 - 24.41	18.23	18.5	1.48%
Paxson	0.90 - 4.24	1.69	1.23	-27.22%
Sinclair	6.12 - 14.20	8.24	8.15	-1.09%
Liberty	38.50 - 51.79	40.4	39.45	-2.35%
Univision	26.42 - 37.57	26.71	26.27	-1.65%
Young	9.29 - 22.30	10.22	9.97	-2.45%
Tribune	38.74 - 52.98	40.21	40.6	0.97%
Meredith	46.91 - 55.94	51.76	47.51	-8.21%
EW Scripps	44.73 - 54.65	48.51	46.64	-3.85%

HD/SD PROFANITY PROTECTION SYSTEM

Monitoring Output

- Dual Mode HD or SD SDI Compatible
- Embedded & Discrete Audio Support
- User Allocatable 24 Sec. HD or SD Delay
- Solid State Delay Memory (No moving parts)
- Programmable Operator Reaction Time Handling
- Over 30 Profanity Protection Transitions
- Program to Safe Shot Transitions: Uninterrupted Clean Switch Video, Popless SoftSwitch™ Audio
- Safe Shot Frame Capture, Video Loop
- Relay Bypass Protection
- Contact Closure Inputs for Transition Triggering

HDSD9545DLY-PRO

Evertz HDSD9545DLY-PRO gives you everything you need to keep profanities from making it on AIR. The HDSD9545DLY-PRO enables the operator to insert the desired time delay via a front panel control and display panel. There are two video paths which are HD and SD compatible. The main program feed will usually be focused on the main detailed action. Both channels are delayed by the same amount. If an offensive event occurs, the operator has only to hit one remote button to cause the program video and audio output to be clean switched to the alternative back-up channel. When the offending material is no longer present, the output can be returned to the main detailed image, all without the audience noticing that an edit has occurred.

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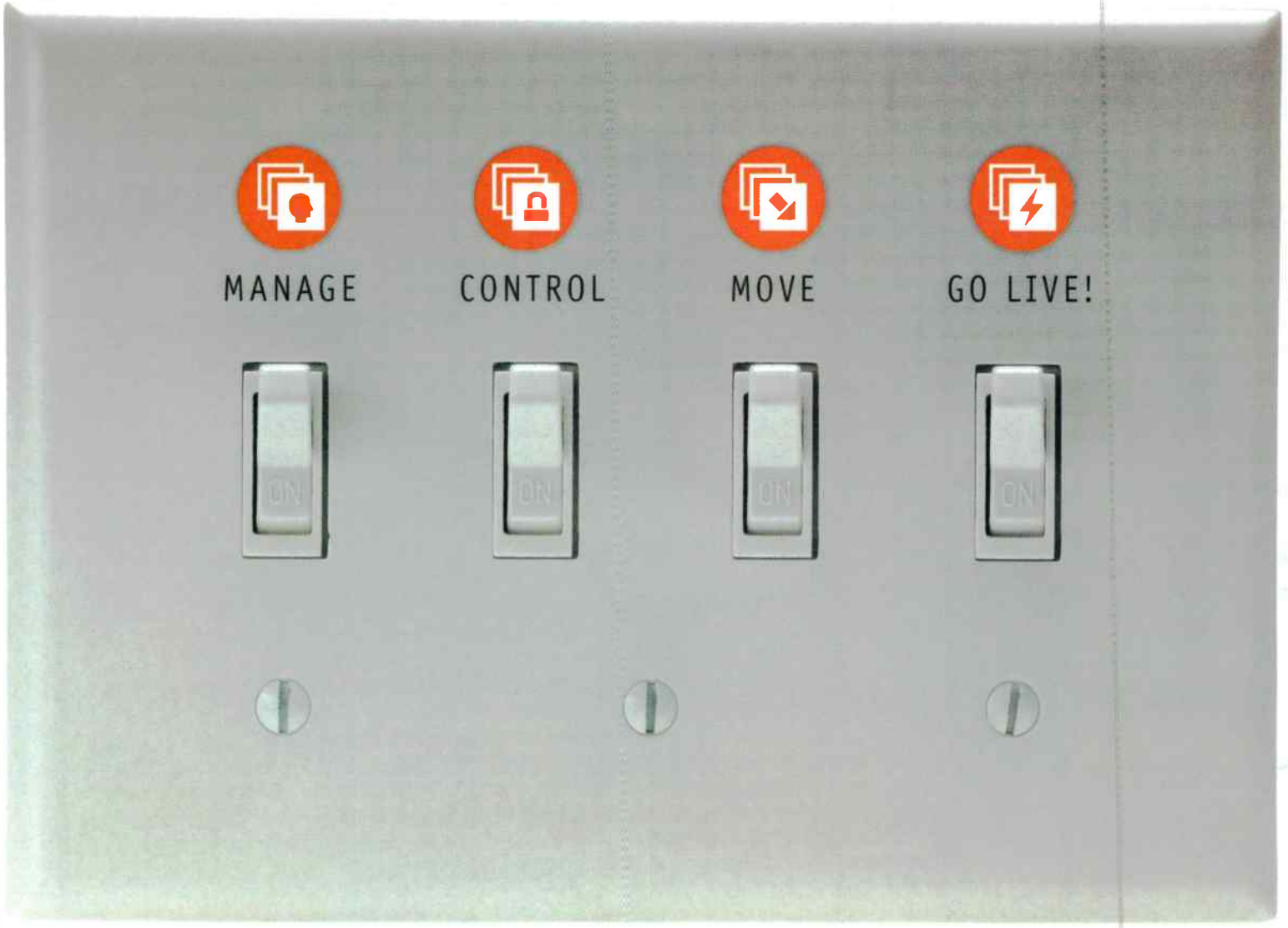

Here's a switch — turn complexity to simplicity in ingest-to-broadcast workflow. The Harris Resource Suite provides a complete set of integrated automation tools that deliver true productivity improvements. From process and asset management to workflow control and movement, the HRS tool set offers simple, intuitive resources to simplify management of the broadcast process. Through pre-defined business rules and links between traffic and master control, we make workflow smooth and seamless. And whether it's automating labor-intensive processes, originating live products outside of master control or seamlessly sharing assets throughout your enterprise, HRS helps to take your organization to higher levels of efficiency in the competitive broadcast environment. So turn on a whole new world of productivity with the Harris HRS.

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