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World Cup Soccer Goes HD

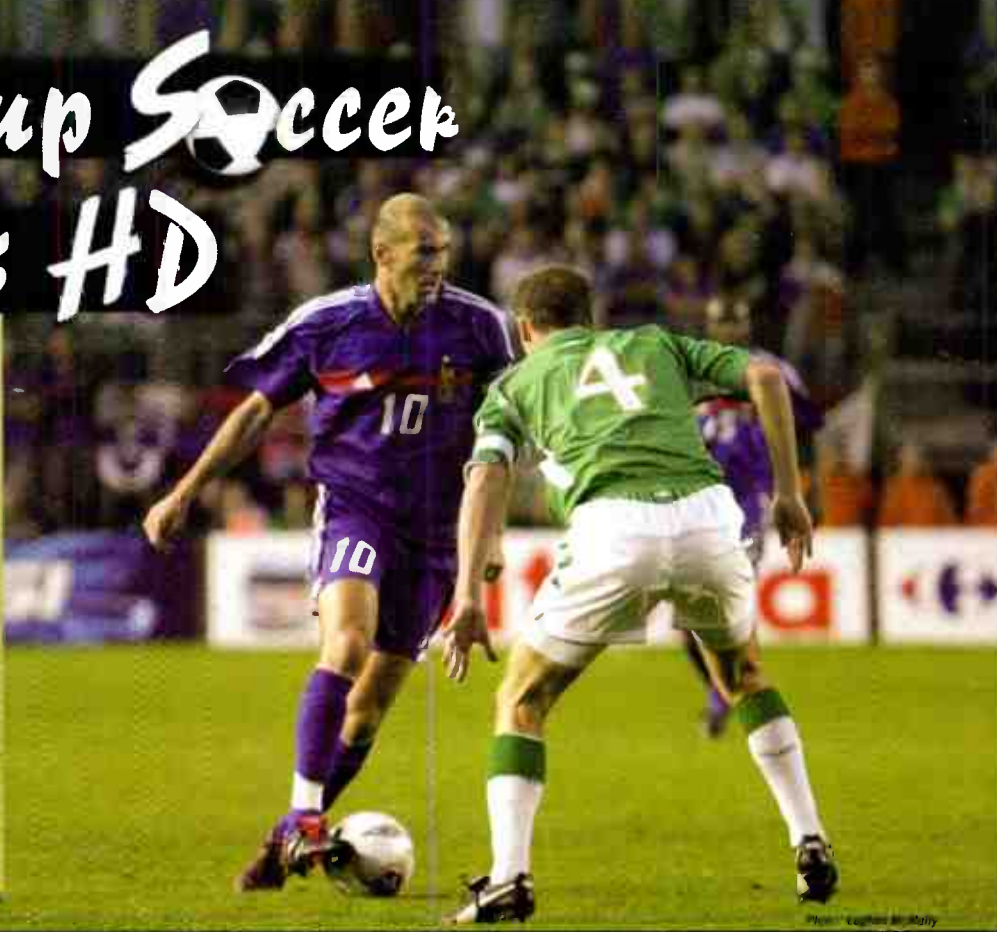
by Claudia Kienzle

MUNICH, GERMANY

With an expected TV audience of more than one billion viewers in over 200 countries, the 18th FIFA World Cup will arguably be one of the premiere telecasts in sports history. For the first time, all of the 2006 tournament's soccer matches will be broadcast in HDTV.

While portions of the 2002 World Cup held in Japan and Korea were televised to Asian audiences in HDTV, Europe is relatively new to HDTV, and consequently, there is a relatively small universe of HDTV-ready

SOCCER, PAGE 6



Cable Touts Diverse Offerings

Cross-platform, digital switching emerge as key factors at NCTA confab

by Gary Arlen

ATLANTA

Befitting the resurgence of digital convergence, last month's National Cable & Telecommunications Association annual convention served up a Southern smörgåsbord of video/data/voice "triple play" developments and cross-platform program distribution. Motorola's "Follow-Me" and Cisco/Scientific-Atlanta's "Connected Life" motifs accelerated

expectations that viewers will soon be transporting content around the house and on the road.

Four sessions on videogames plus an expanded gaming exhibition pavilion underscored the belief that games are converging into the broadband entertainment mix. In addition, several more networks—including Scripps Networks and A&E—launched high-definition channels at the convention.

PROTECTING TURF

The "network PVR" got plenty of attention,

thanks to a Cablevision Systems' announcement that it will soon introduce the service. Switched digital video and the role of home network gateways were under scrutiny at several sessions. And as always, the parade of hopeful new program networks marched along—although many now seem resigned to reside solely on the digital "on demand" platforms that cable operators are building.

FCC Chairman Kevin Martin made a fly-by appearance, primarily to meet with cable

CABLE, PAGE 18

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Zinedine Zidane takes on Kenny Cunningham during the Ireland vs. France World Cup qualifier, Sept. 7, 2005. France won, 1-0.

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Let There Be Lighting

Andy Ciddor



At about the same television sold its soul to the devil, a savvy Internet innovator was standing at the crossroads to salvage the wreckage. Ironically, it was a newspaper—not a television broadcaster—that created what may become an Internet “game changer”... p. 26

As readers may recall, I've recently been writing about problems related to consistent audio levels across broadcast channels. This month, I'd like to discuss more fully the elegance of the dialnorm concept, why we need to embrace it and what it will take to make it work... p. 30

World Radio History

One of the great joys of working with complex equipment is the total unpredictability of the ways that it may choose not to work as expected. No factory-training program can prepare you for the spider that chose last night to build a web in the igniter circuitry... p. 34

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FROM THE EDITOR

Somebody Has To Pay For It



Whoever coined the phrase, "the best things in life are free," never worked in broadcasting.

Like many of you, I have a DVR that I use frequently. But I must admit, also like many of you, that I fast forward through the commercials; it's one of the device's best and most popular features.

Admit it. You probably do the same thing, even though, as a broadcaster, you would prefer your viewers not do it. Ad skipping has been the bane of broadcasters, ever since VCRs first came on the scene. DVRs made the process even easier and faster. Broadcasters and advertising agencies have attempted to walk a fine line between trying to maintain the value of advertising while avoiding angering their viewers. Many say improving the quality of the ads would help, but hey, not every ad can be Super Bowl quality.

One company recently decided to cross the line and introduce a new system that could force viewers to watch ads recorded on DVRs.

Earlier this year, the Netherlands electronics company Philips filed a

patent in the U.S. for a technology that would "lock" the ads, and, in essence, void the fast forward button during commercials.

A firestorm ensued, forcing the company to issue the following statement:

"Inventors from Royal Philips Electronics filed a patent application, as yet not granted, that enables watching a television movie without advertising. However, some people do want to see the ads. So, we developed a system where the viewer can choose, at the beginning of a movie, to either watch the movie without ads or watch the movie with ads. It is up to the viewer to take this decision, and up to the broadcaster to offer the various services.

"Philips never had the intention to force viewers to watch ads against their will and does not use this technology in any current Philips products, nor do we have any plans to do so."

While that last sentence defies logic (why file a patent for a technology you don't plan to use in your products?), the fact that the company had to issue such

a statement illustrated the sensitivity of this issue. Viewers want to maintain control over their content, and, if ad-skipping is their "God-given" right, then by golly, nobody's going to take that away.

The fact is, it's not a "God-given" right. TV programming has never been "free;" we either pay for it by watching ads or, in the case of public TV, through our taxes.

The Philips situation arose at a time when all media companies, from broadcasters to Internet companies to studios are attempting to stifle piracy and negotiate financial deals that take advantage of new technologies, (see "Avoiding the Napsterization of Video on p. 24 of this issue). Broadcasters will have to be creative and savvy to avoid losing their clout in the brave new world of IPTV, p2p and whatever other technology is on the horizon, and keep in mind that whatever happens, somebody has to pay for it.

Tom Butts
Editor

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LETTERS

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

Changing Times

Dear Gary Arlen:

Regarding your article in the March 24 issue of **TV Technology** ("Form Factors and Future Habits a la NAB"), any time someone can so articulate an insightful perspective of the changing landscape of TV and the video industry, I really enjoy reading it. It makes me pause and appreciate where the industry is at this point in time, how quickly things are changing and how different it will be even a year from now. The dynamics of change at this point are so radical and happening so quickly that for an industry that typically adopts change so slowly many are finding it hard to keep up.

If you write anything on how the industry is handling its changes I would like to read it. Having been on the production side and now, as a vendor, I continue to be amazed at the level of frustration and difficulty customers experience as they adopt new technology. There is so much to be learned from other industries but broadcasters and many video professionals don't seem to be interested in learning from and adopting any of their standards and practices.

Chris Torkelson

Ampex Revisited

Dear Editor:

I enjoyed reading Jim O'Neal's well-researched article on the 50th anniversary of the videotape recorder ("The

Videotape Recorder Turns 50," April 12).

I was a climber on Ampex's (Alexander M Poniatoff-EXcellence) career ladder from 1950 to 1962. Alas, only a few Redwood City engineering and marketing folks attended the 1956 NARTB Show at the Chicago Hilton, (Ampex was then a \$3 million company selling analog instrumentation recorders to the government and professional audio recorders to record companies, recording studios and radio stations.)

At show time I was in New York as Ampex Eastern Region Professional Audio Products sales manager. Before the next NARTB, I had been promoted to be national sales manager of the newly formed Professional Products Division (PPD), which was headed by RCA's Neal McNaughten. I received my VTR technology and product training "direct from the horse's mouth," Charlie Ginsburg and his incredible engineers.

By 1957 I had hired and trained an eight-man sales force, and Service Manager Charlie Riley had hired four TV broadcast station senior engineers, to be installation, operations and maintenance training and field service experts. PPD sales more than doubled in each of the next several years. At the 1958 NAB in Los Angeles, we introduced a "color kit" electronics rack (which produced "low-band" NTSC color pictures whose color subcarrier jitter didn't meet FCC subcarrier frequency tolerance specs). Oh well, the pictures looked stable on RCA TV receivers.

Bob Paulsen
Millbury, Mass.

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World Radio History

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CONTINUED FROM PAGE 1

households.

But, many believe that the 2006 World Cup will be an ideal, high-profile showcase that introduces European viewers to HDTV's superior picture quality and Dolby digital sound, and promotes its acceptance worldwide.

HOST BROADCASTER

HBS (Host Broadcast Services), based in Zug, Switzerland, was instrumental in making the 2003 decision to provide the 2006 World Cup in HDTV. HBS, which was hired by Zurich-based FIFA, The Federation Internationale de Football Association, is the exclusive provider of all video and audio "pool" feeds during the World Cup. (HBS also produced the 2002 FIFA World Cup.)

For the 2006 tournament, the scope of the broadcast production is massive,

with 64 soccer matches taking place between June 9 and July 9, in modern, freshly renovated stadiums in 12 host

world's passionate soccer audience, the production is made far more technically chal-

"This is a massive logistical undertaking. We already have 18,000 tasks



A cameraman follows the action during a soccer match in Nurnberg in 2005.

cities across Germany—including Frankfurt, Nuremberg, Munich, Leipzig, Berlin, Hamburg, and Hanover.

Considering the frenzied zeal of the

"It has taken three years of planning to get everything organized and to explain to our 'broadcast partners' what we intend to do and how we are going to do it."

—Nicola Taylor, HBS

lenging by HBS' plans for flawless delivery of live, uncompressed 1080/50i (50Hz), 16:9 widescreen HDTV pictures along with 5.1 channels of surround sound, in addition to SD feeds.

in our project management software," said Nicola Taylor, director of communications for HBS. "It has taken three years of planning to get everything organized and to explain to our 'broadcast partners' what we intend to do and how we are going to do it."

U.K. Broadcasters Use Cup Coverage to Test HDTV

LONDON, ENGLAND

The compelling action of the 2006 FIFA World Cup may help break the ice for HDTV in Europe—that's what the BBC and fellow U.K. broadcaster ITV are hoping.

"The World Cup will be a national obsession for the month of the tournament, and millions will be gripped by the drama on both BBC and ITV," said Roger Mosey, director of sport for the BBC in London. "In 2002, audiences for live England games were some of the largest for the year. If England does well this time, no doubt millions will tune in again."

"On the other hand, there's no two ways about it. HD audiences will be tiny," Mosey said. "HD is only just being introduced in the UK and realistically only a minority of people, and even a minority of those who have HD-ready sets, will get access to HD receivers this time around. Everyone's taking steps with this new technology, and the BBC saw the World Cup as a fantastic opportunity to test it and offer a glimpse of the future."

Seetha Kumar, head of HDTV at the BBC agreed.

"Certainly, it's a big milestone in the introduction of HD," she said. "For the BBC, it's more about doing the biggest and best of what we do in the best possible quality, as our audience expects. HD is now a reality, and many of us think it's here to stay. The BBC makes fantastic programs, and in HD they look even better."

BBC PRODUCTION PLAN

During the 2006 World Cup telecast, June 9 through July 9, the BBC, through its BBC Resources Ltd. division, will take feeds from Host Broadcast Services (HBS), the exclusive provider of all video and audio "pool" feeds for this much-awaited FIFA event. However, "BBC telecasts will not provide 5.1 channel surround sound," said Tony Bate, chief technical manager, World Cup telecast for the BBC.

In addition, "the BBC intends to position three of its own HD cameras in the stadium venue and three HD cameras in a studio, to cover matches that are of particular interest to British audiences," said Andy King, head of technology for BBC Resources. "The BBC will also have a large production truck, called Unit 10; three 'links' [satellite uplink] vehicles; EVS slo-mo replay; and four roving crews [in Germany] to provide BBC coverage not provide by HBS."

Bate said there's not much technical difference between covering these matches in HDTV or SDTV.

"The main difference, however, is in the moving of signals around, both back to the UK and between Munich and Berlin," Bate said. "Because of the amount of encoding and decoding required, we have been concerned about concatenation, and therefore we have to use a fairly high bitrate."

The BBC's coverage will feature the opening game of the tournament, Germany versus Costa Rica in Munich on June 9; as well as England versus Paraguay on June 10. BBC also intends to cover Italy's opening game against Ghana.

ITV, a leading UK-based commercial network, plans to show England's games against Trinidad, Tobago, and Sweden. But if England makes it to the semifinal or final matches, these events would be seen on both the BBC as well as ITV. BBC Interactive, BBC Radio, and the BBC Sport Web site will also provide extensive coverage of every match.

ITV TOO

In early April, ITV confirmed that it will

join the terrestrial HD trial being jointly run this summer by the BBC and two popular British TV stations, Channel 4 and Channel 5. The closed trial will transmit a selection of HD content to 500 viewers living in Central London. ITV will contribute its allocation of World Cup matches alongside a range of other programming. The six-month trial requires a special test and development license and will test a range of consumer equipment to gain a better understanding of terrestrial HD broadcasting.



David Beckham (L) of England heads the ball past Simon Davies of Wales during their FIFA World Cup Qualifying football match in Cardiff last fall. England won 1-0.

SMALL BUT GROWING

According to market data provided by HBS, by the end of 2005, there were already two million HD-ready TV households in Europe, and that by 2010 there will be more than 50 million HD-ready TV sets. HBS also cites market research from Screen Digest which predicts that by 2010, more than 11 million households will be able to receive HD broadcasts on HD ready sets and set-top boxes, and approximately 100 HD channels to watch in Europe.

Claudia Kienzle

BROADCAST PARTNERS

At press time, there were 300 broadcast partners, including TV and radio stations, which had licensed the rights to televise the World Cup to their audiences in more than 200 countries, according to Joerg Polzer, manager of communications and public relations for Infront Sports & Media AG, in Zug Switzerland, one of the world's leading international sports marketing companies.

Infront Sports was contracted by FIFA to handle the worldwide marketing and sales of the broadcast rights to 2006 FIFA World Cup; as well as, to supervise the host broadcast of the games through its wholly owned subsidiary, HBS.

"At this stage, we are unable estimate the availability of HDTV programming worldwide," Polzer told TV Technology. "But the percentage of viewers who will have access to the HD feeds and who have the necessary equipment to watch in HD is still a very small number of the overall total. However, HDTV is expected to grow considerably and having a showcase opportunity using the FIFA World Cup is certain to raise awareness."

As part of the painstaking planning, HBS invited the broadcast partners to several "venue tours" where they were able to survey the sites to determine where they could place their own cameras and trucks in order to produce "unilateral" features about teams, players, and matches of interest to their own local audiences. This production was considered by HBS to be supplemental to their "multilateral" coverage.

PASSING THE HD TEST

According to Taylor, mobile HD production in Europe has come a long way in the past several years.

"In 2003, when we decided to pres-

SOCCEER, PAGE 8

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Soccer

CONTINUED FROM PAGE 6

ent the World Cup in HD, the trucks did not exist," Taylor said. "So we went to the big equipment suppliers and discussed the possibility of their actually building HD trucks by 2005, in time for us to test them—in all 16 venues of The FIFA Confederations Cup in June 2005 in Germany using 15 HD cameras—which they did, and the HD tests were successful."

Thomson Grass Valley was commissioned to provide seven HD mobile trucks, the last of which is being built now.

"Grass Valley will work directly with a number of service providers and mobile unit fabricators to oversee construction of the new all-digital, multi-format mobile production trucks in time for the 2006 World Cup," the company said in a statement.

Each truck will carry a significant number of Grass Valley products, including: one Kalypso HD Video Production Center switcher or one XtenDD HD switcher; a Trinitix digital video routing switcher and a Concerto Series multi-format routing switcher for handling SD and HD signals and a variety of Kameleon and Gecko modular products.

THE CAMERA PLAN

The Thomson trucks will also carry 17 LDK 6000 mk II HD cameras and six LDK 6200 HD slo-mo cameras. In

addition, Panasonic is providing HBS with an arsenal of 100 Mbps DVCPRO HD and 50 Mbps DVCPRO acquisition gear, including: 50 units of DVCPRO SD ENG cameras; 25 units of DVCPRO HD ENG cameras; 100 units of DVCPRO HD VTRs and 75 units of DVCPRO SD VTRs; as well as 60 cameras that record using the new DVCPRO P2 solid state memory cards (including 35 P2 HVS200 handheld units and 25 P2 shoulder ENG cameras). The P2 technology enables a



An engineer mans the production van in Köln.

streamlined, tapeless production workflow within the International Broadcast Center (IBC).

Taylor said that no wireless camera systems will be used because "they are not yet 100-percent reliable. However, we will use mini-cameras to be put in the goal cages [two in-goal cameras with one per cage], probably Iconix. Plus a mini-crane at the exit of the

tunnel to film the footballers as they enter the field of play." Cameramen will protect for the 4:3 "safe area" for audiences watching in analog or standard definition.

The multilateral camera plan calls for 25 HD cameras on each field of play, including "PlayerCams" A & B, which will be

used to follow a single player from each team during the match. Camera positions include: an elevated camera providing the main wide shot; two cameras providing low-angle super slow motion replays; two super Slo-mo cameras behind the goals;

Steadicam cameras to cover players, benches, and other action at pitch level; two elevated reverse angle cameras for Team A & B coverage; and an aerial view providing a beauty shot of the stadium and surrounding area.

ELABORATE VIDEO FEEDS

Multilateral camera signals for the official coverage will be fed to HBS' OB



Commentators line up along the sidelines in Hanover.

(Outside Broadcast) van, then on to the Technical Operations Centre. Unilateral camera signals move from the broadcast partners' cameras to their own OB vans at the venues, then on to the Technical Operations Centre (TOC).

From the TOC, signals will be relayed via fiber optics or satellite to the IBC master control room. The IBC will also include production rooms, editing suites, a videotape archive (DVCPRO HD/SD) and a quality control room. Grass Valley's Systems Group designed, delivered, and installed equipment for the IBC for the worldwide signal distribution.

From the IBC, the feeds may go via fiber optic networks or satellite to TV stations worldwide. Another innovation for this upcoming World Cup is the ability to broadcast to viewers using mobile devices and IP.

Broadcast partners at the venues and at the IBC will receive multiple feeds, including: the basic international feed; a new extended stadium feed (HD/SD); a clean stadium feed (HD/SD); the tactical feed; Playercam A & B feeds; Team A & B feeds, and the ISO cameras and beauty shots.

The IBC will add two feeds to this: the highlights feed; and the EBIF show (or Extended Basic International) feed for extended match coverage, which starts 30 minutes prior to kickoff and ends 30 minutes after the final whistle.

DEUTSCH TELEKOM

To transmit signals from cameras on the playing field to the mobile units, TOC and IBC, and ultimately, to the broadcast partners and viewers' living rooms, HBS is partnering with T-Systems, a division of Deutsche Telekom. T-Systems will provide venue contribution services; domestic contribution services (from team hotels and other public places); international contribution services; for-hire production services; and new media services.

For this mission-critical task, T-Systems' Media and Broadcast division has laid 20,000 km of new fiber optic cable to enable the transmission of uncompressed HDTV pictures. With a total data capacity of around 480 Gbps—equivalent to 7.4 million bundled ISDN lines—this network will

Stateside Coverage: HD and Commercial Free

BRISTOL, CONN.

All 64 matches of the 2006 FIFA World Cup will be offered as a simulcast on ESPN, ABC Sports, and ESPN2 in HDTV without commercial interruptions during play. All three networks will supplement the coverage provided by HBS with pre-match, half-time, and post-match features, as well as make live World Cup matches available to users of its ESPN360 broadband service.

"A multi-day, multi-telecast event like the World Cup is made to order for the combined resources of ESPN HD, ESPN2 HD, and ABC HD," said Bryan Burns, vice president of strategic business planning and development for ESPN. "Coming in the first year ever in the U.S. when more HDTVs will be sold than standard sets, the 2006 FIFA World Cup is perfectly timed for display in our country."

While the HBS feed will be provided in 1080/50i HD, the networks of ESPN HD, ESPN2 HD, and ABC HD will present them in 720/60p (720p). And originally produced "unilateral" programming will be produced in native 720p, including: 12 ABC pre-game shows; 10 World Cup Live in-between game shows; and 34 primetime World Cup Live shows on ESPN HD and ESPN2 HD. All of the World Cup program-

ming by ABC Sports and ESPN will be accompanied by 5.1 channel surround sound.

"The biggest technical challenge in covering the World Cup in HD versus SD will be converting within HD formats from 1080i to 720p," said Tim Scanlan, senior coordinating producer of ESPN's World Cup coverage. "ESPN and ABC Sports will convert the HBS feed coming into our Munich IBC at 1080/50i to 720p/60. The converter box used will be the first of its kind." Scanlan did not give any further details about the converter box or how the system would handle this complex conversion.

Scanlan said that ESPN will monitor all HBS broadcasts and add HD cameras where applicable. ESPN HD and ESPN2 HD will use the Vizrt graphics platform, and ABC Sports HD will use the Chyron Duet Hyper X graphics platform. ESPN is evaluating a variety of cutting-edge graphics elements that will be used in the

Bristol studios for analysis.

For the Spanish-speaking audience, New York-based Univision will also be a broadcast partner of the 2006 FIFA World Cup. While details were unavailable at press time, Univision issued a statement that in 2002, 35 million viewers tuned in to Univision to watch the World Cup. Of those, 15 million were non-Hispanic. In 2006,



All 64 matches will be simulcast on the ESPN360 broadband service.

Univision anticipates an estimated audience of 50 million total viewers.

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HDTV: MAKING IT HAPPEN
World Radio History

Soccer

CONTINUED FROM PAGE 8

operate on a 24/7 basis to support broadcasting to all the time zones. For redundancy, T Systems has arranged for a satellite uplink with satellite operators, such as SES ASTRA.

SURROUND SOUND

For the first time ever, the entire FIFA World Cup tournament will be made available in 5.1 channel surround sound, from the Stage 1 kickoff featuring host nation Germany vs. Costa Rica on June 9, to the popular, much-awaited final in Berlin. In 2002, the final match was watched by 1.1 billion viewers worldwide.

Dolby Laboratories in the UK is providing HBS with equipment and training that will enable the compelling 5.1 soundtracks to be created in specially constructed audio control rooms in the IBC. Dolby-E technology will be used to simplify the distribution of 5.1 audio worldwide to the broadcast partners. Dolby is also supplying equipment to individual broadcasters across Europe (whose identities could not be revealed at press time) who have chosen to feature 5.1 audio in their transmissions. Equipment typically enables Dolby-E decoding for receiving the incoming feeds from HBS, and Dolby Digital encoding to re-encode the audio for final transmission to viewers.

"Watching a football match with surround sound brings the thrill of the stadium to your home," said Francis Tellier, CEO of HBS. "And as not all of us can be there to support our own countries, hearing the cheering of the crowds and the ball kicks in enveloping surround sound is the next best thing. We are pleased to be working with Dolby to deliver this to our broadcast partners around the world."

The microphone plan calls for 18 mics placed strategically on every side of the playing field, including high-end, surround sound-optimized SoundField mics. The HBS audio production plan has been simplified to make it easier for broadcast partners to use the basic mixed audio, but those that require a more sophisticated audio selection will be able to receive the component parts within the simplified stream structure.

The basic audio feeds will be Television International Sound (TVIS), which is stereo sound that accurately reflects the on-screen visuals, featuring a mix of crowd noises, anthems, and ball-kicks. RIS (Radio International Sound) will offer ambient sounds not tied to camera visuals. These mixes will give broadcast partners the flexibility to add their own commentary and presentation to each match.

GRAPHICS

TV graphics are being produced by HBS in cooperation with FIFA and Delta

Tre Video, S.r.l., the onscreen graphics service provider. Based in Torino, Italy, Delta Tre has developed PC-based onscreen graphics systems that can animate characters, text, and backgrounds, in both 2D and 3D environments. The systems can translate data into any number of language outputs instantaneously, including Chinese; and can be fully integrated with the competition database and results system.

"We will not superimpose electronic graphics over the playing field to illustrate the action, as many sports telecasts do," Taylor said. "For editorial reasons, we have to provide FIFA with a clean, 'universally readable' coverage of the FIFA World Cup. Each broadcaster can

unilaterally use additional graphics, provided upon request by Delta Tre, in every conceivable language."

However, the multilateral onscreen graphics will present relevant statistical information about the teams, match, and players. This information includes starting line-ups, group standings, match score, substitutions, individual and team statistics, among other data.

"The World Cup graphics, which are being produced in both HD and SD, are being designed in conjunction with the opening animations to provide a consistent onscreen design package," says Taylor. "The overall HBS graphics look includes 3D graphics

and animations as part of the state of the art graphics package."

GEARING UP FOR 2010

The 2006 World Cup hasn't even started yet, but already HBS has been lined up by FIFA to serve as the host broadcaster for the 2010 FIFA World Cup in South Africa. HBS will also produce the next edition of the FIFA Confederations Cup 2009, and provide ongoing consulting services involving all other FIFA events (with the exception of the FIFA World Club Championship) to ensure the best professional solution and consistent standards for host broadcasting of FIFA's events. ■

Gambling on the World Cup

MUNICH, GERMANY

When the 2006 FIFA World Cup airs in HDTV, the world will be watching on two levels—the game action with superior picture quality and surround sound as well as broadcast history in the making.

To gain insight into this unprecedented use of HDTV on FIFA World Cup telecasts, TV Technology conducted an exclusive interview with Francis Tellier, CEO of HBS (Host Broadcast Services) who initiated the use of HD for this much-anticipated live event.

TV TECHNOLOGY: What was the greatest challenge to producing the 2006 FIFA World Cup in HD?

TELLIER: While it is now possible to offer full production in 1080/50i HD, back in 2003, when we made the decision to offer the World Cup games in HD 2003, there were plenty of problems that needed to be resolved. The technical quality was there, but key pieces of production equipment, such as super slow motion cameras, were not yet available in HD. In discussions with major equipment vendors at the NAB, I became convinced that we would be able to find solutions to every problem. I asked these big companies [such as Thomson Grass Valley, Panasonic, and Dolby] if we could count on their full cooperation and backing on this, and they assured me by saying, "HDTV is strategically extremely important to us, and the FIFA World Cup is a must-have for the broadcasters, so we will support you." So, in 2003, we made the biggest prediction ever, but today, as we approach the actual HDTV telecast, the gaps in production equipment have all been resolved.

TV TECHNOLOGY: What are the technical challenges of serving over 200 broadcast partners considering the differences in broadcast standards worldwide?

TELLIER: We have to understand and address the differences in levels of technical sophistication among our broadcast partners. Approximately 100,000 to 200,000 households in Europe have HDTV sets; one in two households in the U.K. have widescreen SDTV sets; but some regions are

still 4:3 SDTV. While all of the matches will be produced in native 16:9 HDTV, our most important feed, the EBIF show, is one we will make available in 4:3 at the IBC for satellite distribution. [The EBIF show, or Extended Basic International show, is a brand new feed for extended match coverage, which starts 30 minutes prior to kickoff and ends 30 minutes after the final whistle.]

So we are making sure that no one is going to be disadvantaged by the fact that we are producing the shows in native 16:9 HDTV and that the goals of 4:3 SDTV broadcasts are going to be met.



Francis Tellier, CEO of Host Broadcast Services

TV TECHNOLOGY: How do you feel that HDTV will be received both by the viewers and the marketplace? Will there be enough HDTV sets and set-top boxes for those that want to see it in HDTV? And, what has been the feedback of the marketplace to your HD undertaking?

TELLIER: It's clear that full HD reception is still going to be marginal especially on the world level. We're expecting an average audience of 500 million viewers for each match; but it's clear that only a few million households [in countries like the U.S., Japan, and Korea] will be watching in full HDTV. In Europe, we now have several channels that have launched in HDTV, and there's a clear indication that it's moving in that direction; and having the World Cup in HDTV will definitely be a factor [promoting that trend].

TV TECHNOLOGY: How will live graph-

ics be handled for this worldwide audience?

TELLIER: We have just posted all of the HDTV graphics on a password-protected section of our Web site so that our broadcast partners can download them for use in both on-air promotions and in their customized productions of the live events. The text will be offered in English; however, we are providing clean feeds on which our broadcast partners can superimpose their own graphics in Spanish, Japanese, or whatever language they need during the games. However, since there is no consensus among the broadcast partners as to

how to handle the live clock onscreen, we felt it would be easier for them to superimpose their own clock as opposed to trying to remove one we have put on screen. Also, we have decided to offer only relatively basic onscreen graphics, such as the score, based on what our broadcast partners felt was consensually acceptable, and give them the freedom to produce and display their own if they want more.

TV TECHNOLOGY: What are some of the unique aspects of the 2006 FIFA World Cup production?

TELLIER: With the use of Panasonic's new P2 solid-state camera technology, we will be able to keep our entire production tapeless. Our ENG crews, who will be producing "non stadium coverage" using Panasonic HD camcorders, will edit on laptops using Avid NewsCutter editing software, and transmit those files to the IBC. Everything will remain tapeless until the archive stage where World Cup footage will be recorded onto DVCPRO tape. Another unique aspect is our "Playercam A & B feeds" where we will have an HD camera dedicated to following a particular player on each opposing team, producing continuous footage of those players' performances that can be used for post match shows and analysis by our broadcast partners.

Claudia Kienzle

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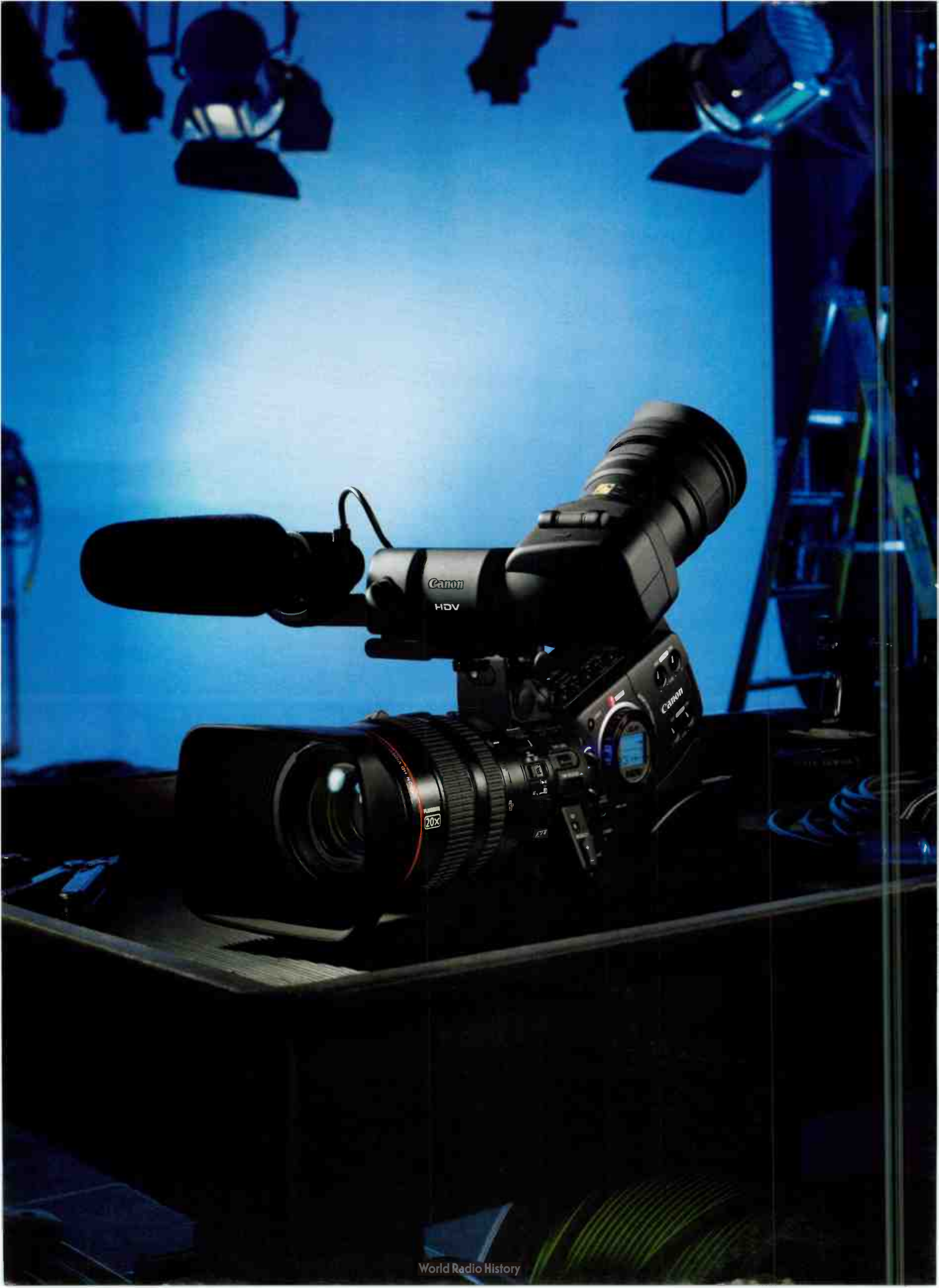
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XL H1 Genlock synchronization. The features and innovations continue as you also get Total Image Control which includes 3 color matrixes, 2 cine gammas, and adjustable: knee, black stretch, setup level, master pedestal, horizontal detail, coring, sharpness, 2 noise reductions, color gain, hue, and master color setup adjustments. Since each adjustment is individual, you can create your own custom look and store it on an SD memory card. The XL H1 delivers 1080i HD resolution, along with three different frame rates of 60i, 30 Frame and 24 Frame – so no matter what your production, the XL H1 has you covered. There's also the optional 60i / 50i Video Mode Option, which means that you can record in both NTSC and PAL. You can even take photos with the XL H1 either in video or camera color space. And in keeping with Canon's Open Architecture approach, optional CONSOLE Image Control & Storage software delivers unprecedented flexibility and versatility. Proving, of course, that the XL H1 is truly high definition's highest expression. You'll find so much more about this amazing, affordable HD camcorder at www.canondv.com.

The Perils and Pitfalls of Upgrading

Firms dodge the bullet with myriad techniques

by Susan Ashworth

SAN FRANCISCO

Like other systems on the market, the flagship archive system from Front Porch Digital—known as the DIVArchive—does exactly what it's supposed to do.

Except, unfortunately, when it can't. That's no fault of DIVA, however. In fact, DIVA, like the majority of video broadcast equipment on the market—from servers to storage to newsroom systems—has been built with zero tolerance to fault redundancy in mind. When the system is up and running, it's programmed to stay that way, around the clock.

But there's a fairly common behind-the-scenes trigger that can cause even the most reliable infrastructure in a broadcast facility to wobble and misfire.

It can happen without warning, and can be brutal to manufacturers, be it an automation manufacturer like Sundance or MicroFirst or a archive management firm like Front Porch Digital, who pride themselves on building reliable, steadfast equipment that works so well a broadcaster shouldn't even have to think about it.

But how is sturdy equipment to fare when one piece of the puzzle is removed? When a broadcast station decides to upgrade a piece of equipment—which is becoming ever-more prevalent and speedy thanks to IT-centric technologies, say experts—the smoothly running machine known as a broadcast facility backroom operates with fits and starts—or maybe doesn't even start at all.

That's one peril of working in an environment where next-generation software is always just around the corner. While broadcasters benefit from vastly shortened release times between

upgrades—which often allow the upgraded equipment to work faster and more smoothly—it can wreak havoc on companion third-party systems. Which in turn can wreak havoc on a broadcast facility itself.

Compatibility issues are a key focus for Ascent Media Systems & Technology Services, an international consulting and systems integration firm, which helps broadcasters deal with equipment roadmaps, development as well as regression testing, which ensures that installed equipment continues to have forward and backward compatibility.

"Many broadcasters have 30 different product deployments," said Stavros Hilaris, senior vice president of technology with Ascent Media Systems & Technology Services. "But one change, if not properly tested, can cause problems in the field."

BROADCAST CHAIN

Even though a kink in the behind-the-scenes system isn't necessarily the fault of any one system, if one part of the broadcast chain isn't working, customers tend to get a tad frantic.

"Equipment like nonlinear editing systems are very exposed," with operators working on them all day, said Brian Campanotti, chief technology officer for Front Porch Digital, a digital archive management company based in Ft.



Brian Campanotti, chief technology officer, Front Porch Digital

Laurel, N.J. "A solution like ours sits in the backroom and when it's working well, no one knows it's there. That's how it ought to be."

Front Porch Digital's DIVArchive, for example, is designed to unify a whole host of broadcast video equipment, from servers and NLEs to newsroom systems, and tie it all together with a storage component. The storage system connects with a variety of equipment "workflow silos," as they're known, and from there the DIVArchive stores content or restores media as needed.

It all works just as planned, until an unknown kink in the system appears, such as new third-party hardware or software upgrades.

To minimize this issue, Front Porch Digital invests heavily in the R&D surrounding a release of its solutions. The company brings companion equipment into its facility—from servers to editing systems—"to facilitate development work" so that all pieces fit together smoothly, Campanotti.

Irving, Texas-based Sundance Digital takes a similar approach. "As an automation vendor, we have mission critical equipment," said Robert Johnson, president of Sundance, "so a big part of our quality assurance department is to make sure that our solution interfaces properly to other systems by running tests in our labs on servers and other equipment."

How do equipment developers go about ensuring that a broadcaster stays up and running when third-party developers release a software or hardware upgrade—and neglect to inform other manufacturers?

REMOTE CONTROL

Front Porch Digital, for example, is one firm that has designed a system that allows the company to remotely check-in to a far-away locale. "We

connect in through a secure environment to make sure everything is working well," Campanotti said. And this is where IT technologies have become a real boon to the industry. Using a basic dial-up connection or a VPN line, companies like Front Porch Digital can download patches and make upgrades, around the clock, all without setting foot in the facility itself.

Johnson gives the example of a firm in Asia that needed to immediately upgrade their software. "It was done overnight, just as if we had been there," he said. "IT technologies allow us to get to work wherever; it doesn't if it's Hong Kong or Des Moines."

With the IT-based IP infrastructure developed for use by the automation firm MicroFirst, "the user may operate, monitor, upgrade and diagnose the entire system, whether the system is local or hundreds of miles away," said Jerry Berger, vice president and general manager of MicroFirst, an Oakland, N.J.-based automation vendor.

MicroFirst has developed an architecture that has no single point of failure for database management, device control or automation processing, all in an effort to ensure that the equipment works seamlessly within a facility, said Berger.

"When one of the third-party products are upgraded, the upgraded system may be tested on a back-up redundant system before being put on the primary air channel," in an effort to ensure that everything is working properly, he said.

The true key to solving incompatibility dilemmas before they start, said Hilaris with Ascent Media Systems, is more planning in the beginning and upgrading only as needed. "You can do all the designs on paper, but until you do interoperability testing, you can encounter problems." ■

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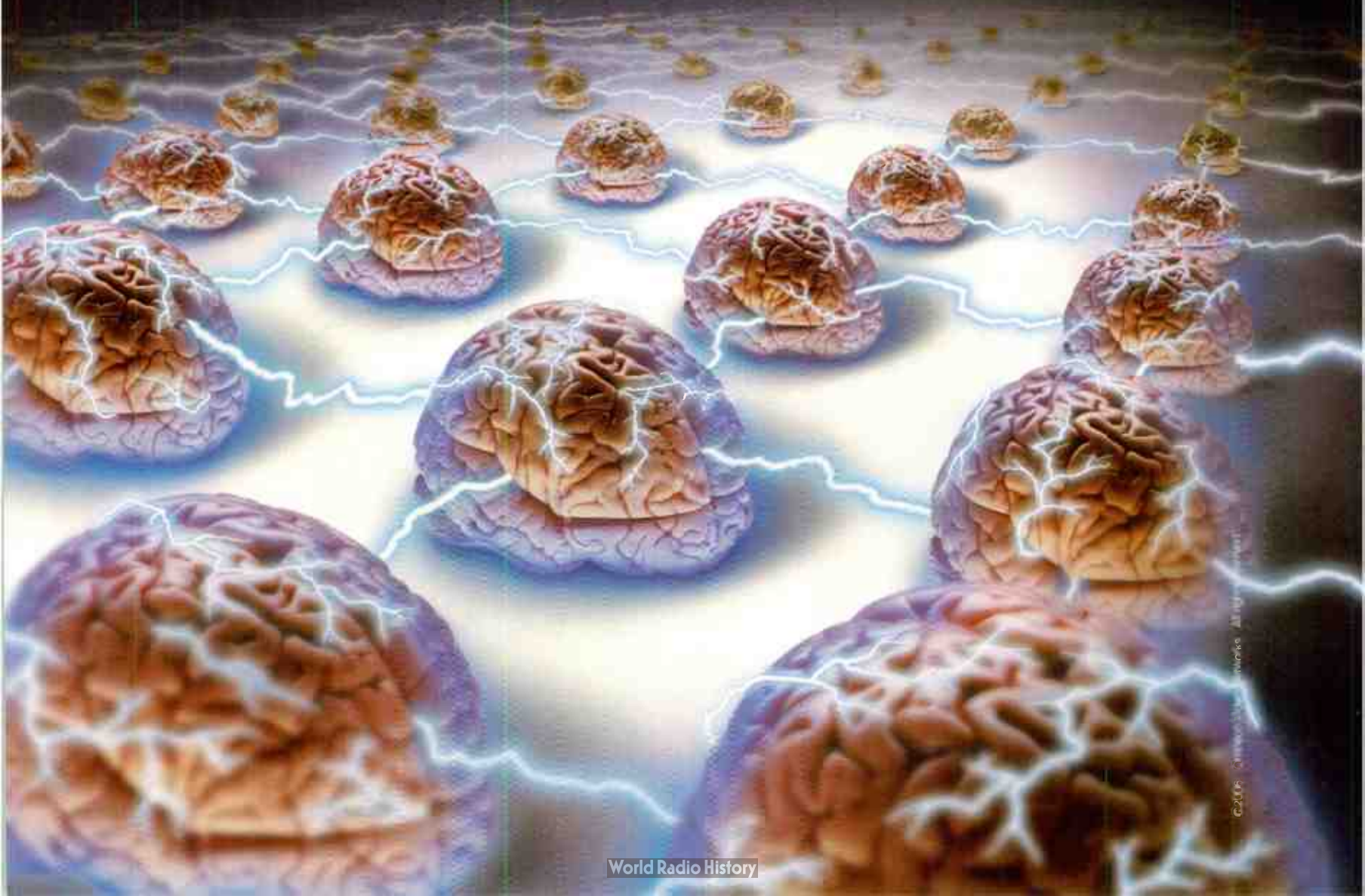
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Simple, Fast and Portable

Reuters, AP provide electronic news solutions

by Robin Berger

LOS ANGELES

The invasion of Iraq in 2003 forced reporters to become one-person news operations, as required by a military fiat for embeds.

"You had to be able to carry everything you needed for one week without assistance," said Julian Wells, Visuals Services Owner, Content Technical Services, EMEA for Reuters. "This led to a radical rethink of the camera and editor solution."

Since then, news organizations have been taking lessons learned from the Iraq experience and incorporating them into their own operations here at home.

REUTERS

Today, Reuters kits include a Sony DSR-PD170 camcorder, Canopus DV converter box, and Sony VAIO laptop with Livewire Connections' IP-Reporter software and Reuters FTP Suite. Canopus' Let's EDIT2 realtime editing software replaced the original Let's EDIT package; IBM laptops are replacing the Sony VAIO models, and Sony HVR-Z1Es are destined to become the cameras of choice.

Within the hand carry allowance of most airlines (briefcase-sized at less than 70 pounds), the kit is compatible with "any Internet connection available," according to Wells, who designed the Light News Gathering unit with Reuters camera op Bart Noonan.

"I chose a laptop that looked fit for [the] purpose, then bought a selection of software and sat down and asked myself, 'is this simple, easy-to-use, not too expensive, and could it be given to anyone without any formal training?'" Wells said, in explaining the development process. "The kits allow

more rapid deployment, lower delivery cost."

Wells would not elaborate on the savings, and he declined to estimate how many one-person operations Reuters had worldwide. Instead, he emphasized anecdotally the notable increase in Reuters' ability to cover stories.

"Crews now file regularly from



AP reporter Haven Daley uses SNAPfeed to file a story from Waikiki.

regions where our previous form of delivery was either a hand-carry or very expensive and unstable satellite feed," said Wells. "Our stringer network across Africa provides on-the-day coverage of events in places like Liberia, Sierra Leone, and the Democratic Republic of Congo. Reuters has also used the LNG gear to increase coverage of sporting events, such as Champions League football."

AP

The Iraq war was also the launch pad for AP's SNAPfeed, a store-and-forward software application that lets journalists transmit news video from remote locations using Windows Media 9.

Ross Simpson, a 50-year old AP

radio reporter, who was embedded with the Marines as they marched to Baghdad, was the first to use SNAPfeed to file video reports.

"Our goal was to make this as simple as possible," said Mike Palmer, director of video technology & strategy for AP, who headed up SNAPfeed's development and deployment. "Ross isn't really a technical guy—he certainly is not a TV guy."

About six months later, AP made SNAPfeed available to its ENPS (Electronic News Production System) customers. Today a "half dozen large customers" use it, said Palmer.

In addition

as it is being transmitted without leaving their desks. Reporters can use a 3G (CDMA or GPRS), WiFi, or satellite phone connection to transmit.

AP's transmission protocol also deftly accommodates interruption.

"If your transmission is interrupted for any reason, it can be resumed at any time from any kind of connection, Palmer said. "You can start it in your car with your mobile phone and finish it from Starbucks or your hotel. You can interrupt it if you have more important news coming through—and then come back and resume [transmission of] your feature story."

Last November, AP added H.263 low latency live to the mix, enabling IFB on the same circuit, thus providing the producer feedback necessary for live feeds without the need for two telephone lines.

Like Reuters' Wells, AP's Palmer believes the greatest virtue of the new system is its ability to expand coverage, though financial savings is another plus.

"Crews now file regularly from regions where our previous form of delivery was either a hand-carry or very expensive and unstable satellite feed."

—Julian Wells, Reuters

to simplicity, the solution distinctly addresses the status of a feed (initiation, percentage of completion). Newsroom personnel can watch a feed

"[It's] the cost of a data connection from Starbucks [vs. satellite] feeds that are \$150 to \$250 a pop—even more if you have an international



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A Reuters newsfeed setup in Davos, Switzerland

story," he said. "International windows are upwards of \$500."

KITS VARY

Richard Matthews, an AP staff reporter and veteran cameraman who covers the southwestern United States, said his 80 pounds of gear includes a Sony HVR-Z1U, Sony VAIO (VGN-AX570G model with Verizon and Sierra air cards and wireless internal modem), plus three mics, a tripod, extra deck, audio mixer, hundreds of yards of cable, rain gear, cases, and a 400-W inverter to plug into his car's cigarette lighter to recharge the laptop.

Yula Rocha, a petite camera novice who has been transmitting video reports from New York for Brazil's SBT (Sistema Brasileiro de Televisão) since September 2005, has a much simpler

set up: a Sony DSR-PD170, Toshiba laptop (Tecra A3), wireless mic, tripod (rarely used) and batteries.

"I don't take my computer everywhere, only if I have a strict deadline," she said.

They both said it took four clicks and about 15 minutes to file their reports (about 1:30), which they've been able to do from parking lots, parks in WiFi zones, home, a museum, and other sites.

TRANSMISSION UPGRADES

In March, AP joined with Sprint in offering an upgrade that allows journalists equipped with SNAPfeed, a laptop, compatible camera and Sprint Mobile Broadband Connection card to send 60 seconds of breaking news quality video back to their broadcast newsroom in less than 10 minutes."

Sprint will soon introduce EV-DO Revision A, which will significantly improve these upload speeds: six to 10 times as fast, according to David Deady, product manager, mobile broadband for Sprint Nextel.

"We'll be launching the EV-DO RevA [backward-compatible] devices in the third quarter, and in the first quarter 2007 we'll launch the actual services," said Deady. "We should be covering over 150 million people by that first quarter 2007."

AP and Reuters are also testing their respective systems with Inmarsat's new BGAN (Broadband Global Area Network) service (see "BGAN Cuts Streaming Down to Size," *TV Technology*, April 12, 2006). Inmarsat claims it can connect at "a half a megabit per second." ■

Telestream Delivers the News

NEVADA CITY, CALIF.

Telestream offers alternatives to delivering news from the field via microwave. For example, Reuters uses Telestream's ClipMail Express and Pro systems for global intra-bureau transfers, according to Ian McSpadden, Manager, Television News Infrastructure and Operations, Americas, at Reuters International Broadcast Center in Washington, D.C.

Telestream's field-to-newsroom package, "Launch," (introduced at NAB2005 as MAPone), went on the market last summer. Retailing at \$495, the file-based software installs on a video editing laptop system, and can send back a one-minute clip via the Internet in "about 10 minutes," according to Telestream spokesperson Janet Swift.

KPRC Houston recently deployed the Launch IP media delivery software on Dell laptops loaded with Grass Valley's NewsEdit LT nonlinear news editing software to crews outfitted with Sony XDCAM digital camcorders.

The media files are transferred from the XDCAM via FireWire to NewsEdit. Once

the piece is edited, it can be saved in a native Vibrant format or as an AVI file, and sent to Launch, which transcodes the media into a broadcast-quality Windows Media 9 file format.

To transmit the footage, the photographer simply hooks up the laptop to an Internet connection. The media files are received at the station by Telestream's FlipFactory, which automatically ingests and transfers the files to a Grass Valley K2 media server,



Telestream's Launch field-to-newsroom package

where content is immediately accessible by any of the station's newsroom NewsEdit SC and XT editing systems.

Robin Berger

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Monitoring 5.1 Surround Sound

Factors include speaker placement, symmetry and room size



by Mary C. Gruszka

NEW YORK

Accurately monitoring 5.1 surround sound involves more than just adding four more loudspeakers to a stereo system.

Creating a successful 5.1 critical monitoring environment involves the right synergistic combination of such key elements as the room (location, dimensions, construction), acoustical treatment, noise control, loudspeakers (type, placement, mounting), electronic equipment, furniture, and more. Let's concentrate here on loudspeaker placement and some aspects of room design. It may sound obvious, but the room needs to be large enough to comfortably accommodate all the gear and people who need to work in it.

What is the size of the mixing console? Mixing consoles for 5.1 can be rather large. What outboard processing and patching is needed? How much work surface is needed for controllers, computer display monitors (for the audio console, digital audio workstations, other computers), telephone, keyboard/mouse, and even for the audio mixer's notes?

Don't forget an HDTV display or projector and screen, and of course, the five loudspeakers plus the subwoofer.

SPEAKER PLACEMENT

A good guide for loudspeaker placement, critical listening position, and room dimensions is offered by the International Telecommunications Union (ITU) Radiocommunications Assembly in the documents ITU-R BS.775-1 and ITU-R BS.1116-1.

The recommendations suggest placing the five loudspeakers (front left, center, right, and rear surround left and right) around the circumference of an imaginary circle at specific locations, with the key listening position in the center of this circle. The recommended radius of the circle (or the distance from the key listener to the loudspeakers) is

between 6.5 to 13 feet.

The center loudspeaker is placed along the centerline of the room aimed directly at the key listening position. (This is the 0 degree reference line.) The front left and right speakers are positioned 30 degrees on either side of this reference line (to the left and right of the center loudspeaker).

The ITU guidelines give a little more leeway in positioning the rear left and right loudspeakers as they suggest placement anywhere from 100 degrees to 120 degrees from the reference line. In the literature, 110 degrees seems to be a common starting point, but some designs have placed the rear surround loudspeakers at 125 degrees.

Since the loudspeakers are all at the same distance to the key listener, the sound emanating from each should reach the listener's ears at the same time. This is one important factor for properly perceiving which direction sound is coming from, something you'd want for 5.1 mixing.

Real room design involves compromise, and the ideal isn't always practical. The center loudspeaker may have to be placed above or below the front video monitor or screen. All the front loudspeakers may have to be placed in a straight line rather than along the circumference of the circle. In these types of cases, sound arrival times to the listener won't be the same from each loudspeaker. Audio signal delays in the shorter acoustical monitor paths are helpful to correct this.

It should go without saying—but it's surprising how many times this doesn't happen—that loudspeakers should be aimed at the listener's ears. The ITU guidelines also recommend that the acoustical axis of the loudspeakers should be positioned at the same vertical height as ear level, defined as 4 feet above the floor for a person seated.

This leaves some room open for manipulation for optimum response. How is the acoustical axis defined for each loudspeaker? Acoustical axis is not necessarily the geometric center of the loudspeaker box, and usually isn't. Other factors to take into account are: how large the loudspeakers are, their directional characteristics (polar pattern), and the method of mounting them.

Large loudspeakers with large bass drivers may need to be placed higher above the floor to avoid detrimental acoustic cancellations at the lower frequencies due to the interaction between the direct sound and the reflections from the floor. If this is the case, then check where the higher frequency drivers are aimed. The loudspeaker unit may now need to be tilted so that the listener is on-

axis with the mid- and high-frequency drivers. Tilt angles, if needed shouldn't be too severe, no more than 15 degrees.

Moving on to the sixth loudspeaker, the low frequency subwoofer or .1 channel of the 5.1 mix. This unit doesn't necessarily need to be placed around the circumference of the circle. A single subwoofer is typically placed on the floor against the wall in the center of the room, or nearly so. It is sometimes placed in the corner of a room.

Genelec, the monitor loudspeaker manufacturer, recommends a distance of less than 3 feet between a subwoofer (set for the reproduction of low frequencies 85 Hz and below) and a wall that provides part of the low frequency loading.

How the loudspeakers are mounted within the room affect not only room size, but factors like room geometry, surface construction, and acoustical treatment.

Loudspeakers can be flush mounted into the walls, mounted on or near the walls, or positioned some distance (3-1/2 to 4 feet) away from the wall. The last option takes up the most room.

SYMMETRY

Symmetry around the critical listening position is very important for accurate surround sound reproduction.

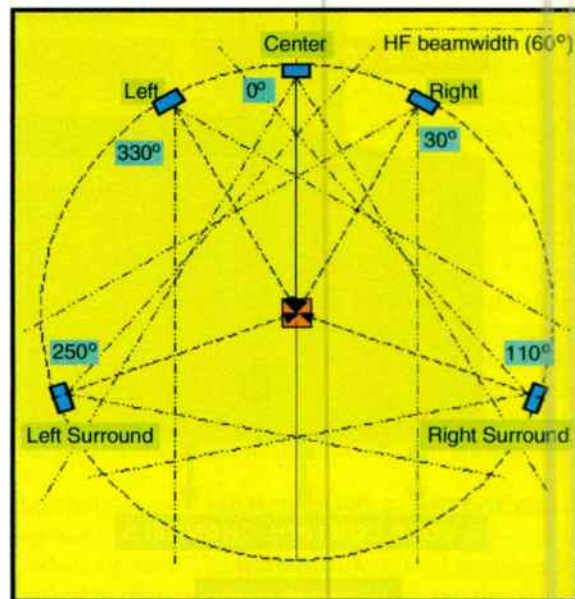
The loudspeaker positioning as recommended by the ITU is symmetrical around the key listener. The five loudspeakers themselves should be the same and of good quality designed for professional use. (What constitutes a good quality loudspeaker is a topic for another article.) However, smaller-sized rear loudspeakers, ideally from the same family of products as the larger ones, are often used due to space considerations. Their mounting may differ from the front speakers as well, and they may also need to be tilted toward the key listener.

The room dimensions and shape should also be symmetrical. So should the acoustical treatment of the room, and the shape, size, positioning, acoustical properties of room furniture, cabinets, rack consoles, etc.

Room dimensions should not be integer multiples of each other (or even close

to integer multiples) to avoid a bumpy low frequency response inside the room due to standing waves reinforcing each other rather than being more spread out.

A review of the literature gives some



ITU's recommended layout for 5-channel surround scheme. The subwoofer is not included here. (From the book "Total Recording," by Dave Moulton, KIQ Productions.)

guidelines.

Where W=width (smaller floor dimension), L=length (longer floor dimension), and H=height of room:
 $1.1W/H \leq L/H \leq 4.5W/H - 4$
 $L/H < 3$ and $W/H < 3$

At the same time, the room floor area should be greater than 320 square feet, and the total room volume less than 10,500 cubic feet.

As you work through the calculations, you will probably find the need for ceiling heights greater than 8 feet.

Some other tips regarding the room: avoid parallel surfaces, through room geometry and with acoustic treatment; and avoid early reflections from wall, ceiling, floor, console and other surfaces to the key listening position.

Another factor to consider is the "back deck" or the producer's seating area. Modifications to the ITU loudspeaker positioning recommendations may have to be made to accommodate the listening needs for people working in this area of the room.

This brief discussion shows that successful audio control room design is not a cookie cutter process. There are myriad intricate interactions among all the elements, and good designs find the best-fit solutions for each particular case, user goals, and applications. ■

Mary C. Gruszka is a professional audio engineer who also pens the monthly "Audio By Design" column for TV Technology.

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Thomson Opens Innovation Center

Burbank lab focuses on digital rights management, imaging and workflows

by Robin Berger

BURBANK, CALIF.

Thomson's technology division recently launched its Innovation Center here, surrounded by production studios, to showcase the company's research and products. CTO Jean-Charles Hourcade insisted it is not a demo center, but a "working tool."

"It's the front end of our organization," he said. "These guys here have a dual mission—we need people locally who can interact with our customers."

Hourcade explained that customers wanted more input into Thomson's product development, something neither the NAB and NCTA events nor company promotion junkets could provide.

"We need more interaction to allow our biggest customers to tweak parameters," he said.

The Innovation Center is the latest in what will be eight working research labs around the world, said Nicholas de Wolff, vice president of communications, SBU Technology, (the eighth will open in Paris later this year). The other six facilities are in Princeton, N.J., Indianapolis, Rennes, France and Beijing, plus Hanover and Villingen, Germany. These entities tackle six prime technology domains: compression, security, networking and communications, storage and recording, imaging, and signal acquisition and

processing.

High on Hourcade's radar screen are digital color and picture quality management, content security, workflow tools (storage, computation, bandwidth), and compression (particularly the next generation of integrated circuits for decoders).

Onboard in Burbank, said Hourcade, are experts in video compression, content security, signal processing, production and post-production workflows and meta-

content at various compression and bit rates to compare quality under different parameters. There are also consumer screens that the crew controls with "a very high level of precision" (based on proprietary processing algorithms), to simulate pro and con-



Thomson contrasts original footage with a pirated version tagged with a work-in-progress technology identified to date as "AntiCam."

data, as well as IT techs for bandwidth storage. Teams are also working on 3D stereoscopic vision cinema and film marking.

COMFORT ZONES

"To get the right people together at the right time," said Hourcade, "you need a minimum level of infrastructure."

The center's viewing room is equipped with a server that can stream

consumer displays that exist today as well as those that will exist in the future, thanks to the company's consumer division and technical partners, Hourcade said.

This setup was used, among other instances, to demonstrate Thomson's work on the Moving Pictures

Experts Group's Scalable Video Coding standard. MPEG SVC would outline the recommended way to generate a bit-stream hierarchically to optimize bandwidth. The successive layers of the hierarchy would correspond to image quality, frame rate and picture size.

A white paper written by members of Thomson's Corporate Research R&D Video Compression Lab compared MPEG SVC to non-scalable technologies like MPEG-2 and MPEG-4 AVC,

which require encoding and delivery at different bit rates, plus transrating to cope with the bandwidth requirements for various content. They concluded that SVC was more seamless and less costly because it enabled the encoding process to be decoupled from the streaming, thereby saving storage space (thus bandwidth) and facilitating management.

SECURITY APPS

Thomson's Digital Presentation Suite (demo room) features various interactive screens that can be accessed via hand held devices.

"We architected the space so that we can have workshops around different demonstrations," said Hourcade.

For example, one can call up a forensic watermarking demonstration originally made for a November 2005 private industry viewing. The process embeds a virtual barcode in visible images on each frame without distorting the images. The barcode would include a theater projection server's identifier, plus time and date stamps.

"We're in the business of mitigating piracy—making it as difficult as possible for a person to commit piracy," said de Wolff.

In addition to the monitoring method described above, the center has a work-in-progress AntiCam solution also targeted at digital cinema pirates. It works on the premise that the camcorder is a sampling device and the human eye is not. As such, it inserts images modulated at high speed (48 Hz or more) into red and green areas, which mars pirated copies with a violation label.

Thomson also has a digital rights management suite called "NexGuard" which blocks, dissuades and identifies "leakages." Targeted at studios, post-production houses and other broadcast markets, NexGuard includes "watermarking, encryption, controlled access and forensic data solutions that manage and secure the storage, transfer and viewing of digital content," according to the company. The system was slated to debut at NAB 2006. ■



The Innovation Center demo room

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Avoiding the 'Napsterization' of Video

Online video download services raise copyright concerns

by Ken Freed

DENVER

As video download services like Movielink.com and peer-to-peer video file sharing services like YouTube.com and Tribler.com gain traction, concerns about copyright protection continue to arise. Yet these new technologies may shape the future of television, experts say.

"The fact TV content can now be made available over the Internet in various new business models has been a really important breakthrough," said John Ramo, CEO of MovieLink, a joint venture of Metro-Goldwyn-Mayer, Paramount Pictures, Sony Pictures Entertainment, Universal Studios, and Warner Bros. Last month, Movielink April 4 announced an expansion of its online video rental service with a new download-to-own service.

The Movielink download-to-own service debuted with the release of 75 titles, including Sony Studio's "Memoirs of a Geisha," and "Spider-Man 2." Universal Studios' Academy Award-winning "Brokeback Mountain" was released the same day the DVD hit retail. A week later, Movielink released Sony Pictures' "Fun with Dick and Jane." Other Movielink offerings this year will include "King Kong," "Good Night and Good Luck," "Pride and Prejudice," "Harry Potter and the Goblet of Fire," and "Walk the Line." Classic titles being released include

"East of Eden," "The Sting," "To Kill a Mockingbird" and "Breakfast at Tiffany's."

NOT FOR APPLE

Movielink's rental service uses both the Microsoft DRM and Real Networks DRM for the Windows Media Player, said Bryan Spaulding, senior vice president of architecture for Movielink and one of the founding team members when the company was incubated by Sony. "It all boils down to market



Bryan Spaulding, senior vice president of technology, Movielink

share," Spaulding said. "The Windows DRM simply is not Macintosh-compatible, and Real Networks has not been able to justify making the move over to the Mac for their DRM solution."

Apple is now selling video down-

loads of selected television shows from the iTunes Web site Spaulding said, "but Apple traditionally makes most of its money selling hardware, like their new video iPod. If Apple continues that strategy, then the onus is on them to develop cross-platform technology that would allow us to download video to their systems."

"While the Movielink service relies on the Windows DRM," said David Cook, chief operating officer of CinemaNow, "the rest of the infrastructure was built in-house."

CinemaNow partners with Movielink to provide licensed video-on-demand content for downloading and streaming from a digital library of more than 4,000 new and classic movies, TV programs, music concerts, and music videos from 20th Century Fox, ABC News, Disney, HDNet, Lionsgate, MGM, Miramax, NBC Universal, Sony, Sundance



The Movielink Web site

Channel, Warner Bros., and more than 250 other licensors. The backers of CinemaNow include Menlo Ventures, Lionsgate, Microsoft, Cisco Systems, and Blockbuster.

"We are extending our existing 24-hour rental model by actually selling the content online," Cook said. Downloaded video can be viewed on a PC, transferred for backup to a DVD disk (in Windows Media format), or streamed around the home network.

PROTECTING CONTENT

The system has restrictions to avert piracy, said Spaulding. The Windows DRM encrypts code into the video that prevents it from being played on any other device except for the one computer initially downloading the video. The backup DVD disk will not work on the household DVD player. The only way downloaded content can be viewed on the home television screen is by attaching that authorized PC to the TV over the home network.

"We at Movielink are focused on getting our content to the TV," Spaulding added. "This is why we're pursuing a solution where the burned disk will be transcoded into a format that can play on any legacy DVD player. There are a lot of legal issues that need to be resolved for this to get a green light, but what we've developed so far will play back on most major brands of DVD players,

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although not all of the players on the market have been vetted."

Controlled licensing is relatively easy within a walled-garden download service, but protecting copyright is much harder within an online peer-to-peer (P2P) video file sharing community like YouTube.com or Europe's new Tribler.com system. Hollywood is worried that P2P video file sharing will enable the same copyright infringements against movie and television producers as the early Napster P2P software enabled against music producers.

"YouTube is committed to upholding copyholders rights," said Julie Supan, senior marketing director for YouTube. "We do this by complying with the DMCA [Digital Millennium Copyright Act of 1998] and removing videos when we have knowledge that they are posted by users without permission of the copyright owners. This is what the law requires of us."

She adds that YouTube has developed a number of internal tools "to help us identify unauthorized videos on site. With 35,000 videos uploaded to our site per day, we clearly need content owners to cooperate and alert us about any unauthorized content."

Because YouTube streams video through a Web browser, she said, "DRM is not directly applicable. DRM is really only necessary if the content is being physically downloaded."

Yet DRM does have a role in the new European P2P system called "Tribler," (pronounced "try-bler").

"Tribler builds on the open source BitTorrent file-sharing principles for distributing very large software and media files," said Dr. Johan Pouwelse, senior researcher of distributed systems at Delft University of Technology in the Netherlands, part of the consortium developing Tribler. "We're creating the third generation of P2P technology."

Unlike movie download services that deliver video from centralized file servers, "Tribler slices up file downloads among all those on the P2P network who have a given file on their computer," Pouwelse said. "By using shared processing power to barter blocks of a given file among many computers, you get much faster download speeds."

Tribler uses Windows DRM for all video content licensed under Creative Commons agreements, said Syb Groeneveld, a board member of KnowledgeLand.org, an independent think tank in Amsterdam. Creative Commons is a San Francisco-based non-profit organization that offers free licenses to protect multimedia content on the Web.

Pouwelse said his consortium is working on cross-platform DRM software. Meanwhile, a Windows XP interface is now available at Tribler.com. The Linux and Mac OS X versions of the Tribler P2P interface

should be available at the site by press time.

To detect content piracy under Creative Commons licenses, said Pouwelse, "Tribler is fully transparent, so the network instantly displays the IP number and geographic location of every computer uploading or downloading a file." He concedes that this means policing copyright infringements after the fact, but he points to

piracy arrests across Europe to affirm the deterrent value of Tribler's transparency.

"What we foresee," said Groeneveld, "is an open-source network combining licensed content from broadcasters and film producers, like the In2movies service from Warner Brothers Home Entertainment, with a P2P environment offering diverse original video from

independent producers worldwide."

"I firmly believe that P2P technology is the most cost-efficient way to deliver video content to the masses," said Pouwelse. "This is why P2P and services like YouTube represent the future of HD television. I have to wonder if American broadcasters are wasting their money building over-the-air facilities when the next generation of television is already here." ■

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NET SOUP

Frank Beacham

News at the Crossroads of Multimedia

About the same time television news sold its soul to the devil, a savvy Internet innovator was standing at the crossroads to salvage the wreckage. Ironically, it was a newspaper—not a television broadcaster—that created what may become an Internet “game changer” in multimedia information storytelling.

Why I am not surprised that an ink-stained “dinosaur” transformed video newsgathering to diamonds from rust? Perhaps because they have the stronger instinct to reinvent themselves and survive in a rapidly changing new media environment.

In order to fully appreciate the recent “major overhaul” of The New York Times Web site, one has to experience it for a few days. After that, it becomes addictive and hard to turn back. What’s at work here is not so much revolution, but extremely intelligent evolution. The new pages have a clean, slick, easy-to-read look and feel, improved navigation, and a hunch of ways to personalize interests.

But, the killer feature is how the Web designers at The Times took TV news, stripped it of annoying banality, and integrated it seamlessly into a very coherent multimedia presentation.

Just as a key instrument serves an orchestra, the video resides with text, still images, graphics, and spoken word audio to make up a palette of choices for the storyteller.

When well executed, the components of this palette are used as needed to communicate the information at hand. Video is shown only when it serves the story. Perhaps a photo, or a slide show works better. Or, maybe just text. The creators can pick the best tool for the job.

Unlike TV news, there’s no video for video’s sake. Video is not necessary to break away for visual relief from Ken and Barbie behind a studio desk. Those live “stand-uppers” just to show off technology become embarrassingly irrelevant.

A wonderful irony is that The New York Times site went online just as the fake TV news scandal erupted. It was if a torch had been passed. Just as one of the most shameful periods in the history of broadcast news began, the

Internet proclaimed to the public: “you don’t have to take it anymore.”

By now, it’s no secret that the Center for Media Democracy and Free Press exposed, after a 10-month investigation, an epidemic of fake news infiltrating local television broadcasts across country.

Scores of local stations have apparently slipped commercial “video news releases,” or VNRs, into regular news programming without telling viewers. The groups identified 77 television sta-

tions actively disguising sponsored content from companies including General Motors, Intel, Pfizer and Capital One to make it look like their own reporting.

Once again, the FCC got left in the dust. While the corporate media moguls beg the commissioners to allow the merger of TV stations and newspapers, one could easily argue that newspapers like The Times don’t need any advice from TV news directors.

CRICKEY, MATE!

As perhaps the best new thinkers in television news today, The Times Web news team is doing just fine without the local blow-dried anchor teams.

Having grown up professionally in the early days of TV news, I find the fake news practices outrageous. However, just as bad, in my opinion, are the “product integration” tactics

CROSSROADS, PAGE 27



TECHNOLOGY CORNER

Randy Hoffner

The Next Step in HDTV: Super Hi-Vision

Those who have been involved in the television industry for a while might remember that the first HDTV system to be commercialized was the Hi-Vision system.

Hi-Vision was pioneered by the Japanese broadcasting organization NHK, in cooperation with Japanese television equipment industries, and we first saw it in the United States around 1980. Hi-Vision began life as an analog HDTV system, but we are now well into the digital television era, and HDTV has come a long way since 1980.

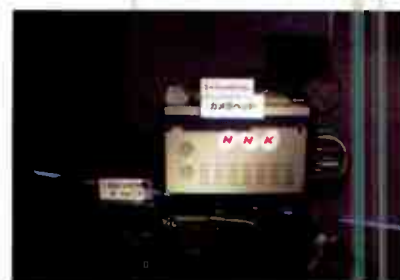
SUPER HI-VISION

Now that HDTV has become a matter of daily routine for broadcasters, NHK’s Science and Technical

Research Laboratories has taken another leap by developing an experimental ultrahigh-definition video system called, logically, Super Hi-Vision.

The experimental Super Hi-Vision system was demonstrated in a Super Hi-Vision Theater over the course of several months at the 2005 World Exposition in Aichi, Japan. Let’s see what Super Hi-Vision is all about.

The original Hi-Vision video system was a 60 field per second (30 fps) interlaced system that scanned 1,035 active lines and had an aspect ratio of 15:9. This scanning structure evolved into the digital 1920x1080 scanning format which has an aspect ratio of 16:9, and which we



An early Super Hi-Vision camera

encounter frequently today in broadcast as 1920x1080i/59.94 fps, and in production and post production as 1920x1080p/24 (23.99) fps. The Super Hi-Vision system has 4,320 active lines, with 7,680 horizontal

HI-VISION, PAGE 33

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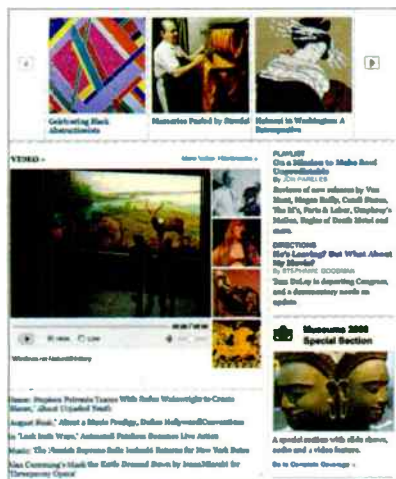
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HAMLET
EXCELLENCE IN VISION

Crossroads

CONTINUED FROM PAGE 26



The killer feature is how the Web designers at The Times took TV news, stripped it of annoying banality, and integrated it seamlessly into a very coherent multimedia presentation.

now being used by KRON, Channel 4, in San Francisco.

The station, according to a San Francisco Chronicle report, aired a five-day series of segments called "Australia Week" in its morning newscasts during March. The segments, totaling three hours, were no more than paid tourism ads.

Tourism Australia, the government body that promotes tourist travel, paid an undisclosed amount to KRON for advertising during the news programs. Also included in the deal was the airfare of six KRON reporters and their food and lodging expenses.

"We're appalled," said one staffer who declined to be named told the newspaper. "We essentially let the government of Australia become our news directors."

What was worse was the defense of the tactic by Mark Antonitis, KRON's general manager. Calling business "bad," he accepted the tactic as necessary. "...you have to be creative and do things you might have found difficult in the past," he said, admitting he is looking for new ways to make money including charging "product integra-

tion fees" for news.

It's no wonder that broadcasters are in trouble. At a time when their original mission of network program distribution is evaporating, logic would hold that stations should enhance their local news coverage. Yet, many stations seem intent on trivializing and weakening what is their best product and strongest long-term franchise.

Hopefully, the promised FCC

investigation into fake news will result in some stiff fines and loss of licenses. Little else will prod broadcasters into cleaning up their acts. The use of the public's airwaves to deceive viewers is the real indecency in broadcasting.

I don't understand what seems to be a "death wish" from many stations, but I do believe the demand for unbiased, quality news and information programming will always be with us.

Unfortunately, at least for now, that public trust is gone from TV news. It must now be re-earned.

Fortunately, others are filling the void. We have the Internet and a few good creative people—like The Times—who are reinventing the medium. That, folks, is the good news.

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

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MEDIA SERVER TECHNOLOGY **Karl Paulsen**

The Elements of Grid Computing for Storage

Server clustering, when two or more servers collectively increase computation performance and provide failover protection, is yet another principle in computing technologies. Clustering allows a group of servers—individually called “nodes”—to appear as a single entity, with any one server capable of picking up where any other server left off during a failure. Mission-critical applications, as in transactional operations or SQL-databases, use clustering to ensure that little or no downtime occurs.

Sometimes called “virtualization,” clustering gives the appearance of one

scattered about geographically.

Grid computing can scale from very simple to extremely complex. In its simpler form, grid computing harnesses many small chunks of CPU idle time from many computers, then collectively assigns each CPU a tiny element of a large computationally intense problem. These parallel processing applications combine many small computational elements and in turn, generate a much larger set of processing power.

A node in a mesh of grid computers may be as simple as the common home PC, which typically has a huge abundance of idle time. One can see how

continues en masse today.

SETI was not the first arrangement of its kind, nor does it use the capabilities of current grid computing systems; many others have employed the concepts to do drug research for cancer, mathematics and even climate modeling. Home users can search for SETI@home, and install the application on their own PCs to experience how grid computing works—and it makes for a great screen saver, too.

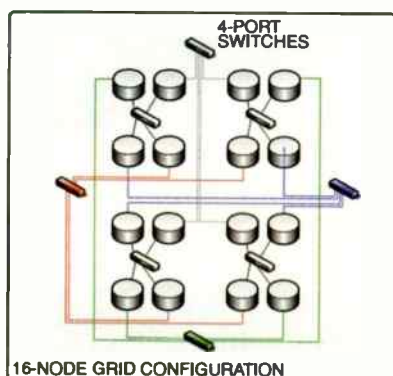
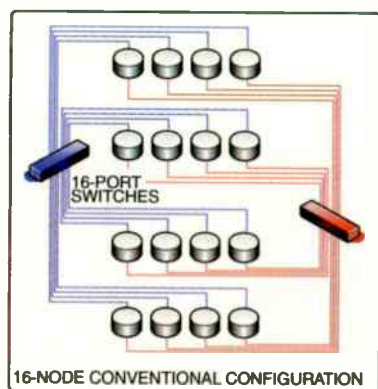
So why the emphasis on clustering and grid computing for media applications? It is actually quite simple.

are diminished by moving away from the traditional layered file system approach and allowing the storage to appear as a single volume.

By using non-high performance drive media (i.e., SATA), as opposed to Fibre Channel drives, the cost to performance ratio is readjusted. As the industry realizes that having everything online is unnecessary or too costly, nearline or secondary storage uses are accelerated.

Grid storage promotes distribution of file elements across many sets of drives. Files are literally sliced up and spread across a larger set of less costly drives. The requirement for a RAID-protected system is mitigated by spreading the risk out over a larger footprint of storage. For protection purposes and increased accessibility, files should be replicated in multiple locations across the storage platform.

With a common file system manager at each node of storage, tracking the location of these file slices no longer becomes the charge of the



“STAR” Storage Configuration (left), provides a more conventional arrangement, requiring two 16-port switches, one of which is for failover. There are 32 wired connections to two expensive switches with two paths to any node with one additional level of protection only.

“GRID” Storage Configuration (right), is more resilient, with less chance of catastrophic failure. Nodes are formed as four groups of four, connected to less expensive four-port switches. Same number of wired connections, with each node connected to two switches. Failure of any switch retains additional paths to connect to any two nodes. Multiple levels of protection available.

server when in actuality there are many in the total system. In the video server domain, mirroring of either online storage or servers, or both, might be construed as clustering, but is really just parallel redundancy. Broadcast automation databases, traffic and billing, and command and control systems may also employ parallel or redundant servers, and are less likely to be operated in a true clustering node configuration.

Multi-element computing, called “grid” computing, is a form of distributed computing, which coordinates and shares resources across dynamic and geographically dispersed entities. The grid may involve application, data, storage or network resources. The principal concept in this computational model is that by combining multiple resources, higher throughput is achievable. Networking several computational platforms together creates a virtual computer architecture that can tackle complex problems. The computers may be in close proximity to each other, or

much idle time occurs in the typical PC by opening the Windows Task Manager Processes tab and look for the System Idle Processes. Take your hands off the keyboard for a few seconds and watch the idle percentage soar to almost 100 percent.

Now consider the thousands of PCs in the world, and sample even a tiny percentage of each ones’ idle time, apply it to a parallel computational effort, and you have the potential for a very large supercomputer that costs literally nothing to operate.

WE ARE NOT ALONE

One widely known non-profit project, called “SETI@home” (Search for Extraterrestrial Intelligence), whose mission is “...to explore, understand and explain the origin, nature and prevalence of life in the universe,” is an example of a grid computing project that uses personal computer CPUs to scavenge for scientific purposes. The project began 40 years ago, and

Multi-element computing, called “grid” computing, is a form of distributed computing, which coordinates and shares resources across dynamic and geographically dispersed entities.

Historically, the video server has followed nearly in lock step with modern computational, processing or storage efforts, from real-time operating systems through NAS and SAN storage. What occurs in the development of network or data-centric computing seems to eventually show up in the media server domain. Grid computing is now headed toward storage for media applications.

SANs and NAS-head storage systems grow universally in deployment, making storage management, data protection and failover/failback recovery far more important. As more assets are placed on spinning disks, the driving forces for greater capabilities must be addressed. Gone are the simple incremental additions to storage platforms, i.e., adding another five or 10 disks to an existing array, changing from a 36 to a 73 GB drive or adding another chassis of disk drives. The industry now demands increased bandwidth with higher accessibility, lower cost and much larger capacities. This happens mostly by upping the storage throughput or increasing the amount of storage.

Enter clustered or grid storage. Applying similar principles to those found in clustered servers or grid computing, but now to storage, allows the user to easily and linearly add storage while increasing bandwidth (i.e., throughput). File system complexities

video server—thus system performance is increased and storage management becomes a separate task. Grids allow for unlimited size and performance scalability.

IP-based connectivity is another driving force for emerging storage platforms. With 10 Gigabit Ethernet, the previous problems of FTP latency are nullified, and the overall storage platforms no longer need to depend on complex fabric-managed switches, such as those in a Fibre Channel implementation.

The gains include increased storage, easy expansion, cost-effective entry levels, and a manageable storage system that uses the well-understood capabilities of Ethernet.

NAB showed just such storage capabilities from well-known established vendors, with a variety of applications, some standalone and others integrated into video server platforms. With these various storage platforms, which may or may not depend on a specific server vendors’ product; options are available today that were impractical only a few years ago—options which continue to promote the all server/tapeless operating environment.

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INSIDE AUDIO

Dave Moulton

Audio Levels, Dialnorm and Cooperation

As readers may recall, I've recently been writing about the problems related to consistent audio levels across broadcast channels. This month, I'd like to discuss more fully the elegance of the dialnorm concept, why we need to embrace it and what it will take to make it work well.

Audio levels exist over an extremely wide range (ca. 1,000,000:1). Given that range, it is essential that we maintain reasonable standards for consistent levels if we wish to maintain any sort of good will on the part of our viewers. Back in the day, we used an analog audio level we called "+4 dBm," based on a sine wave of that magnitude that we would set at "0 VU" on our audio VU meters.

We would then try to get our indicated program levels to hover around 0 VU. That meant, in theory, that all of our levels would more or less agree.

FURTHER NEEDS

However, time passes and things change, including the way we think about and measure levels. We no longer use VU meters, we no longer use +4 dBm, and we no longer seem quite sure what a reference level is. Because of the changes that have occurred, we no longer have coherent audio level standards that are understood and adhered to. The net result is the wide array of levels (easily 20 dB: a variance of 10:1) that viewers get from their TVs.

I don't know who had this idea, but it is a good one. As part of the metadata scheme Dolby developed to cope with the variability in transmitting multichannel audio for a variety of end-users, dialogue level was established as the reference level for all audio signals. This has a number of virtues.

First, dialogue constitutes the most important component of the audio-for-video signal. Second, humans experience dialogue all the time. Third, in the real world, dialogue exists at a fairly consistent level: approximately 65 dBA SPL.

According to Jeff Riedmiller, Dolby's audio-level evangelist, studies strongly indicate that viewers intuitively set TV levels so that dialogue is experienced at 65 dBA SPL. I've informally checked this out, and my experience has been that it holds true.

What this means is that we have a generally available signal that viewers/listeners will intuitively set to a consistent and reasonable level. All we have to do is to get everybody on the production side to set dialogue to the same level!

Now this is where Dolby really got

brilliant. Instead of establishing the Dolby Dialogue Police Authority or some similar Orwellian agency to force everybody to set dialogue at one level (particularly in these troubled times when we no longer quite know what we mean by "level"), Dolby has taken a much more ergonomically satisfying approach. They simply ask that every-

We no longer have coherent audio level standards that are understood and adhered to by everybody operating the system.



get our dialnorm values to agree with our Leq dialogue levels all the time, the one poor schnook who screws up will really stand out. When the happy day arrives that we can casually surf the channels and all the levels are comfortably the same, the one that is 8 dB too loud and painfully squashed is going to stick out like the proverbial sore thumb! Equally the one that is 10 dB too soft.

Also, this system is easily self-regulated. Even now, some channels are beginning to reject submissions with incorrect dialnorm values. All we have to do is check what the LM100 says. If dialnorm and Leq agree we're good to go, if not, send it back to the producer.

There may still be abuses of compression for hyping voice loudness during

body *measure* their dialogue level and tell what it is. Then, the metadata scheme will take care of level matching!

The system needs understanding.

First, you need to measure your dialogue level. Dolby makes a special meter, the LM100, to help with this.

The measurement is a little particular: it is an Leq measurement (a long-term power average), and it is A-weighted. Also, it needs to be applied to the dialogue only. The LM100 will take care of this, or you can do it manually if you have the measurement chops.

You need to measure dialogue level and enter that level as the dialnorm value. You can't assume that leaving the default dialnorm value (-27 dBFS) or setting for the minimum dialnorm value (-31 dBFS) will work. It won't. It's that simple.

TIME AND AGAIN

Finally, we all need to do this in increasingly fine time slices. Right now, it is suggested that stations take Leq averages over several days of broadcasting (as per the Canadian practice I cited last month). That is fine for the long term, but it does not take into account variations between programs or between programs and commercials. However, there is no reason why Leq averages can't be taken for individual program offerings and/or commercials.

Here's the beauty of the system—the better we get at implementing it, the more painfully obvious and apparent the miscreants will be. When all of us

commercials, and it may still be possible to game the system to enhance the effect you want. Nonetheless, the abuses are going to be a lot more obvious, just like the single smoker in the restaurant or the single cell phone in the symphony.

Metadata is a wonderful idea for dealing with the diversity of production practices, end-user needs and formats that have emerged in our field, where one size definitely does not fit all! Setting aside the dazzling technological virtuosity of it (and dazzling it is, when we take the time to admire it), the ergonomics of the finished system are really sweet.

Little by little, as we get used to getting our dialnorm set, levels throughout the system are going to converge. Think of it! No loudspeaker police. No levels wardens. No compressor cops. People will set their levels so they are comfortable, and the whole thing will fall into place for them.

Dialnorm will bring the levels into convergence. Dynamic Range Control will manage the ranges of end-user systems as needed, and up and down-mixing will begin to work a little better (more about that in a future column). We can hope that the audio will begin to broadly and effectively support the video for a far more satisfactory experience for our beloved end-users.

Thanks for listening.

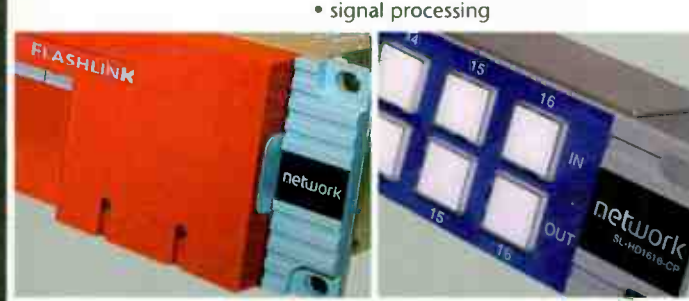
Dave Moulton really wants to thank Jeff Riedmiller at Dolby Labs for his fine work. You can complain to Dave about anything at his Web site, www.moultonlabs.com.

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ATSC UPDATE

Jerry Whitaker

ATSC Does Interactive TV Demonstration Project

The ATSC Planning Committee has undertaken a major demonstration project of the Advanced Common Application Platform interactive TV system. Led by Jon Dakss of NBC Universal, the project is designed to illustrate how ACAP can be used to enhance viewing. Other members of the organizing committee include Glenn Reitmeier of NBC, Jimmy Goodman of Capitol Broadcasting, Wayne Luplow from Zenith, Sterling Davis of Cox Broadcasting, the NAB's Graham Jones and Mark Richer of the ATSC.

The ACAP specification, developed as the result of a harmonization effort between the ATSC DTV Application Software Environment, or DASE, and CableLabs' Open Cable Application Platform specifications, is the culmination of an extensive effort by a dedicated team of specialists from dozens of organizations representing diverse

industry segments.

ACAP enables advanced interactive services while providing content providers, broadcasters, cable and satellite operators, and consumer electronics manufacturers with the technical details

interactive technologies. Two worlds that were once barely connected—television and the Internet—are now on the verge of combining into an entirely new service: namely, interactive television. Thanks to the ongoing transition of tele-

Applications currently in service in Mexico include on-screen information during HDTV soccer matches, programming with interactive puzzle games, real-time information services, TV commerce and audience polling.

necessary to develop interoperable services and products. The rollout of the digital television infrastructure facilitates a new era in service built around two-way

vision from analog to digital, it is now possible to efficiently combine video, audio, and data within the same signal.

This combination leads to powerful new applications. For example, computers can be turned into traditional TV receivers and digital set-top boxes can host applications such as interactive TV, e-commerce, and customized programming.

The term "interactive television" is broad and not entirely well defined. However, it certainly includes the following general categories:

Customized news, weather and traffic
Stock market data, including personal investment portfolio performance in real-time

Enhanced sports scores and statistics on a selective basis

Games associated with programs

On-line real-time purchasing of everything from groceries to software without leaving home

Video-on-demand

There is no shortage of reasons why iTV is viewed with considerable interest around the world. The backdrop for iTV growth comes from both the market strength of the Internet and the technical foundation that supports it.

With the rapid adoption of digital video technology in cable, satellite, and broadcasting, the stage is set for creating an iTV segment that introduces a whole new range of possibilities to a mass consumer market.

For example, technologies are available that support interactive features for game shows, sports and other programs, interactive advertising, e-mail, and Internet access. Rather than concentrating just on Web services, the goal is to deliver a better television experience. Korea is in the process of launching the first regular over-the-air ACAP service.

Broadcasters, including KBS, MBC, SBS, and EBS, have plans to initiate regular DTV ACAP data broadcasts, with service covering Seoul and the surrounding vicinity. Korea's specifications for terrestrial DTV broadcasting of interactive data services based on ACAP are being finalized in the Telecommunication Technology Association and associated regulations are being reviewed by the Ministry of Information and Communication.

Since mid-2004, Korean terrestrial broadcasters have been transmitting experimental ACAP-based interactive applications along with HDTV programming. Aircode, a Korean-based data broadcasting company, has been concentrating its efforts toward developing applications and headend equipment for data emission, while Samsung Electronics, LG Electronics, and Daewoo Electronics have been developing ACAP consumer receivers. With middleware implemented by Korean firm iSET, the Electronics and Telecommunications Research Institute has dedicated its expertise to researching and developing an end-to-end system.

In another important development, TTA has issued Samsung Electronics the first certificate of compliance for the ACAP standard. Certification testing is an important element ACAP implementation.

Mexico's Televisa has been on the air with ACAP since last summer. With support from Aircode, Televisa has provided live transmission of ACAP services using the Pico Tres Padres state-of-the-art transmitting station.

The two companies are working together to evaluate the potential applications of this technology. They have successfully demonstrated datacasting to personal computers and real-time interactive television based on the ATSC ACAP standard. Both of these services are a part of the digital broadcasting service roadmap which guides Mexican terrestrial broadcasting stations. Applications currently in service in Mexico include on-screen information during HDTV soccer matches, programming with interactive puzzle games, real-time information services, TV commerce and audience polling.

FOR MORE INFORMATION

The ACAP specification can be downloaded at no charge from the ATSC Web site (www.atsc.org/standards/a101.html). With publication of ATSC Standard A/101, the initial work of the Specialist Group on ACAP was completed. It is anticipated, however, that ongoing maintenance and periodic updates will be appropriate. Persons interested in participating in this work or the ACAP demonstration project should contact the author.

Jerry Whitaker is vice president of Standards Development for the Advanced Television Systems Committee.

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Hi-Vision

CONTINUED FROM PAGE 26

pixels per line, progressively scanned at 60 fps.

The astute will notice that this is exactly four times as many horizontal pixels and four times as many scan lines as 1920 x 1080, a total of 16 times as many pixels per frame, maintaining the standard 16:9 or 1.78:1 aspect ratio of HDTV. The 1920x1080 frame contains about two megapixels, while the Super Hi-Vision frame contains 16 times that many, or a little more than 33 megapixels.

The design goal for HDTV was to accommodate an ideal viewing distance of three picture heights from the screen, which provides a horizontal viewing angle of 30 degrees.

While this was a significant improvement over the ideal NTSC viewing distance of five to seven picture heights, the Super Hi-Vision system is designed for a viewing distance of 0.75 of a picture height, affording a horizontal viewing angle of more than 100 degrees. This could truly be called total immersion TV.

REALLY BIG SCREEN

The demonstration theater in Japan used a 13-by-7 meter screen (about 42.5 feet wide by 22 feet high), with a diagonal dimension of about 600 inches, and a gain of 1.5. A 0.75 picture height for a screen of that size is about 16.5 feet.

The projector provided 800 lumens of illumination, yielding a peak luminance from the screen of about 40 cd/m². This is reported by NHK to be about equivalent to the peak luminance from a standard cinema screen.

Two cameras have been developed for the format. Both are four-channel devices using four sensors. The first camera, developed in 2002, uses 2.5-inch CCD sensors, while the second, developed in 2004, uses 1.25-inch CMOS sensors. Each individual sensor is two megapixels, the total pixel count for the four sensors in a camera being eight megapixels.

The details of the scanning system are unclear from the information that is readily available, but the camera splits the incoming light into four channels: red, blue, and dual greens. The resulting 24 Gbps video signal is transported from the CCU to a hard disk recording array, and from the disk array to the projector over 16-channel HD-SDI links.

The camera is not an RGB device, but dual green channels implies that twice as many green pixels as red or blue pixels are sampled. This approach, which is used because the eye is more sensitive to green than any other color, is often used in single-chip cameras, and in digital still cameras.

A front-firing LCOS microdisplay projector was used. The projection engine contained four, 1.7-inch,

3840x2048 pixel LCOS microdisplay chips. It goes without saying that a Super Hi-Vision system needs a super audio system to complement it. The demonstration used what NHK calls 22.2 Multichannel Surround Sound.

This system uses a three-tiered loudspeaker arrangement, with nine loudspeaker channels situated near the top of the theater space, 10 channels about midway from floor to ceil-

ing, and three channels (including two LFE channels) near the floor.

In addition to the recorded program material, the 2005 demonstration included a live transmission of uncompressed Super Hi-Vision video and 22.2 Multichannel Sound signals to the theater over fiber-optic links.

It is safe to say that we will not be seeing this kind of resolution, with its huge bandwidth requirements, being trans-

mitted over the air for some time. This was truly an experimental demonstration, and the data rates involved are extremely high. But it serves as an interesting demonstration of the current state of the art in video resolution.

Randy Hoffner is a veteran TV engineer who recently relocated to sunny California from New York. He can be reached c/o TV Technology.

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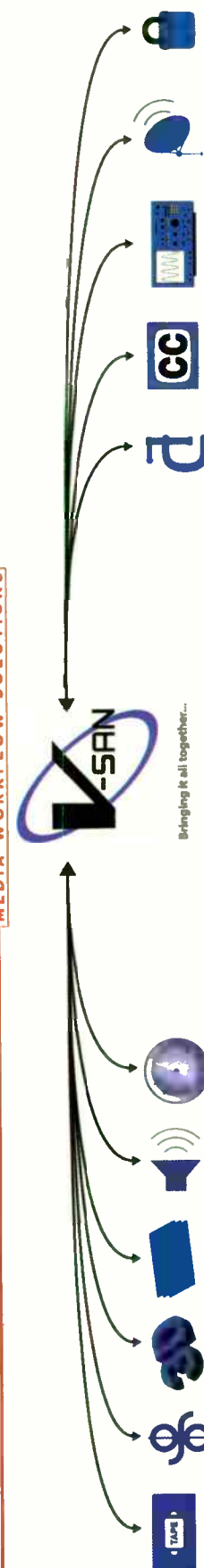
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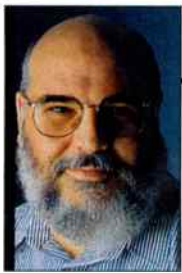
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Andy Ciddor

Getting Help: When 'RTFM' is Not Enough

One of the great joys of working with complex equipment is the total unpredictability of the ways that it may choose not to work as expected.

No factory-training program can prepare you for the spider that chose last night to build a web in the igniter circuitry of the HMI fixture that you fired up (quite literally as it turns out) this morning. No manual can hope to offer you a fix for the combined effects of a serious supply voltage sag combined with accidentally bumping all the buttons on the front of your intelligent dimmer rack, as you bent down to recover a dropped multitool.

Sooner or later, the problems facing you will prove to be insoluble given the time, tools, spares, test gear and expertise available to you at that moment.

A few decades ago I used to pride myself that I could fix pretty much every piece of gear in a lighting system with a pair of linesman's pliers, a small selection of screwdrivers, a soldering iron and a half-decent multimeter. Occasionally a more complex dimmer problem necessitated borrowing an oscilloscope for an hour or so from the white-coated guys in engineering maintenance. However, that was back in the dark ages of manual preset control desks, incandescent manually operated luminaires and

analog phase-control SCR dimmers—when a lighting control network was just a very big bundle of low-voltage multicore cables.

The chances are that any one robotic luminaire in your rig today

bizarre range of behaviors possible when complex systems interact.

I'm not suggesting that factory maintenance courses are a waste of time. Far from it. I'm simply pointing out that no training course, mainte-

No training course, maintenance manual, interactive video tutorial or DVD can possibly prepare any of us for some of the situations that we will eventually encounter.

has more complex electronics than an entire control room from that era. Conversely, since the move to digital storage systems for audio and video, the lighting department now quite possibly maintains more mechanically complex equipment than just about any other. Even if you have enough inventory of any one fixture, dimmer or console family to justify sending someone off on a factory maintenance course, that level of training can't possibly prepare a technician for all of the

nance manual, interactive video tutorial or DVD can possibly prepare any of us for some of the situations that we will eventually encounter. Even if we have outsourced our maintenance to technical specialists, sooner or later, they too will stumble up against the impenetrable interactions of a unique system configuration. And when it happens, you can bet that problem will be in your system, and that it will occur at the least convenient time. (Don't ever forget that Murphy's law is

universal and, by definition, utterly predictable and unpredictable in its impact.)

There's a maxim in the subterranean world of techno-geeks that goes "When all else fails, Read The Flipping (or other F-word of choice) Manual," or "RTFM." However, most serious lighting geeks have already downloaded and read the manual from cover to cover before the equipment was even ordered. In that case, when all else fails, it really is time to seek help from a guru.

In the days before DMX512 set us free from having to source all of our equipment from a single supplier, we could have picked up a phone or sent a telex and (eventually) contacted the team that manufactured our system, then passed the problem on to them for analysis and solution.

HOLD, PLEASE

Despite the vast improvements in telecommunications technologies that now let us contact the support team via landline, cell, voice-over-IP, push-to-talk, e-mail, video conference, Web form, instant messaging, text, or fax, we are often further than ever from being able to get the help that we really need. It's quite likely that person who responds to our inquiry has little or no experience with using the equipment in real production situations.

When a system doesn't behave the way we think it ought to, there are an immense number of potential points of failure. Virtually every piece of equipment in a lighting system today is likely to have at least one processor on board, whether it's merely monitoring voltage, temperature and running hours, driving a dozen stepper motors, chatting to its neighbors on the network, or trying to figure out the CMY equivalent of Roscolux 57 Lavender.

Every new batch of devices to leave the factory is likely to contain an improved version of the controlling software or firmware, even if the hardware is identical to the previous batch. As you would hope, new software for many pieces of equipment is made available via Internet file download, just as soon as an upgrade or a fix is written.

However, not every piece of equipment gets every upgrade straight away, even if it's our policy to keep everything at the most current version. After all, most of us are not crazy or brave enough to upgrade the firmware in our moving lights, DMX merge box, dimmers or console, if we're part way through recording a series, and everything seems to be working just fine.

When a problem eventually arises, we are trying to isolate an anomaly in a system that consists of many complex devices, usually from a range of manufacturers and suppliers, and frequently with a variation in versions of control software. Even if, after days of

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working our way up through the hierarchy of the field service personnel who have "never seen a fault like this before," we are able to speak with the team that designed the equipment, we are likely to be disappointed. The designers are unlikely to know about the need that has arisen to use a different part in manufacturing, and the three attempts that were required to get the firmware right for the changed hardware. They're almost certainly going to tell you that they believe the fault is in some other part of your system, doubtlessly one not designed or manufactured by them.

For some equipment producers, this has been one of the few benefits of the DMX512 standard. If they can no longer lock you in to using their proprietary equipment exclusively, then at least they can try to blame someone else for problems arising from their equipment. Finger-pointing is one of the least acknowledged art forms to have come out of the great leap forward in electronics technology. Since the wide acceptance of DMX512, I have been "confidentially" informed by any number of equipment suppliers, that Brand X dimmers don't deal with full frame rate updates, that Console W doesn't put out properly formed data packets, that Brand Z doesn't produce detailed enough parameter information to pro-

duce proper personalities for its fixtures, that Brand Y merge boxes introduce too much latency, etc., etc. Very rarely does anyone volunteer the information that they have produced some buggy units, and that we shouldn't be using a particular version of their software or hardware.

P2P HELP

In circumstances such as these, where the complexity of interactions between devices leaves us without a definitive source of information to help us resolve our problems, the Internet comes into its own. Now while you probably checked the equipment manufacturers' and suppliers' support pages, and may even have visited their online forums, there is a much more powerful resource available—the whole of the lighting world.

Although a lot of money has been spent to give you the contrary impression, the overwhelming majority of lighting knowledge and experience is not held in factories or service departments in Shenzhen, Austin, Gothenburg, New York, Kirkaldy,

Bergamo, Sydney, Los Angeles, Hammersmith or Århus. It's held by the people who make the gear work every day, despite the unusable placement of knobs and controls, the errors in manuals, the bugs in software, the undocumented changes to parts and the hype of marketing departments. In some cases, these real experts have given up even talking to the folks in factory support, who are increasingly being muzzled by paranoid corporate lawyers or anxious marketing executives.



The LightNetwork screen

Among the best of these resources are both Web forum sites that work as bulletin boards and mailing lists that work via e-mail servers. Having said that, most forums can send out e-mail updates and most mailing lists are now also available through a Web site

interface.

One of the most active and lighting-focused resources is LightNetwork (www.lightnetwork.com/), which has been around for more than eight years and offers a huge range of topic forums. The Cinematography mailing list (www.cinematography.net) has a dedicated lighting forum area, although some of the topics tend to be more film related. And even though it is ostensibly about show control, the Show Control mailing list (groups.yahoo.com/group/Show-Control/) deals extensively with lighting control issues, in particular control protocols.

Almost as old as the Internet itself, the Stagecraft mailing list (www.theprices.net/lists/stagecraft/), covers a wide range of issues related to stagecraft and technical production, but has much lighting-related material.

In addition to being live interactive discussion platforms, all of these resources also have valuable archives, covering many years of previous exchanges. It's quite likely that you may find that your topic has been discussed before, and that the answer you need is just waiting for you to find.

Andy Ciddor has been involved in lighting for more than three decades as a practitioner, teacher and writer. You can reach him via e-mail clo@TVTechnology.com.

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BUYERS GUIDE

Signal Processing

USER REPORT

WSHM-TV Launches With Grass Valley

by Mike McCarthy
On-Site Engineer
WSHM-TV

SPRINGFIELD, MASS.

When we built this station last summer, we were faced with having to put a local news operation on the air in a very short time, and on a very limited budget. When we selected signal processing equipment, we were careful to do our homework and pick equipment providing both value and flexibility. The system had to make sense for us, both financially and technically.

We chose Grass Valley's Gecko modular products and 8900 Series frames for all A/D and D/A conversions. The converters also double as distribution amplifiers, helping us keep costs down. As the Gecko converters have four outputs, we didn't need separate d.a.s. The frame sync option eliminates the need for an outboard proc amp. This saved rack space, reduced the number of patch panels and cut wiring requirements.

We were able to save money by purchasing four-channel modules for analog signal monitoring. Now we get four channels with one card and this reduced the number of module frames needed. These features, along with a full line of cards and proven reliability, made Grass Valley very attractive.

As we had selected other Grass Valley equipment—an Ignite automated production system to run newscasts; a Concerto audio/video/time code router; and several Grass Valley M-Series iVDRs—the Gecko was a natural, as it is



Mike McCarthy with some of WSHM-TV's Grass Valley equipment

fully compatible and communicates seamlessly.

We've also installed a Grass Valley Newton modular control panel in a centralized location, giving us SNMP-based access to modules and helping us use them efficiently. This was a key ingredient in the system and the main reason we chose Grass Valley. Newton controls not only the cards, but also the router and other Grass Valley equipment. With its intuitive interface, Newton allows non-technical people to monitor sources from the panel presets and makes the entire operation run smoother.

After installation, we quickly discovered the extra perks that came along, including SNMP control, NetCentral and NetConfig. NetCentral flags any equipment errors and signal problems, and NetConfig makes set up really easy. This was important, as we rely on a small staff to keep the place running. We did all wiring and system configuration ourselves, and these fea-

tures are very helpful.

With full SNMP remote access capability, not only can we process our incoming sources, but also control audio gain using remote access d.a.s. That's great, as there's no dedicated audio engineer in the control room.

LEVEL PROBLEMS SOLVED

Everyone knows that remote feed levels can be all over the place. With Grass Valley's Newton system, we can set color and video levels, and then set audio levels without having to run into the machine room down the hall.

The system also allows you to organize and recall sources as streams or channels, by assigning them specific names or numbers that are easily accessed and manipulated. This makes a big difference when troubleshooting.

The feature set provided with the Grass Valley Gecko modular system is much greater than anything else we found, and we've had no problems at all. We couldn't be happier with our choice, as Grass Valley gives us all of this functionality in a tightly integrated package. No other company could give better value. Grass Valley stands behind its equipment, as we have learned during our long association with them.

Mike McCarthy is the on-site engineer at WSHM-TV. He has been with the station since start up and has also worked at WFSB in Hartford, Conn. The opinions expressed are the author's alone. He may be contacted at Michael.mccarthy@cbsv3.com.

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

USER REPORT

Miranda Is Big Player At Current TV

by Stéphane Savard
Chief Scientist
Current TV

SAN FRANCISCO

Current TV launched in August 2005, allowing company chairman, Al Gore, to realize his vision of democratizing television. Targeted at 18- to 34-year-olds, the

national cable and satellite channel allows viewers to create content as well as vote on what's aired. About a third of the channel's output is viewer-created content, or VC2. Anyone who wishes to contribute to Current TV can upload a video on the channel's Web site at www.current.tv. Once the video is uploaded, everyone in the Current TV online community can vote on which video they want to see on air.

Current TV's programs are wide-ranging, with many offerings not easily found on mainstream TV.

We also started a joint venture with Google to produce a special application that enables us to observe the most popular search topics every hour, allowing us to air content relevant to viewer interests.

Our main facility is in San Francisco and we have production facilities in Los Angeles.

STARTUP TIMELINE

We had a very tight timeline to get ready for air, especially as there were no pre-existing TV facilities. Miranda came to our aid with scheduling and integration tal-

MIRANDA, PAGE 37

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Miranda

CONTINUED FROM PAGE 36

ents and quick response times. They were a huge help in getting ready, as we had to construct everything in just four months.

The most important thing was integration. Not just third-party device integration, but signal standards and formats and the control and monitoring of each. Miranda's iControl system provided the answer for facility monitoring over IP. We were impressed with iControl's ability to do remote monitoring of our Los Angeles studio.



Stéphane Savard enlisted Miranda technology and talents to deliver an innovative television facility in a very short period.

The Miranda solution brings together all the elements for a fully integrated control and monitoring environment. There's just one interface for the entire broadcast chain. Our operators find this incredibly efficient, and we've set up the system to respond to alarm conditions.

Current TV's operators can quickly zero in on any failures as graphical representations, making it easy to see what's going on with the devices and signals. Station monitoring can be presented with multi-

ple views to aid fault investigation. Maintenance views offer video and audio parameter status, and geographic views provide an overview of multiple sites.

We installed Miranda multi-image display processors in our master control and production areas. They fully integrate with the Miranda master control switching and infrastructure monitoring systems.

Miranda knew that we were creating a powerful new brand of television that does-

n't treat audiences as merely viewers, but as collaborators. We selected the company's PresMaster and Imagescore Intuition system for graphics and branding. It allows playout of a virtually unlimited number of animations and stills and also allows us to create templates with embedded control.

Miranda has contributed significantly to Current TV's success, in terms of the quality of the products and its innovative spirit, and also by the excellence of

the sales, operations and support teams, all of whom were crucial in the on-time start-up of the network.

Stéphane Savard studied computer science at McGill University and is an active member of SMPTE engineering standards committees. He may be contacted at ssavard@currentmedia.com.

For more information contact Miranda at 514-333-1772 or visit www.Miranda.com.



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BUYERS BRIEF

Time Tailor Digital from Prime Image Inc. processes program content in such a manner as to reduce run time without discernible audio or video effects. The unit allows the creation of up to 30 seconds of additional time availability within a 20 to 30 minute show. It can be supplied with an option for creation of up to 180 seconds of additional time. The processor accepts SDI video, as well as analog component and composite video, and also analog and AES audio. The Time Tailor Digital features a redundant power supply and has black hole detection and reporting capabilities.

For more information, contact Prime Image Inc. at 408-867-6519 or visit www.primeimageinc.com.

Show after show, day after day, broadcasters across the US depend on Solid State Logic's C100 to deliver superior-quality audio mixes with bullet-proof reliability. In Boston, NBC-affiliate WHDH-TV is just the latest in a growing list of stations to enjoy the enhanced workflow and peace of mind that comes with the C100's robust proprietary platform, comprehensive self-healing and redundancy features, and a future-proof, HD-enabled design.

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USER REPORT

KCRA Converts to Digital With Leitch

by **Stefan Hadl**
Director of Engineering
KCRA

SACRAMENTO, CALIF.

Since its debut in 1955, KCRA has been the market leader in its use of the latest technology and equipment for bringing the news and information to local viewers. We provide our viewers in the Sacramento-Stockton-Modesto area with the most comprehensive and timely news, and our remote locations and ENG sites allow us to provide a news product like none other in our market.

Our technical operation consists of a studio facility where we control our two network-affiliated stations, KCRA and KQCA. We maintain both NTSC and DTV transmitters. As director of engineering, I deal with a great variety of issues, including supporting the current infrastructure and managing the station's technical and operational future. Most recently, I've been heavily involved in planning for new ventures that DTV now affords.

CONVERSION

The recent conversion to an SDI video/embedded audio plant prompted the need for system upgrades. We were going from an analog infrastructure to an SDI/HD embedded one and had been using external frame sync devices to correct and

adjust levels and other signal parameters.

As broadcast facilities move toward a fully digital operation, content processing requirements increase significantly, as does demand for more functionality in less space. We looked at other manufacturers, but decided that Leitch offered the best value for us. We elected to go with a variety of modules in the Leitch NEO platform, including the NEO XHD series modules for up, down and cross conversion, muxes and demux, frame synchronizers, switchers and aspect ratio converters. We also chose modules in the 6800+ platform, including frame syncs, d.a.s, muxes/demuxes and SDI keyers. We selected the Panacea router, and also purchased Leitch's X75 multiple-path up/down/cross converter and synchronizer units.

We really needed a product that provided us with control for all of our processing gear. The Nucleus user-configurable network control panel was that product. The move to digital has taken some of the user-friendly control devices away from our operators. Adjusting levels and correcting problems with remote sources was easy in analog. In the integrated, single-card digital world, user handles are found on a card edge or within a computer GUI.

The need for device control capability was so great at my facility that I bought the very first system from Leitch. The Nucleus gave us back the control we needed and made our video product bet-



Leitch 6800+ and NEO installations at KCRA

ter by providing easy control over QC functions. The panels are programmable to provide the amount of functionality needed and they also have plenty of user controls for parameter adjustments, as well as a display that is easy to read.

Our operators now have the QC handles they need with Nucleus. Soon, we

hope to interface with our station router with Nucleus control. It's easy to use and allows for control of multiple devices with a single panel.

Leitch has always developed products to fit customer's needs. As with the NEO and 6800+ platforms, and more recently, the X75, the Nucleus is such a product. Installation and setup were straightforward. From past experience, I also knew I had the support of both the sales and engineering departments, which once again made me feel comfortable buying from Leitch.

Stefan Hadl is director of engineering for Sacramento's KCRA Television. He may be contacted at shadl@hearst.com.

For additional information contact Leitch at 800-231-9673 or visit www.leitch.com.

USER REPORT

TVG Network Places A Winning Bet

by **Steve Orland**
Vice President of Broadcast
Operations and Chief Engineer
TVG Network

LOS ANGELES

TVG Network is a 24/7 television channel providing live coverage from more than 60 horseracing venues in the United States. TVG is delivered to about 18 million households nationwide via cable and satellite.

Our live coverage begins at 9:00 a.m. Pacific Time, with races from the East Coast, then follows the sun as various racetracks open across the country. We also provide coverage of international horse racing events from locations such as South Africa, England and Japan.

Nvision helped us solve the technical challenge of synchronizing and processing incoming feeds from this variety of venues. Feeds arrive via satellite and fiber and can be analog or SDI. Analog signals must be converted to digital, and all signals synchronized to plant reference. For this purpose, TVG chose the Nvision ASM10, which accepts analog and digital inputs, provides video and audio A/D conversion, frame synchronization, signal processing adjustments and audio embedding on a single module. We are able to process and synchronize up to 18 feeds using a single 4RU frame, and stack multiple frames for several dozen incoming feeds.

The Nvision ASM10 provides exceptional quality, reliability and signal

TVG, PAGE 39

Another winning team.



Whatever the action, you can count on the Studio Technologies broadcast equipment team to come through every time.

Designed for television, radio, and production applications, the Model 200-series announcer's console products support the most demanding applications with excellent audio, reliable performance, and configuration flexibility. Five models are available, each with its own unique set of resources and features. The newly introduced Model 212 is compatible with digital audio signals.

The Model 72 Level Meter/Interface is a unique "problem solver" that will find use in many in-studio and field applications. Connected directly to "wet" intercom and IFB lines, the unit provides dual 5-segment LED level meters and transformer-balanced line-level audio outputs.

The Models 41, 42, and 43 are interface units that convert analog audio signals, typically provided by matrix intercom systems, into industry-standard IFB lines. The IFB outputs handle long cable runs with aplomb and provide audio that's simply superior. The Model 34 Talent Amplifier is a compact, lightweight "listen-only" belt-pack. Compatible with standard IFB lines, it features simple yet flexible operation and fine audio performance.

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TVG

CONTINUED FROM PAGE 38

integrity. In addition, it also provides full control and status monitoring via the front panel or Ethernet. The SCP08 control panel allows TVG personnel to remotely access and adjust operational settings, such as video and audio levels, on any ASM10 in the system.

Setup of the ASM10 is a breeze. Once the frame is installed, it's all very straightforward. You simply plug in the module and use the control panel to make a few configuration settings, and you're ready. It only takes a minute or so. It's a very easy to use, space-saving module.

The frame synchronizer ensures all incoming feeds are in time, permitting glitch-free switching and allowing us to add special effects and extensive graphics. Another very important feature of the ASM10 is the automatic audio tracking function of the frame synchronizer.

Audio quality and synchronization are very important to us, whether we use the local track announcer during the race or have TVG talent on camera at the track. Between races we often have two-ways with our in-studio talent who also do race handicapping and provide race recaps, analysis, and other interesting commentary for our viewers.

GOES THE EXTRA FURLONG

Nvision has been very cooperative in taking care of our needs. For instance, we requested they provide a means for us to adjust the gain and phase of the embedded audio. They agreed, and this feature has made it easier for us to ensure consistent, high quality audio.

The ASM10 is an ideal choice for anyone who needs to integrate a mix of external analog and digital sources into an all-digital facility, particularly where



The ASM10 and SFR08 are part of the Nvision Synapse system.

synchronization and audio embedding are required. By combining video and audio A/D conversion, video and audio synchronization and audio embedding into a single module, Nvision has simplified signal conversion requirements.

Because of TVG's attention to programming and technical quality, our channel appeals to a broad cross-section of viewers from channel surfers to hardcore horseracing enthusiasts. To help us

achieve our technical goals, Nvision has been a valuable partner and the ASM10 a worthy steed.

Steve Orland is vice president of broadcast operations and chief engineer for the TVG Network. He may be contacted at sorland@tvg.com.

For additional information, contact Nvision at 800-719-1900 or visit www.nvision.tv.

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BUYERS BRIEF

The Vistec V1641 from Pro-Bel Inc. is a frame synchronizer card for SDI video applications. It features a 2x1 input switch and functions as processing amplifier, allowing control over video parameters. There's an option for processing embedded audio. Other options are available for embedding or extracting audio from SDI video. The V1641 has a built-in video test generator providing color bars, ramp and other signals. The synchronizer is designed to be used in the company's V1600 series of card enclosures.

For more information, contact Pro-Bel Inc. at 804-327-9800 or visit www.pro-bel.com.

USER REPORT

Taking Scopus Technology on the Road

by Mark Siegel

President

Advanced Broadcast Solutions

KENT, WASH.

It's very rare when you can get engineers, general managers, news directors and operations and production staff together outside the studio for a discussion about their broadcast systems, but this is what we've achieved with our ABS Technology Tours.

We began the tour to inform and educate clients about the newest industry tools available. Rather than investing in multiple sites across the West and Pacific Northwest, we've equipped a 38-foot coach with best-of-breed equipment and hit the road.

Smaller market stations typically don't send many employees to NAB. Our coach tours provide a valuable forum for exchanging information, addressing specific needs and identifying opportunities for doing things better or differently.

Each tour presents broadcast tools to users in a way that is easy to understand. We also offer consulting services to help stations improve their efficiency and quality of broadcast products. By

addressing both the technology and business model, we help broadcasters find creative ways to become more profitable in smaller markets.

We feel that visiting customers in these markets is just as valuable as calling on those in large cities. They are easy to deal with because they appreciate what we're doing.

The first technology tour was all about transmission via fiber, IP, or traditional terrestrial technologies. In May of 2005, we visited 46 stations in 15 days. Encoding systems from Scopus Video Networks were among the items packed into the truck. We chose Scopus gear because the company offers high-quality, feature-rich products at very competitive prices. We also enjoy working with the company, as their staff makes an extra effort to work with us.

At each stop on this tour, we used Scopus MPEG-2 encoders to encode SDI sources into an ASI transport stream and used a Triveni Digital StreamScope MPEG-2 analyzer to evaluate signal quality and ensure FCC compliance. We then decoded the product using Scopus equipment and compared the resulting signal to the original. With both SD and HD, results were very good.

Though the E-90 professional MPEG-2 encoder is extremely compact, it's robust enough to provide high video quality at low bit-rates. The IRD-2900 professional MPEG-2 DVB processor includes QPSK L-band inputs, telco front-end options, dual MPEG-over-IP inputs, MPEG-over-IP output and ASI transport-stream I/Os supporting bit rates exceeding 150 Mbps.

In our HD transmission demonstrations, we encoded signals with the Scopus E-1800 HD encoder and used the Scopus IRD-2450 professional HDTV receiver to decode them. This unit supports varied forms of MPEG-2/ATSC transport streams.

MARKET GROWING

We're seeing a quick growth in the transmission encoder/decoder market, and Scopus offers a lot of quality and value. Their products integrate easily with digital signal sources in our coach, as well with those in our client's facilities.

We've enjoyed excellent support from Scopus and found the company



Advanced Broadcast Solutions takes the latest technology to smaller market stations.

to be consistently fast in getting products to customers. IP solutions promise to be a larger part of our future sales and systems integration operations. We'll certainly be using more of Scopus' encoder and receiver/decoder systems in the future.

Mark Siegel is president of Advanced Broadcast Solutions Inc., a Kent, Wash.-based company in personalized broadcast services. He may be contacted at mark@advancedbroadcastsolutions.com.

For additional information, contact Scopus Video Networks at 609-987-8090 or visit www.scopus.net.

USER REPORT

Network Electronics Serves Great Audio

by David Burnor

Principal, AVVIT Consulting LLC

Steven Schlaff

President, Norcon Communications Inc.

FLUSHING MEADOWS, N.Y.

Reliable, noise-free audio signals have always been important to the United States Tennis Association, which sponsors the US Open that ran from Aug. 29 to Sept. 11 at the National Tennis Center. CBS Sports and USA Network broadcast the event. This is one of the most highly attended annual events in sports, with as many as 24 foreign broadcasters providing coverage to their home countries.

The 2005 championship match set several new records for attendance and website traffic, and generated significantly higher TV ratings over prior years. The National Tennis Center facility includes three stadiums, 15 field courts, and numerous smaller buildings.

With the growth of the event, prob-



National Tennis Center in Flushing Meadows, N.Y.

lems with audio feeds began to surface as increasing numbers of journalists and broadcasters began plugging into the audio system their wide variety of recorders, mixers, and other electronic equipment. Grounding, crosstalk, and backfeed noise situations were occasionally created. The real problem is directly connected with the magnitude of the event—audio feeds serving 40 broadcast commentary positions and a primary interview room accommodating 140 people. The challenge was to accommodate everyone, even those

using less than professional equipment, with a clean, consistent signal.

AVVIT Consulting LLC in New York City, has acted as consultant to the USTA since 1992, and is responsible for designing all of the audio and video systems at the facility. AVVIT selected the Network Electronics analog audio distribution amplifier system to provide the audio signals coming from the court, umpire and stadium announcer microphones to the press booths and interview rooms.

The Network Electronics equipment met a variety of criteria all at once. The fact that the outputs were isolated and buffered was critical to the application. In addition, the compact card form factor of the distribution amplifiers, the fit of the redundant power supplies into the card frame, circuit design and cost were significant factors in this choice. The Network Electronics system selected included a six-frame network with 37 distribution amplifier cards and three redundant power supplies. Gepco provided custom breakout cables.

Technical support from Network Elec-

tronics was much more than satisfactory. Their engineer visited the site prior to the event and was on stand-by throughout. Backup equipment was also provided, but was not needed.

Norcon Communications, Inc., a company involved with USTA and the U.S. Open since 1977, served as the system integrator for the project, installing the frames and contributing beautifully done wiring and cable management.

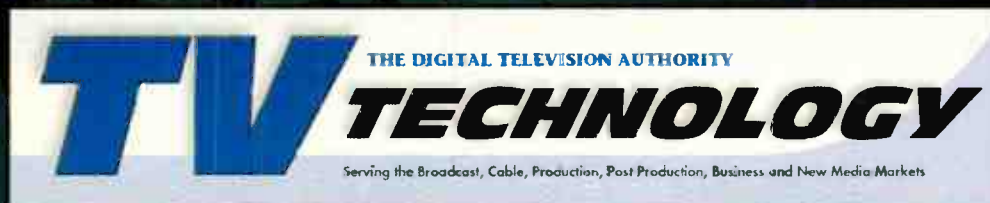
The final result—six channels of distributed audio running all over the place for 14 days with absolutely no problems!

David Burnor is a principal at AVVIT Consulting LLC, New York. He may be contacted at dburnor@soundvisions.com.

Steven Schlaff is president of Norcon Communications, Inc., Inwood, Long Island, N.Y. He may be contacted at steven.schlaff@norconcomm.com.

For additional information, contact Network Electronics at 800-420-5909 or visit www.network-electronics.com.

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USER REPORT

Oregon Public Selects Ensemble Designs

by Don McKay

Director of Engineering,
Network Center
Oregon Public Broadcasting

PORTLAND, ORE.

I'm responsible for all of the non-RF engineering for television and radio at Oregon Public Broadcasting and I've been here eight years. I enjoy my career in public television, as it gives me the opportunity to provide quality content for viewers.

Our station networks cover 95 percent of the state and include a variety of television and radio transmitters. We have more than 80 translators, 1300 miles of microwave paths and are installing fiber distribution. We're also in the process of converting both television and radio to digital.

We produce national, regional and local PBS programming at our facility. We're also responsible for a large



Don McKay and Ensemble Designs Avenue equipment installed at Oregon Public Broadcasting.

quantity of non-broadcast, high-end, educational programming for colleges and university classes, streaming and pod casting. This type of production requires the handling of multiformat

programs. We may produce the program in HD, but have to output copies in HD, SD, as well as PAL for overseas distribution. We have to have a very flexible production system, and Ensemble has helped us to accomplish that goal.

When we started to build a new digital system, we had to pick equipment that would be versatile, reliable and supportable. After much research and testing, we standard-

ized on the Ensemble Designs Avenue system. We liked the variety of cards available and the reliability. Installation and programming were very easy.

Ensemble Avenue is the basis of our technical core, and a critical component in our master control system.

The Avenue trays we purchased are equipped with a touch screen display, making adjustments easy. These controls are very logical and user friendly. You can get to any card in any frame from any control system. We also use the Avenue PC software for accessing the cards and making tweaks. It has alarms too, so we can address prob-

lems immediately.

Ensemble notifies us about software fixes and upgrades and the Avenue PC software has a dialog box that makes installation easy. Ensemble's service department has been very responsive to our needs. Whenever we've had to contact them, the response time was very fast.

Our decision to go with Ensemble was a very good one and we would buy from Ensemble again if starting over.

Clearly, Ensemble wants to be in the broadcast equipment business. It's rare to find a company of this caliber that has not been gobbled up by a large corporation. They are privately held, so they don't have to please the money people. They put their efforts into their products and working with customers.

I'm really happy with the Avenue products and Ensemble's service, and even more important, my engineers are happy. We will be rebuilding our production control room soon and we will be using Avenue.

Don McKay is network center director of engineering at Oregon Public Broadcasting. He may be contacted at don_mckay@oph.org.

For additional information contact Ensemble Designs Inc. at 530-478-1830 or visit www.ensembledesigns.com.

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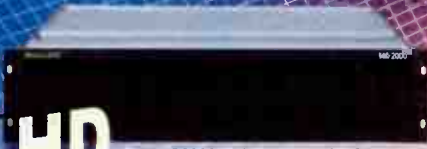
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USER REPORT

Ross Video Provides Value, Performance

by Mark K. Johnson

Engineering Maintenance Supervisor
WANE-TV

FT. WAYNE, IND.

WANE-TV is the number one rated news and information TV station in the Fort Wayne market. At our facility, we have three stations operating out of the same plant. These include NewsChannel 15, UPN Fort Wayne and the Local Weather station.

Everyday we strive to deliver quality news, information and entertainment programming to our viewers. Each day brings challenges and when a problem occurs, we correct

it as fast as possible to minimize any service interruptions. We are the daily technical problem solvers within our facility.

The plant had a lot of old analog equipment and we needed to update for the digital transition. It was time to bring everything up to current technology and prepare for the future.

As this point in time, we have completed a lot of the installation work necessary to take us into our digital future. WANE-TV has invested in a lot of RossGear equipment to bring the plant up to spec. We have many of their SDI products.

We selected RossGear for the great flexibility associated with their

ROSS, PAGE 43

Ross

CONTINUED FROM PAGE 42

cards. Our engineers have been amazed at their capabilities.

For instance, the RossGear digital distribution amplifier can also convert to analog. One card is required



Mark Johnson is pleased with the performance delivered by RossGear.

instead of two, giving us more value for our investment and we are always searching for cost efficiencies.

When we did our research to make the appropriate investment, we found RossGear to have the features, flexibility and price we were looking for.

We have had great success with Ross. We simply installed the cards and have never had to worry about them again. There have been no issues fixing or replacing the cards. Delivery was on time, the installation was easy and the products have worked so well for us that we've pur-

chased additional frames and cards.

The performance of the RossGear terminal equipment for distribution, analog conversion and audio embedding/de-embedding has been excellent. Problems are extremely rare.

Overall RossGear has improved our production abilities quite a bit and added flexibility in connection with our video router system. The router has no built-in analog to digital or

digital to analog capabilities. Outboard D/A and A/D conversion equipment supplied by RossGear has taken care of such conversions for us.

We saw the value in purchasing one card instead of two and have saved both money and space. And as we all know, space is worth a lot.

Our plant is always changing and when upgrading equipment in the future, we'll be investigating HD ter-

minal equipment. I'm sure that Ross Video will continue to play an important role in our conversion needs.

Mark K. Johnson is engineering maintenance supervisor at WANE-TV and may be contacted at mark.johnson@wane.com.

For additional information, contact Ross Video Ltd. at 613-652-4886 or visit www.rossvideo.com.

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BUYERS BRIEF

The BP 5100 Broadcast Platform from Terayon is a multifunction unit for processing and managing compressed SD and HD video programming. It performs MPEG stream splicing, allowing seamless transitions between multiple program feeds and has the ability to insert both static and motion graphics into programming for channel branding. The BP 5100 also provides multicasting functionalities for delivery of multiple program streams. It can combine up to 32 SD streams or eight HD streams, or a combination of both. The device is designed to assist in station/network automation and control. The unit provides up to 16 physical ASI inputs and a GPI panel with 24 inputs and 16 outputs.

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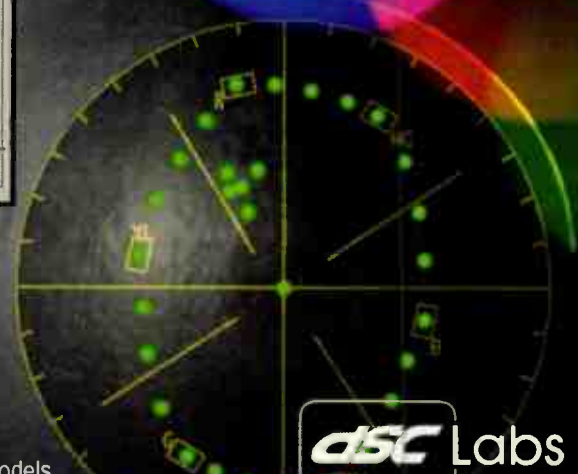
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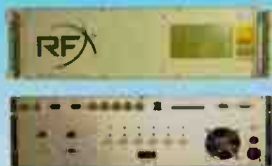


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Presenting The SDI Product Line

The **Model SDI-900*** is an all digital **Color Corrector/Video Processor** that directly interfaces with the 4:2:2 video at 270 Mbs. (Optional analog inputs and outputs are also available). It features individual control of Red, Blue, Green gains and setups, luminance brightness, high frequency response and gamma. There is no need to navigate a menu, all controls are independent and instantly responsive. The **Model SDI-900*** comes in several versions for additional features. It can have up to 400 memory presets, as well as up to 9 dBs of random noise reduction. Noise reduction is automatic or manual. It's ideal for matching any video feed to any display characteristics and for video pre-processing to maximize compression efficiency. Priced from \$1350.

The **Model SDI-313** is a **Universal Transcoder** that converts any analog video format (525/625 lines 50/60 fields/sec) to SDI as well as to any other analog format having the same scanning rates. It also converts a SDI input to any corresponding analog format. List price \$1495.

The **Model SDI-333** is a **Universal Analog to SDI Converter**. It converts any analog format (NTSC or PAL scan rates) to SDI. List price \$895.

Other SDI products from Xintekvideo include the **SDI-1 SDI to NTSC Converter** (\$295), the **SDI-3 Analog to SDI Converter** (\$345), the **SDI-10 Noise Reducer** (\$1295), the **SDI-110 Professional SDI to Analog Converter** (\$895), the **SDI-310 NTSC to SDI Converter** (\$995), the **SDI-330 Components to SDI Converter/Noise Reducer** (\$1395), the **VP-3000 Pre-Compression Processor with SDI output** (\$2995).

USER REPORT

IQ Modular Simplifies Digital Transition

by Joe Martinelli
Director of Engineering
WCPO-TV

CINCINNATI

In 2002, shortly before I joined WCPO-TV, the station had been presented with the opportunity to relocate. The new facility allowed us to upgrade from analog to digital operations and also gave us the chance to incorporate some HD capabilities into our infrastructure.

Given the scope of the project and the fact that we weren't going to be taking all of our old gear with us, we knew we'd need to purchase lot of new equipment.

Most of our digital infrastructure was supplied by Snell & Wilcox. The choice was a simple matter of economics. While Snell & Wilcox IQ Modular gear is not cheap, it did offer us the most cost-effective solution for our operations. It's important to buy a product that is reliable and you know will be serviceable and problem-free.

Though the IQ modular infrastructure gear wound up being less expensive

than the competing systems we evaluated, the ability to maintain a product and keep signals on air was really more important to us than cost. With multiple parts depots and service centers, Snell & Wilcox is prepared to make speedy repairs or replacements.

200 CIRCUIT CARDS

Signal processing gear in our plant today occupies more than 20 equipment frames, with each frame loaded to capacity. That's 200 circuit boards. We also integrated the Snell & Wilcox RollCall control and monitoring system into our facility. We really enjoy it and rely on it to make our operations more efficient.

RollCall is a comprehensive control and monitoring system that gives our engineers the ability to stay in one place while configuring all RollCall-enabled hardware. This is virtually all of our infrastructure equipment. They can check levels and make sure that equipment is operating properly. It's like having the whole plant on one computer screen. The modules identify themselves and we can look at each individual piece of equipment in each rack to see how it's performing and make

any necessary adjustments.

I can't stress enough how much time it has saved. Our equipment room has 16 rows of racks. Without RollCall, we'd be going from rack to rack, frame to frame and card to card to make adjustments.

The system is very accurate and when we have lost a signal, RollCall enabled us to find it immediately.

Delivery of our IQ Modular systems was unbelievable. We were on an extremely tight timeline, trying to finish the equivalent of a three-year job in just a year and a half. Snell & Wilcox pooled all of its resources and got the equipment to us. Not one piece of equipment failed to operate when we turned it on. Every general manager wants to hear "on time and on budget."

We've incorporated enough HD conversion gear into our facility to support prime time HD broadcasts and sports, and the modular nature of the Snell & Wilcox equipment will allow us to add additional cards as we grow into HD.

I selected Snell & Wilcox because I wanted trouble-free operations, but the



Snell & Wilcox played a big part in Cincinnati's WCPO-TV's move into new facilities.

IQ Modular systems also are great for migrating from analog up to HD. They will serve you well on the path to HD and provide significant savings by the time you get there.

Joe Martinelli is director of engineering for Cincinnati's WCPO-TV. He has been with the station for four years and has been in television engineering since 1973. He may be contacted at jmartinelli@wcpo.com.

For additional information, contact Snell & Wilcox at 212-481-2416 or visit www.snellwilcox.com.

USER REPORT

FireBridge Scores Homerun

by Frank O'Connor
Director of Engineering
MediaOne

SAN FRANCISCO

MediaOne Services is a leading independent provider of television broadcast and studio production services, serving national and international television networks, sports and entertainment companies and Fortune 1000 corporations. Clients depend on MediaOne to deliver video content worldwide, 24 hours a day, via fiber, satellite and the Internet.

MediaOne has a long history in venue broadcast design and management, mostly focused on interfacing with broadcasters behind the scenes to ensure top quality broadcast transmission of events. MediaOne designed the broadcast facility at AT&T Park here, and has managed the transmission of San Francisco Giants' games locally and nationally for six years.

Both at the ballpark, and at our studio facility in downtown San Francisco, we do numerous live shots for networks such as ESPN, Fox, ABC, NBC and PBS.

As director of engineering, I oversee MediaOne's extensive production and transmission operations, including content capture and satellite transmis-



The Computer Modules DVEO FireBridge HDV to DBV-ASI converter

sions. Among other things, I managed the technical implementation of our broadcast facility at AT&T Park.

REAL-TIME HDV/DVB-ASI

Being an engineer, I'm always looking for better ways to meet our customers' needs. When I heard that DVEO, the broadcast division of

Computer Modules, Inc., had a real-time HDV to DVB-ASI converter, I decided it might be a cost-effective way to do high-definition live shots that need to be transmitted.

We are currently involved with arranging tests with ESPN and ABC to demonstrate the performance of the JVC GY-HD100U as a live shot camera. We're using the DVEO FireBridge to convert the camera signal to ASI prior to transmission on a 270 Mbs first mile circuit. Then it goes long distance via VYVX. To confidence monitor the ASI encoded signal

prior to transmission, we use the Televue TLV 200D ASI decoder, also supplied by Computer Modules.

Currently, we provide live shot facilities for broadcasters in standard definition NTSC, so we consider that this equipment is a cost effective transition to the world of high definition television.

DVEO's FireBridge converts HDV output from JVC GY-HD100U and Sony Z1U video cameras to DVB-ASI. FireBridge converts the FireWire output from 720/30p to 720/60p, making the output fully compatible with standard broadcast 720/60p equipment. According to DVEO, FireBridge is the only ASI bridge available now with this advanced feature.

FULLY COMPATIBLE

The FireBridge output is compatible with DVB-ASI equipment from Tandberg, Terayon and Harmonic. FireBridge is also compatible with DVEO's T-Streamer/ASI, a transport stream recorder/player with a built-in transport stream analyzer.

I've been very pleased with FireBridge's cost effective ability to encode HD signals for live transmission.

Frank O'Connor has been with MediaOne for the past decade and has more than 25 years of experience in the broadcast production and transmission industry. He may be contacted at focconnor@mediaoneservices.com.

For additional information, contact DVEO, a division of Computer Modules Inc. at 858-613-1818 or visit www.computermodules.com.

USER REPORT

Hallmark Goes Tapeless with Telestream

by Mark Stolnitz

Vice President of Facility Operations
Hallmark Channel

LOS ANGELES

In late 2001, Hallmark Channel management presented my department with an exciting challenge. Instead of playing back content from a facility across town here in Los Angeles, we were moving playback to Denver.

Delivery of commercials and promos were now subject to a FedEx timetable. Sometimes a spot absolutely positively has to be there in a few hours, and FedEx is limited to overnight. My Denver counterparts introduced me to Telestream's ClipMail Pro and the problem was solved. ClipMail Pro is an MPEG encoding and delivery appliance, providing both speed and convenience. It encodes from a wide range of video/audio tape formats, digitizing and converting media into MPEG-2 or MPEG-1 files. Digital media parcels are easily assembled for fast, efficient delivery over the Internet to a receiving appliance in Denver.

Over time, ClipMail Pro's value has grown. We use the system to encode



Mark Stolnitz operates Telestream products at Hallmark Channel's Los Angeles facility.

long-form titles at low-res and send them to our closed captioning vendor's ftp server. This is usually a last-minute process that requires rapid turnaround.

ClipMail Pro is also used as the input/output device for our digital asset management system. This primarily consists of promotional elements produced outside of Hallmark, since content produced in-house is ingested directly as digital files from the edit bays via Telestream's FlipFactory. The ClipMail also converts requested compilations of digital files from the digital asset management back to baseband video and lays the material off to the required

videotape format. We can even specify how many seconds of black will be laid between spots.

My next goal was to remove tape from the process altogether. On the commercial side, advertisers were all moving to digital delivery services. On the promo side, we were cutting promos in digital form. As long as all these assets were already digital, I wanted a tool that could manage and transcode the media and track all associated metadata through every step of our processes.

TELESTREAM SOLUTION

Again, we turned to Telestream for a workflow automation solution that combined ClipMail Pro and FlipFactory TrafficManager to provide the managed digital delivery solution we needed. Now, our TrafficManager system monitors Media DVX, DG Systems, Vyvx and FastChannel servers for incoming commercials and our Avid Unity storage for promos exported from our Avid bays. Media is analyzed, proxies are generated for review, metadata is managed and people are notified. And it's all automatic.

Some ads still come on tape and that's not a problem. We just use our ClipMail Pro to encode and send them right in to the same TrafficManager factory that handles the digitally delivered spots.

TrafficManager provides a localization point for receiving, identifying and managing distribution of media within Hallmark Channel. Commercials are automatically logged, a proxy generated and content moved to our air server for playout. We have achieved a nearly tapeless post production operation for promos by feeding our digital asset management system in the same way it feeds our on-air servers.

From ingest to on-air, Telestream provides the complete end-to-end tapeless solution that we needed.

Mark Stolnitz joined the Odyssey Network in 1999. Two years later Odyssey became the Hallmark Channel. He is now vice president of facility operations and may be contacted at markstolnitz@hallmarkchannel.com.

For additional information, contact Telestream at 530-470-1300 or www.telestream.net.

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REFERENCE GUIDE

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

MANUFACTURER	MODEL	TYPE A/D OR D/A	INPUTS	OUTPUTS	VIDEO FORMATS	FEATURES	PRICE
AJA Video 530-274-2048 www.aja.com	HD10C2	D/A standalone	HD-SDI	2xHD-SDI; RGB/YPrPb	1080i, 1080p, 720p	HD-SDI and SDI D/A 10-bit converter	Call for pricing
Cobalt Digital 217-344-1243 www.cobaltdigital.com	HD8024	Up/down/cross-converter D/A, rackmount	SD/HD-SDI	2x input copies, 2x up/down/cross-converted output HD: HD-SDI, XGA	1080i/p/sF 720p, 486i and 576i	Proc amp, user programmable, overlay reticules, front control panel, remote control, full aspect ratio	\$5,495
Ensemble Designs 530-478-1830 www.ensembledesigns.com	7900 Avenue	Up/down/cross-converter D/A rackmount	SD/HD-SDI	HD/SD-HDI	1080i, 720p, 525, 625	Frame sync, proc amp, optional 8-channel audio mux/demux, audio tracking delay, 16- and 24-bit	Call for pricing
Grass Valley 800-547-8949 www.thomsongrassvalley.com	2090MDC	D/A	HD-SDI	NTSC/PAL, SDI and YUV/RGB down-converted outputs	1035i, 1080i, 720p	50, 59.94 and 60 Hz field/frame rates	Call for pricing
Harris Corp. 800-231-9673 www.harris.com	Leitch X75HD	D/A and A/D	SD/HD-SDI	Two composite SD, YPrPb, SD RGB	1080i, 720p, 480i	Up/down/cross conversion, SD/HD frame sync and extensive video and audio processing capabilities	Call for pricing
Miranda 973-683-0800 www.miranda.com	SDM-873p	D/A	SD/HD-SDI	CAV (RGB/YPrPb)	525i, 625i, 720p, 1080p, 1080i	Automatic input scan-rate detection, supports direct output p to PsF, PsF to p. 3:2 insertion, Panasonic Varicam mode	Call for pricing
Pro-Bel 631-549-5159 www.pro-bel.com	3417	D/A	HD-SDI	2x HD-SDI, YPrPb, XGA	1080i	XGA computer monitor output, test signal mode, error pulse output	Call for pricing
Ross Video 613-652-4886 www.rossvideo.com	DAC-9213-R	D/A standalone	MD-SDI (SD or HD)	2x MD-SDI, RGB/PrPb	1080i, 1080p, 720p, 480i	Auto-sense, SD/HD input, 2x reclocked outputs, 11-bit processing, 10-bit DAC, 30 MHz bandwidth	\$1,195

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USER REPORT

Streambox: Solid Video Transport

by Michael Goodman
Director of Engineering
KCPQ/KTWB/KWBP

SEATTLE

When Tribune Broadcasting acquired Portland television station KWBP, the engineering team at Tribune-owned KCPQ/KTWB was tasked with providing remote control for the station from our Seattle facilities. The goal was to regionalize operations in Seattle so that the Portland station could run unmanned.

The overall project was quite complex, as we were joining pieces that hadn't been used together before. Among other things, it required monitoring of off-air signals from the station's digital and analog transmitters, and cable and satellite retransmission outlets over a 180 mile ATM network. Unfortunately, we didn't consider the monitoring issue until the project was nearing completion.

NO LEGACY SYSTEMS

We began by looking at a legacy system used in the radio broadcast industry for muxing signals, data and telemetry onto

carriers. However, I didn't want to go backwards; I wanted to find something that was Internet-based, as we had fairly high bandwidth connectivity between Seattle and Portland.

I was tasked with producing a regional operations center with cutting-edge technology and wanted a solution that would provide an alternative to having to configure Windows Media on our own. That's why we got involved



Michael Goodman,
director of engineering for Tribune
Broadcasting's KCPQ,
KTWB and KWBP.

contacts and asked them for an end-to-end solution, delivered within a

fixed time and at a fixed price. They said they could deliver and they did. The Streambox SBT3-1000 ACT-L3 solution worked out of the box. We installed the system a few weeks before we launched remote control of KWBP, and it has operated flawlessly for a year. The system lets us look at the signals from the transmitters via the Internet link in a closed monitoring loop. Just seconds later in Seattle, master control operators can see what actually went out over the air in Portland.

I became familiar with Streambox through local

fixed time and at a fixed price. They said they could deliver and they did.

The Streambox SBT3-1000 ACT-L3 solution worked out of the box. We installed the system a few weeks before we launched remote control of KWBP, and it has operated flawlessly for a year. The system lets us look at the signals from the transmitters via the Internet link in a closed monitoring loop. Just seconds later in Seattle, master control operators can see what actually went out over the air in Portland.

PRETTY GOOD IMAGE

We're running three Streambox encoders at 300 kbps, which helps to save ATM service costs and provides a pretty good image. Each encoder handles one video and two audio channels. In more than a year of operation, the Streambox encoders have proven very robust and solid. We have had no problems with them since they were drop-shipped from Seattle. We knew we wanted a system that would work right out of the box and it actually happened. That was really the motivation for taking this approach: to have someone else engineer a complete system for me that I didn't

have to work on or worry about, as we had so many other things to figure out and bring online.

The Streambox approach wound up being cheaper than the legacy approach and getting a Windows Media-based solution to function to our satisfaction just didn't seem worth the effort, especially when Streambox could deliver three channels of video, six channels of audio and a successful installation within three weeks. When someone tells me they can do something like this, and they do it, it's a great feeling. We let one part of this project out of our hands, and it worked out great because right around the corner, we had a partner that had the expertise, responsiveness and solution we needed.

Michael Goodman is director of engineering for KCPQ, KTWB and KWBP. Prior to joining Tribune Broadcasting in 1996, he worked in a variety of broadcast operations in Boston. He may be contacted at mgoodman@tribune.com.

For additional information, contact Streambox at 206-956-0544 or visit www.streambox.com.

BUYERS BRIEFS

The Studio Scan XTD625 from **Analog Way** is a professional computer to broadcast video scan converter with genlock. It allows users to convert PC and Macintosh graphics into video images in real time. Images up to 1280x1024 are accommodated. The XTD625 provides 16 user presets to store settings for a variety of applications. The converter can provide component, composite and D1 outputs and has an RS-232 port for remote control of functions. Image freeze, underscan/overscan, zoom and other frequently accessed functions are provided via the device's front panel controls and LCD display. The zoom functionality allows image resizing of up to 200 percent. The XTD625 accepts horizontal scanning frequencies up to 86 KHz and vertical rates up to 130 Hz.

For more information contact Analog Way at 212-269-1902 or visit www.analogway.com.

The Masterkey 7 from **Broadcast Video Systems** is a standalone keyer for SDI video. It features 100 percent

linear keying with adjustable transparency and offers a split screen mode for color matching and source evaluation. The Masterkey 7 provides frame accurate mixes, wipes and fades to black and includes a safe area generator on the preview output for both 4:3 and 16:9 aspect ratios. The unit has a fail-safe automatic bypass feature. It is available in either a 5-inch x 7-inch desktop panel or a 1-RU rack mounted enclosure. User programmable GPIs are available for mixes, fades and wipes. The Masterkey 7 is available with an optional redundant power supply and four input, two level key/fill switcher.

For more information, contact Broadcast Video Systems Corp. at 905-305-0565 or visit www.bvs.ca.

The ImagePro-HD from **Folsom Research** is a signal conversion unit that performs analog to digital and digital to analog video conversion, as well as video scaling, standards conversion and transcoding. The unit feature set includes genlock, a built-in test pattern generator, de-interlacing, 3:2 and 2:2 pulldown detection and aspect ratio

conversion. The Image-Pro accepts NTSC, PAL and SECAM composite video, RGB, S-Video, SDI, DVI and other signal formats into a user-selectable video output. Three de-interlacing modes are provided—motion adaptive, field to frame and frame to frame. The device also has a logo store with image capture and dissolve capabilities and utilizes 10-bit processing.

For more information, contact Folsom Research at 888-414-7226 or visit www.folsom.com.

The FA-9000 HD/SD signal processor from **For-A Corporation of America** is the newest offering in the company's FA series. The unit's frame synchronizer capabilities support all video formats, including SD, HD, analog and digital. It uses 12-bit processing for quality image performance and performs both up and down video conversions, as well as analog to digital and digital to analog. In addition, the processor does color correction, noise reduction and has an internal logo generator. The FA-9000 also processes audio in the same manner, providing

A/D and D/A conversions. With an optional Dolby-E decoder, surround sound signal monitoring and correction is possible. The FA-9000 occupies a single RU of rack space.

For more information, contact For-A at 714-894-3311 or visit www.for-a.com.

The DiviCom Electra 5000 from **Harmonic Inc.** is a multi-codec, multi-service encoder designed for high quality encoding of standard definition MPEG and other signals. The unit supports up to 20 mono audio channels and features pre-processing and noise reduction. It offers inputs for analog and digital sources and allows users to deliver content in both high resolution and low resolution formats simultaneously. The Electra 5000 supports two SD channels and multiple low resolution channels, lending itself to both broadcast and mobile applications. The unit can provide RTP/UDP/IP packetization for DVB-H applications. It operates in 4:3 and 16:9 aspect ratios.

For more information, contact Harmonic Inc. at 408-542-2500 or visit www.harmonicinc.com.

USER REPORT

Cobalt Digital Solution For NEP

by George Hoover

Senior Vice President of Engineering
NEP

PITTSBURGH

Back in the summer of 2005 we were looking for a downconverting HD distribution amplifier that provided field lock. We approached Cobalt Digital who developed a product that not only met our needs but also provided us with lots of additional features.

The product is known as the 9821 and accepts both SD and HD SDI sources. It provides four outputs which are reclocked copies of the HD or SD input and four additional outputs with SD downconversion from HD. Each downconverted output can be individually selected as an analog or digital. With SD, the signal can be passed through an aspect ratio converter, allowing us to easily change 4:3 into 16x9 if needed.

Field lock is important when converting from progressive to interlace scan in order to consistently and cor-

rectly establish field one in the interlace world. In one of our applications, we need to downconvert from 720p to 486i and we need multiple downconverting d.a.s that can be locked together.

We can take one 720p signal and put it through a Cobalt 9821 downconverting



The model 9821 downconverter card from Cobalt Digital

d.a. and a second 720p signal and put it through another Cobalt 9821. We provide both 9821s with a black burst reference and our progressive scan HD feeds are downconverted to interlace scan SD and are in time with each other. I don't know of anybody else that offers those features in a single product.

The 9821 is a very high quality downconverting d.a. with SD outputs having full color space correction and 10-bit resolution. You can fit 10 of

them into a 2 RU card frame, which is important in a truck environment. Cobalt is about to ship a new rear frame I/O that will let us populate a frame with 15 cards.

The downconverted outputs offer variable aspect ratio conversion so that your output can be 4:3, 16:9, letterbox, or anamorphic. The 9821 also provides 3:2 pull down for 23.98 inputs, safe title, safe area and center cross reticules.

We took delivery of the first batch of 9821s early in 2006 and used them at the Super Bowl. We now have 500 and another 300 on order. We use 200 of them per truck and are planning to outfit four trucks.

Our 9821s are used in the new openGear frame, developed by Ross Video and available through Cobalt Digital. These frames allow us to mix Cobalt modules with modules from other manufacturers including Ross and Ward-Beck. This provides us with a lot of flexibility in card choices without having to tie up space with multiple card frames.

REMOTE CONTROL TOO

We're really looking forward to enabling the promised remote control functionality via TCP/IP over Ethernet. With this you'll be able to use an HTTP server, SNMP or a dedicated remote control program to see what's going on in the frame and to control cards.

We are very satisfied with the combination of the Cobalt 9821 HD downconverter/d.a. and the openGear frame. As with all the other Cobalt products that NEP uses, the 9821 has proven reliable and robust. We value our relationship with Cobalt Digital. They have been very responsive to our requests and needs and they have consistently and speedily brought unique and superior products to market.

George Hoover is senior vice president of engineering at NEP Broadcasting LLC in Pittsburgh. He may be contacted at george.hoover@nepinc.com.

For additional information, contact Cobalt Digital at 800-669-1691 or visit www.cobaltdigital.com.

BUYERS BRIEFS

The DE41 from **Hotronic Inc.** is a video delay unit for broadcast purposes. Three models are available, providing video delays from four to 16 frames. Delay increments can be adjusted in frame or field increments. The DE41 is designed for use with either NTSC or PAL standards and has composite video inputs and outputs. The delay unit uses 4X subcarrier sampling and offers a signal to noise ratio of 58 dB. Differential phase error is better than one degree and differential gain is less than one percent. It is available in rack mount configuration or as a stand-alone box.

For more information, contact Hotronic Inc. at 408-378-3883 or visit www.hotronics.com.

The SP-11D multistandard/multi-format video processor from **Kramer Electronics** is a broadcast quality device that provides many essential functions in today's hybrid analog/digital environment. The unit accepts video in composite, component, Y/C or SDI formats and outputs all formats simultaneously. It can convert television signals to any format and can genlock that output to an external

reference. The unit's proc amp function allows adjustment of video and black levels, as well as image sharpness and a full range of color adjustments in both YUV and RGB colorspaces. The SP-11D has 15 non-volatile memory locations for storing settings.

For more information, contact Kramer Electronics at 206-321-6947 or visit www.kramerstore.com.

The LTM-6000D media converter from **Laird Telemedia** is a bi-directional all-format conversion unit for both video and audio signals. The unit features genlock and a built-in time-base corrector for coping with jitter in DV format transcoding. The LTM-6000D supports vertical interval and linear time code functionalities and can provide an on screen display of time code for the user. An RS-422 port is provided for remote control of equipment with Sony protocol. An RS-232 port is also provided for firmware modifications or remote control purposes. It operates on AC or 12 VDC.

For more information, contact Laird Telemedia at 845-339-0759 or visit www.lairdtelemedia.com.

The HDE-3000 from **Link Electronics Inc.** is a caption encoder designed for both standard and high definition applications. The unit reads all known closed caption file formats and is able to translate EIA-608 captions to EIA-708 file formats. In addition to captioning, the HDE-300 can also generate slates, bugs and subtitles. It does not require a PC or captioning/subtitling encoding software. It can operate in 525, 625, 720p, 1080i and 1080p line standards. The HDE-3000 features an RS-232 serial port and an RJ45 Ethernet port. Internal firmware is upgradable via the Ethernet port or from a front panel floppy drive.

For more information, contact Link Electronics Inc. at 573-334-4433 or visit www.linkelectronics.com.

The AJFRC27 from **Panasonic** is a frame rate converter for HD cinema applications. The unit is available for SD and HD, as well as composite video. It features an internal hard drive for recording up to 100 minutes of HD footage. In HD applications, the AJ-FRC27 is capable of converting 720p video to 1080/24p, 1080/60i or 1080/50.

The converter can convert variable frame rate footage from the Panasonic AJ-HDC27 VariCam camera to 24 fps. It provides immediate viewing of undercranked or overcranked off-speed effect footage. The device features a VTR-type control panel and an RS-422 port for remote control applications.

For more information, contact Panasonic at 800-528-8601 or visit www.panasonic.com.

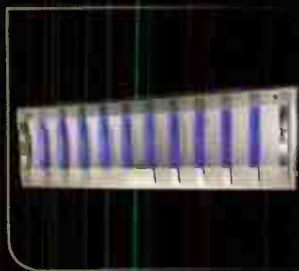
The BDXM1000 from **Sony** is a multiple input DVB-ASI MPEG transport stream multiplexer. The unit is capable of multiplexing nine separate DVB-ASI streams into one. It can add, drop or remultiplex MPEG streams before passing them to the unit's multiplexer output. The BDXM100 features a maximum transport rate of 190 Mbps and provides a user control interface via both Ethernet and RS-232C ports. Two DVB-ASI outputs are provided and the unit is rack-mountable.

For more information, contact Sony at 800-686-7669 or visit www.sony.com/professional.



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USER REPORT

Teranex Converts Euro Wildlife Footage

by Carol Martin

Director of Sales and Technology

FootageBank HD

VENICE, CALIF.

As the first stock footage library to specialize in high definition content, FootageBank HD has had a high demand for HD material of African wildlife. Raw images of lions or cheetahs are of perennial interest because of the timeless concepts they represent and the simple thrill they incite.

We needed to find filmmakers who knew how to capture the African environment in HD and were pleased to discover excellent material from two South African wildlife filmmakers, Peter Lamberti of Aquavision/Wildside Productions in Johannesburg and Dereck Joubert of Wildlife Films in Botswana.

EUROPEAN TO AMERICAN

However, wildlife cinematographers in Africa shoot at the European HD standard of 50 interlaced fields per second (50i). In the United States, HD material is generally shot at 23.98 progressive segmented frames per second (24p) or 59.94 interlaced fields per second (1080i). We had to convert this

material into American standards.

As the HD camera captures so much information, the slightest incorrect pixel manipulation can cause glaring negative results. There is no longer the fuzzy margin for error that existed with standard definition.

We ran two unsatisfactory tests at post houses in New York and Los Angeles before Deluxe Media Services in Hollywood accepted the conversion challenge with their Teranex VC-300 3RU. This format converter needed to pull off more than a few miracles.

We first had to choose whether to increase the frames per second significantly, allowing the fields to remain interlaced (25i to 30i) or to decrease the frames per second by a smaller margin, but de-interlacing the fields (25i to 24p.) Any change in frame rate would affect the speed at which objects move in the frame. Although the Teranex adds a 3:2 pull-down, this was nature footage and it had to look real. With DMS guidance, we chose to convert the 50 fps to the nearest rate of 23.98 fps. Now we faced the larger challenge of de-interlacing the images, which in high definition can prove to be even more risky to image quality.

DE-INTERLACING RISKY

When de-interlacing the fields to

create the progressive segmented frame advance, the shot is in jeopardy, because if it is done improperly "combing" or "feathering" artifacts will result. We witnessed this in our earlier unsuccessful tests. What should have been the graceful swing of an elephant's trunk was more of a stutter. Teranex employs several steps in conversions. Other converters simply ignore even fields or evaluate motion frame by

interpolation for reconstruction of data at the edges of moving objects sharpens the image. A unique noise reduction method distinguishes moving objects from noise and eliminates the possibility of the "ghosting" effect associated with some noise reduction tools.

Teranex has made a vast collection of African material accessible to the American market. The entire world of HD is now at our fingertips.

HD conversions can be intimidating to clients that have chosen one format to work in and need certain footage that exists in another. With our new expertise, we can easily guide them through the conversion process.



FootageBank HD's Carol Martin with the Teranex high definition conversion equipment

Carol Martin is the director of sales and technology at FootageBank HD, a high definition stock footage house in Venice, California, and has been with the company since its creation in 2002. She may be contacted at carolm@footagebank.com.

For additional information, contact Teranex at 407-858-6000 or visit www.teranex.com.

USER REPORT

Maple Leaf Sports Sparkle With Evertz

by Drew Kikauka

Systems Technologist

Leafs TV and Raptors NBATV

TORONTO

As broadcasters make the transition from analog to digital video, they immediately discover that there are many new challenges to face along the way. With a mixture of HD and SD programming in the broadcast facility, a big hurdle is finding the proper equipment to handle the multiple television formats and at the same time keeping equipment costs down.

We found that Evertz Microsystems provides broadcasters with many ideal solutions, including the company's 710XUDC-AES4-HD up/down/cross converter. This device makes it easy for broadcasters to convert incoming standard or high definition video to a format that is native within their facility. It

also provides features that eliminate the need for additional and costly image processing devices, as the converter has built-in proprietary technology to provide both high quality noise reduction and detail image enhancement.

NOISE REDUCTION

At Maple Leaf Sports and Entertainment Ltd. in Toronto, we use the 710XUDC-AES4-HD to handle conversion of HD/SD NBA game feeds to 720p/59.94 for the HD version of Raptors NBATV. The converter's noise reduction feature is a big help in reducing noise from standard definition television signals before their conversion to high definition. By using this technology, we ensure that our viewers can receive a



The Evertz 710XUDC-AES4 HD up/down/cross converter

cleaner and better

looking HD video signal. As this noise reduction capability is built into the Evertz 710XUDC-AES4-HD, it eliminated the need to shop for and purchase outboard noise reduction products.

We are also impressed with the user friendliness of the 710XUDC-AES4-HD converter. The on-screen display provides a comprehensive menu system allowing operators easy access and control of system parameters. The 710XUDC-AES4-HD can

also be controlled and monitored with Evertz VistaLINK Pro software. This powerful control system is based on Simple Network Management Protocol and allows users to configure and monitor the 710XUDC-AES4-HD and other connected Evertz equipment via networked PCs.

We are pleased with the performance and features of all the 710 series products we're using. In our opinion, they gave us the best value for our money and tightest integration within our plant, while maintaining the highest picture quality for our viewers.

Drew Kikauka is systems technologist for Maple Leafs TV and the Raptors NBATV. He may be contacted at dkikauka@mapleleafsports.com.

For additional information, contact Evertz at 877-995-3700 or visit www.evertz.com.

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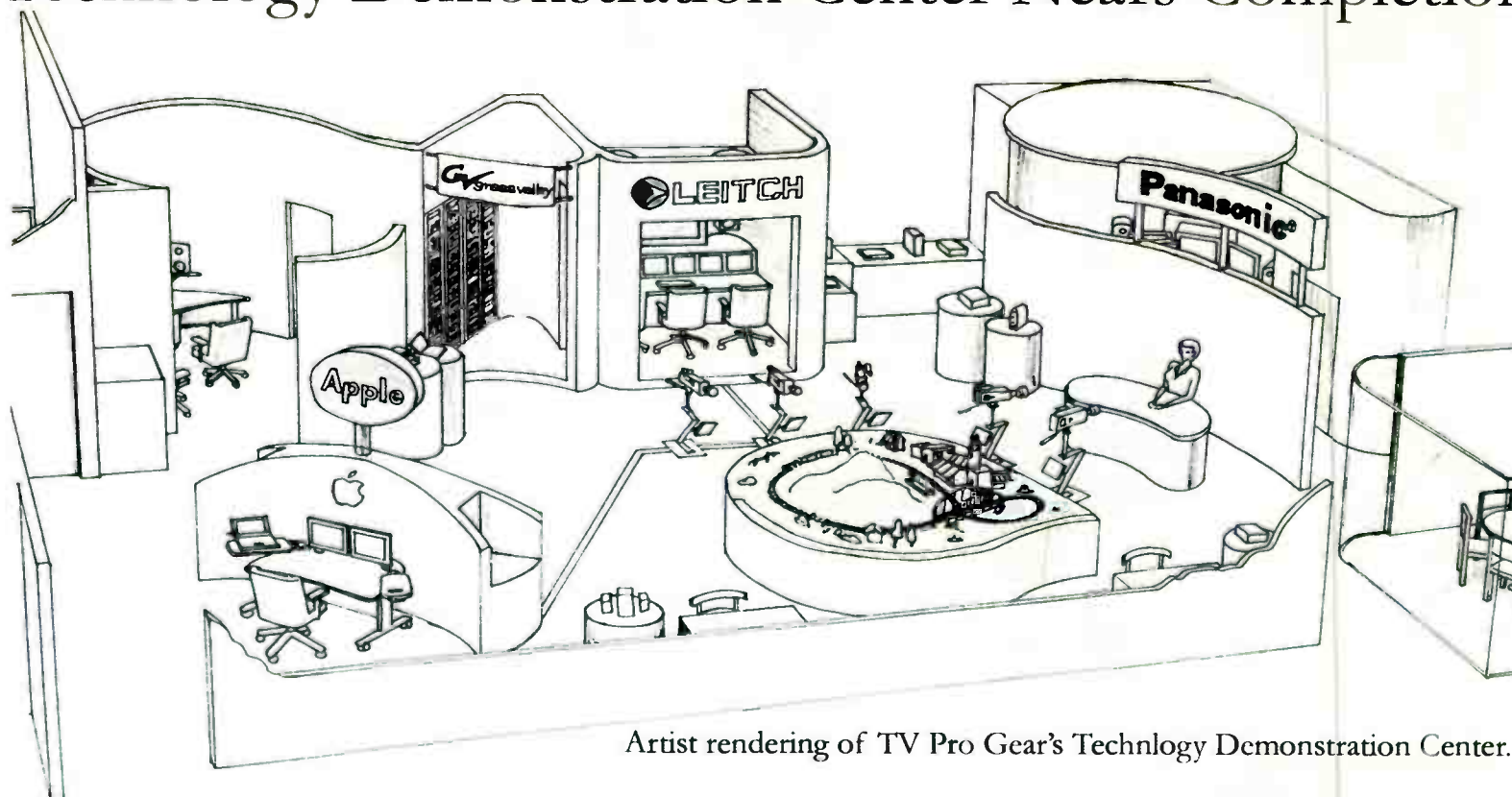
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This position requires a comprehensive understanding of Analog/SD/HD video and audio broadcast systems. The ideal candidate must possess good written and verbal communication skills and the ability to manage both staff and freelance technical crew. An AS Degree in Electronics (minimum) and SBE Certification or equivalent broadcast experience is required.

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Please check only one entry for each category:

I. Type of Firm

- | | | |
|---|---|--|
| ☐ A. VHF-TV station | ☐ R. Broadcast consultant | ☐ N. Gov. TV facility |
| ☐ B. UHF-TV station | ☐ S. Mtg. dist or dealer | ☐ P. Edu TV facility |
| ☐ D. Prod/post-prod studio | ☐ L. Corporate TV facility | ☐ Q. Record studio |
| ☐ E. Cable TV | ☐ M. Medical TV facility | ☐ K. Other (specify) |
| ☐ G. Network/group owner | | |

Purchasing Authority (check one only) ☐ 1. Recommend ☐ 2. Specify ☐ 3. Approve

II. Job Function

- | | |
|--|---|
| ☐ A. Corporate mgt | ☐ E. News mgt or staff |
| ☐ B. Engineering mgt | ☐ G. Training |
| ☐ C. Engineering staff | ☐ F. Other (specify) |
| ☐ D. Prod/oper mgt or staff | |

WTS ☐ WTB ☐ Category: _____

Make: _____ Model: _____

Brief Description: _____

Price: _____

WTS ☐ WTB ☐ Category: _____

Make: _____ Model: _____

Brief Description: _____

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WTS ☐ WTB ☐ Category: _____

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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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BUYERS BRIEFS

The SC-2055A TV/PC scan converter from **Astro Systems** supports a large variety of signals including SD, HD, DVI, analog composite and component and features built-in noise reduction and edge enhancement. Interchangeable input and output modules to accommodate different signals. The SC-2055A has 3:2 and 2:2 pull down functions for film imagery work and can also function as a line doubler for conversion of interlaced signals into progressive signals.

For more information, contact Astro Systems at 818-848-7722 or visit www.astro-systems.com.

The UDC-550 from the **Fortel DTV Inc.** is an HD up/down/cross converter with optional color cor-

rection and legalizer capabilities. It can convert SD to HD and HD to SD, as well as converting 720p to 1080i and 1080i to 720p. Processing is performed at full bandwidth and the unit de-interlaces and interlaces as required. Motion adaption and edge interpolation are provided.

For more information, contact Fortel DTV Inc. at 770-806-0234 or visit www.fortelDTV.com.

The model RH10MD from **AJA Video Systems** is a single card HD downconverter and distribution amplifier. It provides four reclocked HD SDI outputs and four SD-converted outputs, which may be configured as either SDI or analog video. The unit's standard definition outputs can be formatted for either 4:3 or 16:9 aspect

ratios and is designed to be used in FR1 or FR2 card frames. It accepts 1080i, 1080p and 720p video.

For more information, contact AJA Video Systems at 530-274-2048 or visit www.aja.com.

The E5710 from **Tandberg Television** is a standard definition MPEG-2 real time encoder designed for broadband DSL/fiber, satellite, cable, or terrestrial applications. The device accepts both SDI and analog composite signals and provides MPEG encoding at rates between 1.5 Mbps and 15 Mbps. The E5710 features a built-in test pattern generator and does logo insertion. RS-232 and RS-422 ports are provided for low and high speed data inputs.

For more information, contact

Tandberg Television at 678-812-6300 or visit www.tandbergTV.com.

Blackmagic Designs' Multibridge Studio all-in-one bi-directional signal convertor instantly switches between standard and HD video signals and can simultaneously convert from digital to analog and from analog to digital video and audio signals. The unit has a built-in sync generator and works with HDCAM, HD-D5 and HDCAM SR video. Full resolution high definition monitoring with a low cost computer is possible with the provided DVI-D dual link output connector.

For more information, contact Blackmagic Design USA at 702-257-2371 or visit www.blackmagic-design.com.

ADVERTISERS INDEX

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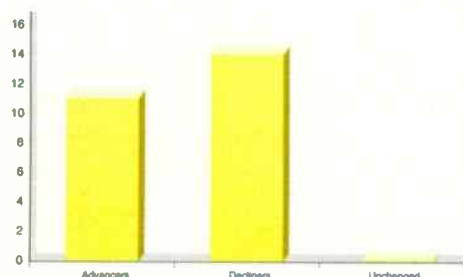
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TV TECH BUSINESS

WIN-LOSE RATIO



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

TOP ADVANCERS BROADCAST STOCKS (April 7 - April 21)

Young +10.75%
Lin TV +3.92%

TOP DECLINERS BROADCAST STOCKS (April 7 - April 21)

Emmis -18.51%
Acme -11.76%

TOP ADVANCERS TV TECH STOCKS (April 7 - April 21)

Scopus +8.00%
Tektronix +4.50%

TOP DECLINERS TV TECH STOCKS (April 7 - April 21)

Avid -14.74%
LSI Logic -12.20%

TV Tech STOCKS as of April 21

Company Name	52-Week Range	April 7	April 21	% Change
Avid	35.78 - 61.39	43.27	36.89	-14.74%
Belden	17.65 - 27.72	26.61	27.18	2.14%
Ciprico	3.70 - 6.20	5.98	6.10	2.01%
Harmonic	4.08 - 7.89	6.7	6.16	-8.20%
Harris	27.25 - 49.78	46.84	45.86	-2.09%
LSI Logic	5.15 - 11.81	1.39	10.00	-12.20%
Scopus	4.80 - 8.35	5.00	5.40	8.00%
SeaChange	5.07 - 10.94	7.18	7.60	85%
Tektronix	20.97 - 36.89	34.68	36.24	4.50%

Broadcast STOCKS as of April 21

Company Name	52-Week Range	April 7	April 21	% Change
Acme	3.30 - 5.30	5.10	4.50	-11.76%
Belo	18.71 - 24.96	19.50	18.87	-3.23%
Emmis	11.86 - 24.49	15.45	12.59	-18.51%
Entravision	6.80 - 9.50	8.80	8.36	-5.00%
Fisher	41.43 - 51.75	42.53	43.19	1.55%
Gray	7.53 - 13.59	8.22	7.78	-5.35%
Hearst Argyle	22.73 - 26.34	23.05	22.92	-0.56%
Nexstar	3.93 - 6.37	5.04	4.64	-7.94%
Lin TV	8.33 - 16.40	8.68	9.02	3.92%
Paxson	0.37 - 1.15	0.92	0.90	-2.17%
Sinclair	7.18 - 10.07	7.70	7.76	0.78%
Univision	23.52 - 35.65	34.78	34.95	0.49%
Young	1.70 - 7.77	3.07	3.40	10.75%
Tribune	27.09 - 39.56	27.60	28.00	1.45%
Meredith	44.65 - 56.83	55.70	50.80	-8.80%
EW Scripps	43.21 - 51.95	45.40	43.57	-4.03%

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Networks Negotiate Internet-Affiliate Deals

NEW YORK

The networks are bargaining with affiliates in varying degrees to cash in on Internet distribution.

Last month, NBC and its 230 affiliates agreed to form a new joint venture under the working title "the National Broadband Company" to capitalize on the online video that its participants have to offer. This is the second venture for the NBC Affiliates Futures Committee, founded three years ago to develop strategic online partnerships. In November 2004 it announced the formation of NBC Weather Plus, LLC, a 50/50 joint venture which subsequently launched the first ever 24/7, all digital, national-local broadcast network. NBC Weather Plus launched its own Web site in January 2006.

Meanwhile, Fox affiliates agreed to let their network negotiate deals to provide Fox shows for a fee to nonlinear outlets, according to one network source, who noted that the affiliates would get a percentage of the revenue. No deals have yet been announced, and Fox declined to discuss the affiliates' cut.

The pact was negotiated over six months as part of the six-year extension to a network-affiliates NFL contract, clinched in early April with no increase to the affiliates' cash contributions to the pro football deal. In exchange, the network can repurpose six hours of programming per week versus the four allowed prior to the deal, and will be able to repurpose 100 percent of its prime-time line-up by the third year of the contract.

Also last month, ABC said it would offer four prime-time shows on www.abc.com for free in May and June. The shows will include advertising that cannot be skipped over during viewing. The line-up includes current episodes of "Desperate Housewives," "Lost" and "Commander in Chief," plus the entire season of "Alias."

"We will take the research from this and move forward in trying to work with the affiliates to get their involvement in this at a later re-launch," said an ABC spokesperson.

Robin Berger

Harris Announces Acquisition, New Broadcast Head

MELBOURNE, FLA.

Just prior to NAB, Harris Corp. announced a deal to acquire Optimal Solutions Inc. (OSi) for approximately

\$32 million in cash. The company also announced the appointment of a new president of its broadcast division.

Based in Kansas City, Mo., OSi is a privately held provider of airtime sales, traffic and billing software systems to more than 350 call-letter stations in North America. Harris said the acquisition will help it expand its capabilities for managing and schedule advertising and programming for broadcasters.

OSi's revenue for the year—which ended March 31, 2006—was about \$5 million and it currently has about \$27 million in revenue under contract. Harris said the transaction is expected to close in early May.

Harris also announced the promotion of long-time industry veteran Tim Thorsteinson to head up its broadcast communications division. Thorsteinson replaces Jeremy C. Wensinger, who was named group president of integrated systems and services for Harris Corp.

Thorsteinson, 52, a 15-year veteran of the broadcast industry, served as president of the Leitch Technology business unit of the Harris Broadcast Communications Division. Harris acquired Leitch in October 2005. He is also a former president of Grass Valley.

Miranda Acquires VertigoXmedia

MONTREAL

Miranda Technologies, a developer of broadcast production equipment, is purchasing fellow Montreal graphics company VertigoXmedia for approximately \$12.5 million (Cdn\$11 million) in cash.

VertigoXmedia represents Miranda's first acquisition since it went public in December 2005. Under the terms of the purchase, 25 employees of VertigoXmedia's broadcast division will join Miranda. Miranda spun off VertigoXmedia's digital signage division—which has 10 employees—prior to the acquisition, which is expected to be completed by early May.

VertigoXmedia develops high-end graphics automation software and systems. For the past three years, the company's broadcast division has experienced an annual growth rate of approximately 20 percent, reporting annual revenues of \$6.03 million, (Cdn\$5.3 million).

The transaction will allow Miranda to extend its portfolio into the expanding market for branding, graphics management and playout. In addition, the VertigoXmedia graphics platform will also give Miranda a new product range for live production environments.



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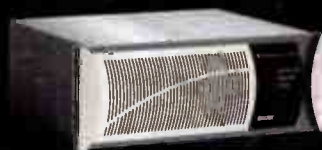
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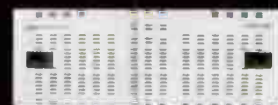
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